TABLE OF CONTENTS

1. PURPOSE

THE KEYBOARD PRINTER FUNCTION TEST CHECKS THE OPERATING PERFORMANCE OF THE PRINTER AND KEYBOARD AND AIDS IN THEIR PROPER ADJUSTMENT WHILE BEING RUN IN OVERLAP WITH OTHER SYSTEN FUNCTIONS.

2. PREREQUISITES

THIS PROGRAM MUST RUN UNDER CONTROL OF THE DIAGNOSTIC MONITOR. THE DIAGNOSTIC MONITOR PROGRAM USES 1,500 STORAGE WORDS, AND THIS PROGRAM USES 1,200 STORAGE WORDS.

3. OPERATING PROCEDURE

3.1*** PROGRAM LOADING

STANDARD MONITOR LOADING PROCEDURES APPLY

THESE PROCEDURES ARE SUMMARIZED HERE. SEE DM USE PROCEDURE FOR DETAILS.

1. SET FIRST TYPEWRITER TAB 20 CHARACTERS FROM LEFT MARGIN.
2. SET BIT SWITCH 15 OFF - LOAD AND GO
   ON - TO SPECIFY OPTIONS BEFORE RUNNING.

IF HALTED AFTER LOADINGS SELECT PROGRAM OPTIONS THEN TURN OFF HALT SWITCH OR FOLLOW NORMAL RESTART PROCEDURE (SECTION 3.5).

3. LOAD DIAGNOSTIC MONITOR AND KEYBOARD PRINTER TEST.
4. SELECT PROGRAM OPTIONS, IF DESIRED.

******

3.2*** PROGRAM OPERATION.

STANDARD MONITOR OPERATING PROCEDURES APPLY.
THESE PROCEDURES ARE SUMMARIZED HERE. SEE DM USE PROCEDURE FOR DETAILS.

3.2.1 PROGRAM CONTROL - FUNCTION 0

1. SET SWITCHES 0-7 TO 01.
2. SET SWITCHES 8-15 AS DESIRED.

SW	FUNCTION
8	RESTART
9	ROUTINE START MESSAGE
10	LOCK ON FUNCTION
11	LOOP PROGRAM
12	LOOP ON ERROR
13	BYPASS ERROR PRINTOUT
14	HALT ON ERROR
15	HALT

3. PRESS INT REQ KEY ON CONSOLE.

**

3.2.2 ROUTINE SELECTION - FUNCTION 1

THE SELECTED ROUTINE WILL LOOP UNTIL A NEW ROUTINE IS SELECTED.

1. TO SET ROUTINE SELECTION

   A. SET SWITCHES 0-7 TO 41.
   B. SET ROUTINE NUMBER IN SWITCHES 12-15

RTN	DESCRIPTION	
1	PRINT LAST KEYBOARD ENTRY	NORMAL ROUTINES-
2	TAB AND CARRIER RETURN	THE PROGRAM STARTS WITH
3	UPPER CASE CHARACTERS	ROUTINE 1, RUNS EACH
4	LOWER CASE CHARACTERS	ROUTINE IN SEQUENCE
5	REGISTRATION	THEN TERMINATES AFTER
6	BACKSPACE AND INDEX	ROUTINE A.
7	END OF LINE CARRIER RETURN	
8	ROCK	
9	TWIST	
A	ROLL	

B	*	PRINT BIT SWITCH IMAGE	OPTIONAL ROUTINES MUST BE SELECTED

* = REFER TO SECTION 3.2.3 FOR SPECIAL INSTRUCTIONS.

C. PRESS INT REQ KEY ON CONSOLE.

2. TO RESET ROUTINE SELECTION SET AS IF SELECTING ROUTINE ZERO.

**

3.2.3 PRINT FROM BIT SWITCHES

ROUTINE B WILL ALTERNATELY PRINT TWO CHARACTERS SET IN THE BIT SWITCHES. TO SPECIFY THE DESIRED CHARACTERS, SET SWITCH 0-7 AND 8-15 TO THE ROTATE AND TILT CODE FOR THE CHARACTERS.

******

3.3*** PROGRAM HALTS

3.3.1 NORMAL HALTS

HALT NO. (B REG)	DESCRIPTION	RESTART ACTION
3001	PROGRAM STOP OR ADDRESS STOP	PRESS START
3002	HALT ON ERROR	DISPLAY MODE-PRESS START. RUN MODE-PRESS START

**

3.3.2 ERROR HALTS

HALT NO. (B REG)	DESCRIPTION	RESTART ACTION
30F1	CHECK SUM ERROR ON FIRST CARD OF LOADER	RELOAD
30F2	READER DSW ERROR WHEN LOADING LOADER	RELOAD
30F3	CARD 2 OF LOADER DID NOT LOAD	RELOAD
30F4	CAN NOT CLEAR CORE - DUE TO ERROR IN ADDRESSING UPPER CORE.	
30F5	READER CHECK WHEN LOADING MONITOR OR TEST PROGRAM	NPRO THEN PLACE CARDS RUN OUT IN FRONT OF REMAINING DECK AND PRESS START.
30F6	MONITOR DID NOT LOAD	RELOAD
30F7	CHECK SUM WHEN LOADING MONITOR	RELOAD
30F8	READER NOT READY	MAKE READER READY
30F9	INVALID INTERRUPT WHICH WILL NOT RESET	PRESS RESET AND START
30FA	CONSOLE PRINTER HANG UP - BUSY WILL NOT GO OFF	FIX THE CONSOLE PRINTER OR NOP THIS WAIT

******

3.4*** PROGRAM TERMINATION

IF LOOP PROGRAM HAS NOT BEEN SPECIFIED THE PROGRAM WILL TERMINATE AT THE END OF ROUTINE 7. ROUTINE 7,A, AND E WILL ONLY RUN SELECTED.

IF ANY ROUTINE IS SELECTED THAT ROUTINE WILL LOOP AND WILL NOT TERMINATE.

******

3.5*** RESTART

1. SET SWITCHES 0-7 TO 01.
2. TURN ON SWITCH 8.
3. SET DESIRED CONTROL IN SWITCHES 9-14.
4. PRESS INTERRUPT REQUEST KEY.

****

4. PRINTOUTS

ALL PRINTOUTS ARE IN THE STANDARD FORMAT.

```
APPNN OORR AAAA              (MESSAGE)
OR
EPPNN OORR AAAA              (MESSAGE)
```

WHERE
- A IDENTIFIES STATUS MESSAGES
- E IDENTIFIES ERROR MESSAGES
- PP IS THE PID OF THE PROGRAM CAUSING THE MESSAGE

  THIS WILL BE EITHER 00 FOR MESSAGES ORIGINATED BY THE MONITOR OR 04 FOR MESSAGES ORIGINATED BY TH'S PROGRAM.
- NN IS THE MESSAGE SEQUENCE NUMBER
- RR IS THE ROUTINE NUMBER
- AAAA IS THE ADDRESS OF THE ROUTINE
- MESSAGE IS ANY VARIABLE INFORMATION

4.1*** STATUS MESSAGES

```
A0000                        NUM  PID  ADRS RELF  LD
                             XXXX XXXX XXXX XXXX
```

THIS MESSAGE IS PRINTED FOLLOWING THE LOADING OF ANY PROGRAM (EXCEPT MONITOR). THE MESSAGE GIVES THE LOAD SEQUENCE NUMBER, THE PROGRAM ID, THE ADDRESS INTO WHICH THE PROGRAM WAS LOADED, AND THE RELOCATION FACTOR.

```
A0001                        SWS  PID
                             XXXX XXXX
```

THIS MESSAGE IS PRINTED EACH TIME A VALID SWITCH ENTRY IS READ BY THE MONITOR. THE MESSAGE CONTAINS THE SWITCH SETTING READ TOGETHER WITH THE PROGRAM ID OF THE PROGRAM INTO WHICH THE CONTENTS OF SWITCHES 8-15 WERE STORED. IF THE SWITCH ENTRY CALLED FOR HALT OF ANY PROGRAM, THE WORD HALT WILL FOLLOW THE MESSAGE.

```
A0400 000R AAAA
```

ROUTINE START MESSAGE - IF SWITCH 9, FUNCTION 0, IS TURNED ON, THIS MESSAGE WILL BE PRINTED BEFORE THE START OF EACH ROUTINE. R IS THE NUMBER OF THE NEXT ROUTINE AND AAAA IS THE STARTING ADDRESS.

```
A0401 000R AAAA        CONSOLE
   OR
A0401 000R AAAA        KEYBOARD
```

THIS MESSAGE INDICATES THE POSITION OF THE CONSOLE/KEYBOARD SWITCH EACH TIME IT IS CHANGED.

******

4.2*** ERROR MESSAGES

THE DSW IS CHECKED FOR ABSOLUTE CORRECTNESS AT ALL TIMES. IF AN ERROR IS DETECTED ONE OF THE MESSAGES BELOW WILL INDICATE THE PROBLEM. IT IS LEFT TO THE OPERATOR TO ANALYZE THE DSW FOR THE SPECIFIC PROBLEM AREA.

TYPEWRITER-KEYBOARD DSW

BIT	
0	TYPEWRITER SERVICE RESPONSE
1	KEYBOARD RESPONSE
2	KEYBOARD REQUEST
3	ON - CONSOLE ENTRY OFF - KEYBOARD
4	TYPEWRITER BUSY
5	TYPEWRITER NOT READY
6	KEYBOARD BUSY
7	NOT USED
8	NOT USED
9	NOT USED
10	NOT USED
11	NOT USED
12	NOT USED
13	NOT USED
14	NOT USED
15	NOT USED

```
E0001                        SWS  INVLD
                             XXXX
```

THE SETTING OF SWITCHES 4-7 DID NOT EQUAL THE LOAD SEQUENCE NUMBER OF ANY PROGRAM IN CORE.

```
E0003                        OVR CORE
```

THE PROGRAM WHICH THE LOADER WAS ATTEMPTING TO LOAD EXCEEDED AVAILABLE CORE. LOADING WAS TERMINATED.

```
E0004                        CKSUM
```

A CHECK SUM ERROR WAS DETECTED WHILE LOADING A TEST PROGRAM. THIS ERROR OCCURS UNDER ANY OF THE FOLLOWING CONDITIONS.

1. A CARD IS MISSING OR IS OUT OF SEQUENCE.
2. THERE IS AN EXTRA CARD IN THE DECK.
3. THE PUNCHED INFORMATION ON THE CARD IS NOT CORRECT.
4. DATA WAS LOST OR PICKED UP DUE TO A MACHINE MALFUNCTION.
5. DUE TO A CPU MALFUNCTION, THE CHECK SUM WAS NOT CORRECTLY CALCULATED.

WHEN THIS ERROR OCCURS ATTEMPT TO RELOAD THE PROGRAM.

```
E0005                        000N XXXX
```

THIS ERROR WILL OCCUR IS AN INTERRUPT OCCURS, BUT THE ILSW WAS NOT CORRECT. N IS THE INTERRUPT LEVEL AND XXXX IS THE ILSW. THIS PRINTOUT WILL ONLY OCCUR IF THE INTERRUPT IS RESET BY A BOSI. NO ATTEMPT IS MADE BY THE ERROR ROUTINE TO RESET THE REQUEST BIT.

```
E0401 000R AAAA              XXXX X000
```

DSW ERROR ON CHECKING FOR READY

E0402 000R AAAA XXXX XC00

DSW ERROR IMMEDIATELY AFTER OUTPUT COMMAND.

E0403 000R AAAA XXXX XX00

INTERRUPT DSW ERROR

E0404 000R AAAA XXXX X000

LOST PRINTER INTERRUPT.
DSW AFTER LAST XIO WRITE COMMAND IS PRINTED

E0405 000R AAAA XXXX

KEYCODE ENTRY ERROR. AN ILLEGAL KEYBOARD CODE HAS BEEN DETECTED.
THE KEYBOARD CODE SHOULD HAVE BEEN AN IMAGE OF CARD HOLERITH. COLS
12 - 9 IN BITS 0-11, RESPECTIVELY.

E0406 000R AAAA XXXX X200

DSW ERROR ON PLACING KEYBOARD IN PROCEED STATUS

E0407 000R AAAA XXXX 0000

DSW ERROR AFTER READ KEYBOARD COMMAND

5. COMMENTS

THIS FUNCTION TEST CHECKS THE PROPER OPERATION OF THE PRINTER-KEYBOARD STATUS INDICATORS. THE VARIOUS ROUTINES AID IN DETERMINING THE PROPER ADJUSTMENT OF THE PRINTER.

5.1*** THE PRINTER TEST.

THE PRINTER TEST IS A SERIES OF STANDARD TESTS PERFORMED IN ORDER OF COMPLEXITY. EACH TEST HAS TWO LINES OF OUTPUT (THE FIRST IN BLACK AND THE SECOND IN RED). THE ONLY EXCEPTION IS THE REGISTRATION TEST WHICH HAS ONLY ONE LINE.

A. THE NORMALLY RUN ROUTINES ARE DONE SEQUENTIALLY AS FOLLOWS,

1. PRINT LAST KEYBOARD ENTRY.
2. CARRIER RETURN AND TABULATE.
3. UPPER CASE CHARACTERS.
4. LOWER CASE CHARACTERS. (SHIFT SIDE OF ELEMENT).
5. REGISTRATION

THIS TEST PRINTS A BLACK '+' ENCLOSED BY A RED 'O'. IT CHECKS THE BACKSPACE FUNCTION AND THE ALIGNMENT OF THE PRINT.

6. BACKSPACE, INDEX.

CHECKS TABULATE, BACKSPACE, AND LINE FEED FUNCTIONS.

7. END OF LINE CARRIER RETURN

CHECKS TO SEE THAT THE END OF LINE CARRIER RETURN WORKS PROPERLY.

8. ROCK

TESTS THE TILT MECHANISM BY TYPING CHARACTERS LOCATED ONE AFTER ANOTHER IN VERTICAL COLUMNS ON THE PRINT HEAD.

9. ROLL

TESTS THE ROTATE MECHANISM BY SELECTING CHARACTERS ONE AFTER ANOTHER IN HORIZONTAL BANDS AROUND THE PRINT HEAD.

A. TWIST

TESTS THE COMBINED ROTATE AND TILT MECHANISM BY CAUSINGA MAXIMUM ROTATION AND TILT BETWEEN CHARACTERS.

B. ROUTINES AVAILABLE FOR EXECUTION ON AN OPTIONAL BASIS FOLLOW,

B. PRINT BIT SWITCH IMAGE

THE TWO CHARACTERS IN THE BIT SWITCHES ARE ALTERNATELY PRINTED.

TO ENTER THIS MODE, ROUTINE B MUST BE SPECIFIED (FCN 1).

5.2*** THE KEYBOARD TEST (ROUTINE C)

THE KEYBOARD TEST IS ENTERED BY SWITCHING THE CONSOLE/KEYBOARD SWITCH TO THE KEYBOARD POSITION.

AT THIS TIME THE OPERATOR MAY ENTER ANY NUMBER OF CHARACTERS. EACH CHARACTER ENTERED IS PRINTED AS IT IS KEYED IN. WHEN THE CONSOLE/KEYBOARD SWITCH IS RETURNED TO THE CONSOLE POSITION, THE PROGRAM WILL LOOP ON ROUTINE ONE PRINTING THE FIRST 48 CHARACTERS ENTERED VIA THE KEYBOARD. IF NO ENTRY WAS MADE THEN THE PROGRAM COMPLETES THE PRINTER TEST.

ALL KEYBOARD KEYS RETAIN THEIR NORMAL USE EXCEPT,

KEY	FUNCTION
EOF	CARRIER RETURN
ERASE FIELD	THE NEXT CHARACTER (IF ALPHABETIC) WILL BE IN LOWER CASE.
0-2-8	LINE FEED

FIGURE 1. STANDARD TESTS PRINTOUTS

```
A0400 0000                          CONSOLE


CARRIER RETURN                      TABULATE
CARRIER RETURN                      TABULATE

ABCDEFGHIJKLMNOPQRSTUVWXYZ (+<¬);*'"|=_?:>!%¢
ABCDEFGHIJKLMNOPQRSTUVWXYZ (+<¬);*'"|=_?:>!%¢

ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890#/-,&$@.
ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890#/-,&$@.

@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
                            BACK SPACE
                                     I
                                     N
                                     D
                                     E
                                     X
                            BACK SPACE
                                     I
                                     N
                                     D
                                     E
                                     X



CARRIER RETURN
                                            CARRIER RETURN


#,$.IRZ96WOFDMU42SKB@&-08YQHGPX75VNECLT31/JA ¢!:="ZRIFOW;¬UMDBKS+|?>%HQY'*XPGENV)<TLCAJ_(
#,$.IRZ96WOFDMU42SKB@&-08YQHGPX75VNECLT31/JA ¢!:="ZRIFOW;¬UMDBKS+|?>%HQY'*XPGENV)<TLCAJ_(

#9642087531/TVXY-SUWZ,$ROMK&QPNLJACEGH@BDFI. ACEGH%BDFI¢!ROMK>QPNLJ_TVXY?SUWZ:=";¬+|'*)<(
#9642087531/TVXY-SUWZ,$ROMK&QPNLJACEGH@BDFI. ACEGH%BDFI¢!ROMK>QPNLJ_TVXY?SUWZ:=";¬+|'*)<(

#A,J$_.(I<RTZL9C6EWNOVF)D*MXUP4G2HSQKYB'@|&?->0%8BYKQSH+G¬PUXM7D5FVONWE;C"LZTR3I1¢/!J:A=
#A,J$_.(I<RTZL9C6EWNOVF)D*MXUP4G2HSQKYB'@|&?->0%8BYKQSH+G¬PUXM7D5FVONWE;C"LZTR3I1¢/!J:A=
A04FF 0000                          0004 END
```

NOTE: SEE SECTION 5 (COMMENTS) FOR RED PRINT/BLACK PRINT DESIGNATION.

PRINTER CHARACTER CODING

LATCH MAGNETS

T2
T1
R1
R2A
R-2
R-5

B0	B1	B2	B3	B4	B5	LO-ER CASE B6=0	LO-ER CASE HEXADECIMAL	UPPER CASE B6=1	UPPER CASE HEXADECIMAL	B7
0	0	1	1	1	1	a	3C	A	3E	0
0	0	0	1	1	0	b	18	B	1A	0
0	0	0	1	1	1	c	1C	C	1E	0
0	0	1	1	0	0	d	30	D	32	0
0	0	1	1	0	1	e	34	E	36	0
0	0	0	1	0	0	f	10	F	12	0
0	0	0	1	0	1	g	14	G	16	0
0	0	1	0	0	1	h	24	H	26	0
0	0	1	0	0	0	i	20	I	22	0
0	1	1	1	1	1	j	7C	J	7E	0
0	1	0	1	1	0	k	58	K	5A	0
0	1	0	1	1	1	l	5C	L	5E	0
0	1	1	1	0	0	m	70	M	72	0
0	1	1	1	0	1	n	74	N	76	0
0	1	0	1	0	0	o	50	O	52	0
0	1	0	1	0	1	p	54	P	56	0
0	1	1	0	0	1	q	64	Q	66	0
0	1	1	0	0	0	r	60	R	62	0
1	0	0	1	1	0	s	98	S	9A	0
1	0	0	1	1	1	t	9C	T	9E	0
1	0	1	1	0	0	u	B0	U	B2	0
1	0	1	1	0	1	v	B4	V	B6	0
1	0	0	1	0	0	w	90	W	92	0
1	0	0	1	0	1	x	94	X	96	0
1	0	1	0	0	1	y	A4	Y	A6	0
1	0	1	0	0	0	z	A0	Z	A2	0
1	1	1	1	1	1	1	FC		FE	0
1	1	0	1	1	0	2	D8	+	DA	0
1	1	0	1	1	1	3	DC	-	DE	0
1	1	1	1	0	0	4	F0	¼	F2	0
1	1	1	1	0	1	5	F4	½	F6	0
1	1	0	1	0	0	6	D0	¾	D2	0
1	1	0	1	0	1	7	D4	*	D6	0
1	1	1	0	0	1	8	E4	'	E6	0
1	1	1	0	0	0	9	E0	"	E2	0
1	1	0	0	0	1	0	C4	(	C6	0
1	1	0	0	0	0	#	C0	=	C2	0
1	0	1	1	1	1	/	BC	)	BE	0
1	0	0	0	0	1	-	84	?	86	0
1	0	0	0	0	0	,	80	:	82	0
0	1	0	0	0	1	.	44	>	46	0
0	1	0	0	0	0	$	40	<	42	0
0	0	0	0	0	1	¢	04	¤	06	0
0	0	0	0	0	0	.	00	¢	02	0

TILT/ROTATE TABLE FOR PRINT ELEMENT 969

TILT

	ROTATE -						ROTATE +				
	5	4	3	2	1	0	1	2	3	4	5
0	'	"	(	<	*	)	+	—	.	¨	=
1	_	T	V	X	Y	-	S	U	W	Z	,
2	J	L	N	P	Q	&	R	M	O	R	!
3	A	C	E	G	H	7	B	D	F	I	$

UPPER CASE

TILT

	ROTATE -						ROTATE +				
	5	4	3	2	1	0	1	2	3	4	5
0	1	3	5	7	8	C	2	4	6	9	#
1	/	T	V	X	Y	-	S	U	W	Z	,
2	J	L	N	P	Q	&	R	M	O	R	$
3	A	C	E	G	H	-	B	D	F	I	.

LOWER CASE

DATE	02JAN66	01MAY66	15NOV66	1 MAR 67	15 JUN 67
EC NO.	415490	415440B	419643	419643B	420317

PROG ID 0304-*
PAGE 6

1131 KEYBOARD-PRINTER TEST

```
                *****************************************************************  30400030
                *                                                               *  30400040
                *  THIS ENGINEERING CHANGE REFLECTS MAJOR                       *  30400050
                *  CHANGES TO THE DIAGNOSTIC MONITOR.  PREVIOUS                 *  30400060
                *  TESTS WILL NOT RUN WITH DIAGNOSTIC MONITOR II.               *  30400070
                *                                                               *  30400080
                *  THIS TEST WILL NOT RUN WITH PREVIOUS MONITORS.               *  30400090
                *                                                               *  30400100
                *  TESTS PRIOR TO EC 419643 DATED NOV 15, 1966                  *  30400110
                *  WILL NOT OPERATE PROPERLY WITH DIAGNOSTIC                    *  30400120
                *  MONITOR II.                                                  *  30400130
                *                                                               *  30400140
                *****************************************************************  30400150
                ***************************************************             30400160
                *              EQUATE TABLE                       *             30400170
                ***************************************************             30400180
                *     THIS TABLE EQUATES TEST PROGRAM LABELS      *             30400190
                *     TO THEIR EQUIVALENT DIAGNOSTIC MONITOR      *             30400200
                *     ADDRESSES.                                  *             30400210
                *                                                 *             30400220
0160            BEGIN EQU     /160       BEGIN ROUTINE          *             30400230
0161            START EQU     BEGIN+1    SUPERVISOR ROUTINE     *             30400240
0162            ERROR EQU     START+1    ERROR LOG ROUTINE      *             30400250
0163            LOG   EQU     ERROR+1    STATUS LOG ROUTINE     *             30400260
0164            END   EQU     LOG+1      END ROUTINE            *             30400270
                *-------------------------------------------------*             30400280
                *     MONITOR CONTROL WORD ADDRESSES              *             30400290
                *                                                 *             30400300
0165            RTNSW EQU     END+1      ROUTINE START SWITCH   *             30400310
0166            ERLCK EQU     END+2      LOCK ON ERROR CONTROL  *             30400320
0167            LOGBY EQU     END+3      I/O BUSY SW ADR        *             30400330
0168            RLCF  EQU     END+4      RELOCATION FACTOR ADR  *             30400340
                *-------------------------------------------------*             30400350
                *     INTERRUPT TRANSFER VECTOR ADDRESSES         *             30400360
                *                                                 *             30400370
017A            IL0   EQU     /17A       INTERRUPT LEVEL ZERO   *             30400380
018A            IL1   EQU     IL0+16     INTERRUPT LEVEL ONE    *             30400390
019A            IL2   EQU     IL1+16     INTERRUPT LEVEL TWO    *             30400400
01AA            IL3   EQU     IL2+16     INTERRUPT LEVEL THREE  *             30400410
01BA            IL4   EQU     IL3+16     INTERRUPT LEVEL FOUR   *             30400420
01BB            RQTY  EQU     IL4+1      TYPR SVC REQUEST INTERPT*             30400430
01BC            RQKB  EQU     RQTY+1     KEYBOARD REQUEST INTERPT*             30400440
01BD            SVKB  EQU     RQKB+1     KEYBOARD SERVICE INTERPT*             30400450
                ***************************************************             30400460
                *                                                               30400470
                *                                                               30400480
                *                                                               30400490
                *            TABLE OF INDEXES FOR REFERENCE                     30400500
                *              TO PRINTER STATUS TABLES                         30400510
                *                                                               30400520
                *            INDEX REG 3 ALWAYS HAS THE ADDR                    30400530
                *                 OF THE PRINTER TABLE                          30400540
                *                       PTRO                                    30400550
                *                                                               30400560
0000            ADR   EQU     0                                                30400570
0001            RTN   EQU     1                                                30400580
0002            STS   EQU     2                                                30400590
0003            OUT   EQU     3                                                30400600
0004            ITR   EQU     4                                                30400610
0005            SLT   EQU     5                                                30400620
0006            NOS   EQU     6                                                30400630
0007            PAD   EQU     7                                                30400640
0008            MRT   EQU     8                                                30400650
000A            PTR   EQU     10                                               30400660
000C            SNR   EQU     12                                               30400670
000E            KEY   EQU     14                                               30400680
0010            SEE   EQU     16                                               30400690
0012            ERR   EQU     18                                               30400700
```


1131 KEYBOARD-PRINTER TEST

```
                *                                                               30400710
                *                                                               30400720
0000                    ORG   *+1500                                            30400730
                ***************************************************             30400740
                *                DIAGNOSTIC MONITOR               *             30400750
                *                    CONTROLLED                   *             30400760
                *                1130 KEYBOARD  PRINTER           *             30400770
                *                FUNCTION TEST.                   *             30400780
                ***************************************************             30400790
05DC 0 0304     PID   DC      /0304      PROGRAM ID NO           *             30400800
05DD 0 0000     RID   DC      0          ROUTINE NUMBER          *             30400810
05DE 1 0646     RAD   DC      GO         ROUTINE ADDRESS         *             30400820
05DF 0 0000     SW0   DC      /0000      FCN 0 - CONTROL         *             30400830
05E0 0 0000     SW1   DC      0          FCN 1 - RTN SELECTION   *             30400840
05E1 0 0000     SW2   DC                 NOT USED                *             30400850
05E2 0 0000     SW3   DC                 NOT USED                *             30400860
05E3 1 0646           DC      GO         LOOP PROGRAM ADDRESS    *             30400870
05E4 1 0646           DC      GO         INITIALIZE ADDR         *             30400880
05E5 0 0000     MLSCF DC      *-*        PROGRAM CONTROL FLD     *             30400890
05E6 0 FFFF     TERM  DC      /FFFF      TERMINATOR              *             30400900
                ***************************************************             30400910
                *                                                               30400920
                *                PRINTER INTERRUPT ROUTINE                      30400930
                *                                                               30400940
                *                                                               30400950
                *                THIS ROUTINE CHECKS THE                        30400960
                *                 INTERRUPT DSW FOR THE                         30400970
                *                 PROPER BITS.                                  30400980
                *                                                               30400990
                *                IF AN ERROR IS DETECTED                        30401000
                *                 THE ERROR IS SAVED IN THE                     30401010
                *                 PRINTER TABLE, PTRO,                          30401020
                *                 AND THE ERROR INDICATOR                       30401030
                *                 IS SET.                                       30401040
                *                                                               30401050
                *                THE ERROR WILL BE PRINTED                      30401060
                *                 WHEN THE PROGRAM RETURNS                      30401070
                *                 TO MAIN LINE.                                 30401080
                *                                                               30401090
                *                                                               30401100
05E7 0 0000     COMIN DC      /0000                                           30401110
05E8 01 67000A26      LDX   L3 PTRO                                           30401120
                *                                                               30401130
05EA 01 D400063D      STO   L  DSWIT     SAVE DSW                            30401140
                ***************************************************             30401150
                *                                                               30401160
05EC 0  18DE          RTE      30                                             30401170
05ED 01 4C280603      BSC   L  KBDRQ,+Z  BR IF KBD RQST INTRPT                 30401180
05EF 0  18D2          RTE      18        PLACE DSW IN Q                       30401190
05F0 0  C302          LD    3  STS       FETCH PRINTER STATUS                 30401200
05F1 01 940007CF      S     L  KF000                                           30401210
05F3 01 4C18062A      BSC   L  KBDSV,+-  BR IF S/B KBD SVC INT                30401220
05F5 0  C302          LD    3  STS       FETCH PRINTER STATUS                 30401230
05F6 01 94000844      S     L  KE000                                           30401240
05F8 01 4C2805FD      BSC   L  COMI3,+Z  BR IF S/NB TYPR SVC INT              30401250
05FA 0  4808          BSC      +         SKIP IF NOT KBD RTN                  30401260
05FB 0  C040          LD       KA000     SELECT KEYBOARD NEXT                 30401270
05FC 0  7021          MDX      TYPSV     CHECK TYPR SVC INT                   30401280
                *                                                               30401290
05FD 0  C03E    COMI3 LD       KA000     SELECT KEYBOARD NEXT                 30401300
05FE 0  D302          STO   3  STS                                            30401310
05FF 0  C03D          LD       DSWIT     SAVE SPURRIOUS INT ERR               30401320
0600 01 E4000774      AND   L  KCNSL                                          30401330
0602 0  7033          MDX      KEYER                                          30401340
                *                                                               30401350
                *                     THE USE OF THE KEYBOARD                   30401360
                *                      HAS BEEN REQUESTED BY                    30401370
                *                      THE INTERRUPT REQUEST KEY                30401380
```

```
                 *                      WHILE THE CONSOLE SW WAS
                 *                      IN THE KEYBOARD POSITION
                 *
0603 0  18C1     KBDRQ RTE      1
0604 01 4C10060A       BSC  L  KBD2,-       BR IF DSW OK
0606 0  18D1           RTE      17
0607 0  C035           LD       DSWIT
0608 0  E039           AND      KBE00
0609 0  702C           MDX      KEYER
                 *
                 *
060A 0  C031     KBD2  LD       KA000       SELECT KEYBOARD NEXT
060B 0  D302           STO    3 STS
060C 0  0B10           XIO    3 SEE         DESELECT KEYBOARD
                 *
060D 0  C033           LD       TWLVE
060E 0  D301           STO    3 RTN         SET RTN NUMBER
                 *
060F 0  63E7           LDX    3 -25         INITIALIZE KEYBOARD
0610 01 6F0007AC       STX   L3 WRDCT+1      INPUT TABLE
0612 0  6300           LDX    3 0
0613 01 6F0007CA       STX   L3 SLTWD
0615 01 6F00085C       STX   L3 ANY+3
0617 0  1010           SLA      16
0618 01 D4000640       STO  L  ERIND
061A 0  6301           LDX    3 1
061B 01 6F00085B       STX   L3 ANY+2
                 *
061D 0  701B           MDX      COMIX       EXIT
                 *
061E 0  D302     TYPSV STO    3 STS         RESTORE PTR STS
061F 0  C01D           LD       DSWIT       CHECK TYPR RESP DSW
0620 01 E4000773       AND  L  KEFFF
0622 0  F01B           EOR      K8000
0623 01 4C180639       BSC  L  COMIX,+-     BR IF DSW OK
0625 0  C017           LD       DSWIT       SAVE TYPR RESP DSW ERR
0626 01 E4000774       AND  L  KCNSL
0628 0  E815           OR       K8000
0629 0  700C           MDX      KEYER
                 *
062A 0  C014     KBDSV LD       KC000       READ KEYBOARD NEXT
062B 0  D302           STO    3 STS
062C 0  C010           LD       DSWIT       CHECK KEYBOARD RESP
062D 0  F00D           EOR      K4200        DSW
062E 01 E4000773       AND  L  KEFFF
0630 01 4C180639       BSC  L  COMIX,+-     BR IF DSW OK
0632 0  C00A           LD       DSWIT       SAVE KBD RESP DSW ERR
0633 01 E4000774       AND  L  KCNSL
0635 0  E805           OR       K4200
0636 0  18D0     KEYER RTE      16
                 *
0637 0  DB12           STD    3 ERR         SAVE DSW ERROR
0638 0  6B07           STX    3 ERIND       SET ERROR INDICATOR
                 *
0639 01 4C8005E7 COMIX BSC  I  COMIN        BUG - OUT OF INTRPT
                 *
063B 0  4200     K4200 DC       /4200       CONSTANTS
063C 0  A000     KA000 DC       /A000
063D 0  0000     DSWIT DC       /0000       INTRPT DSW STORAGE
063E 0  8000     K8000 DC       /8000       PTR SVC INT DSW S/B
063F 0  C000     KC000 DC       /C000
0640 0  0000     ERIND DC       /0000       ERROR INDICATOR
0641 0  000C     TWLVE DC       12
0642 0  BE00     KBE00 DC       /BE00
                 *******************************************
                 *
                 *******************************************
0643 00 44800160 TYCUS BSI  I  BEGIN                             * SC
```



```
0645 1  05DC           DC       PID                                *
                 *******************************************
                 *
                 *******************************************
                 *                                                 *
                 *                      INITIAL PROGRAM ENTRY      *
                 *                            POINT                *
                 *                                                 *
                 *******************************************
                 *
0646 01 6C000A7F GO    STX   L0 FIRST       SET TO PRINT SW STS
0648 01 6C000A28       STX   L0 PTR0+STS
064A 0  1010           SLA      16          RESET LOOP RTN 1
064B 01 D400085C       STO  L  ANY+3
064D 01 D4000640       STO  L  ERIND
064F 01 D40005DD       STO  L  RID
0651 01 C40005E0       LD   L  SW1
0653 0  18C1           RTE      1
0654 0  4820           BSC      Z
0655 0  1081           SLT      1
0656 01 D40005E0       STO  L  SW1
                 *
0658 00 6500FFFF       LDX   L1 -1          TERMINATE KBD INPUT
065A 01 6D00085B       STX   L1 ANY+2
                 *
065C 01 67000A26 GO3   LDX   L3 PTR0        INTR PTR STATUS TABL
065E 01 C4000859       LD   L  ANY
0660 0  D304           STO    3 ITR
0661 0  D305           STO    3 SLT
0662 0  1801           SRA      1
0663 0  D306           STO    3 NOS
0664 0  D307           STO    3 PAD
                 *
0665 0  63E7           LDX    3 -25         INITIALIZE KEYBOARD
0666 01 6F0007AC       STX   L3 WRDCT+1      INPUT TABLE
0668 0  6300           LDX    3 0
0669 01 6F0C07CA       STX   L3 SLTWD
066B 0  7000           MDX      PRCON
                 *******************************************
                 *******************************************
                 *
                 *                      ROUTINE CONTROLLER
                 *
                 *                      THIS ROUTINE CONTROLS THE
                 *                       EXECUTION OF ALL PRINTER
                 *                       AND KEYBOARD ROUTINES.
                 *
                 *                      IF THIS ROUTINE TIMES OUT
                 *                       WHEN WAITING FOR AN
                 *                       INTERRUPT FROM THE PRINTER
                 *                       AN ERROR WILL BE PRINTED.
                 *
                 *                      THE SEQUENCING OF ROUTINES
                 *                       IS CONTROLLED BY THE MARK
                 *                       ROUTINE WHICH BUILDS THE
                 *                       CHARACTERS TO BE PRINTED.
                 *
066C 0  C0D3     PRCON LD       ERIND
066D 01 4C20075F       BSC  L  INERR,Z      BR IF ERROR INDICATD
                 *
066F 01 C40005DD       LD   L  RID          FETCH ROUTINE NUMBER
0671 0  90CF           S        TWLVE
0672 01 44180A3D       BSI  L  SWSET,+-     CHECK SWS IF KBD RTN
                 *
0674 01 67000A26       LDX   L3 PTR0        FETCH PRINTER STATUS
0676 0  C302           LD     3 STS
0677 0  D025           STO      RESTO       SAVE IT
0678 01 4C10068D       BSC  L  EXEC3,-      BR IF PTR SVC RQSTD
```

```
                        *                                                       30402750
                        *                                                       30402760
                        *                                                       30402770
                        *                 WHEN STS IS,                          30402780
                        *                                                       30402790
                        *                  ZERO-POS   GO SERVICE PTR            30402800
                        *                  NEGATIVE,                            30402810
                        *                   A000      SELECT KBD               30402820
                        *                   C000      READ KBD NEXT            30402830
                        *                   FC00-FFFE COUNT FOR INT            30402840
                        *                   FFFF      LOST INT ERR             30402850
                        *                   E000      WAIT TYPWR INT           30402860
                        *                   F000      WAIT KBD INT             30402870
                        *                   8000      IGNORE                   30402880
                        *                                                       30402890
067A 0  1001                    SLA     1                                       30402900
067B 01 4C180876                BSC  L  TYEND,+-    BR IF END PROGRAM           30402910
067D 0  180C                    SRA     12                                      30402920
067E 01 4C040688                BSC  L  SVC,E       BR IF WAIT KBD INT          30402930
0680 0  1802                    SRA     2                                       30402940
0681 0  901D                    S       K0001                                   30402950
0682 01 4C180781                BSC  L  SELC2,+-    BR IF SELECT KBD            30402960
0684 0  901A                    S       K0001                                   30402970
0685 01 4C1807A3                BSC  L  KEYBD,+-    BR IF READ KEYBD            30402980
0687 0  700E                    MDX     EXEC9       IGNORE OR WAIT              30402990
                        *                                                       30403000
0688 01 74010428        SVC     MDX  L  PTRO+STS,1  COUNT DOWN FOR INT          30403010
068A 0  7008                    MDX     EXEC9       WAIT FOR INTRPT             30403020
068B 01 4C000775                BSC  L  NOIN        PRINT NO INTRPT ERROR       30403030
                        *                                                       30403040
068D 01 44000A3D        EXEC3   BSI  L  SWSET       CK CON/KBD SW SETTING       30403050
068F 0  C00E                    LD      KF800       SERVICE PRINTER             30403060
0690 0  D302                    STO  3  STS         UPDATE PTR STATUS           30403070
0691 01 4C000736                BSC  L  READY                                   30403080
                        *                                                       30403090
0693 0  C009            EXEC7   LD      RESTO       RESTORE TO TRY LATER        30403100
0694 01 D4000A28                STO  L  PTRO+STS                                30403110
0696 01 6500066C        EXEC9   LDX  L1 PRCON       TRY AGAIN - LATER           30403120
0698 01 6D0005E5                STX  L1 MLSCF                                   30403130
069A 00 44800161                BSI  I  START                                   30403140
                        *                                                       30403150
069C 0  0001            I       DC      1                                       30403160
069D 0  0000            RESTO   DC      /0000                                   30403170
069E 0  F800            KF800   DC      /F800                                   30403180
069F 0  0001            K0001   DC      /0001       CONSTANT                    30403190
                        *                                                       30403200
                        ****************************************                30403210
                        *                                                       30403220
                        *                                                       30403230
                        *                 THIS ROUTINE BUILDS THE               30403240
                        *                  NEXT CHARACTER TO BE                 30403250
                        *                  PRINTED.  THE CHARACTER              30403260
                        *                  IS FETCHED FROM THE                  30403270
                        *                  PROPER ROUTINE TABLE OR              30403280
                        *                  IS TAKEN FROM THE BIT SWS.           30403290
                        *                                                       30403300
                        *                 A ROUTINE WHICH IS RUNNING            30403310
                        *                  WILL NOT TERMINATE UNTIL             30403320
                        *                  IT HAS BEEN COMPLETED.               30403330
                        *                                                       30403340
06A0 01 C40005E0        MARK    LD   L  SW1                                     30403350
06A2 0  100C                    SLA     12                                      30403360
06A3 0  180C                    SRA     12                                      30403370
06A4 01 9400084D                S    L  ELVEN       IS TYPE SWS ROUTINE         30403380
06A6 01 4C2006E3                BSC  L  MARKG,Z     BR IF NO                    30403390
                        *                                                       30403400
06A8 01 C400084D                LD   L  ELVEN       SET ROUTINE ID              30403410
06AA 01 D40005DD                STO  L  RID                                     30403420
```



```
06AC 0  6B09                    STX     3 MARKU+1   SAVE IX                     30403430
06AD 0  C006                    LD      MARKT       SET MLSCF                   30403440
06AE 01 D40005E5                STO  L  MLSCF       *                           30403450
06B0 00 6C000165                STX  L  RTNSW       SET RTN SW                  30403460
06B2 00 44800161                BSI  I  START       GO TO START                 30403470
06B4 1  06B5            MARKT   DC      MARKU                                   30403480
06B5 00 67000000        MARKU   LDX  L3 0           RESTORE IX                  30403490
                        *                                                       30403500
06B7 01 0C000A3A                XIO  L  RDBS        READ BIT SWITCHES           30403510
06B9 01 C4000A3C                LD   L  BITSW                                   30403520
06BB 00 65000000        MARK1   LDX  L1 /0000       FETCH SHIFT COUNT           30403530
06BD 0  1100                    SLA     1 0                                     30403540
06BE 0  1806                    SRA     8                                       30403550
06BF 0  F0DC                    EOR     I                                       30403560
06C0 0  4820                    BSC     Z           SKIP IF ILLEGAL CODE        30403570
06C1 0  F0DA                    EOR     I                                       30403580
06C2 0  1008                    SLA     8                                       30403590
06C3 0  D303                    STO  3  OUT                                     30403600
06C4 0  C0F7                    LD      MARK1+1     RESET SHIFT COUNT           30403610
06C5 0  4830                    BSC     -Z                                      30403620
06C6 0  6100                    LDX     1 0                                     30403630
06C7 0  4808                    BSC     +                                       30403640
06C8 0  6108                    LDX     1 8                                     30403650
06C9 0  69F2                    STX     1 MARK1+1                               30403660
06CA 0  70CB                    MDX     EXEC9                                   30403670
                        *                                                       30403680
                        *                                                       30403690
06CB 01 4C000876        MARK2   BSC  L  TYEND       END PROGRAM                 30403700
                        *                                                       30403710
06CD 0  7201            MARK3   MDX     2 1                                     30403720
06CE 01 6E000A27        MARK4   STX  L2 PTRO+RTN                                30403730
06D0 01 D40005DD                STO  L  RID         SAVE THE ROUTINE NO         30403740
                        *                                                       30403750
06D2 01 6E8006E6                STX  I2 MARKL+1                                 30403760
                        *                                                       30403770
06D4 01 C680084D                LD   I2 FUNR-1      FETCH ADRS OF TEST          30403780
06D6 0  D304                    STO  3  ITR                                     30403790
                        *                                                       30403800
06D7 0  1810                    SRA     16          RESTORE WORDS PT            30403810
06D8 0  D307                    STO  3  PAD                                     30403820
                        *                                                       30403830
06D9 01 C600084D        MARK5   LD   L2 FUNR-1      RESTORE TEST PT             30403840
06DB 01 4C2806CB                BSC  L  MARK2,Z+    BR IF PTR FINISHED          30403850
                        *                                                       30403860
06DD 0  8307                    A    3  PAD                                     30403870
06DE 0  D300                    STO  3  ADR                                     30403880
                        *                                                       30403890
06DF 0  1810                    SRA     16          RESTORE WORDS PRTD          30403900
06E0 0  D306                    STO  3  NOS                                     30403910
                        *                                                       30403920
06E1 0  C0BA                    LD      I           RESTORE SHIFT WORD          30403930
06E2 0  D305                    STO  3  SLT                                     30403940
                        *                                                       30403950
06E3 01 65800A26        MARKG   LDX  I1 PTRO+ADR                                30403960
06E5 01 66800A27        MARKL   LDX  I2 PTRO+RTN                                30403970
06E7 0  6916                    STX     1 MARKP+1   SAVE IXING                  30403980
06E8 0  6A17                    STX     2 MARKQ+1   *                           30403990
06E9 0  6B18                    STX     3 MARKR+1   *                           30404000
06EA 01 C4000A27                LD   L  PTRO+RTN    GET RTN                     30404010
06EC 01 F40005DD                EOR  L  RID         HAS IT CHANGED              30404020
06EE 01 4C1806FD                BSC  L  MARKP,+-    NO                          30404030
06F0 01 C4000A27                LD   L  PTRO+RTN    SET RTN                     30404040
06F2 01 D40005DD                STO  L  RID         *                           30404050
06F4 00 6C000165                STX  L  RTNSW       SET SWITCH                  30404060
06F6 01 C40006FC                LD   L  MARKZ       SET MLSCF                   30404070
06F8 01 D40005E5                STO  L  MLSCF       *                           30404080
06FA 00 44800161                BSI  I  START       GO TO START                 30404090
06FC 1  06FD            MARKZ   DC      MARKP                                   30404100
```

```
06FD 00 65000000    MARKP LDX  L1 0         RESTORE IXING
06FF 00 66000000    MARKQ LDX  L2 0         *
0701 00 67000000    MARKR LDX  L3 0         *
                    *
0703 0  C305              LD    3 SLT       BUMP SFF WT BY ONE
0704 0  8097              A       I
0705 0  D305              STO   3 SLT
                    *
0706 01 4C04070A          BSC  L  MARKS,E   SHIFT IF ODD
0708 0  C101              LD    1 1         FETCH OUTPUT WORD
0709 0  7008              MDX     MARKN
                    *
070A 0  C306        MARKS LD    3 NOS       BUMP WORDS BY ONE
070B 0  8090              A       I
070C 0  D306              STO   3 NOS
                    *
070D 0  7101              MDX   1 1
070E 01 6D8006E4          STX  I1 MARKG+1
0710 0  C100              LD    1 0         FETCH OUTPUT CHAR
0711 0  1008              SLA     8         SHIFT IT
                    *
0712 0  D303        MARKN STO   3 OUT       SAVE NEXT OUTPUT WD
                    *
0713 0  F05C              EOR     KFF00
0714 01 4C200696          BSC  L  EXEC9,Z   BR IF NOT END OF FCN
                    *
0716 0  C304              LD    3 ITR       DECREMENT ITCNT
0717 01 9400069C          S    L  I
0719 0  D304              STO   3 ITR
071A 01 4C2006D9          BSC  L  MARK5,Z   BR IF NO DO AGAIN
                    *
071C 0  C306              LD    3 NOS       UPDATE MODIFIER WORD
071D 01 8400069C          A    L  I
071F 0  D306              STO   3 NOS
0720 0  8307              A     3 PAD
0721 0  D307              STO   3 PAD
                    *
0722 0  C101              LD    1 1         FETCH NEXT REPEAT CT
0723 0  D304              STO   3 ITR
0724 01 F40005E6          EOR  L  TERM
0726 01 4C2006D9          BSC  L  MARK5,Z   BR IF NOT END OF RTN
0728 01 C40005E0          LD   L  SW1
072A 0  E00A              AND     BASIC     ASSURE PROPER ENTRY
072B 01 4C1806CD          BSC  L  MARK3,+-  BR IF NO RTN SELECT
                    *
072D 0  D004              STO     MARKE+1
072E 0  9005              S       ALL
072F 01 4C3006CD          BSC  L  MARK3,-Z  BR IF RTN TOO LARGE
0731 00 66000001    MARKE LDX  L2 1
0733 0  709A              MDX     MARK4
                    *
                    *
                    *
                    ***********************************************
                    ***********************************************
                    *
                    *
0734 0  000A        ALL   DC      FUND-FUNR  ALL TYPEWRITER RTNS
0735 0  000F        BASIC DC      /000F
                    ***********************************************
                    *
                    *                 THIS ROUTINE CHECKS IF THE
                    *                  PRINTER CAN BE USED AND
                    *                  IF THE PRINTER IS READY.
                    *
                    *                 WHEN LOGBY INDICATES THAT
                    *                  THE PRINTER IS LOGICALLY
                    *                  NOT BUSY, THE DSW IS
```



```
                    *                     CHECKED FOR READY.
                    *
0736 00 C4800167    READY LD    I  LOGBY
0738 01 4C20074C          BSC  L  RDY2,Z    BR IF NO TYPE NOW
                    *
073A 01 650005E7          LDX  L1 COMIN     SET INT VECTOR
073C 00 6D0001BB          STX  L1 RQTY
073E 01 67000A26          LDX  L3 PTRO
0740 0  10A0              SLT     32
                    *
0741 0  0B0A              XIO   3 PTR       SENSE - RESET DSW
0742 0  D02C              STO     DSWAS
0743 0  E02F              AND     KEFFF
0744 01 4C180750          BSC  L  TYPIT,+-  BR IF DSW OK
0746 0  C828              LDD     DSWAS
0747 0  E02C              AND     KCNSL
0748 0  18D0              RTE     16
                    *
0749 0  6101              LDX   1 1         ERROR - NOT READY
074A 01 44000833          BSI  L  PRDSW     PRINT THE ERROR MSG
074C 01 65000736    RDY2  LDX  L1 READY
074E 01 4C000840          BSC  L  PDSWX
                    *
                    *                     PRINT ONE CHARACTER
                    *
                    *               THIS ROUTINE PRINTS ONE
                    *                CHARACTER ON THE CONSOLE
                    *                PRINTER AND THEN CHECKS
                    *                IF THE PRINTER BECAME
                    *                BUSY-NOT READY BY THE
                    *                OUTPUT COMMAND.
                    *
0750 0  0B08        TYPIT XIO   3 WRT       PRINT CHARACTER
0751 0  0B0A              XIO   3 PTR       SENSE - RESET DSW
0752 0  D01A              STO     DSWBY
                    *
                    *               CHECK BUSY DSW
0753 0  E01F              AND     KEFFF
0754 0  F019              EOR     KOC00
0755 01 4C1806A0    BSYOK BSC  L  MARK,+-   BR IF DSW OK
                    *
0757 0  C815              LDD     DSWBY
0758 0  E01B              AND     KCNSL
0759 0  E814              OR      KOC00
075A 0  18D0              RTE     16
075B 0  6102              LDX   1 2
075C 01 44000833          BSI  L  PRDSW     PRINT THE ERROR MSG
075E 0  70F6              MDX     BSYOK
                    ***********************************************
                    *
                    *               .  PRINT INTERRUPT DSW ERROR
                    *
075F 0  10A0        INERR SLT     32        RESET ERROR IND
0760 01 D4000640          STO  L  ERIND
                    *
0762 01 CC000A38          LDD  L  ERR+PTRO  FETCH THE ERROR MESG
0764 0  6103              LDX   1 3         SET MSG ID - 3
0765 01 44000833          BSI  L  PRDSW     PRINT THE ERROR MSG
0767 0  10A0              SLT     32
0768 0  DB12              STD   3 ERR       RESET ERROR IND
0769 01 4C00066C          BSC  L  PRCON     RETURN TO MAIN LINE
                    ***********************************************
                    *
                    *
076C    0001              BSS  E  1
076D 0  0000        DSWBY DC      /0000     LAST BUSY DSW
076E 0  0C00        KOC00 DC      /0C00     BUSY DSW S/B
076F 0  0000        DSWAS DC      /0000     LAST READY DSW
```

```
0770 0  FF00      KFF00 DC      /FF00       CONSTANT                  30405470
0771 0  0000      DSWBS DC      /0000                                 30405480
0772 0  0200      F0200 DC      /0200                                 30405490
0773 0  EFFF      KEFFF DC      /EFFF       MASK CONSOLE SW           30405500
0774 0  1000      KCNSL DC      /1000                                 30405510
                  ********************************************      30405520
                  *                                                 30405530
                  *                                                 30405540
                  *                 PRINT NO INTERRUPT ERROR        30405550
                  *                                                 30405560
0775 0  0B0A      NOIN  XIO   3 PTR         SENSE - RESET DSW         30405570
0776 0  D0FA            STO     DSWBS                                 30405580
0777 0  C8F9            LDD     DSWBS                                 30405590
0778 0  E0FB            AND     KCNSL                                 30405600
0779 01 EC00063E        OR    L K8000                                 30405610
077B 0  18D0            RTE     16                                    30405620
077C 0  6104            LDX   1 4           ERROR - 4                 30405630
077D 01 44000833        BSI   L PRDSW       PRINT THE ERROR MSG       30405640
077F 01 4C00066C        BSC   L PRCON                                 30405650
                  ********************************************      30405660
                  *                                                 30405670
                  *                 KEYBOARD TEST                   30405680
                  *                                                 30405690
                  *                                                 30405700
                  *                 SELECT KEYBOARD ROUTINE         30405710
                  *                                                 30405720
0781 01 660005E7  SELC2 LDX   L2 COMIN       RESET INT XFR VECTOR      30405730
0783 00 6E00018C        STX   L2 RQKB         FOR KEYBOARD REQ          30405740
0785 00 6E00018D        STX   L2 SVKB         AND SVC KEYBOARD          30405750
                  *                                                 30405760
0787 0  0B0A            XIO   3 PTR         SENSE AND SAVE DSW        30405770
0788 0  D0E6            STO     DSWAS                                 30405780
                  *                                                 30405790
0789 0  C045            LD      KF000       RESET PTR STATUS          30405800
078A 0  D302            STO   3 STS                                   30405810
078B 0  C8E3            LDD     DSWAS                                 30405820
078C 0  E0E6            AND     KEFFF                                 30405830
078D 01 4C180793        BSC   L SELC,+-     BR IF DSW OK              30405840
078F 0  C0DF            LD      DSWAS                                 30405850
0790 0  E0E3            AND     KCNSL                                 30405860
0791 0  6101            LDX   1 1           ERROR - 1                 30405870
0792 0  7008            MDX     SELC1       PRINT DSW ERROR           30405880
                  *                                                 30405890
0793 0  0B0E      SELC  XIO   3 KEY         SELECT KEYBOARD           30405900
0794 0  0B0A            XIO   3 PTR         SENSE - RESET DSW         30405910
0795 0  D0DB            STO     DSWBS                                 30405920
0796 0  F0DB            EOR     F0200                                 30405930
0797 0  E0DB            AND     KEFFF                                 30405940
0798 01 4C18066C        BSC   L PRCON,+-    BR IF DSW OK              30405950
                  *                                                 30405960
079A 0  C8D6            LDD     DSWBS       PRINT DSW ERROR           30405970
079B 0  E0D8            AND     KCNSL                                 30405980
079C 0  E8D5            OR      F0200                                 30405990
079D 0  6106            LDX   1 6           ERROR - 6                 30406000
                  *                                                 30406010
079E 0  18D0      SELC1 RTE     16                                    30406020
079F 01 44000833        BSI   L PRDSW       PRINT THE ERROR MSG       30406030
07A1 01 64000693        LDX   L EXEC7       TRY AGAIN - LATER         30406040
                  ********************************************      30406050
                  *                                                 30406060
                  *                 DECODE CHARACTER KEYED IN       30406070
                  *                                                 30406080
                  *                                                 30406090
07A3 0  0B10      KEYBD XIO   3 SEE         READ AND SAVE CHAR        30406100
07A4 0  0B0A            XIO   3 PTR         SENSE - RESET DSW         30406110
07A5 0  10A0            SLT     32                                    30406120
07A6 01 4C1807AB        BSC   L WRDCT,+-                              30406130
07A8 0  6107            LDX   1 7           ERROR - 7                 30406140
```



```
07A9 01 44000833        BSI   L PRDSW       PRINT DSW ERROR - 7       30406150
                  *                                                 30406160
07AB 00 66000000  WRDCT LDX   L2 /0000                              30406170
07AD 0  61BF            LDX     1 -65       LOOK UP CHAR IN TABLE     30406180
07AE 01 C50008B9  CNVRT LD    L1 KECOD+65                           30406190
07B0 0  F30E            EOR     3 KEY                               30406200
07B1 01 4C1807D0        BSC   L CMPRE,+-    BR IF CHAR MATCHES        30406210
07B3 0  7101            MDX     1 1                                 30406220
07B4 0  70F9            MDX     CNVRT                               30406230
                  *                                                 30406240
07B5 0  C30E            LD      3 KEY                               30406250
07B6 0  F011            EOR     NCAP                                30406260
07B7 01 4C1807C5        BSC   L NOCP,+-     BR IF NO CAP NEXT         30406270
                  *                                                 30406280
07B9 0  C00F            LD      ERSLC                               30406290
07BA 0  F30E            EOR     3 KEY                               30406300
07BB 01 4C1807F9        BSC   L ERSE,+-     BR IF ERASE LAST CHR      30406310
                  *                                                 30406320
07BD 0  6201            LDX     2 1         SET MODIFIER WORD COUNT   30406330
07BE 01 6E000847        STX   L2 EMESG+2                              30406340
                  *                                                 30406350
07C0 0  6105            LDX     1 5         ERROR 5                   30406360
07C1 0  C30E            LD      3 KEY       KB READ ERROR WORD        30406370
07C2 01 44000833        BSI   L PRDSW       PRINT THE ERROR MSG       30406380
07C4 0  70BC            MDX     SELC2                                 30406390
                  *                                                 30406400
07C5 0  6801      NOCP  STX     0 LOWER                               30406410
07C6 0  70BA            MDX     SELC2                                 30406420
                  ********************************************      30406430
                  *                                                 30406440
                  *                                                 30406450
07C7 0  0000      LOWER DC      /0000       = 0 IF NEXT UPR CASE      30406460
07C8 0  0002      NCAP  DC      /0002       ERASE FIELD KEY CODE      30406470
07C9 0  0004      ERSLC DC      /0004       BACKSPACE KEY CODE        30406480
07CA 0  0000      SLTWD DC      /0000       KEYBOARD SHIFT WORD       30406490
07CB 0  FFE7      KFFE7 DC      -25                                   30406500
07CC 0  0000      ERSEA DC      /0000                                 30406510
07CD 0  1111      BSPSE DC      /1111       BACK SPACE                30406520
07CE 0  0008      K0008 DC      /0008                                 30406530
07CF 0  F000      KF000 DC      /F000                                 30406540
                  ********************************************      30406550
                  *                                                 30406560
                  *                 PLACE CHAR KEYED IN             30406570
                  *                 OUTPUT TABLE                    30406580
                  *                                                 30406590
07D0 01 C50008FA  CMPRE LD    L1 TYCOD+65   FETCH PRINTER CHAR        30406600
07D2 01 740007C7        MDX   L LOWER,0     SKIP IF UPPER CASE        30406610
07D4 0  1808            SRA     8                                   30406620
07D5 0  1008            SLA     8                                   30406630
07D6 0  D303            STO   3 OUT         SAVE OUTPUT CHAR          30406640
                  *                                                 30406650
07D7 0  6100            LDX     1 0         RESET LOWER CASE SW       30406660
07D8 0  69EE            STX     1 LOWER                               30406670
                  *                                                 30406680
07D9 01 740007CA        MDX   L SLTWD,0     BR IF CHAR IS FIRST       30406690
07DB 0  7004            MDX     SFT       * TO BE PLACED IN WD        30406700
                  *                                                 30406710
07DC 0  6121            LDX     1 /21                               30406720
07DD 0  7201            MDX     2 1         SKIP IF TABLE COMPLT      30406730
07DE 0  7006            MDX     TBLIS                               30406740
07DF 0  7009            MDX     EXIT                                30406750
                  *                                                 30406760
07E0 0  6100      SFT   LDX     1 0                                   30406770
07E1 0  1808            SRA     8                                   30406780
07E2 0  7009            MDX     TBLIZ                               30406790
                  *                                                 30406800
07E3 01 EE000874  TBLIZ OR    L2 ANY+27     PLACE CHAR IN OUTPUT      30406810
07E5 01 D6000874  TBLIS STO   L2 ANY+27     * TABLE                   30406820
```

```
                     *
07E7 0  69E2         TBLI  STX   1 SLTWD       SAVE TEST STATUS
07E8 0  6AC3               STX   2 WRDCT+1
07E9 01 C4000844     EXIT  LD    L  KE000
07EB 0  D302               STO   3 STS         UPDATE PRTR STATUS
07EC 01 650007E9           LDX  L1 EXIT
07EE 00 C4800167           LD    I  LOGBY
07F0 01 4C200840           BSC   L  PDSWX,Z
07F2 01 650005E7           LDX  L1 COMIN
07F4 00 6D0001BB           STX  L1 RQTY
07F6 0  0B08               XIO   3 WRT         PRINT ONE CHARACTER
07F7 01 4C00066C           BSC   L  PRCON      CONTINUE TILL INTRPT
                     ********************************************
                     *
                     *                   ERASE LAST CHARACTER
                     *                         KEYED IN
                     *
07F9 0  6AD2         ERSE  STX   2 ERSEA
07FA 0  C0D1               LD       ERSEA
07FB 0  F0CF               EOR      KFFE7
07FC 01 4C1P0781           BSC   L  SELC2,+-   BR IF TABLE EMPTY
                     *
07FE 0  C0CB               LD       SLTWD
07FF 01 4C200809           BSC   L  ERSE1,Z    BR IF NOT SHIFTED
0801 0  6121               LDX   1 /0021       ERASE SHIFTED CHAR
0802 01 C6000874           LD   L2 ANY+27
0804 0  1808               SRA      8
0805 0  1008               SLA      8
0806 01 D6000874           STO  L2 ANY+27
0808 0  7006               MDX      ERSE2
                     *
0809 0  1010         ERSE1 SLA      16
080A 0  6100               LDX   1 0
0L08 0  72FF               MDX   2 -1
080C 0  1000               NOP
080D 01 D6000875           STO  L2 ANY+28
08uF 0  C0BD         ERSE2 LD       BSPSE      SET BACKSPACE CODE
0810 0  D303               STO   3 OUT       * IN OUTPUT WORD
0811 0  70D5               MDX      TBLI
                     ********************************************
                     *
                     *                   TERMINATE MESSAGE ROUTINE
                     *
0812 0  0000         ENDM  DC       /0000
0813 0  C048               LD       ANY+3
0814 01 668007AC           LDX  I2 WRDCT+1
0816 01 4C180829           BSC   L  ENDM2,+-   BR IF TABLE EMPTY
0818 0  6102               LDX   1 2
0819 0  6941               STX   1 ANY+2
081A 0  C0AF               LD       SLTWD
081B 01 4C180821           BSC   L  ENDM1,+-   BR IF LAST SHIFTED
081D 01 EE000874           OR   L2 ANY+27
081F 01 D6000874           STO  L2 ANY+27
                     *
0821 01 C40u0909     ENDM1 LD    L  RED1       SET TABLE TERMINATOR
0823 01 D6000875           STO  L2 ANY+28
0825 0  C032               LD       FUND
0826 01 D6000876           STO  L2 ANY+29
0828 0  7002               MDX      ENDM3
                     *
0829 0  C02E         ENDM2 LD       FUND       SET TABLE TERMINATOR
082A 0  D030               STO      ANY+2
                     *
082B 0  C0A2         ENDM3 LD       K0008      RESTORE PTR RTN
082C 01 D4000A28           STO   L  STS+PTR0
                     *
082E 0  6200               LDX   2 0
082F 01 6E0005E0           STX  L2 SW1
```



```
                     *
0831 01 4C800812           BSC   I  ENDM       RETURN TO USER
                     ********************************************
                     *
                     *                   PRINT ERROR ROUTINE
                     *
0833 0  0000         PRDSW DC       /0000
0834 0  D815               STD      EMESG+5    SAVE DATA MESSAGE
                     *
0835 0  690F               STX   1 EMESG       SAVE MESSAGE ID NO
                     *
                     ********************************************
0836 00 44800162           BSI   I  ERROR                         *
0838 1  0845               DC       EMESG      MESSAGE ADDR       *
0839 0  0000               DC                  LOOP ON ERR - NONE *
                     ********************************************
083A 0  6303               LDX   3 3           RESET MODIFIER WORD CNT
083B 0  6B0B               STX   3 EMESG+2
083C 01 67000A26           LDX  L3 PTRO        RESTORE XR3
083E 01 4C800833           BSC   I  PRDSW      RETURN TO USER
                     *
                     *
0840 01 6D0005E5     PDSWX STX  L1 MLSCF
0842 00 44800161           BSI   I  START
                     *
0844    0000               BSS   E
0844 0  E000         KE000 DC       /E000      ERROR ID
0845 0  0000         EMESG DC       /0000      MESSAGE ID NO
0846 0  0000               DC       /0000      HEX     OUTPUT
0847 0  0003               DC       /0003      DATA ID WORD
0848 0  0000               DC       /0000      ALPHA ADDR
0849 0  0000               DC       /0000      ALPHA ADDR
084A 0  0000               DC       /0000      DSWAS
084B 0  0000               DC       /0000      DSW S/B
                     *
                     *
084C 0  0000         TIMEX DC       /0000      DELAY TIME  STORAGE
084D 0  000B         ELVEN DC       11
                     ********************************************
                     *
                     *                   PRINTER TEST SEQUENCE
                     *                         CONTROL TABLE
                     *
084E 1  0859         FUNR  DC       ANY        KEYBOARD OPTION
084F 1  08FA               DC       TACAR      TAB + CARRIER RETURN
0850 1  090B               DC       UCASE      UPPER CASE CHARS
0851 1  0927               DC       LCASE      LOWER CASE CHARS
0852 1  0943               DC       COLOR      COLOR SHIFT ROUTINE
0853 1  0959               DC       SPNDX      BACKSPACE AND INDEX
0854 1  0974               DC       AUCAR      AUTO CARRIER RETURN
0855 1  098F               DC       ROCK       TEST TILT
0856 1  09C1               DC       ROLL       TEST ROTATE
0857 1  09F3               DC       TWIST      TEST TILT AND ROTATE
0858 0  FFFF         FUND  DC       /FFFF                         *
                     ********************************************
                     *
                     *                   KEYBOARD OPTION TABLE
                     *
0859 0  0001         ANY   DC       1          ITCNT
085A 0  05FF               DC       /05FF      BLACK
085B 0  FFFF               DC       /FFFF      ITCNT
085C 0  0000               DC       /0000
085D 0  0000               DC       /0000
085E 0  0000               DC       /0000
085F 0  0000               DC       /0000
0860 0  0000               DC       /0000
0861 0  0000               DC       /0000
0862 0  0000               DC       /0000
```

1131 KEYBOARD-PRINTER TEST

```
0863 0  0000             DC        /0000                                    30408190
0864 0  0000             DC        /0000                                    30408200
0865 0  0000             DC        /0000                                    30408210
0866 0  0000             DC        /0000                                    30408220
0867 0  0000             DC        /0000                                    30408230
0868 0  0000             DC        /0000                                    30408240
0869 0  0000             DC        /0000                                    30408250
086A 0  0000             DC        /0000                                    30408260
086B 0  0000             DC        /0000                                    30408270
086C 0  0000             DC        /0000                                    30408280
086D 0  0000             DC        /0000                                    30408290
086E 0  0000             DC        /0000                                    30408300
086F 0  0000             DC        /0000                                    30408310
0870 0  0000             DC        /0000                                    30408320
0871 0  0000             DC        /0000                                    30408330
0872 0  0000             DC        /0000                                    30408340
0873 0  0000             DC        /0000                                    30408350
0874 0  0000             DC        /0000                                    30408360
0875 0  FFFF             DC        /FFFF                                    30408370
                   **************************************************      30408380
                   *                                                        30408390
                   *                                                        30408400
                   *               END PROGRAM ROUTINE                      30408410
                   *                                                        30408420
                   **************************************************      30408430
0876 00 44800164   TYEND BSI  I  END                                *      30408440
                   **************************************************      30408450
                   *                                                        30408460
                   *                                                        30408470
                   *               KEYBOARD CODE TABLE                      30408480
                   *                                                        30408490
0878 0  4220       KECOD DC        /4220    *                               30408500
0879 0  3000             DC        /3000    /                               30408510
087A 0  2000             DC        /2000    0                               30408520
087B 0  1000             DC        /1000    1                               30408530
087C 0  0800             DC        /0800    2                               30408540
087D 0  0400             DC        /0400    3                               30408550
087E 0  0200             DC        /0200    4                               30408560
087F 0  0100             DC        /0100    5                               30408570
0880 0  0080             DC        /0080    6                               30408580
0881 0  0040             DC        /0040    7                               30408590
0882 0  0020             DC        /0020    8                               30408600
0883 0  0010             DC        /0010    9                               30408610
0884 0  4420             DC        /4420    $                               30408620
0885 0  8420             DC        /8420    .                               30408630
0886 0  2420             DC        /2420    ,                               30408640
0887 0  00A0             DC        /00A0    =                               30408650
0888 0  0120             DC        /0120    '                               30408660
0889 0  8120             DC        /8120    (                               30408670
088A 0  4120             DC        /4120    )                               30408680
088B 0  80A0             DC        /80A0    +                               30408690
088C 0  4000             DC        /4000    -                               30408700
088D 0  8820             DC        /8820    CENT SIGN                       30408710
088E 0  8220             DC        /8220    LESS THAN                       30408720
088F 0  8060             DC        /8060    LOGICAL OR                      30408730
0890 0  8000             DC        /8000    AND                             30408740
0891 0  4820             DC        /4820    EXCLAIMATION                    30408750
0892 0  40A0             DC        /40A0    SEMI COLON                      30408760
0893 0  4060             DC        /4060    LOGICAL NOT                     30408770
0894 0  2220             DC        /2220    PER CENT                        30408780
0895 0  2120             DC        /2120    UNDERSCORE                      30408790
0896 0  20A0             DC        /20A0    GREATER THAN                    30408800
0897 0  2060             DC        /2060    QUESTION MARK                   30408810
0898 0  0820             DC        /0820    COLON                           30408820
0899 0  0420             DC        /0420    NUMBERS                         30408830
089A 0  0220             DC        /0220    AT                              30408840
089B 0  0060             DC        /0060    QUOTE                           30408850
089C 0  9000             DC        /9000    A                               30408860
```


1131 KEYBOARD-PRINTER TEST

```
089D 0  8800             DC        /8800    B                               30408870
089E 0  8400             DC        /8400    C                               30408880
089F 0  8200             DC        /8200    D                               30408890
08A0 0  8100             DC        /8100    E                               30408900
08A1 0  8080             DC        /8080    F                               30408910
08A2 0  8040             DC        /8040    G                               30408920
08A3 0  8020             DC        /8020    H                               30408930
08A4 0  8010             DC        /8010    I                               30408940
08A5 0  5000             DC        /5000    J                               30408950
08A6 0  4800             DC        /4800    K                               30408960
08A7 0  4400             DC        /4400    L                               30408970
08A8 0  4200             DC        /4200    M                               30408980
08A9 0  4100             DC        /4100    N                               30408990
08AA 0  4080             DC        /4080    O                               30409000
08AB 0  4040             DC        /4040    P                               30409010
08AC 0  4020             DC        /4020    Q                               30409020
08AD 0  4010             DC        /4010    R                               30409030
08AE 0  2800             DC        /2800    S                               30409040
08AF 0  2400             DC        /2400    T                               30409050
08B0 0  2200             DC        /2200    U                               30409060
08B1 0  2100             DC        /2100    V                               30409070
08B2 0  2080             DC        /2080    W                               30409080
08B3 0  2040             DC        /2040    X                               30409090
08B4 0  2020             DC        /2020    Y                               30409100
08B5 0  2010             DC        /2010    Z                               30409110
08B6 0  0000             DC        /0000    SPACE                           30409120
08B7 0  2820             DC        /2820    0 - 8 - 2                       30409130
08B8 0  0008             DC        /0008    EOF                             30409140
                   *                                                        30409150
                   *               PRINTER CODE TABLE                       30409160
                   *                                                        30409170
08B9 0  D6D6       TYCOD DC        /D6D6    *                               30409180
08BA 0  BCBC             DC        /BCBC    /                               30409190
08BB 0  C4C4             DC        /C4C4    0                               30409200
08BC 0  FCFC             DC        /FCFC    1                               30409210
08BD 0  D8D8             DC        /D8D8    2                               30409220
08BE 0  DCDC             DC        /DCDC    3                               30409230
08BF 0  F0F0             DC        /F0F0    4                               30409240
08C0 0  F4F4             DC        /F4F4    5                               30409250
08C1 0  D0D0             DC        /D0D0    6                               30409260
08C2 0  D4D4             DC        /D4D4    7                               30409270
08C3 0  E4E4             DC        /E4E4    8                               30409280
08C4 0  E0E0             DC        /E0E0    9                               30409290
08C5 0  4040             DC        /4040    $                               30409300
08C6 0  0000             DC        /0000    .                               30409310
08C7 0  8080             DC        /8080    ,                               30409320
08C8 0  C2C2             DC        /C2C2    =                               30409330
08C9 0  E6E6             DC        /E6E6    '                               30409340
08CA 0  FEFE             DC        /FEFE    (                               30409350
08CB 0  F6F6             DC        /F6F6    )                               30409360
08CC 0  DADA             DC        /DADA    +                               30409370
08CD 0  8484             DC        /8484    -                               30409380
08CE 0  0202             DC        /0202    CENTS SIGN                      30409390
08CF 0  DEDE             DC        /DEDE    LESS THAN                       30409400
08D0 0  C6C6             DC        /C6C6    LOGICAL OR                      30409410
08D1 0  4444             DC        /4444    AND                             30409420
08D2 0  4242             DC        /4242    EXCLAIMATION                    30409430
08D3 0  D2D2             DC        /D2D2    SEMI COLON                      30409440
08D4 0  F2F2             DC        /F2F2    LOGICAL NOT                     30409450
08D5 0  0606             DC        /0606    PERCENT SIGN                    30409460
08D6 0  BEBE             DC        /BEBE    UNDERSCORE                      30409470
08D7 0  4646             DC        /4646    GREATER THAN                    30409480
08D8 0  8686             DC        /8686    QUESTION MARK                   30409490
08D9 0  8282             DC        /8282    COLON                           30409500
08DA 0  C0C0             DC        /C0C0    NUMBERS                         30409510
08DB 0  0404             DC        /0404    AT                              30409520
08DC 0  E2E2             DC        /E2E2    QUOTE                           30409530
08DD 0  3C3E             DC        /3C3E    A                               30409540
```

```
08DE 0  181A          DC     /181A     B              30409550
08DF 0  1C1E          DC     /1C1E     C              30409560
08E0 0  3032          DC     /3032     D              30409570
08E1 0  3436          DC     /3436     E              30409580
08E2 0  1012          DC     /1012     F              30409590
08E3 0  1416          DC     /1416     G              30409600
08E4 0  2426          DC     /2426     H              30409610
08E5 0  2022          DC     /2022     I              30409620
08E6 0  7C7E          DC     /7C7E     J              30409630
08E7 0  585A          DC     /585A     K              30409640
08E8 0  5C5E          DC     /5C5E     L              30409650
08E9 0  7072          DC     /7072     M              30409660
08EA 0  7476          DC     /7476     N              30409670
08EB 0  5052          DC     /5052     O              30409680
08EC 0  5456          DC     /5456     P              30409690
08ED 0  6466          DC     /6466     Q              30409700
08EE 0  6062          DC     /6062     R              30409710
08EF 0  989A          DC     /989A     S              30409720
08F0 0  9C9E          DC     /9C9E     T              30409730
08F1 0  B0B2          DC     /B0B2     U              30409740
08F2 0  B4B6          DC     /B4B6     V              30409750
08F3 0  9092          DC     /9092     W              30409760
08F4 0  9496          DC     /9496     X              30409770
08F5 0  A4A6          DC     /A4A6     Y              30409780
08F6 0  A0A2          DC     /A0A2     Z              30409790
08F7 0  2121          DC     /2121     SPACE          30409800
08F8 0  0303          DC     /0303     LINE FEED      30409810
08F9 0  8181          DC     /8181     CR             30409820
                *                                     30409830
                *                                     30409840
                *             TAB AND CARRIER RETURN  30409850
                *                                     30409860
08FA 0  0001    TACAR DC     1         ITCNT          30409870
08FB 0  85FF          DC     /85FF     BLACK          30409880
08FC 0  0002          DC     2         ITCNT          30409890
08FD 0  811E          DC     /811E     CR  C          30409900
08FE 0  3C60          DC     /3C60     A   R          30409910
08FF 0  6020          DC     /6020     R   I          30409920
0900 0  3460          DC     /3460     E   R          30409930
0901 0  2160          DC     /2160         R          30409940
0902 0  349C          DC     /349C     E   T          30409950
0903 0  B060          DC     /B060     U   R          30409960
0904 0  7441          DC     /7441     N   TAB        30409970
0905 0  9E3C          DC     /9E3C     T   A          30409980
0906 0  18B0          DC     /18B0     B   U          30409990
0907 0  5C3C          DC     /5C3C     L   A          30410000
0908 0  9C34          DC     /9C34     T   E          30410010
0909 0  09FF    RED1  DC     /09FF     RED            30410020
090A 0  FFFF          DC     /FFFF                    30410030
                *                                     30410040
                *                                     30410050
                *             CHARACTER COMPLIMENT    30410060
                *                                     30410070
                *             UPPER CASE              30410080
                *                                     30410090
                *                                     30410100
090B 0  0001    UCASE DC     1         ITCNT          30410110
090C 0  85FF          DC     /85FF     BLACK          30410120
090D 0  0002          DC     2         ITCNT          30410130
090E 0  813E          DC     /813E     CR  A          30410140
090F 0  1A1E          DC     /1A1E     B   C          30410150
0910 0  3236          DC     /3236     D   E          30410160
0911 0  1216          DC     /1216     F   G          30410170
0912 0  2622          DC     /2622     H   I          30410180
0913 0  7E5A          DC     /7E5A     J   K          30410190
0914 0  5E72          DC     /5E72     L   M          30410200
0915 0  7652          DC     /7652     N   O          30410210
0916 0  5666          DC     /5666     +   Q          30410220
```



```
0917 0  629A          DC     /629A     R   S          30410230
0918 0  9EB2          DC     /9EB2     T   U          30410240
0919 0  B692          DC     /B692     V   W          30410250
091A 0  96A6          DC     /96A6     X   Y          30410260
091B 0  A221          DC     /A221     Z   SP         30410270
091C 0  FEDA          DC     /FEDA     (   +          30410280
091D 0  DEF2          DC     /DEF2     LES INT        30410290
091E 0  F6D2          DC     /F6D2     )   SMI        30410300
091F 0  D6E6          DC     /D6E6     *   '          30410310
0920 0  E2C6          DC     /E2C6     QTE LOR        30410320
0921 0  C2BE          DC     /C2BE     '   UDR        30410330
0922 0  8682          DC     /8682     QSN CLN        30410340
0923 0  4642          DC     /4642     GTR EXC        30410350
0924 0  0602          DC     /0602     PCT CNT        30410360
0925 0  09FF          DC     /09FF     RED            30410370
0926 0  FFFF          DC     /FFFF                    30410380
                *                                     30410390
                *             LOWER CASE              30410400
                *                                     30410410
0927 0  0001    LCASE DC     1         ITCNT          30410420
0928 0  85FF          DC     /85FF     BLACK          30410430
0929 0  0002          DC     2         ITCNT          30410440
092A 0  813C          DC     /813C     CR  A          30410450
092B 0  181C          DC     /181C     B   C          30410460
092C 0  3034          DC     /3034     D   E          30410470
092D 0  1014          DC     /1014     F   G          30410480
092E 0  2420          DC     /2420     H   I          30410490
092F 0  7C58          DC     /7C58     J   K          30410500
0930 0  5C70          DC     /5C70     L   M          30410510
0931 0  7450          DC     /7450     N   O          30410520
0932 0  5464          DC     /5464     P   Q          30410530
0933 0  6098          DC     /6098     R   S          30410540
0934 0  9CB0          DC     /9CB0     T   U          30410550
0935 0  B490          DC     /B490     V   W          30410560
0936 0  94A4          DC     /94A4     X   Y          30410570
0937 0  A021          DC     /A021     Z   SP         30410580
0938 0  FCD8          DC     /FCD8     1   2          30410590
0939 0  DCF0          DC     /DCF0     3   4          30410600
093A 0  F4D0          DC     /F4D0     5   6          30410610
093B 0  D4E4          DC     /D4E4     7   8          30410620
093C 0  E0C4          DC     /E0C4     9   0          30410630
093D 0  C0BC          DC     /C0BC     NOS /          30410640
093E 0  8480          DC     /8480     -   ,          30410650
093F 0  4440          DC     /4440     AND $          30410660
0940 0  0400          DC     /0400     AT  .          30410670
0941 0  09FF          DC     /09FF     RED            30410680
0942 0  FFFF          DC     /FFFF                    30410690
                *                                     30410700
                *                                     30410710
                *             COLOR SHIFT             30410720
                *                                     30410730
0943 0  0002    COLOR DC     2         ITCNT          30410740
0944 0  81FF          DC     /81FF     CR             30410750
0945 0  0014          DC     20        ITCNT          30410760
0946 0  0952          DC     /0952     RED O          30410770
0947 0  1105          DC     /1105     BSP BLK        30410780
0948 0  DA21          DC     /DA21     +   SP         30410790
0949 0  21FF          DC     /21FF     SP             30410800
094A 0  003B          DC     59        ITCNT          30410810
094B 0  11FF          DC     /11FF     BSP            30410820
094C 0  0014          DC     20        ITCNT          30410830
094D 0  0952          DC     /0952     RED O          30410840
094E 0  1105          DC     /1105     BSP BLK        30410850
094F 0  DA21          DC     /DA21     +   SP         30410860
0950 0  21FF          DC     /21FF     SP             30410870
0951 0  003B          DC     59        ITCNT          30410880
0952 0  11FF          DC     /11FF     BSP            30410890
0953 0  0014          DC     20        ITCNT          30410900
```

1131 KEYBOARD-PRINTER TEST

```
0954 0 0952          DC    /0952     RED 0                30410910
0955 0 1105          DC    /1105     BSP BLK              30410920
0956 0 DA21          DC    /DA21     +   SP               30410930
0957 0 21FF          DC    /21FF     SP                   30410940
0958 0 FFFF          DC    /FFFF                          30410950
                     *                                    30410960
                     *                                    30410970
                     *          BACK SPACE AND INDEX      30410980
                     *                                    30410990
0959 0 0001     SPNDX DC    1         ITCNT                30411000
095A 0 8181          DC    /8181     CR  CR               30411010
095B 0 45FF          DC    /45FF     BLACK                30411020
095C 0 0002          DC    2         ITCNT                30411030
095D 0 3611          DC    /3611     E   *                30411040
095E 0 111E          DC    /111E     *   C                30411050
095F 0 1111          DC    /1111     *   *                30411060
0960 0 3E11          DC    /3E11     A   *                30411070
0961 0 1156          DC    /1156     *   P                30411080
0962 0 1111          DC    /1111     *   *                30411090
0963 0 9A11          DC    /9A11     S   *                30411100
0964 0 1111          DC    /1111     *   *                30411110
0965 0 5A11          DC    /5A11     K   *                30411120
0966 0 111E          DC    /111E     *   C                30411130
0967 0 1111          DC    /1111     *   *                30411140
0968 0 3E11          DC    /3E11     A   *                30411150
0969 0 111A          DC    /111A     *   B                30411160
096A 0 8141          DC    /8141     CR  TAB              30411170
096B 0 2213          DC    /2213     I   DX               30411180
096C 0 7613          DC    /7613     N   DX               30411190
096D 0 3213          DC    /3213     D   DX               30411200
096E 0 3613          DC    /3613     E   DX               30411210
096F 0 9613          DC    /9613     X   DX               30411220
0970 0 09FF          DC    /09FF     RED                  30411230
0971 0 0002          DC    2         ITCNT                30411240
0972 0 85FF          DC    /85FF     CR                   30411250
0973 0 FFFF          DC    /FFFF                          30411260
                     *                                    30411270
                     *                                    30411280
                     * AUTOMATIC CARRIER RETURN *         30411290
                     *                                    30411300
0974 0 0001     AUCAR DC    /0001     ITCNT                30411310
0975 0 85FF          DC    /85FF     BLACK                30411320
0976 0 0001          DC    1         ITCNT                30411330
0977 0 1E3C          DC    /1E3C     C   A                30411340
0978 0 6060          DC    /6060     R   R                30411350
0979 0 2034          DC    /2034     I   E                30411360
097A 0 6021          DC    /6021     R                    30411370
097B 0 6034          DC    /6034     R   E                30411380
097C 0 9CB0          DC    /9CB0     T   U                30411390
097D 0 6074          DC    /6074     R   N                30411400
097E 0 21FF          DC    /21FF                          30411410
097F 0 0078          DC    120       ITCNT                30411420
0980 0 21FF          DC    /21FF     SPACE                30411430
0981 0 0001          DC    1         ITCNT                30411440
0982 0 09FF          DC    /09FF     RED                  30411450
0983 0 0001          DC    1         ITCNT                30411460
0984 0 1E3C          DC    /1E3C     C   A                30411470
0985 0 6060          DC    /6060     R   R                30411480
0986 0 2034          DC    /2034     I   E                30411490
0987 0 6021          DC    /6021     R                    30411500
0988 0 6034          DC    /6034     R   E                30411510
0989 0 9CB0          DC    /9CB0     T   U                30411520
098A 0 6074          DC    /6074     R   N                30411530
098B 0 21FF          DC    /21FF                          30411540
098C 0 0078          DC    120       ITCNT                30411550
098D 0 21FF          DC    /21FF     SPACE                30411560
098E 0 FFFF          DC    /FFFF                          30411570
                     *                                    30411580
```


1131 KEYBOARD-PRINTER TEST

```
                     *                                    30411590
098F 0 0001     ROCK  DC    1         ITCNT                30411600
0990 0 85FF           DC    /85FF     BLACK                30411610
0991 0 0002           DC    2         ITCNT                30411620
0992 0 81C0           DC    /81C0     CR  NOS              30411630
0993 0 8040           DC    /8040     .   $                30411640
0994 0 0020           DC    /0020     .   I                30411650
0995 0 60A0           DC    /60A0     R   Z                30411660
0996 0 E0D0           DC    /E0D0     9   6                30411670
0997 0 9050           DC    /9050     W   D                30411680
0998 0 1030           DC    /1030     F   D                30411690
0999 0 70B0           DC    /70B0     M   U                30411700
099A 0 F0D8           DC    /F0D8     4   2                30411710
099B 0 9858           DC    /9858     S   K                30411720
099C 0 1804           DC    /1804     B   A1               30411730
099D 0 4484           DC    /4484     AND -                30411740
099E 0 C4E4           DC    /C4E4     0   8                30411750
099F 0 A464           DC    /A464     Y   Q                30411760
09A0 0 2414           DC    /2414     H   G                30411770
09A1 0 5494           DC    /5494     P   X                30411780
09A2 0 D4F4           DC    /D4F4     7   5                30411790
09A3 0 B474           DC    /B474     V   N                30411800
09A4 0 341C           DC    /341C     E   C                30411810
09A5 0 5C9C           DC    /5C9C     L   T                30411820
09A6 0 DCFC           DC    /DCFC     3   1                30411830
09A7 0 BC7C           DC    /BC7C     /   J                30411840
09A8 0 3C21           DC    /3C21     A                    30411850
09A9 0 0242           DC    /0242     CNT ECX              30411860
09AA 0 82C2           DC    /82C2     CLN =                30411870
09AB 0 E2A2           DC    /E2A2     QTE Z                30411880
09AC 0 6222           DC    /6222     R   LOR              30411890
09AD 0 1252           DC    /1252     F   Q                30411900
09AE 0 92D2           DC    /92D2     W   SMI              30411910
09AF 0 F2B2           DC    /F2B2     I   U                30411920
09B0 0 7232           DC    /7232     M   D                30411930
09B1 0 1A5A           DC    /1A5A     B   K                30411940
09B2 0 9ADA           DC    /9ADA     S   T                30411950
09B3 0 C686           DC    /C686     LNT QSN              30411960
09B4 0 4606           DC    /4606     GTR PCT              30411970
09B5 0 2666           DC    /2666     H   Q                30411980
09B6 0 A6E6           DC    /A6E6     Y   '                30411990
09B7 0 D696           DC    /D696     *   X                30412000
09B8 0 5616           DC    /5616     P   G                30412010
09B9 0 3676           DC    /3676     E   N                30412020
09BA 0 B6F6           DC    /B6F6     V   )                30412030
09BB 0 DE9E           DC    /DE9E     LES T                30412040
09BC 0 5E1E           DC    /5E1E     L   C                30412050
09BD 0 3E7E           DC    /3E7E     A   J                30412060
09BE 0 BEFE           DC    /BEFE     UDR (                30412070
09BF 0 09FF           DC    /09FF     RED                  30412080
09C0 0 FFFF           DC    /FFFF                          30412090
                     *                                    30412100
                     *                                    30412110
09C1 0 0001     ROLL  DC    1         ITCNT                30412120
09C2 0 85FF           DC    /85FF     BLACK                30412130
09C3 0 0002           DC    2         ITCNT                30412140
09C4 0 81C0           DC    /81C0     CR  NOS              30412150
09C5 0 E0D0           DC    /E0D0     9   6                30412160
09C6 0 F0D8           DC    /F0D8     4   2                30412170
09C7 0 C4E4           DC    /C4E4     0   8                30412180
09C8 0 D4F4           DC    /D4F4     7   5                30412190
09C9 0 DCFC           DC    /DCFC     3   1                30412200
09CA 0 BC9C           DC    /BC9C     /   T                30412210
09CB 0 B494           DC    /B494     V   X                30412220
09CC 0 A484           DC    /A484     Y   -                30412230
09CD 0 98B0           DC    /98B0     S   U                30412240
09CE 0 90A0           DC    /90A0     M   Z                30412250
09CF 0 8040           DC    /8040     ,   $                30412260
```

```
09D0 0 6050          DC    /6050    R   O          30412270
09D1 0 7058          DC    /7058    M   K          30412280
09D2 0 4464          DC    /4464    AND Q          30412290
09D3 0 5474          DC    /5474    P   N          30412300
09D4 0 5C7C          DC    /5C7C    L   J          30412310
09D5 0 3C1C          DC    /3C1C    A   C          30412320
09D6 0 3414          DC    /3414    E   G          30412330
09D7 0 2404          DC    /2404    H   AT         30412340
09D8 0 1830          DC    /1830    B   D          30412350
09D9 0 1020          DC    /1020    F   I          30412360
09DA 0 0021          DC    /0021    .              30412370
09DB 0 3E1E          DC    /3E1E    A   C          30412380
09DC 0 3616          DC    /3616    E   G          30412390
09DD 0 2606          DC    /2606    H   PCT        30412400
09DE 0 1A32          DC    /1A32    B   D          30412410
09DF 0 1222          DC    /1222    F   I          30412420
09E0 0 0242          DC    /0242    CNT EXC        30412430
09E1 0 6252          DC    /6252    R   O          30412440
09E2 0 725A          DC    /725A    M   K          30412450
09E3 0 4666          DC    /4666    GTR Q          30412460
09E4 0 5676          DC    /5676    P   N          30412470
09E5 0 5E7E          DC    /5E7E    L   J          30412480
09E6 0 BE9E          DC    /BE9E    UDR T          30412490
09E7 0 B696          DC    /B696    V   X          30412500
09E8 0 A686          DC    /A686    Y   QSN        30412510
09E9 0 9AB2          DC    /9AB2    S   U          30412520
09EA 0 92A2          DC    /92A2    W   Z          30412530
09EB 0 82C2          DC    /82C2    CLN =          30412540
09EC 0 E2D2          DC    /E2D2    QTE SMI        30412550
09ED 0 F2DA          DC    /F2DA    LNT +          30412560
09EE 0 C6E6          DC    /C6E6    LOR '          30412570
09EF 0 D6F6          DC    /D6F6    *   )          30412580
09F0 0 DEFE          DC    /DEFE    LES (          30412590
09F1 0 29FF          DC    /29FF    RED            30412600
09F2 0 FFFF          DC    /FFFF                   30412610
                     *                             30412620
                     *                             30412630
09F3 0 0001    TWIST DC    1        ITCNT          30412640
09F4 0 85FF          DC    /85FF    BLACK          30412650
09F5 0 0002          DC    2        ITCNT          30412660
09F6 0 81C0          DC    /81C0    CR  NDS        30412670
09F7 0 3E80          DC    /3E80    A   ,          30412680
09F8 0 7E40          DC    /7E40    J   $          30412690
09F9 0 BE00          DC    /BE00    UDR .          30412700
09FA 0 FE20          DC    /FE20    (   I          30412710
09FB 0 DE60          DC    /DE60    LES R          30412720
09FC 0 9EA0          DC    /9EA0    T   Z          30412730
09FD 0 5EE0          DC    /5EE0    L   9          30412740
09FE 0 1ED0          DC    /1ED0    C   6          30412750
09FF 0 3690          DC    /3690    E   W          30412760
0A00 0 7650          DC    /7650    N   O          30412770
0A01 0 8610          DC    /8610    V   F          30412780
0A02 0 F630          DC    /F630    )   D          30412790
0A03 0 D670          DC    /D670    *   M          30412800
0A04 0 96B0          DC    /96B0    X   U          30412810
0A05 0 56F0          DC    /56F0    P   4          30412820
0A06 0 16D8          DC    /16D8    G   2          30412830
0A07 0 2698          DC    /2698    H   S          30412840
0A08 0 6658          DC    /6658    Q   K          30412850
0A09 0 A618          DC    /A618    Y   B          30412860
0A0A 0 E604          DC    /E604    '   AT         30412870
0A0B 0 C644          DC    /C644    LOR AND        30412880
0A0C 0 8684          DC    /8684    QSN -          30412890
0A0D 0 46C4          DC    /46C4    GTR 0          30412900
0A0E 0 06E4          DC    /06E4    PCT 8          30412910
0A0F 0 1AA4          DC    /1AA4    B   Y          30412920
0A10 0 5A64          DC    /5A64    K   Q          30412930
0A11 0 9A24          DC    /9A24    S   H          30412940
```



```
0A12 0 DA14          DC    /DA14    +   G          30412950
0A13 0 F254          DC    /F254    LNT P          30412960
0A14 0 B294          DC    /B294    U   X          30412970
0A15 0 72D4          DC    /72D4    M   7          30412980
0A16 0 32F4          DC    /32F4    D   5          30412990
0A17 0 12B4          DC    /12B4    F   V          30413000
0A18 0 5274          DC    /5274    O   N          30413010
0A19 0 9234          DC    /9234    W   E          30413020
0A1A 0 D21C          DC    /D21C    SMI C          30413030
0A1B 0 E25C          DC    /E25C    QTE L          30413040
0A1C 0 A29C          DC    /A29C    Z   T          30413050
0A1D 0 62DC          DC    /62DC    R   3          30413060
0A1E 0 22FC          DC    /22FC    I   1          30413070
0A1F 0 02BC          DC    /02BC    CNT /          30413080
0A20 0 427C          DC    /427C    EXC J          30413090
0A21 0 823C          DC    /823C    CLN A          30413100
0A22 0 C225          DC    /C225    (   BLACK      30413110
0A23 0 29FF          DC    /29FF    RED            30413120
0A24 0 FFFF          DC    /FFFF                   30413130
                *****************************************  30413140
                *****************************************  30413150
                *                                        30413160
                *          PRINTER OUTPUT STATUS         30413170
                *                TABLES                  30413180
                *             PRINTER NO 0               30413190
0A26    0000         BSS   E 0                    LABEL  30413200
0A26 1 08FA    PTRO  DC      TACAR    WORD POINTER  ADR  30413210
0A27 0 0002          DC      2        TEST POINTER  RTN  30413220
0A28 0 8000          DC      /8000    PTR STATUS    STS  30413230
                *             /A000    SELECT KBD         30413240
                *             /C000    READ KBD NEXT      30413250
                *             /FC00-FFFE COUNT FOR INTERRUPT 30413260
                *             /FFFF    LOST INT ERROR     30413270
                *             /E000    WAIT TYP READ INTERT 30413280
                *             /F000    WAIT KBD INT       30413290
                *             /8000    IGNORE             30413300
0A29 0 81FF          DC      /81FF    NEXT PTR OUTPUT WORD OUT 30413310
0A2A 0 0001          DC      1        ITERATION COUNT  ITR  30413320
0A2B 0 0001          DC      1        SHIFT WORD       SLT  30413330
0A2C 0 0000          DC               WORDS PRINTED    NDS  30413340
0A2D 0 0000          DC               LAST ITCNT ADDR PT PAD 30413350
0A2E 1 0A29          DC      PTRO+OUT                  WRT  30413360
0A2F 0 0900          DC      /0900    WRITE COMMAND       30413370
0A30 0 0000          DC      0                         PTR  30413380
0A31 0 0F01          DC      /0F01    SENSE DSW COMMAND   30413390
0A32 0 0000          DC               SENSE - NO RESET SNR 30413400
0A33 0 0F00          DC      /0F00                        30413410
0A34 0 0000          DC                                KEY  30413420
0A35 0 0C00          DC      /0C00    SELECT KEYBOARD CMD 30413430
0A36 1 0A34          DC      PTRO+KEY                  SEE  30413440
0A37 0 0A00          DC      /0A00    READ KEYBOARD CMD   30413450
0A38 0 0000          DC      /0000    ERROR DSW WAS    ERR 30413460
0A39 0 0000          DC      /0000    DSW SHOULD HAVE BEEN 30413470
0A3A 1 0A3C    RDBS  DC      BITSW                        30413480
0A3B 0 3A00          DC      /3A00                        30413490
0A3C 0 0000    BITSW DC      /0000                        30413500
                *                                        30413510
                *                                        30413520
                *          KEYBOARD - CONSOLE SWITCH     30413530
                *               STATUS ROUTINE           30413540
                *                                        30413550
                *          THIS ROUTINE PRINTS ANY       30413560
                *           CHANGE IN THE STATUS OF      30413570
                *           OF THE CONSOLE/KEYBOARD      30413580
                *           SWITCH.  IF NO CHANGE        30413590
                *           IS MADE THEN NOTHING IS      30413600
                *           PRINTED.                     30413610
                *                                        30413620
```

```
0A3D 0  0000        SWSET DC
0A3E 0  08F3              XIO    SNR+PTR0    SENSE DEVICE STATUS
0A3F 0  F03E              EOR    LAST        CHECK SWITCH SETTING
0A40 01 E4000A80          AND  L K1000
0A42 0  E83C              OR     FIRST
0A43 01 4C980A3D          BSC  I SWSET,+-    RETURN IF NOT CNGED
                    *
0A45 0  08EC              XIO    SNR+PTR0    SENSE DEVICE STATUS
0A46 01 E4000A80          AND  L K1000
0A48 0  D035              STO    LAST
0A49 01 4C200A56          BSC  L SWSC,Z      BR IF IN CONSOLE
                    *
0A4B 01 C4000641          LD   L TWLVE       SET ROUTINE NO.
0A4D 01 D40005DD          STO  L RID
                    *
0A4F 0  1010              SLA    16
0A50 01 D400085C          STO  L ANY+3
                    *
0A52 00 6500A000          LDX  L1 /A000      SET TO SELECT KBD NEXT
0A54 0  C02C              LD     KBMES       KEYBOARD MESSAGE
0A55 0  701A              MDX    SWSP        GO PRINT THE SWS
                    *
0A56 01 44000812    SWSC  BSI  L ENDM        TERMINATE KBD ENTRY
0A58 0  1810              SRA    16
0A59 01 C40005E0          LD   L SW1
0A5B 0  18C1              RTE    1
0A5C 0  4820              BSC    Z
0A5D 0  1081              SLT    1
0A5E 0  D001              STO    *+1
0A5F 00 65000000          LDX  L1 /0000
0A61 01 C400085B          LD   L ANY+2       CHECK IF ANY KBD ENTRY
0A63 0  4810              BSC    -           BR IF TABLE EMPTY
0A64 0  6101              LDX    1 1         SET TO LOOP RTN 1
0A65 0  69C1        SWSD  STX    1 RTN+PTR0
0A66 01 C500084E          LD   L1 FUNR
0A68 0  D0BD              STO    ADR+PTR0
0A69 01 C400085A          LD   L ANY+1
0A6B 0  D06D              STO    OUT+PTR0
                    *
0A6C 01 6D0005E0    SWSE  STX  L1 SW1        SET OR CLEAR LOOP RTN
0A6E 0  08C7              XIO    SEE+PTR0    DESELECT KEYBOARD
                    *
0A6F 0  C018              LD     CNMES       CONSOLE MESSAGE
                    *
0A70 0  D00C        SWSP  STO    LOGM+4      SAVE MESSAGE
0A71 0  6986              STX    1 STS+PTR0  SET PRINTER STATUS
0A72 0  1010              SLA    16
0A73 0  D008              STO    FIRST       RESET FIRST INDICATOR
                    ********************************************
0A74 00 44800163          BSI  I LOG                          *
0A76 1  0A79              DC     LOGM        ADRS OF MESS     *
                    ********************************************
0A77 01 4C00065C          BSC  L GO3         RETURN TO MAINLINE
                    *
0A79 0  0000        LOGM  DC     /0000
0A7A 0  0000              DC     /0000
0A7B 0  0000              DC     /0000
0A7C 0  0000              DC     /0000
0A7D 0  0000              DC     /0000
                    *
                    *
0A7E 0  0000        LAST  DC     /0000       LAST KBD/CNSL SW SET
0A7F 1  0A7F        FIRST DC     FIRST       PROG RESRT INDICATOR
0A80 0  1000        K1000 DC     /1000       CONSTANT
                    *
0A81 1  0A82        KBMES DC     KBMES+1
0A82 0  5A36              DC     /5A36       KEYBOARD
0A83 0  A61A              DC     /A61A
```

```
30413630
30413640
30413650
30413660
30413670
30413680
30413690
30413700
30413710
30413720
30413730
30413740
30413750
30413760
30413770
30413780
30413790
30413800
30413810
30413820
30413830
30413840
30413850
30413860
30413870
30413880
30413890
30413900
30413910
30413920
30413930
30413940
30413950
30413960
30413970
30413980
30413990
30414000
30414010
30414020
30414030
30414040
30414050
30414060
30414070
30414080
30414090
30414100
30414110
30414120
30414130
30414140
30414150
30414160
30414170
30414180
30414190
30414200
30414210
30414220
30414230
30414240
30414250
30414260
30414270
30414280
30414290
30414300
```



```
0A84 0  523E              DC     /523E
0A85 0  6232              DC     /6232
0A86 0  8100              DC     /8100
0A87 0  FFFF              DC     /FFFF       TERMINATOR
                    *
0A88 1  0A89        CNMES DC     CNMES+1
0A89 0  1E52              DC     /1E52       CONSOLE
0A8A 0  769A              DC     /769A
0A8B 0  525E              DC     /525E
0A8C 0  3600              DC     /3600
0A8D 0  FFFF              DC     /FFFF       TERMINATOR
                    ********************************************
                    *
0A8E    0643              END    TYCUS
```

```
30414310
30414320
30414330
30414340
30414350
30414360
30414370
30414380
30414390
30414400
30414410
30414420
30414430
30414440
```

1131 KEYBOARD-PRINTER TEST

CROSS REFERENCE LISTING

SYMBOL	VALUE	REFERENCES
ADR	0000	06DE,06E3,0A68
ALL	0734	072E
ANY	0859	0615,061B,064B,065A,065E,07E3,07E5,0802,0806,080D, 0813,0819,081D,081F,0823,0826,082A,084E,0A50,0A61, 0A69
AUCAR	0974	0854
BASIC	0735	072A
BEGIN	0160	0000,0643
BITSW	0A3C	06B9,0A3A
BSPSE	07CD	080F
BSYOK	0755	075E
CMPRE	07D0	07B1
CNMES	0A88	0A6F,0A88
CNVRT	07AE	0784
COLOR	0943	0852
COMIN	05E7	0639,073A,0781,07F2
COMIX	0639	061D,0623,0630
COMI3	05FD	05F8
DSWAS	076F	0742,0746,0788,078B,078F
DSWBS	0771	0776,0777,0795,079A
DSWBY	076D	0752,0757
DSWIT	063D	05EA,05FF,0607,061F,0625,062C,0632
ELVEN	084D	06A4,06A8
EMESG	0845	07BE,0834,0835,0838,083B
END	0164	0000,0000,0000,0000,0876
ENDM	0812	0831,0A56
ENDM1	0821	0818
ENDM2	0829	0816
ENDM3	082B	0828
ERIND	0640	0618,0638,064D,066C,0760
ERLCK	0166	
ERR	0012	0637,0762,0768
ERROR	0162	0000,0836
ERSE	07F9	07BB
ERSEA	07CC	07F9,07FA
ERSE1	0809	07FF
ERSE2	080F	0808
ERSLC	07C9	07B9
EXEC3	068D	0678
EXEC7	0693	07A1
EXEC9	0696	0687,068A,06CA,0714
EXIT	07E9	07DF,07EC
FIRST	0A7F	0646,0A42,0A73,0A7F
FUND	0858	0734,0825,0829
FUNR	084E	06D4,06D9,0734,0A66
FO200	0772	0796,079C
GO	0646	05DE,05E3,05E4
GO3	065C	0A77
I	069C	06BF,06C1,06E1,0704,0708,0717,071D
IL0	017A	0000
IL1	018A	0000
IL2	019A	0000
IL3	01AA	0000
IL4	01BA	0000
INERR	075F	066D
ITR	0004	0660,06D6,0716,0719,0723
KA000	063C	05FB,05FD,060A
KBDRQ	0603	05ED
KBDSV	062A	05F3
KBD2	060A	0604
KBE00	0642	0608
KBMES	0A81	0A54,0A81
KCNSL	0774	0600,0626,0633,0747,0758,0778,0790,079B
KC000	063F	062A
KECOD	0878	07AE

1131 KEYBOARD-PRINTER TEST

KEFFF	0773	0620,062E,0743,0753,078C,0797
KEY	000E	0793,07B0,07B5,078A,07C1,0A36
KEYBD	07A3	0685
KEYER	0636	0602,0609,0629
KE000	0844	05F6,07E9
KFFE7	07CB	07FB
KFF00	0770	0713
KF000	07CF	05F1,0789
KF800	069E	068F
K0C00	076E	0754,0759
K0001	069F	0681,0684
K0008	07CE	082B
K1000	0A80	0A40,0A46
K4200	063B	062D,0635
K8000	063E	0622,0628,0779
LAST	0A7E	0A3F,0A48
LCASE	0927	0851
LOG	0163	00C0,0A74
LOGBY	0167	0736,07EE
LOGM	0A79	0A70,0A76
LOWER	07C7	C7C5,07D2,07D8
MARK	06A0	0755
MARKE	0731	072D
MARKG	06E3	06A6,070E
MARKL	06E5	06D2
MARKN	0712	0709
MARKP	06FD	06E7,06EE,06FC
MARKQ	06FF	06E8
MARKR	0701	06E9
MARKS	070A	0706
MARKT	06B4	06AD
MARKU	06B5	06AC,06B4
MARKZ	06FC	06F6
MARK1	06BB	06C4,06C9
MARK2	06CB	06DB
MARK3	06CD	072B,072F
MARK4	06CE	0733
MARK5	06D9	071A,0726
MLSCF	05E5	0698,06AE,06F8,0840
NCAP	07C8	07B6
NOCP	07C5	07B7
NOIN	0775	068B
NOS	0006	0663,06E0,070A,070C,071C,071F
OUT	0003	06C3,0712,07D6,08I0,0A2E,0A6B
PAD	0007	0664,06D8,06DD,0720,0721
PDSWX	0840	074E,07F0
PID	05DC	0645
PRCON	066C	066B,0696,0769,077F,0798,07F7
PRDSW	0833	074A,075C,0765,077D,079F,07A9,07C2,083E
PTR	000A	0741,0751,0775,0787,0794,07A4
PTRO	0A26	05E8,0648,065C,0674,0688,0694,06CE,06E3,06E5,06EA, 06F0,073E,0762,082C,083C,0A2E,0A36,0A3E,0A45,0A65, 0A68,0A6B,0A6E,0A71
RAD	05DE	
RDBS	0A3A	06B7
RDY2	074C	0738
READY	0736	0691,074C
RED1	0909	0821
RESTO	069D	0677,0693
RID	05DD	064F,066F,06AA,06D0,06EC,06F2,0A4D
RLCF	0168	
ROCK	098F	0855
ROLL	09C1	0856
RQKB	01BC	0000,0783
RQTY	01BB	0000,073C,07F4
RTN	0001	060E,06CE,06E5,06EA,06F0,0A65
RTNSW	0165	0680,06F4
SEE	0010	060C,07A3,0A6E

1131 KEYBOARD-PRINTER TEST

TABLE OF CONTENTS

3. OPERATING PROCEDURE

THESE OPERATING PROCEDURES APPLY TO SINGLE PROGRAM OPERATION ONLY. FOR OVERLAP OPERATION, REFER TO SECTION 3.2.3 OF THE 1130 DIAGNOSTIC MONITOR II DOCUMENTATION.

3.1*** PROGRAM LOADING

STANDARD MONITOR LOADING PROCEDURES APPLY

THESE PROCEDURES ARE SUMMARIZED HERE. SEE DM USE PROCEDURE FOR DETAILS.

1. SET FIRST TYPEWRITER TAB 20 CHARACTERS FROM LEFT MARGIN.
2. SET BIT SWITCH 15 OFF - LOAD AND GO
   ON - TO HALT AFTER LOADING

   IF HALT AFTER LOADING, SELECT PROGRAM OPTIONS THEN TURN OFF HALT SWITCH OR FOLLOW NORMAL RESTART PROCEDURE (SECTION 3.5).
3. LOAD DIAGNOSTIC MONITOR AND THIS PROGRAM.
4. SELECT PROGRAM OPTIONS, IF DESIRED.

******

3.2*** PROGRAM OPERATION.

3.2.1 PROGRAM CONTROL - FUNCTION 0

1. SET SWITCHES 0-7 TO 01.
2. SET SWITCHES 8-15 AS DESIRED.

SW	FUNCTION
8	RESTART
9	ROUTINE START MESSAGE
10	LOCK ON FUNCTION
11	LOOP PROGRAM
12	LOOP ON ERROR
13	BYPASS ERROR PRINTOUT
14	HALT ON ERROR
15	HALT

3. PRESS INT REQ KEY ON CONSOLE.

**

3.2.2 ROUTINE SELECTION - FUNCTION 1

THE SELECTED ROUTINE WILL LOOP UNTIL A NEW ROUTINE IS SELECTED OR ROUTINE SELECTION IS RESET.

1. TO SET ROUTINE SELECTION

   A. SET SWITCHES 0-7 TO 41.
   B. SET ROUTINE NUMBER IN SWITCHES 12-15.

RTN		DESCRIPTION	
1		PEN UP-PEN DOWN OCTAGON TEST.	NORMAL ROUTINES-
2		REGISTRATION TEST	THE PROGRAM STARTS WITH
3		SWING TEST	ROUTINE 1, RUNS EACH
4.	*	STRESS TEST	ROUTINE IN SEQUENCE
			THEN TERMINATES AFTER
			ROUTINE 4.
5.	*	SELECTION COMMAND	OPTIONAL ROUTINES
			THESE ROUTINES RUN
			ONLY IF SELECTED.

* _ REFER TO SECTION 3.2.3 FOR SPECIAL INSTRUCTIONS.

   C. PRESS INT REQ KEY ON CONSOLE.

2. TO RESET ROUTINE SELECTION, SET AS IF SELECTING ROUTINE ZERO.

**

3.2.3 PROGRAM OPTION

ROUTINE 5 - SELECTION COMMAND

AFTER SELECTION BY FUNCTION 1, THE CONTROL COMMAND DATA IS TAKEN FIRST FROM BITS 0-5 AND THEN FROM 8-13.

ACTION OR MOTION	BITS
LOWER PEN TO PAPER	0 OR 8
UP (PAPER MOVES DOWN)	1 9
DOWN (PAPER MOVES UP)	2 10
RIGHT	3 11
LEFT	4 12
RAISE PEN FROM PAPER	5 13

******

3.3*** PROGRAM HALTS

3.3.1 NORMAL HALTS

HALT NO. (B REG)	DESCRIPTION	RESTART ACTION
3001	PROGRAM STOP OR ADDRESS STOP	PRESS START
3002	HALT ON ERROR	PDISPLAY MODE-PRESS START RUN MODE-PRESS START

**

3.3.2 ERROR HALTS

HALT NO. (B REG)	DESCRIPTION	RESTART ACTION
30F1	CHECK SUM ERROR ON FIRST CARD OF LOADER	RELOAD
30F2	READER DSW ERROR WHEN LOADING LOADER	RELOAD
30F3	CARD 2 OF LOADER DID NOT LOAD	RELOAD
30F4	CAN NOT CLEAR CORE - DUE TO ERROR IN ADDRESSING UPPER CORE.	
30F5	READER CHECK WHEN LOADING MONITOR OR TEST PROGRAM	NPRO THEN PLACE CARDS RUN OUT IN FRONT OF REMAINING DECK AND PRESS START.
30F6	MONITOR DID NOT LOAD	RELOAD
30F7	CHECK SUM WHEN LOADING MONITOR	RELOAD
30F8	READER NOT READY	MAKE READER READY
30F9	INVALID INTERRUPT WHICH WILL NOT RESET	PRESS RESET AND START
30FA	CONSOLE PRINTER HANG UP - BUSY WILL NOT GO OFF	FIX THE CONSOLE PRINTER

******

3.4*** PROGRAM TERMINATION

IF LOOP PROGRAM HAS NOT BEEN SPECIFIED THE PROGRAM WILL TERMINATE AT THE END OF ROUTINE 4. ROUTINE 5 WILL ONLY RUN IF SELECTED.

IF ANY ROUTINE IS SELECTED THAT ROUTINE WILL LOOP AND WILL NOT TERMINATE.

******

3.5*** RESTART

1. SET SWITCHES 0-7 TO 01.
2. TURN ON SWITCH 8.
3. SET DESIRED CONTROL IN SWITCHES 9-14.
4. PRESS INTERRUPT REQUEST KEY.

****

4. PRINTOUTS

ALL PRINTOUTS ARE IN THE STANDARD FORMAT.

```
APPNN CCRR AAAA                (MESSAGE)
OR
EPPNN CCRR AAAA                (MESSAGE)
```

WHERE	A	IDENTIFIES STATUS MESSAGES
	E	IDENTIFIES ERROR MESSAGES
	PP	IS THE PID OF THE PROGRAM CAUSING THE MESSAGE
		THIS WILL BE EITHER 00 FOR MESSAGES ORIGINATED BY THE MONITOR OR 0B FOR MESSAGES ORIGINATED BY THIS PROGRAM.
	NN	IS THE MESSAGE SEQUENCE NUMBER
	RR	IS THE ROUTINE NUMBER
	AAAA	IS THE ADDRESS OF THE ROUTINE
	MESSAGE	IS ANY VARIABLE INFORMATION

4.1*** STATUS MESSAGES

A0000 NUM PID ADRS RELF LD
XXXX XXXX XXXX XXXX

THIS MESSAGE IS PRINTED FOLLOWING THE LOADING OF ANY PROGRAM (EXCEPT MONITOR), THE MESSAGE GIVES THE LOAD SEQUENCE NUMBER, THE PROGRAM ID, THE ADDRESS INTO WHICH THE PROGRAM WAS LOADED, AND THE RELOCATION FACTOR.

A0001 SWS PID
XXXX XXXX

THIS MESSAGE IS PRINTED EACH TIME A VALID SWITCH ENTRY IS READ BY THE MONITOR. THE MESSAGE CONTAINS THE SWITCH SETTING READ TOGETHER WITH THE PROGRAM ID OF THE PROGRAM INTO WHICH THE CONTENTS OF SWITCHES 8-15 WERE STORED. IF THE SWITCH ENTRY CALLED FOR HALT OF ANY PROGRAM, THE WORD HALT WILL FOLLOW THE MESSAGE.

A0500 00RR AAAA

ROUTINE START MESSAGE - IF SWITCH 9, FUNCTION 0, IS TURNED ON, THIS MESSAGE WILL BE PRINTED BEFORE THE START OF EACH ROUTINE. R IS THE NUMBER OF THE NEXT ROUTINE AND AAAA IS THE STARTING ADDRESS.

A05C5 CCRR NRDY

PLOTTER POWER IS TURNED OFF.

A05C8 CCRR PROG HALT

INDICATES PROGRAM HAS BEEN HALTED BY BIT SWITCH 15 FUNCTION 00 BEING SET ON. SET BIT 15 OFF TO CONTINUE.

4.2*** ERROR MESSAGES

THE DSW IS CHECKED FOR ABSOLUTE CORRECTNESS AT ALL TIMES. IF AN ERROR IS DETECTED ONE OF THE MESSAGES BELOW WILL INDICATE THE PROBLEM. IT IS LEFT TO THE OPERATOR TO ANALYZE THE DSW FOR THE SPECIFIC PROBLEM AREA.

THE PLOTTER DSW

BIT	
0	PLOTTER RESPONSE
1	NOT USED
2	NOT USED
3	NOT USED
4	NOT USED
5	NOT USED
6	NOT USED
7	NOT USED
8	NOT USED
9	NOT USED
10	NOT USED
11	NOT USED
12	NOT USED
13	NOT USED
14	BUSY
15	NOT READY

E0001 SWS INVLD
XXXX

THE SETTING OF SWITCHES 4-7 DID NOT EQUAL THE LOAD SEQUENCE NUMBER OF ANY PROGRAM IN CORE.

E0003 OVR CORE

THE PROGRAM WHICH THE LOADER WAS ATTEMPTING TO LOAD EXCEEDED AVAILABLE CORE. LOADING WAS TERMINATED.

E0004 CKSUM

A CHECK SUM ERROR WAS DETECTED WHILE LOADING A TEST PROGRAM. THIS ERROR OCCURS UNDER ANY OF THE FOLLOWING CONDITIONS.

1. A CARD IS MISSING OR IS OUT OF SEQUENCE.
2. THERE IS AN EXTRA CARD IN THE DECK.
3. THE PUNCHED INFORMATION ON THE CARD IS NOT CORRECT.
4. DATA WAS LOST OR PICKED UP DUE TO A MACHINE MALFUNCTION.
5. DUE TO A CPU MALFUNCTION, THE CHECK SUM WAS NOT CORRECTLY CALCULATED.

WHEN THIS ERROR OCCURS ATTEMPT TO RELOAD THE PROGRAM.

E0005 000N XXXX

THIS ERROR WILL OCCUR IS AN INTERRUPT OCCURS, BUT THE ILSW WAS NOT CORRECT. N IS THE INTERRUPT LEVEL AND XXXX IS THE ILSW. THIS PRINTOUT WILL ONLY OCCUR IF THE INTERRUPT IS RESET BY A BOSC. NO ATTEMPT IS MADE BY THE ERROR ROUTINE TO RESET THE REQUEST BIT.

E0501 000R AAAA WAS S/B DSW
XXXX 0000

STATIC DSW ERROR. THIS DSW IS SENSED BEFORE GIVING A CONTROL COMMAND TO THE 1627. ANY BITS ON INDICATE AN ERROR. IF BIT 15 IS ON (NOT READY), CHECK FOR 1627 POWER ON.

E0502 000R AAAA WAS S/B BUSY DSW
XXXX 0002

BUSY DSW ERROR. THIS DSW WAS SENSED IMMEDIATELY AFTER A CONTROL COMMAND WAS GIVEN TO THE 1627. IT SHOULD SHOW THE 1627 BUSY. NO OTHER BITS SHOULD BE ON.

IF THIS ERROR OCCURS DURING OVERLAP SEE NOTE ON I/O TEST INDEX PAGE, P/N 2191291.

E0503 000R AAAA DSW NO INTRPT
XXXX

NO INTERRUPT WAS RECEIVED AFTER A CONTROL COMMAND TO THE 1627. THE DSW WAS SENSED AT LEAST 2 SECONDS AFTER THE 1627 COMMAND.
IF A BUSY DSW ERROR (E0502) IS ALSO INDICATED, THE CONTROL COMMAND WAS NOT RECEIVED BY THE 1627.

E0504 000R AAAA WAS S/B INTRPT DSW

INTERRUPT DSW ERROR. THIS DSW WAS SENSED IN INTERRUPT. IT SHOULD SHOW THE RESPONSE BIT ON AND ALL OTHER BITS OFF.

---

5. COMMENTS

5.1*** ROUTINE 1 (PEN UP-PEN DOWN OCTAGON TEST)

THE PURPOSE OF THIS ROUTINE IS TO TEST THE CAPABILITY OF THE PLOTTER TO EXECUTE THE PEN UP AND PEN DOWN PLOTTER COMMANDS. IN THIS ROUTINE, AS IN THE OTHER PLOTTER PATTERN GENERATING ROUTINES, AN ADDRESS TABLE IS USED TO SELECT THE CORRECT PLOTTER COMMANDS. THE ADDRESS TABLE, IN TURN, POINTS TO A PAIR OF COMPUTER WORDS. ONE WORD CONTAINS A NUMBER WHICH INDICATES THE NUMBER OF TIMES THE OTHER WORD (THE PLOTTER COMMAND) IS TO BE EXECUTED.

THE PATTERN PLOTTED IN THIS FUNCTION TEST CONTAINS TWO ADJACENT OCTAGONS, WHOSE SIDES ARE ONE AND ONE HALF INCHES IN LENGTH. OCTAGON NO. 1 (LEFTMOST OCTAGON) IS PLOTTED IN A CLOCKWISE DIRECTION. OCTAGON NO. 2 (RIGHTMOST OCTAGON) IS PLOTTED IN A COUNTER CLOCKWISE DIRECTION.

THIS ROUTINE IS DESIGNED SO THAT, IF A PEN UP COMMAND IS NOT EXECUTED AS IT SHOULD BE, A LINE WILL BE DRAWN IN THE INNER PORTION OF THE OCTAGON. IF A PEN DOWN COMMAND IS NOT EXECUTED, A SIDE OF THE OCTAGON WILL BE MISSING. FIGURE 1 SHOWS AN EXAMPLE OF THE OUTPUT OF THIS ROUTINE.

5.2*** ROUTINE 2 REGISTRATION TEST

THE FUNCTION OF THIS ROUTINE IS TO DETERMINE IF ANY ADJUSTMENTS ARE NEEDED IN THE PEN OR DRUM MOVEMENT MECHANISMS. FIGURE 2 SHOWS THE PATTERN GENERATED BY THIS ROUTINE. IF ANY OF THE LINES FAIL TO INTERSECT, MECHANICAL ADJUSTMENT OF THE PLOTTER IS NECESSARY.

5.3*** ROUTINE 3 SWING TEST

THE PURPOSE OF THIS ROUTINE IS TO TEST THE ABILITY OF THE PLOTTER TO PLOT LONG LINE SEGMENTS IN VARIOUS DIRECTIONS. THE PATTERN GENERATED BY THIS ROUTINE IS SO DESIGNED, THAT IF PLOTTER COMMANDS ARE NOT EXECUTED OR EXTRA COMMANDS ARE EXECUTED, THE CORNERS OF THE PATTERN WILL NOT JOIN. THIS TEST WILL ALSO SHOW UP ANY MALADJUSTMENT IN THE PEN OR DRUM MECHANISM.

THE METHOD USED IN GENERATING THE PATTERN IS AS FOLLOWS,

A. THE LEFT AND TOP SIDES OF A SERIES OF SQUARES ARE DRAWN AS A CONTINUOUS LINE, VARYING IN SIZE FROM 10 TO 2 INCHES.

B. THE RIGHT AND BOTTOM SIDES OF THE SERIES OF SQUARES ARE DRAWN IN ONE QUARTER INCH LINE SEGMENTS, JOINED TOGETHER, AND TOTALING THE LENGTH OF THE LEFT AND TOP SIDES.

C. ON COMPLETING THE PLOTTING OF THE SQUARES, LINES ARE DRAWN (BOTH SEGMENTED AND CONTINEOUS) THRU THE CORNERS OF THE SQUARES. ALL OF THESE DIAGONAL LINES SHOULD INTERSECT THE CORNERS OF THE SQUARES PERFECTLY.

FIGURE 3 SHOWS THE PLOTTER PATTERN GENERATED BY THIS ROUTINE.

5.4*** ROUTINE 4 STRESS TEST (WINDMILL PATTERN)

THE PURPOSE OF THIS ROUTINE IS TO EXERCISE ALL OF THE MECHANICAL FUNCTIONS OF THE PLOTTER. THIS OBJECTIVE IS ACCOMPLISHED BY PLOTTING A PATTERN OF TRIANGLES, ROUGHLY RESEMBELING A WINDMILL. EACH SIDE OF THE TRIANGLE CONSISTS OF A SERIES OF SHORT SAWTOOTH-LIKE SEGMENTS, WHICH TESTS THE ABILITY OF THE PLOTTER TO PLOT SHORT LINE SEGMENTS WITH ABRUPT CHANGES IN DIRECTION. A SET OF FIVE TRIANGLES IS PLOTTED, THE AXIS IS THEN ROTATED 90 DEGREES AND FIVE MORE TRIANGLES ARE PLOTTED IN THE SAME MANNER UNTIL, FINALLY, FOUR SETS OF TRIANGLES HAVE BEEN PLOTTED. WHEN THE TRIANGLES HAVE BEEN PLOTTED, A LINE IS DRAWN THRU THE INNERMOST POINTS OF THE TRIANGLES. THE RESULTANT PATTERN THEN APPEARS AS A WINDMILL WITH A DIAMOND SHAPED PATTERN CONNECTING THE INNER POINTS OF THE TRIANGLES. THE DIAMOND DESIGN SHOULD INTERSECT ALL OF THE INNER POINTS OF THE TRIANGLES IF THE PLOTTER IS ADJUSTED CORRECTLY. FIGURE 4 SHOWS THE PLOTTER PATTERN GENERATED BY THE ROUTINE.

5.5*** ROUTINE 5 SELECT COMMAND

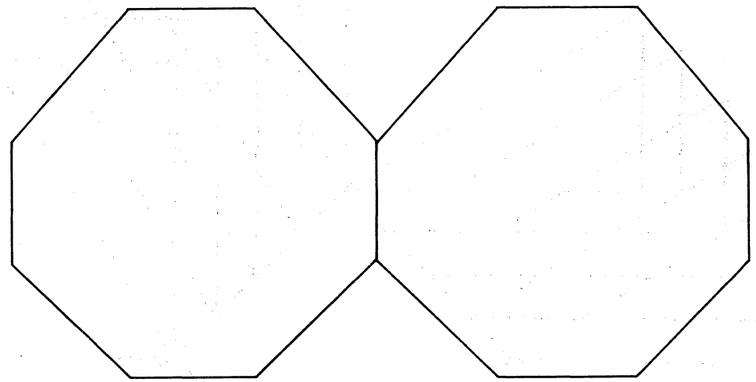
ROUTINE 5 WILL NOT RUN UNLESS SELECTED. THIS ROUTINE ALLOWS THE FIELD ENGINEER TO EXECUTE ANY DESIRED COMBINATION OF TWO PLOTTER COMMANDS. ONE COMMAND IS SET IN SWITCHES 0-5, THE OTHER IS SWITCHES 8-13. THE SWITCHES ARE READ DIRECTLY BY THIS ROUTINE. THUS ANY CHANGE IN SWITCH SETTING WILL RESULT IN AN IMMEDIATE CHANGE IN THE COMMAND. THE PROGRAM WILL RUN IN THIS ROUTINE UNTIL ANOTHER ROUTINE IS SELECTED.

6. APPENDIX

THE FOLLOWING PAGES CONTAIN THE PLOTTER OUTPUT PATTERNS.

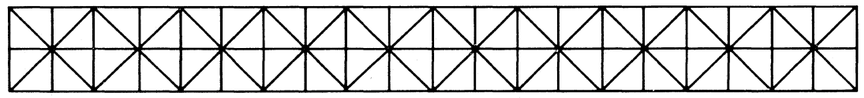
FIG. 1 PATTERN FOR PEN UP/PEN DOWN TEST
FIG. 2 PATTERN FOR REGISTRATION TEST
FIG. 3 SWING TEST PATTERN
FIG. 4 STRESS TEST WINDMILL PATTERN

FIGURE 1 PATTERN FOR PEN UP/PEN DOWN TEST



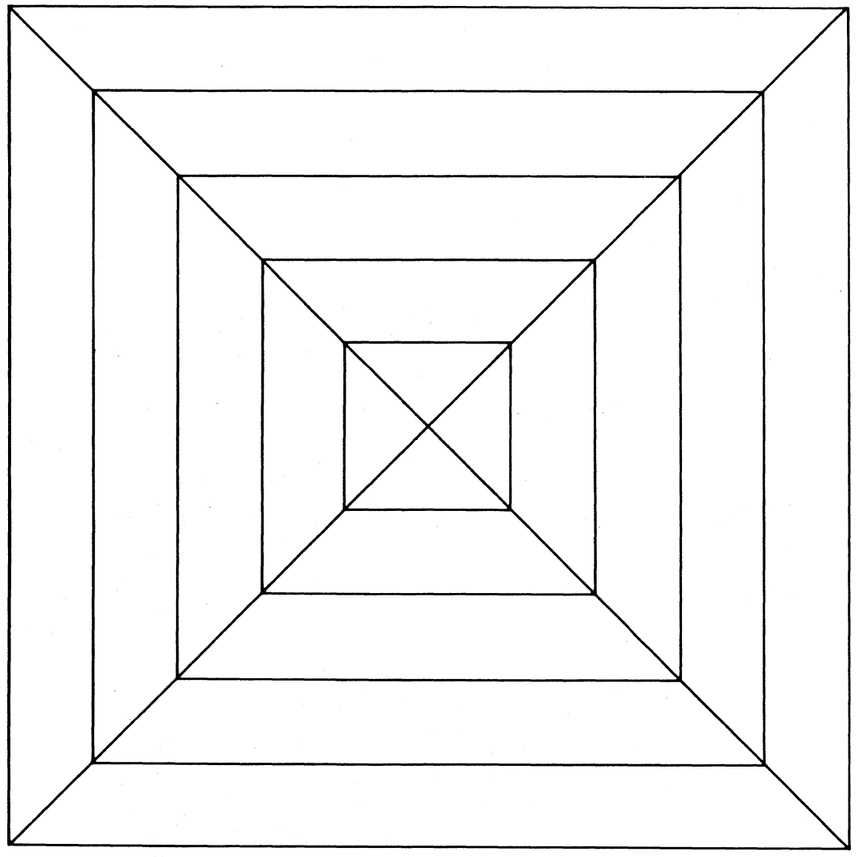
SCALE: 3/4 = 1

FIGURE 2 PATTERN FOR REGISTRATION TEST



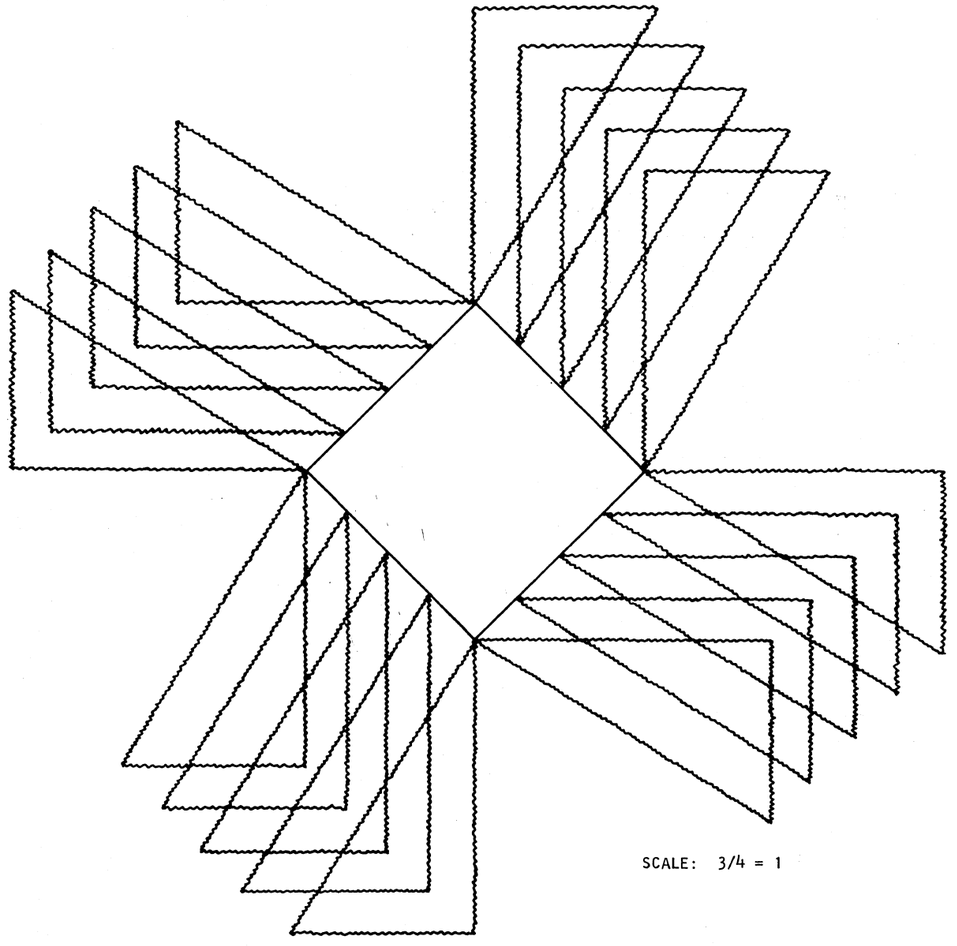
SCALE: 3/4 = 1

FIGURE 3 SWING TEST - PATTERN



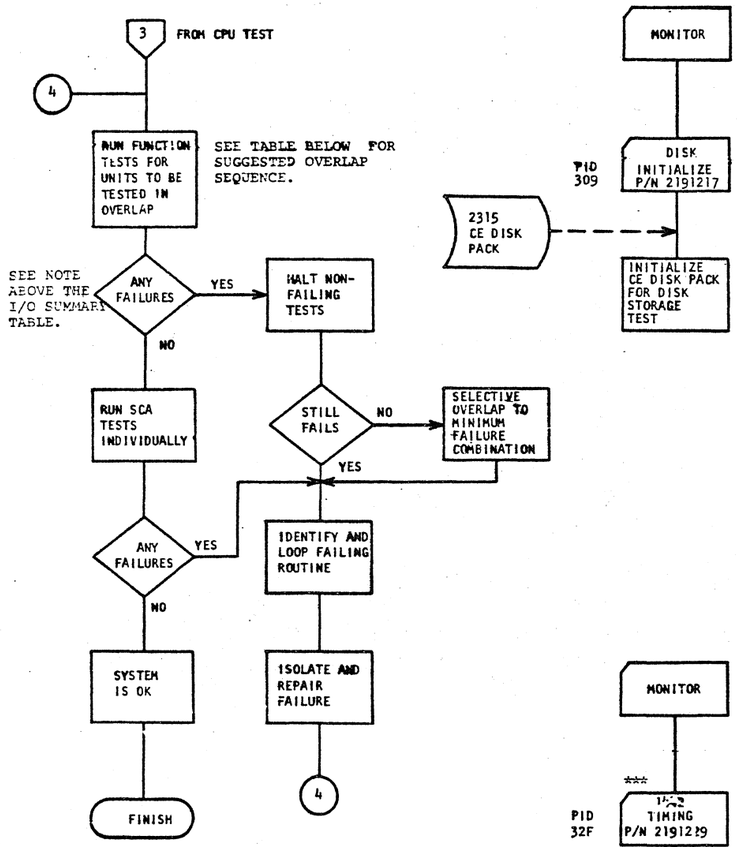
SCALE: 3/4 = 1

FIGURE 4 STRESS TEST - WINDMILL PATTERN



SCALE: 3/4 = 1

I/O TEST INDEX



PID	NAME	P/N	COMMENTS
300	MONITOR	2191201	
304	KB/PRINTER	2191241	
305	1627 PLOTTER	2191237	
309	DISK F.T.	2191213	
30B	PAPER TAPE	2191233	
30C	1132 PRINTER	2191221	
314	1231 OMPR	2243554	
30D	1403 PRINTER	2243557	
318	SCA PROGRAM INSTRUCTION	2191297	ONLY SCA TEST FOR OVERLAP
30E	2501/1442 - V	2243551	EITHER PROGRAM BUT NOT BOTH
30F	1442 - VI, VII	2191225	

* WILL NOT OVERLAP WITH ANY OTHER SCA PROGRAM
*** AVAILABLE FOR CARD INPUT ONLY

MONITOR CONTROLLED I/O TEST NORMAL OPERATION SUMMARY

P/N 2191291

1. FOR PAPER TAPE-MOUNT MONITOR TAPE IN TAPE READER AND MAKE READY. (THE RELOCATING LOADER IS AHEAD OF MONITOR ON THE MONITOR TAPE). PRESS STOP, RESET AND PROGRAM LOAD. MONITOR WILL LOAD AND STOP FOR LOADING THE NEXT I/O TEST TAPE. MOUNT NEXT I/O TAPE, SET SWS 0 AND 8 ON FOR SINGLE I/O TEST OR SWS 0,8,9 AND 15 ON FOR OVERLAP, AND THEN PRESS INTERRUPT REQUEST KEY. BRANCH TO ITEM 3.
2. FOR CARD SYSTEM-PLACE RELOCATING LOADER, FOLLOWED BY MONITOR II AND I/O TESTS IN THE DESIRED RUN SEQUENCE IN THE CARD READER AND MAKE READER READY.
   A. TO RUN TESTS ON AN INDIVIDUAL TEST BASIS, PLACE A BLANK CARD AFTER EACH I/O TEST DECK.
   B. TO RUN TESTS IN OVERLAP MODE, PLACE A BLANK CARD AFTER THE LAST I/O TEST DECK.
   C. TO STOP MONITOR AFTER ALL PROGRAMS ARE LOADED, PLACE BIT SW 15 ON BEFORE LOADING. PRESS STOP, RESET AND PROGRAM LOAD.
3. A STATUS MESSAGE WILL PRINT OUT AFTER EACH I/O TEST IS LOADED. THIS MESSAGE WILL INDICATE LOADING SEQUENCE NUMBER OF THE TEST, THE PROGRAM ID (PID) NUMBER, THE STARTING ADDRESS IN STORAGE AND THE RELOCATION FACTOR.
4. CONTROL OPTIONS MAY BE ENTERED AT ANY TIME. THIS IS FUNCTION 0 AND IS EFFECTIVE WHEN BIT SWITCH 0 AND 1 ARE OFF. IF BIT SWITCHES 4,5,6 AND 7 ARE OFF MONITOR IS ADDRESSED BUT WHEN THESE SWITCHES ARE SET TO A LOADING SEQUENCE NUMBER, THAT I/O TEST IS BEING ADDRESSED. CONTROL OPTIONS AND SWITCH SETTINGS ARE:

   8 - RESTART 10 - LOCK ON FUNCTION 12 - LOOP ON ERROR (ONCE PER ERROR) 14 - HALT ON ERROR
   9 - PRINT RTN ID 11 - LOOP ON PROGRAM 13 - BYPASS ERROR PRINT OUT 15 - HALT
5. TO STOP ALL PROGRAMS, PRESS PROGRAM STOP, MONITOR WILL WAIT (3001) AT ADDRESS 040C.
6. TO RESTART AFTER PROGRAM STOP, PRESS PROGRAM START. MONITOR HAS SAVED THE STATUS OF TESTS.
7. TO STOP ANY ONE PROGRAM (WHILE OVERLAPPING), SET BIT SWS TO ONO1 AND PRESS INT. REQ. KEY. N=LOAD SEQUENCE NUMBER
8. TO RESTART ANY ONE PROGRAM, SET BIT SWS TO ONSO AND PRESS INTERRUPT REQUEST KEY. N = LOAD SEQUENCE NUMBER
9. ERROR TYPE OUTS ARE EXPLAINED IN SECTION 4.2 OF EACH I/O DESCRIPTION.
10. AS EACH TEST REACHES ITS NORMAL END A MESSAGE WILL BE TYPED OUT. FOR EXAMPLE XXXX END, WHERE XXXX = PID.

NOTE: THERE ARE TIME DEPENDENT DEVICES WHICH MUST BE SERVICED WITHIN A SPECIFIED TIME LIMIT AFTER AN INTERRUPT OCCURS. IF THESE LIMITS ARE NOT COMPLIED WITH, DATA WILL BE LOST BETWEEN THE PROCESSOR AND THE I/O DEVICE. THESE TYPES OF ERRORS OCCUR WHEN ANOTHER DEVICE'S PROGRAM KEEPS CONTROL IN MAINLINE OR INTERRUPT ROUTINE FOR EXTENDED PERIODS OF TIME.

PROGRAMS WITH A HIGH RATE OF INTERRUPTS MAY CAUSE OTHER PROGRAMS TO LOSE MAINLINE CONTROL. THIS LOSS OF CONTROL BETWEEN AN XIO READ, WRITE OR CONTROL AND AN XIO SENSE DEVICE MAY CAUSE FALSE DSW ERRORS. THIS TYPE OF ERROR SAYS THE DEVICE SHOULD HAVE BEEN BUSY AND NOT READY. THE PROBLEM IS THE DEVICE HAS COMPLETED IT'S OPERATION, DROPPED BUSY AND BROUGHT UP READY BEFORE CONTROL WAS REGAINED BY THE PROGRAM INDICATING THE ERROR.

IF ANY OF THE TYPES OF ERRORS ABOVE ARE SUSPECTED IN OVERLAP, RUN THE FAILING TEST ALONE TO CHECK FOR TRUE ERRORS.

I/O SUMMARY TABLE

PROGRAM	PROG ID NO	CORE SIZE	OVER-LAP	RUN TIME	SPECIAL INSTRUCTIONS
RELOCATING LOADER - 1442	3AA	340	BASIC	-	CARD LOADER FOR MONITOR II
RELOCATING LOADER 2501	3AB	340	BASIC	-	CARD LOADER FOR MONITOR II
RELOCATING LOADER PAPER TAPE	3AC	340	BASIC	-	PAPER TAPE LOADER IN FRONT OF MONITOR II ON PAPER TAPE.
MONITOR II	300	1160	BASIC	-	PROVIDES BASIC CONTROL FOR ALL I/O PROGRAMS.
KEYBOARD PRINTER	304	1200	YES	3 MIN	FOR MANUAL KEYBOARD TESTS SEE SECTION 3.2.3.
1627 PLOTTER (SEE NOTE)	305	950	YES	6 MIN	FOR MANUAL CONTROL SEE SECTION 3.2.3.
DISK INITIALIZATION	308	2300	NO	5 MIN	USE ONCE TO INITIALIZE FE DISK PACK.
DISK FUNCTION TEST	309	2350	YES	3 MIN	USE ONLY DISKS WHICH HAVE BEEN INITIALIZED.
PAPER TAPE	30B	750	YES	2 MIN	TAPE MAY BE REPRODUCED BY FUNCTION 1 AND RTN 4.
1132 PRINTER	30C	2200	YES	4 MIN	USE CARRIAGE TAPE WITH 16 OR FEWER PUNCHED HOLES.
1442 FUNCTION TEST	30F	1400	YES	NOT FIXED	ROUTINE 1-PUNCH AND FEED WILL PUNCH ONLY INTO BLANK CARDS.
1442 TIMING TEST	32F	1650	NO	NOT FIXED	ENTER 1442 MODEL-8105,8106 OR 8107.
SCA INSTRUCTION F.T.	318	1600	YES *	5 MIN	NO RESET FAST PASS OPTION RUNS ONE (1) MINUTE.
SCA WRT/RD BUF, LINE NOISE DET.	311	1550	YES *	11 MIN	BUFFER TEST 30 SECONDS AND LINE LISTENING 10.5 MINUTES
SCA WRAP-AROUND TEST	319	1800	NO	5 MIN	NO RESET, FAST PASS OPTION ONE MINUTE
SCA TRANSMIT/RECEIVE	313	2050	NO	NOT FIXED	TWO MINUTES IS MIN. OPTIONAL TIME INDEFINITE
SCA DISPLAY PROGRAM	315	3755	NO	NOT FIXED	LOAD WITH RELOCATING LOADER
2501/1442 - 5 F.T.	30E	1405	YES	NOT FIXED	
1231 OPTICAL MARK PAGE RDR F.T.	314	900	YES	NOT FIXED	USE CONTROL SHEET
1403 F.T.	30D	1400	YES	3 MIN	USE CARRIAGE TAPE CALLED OUT IN SECTION 5.3
SCA-BSC-PT-TO-PT	317	2500	NO	NOT FIXED	
SCA-BSC-MULTI-PT	31A	2500	NO	NOT FIXED	

TABLE OF CONTENTS

1. PURPOSE

THE FUNCTION TEST IS DESIGNED (1) TO TEST FOR PROPER OPERATION OF THE PAPER-TAPE STATUS INDICATORS AND (2) TO TEST FOR ACCURATE DATA HANDLING BY THE PAPER-TAPE READER AND PAPER-TAPE PUNCH WHEN OVERLAPPED WITH OTHER ELEMENTS OF THE 1130 SYSTEM. THIS TEST MAY ALSO BE USED TO REPRODUCE TAPES.

2. PREREQUISITES

2.1*** PROGRAM PREREQUISITES

1130 DIAGNOSTIC MONITOR II

2.2*** EQUIPMENT PREREQUISITES

1. 1131 CPU WITH PROGRAM LOAD FROM EITHER CARD OR PAPER TAPE READER
2. 1134 PAPER TAPE READER AND/OR 1055 PAPER TAPE PUNCH.
3. AT LEAST 750 WORDS OF AVAILABLE CORE STORAGE.

3. OPERATING PROCEDURE

THESE OPERATING PROCEDURES APPLY TO SINGLE PROGRAM OPERATION ONLY. FOR OVERLAP OPERATION, REFER TO SECTION 3.2.3 OF THE 1130 DIAGNOSTIC MONITOR II DOCUMENTATION.

3.1*** PROGRAM LOADING

FOR THE CONVENIENCE OF 'READER ONLY' SYSTEMS, THE TEST PATTERN HAS BEEN INCLUDED ON THE END OF THE PAPER TAPE PROGRAM TAPE AND MAY BE IDENTIFIED BY COMPARING WITH THE SAMPLE TAPE. SECTION 6.1.

STANDARD MONITOR LOADING PROCEDURES APPLY

THESE PROCEDURES ARE SUMMARIZED HERE. SEE DM USE PROCEDURE FOR DETAILS.

1. SET FIRST TYPEWRITER TAB 20 CHARACTERS FROM LEFT MARGIN.
2. SET BIT SWITCH 15 OFF - LOAD AND GO
   ON - TO HALT AFTER LOADING

   IF HALT AFTER LOADING, SELECT PROGRAM OPTIONS THEN TURN OFF HALT SWITCH OR FOLLOW NORMAL RESTART PROCEDURE (SECTION 3.5).
3. LOAD DIAGNOSTIC MONITOR AND THIS PROGRAM.
4. SELECT PROGRAM OPTIONS, IF DESIRED.

******

3.2*** PROGRAM OPERATION.

3.2.1 PROGRAM CONTROL - FUNCTION 0

1. SET SWITCHES 0-7 TO 01.
2. SET SWITCHES 8-15 AS DESIRED.

SW	FUNCTION
8	RESTART
9	ROUTINE START MESSAGE
10	LOCK ON FUNCTION
11	LOOP PROGRAM
12	LOOP ON ERROR
13	BYPASS ERROR PRINTOUT
14	HALT ON ERROR
15	HALT

3. PRESS INT REQ KEY ON CONSOLE.

**

3.2.2 ROUTINE SELECTION - FUNCTION 1

THE SELECTED ROUTINE WILL LOOP UNTIL A NEW ROUTINE IS SELECTED OR ROUTINE SELECTION IS RESET.

1. TO SET ROUTINE SELECTION

   A. SET SWITCHES 0-7 TO 41.
   B. SET ROUTINE NUMBER IN SWITCHES 12-15.

RTN		DESCRIPTION	
1		PUNCH PATTERN	NORMAL ROUTINES- THE PROGRAM STARTS WITH ROUTINE 1, RUNS EACH ROUTINE IN SEQUENCE THEN TERMINATES AFTER ROUTINE 3.
2		READ PATTERN	
3		PUNCH AND READ PATTERN	
4	*	REPRODUCE TAPE	OPTIONAL ROUTINES THESE ROUTINES RUN ONLY IF SELECTED.
5	*	PUNCH BIT SWITCH SETTING	

* = REFER TO SECTION 3.2.3 FOR SPECIAL INSTRUCTIONS.

   C. PRESS INT REQ KEY ON CONSOLE.

2. TO RESET ROUTINE SELECTION, SET AS IF SELECTING ROUTINE ZERO

**

3.2.3 PROGRAM OPTIONS

1. PUNCH FROM BIT SWITCHES

   ROUTINE 5 PUNCHES ALTERNATELY FROM SWITCHES 0-7 AND SWITCHES 8-15. AFTER THE ROUTINE IS SELECTED, SET THE DESIRED PATTERN IN THESE SWITCHES.

2. RE ALIGN PAPER TAPE

   TO REALIGN THE PAPER TAPE AT ANY TIME DURING RUNNING OF THE PROGRAM -
   A. SET SWITCHES TO 8180
   B. PRESS INT REG. KEY.

******

3.3*** PROGRAM HALTS

3.3.1 NORMAL HALTS

HALT NO. (B REG).	DESCRIPTION	RESTART ACTION
3001	PROGRAM STOP OR ADDRESS STOP	PRESS START
3002	HALT ON ERROR	DISPLAY MODE PRESS START. RUN MODE - PRESS START

**

3.3.2 ERROR HALTS

HALT NO. (B REG).	DESCRIPTION	RESTART ACTION
30F1	CHECK SUM ERROR ON FIRST CARD OF LOADER	RELOAD
30F2	READER DSW ERROR WHEN LOADING LOADER	RELOAD
30F3	CARD 2 OF LOADER DID NOT LOAD	RELOAD
30F4	CAN NOT CLEAR CORE - DUE TO ERROR IN ADDRESSING UPPER CORE.	
30F5	READER CHECK WHEN LOADING MONITOR OR TEST PROGRAM	NPRO THEN PLACE CARDS RUN OUT IN FRONT OF REMAINING DECK AND PRESS START.
30F6	MONITOR DID NOT LOAD	RELOAD
30F7	CHECK SUM WHEN LOADING MONITOR	RELOAD
30F8	READER NOT READY	MAKE READER READY
30F9	INVALID INTERRUPT WHICH WILL NOT RESET	PRESS RESET AND START
30FA	CONSOLE PRINTER HANG UP - BUSY WILL NOT GO OFF	FIX THE CONSOLE PRINTER OR NOP THIS WAIT

******

3.4*** PROGRAM TERMINATION

IF LOOP PROGRAM HAS NOT BEEN SPECIFIED THE PROGRAM WILL TERMINATE AT THE END OF ROUTINE 3. ROUTINE 4 AND 5 WILL ONLY RUN IF SELECTED.

IF ANY ROUTINE IS SELECTED THAT ROUTINE WILL LOOP AND WILL NOT TERMINATE.

******

3.5*** RESTART

1. SET SWITCHES 0-7 TO 01.
2. TURN ON SWITCH 8.
3. SET DESIRED CONTROL IN SWITCHES 9-14.
4. PRESS INTERRUPT REQUEST KEY.

****

4. PRINTOUTS

ALL PRINTOUTS ARE IN THE STANDARD FORMAT.

```
APPNN OORR AAAA                (MESSAGE)
OR
EPPNN OORR AAAA                (MESSAGE)
```

WHERE
- A IDENTIFIES STATUS MESSAGES
- E IDENTIFIES ERROR MESSAGES
- PP IS THE PID OF THE PROGRAM CAUSING THE MESSAGE THIS WILL BE EITHER 00 FOR MESSAGES ORIGINATED BY THE MONITOR OR OB FOR MESSAGES ORIGINATED BY THIS PROGRAM.
- NN IS THE MESSAGE SEQUENCE NUMBER
- RR IS THE ROUTINE NUMBER
- AAAA IS THE ADDRESS OF THE ROUTINE
- MESSAGE IS ANY VARIABLE INFORMATION

4.1*** STATUS MESSAGES

A0000 NUM PID ADRS RELF LD
XXXX XXXX XXXX XXXX

THIS MESSAGE IS PRINTED FOLLOWING THE LOADING OF ANY PROGRAM (EXCEPT MONITOR), THE MESSAGE GIVES THE LOAD SEQUENCE NUMBER, THE PROGRAM ID, THE ADDRESS INTO WHICH THE PROGRAM WAS LOADED, AND THE RELOCATION FACTOR.

A0001 SWS PID
XXXX XXXX

THIS MESSAGE IS PRINTED EACH TIME A VALID SWITCH ENTRY IS READ BY THE MONITOR. THE MESSAGE CONTAINS THE SWITCH SETTING READ TOGETHER WITH THE PROGRAM ID OF THE PROGRAM INTO WHICH THE CONTENTS OF SWITCHES 8-15 WERE STORED. IF THE SWITCH ENTRY CALLED FOR HALT OF ANY PROGRAM, THE WORD HALT WILL FOLLOW THE MESSAGE.

A0B00 OORR AAAA

ROUTINE START MESSAGE - IF SWITCH 9, FUNCTION 0, IS TURNED ON, THIS MESSAGE WILL BE PRINTED BEFORE THE START OF EACH ROUTINE. R IS THE NUMBER OF THE NEXT ROUTINE AND AAAA IS THE STARTING ADDRESS.

A0B01 OORR AAAA TAPE ALIGNED

THE PAPER TAPE TEST RECORD IS ASSUMED TO BE PROPERLY ALIGNED IN THE READER AT THIS TIME. THIS MESSAGE IS RECEIVED ONLY AFTER OPERATOR SPECIFICATION OF REALIGN TAPE OPTION.

******

4.2*** ERROR MESSAGES

THE DSW IS CHECKED FOR ABSOLUTE CORRECTNESS AT ALL TIMES. IF AN ERROR IS DETECTED ONE OF THE MESSAGES BELOW WILL INDICATE THE PROBLEM. IT IS LEFT TO THE OPERATOR TO ANALYZE THE DSW FOR THE SPECIFIC PROBLEM AREA.

THE PAPER TAPE DSW

BIT	
0	PARITY ERROR
1	READER SERVICE
2	NOT USED
3	PUNCH SERVICE
4	READER BUSY
5	READER NOT READY
6	PUNCH BUSY
7	PUNCH NOT READY
8	NOT USED
9	NOT USED
10	NOT USED
11	NOT USED
12	NOT USED
13	NOT USED
14	NOT USED
15	NOT USED

E0001 SWS INVLD
XXXX

THE SETTING OF SWITCHES 4-7 DID NOT EQUAL THE LOAD SEQUENCE NUMBER OF ANY PROGRAM IN CORE.

E0003 OVR CORE

THE PROGRAM WHICH THE LOADER WAS ATTEMPTING TO LOAD EXCEEDED AVAILABLE CORE. LOADING WAS TERMINATED.

E0004 CKSUM

A CHECK SUM ERROR WAS DETECTED WHILE LOADING A TEST PROGRAM. THIS ERROR OCCURS UNDER ANY OF THE FOLLOWING CONDITIONS.

1. A CARD IS MISSING OR IS OUT OF SEQUENCE.
2. THERE IS AN EXTRA CARD IN THE DECK.
3. THE PUNCHED INFORMATION ON THE CARD IS NOT CORRECT.
4. DATA WAS LOST OR PICKED UP DUE TO A MACHINE MALFUNCTION.
5. DUE TO A CPU MALFUNCTION, THE CHECK SUM WAS NOT CORRECTLY CALCULATED.

WHEN THIS ERROR OCCURS ATTEMPT TO RELOAD THE PROGRAM.

E0005 000N XXXX

THIS ERROR WILL OCCUR IS AN INTERRUPT OCCURS, BUT THE ILSW WAS NOT CORRECT. N IS THE INTERRUPT LEVEL AND XXXX IS THE ILSW. THIS PRINTOUT WILL ONLY OCCUR IF THE INTERRUPT IS RESET BY A BOSI. NO ATTEMPT IS MADE BY THE ERROR ROUTINE TO RESET THE REQUEST BIT.

E0B01 OORR AAAA XXXX 0X00

DSW ERROR AFTER READER-CONTROL COMMAND

E0B02 OORR AAAA XXXX 0X00

DSW ERROR AFTER PUNCH COMMAND

E0B03 OORR AAAA XXXX 0F00

DSW ERROR AFTER READER-CONTROL AND PUNCH COMMANDS

E0B04 OORR AAAA XXXX 0X00

DSW ERROR WHEN CHECKING FOR READER-READY

E0B05 OORR AAAA XXXX 0X00

DSW ERROR WHEN CHECKING FOR PUNCH-READY

E0B06 OORR AAAA XXXX 4000

READER SERVICE-REQUEST DSW ERROR

E0B07 OORR AAAA XXXX 1000

PUNCH SERVICE-REQUEST DSW ERROR

E0B08 OORR AAAA XXXX 5000

DSW ERROR WHEN PUNCH AND READER INTERRUPTS RECEIVED AT SAME TIME

E0B09 OORR AAAA XXXX X000

DSW ERROR WHEN FIRST INTERRUPT WAS RECEIVED. AT THIS TIME BOTH THE READER AND THE PUNCH ARE BEING RUN UNDER RACE CONDITIONS. THE DSW FOR THE DEVICE THAT INTERRUPTS FIRST IS ANALIZED FIRST. ANY ERROR WILL BE PRINTED AS AN E0B09. SIMILARLY FOR THE SECOND INTERRUPT, AN ERROR WILL BE PRINTED AS E0B10.

E0B10 OORR AAAA XXXX X000

DSW ERROR WHEN FIRST INTERRUPT WAS RECEIVED. AT THIS TIME BOTH THE READER AND THE PUNCH ARE BEING RUN UNDER RACE CONDITIONS. THE DSW FOR THE DEVICE THAT INTERRUPTS FIRST IS ANALIZED FIRST. ANY ERROR WILL BE PRINTED AS AN E0B09. SIMILARLY FOR THE SECOND INTERRUPT, AN ERROR WILL BE PRINTED AS E0B10.

E0B11 OORR AAAA XXXX 0X00

NO READER INTERRUPT RECEIVED. (XXXX IS THE LAST DSW SENSED IMMEDIATELY AFTER THE READER-CONTROL COMMAND.

E0B12 OORR AAAA XXXX 0X00

NO PUNCH INTERRUPT RECEIVED (XXXX IS THE LAST DSW SENSED IMMEDIATELY AFTER THE READER-CONTROL COMMAND)

E0B13 OORR AAAA XXXX 0F00

NO PUNCH OR READER INTERRUPT (XXXX IS THE LAST DSW SENSED IMMEDIATELY AFTER THE READER-CONTROL AND PUNC COMMANDS)

E0B14 OORR AAAA DATA ERR
XX00 XX00

READ/COMPARE ERROR (RDR BUFFER CHANGED)
DATA (XX00) PRINTED AS ENTERED IN CORE - CHANNELS 8-1 RESPECTIVELY

E0B15 OORR AAAA DATA ERR
XX00 XX00

READ/COMPARE ERROR (RDR BUFFER UNCHANGED)
DATA (XX00) PRINTED AS ENTERED IN CORE - CHANNELS 8-1 RESPECTIVELY

E0B16 OORR AAAA XXXX 0000 XX00

READER-DSW READ ERROR WHEN REPRODUCING TAPES. IF TAPE STOPPED, THE FIRST CHARACTER BEYOND THE READ STATION WAS PERHAPS IMPROPERLY READ. THIS CHARACTER HAS NOT AS YET BEEN PUNCHED. BACK THE READER UP ONE CHARACTER AND PRESS START ON THE P-C.
DATA (XX00) PRINTED AS ENTERED IN CORE - CHANNELS 8-0 RESPECTIVELY.

READ READ
1ST 2ND
E0B18 OORR AAAA XX00 XX00

CONSECUTIVE READ ERROR DATA (XX00) SHOULD AGREE.

E0B19 OORR AAAA XX00 YY00

THE PROGRAM COULD NOT ALIGN THE TAPE IN THE READER IN THE LAST 500 CHARACTERS.

THE PROBLEM IS,

A. OPEN DATA CHANNEL(S). XX00 SHOULD BE FF00, WHICH IS THE CHARACTER THAT WOULD BE PLACED IN CORE BY READING AN ALL-BITS CHARACTER. ANY MISSING BIT(S) INDICATE THE OPEN DATA CHANNEL(S).

B. SHORTED DATA CHANNEL(S). YY00 SHOULD BE 0000, WHICH IS THE CHARACTER THAT WOULD BE PLACED IN CORE BY READING A NO-BITS CHARACTER. ANY BIT(S) PRESENT INDICATE THE SHORTED CHANNEL(S).

C. IF BOTH XX00 AND YY00 ARE CORRECT,

1. THE TAPE IS NOT IN THE READER CORRECTLY, OR
2. THE READER CANNOT READ THE FIRST 8 CHARACTERS PROPERLY. IF SO, TRY ONE OF THESE,

A. TRY RUNNING THE REPRODUCE TAPE ROUTINE (ROUTINE 4).
B. TRY MANUALLY ALIGNING THE TAPE IN THE READER. THEN SPECIFY THE MANUAL TAPE ALIGNMENT OPTION (TABLE O) AND RESTART THE PROGRAM.

E0B20 OORR AAAA XXXX

A SPURIOUS OR NON-RESETABLE INTERRUPT HAS BEEN RECEIVED.

5. COMMENTS

THE FUNCTION TEST CONSISTS OF THREE NORMAL ROUTINES AND TWO OPTIONAL ROUTINES. NORMALLY, ROUTINES ONE THROUGH THREE ARE RUN IN ORDER. ALL ROUTINES ARE DESCRIBED IN PARAGRAPHS 5.1 THROUGH 5.5. THE FUNCTION TEST,

A. CHECKS DSW FOR PROPER BITS BEFORE ISSUING WRITE (PUNCH) OR CONTROL (READER) COMMANDS.

B. CHECKS DSW FOR CORRECTNESS AFTER XIO INSTRUCTION.

C. CHECKS FOR INTERRUPT FROM DEVICE WITHIN SPECIFIED TIME LIMIT.

D. CHECKS DSW AFTER INTERRUPT IS RECEIVED.

5.1*** ROUTINE NO. 1 (PUNCH TEST)

TEST NO. 1 CHECKS THE OPERATION OF THE PAPER-TAPE PUNCH WHILE PUNCHING TWO TEST RECORDS. THE RECORD INCLUDES A RIPPLE PATTERN AND AN ALL-CHARACTER PATTERN. (REFER FIGURE 1).

5.2*** ROUTINE NO. 2 (READER TEST)

THIS TEST CHECKS THE OPERATION OF THE PAPER TAPE READER WHILE READING ONE RECORD PRODUCED BY THE PUNCH TEST. THE TAPE IS NORMALLY AUTOMATICALLY ALIGNED IN THE READER BY READING EIGHT CONSECUTIVE CHARACTERS CORRECTLY. A MESSAGE IS PRINTED WHEN THE TAPE IS PROPERLY ALIGNED. IF DESIRED, THE OPERATOR CAN MANUALLY PLACE THE TAPE IN THE THE READER ON THE FIRST CHARACTER OF THE RIPPLE PATTERN AND SPECIFY THE MANUAL ALIGNMENT OPTION AS IN TABLE O. THE TAPE MAY ALSO BE REALIGNED IN THE READER AT ANY TIME.

EACH CHARACTER READ IS COMPARED WITH A WORD IN STORAGE. AN UNEQUAL COMPARE WILL CAUSE AN ERROR TYPEOUT. SEE 4.2. THERE WILL BE BE ONE ERROR TYPEOUT FOR EACH READ/COMPARE ERROR.

THESE ERROR PRINTOUTS MAY INDICATE THE TAPE IS NOT IN THE PROPER POSITION IN THE READER. THE TAPE MAY BE MANUALLY ADJUSTED IN THE READER OR THE OPERATOR MAY SELECT REALIGN TAPE. (TABLE O)

5.3*** ROUTINE NO. 3 (PUNCH/READ/COMPARE TEST)

THIS TEST CHECKS THE FUNCTION AND RELIABILITY OF THE PAPER TAPE READER AND PUNCH WHEN OPERATED TOGETHER. BOTH DEVICES ARE OPERATED AT THE SAME SPEED. THE DATA READ IS COMPARED WITH THE DATA PUNCHED IN A NEW TAPE. THIS TEST ALSO HAS THE TAPE ALIGNMENT FEATURE OF TEST NO. 2. THE TEST IS COMPLETE AFTER ONE RECORD HAS BEEN PROCESSED.

5.4*** ROUTINE NO. 4 (REPRODUCE-TAPES TEST)

THE OPERATOR HAS THE OPTION OF REPRODUCING ANY TAPE. THE OPERATOR MUST SPECIFY HALT ON ERROR OPTION IN MONITOR CONTROL TABLE O. AGAIN, ALL DEVICE STATUS CHECKING DONE IN TESTS NOS. 1 AND 2 IS INCLUDED IN THIS TEST. ALSO, A DSW ERROR WHEN READING THE TAPE WILL CAUSE A DELAY OF THE PROGRAM UNTIL THE OPERATOR CAN INTERVENE. OTHER THAN E016 IS PRINTED PRESS START AND THEN VERIFY THAT THE PROPER PUNCHES ARE OBTAINED. SEE SPECIFIC ERROR MESSAGE FOR AID IN INSTRUCTIONS.

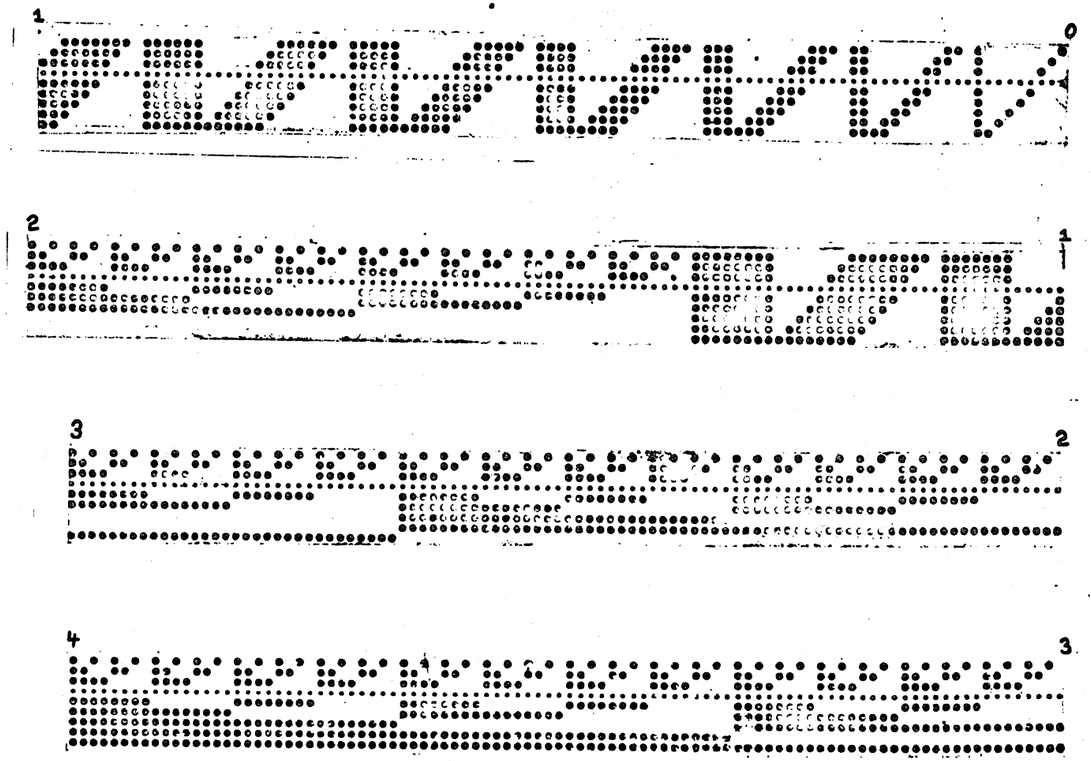
5.5*** ROUTINE NO. 5 (PUNCH BIT SWITCH IMAGE)

THIS ROUTINE PUNCHES THE DATA ENTERED IN THE BIT SWITCHES. THE ROUTINE WILL ALTERNATELY PUNCH FROM SWITCHES 0-7 THEN SWITCHES 8-15.

6. APPENDIX

6.1 SAMPLE TAPE

FIGURE 1 SHOWS AN EXAMPLE OF A PAPER TAPE RECORD.



PAPER TAPE READER/PUNCH FUNCTION TEST

```
**********************************************************************  30B00030
                         *                                               30B00040
                         *  THIS ENGINEERING CHANGE REFLECTS MAJOR       30B00050
                         *  CHANGES TO THE DIAGNOSTIC MONITOR.  PREVIOUS 30B00060
                         *  TESTS WILL NOT RUN WITH DIAGNOSTIC MONITOR II. 30B00070
                         *                                               30B00080
                         *  THIS TEST WILL NOT RUN WITH PREVIOUS MONITORS. 30B00090
                         *                                               30B00100
                         *  TESTS PRIOR TO EC 419643 DATED NOV 15, 1966  30B00110
                         *  WILL NOT OPERATE PROPERLY WITH DIAGNOSTIC    30B00120
                         *  MONITOR II.                                  30B00130
                         *                                               30B00140
**********************************************************************  30B00150
                         ********************************************** 30B00160
                         *              EQUATE TABLE                     30B00170
                         ********************************************** 30B00180
                         *     THIS TABLE EQUATES TEST PROGRAM LABELS    30B00190
                         *     TO THEIR EQUIVALENT DIAGNOSTIC MONITOR    30B00200
                         *     ADDRESSES.                                30B00210
                         *                                               30B00220
0160                     BEGIN EQU   /160       BEGIN ROUTINE            30B00230
0161                     START EQU   BEGIN+1    SUPERVISOR ROUTINE       30B00240
0162                     ERROR EQU   START+1    ERROR LOG ROUTINE        30B00250
0163                     LOG   EQU   ERROR+1    STATUS LOG ROUTINE       30B00260
0164                     END   EQU   LOG+1      END ROUTINE              30B00270
                         *---------------------------------------------- 30B00280
                         *     MONITOR CONTROL WORD ADDRESSES            30B00290
                         *                                               30B00300
0165                     RTNSW EQU   END+1      ROUTINE START SWITCH     30B00310
0166                     ERLCK EQU   END+2      LOCK ON ERROR CONTROL    30B00320
0167                     LOGBY EQU   END+3      I/O BUSY SW ADR          30B00330
0168                     RLCF  EQU   END+4      RELOCATION FACTOR ADR    30B00340
                         *---------------------------------------------- 30B00350
                         *  .  INTERRUPT TRANSFER VECTOR ADDRESSES       30B00360
                         *                                               30B00370
017A                     IL0   EQU   /17A       INTERRUPT LEVEL ZERO     30B00380
018A                     IL1   EQU   IL0+16     INTERRUPT LEVEL ONE      30B00390
019A                     IL2   EQU   IL1+16     INTERRUPT LEVEL TWO      30B00400
01AA                     IL3   EQU   IL2+16     INTERRUPT LEVEL THREE    30B00410
01BA                     IL4   EQU   IL3+16     INTERRUPT LEVEL FOUR     30B00420
01BB                     RQTY  EQU   IL4+1      TYPR SVC REQUEST INTERPT 30B00430
01BC                     RQKB  EQU   RQTY+1     KEYBOARD REQUEST INTERPT 30B00440
01BD                     SVKB  EQU   RQKB+1     KEYBOARD SERVICE INTERPT 30B00450
                         ********************************************** 30B00460
0000                           ORG   *+15C0                              30B00470
                         *                                               30B00480
                         ******************************************      30B00490
                         *           .    DIAGNOSTIC MONITOR      *      30B00500
                         *                    CONTROLLED          *      30B00510
                         *                1130 PAPER TAPE TEST    *      30B00520
                         ******************************************      30B00530
                         *                                               30B00540
                         *                 PROGRAM STATUS TABLE          30B00550
                         *                                               30B00560
05DC 0  030B             PID   DC    /030B      PROGRAM ID NUMBER        30B00570
05DD 0  0000             RID   DC    /0000      ROUTINE NUMBER           30B00580
05DE 0  0000             RAD   DC    /0000      ROUTINE ADDRESS          30B00590
05DF 0  0000             SW0   DC    /0000      FCN 0 - CONTROL          30B00600
05E0 0  0000             SW1   DC    /0000      FCN 1 - INITIAL RTN      30B00610
05E1 0  0000             SW2   DC               NOT USED                 30B00620
05E2 0  0000             SW3   DC    /0000      PUNCH SWS WORD           30B00630
05E3 1  0647                   DC    LOOP       LOOP PROGRAM ADDRESS     30B00640
05E4 1  0634                   DC    RESRT      INITIALIZATION ADDR      30B00650
05E5 0  0000             MLSCF DC    *-*        MAIN LINE SEQ CNTL       30B00660
05E6 1  0634                   DC    RESRT                               30B00670
05E7 0  0000                   DC    /0000      COUNTER ENTRY            30B00680
05E8 0  FFFF             TERM  DC    /FFFF      TERMINATOR               30B00690
                         ******************************************      30B00700
```


PAPER TAPE READER/PUNCH FUNCTION TEST

```
                         *                                                30B00710
                         *                                                30B00720
                         *                                                30B00730
                         *                 INTERRUPT ROUTINE              30B00740
                         *                                                30B00750
                         *                                                30B00760
05E9 0  0000             POINT DC        /0000                            30B00770
05EA 01 CC00074C               XIO   L   XICSD      SENSE DSW             30B00780
05EC 0  D036                   STO       DSWIT                            30B00790
05ED 01 6780062E               LDX   I3  INTEX                            30B00800
05EF 01 4F800625               BSC   I3  HANDL-1    BR TO PROPER CHECK    30B00810
                         *                                                30B00820
05F1 01 F700062B         SINT  EOR   L3  INTEX-3    CHECK SINGLE INTRPT   30B00830
05F3 01 E780062E               AND   I3  INTEX                            30B00840
05F5 01 4C18061C               BSC   L   PINT3,+-   BR IF DSW OK          30B00850
05F7 01 6700075F               LDX   L3  NIPES      SVC REC ERROR         30B00860
05F9 0  7024                   MDX       PINT1                            30B00870
                         *                                                30B00880
05FA 0  F030             DINT  EOR       INTED      CK DSW FOR 2 SVC REC  30B00890
05FB 00 4C000000               BSC   L   /0000      BR IF 2ND DOUBLE INT  30B00900
05FD 0  D02B             DINT1 STO       DSWDI      CK FIRST INTERPT DSW  30B00910
05FE 0  E02C                   AND       INTED                            30B00920
05FF 0  D02A                   STO       DSWID                            30B00930
0600 01 4C200610               BSC   L   DINT4,Z    EXIT IF ONLY ONE REC  30B00940
0602 0  C026                   LD        DSWDI                            30B00950
0603 01 4C18061C               BSC   L   PINT3,+-   BR IF DSW OK          30B00960
0605 01 67000769               LDX   L3  DINE1      PRINT DSW ERROR NEXT  30B00970
0607 0  7016                   MDX       PINT1                            30B00980
                         *                                                30B00990
0608 0  E821             DINT2 OR        DSWID      CHECK SECOND INTRPT DSW 30B01000
0609 0  D019                   STO       DSWIT                            30B01010
060A 0  F020                   EOR       INTED                            30B01020
                         *                                                30B01030
060B 01 4C18061C               BSC   L   PINT3,+-   BR IF DSW OK          30B01040
060D 01 6700076E               LDX   L3  DINE2                            30B01050
060F 0  700E                   MDX       PINT1                            30B01060
                         *                                                30B01070
                         *                                                30B01080
0610 0  1340             DINT4 SLCA  3 0                                  30B01090
0611 0  1001                   SLA       1                                30B01100
0612 0  D011                   STO       BUMRQ      ZERO IF NO IEQ BIT    30B01110
0613 01 67000608               LDX   L3  DINT2      SET SECOND INT SW     30B01120
0615 0  6BE6                   STX   3   DINT1-1                          30B01130
0616 0  700A                   MDX       XIT                              30B01140
                         *                                                30B01150
0617 01 67000755         EINT  LDX   L3  SPUR       SPURRICUS OR NON-     30B01160
0619 01 6F0005E5               STX   L3  MLSCF       RESETABLE INTERRUPT  30B01170
061B 0  7005                   MDX       XIT                              30B01180
                         *                                                30B01190
061C 01 6700077D         PINT3 LDX   L3  DINE6      DSW OK - RET TO MLINE 30B01200
061E 0  6BC7             PINT1 STX   3   MLSCF+1                          30B01210
                         *                                                30B01220
061F 0  6300                   LDX   3   0          RESET INTRPT EXPECTED 30B01230
0620 0  680D                   STX   3   INTEX                            30B01240
                         *                                                30B01250
0621 01 4C8005E9         XIT   BSC   I   POINT      BUG OUT               30B01260
                         ******************************************       30B01270
                         *                                                30B01280
0623 0  0000             DSWIT DC        /000C      LAST INTERRUPT DSW    30B01290
0624 0  0000             BUMRQ DC        /0000                            30B01300
0625 1  0617                   DC        EINT                             30B01310
                         *                          INTERRUPT BR ADRS     30B01320
0626 1  05F1             HANDL DC        SINT       PUNCH INTR CK ADRS    30B01330
0627 1  05F1                   DC        SINT       RDR INTER CK ADRS     30B01340
0628 1  05FA                   DC        DINT       RDR-PUNCH INT CK      30B01350
0629 0  0000             DSWDI DC        /0000                            30B01360
062A 0  0000             DSWID DC        /0000      IDENTIFY INT YET EXP  30B01370
                         *                                                30B01380
```

```
062B 0  5000      INTED DC    /5000      RDR-PCH SVC REQ EXP     30B01390
062C 0  4000            DC    /4000      RDR SVC REQ             30B01400
062D 0  1000            DC    /1000      PCH SVC REQ             30B01410
062E 0  0000      INTEX DC    /0000      INTERRUPT EXPECTED      30B01420
                  *                       1 = READER .          30B01430
                  *                       2 = PUNCH             30B01440
                  *                       3 = BOTH              30B01450
062F 1  0748            EC    RMASK      READER                  30B01460
0630 1  0749            EC    XMASK      PUNCH                   30B01470
                  ********************************************  30B01480
                  *                                             30B01490
                  ********************************************  30B01500
0631 00 44800160  PTBGN BSI I 1 BEGIN    CALL MONITOR        *   30B01510
0633 1  05DC            EC    PID        ADDR OF PID NO      *   30B01520
                  ********************************************  30B01530
                  *                                             30B01540
                  *      INITIAL PROGRAM ENTRY POINT            30B01550
                  *                                             30B01560
0634 0  62F8      RESRT LDX   2 -8       RESET TAPE ALIGN WORDS  30B01570
0635 01 6E0007E7        STX   L2 CORCT                          30B01580
0637 01 C40005E1        LD    L  SW2                            30B01590
0639 0  1810            SRA   16                                30B01600
063A 01 D40007E8        STO   L  NIST                           30B01610
                  *                                             30B01620
063C 0  6103            LDX   1 3      RESTORE ERROR WD CNT     30B01630
063D 01 6D000819        STX   L1 EMESG+2                        30B01640
                  *                                             30B01650
063F 00 6500030E        LDX   L1 782   RESTORE FOR 2 PU RCDS    30B01660
0641 01 6D000685        STX   L1 RTN1I+1                        30B01670
0643 01 650005E9        LDX   L1 PCINT SET INTERRUPT  TRAP      30B01680
0645 00 6D0001BA        STX   L1 IL4    VECTOR                  30B01690
                  ********************************************  30B01700
                  *                                             30B01710
                  *                                             30B01720
                  *      ROUTINE CONTROLLER                     30B01730
                  *                                             30B01740
                  *                                             30B01750
                  *  THIS ROUTINE CHECKS SWITCHES AND CONTROLS  30B01760
                  *  SEQUENCE IN WHICH TEST ROUTINES ARE RUN.   30B01770
                  *                                             30B01780
0647 0  1010      LOOP  SLA     16       RESET ROUTINE NUMBER    30B01790
0648 0  D094            STO     RID                             30B01800
                  *                                             30B01810
0649 01 C40005E0  CNTRL LD    L  SW1                            30B01820
064B 0  D037            STO     SWCMP                           30B01830
064C 01 4C080658        BSC   L  CN20,+  BR IF NC RTN SELECTD   30B01840
                  *                                             30B01850
064E 01 D40005DD  CN10  STO   L  RID     SAVE NEW RTN NUMBER     30B01860
0650 0  902C            S       RIDCK                           30B01870
0651 01 4C08065F        BSC   L  CN25,+  BR IF VALID RTN        30B01880
0653 0  1810            SRA     16                              30B01890
0654 01 D40005E0        STO   L  SW1     IF INVALID RTN GO       30B01900
0656 01 D40005DD        STO   L  RID                            30B01910
                  *                                             30B01920
0658 01 740105DD  CN20  MDX   L  RID,1   ADV TO NEXT RTN         30B01930
065A 0  C021            LD      RTNOM                           30B01940
065B 01 940005DD        S     L  RID                            30B01950
                  *                                             30B01960
                  *                                             30B01970
065D 00 44880164        BSI   I  END,+   END PROGRAM            30B01980
                  *                                             30B01990
065F 01 658005DD  CN25  LDX   I1 RID                            30B02000
0661 01 C500067D        LD    L1 RTTBL-1 SET ROUTINE ADDRESS    30B02010
                  *                                             30B02020
0663 01 D40005DE        STO   L  RAD                            30B02030
0665 01 6700066E        LDX   L3 CN30    SET MLSCF ENTRY        30B02040
0667 01 6F0005E5        STX   L3 MLSCF   *                      30B02050
0669 00 6F000165        STX   L3 RTNSW   SET RTN SWITCH         30B02060
```



```
066B 0  6903            STX   1 CN30+1   SAVE IX 1               30B02070
066C 00 44800161        BSI   I  START    GO TO MONITOR           30B02080
066E 00 65000000  CN30  LDX   L1 0        RESTORE IX 1            30B02090
0670 0  6300            LDX     3 0      RESTORE CHAR RTN        30B02100
0671 01 6F000647        STX   L3 DULP+1                           30B02110
0673 0  6301            LDX     3 1                             30B02120
0674 01 6F000845        STX   L3 DULP-1                           30B02130
                  *                                             30B02140
0676 00 67000187        LDX   L3 391      SET RECORD LENGTH       30B02150
0678 01 6F0006A3        STX   L3 WRECK                            30B02160
                  *                                             30B02170
067A 01 4D80067D        BSC   I1 RTTBL-1  BR TO ROUTINE           30B02180
                  ********************************************  30B02190
                  *                                             30B02200
                  *                                             30B02210
067C 0  0004      RTNOM DC    NRTN-RTTBL+2                      30B02220
067D 0  0005      RIDCK DC    LRTN-RTTBL+1                      30B02230
                  *                                             30B02240
                  *      ROUTINE ADDRESS TABLE                  30B02250
                  *                                             30B02260
                  *          NORMAL ROUTINES                    30B02270
                  *                                             30B02280
                  *                                             30B02290
067E 1  0684      RTTBL DC    RTN1I     PUNCH ROUTINE           30B02300
067F 1  0691            DC    RTN2      READER RTN              30B02310
0680 1  0699      NRTN  DC    RTN3      PCH + RDR CHECK         30B02320
                  *                                             30B02330
                  *      OPTIONAL ROUTINES                      30B02340
                  *                                             30B02350
0681 1  06A4            DC    RTN4I     REPRODUCE TAPE          30B02360
0682 1  06C2      LRTN  DC    RTN5A     PCH BIT SW DATA RTN     30B02370
                  *                                             30B02380
0683 0  0000      SWCMP DC    /0000     SW1 COMPARE WORD        30B02390
                  ********************************************  30B02400
                  *                                             30B02410
                  *                                             30B02420
                  *          MAINLINE ROUTINES                  30B02430
                  *                                             30B02440
                  *                                             30B02450
                  *          ROUTINE  1 - PUNCH TEST            30B02460
                  *                                             30B02470
0684 00 6500030E  RTN1I LDX   L1 782      SET FOR 2 RECORDS       30B02480
0686 0  691C            STX     1 WRECK                         30B02490
0687 00 65000187        LDX   L1 391      CNE RECORD NEXT TIME    30B02500
0689 0  69FB            STX     1 RTN1I+1                       30B02510
068A 01 4400083F  RTN1  BSI   L  MARK     BUILD NEXT CHARACTER    30B02520
068C 0  4053            BSI     XKRDY     PUNCH READY             30B02530
068D 01 4C00072F        BSC   L  PUNH     PUNCH ONE CHARACTER     30B02540
                  ********************************************  30B02550
068F 0  4048      RTN1A BSI     CRASH     CK IF END ROUTINE       30B02560
                  ********************************************  30B02570
0690 0  70F9            MDX     RTN1      NC - RETURN             30B02580
                  *                                             30B02590
                  *          ROUTINE  2 - READER TEST           30B02600
                  *                                             30B02610
0691 01 4400083F  RTN2  BSI   L  MARK     BUILD NEXT CHARACTER    30B02620
0693 0  4062            BSI     RRDY      READER READY            30B02630
0694 0  7077            MDX     FEED      CONTROL READER          30B02640
0695 01 4400079B  RTN2A BSI   L  RDIT     READ AND COMPARE        30B02650
0697 0  4040            BSI     CRASH     CK IF END ROUTINE       30B02660
0698 0  70F8            MDX     RTN2      NC - RETURN             30B02670
                  *                                             30B02680
                  *                                             30B02690
                  *          ROUTINE  3 - PCH-RD + COMPARE      30B02700
                  *                                             30B02710
0699 01 4400083F  RTN3  BSI   L  MARK     BUILD NEXT CHARACTER    30B02720
069B 0  4044            BSI     XKRDY     PUNCH READY             30B02730
069C 0  4059            BSI     RRDY      READER READY            30B02740
```

```
069D 01 4C000718        BSC  L  XFEED      PUNCH + CONTROL RDR          30B02750
069F 01 4400079B  RTN3A BSI  L  RDIT       READ AND COMPARE             30B02760
06A1 0  4036            BSI     CRASH      CK IF END OF ROUTINE         30B02770
06A2 0  70F8            MDX     RTN3       NO - RETURN                  30B02780
                        *                                               30B02790
06A3 0  0000      WRECK DC      /0000      RECORD LENGTH COUNTER        30B02800
                        ********************************************** 30B02810
                        *                                               30B02820
                        *          ROUTINE 4 - REPRO PAPER TAPE         30B02830
                        *                                               30B02840
06A4 0  4051      RTN4I BSI     RRDY                                    30B02850
06A5 0  7066            MDX     FEED                                    30B02860
                        *                                               30B02870
06A6 01 C40005E0  RTN4  LD   L  SW1                                     30B02880
06A8 0  F0DA            EOR     SWCMP                                   30B02890
06A9 01 4C200647        BSC  L  LOOP,Z     BR IF END THIS RTN           30B02900
06AB 0  4034            BSI     XKRDY      PUNCH READY                  30B02910
06AC 0  4049            BSI     RRDY       READER READY                 30B02920
06AD 01 4C000718        BSC  L  XFEED      PUNCH + CONTROL RDR          30B02930
                        *                                               30B02940
06AF 01 0C000744  RTN4A XIO  L  XIORR      READ RDR BUFFER              30B02950
06B1 01 C400081E        LD   L  CARED      PLACE CHAR READ IN           30B02960
06B3 01 D400081F        STD  L  XCHAR       OUTPUT AREA                 30B02970
06B5 0  10A0            SLT     32                                      30B02980
06B6 01 0C000740        XIO  L  XIOSD      SENSE DSW                    30B02990
06B8 01 4C1006A6        BSC  L  RTN4,-     BR IF NO DSW ERRORS          30B03000
                        *                                               30B03010
06BA 0  6116            LDX     1 /0016    PRINT RDR ERROR              30B03020
06BB 0  6207            LDX     2 7                                     30B03030
06BC 01 44000809        BSI  L  PRDSW      PRINT THE ERROR              30B03040
06BE 01 6E000819        STX  L2 EMESG+2                                 30B03050
                        *                                               30B03060
06C0 0  4035            BSI     RRDY       READER READY                 30B03070
06C1 0  704A            MDX     FEED       CONTROL READER               30B03080
                        *       MDX     RTN4                            30B03090
                        ********************************************** 30B03100
                        *                                               30B03110
                        *                                               30B03120
                        *          ROUTINE 5 - PUNCH FROM BIT SWITCHES  30B03130
                        *                                               30B03140
                        *                                               30B03150
06C2 00 67000000  RTN5A LDX  L3 /0000                                   30B03160
06C4 01 0C000746  RTN5B XIO  L  RDBS       READ THE BIT SWITCHES        30B03170
06C6 01 C4000754        LD   L  BITSW                                   30B03180
06C8 0  1300            SLA     3 0                                     30B03190
06C9 01 D400081F        STD  L  XCHAR      SAVE NEXT PCH CHAR           30B03200
06CB 0  C0F7            LD      RTN5A+1                                 30B03210
06CC 0  4830            BSC     -2                                      30B03220
06CD 0  6300            LDX     3 0                                     30B03230
06CE 0  4808            BSC     +                                       30B03240
06CF 0  6308            LDX     3 8                                     30B03250
06D0 0  68F2      RTN5D STX     3 RTN5A+1                               30B03260
06D1 01 C40005E0        LD   L  SW1                                     30B03270
06D3 0  F0AF            EOR     SWCMP                                   30B03280
06D4 01 4C200647        BSC  L  LOOP,Z     BR IF END THIS RTN           30B03290
06D6 0  4009            BSI     XKRDY      CHECK PUNCH READY            30B03300
06D7 0  7057            MDX     PUNH       PUNCH THE CHARACTER          30B03310
                        *       MDX     RTN5A                           30B03320
                        ********************************************** 30B03330
                        *                                               30B03340
                        *                                               30B03350
                        *                                               30B03360
                        *          COUNT CHARACTERS SUBROUTINE          30B03370
                        *                                               30B03380
06D8 0  0000      CRASH DC      /0000      IS RTN COMPLETE              30B03390
06D9 01 74FF06A3        MDX  L  WRECK,-1   DECREMENT CHSR CNTR          30B03400
06DB 0  7002            MDX     RASH                                    30B03410
                        *                                               30B03420
```



```
06DC 01 4C000649        BSC  L  CNTRL      BR - END OF RECORD           30B03430
                        *                                               30B03440
06DE 01 4C8006D8  RASH  BSC  I  CRASH      RET IF RCD NOT CMPLT         30B03450
                        *                                               30B03460
                        ********************************************** 30B03470
                        *                                               30B03480
                        *                                               30B03490
                        *          PUNCH READY SUBROUTINE               30B03500
                        *                                               30B03510
06E0 0  0000      XKRDY DC      /0000                                   30B03520
06E1 0  085E            XIO     XIOSD      SENSE AND SAVE DSW           30B03530
06E2 0  D070            STO     DSWAS                                   30B03540
                        *                                               30B03550
06E3 0  E065            AND     XMASK      REMOVE RDR NRDY BIT          30B03560
                        *                                               30B03570
06E4 01 4C9806EC        BSC  I  XKRDY,+-   BR IF DSW OKAY               30B03580
                        *                                               30B03590
06E6 0  1007            SLA     7          DSW ERROR                    30B03600
06E7 01 4C1006ED        BSC  L  XKRD2,-    BR IF PUNCH READY            30B03610
06E9 01 CC000868        LDD  L  PNRDY      SET PUNCH NOT READY          30B03620
06EB 01 DC00081A        STD  L  EMESG+3                                 30B03630
                        *                                               30B03640
06ED 0  6105      XKRD2 LDX     1 5        ERROR - 5                    30B03650
06EE 0  C664            LDD     DSWAS                                   30B03660
06EF 0  E05F            AND     POFF                                    30B03670
06F0 0  16D0            RTE     16                                      30B03680
06F1 01 44000809        BSI  L  PRDSW      PRINT THE ERROR              30B03690
                        *                                               30B03700
06F3 01 44000830        BSI  L  TIME       PAUSE BEFORE RECHECK         30B03710
06F5 0  70EB            MDX     XKRDY+1                                 30B03720
                        ********************************************** 30B03730
                        *                                               30B03740
                        *                                               30B03750
                        *          READER READY SUBROUTINE              30B03760
                        *                                               30B03770
06F6 0  0000      RRDY  DC      /0000                                   30B03780
06F7 0  0848            XIO     XIOSD      SENSE AND SAVE DSW           30B03790
06F8 0  D05A            STO     DSWAS                                   30B03800
                        *                                               30B03810
06F9 0  E04E            AND     RMASK      REMOVE PCH NRDY BIT          30B03820
                        *                                               30B03830
06FA 01 4C9806F6        BSC  I  RRDY,+-    BR IF DSW OKAY               30B03840
                        *                                               30B03850
06FC 0  1005            SLA     5          DSW ERROR                    30B03860
06FD 01 4C100703        BSC  L  RRDY2,-    BR IF READER READY           30B03870
06FF 01 CC000886        LDD  L  RNRDY      SET NOT READY MSG            30B03880
0701 01 DC00081A        STD  L  EMESG+3                                 30B03890
0703 0  6104      RRDY2 LDX     1 4        ERROR - 4                    30B03900
0704 0  C84E            LDD     DSWAS                                   30B03910
0705 0  E048            AND     ROFF                                    30B03920
0706 0  16D0            RTE     16                                      30B03930
0707 01 44000809        BSI  L  PRDSW      PRINT THE ERROR              30B03940
                        *                                               30B03950
0709 01 44000830        BSI  L  TIME       PAUSE BEFORE RECHECK         30B03960
070B 0  70EB            MDX     RRDY+1                                  30B03970
                        ********************************************** 30B03980
                        *                                               30B03990
                        *          CONTRCL READER SUBROUTINE            30B04000
                        *                                               30B04010
070C 0  6101      FEED  LDX     1 1        SET READER INTRPT            30B04020
070D 01 6D00062E        STX  L1 INTEX       EXPECTED                    30B04030
                        *                                               30B04040
070F 0  0832            XIO     XICFD      FEED READER                  30B04050
                        *                                               30B04060
0710 0  082F            XIO     XICSD      SAVE BUSY DSW                30B04070
0711 0  D03F            STO     DSWBY                                   30B04080
0712 01 44000788        BSI  L  BSYES      CHECK BUSY DSW               30B04090
                        *                                               30B04100
```

```
0714 01 44000830          BSI  L  TIME       PAUSE FOR INTRPT          30B04110
                          *                    NO READ INTERPT         30B04120
0716 0  6111              LDX  1 /0011       ERRCR - 11                30B04130
0717 0  C839              LDD    DSWBY                                 30B04140
0718 0  E035              AND    ROFF                                  30B04150
0719 0  E831              OR     DSWR2                                 30B04160
071A 0  705F              MDX    DINE5       GO PRINT THE ERROR        30B04170
                          ********************************************* 30B04180
                          *                                            30B04190
                          *                PUNCH AND CONTROL READER    30B04200
                          *                  SUBROUTINE                30B04210
                          *                                            30B04220
071B 01 650005FD          XFEED LDX  L1 DINT1    RESTORE DOUBLE INT     30B04230
071D 01 600005FC              STX  L1 DINT1-1      SWITCH               30B04240
                          *                                            30B04250
071F 0  6103              LDX  1 3           SET DOUBLE INTRPT         30B04260
0720 01 6D00062E          STX  L1 INTEX        EXPECTED                30B04270
                          *                                            30B04280
0722 0  081B              XIO    XIOXX       FEED AND PUNCH            30B04290
0723 0  081E              XIO    XIOFD                                 30B04300
                          *                                            30B04310
0724 0  081B              XIO    XIOSD       SAVE BUSY DSW             30B04320
0725 0  D02B              STO    DSWBY                                 30B04330
0726 01 44000786          BSI  L BSYES      CHECK BUST DSW             30B04340
                          *                                            30B04350
0728 01 44000830          BSI  L TIME        PAUSE FCR INTERRUPT       30B04360
                          *                                            30B04370
072A 0  C026              LD     DSWBY       LOST INTERPT              30B04380
072B 0  6113              LDX  1 /0013       ERROR - 13                30B04390
072C 0  1800              RTE    16                                    30B04400
072D 0  C01F              LD     DSWRX                                 30B04410
072E 0  704B              MDX    DINE5       GO PRINT THE ERROR        30B04420
                          ********************************************* 30B04430
                          *                                            30B04440
                          *                PUNCH SUBROUTINE            30B04450
                          *                                            30B04460
072F 0  6102              PUNH  LDX  1 2           SET PUNCH INTRPT    30B04470
0730 01 6D00062E              STX  L1 INTEX        EXPECTED            30B04480
                          *                                            30B04490
0732 0  0808              XIO    XIOXX       PUNCH CHARACTER           30B04500
                          *                                            30B04510
0733 0  080C              XIO    XIOSD       SAVE BUSY DSW             30B04520
0734 0  D01C              STO    DSWBY                                 30B04530
0735 01 44000788          BSI  L BSYES      CHECK BUSY DSW             30B04540
                          *                                            30B04550
0737 01 4400083C          BSI  L TIME        PAUSE FCR INTERRUPT       30B04560
                          *                                            30B04570
0739 0  C817              LDD    DSWBY       NO PUNCH INTERPT          30B04580
073A 0  6112              LDX  1 /0012       ERROR - 12                30B04590
073B 0  E013              AND    POFF                                  30B04600
073C 0  E80F              OR     DSWX2                                 30B04610
073D 0  703C              MDX    DINE5                                 30B04620
                          ********************************************* 30B04630
                          *                                            30B04640
                          *                                            30B04650
073E    0000              BSS  E                                       30B04660
073E 1  081F              XIOXX DC       XCHAR       PUNCH IOCC        30B04670
073F 0  1900                    DC       /1900                         30B04680
0740 0  0000              XIOSD DC       /0000       SENSE DSW IOCC    30B04690
0741 0  1F01                    DC       /1F01                         30B04700
0742 0  0000              XIOFD DC       /0000       FEED IOCC         30B04710
0743 0  1C10                    DC       /1C10                         30B04720
0744 1  081E              XIORR DC       CARED       READ IOCC         30B04730
0745 0  1A00                    DC       /1A00                         30B04740
0746 1  0754              RDBS  DC       BITSW       READ BIT SWITCHES 30B04750
0747 0  3A00                    DC       /3A00                         30B04760
0748 0  FEFF              RMASK DC       /FEFF       READER MASK       30B04770
0749 0  FBFF              XMASK DC       /FBFF       PUNCH MASK        30B04780
```



```
074A 0  FFFF                    DC       /FFFF       MINUS ONE         30B04790
074B 0  0C00              DSWR2 DC       /0C00       RDR BUSY EXP DSW  30B04800
074C 0  0300              DSWX2 DC       /0300       PCH BUSY EXP DSW  30B04810
074D 0  0F00              DSWRX DC       /0F00       DOUBLE BUSY DSW EXP 30B04820
074E 0  0100              ROFF  DC       /0100                         30B04830
074F 0  0400              POFF  DC       /0400                         30B04840
0750 0  0000                    DC       /0000                         30B04850
0751 0  0000              DSWBY DC       /0000       LAST BUSY DSW     30B04860
0752 0  0000                    DC       /0000       NOT USED          30B04870
0753 0  0000              DSWAS DC       /0000       LAST DSWER PRINTED 30B04880
0754 0  0000              BITSW DC                                     30B04890
                          ********************************************* 30B04900
                          *                                            30B04910
                          *                                            30B04920
0755 0  6101              SPUR  LDX  1 1                               30B04930
0756 01 6D000819              STX  L1 EMESG+2                          30B04940
0758 0  6120                  LDX  1 /20       ERRCR - 20              30B04950
0759 01 C4000623              LD   L DSWIT                             30B04960
075B 01 44000809              BSI  L PRDSW     PRINT DSW ERROR         30B04970
                          *                      SPURRIOUS OR NON-     30B04980
                          *                      RESETABLE INTERRUPT   30B04990
075D 00 44800161              BSI  I START                             30B05000
                          ********************************************* 30B05010
                          *                                            30B05020
                          *                PRINT DSW ERRORS DETECTED   30B05030
                          *                DURING INTERRUPT            30B05040
                          *                                            30B05050
075F 00 65000000          NIPES LDX  L1 /0000      PRINT DSW ERROR     30B05060
                          *                        DETECTED WHILE      30B05070
                          *                        RUNNING RTN 1 OR    30B05080
                          *                        RTN 2               30B05090
0761 01 CC000623              LDD  L DSWIT                             30B05100
0763 01 E5000740              AND  L1 ROFF-1                           30B05110
0765 01 ED00062B              OR   L1 INTEX-3                          30B05120
0767 0  7105                  MDX  1 5         ERRCR - 6 OR 7          30B05130
0768 0  7011                  MDX    DINE5                             30B05140
                          *                                            30B05150
                          *                                            30B05160
0769 01 C4000623          DINE1 LD   L DSWIT   PRINT DSW ERROR         30B05170
                          *                      DETECTED WHILE      30B05180
                          *                      RUNNING RTN 3 OR    30B05190
                          *                      RTN 4               30B05200
076B 0  18D0                  RTE    16                                30B05210
076C 0  6108                  LDX  1 8         ERROR - 8               30B05220
076D 0  700A                  MDX    DINE4                             30B05230
                          *                                            30B05240
076E 01 C4000623          DINE2 LD   L DSWIT   SEQ SVC REQ ERROR       30B05250
0770 0  18D0                  RTE    16                                30B05260
0771 01 C4000624              LD   L BUMRQ                             30B05270
0773 01 4C200777              BSC  L DINE3,Z   BR IF 1ST SVC REQ OK    30B05280
0775 0  6109                  LDX  1 9         ERROR - 9               30B05290
0776 0  7001                  MDX    DINE4                             30B05300
                          *                                            30B05310
0777 0  6110              DINE3 LDX  1 /0010   ERROR - 10              30B05320
0778 01 C4000628          DINE4 LD   L INTED                           30B05330
077A 0  18D0              DINE5 RTE    16                              30B05340
077B 01 44000809              BSI  L PRDSW     PRINT THE ERROR         30B05350
                          *                                            30B05360
077D 0  1010              DINE6 SLA    16      INTRPT RECEIVED         30B05370
077E 01 D40005E7              STO  L MLSCF+2    BLOCK TIMER RETURN     30B05380
0780 01 658005DD              LDX  I1 RID      RET TO MAINLINE RTN     30B05390
0782 0  C063                  LD     ERRET                             30B05400
0783 01 4D98087E              BSC  I1 SORTS-1,+- BR IF NC ERROR LAST   30B05410
                          *                                            30B05420
0785 0  1810                  SRA    16        RETURN TO FINISH        30B05430
0786 0  D05F                  STO    ERRET      ALIGNING TAPE          30B05440
0787 0  7014                  MDX    READ       IN READER              30B05450
                          ********************************************* 30B05460
```

PAPER TAPE READER/PUNCH FUNCTION TEST

```
                       *                                            30B05470
                       *                  CHECK BUSY DSW            30B05480
                       *                                            30B05490
0788 0  0000           BSYES DC     /0000                           30B05500
0789 01 6D000760             STX  L1 NIPES+1      FETCH LAST DSW SENSED  30B05510
078B 0  C0C5                 LD      DSWBY        AFTER I/O COMMAND 30B05520
078C 01 E5000747             AND  L1 RMASK-1                        30B05530
078E 01 F500074A             EOR  L1 DSWR2-1                        30B05540
0790 01 4C980788             BSC  I  BSYES,+-     BR IF DSW CK      30B05550
                       *                                            30B05560
0792 0  C88E                 LDD     DSWBY        PRINT DSW ERROR   30B05570
0793 01 E500074D             AND  L1 ROFF-1                         30B05580
0795 01 ED00074A             OR   L1 DSWR2-1      ERRCR - 1 CR 2 OR 3  30B05590
0797 0  18D0                 RTE     16                             30B05600
0798 0  4070                 BSI     PRDSW        PRINT THE ERROR   30B05610
                       *                                            30B05620
                       *                                            30B05630
0799 01 4C800788       XBSYX BSC  I  BSYES        EXIT TO USER      30B05640
                       *                                            30B05650
                       *                                            30B05660
                       **********************************************  30B05670
                       *                                            30B05680
                       *                                            30B05690
                       *          READ AND COMPARE SUBROUTINE       30B05700
                       *                                            30B05710
                       *  THIS ROUTINE READS THE READER BUFFER TWICE  30B05720
                       *  TO ENSURE THE SAME DATA IS READ.  THEN IT   30B05730
                       *  COMPARES THE DATA READ WITH WHAT SHOULD HAVE  30B05740
                       *  BEEN READ.  IF AN ERROR IS FOUND THIS ROUTINE  30B05750
                       *  WILL REALIGN THE TAPE IN THE READER BEFORE  30B05760
                       *  RETURNING TO MAINLINE ROUTINE IF THAT OPTION  30B05770
                       *  WAS SPECIFIED.  OTHERWISE ONE ERROR IS PRINTED  30B05780
                       *  FOR EACH NON-COMPARE.                     30B05790
                       *                                            30B05800
                       *  AN ERROR WILL ALSO BE PRINTED IF THE ROUTINE  30B05810
                       *  CANNOT REALIGN THE TAPE IN 100 CHARACTERS.  30B05820
                       *                                            30B05830
                       *                                            30B05840
079B 0  0000           RDIT  DC     /0000                           30B05850
079C 01 C400081E       READ  LD   L  CARED        SAVE LAST CHAR READ  30B05860
079E 01 D4000821             STO  L  LREAD                          30B05870
07A0 0  08A3                 XIO     XIORR        READ CHARACTER    30B05880
                       *                                            30B05890
07A1 01 C400081E             LD   L  CARED        SAVE CHARACTER READ  30B05900
07A3 0  D045                 STO     SAVIT                          30B05910
                       *                                            30B05920
07A4 0  089F                 XIO     XIORR        READ              30B05930
07A5 0  C043                 LD      SAVIT        CHECK IF SAME CHAR  30B05940
07A6 0  F077                 EOR     CARED                          30B05950
07A7 01 4C2007C5             BSC  L  RDIT1,Z      BR IF ERR IN READ 30B05960
                       *                                            30B05970
                       *                                            30B05980
07A9 01 C400081F       RDITO LD   L  XCHAR        DO CHARACTERS     30B05990
07AB 0  F072                 EOR     CARED          COMPARE         30B06000
07AC 0  1808                 SRA     8                              30B06010
07AD 01 4C2007CC             BSC  L  RDIT2,Z      BR IF NON COMPARE 30B06020
07AF 01 740107E7             MDX  L  CORCT,1                        30B06030
07B1 0  7055                 MDX     RDITE        EXIT              30B06040
                       *                                            30B06050
07B2 0  6835                 STX   0 NIST                           30B06060
07B3 00 6500A001             LDX  L1 /A001        PRINT TAPE ALIGNED  30B06070
07B5 01 CC00088A             LDD  L  TEAL                           30B06080
07B7 0  406A                 BSI     PTLOG        PRINT THE MESSAGE 30B06090
07B8 01 C40005E1             LD   L  SW2          TURN OFF REALIGN SW  30B06100
07BA 0  1009                 SLA     9                              30B06110
07BB 0  1809                 SRA     9                              30B06120
07BC 01 D40005E1             STO  L  SW2                            30B06130
07BE 0  1810           RDITD SRA     16           RESET BITLINE CHECK  30B06140
```


PAPER TAPE READER/PUNCH FUNCTION TEST

```
07BF 0  D02B                 STO     BTLNE                          30B06150
07C0 0  C02C                 LD      KFF00                          30B06160
07C1 0  D028                 STO     NOLNE                          30B06170
07C2 0  6164                 LDX   1 100                            30B06180
07C3 0  6928                 STX   1 TRIAL                          30B06190
07C4 0  7042                 MDX     RDITE        EXIT              30B06200
                       *                                            30B06210
07C5 0  C023           RDIT1 LD      SAVIT        CONSECUTIVE READ ERROR  30B06220
07C6 0  18D0                 RTE     16                             30B06230
07C7 0  C056                 LD      CARED                          30B06240
07C8 0  6118                 LDX   1 /18          ERROR - 18        30B06250
07C9 01 44000609             BSI  L  PRDSW        PRINT THE ERROR   30B06260
07CB 0  70DD                 MDX     RDITO                          30B06270
                       *                                            30B06280
07CC 0  C01B           RDIT2 LD      NIST                           30B06290
07CD 01 4C2007EE             BSC  L  RDIT4,Z      BR IF TAPE ALIGNED  30B06300
                       *                                            30B06310
07CF 0  C01B                 LD      BTLNE        BIT LINE OPEN CK  30B06320
07D0 0  E84D                 OR      CARED                          30B06330
07D1 0  D019                 STO     BTLNE                          30B06340
                       *                                            30B06350
07D2 0  C017                 LD      NOLNE        BIT LINE SHORT CK 30B06360
07D3 0  E04A                 AND     CARED                          30B06370
07D4 0  D015                 STO     NOLNE                          30B06380
                       *                                            30B06390
07D5 01 74FF07EC             MDX  L  TRIAL,-1     COUNT DOWN 100 MAX  30B06400
07D7 0  7007                 MDX     RDIT3                          30B06410
                       *                                            30B06420
07D8 0  C011                 LD      NOLNE        NO ALIGNMENT ERROR  30B06430
07D9 0  6119                 LDX   1 /0019        ERROR - 19        30B06440
07DA 0  18D0                 RTE     16                             30B06450
07DB 0  C00F                 LD      BTLNE                          30B06460
07DC 01 44000809             BSI  L  PRDSW        PRINT THE ERROR   30B06470
                       *                                            30B06480
07DE 0  70DF                 MDX     RDITD                          30B06490
                       *                                            30B06500
07DF 0  61F8           RDIT3 LDX   1 -8                             30B06510
07E0 0  6906                 STX   1 CORCT                          30B06520
07E1 01 440006F6             BSI  L  RRDY         READER READY      30B06530
07E3 0  6802                 STX   0 ERRET                          30B06540
07E4 01 4C00070C             BSC  L  FEED         CONTROL READER    30B06550
                       *                                            30B06560
07E6 0  0000           ERRET DC     /0000         RET TO CMPRE IF SET  30B06570
07E7 0  0000           CORCT DC     /0000         TAPE ALIGNMENT    30B06580
07E8 0  0000           NIST  DC     /0000          WORK AREAS       30B06590
07E9 0  0000           SAVIT DC     /0000         SAVED CHARACTER   30B06600
07EA 0  FF00           NOLNE DC     /FF00         SOLID LINE CHECK  30B06610
07EB 0  0000           BTLNE DC     /0000         OPEN LINE CHECK   30B06620
07EC 0  0064           TRIAL DC     100           100 TRIALS MAXIMUM  30B06630
07ED 0  FF00           KFF00 DC     /FF00                           30B06640
                       *                                            30B06650
07EE 01 C40005E1       RDIT4 LD   L  SW2                            30B06660
07F0 0  1008                 SLA     8                              30B06670
07F1 01 4C1007F6             BSC  L  RDIT6,-      BR IF NO REALIGN  30B06680
07F3 0  1008                 SLA     8                              30B06690
07F4 0  D0F3                 STO     NIST                           30B06700
07F5 0  70E9                 MDX     RDIT3                          30B06710
                       *                                            30B06720
07F6 0  6114           RDIT6 LDX   1 /0014        DATA READ ERROR   30B06730
07F7 01 CC000884             LDD  L  WASSB        SET ALPHA MESSAGE 30B06740
07F9 0  D820                 STD     EMESG+3                        30B06750
07FA 0  C025                 LD      LCHAR                          30B06760
07FB 0  F023                 EOR     XCHAR                          30B06770
07FC 01 4C180802             BSC  L  RDIT5,+-     BR IF BUF S/NB CNGD  30B06780
07FE 0  C01F                 LD      CARED                          30B06790
07FF 0  F021                 EOR     LREAD                          30B06800
0800 0  4818                 BSC     +-           BR IF RDR BUF CNGED  30B06810
0801 0  6115                 LDX   1 /0015                          30B06820
```

```
0802 0  C01C        RDIT5 LD      XCHAR       BUILD ERROR MESSAGE      30B06830
0803 0  1898              SRT     24                                   30B06840
0804 0  1088              SLT     8           ERROR - 14 OR 15         30B06850
0805 0  C018              LD      CARED                                30B06860
0806 0  4002              ESI     PRDSW       PRINT THE ERROR          30B06870
                    *                                                  30B06880
0807 01 4C80C798    RDITE ESC   I   RDIT                               30B06890
                    ********************************************       30B06900
                    *                                                  30B06910
                    *                                                  30B06920
                    *                PRINT ERROR SUBROUTINE            30B06930
                    *                                                  30B06940
0809 0  0000        PRDSW DC      /0000       PRINT ERROR RTN          30B06950
                    *                                                  30B06960
080A 0  D811              STD     EMESG+5     SAVE DATA WAS + S/B      30B06970
                    *                                                  30B06980
080B 0  690B              STX   1 EMESG       SAVE MESSAGE ID NO       30B06990
                    ********************************************       30B07000
080C 00 44800162          BSI   I ERROR                          *     30B07010
080E 1  0817              DC      EMESG       MESSAGE ADDR       *     30B07020
080F 0  0000              DC                  LOOP ON ERR ADDR   *     30B07030
                    ********************************************       30B07040
0810 0  6203              LDX   2 3                                    30B07050
0811 0  6A07              STX   2 EMESG+2                              30B07060
0812 0  10A0              SLT     32          CLEAR ALPHA MESS         30B07070
0813 0  D806              STD     EMESG+3                              30B07080
0814 01 64800809          LDX   I0 PRDSW      NORMAL + LOOP RETS       30B07090
                    *                                                  30B07100
0816    0000              BSS   E                                      30B07110
0816 0  1000        TIMEX DC      /1000       COUNTER                  30B07120
0817 0  0000        EMESG DC      /0000       MESSAGE ID               30B07130
0818 0  0000              DC      /0000       HEX     OUTPUT           30B07140
0819 0  0003              DC      /0003       WORD COUNT               30B07150
081A 0  0000              DC      /0000       ALPHA ADRS               30B07160
081B 0  0000              DC      /0000       ALPHA ADRS               30B07170
081C 0  0000              DC      /0000       DSWAS                    30B07180
081D 0  0000              DC      /0000       DSW S/B                  30B07190
                    *                                                  30B07200
                    *                                                  30B07210
081E 0  0000        CARED DC      /0000       CHARACTER READ           30B07220
081F 0  0000        XCHAR DC      /0000       PUNCH OUTPUT CHAR        30B07230
0820 0  0000        LCHAR DC      /0000       PREVIOUS OUTPUT CHAR     30B07240
0821 0  0000        LREAD DC      /0000       PREVIOUS CHAR READ       30B07250
                    ********************************************       30B07260
                    *                                                  30B07270
                    *                                                  30B07280
                    *                LOG MESSAGE SUBROUTINE            30B07290
                    *                                                  30B07300
0822 0  0000        PTLOG DC      /0000                                30B07310
0823 0  6907              STX   1 LGMS        SAVE MESSAGE ID          30B07320
                    *                                                  30B07330
0824 0  D809              STD     LGMS+3      SAVE MODIFIERS           30B07340
                    ********************************************       30B07350
0825 00 44800163          BSI   I LOG                            *     30B07360
0827 1  0828              DC      LGMS        ADDR OF MESSAGE    *     30B07370
                    ********************************************       30B07380
0828 01 64800822          LDX   I0 PTLOG      NORMAL RETURN            30B07390
                    *                                                  30B07400
082A    0001              BSS   E 1                                    30B07410
082B 0  0001        LGMS  DC      1           MSG ID                   30B07420
082C 0  0000              DC      /0000       HEX OUTPUT               30B07430
082D 0  0000              DC      /0000       DATA ID                  30B07440
082E 0  0000              DC      /0000                                30B07450
082F 0  0000              DC      /0000                                30B07460
                    ********************************************       30B07470
                    *                                                  30B07480
                    *                TIMED DELAY SUBROUTINE            30B07490
                    *                                                  30B07500
```



```
0830 0  0000        TIME  DC      /0000                                30B07510
0831 00 65001000          LDX   L1 /1000      SET UP COUNTER           30B07520
0833 0  69E2              STX     1 TIMEX                              30B07530
0834 01 74FF0816          MDX   L TIMEX,-1    DECREMENT COUNTER        30B07540
0836 0  7002              MDX     TIME1                                30B07550
0837 01 4C80C830          BSC   I TIME        EXIT TIME UP             30B07560
                    *                                                  30B07570
0839 01 65000834    TIME1 LDX   L1 TIME+4     SET FOR REENTRY          30B07580
083B 01 6D0005E7    PDSWX STX   L1 MLSCF+2                             30B07590
083D 00 44800161          BSI   I START                                30B07600
                    ********************************************       30B07610
                    *                                                  30B07620
                    *              BUILD NEXT CHARACTER                30B07630
                    *                 SUBROUTINE                       30B07640
                    *                                                  30B07650
083F 0  0000        MARK  DC      /0000                                30B07660
0840 0  C0DE              LD      XCHAR       SAVE LAST CHARACTER      30B07670
0841 0  1808              SRA     8                                    30B07680
0842 0  1008              SLA     8                                    30B07690
0843 0  D0DC              STO     LCHAR                                30B07700
                    *                                                  30B07710
0844 00 65000001          LDX   L1 1          INIT TEST XR1            30B07720
0846 00 66000000    DULP  LDX   L2 0                  XR2              30B07730
0848 01 4E800870          BSC   I2 WHAT       GO BUILD CHARACTER       30B07740
                    *                                                  30B07750
084A 01 C5000874    NRIPX LD    L1 BITSX      START NEW RIPPLE         30B07760
084C 0  D0D2              STO     XCHAR        PATTERN                 30B07770
084D 0  6201              LDX   2 1                                    30B07780
084E 0  701D              MDX     EXITX                                30B07790
                    *                                                  30B07800
084F 0  C0CF        SRIPX LD      XCHAR       SHIFT RIPPLE PATTERN     30B07810
0850 0  1001              SLA     1                                    30B07820
0851 0  D0CD              STO     XCHAR                                30B07830
0852 0  4820              BSC     Z           SKIP NEXT CH NO BITS     30B07840
0853 0  7018              MDX     EXITX                                30B07850
0854 0  6202              LDX   2 2                                    30B07860
0855 0  C01E              LD      BITSX       PLACE ALL BIT CHAR       30B07870
0856 0  D0C8              STO     XCHAR                                30B07880
0857 0  6925              STX   1 COUNX                                30B07890
                    *                                                  30B07900
0858 01 74FF087D    BARX  MDX   L COUNX,-1    SKIP WHEN COUNX GO 0     30B07910
085A 0  7011              MDX     EXITX                                30B07920
085B 0  6200              LDX   2 0                                    30B07930
085C 0  7101              MDX   1 1                                    30B07940
085D 0  6920              STX   1 KOUNX                                30B07950
085E 01 74F8087E          MDX   L KOUNX,-8    SKIP EXCEPT END RIPPE    30B07960
0860 0  7001              MDX     ENRIX       BR TO END RIPPLE ROUT    30B07970
0861 0  700A              MDX     EXITX       BR TO EXIT               30B07980
                    *                                                  30B07990
0862 0  6203        ENRIX LDX   2 3           END RIPPLE PATTERN       30B08000
0863 0  7008              MDX     EXITX                                30B08010
                    *                                                  30B08020
0864 0  C018        ALLBX LD      COUNX       ALL CHARS PATTERN        30B08030
0865 0  D0B9              STO     XCHAR                                30B08040
0866 0  800E              A       ONEEX       ADD ONE I. E. 0100       30B08050
0867 0  D015              STO     COUNX                                30B08060
0868 01 4C20086C          BSC   L EXITX,Z                              30B08070
                    *                                                  30B08080
                    *                                                  30B08090
086A 0  6101              LDX   1 1           REINITIALIZE             30B08100
086B 0  6200              LDX   2 C                                    30B08110
086C 0  69D8        EXITX STX   1 DULP-1                             30B08120
086D 0  6AD9              STX   2 DULP+1                             30B08130
086E 01 4C80083F          BSC   I MARK        EXIT                     30B08140
                    *                                                  30B08150
                    ********************************************       30B08160
                    *                                                  30B08170
0870 1  084A        WHAT  DC      NRIPX       RECORD CONTROL ADRS      30B08180
```

```
0871 1 084F            DC      SRIPX                          30B08190
0872 1 0858            DC      BARX                           30B08200
0873 1 0864            DC      ALLBX                          30B08210
                       *                                      30B08220
                       *                                      30B08230
0874 0 FF00    BITSX   DC      /FF00     CHARACTER PATTERN    30B08240
0875 0 0100    ONEEX   DC      /0100      CONSTANTS           30B08250
0876 0 00C0            DC      /00C0                          30B08260
0877 0 00E0            DC      /00E0                          30B08270
0878 0 00F0            DC      /00F0                          30B08280
0879 0 00F8            DC      /00F8                          30B08290
087A 0 00FC            DC      /00FC                          30B08300
087B 0 00FE            DC      /00FE                          30B08310
087C 0 00FF            DC      /00FF                          30B08320
                       *                                      30B08330
087D 0 0000    COUNX   DC      /0000     WORK AREAS           30B08340
087E 0 0000    KOUNX   DC      /0000                          30B08350
                       ********************************************30B08360
                       *                                      30B08370
                       *                                      30B08380
                       *          ADDRESSES FOR RETURN TO     30B08390
                       *            MAINLINE AFTER INTRPT     30B08400
                       *                                      30B08410
087F 1 068F    SORTS   DC      RTN1A     ROUTINE 1            30B08420
0880 1 0695            DC      RTN2A     ROUTINE 2            30B08430
0881 1 069F            DC      RTN3A     ROUTINE 3            30B08440
0882 1 06AF            DC      RTN4A     ROUTINE 4            30B08450
0883 1 06C2            DC      RTN5A     ROUTINE 5            30B08460
                       ********************************************30B08470
                       *                                      30B08480
                       *          ALPHABETIC MESSAGE          30B08490
                       *            STORAGE AREAS             30B08500
                       *                                      30B08510
0884    0000           BSS     E                              30B08520
0884 1 0899    WASSB   DC      AWAS                           30B08530
0885 1 089C            DC      ASB                            30B08540
0886 1 088C    RNRDY   DC      ARDR                           30B08550
0887 1 08A5            DC      ANRDY                          30B08560
0888 1 088F    PNRDY   DC      APCH                           30B08570
0889 1 08A5            DC      ANRDY                          30B08580
088A 0 0000    TEAL    DC      0                              30B08590
088B 1 0892            DC      ATAPE                          30B08600
                       *                                      30B08610
088C 0 6232    ARDR    DC      /6232     RDR ERROR            30B08620
088D 0 6200            DC      /6200                          30B08630
088E 0 FFFF            DC      /FFFF                          30B08640
                       *                                      30B08650
088F 0 561E    APCH    DC      /561E     PCH                  30B08660
0890 0 2600            DC      /2600                          30B08670
0891 0 FFFF            DC      /FFFF                          30B08680
                       *                                      30B08690
0892 0 9C3C    ATAPE   DC      /9C3C     TAPE ALIGNED         30B08700
0893 0 5434            DC      /5434                          30B08710
0894 0 213C            DC      /213C                          30B08720
0895 0 5C20            DC      /5C20                          30B08730
0896 0 1474            DC      /1474                          30B08740
0897 0 3430            DC      /3430                          30B08750
0898 0 FFFF            DC      /FFFF                          30B08760
                       *                                      30B08770
0899 0 923E    AWAS    DC      /923E     WAS                  30B08780
089A 0 9A00            DC      /9A00                          30B08790
089B 0 FFFF            DC      /FFFF                          30B08800
                       *                                      30B08810
089C 0 219A    ASB     DC      /219A     S/B - DATA ERROR     30B08820
089D 0 BC1A            DC      /BC1A                          30B08830
089E 0 2184            DC      /2184                          30B08840
089F 0 2132            DC      /2132                          30B08850
08A0 0 3E9E            DC      /3E9E                          30B08860
```



```
08A1 0 3E21            DC      /3E21                          30B08870
08A2 0 3662            DC      /3662                          30B08880
08A3 0 6200            DC      /6200                          30B08890
08A4 0 FFFF            DC      /FFFF                          30B08900
08A5 0 7662    ANRDY   DC      /7662     NRDY                 30B08910
08A6 0 32A6            DC      /32A6                          30B08920
08A7 0 FFFF            DC      /FFFF                          30B08930
                       *                                      30B08940
08A8    0631           END     PTBGN                          30B08950
```

CROSS REFERENCE LISTING

SYMBOL	VALUE	REFERENCES
ALLBX	0864	0873
ANRDY	08A5	0887,0839
APCH	088F	0888
ARDR	086C	0886
ASB	089C	0885
ATAPE	0892	088B
AWAS	0899	0884
BARX	0858	0872
BEGIN	0160	0000,0631
BITSW	0754	06C6,0746
BITSX	0874	084A,0855
BSYES	0786	0712,0726,0735,0790,0799
BTLNE	07EB	07BF,07CF,07D1,07DB
BUMRQ	0624	0612,0771
CAREC	081E	0681,0744,079C,07A1,07A6,07AB,07C7,07D0,07D3,07FE, 0805
CNTRL	0649	06DC
CN10	064E	
CN20	0658	064C
CN25	065F	0651
CN30	066E	0665,066B
CORCT	07E7	0635,07AF,07E0
COUNX	087D	0857,0858,0864,0867
CRASH	06D8	068F,0697,06A1,06DE
DINE1	0769	0605
DINE2	076E	060D
DINE3	0777	0773
DINE4	0778	076D,0776
DINE5	077A	071A,072E,073D,0768
DINE6	077D	061C
DINT	05FA	0628
DINT1	05FD	0615,0718,071D
DINT2	0608	0613
DINT4	0610	0600
DSWAS	0753	06E2,06EE,06F8,0704
DSWBY	0751	0711,C717,0725,072A,0734,0739,078B,0792
DSWDI	0629	05FD,0602
DSWIC	062A	05FF,0608
DSWIT	0623	05EC,0609,0759,0761,0769,076E
DSWRX	074D	072D
DSWR2	074B	0719,078E,0795
DSWX2	074C	073C
DULP	0846	0671,0674,086C,086D
EINT	0617	0625
EMESG	0817	063D,06BE,06EB,0701,0756,07F9,080A,080B,080E,0811, 0813
END	0164	0000,0000,0000,0000,065D
ENRIX	0862	0860
ERLCK	0166	
ERRET	07E6	0782,0786,07E3
ERROR	0162	0000,080C
EXITX	086C	084E,0853,085A,0861,0863,0868
FEED	070C	0694,06A5,06C1,07E4
HANDL	0626	05EF
IL0	017A	0000
IL1	018A	0000
IL2	019A	0000
IL3	01AA	0000
IL4	018A	0000,0645
INTED	062B	05FA,05FE,060A,0778
INTEX	062E	05ED,05F1,05F3,0620,070D,0720,0730,0765
KFF00	07ED	07C0
KOUNX	087E	085D,085E
LCHAR	0820	07FA,0643
LGMS	0828	0823,0824,0827

LOG	0163	0000,0825
LOGBY	0167	
LOOP	0647	05E3,06A9,06D4
LREAD	0821	079E,07FF
LRTN	0682	067D
MARK	083F	068A,0691,0699,086E
MLSCF	05E5	0619,061E,0667,077E,083B
NIPES	075F	05F7,0789
NOLNE	07EA	07C1,07D2,07D4,07D8
NRIPX	084A	0870
NRTN	0680	067C
NLST	07E8	063A,07B2,07CC,07F4
ONEEX	0875	0866
PDSWX	083B	
PID	05DC	0633
PIN11	061E	05F9,0607,060F
PINT3	061C	05F5,0603,0608
PNRDY	0888	06E9
POFF	074F	06EF,073B
POINT	05E9	0621,0643
PRDSW	0809	068C,06F1,0707,075B,077B,0798,07C9,07DC,0806,0814
PTBGN	0631	08A8
PTLOG	0822	07B7,0828
PUNH	072F	068D,06D7
RAD	05DE	0663
RASH	06DE	06DB
RDBS	0746	06C4
RDIT	079B	0695,069F,0807
RDITD	078E	07DE
RDITE	0807	07B1,07C4
RDITO	07A9	07CB
RDIT1	07C5	07A7
RDIT2	07CC	07AD
RDIT3	07DF	07D7,07F5
RDIT4	07EE	07CD
RDIT5	0802	07FC
RDIT6	07F6	07F1
READ	079C	0787
RESRT	0634	05E4,05E6
RID	05DD	0648,064E,0656,0658,0658,065F,0780
RIDCK	067D	0650
RLCF	0168	
RMASK	0748	062F,06F9,078C
RNRDY	0886	06FF
ROFF	074E	0705,0718,0763,0793
RQKB	018C	0000
RQTY	01BB	0000
RRDY	06F6	0693,069C,06A4,06AC,06C0,06FA,070B,07E1
RRDY2	0703	06FD
RTNCM	067C	065A
RTNSW	0165	0669
RTN1	068A	0690
RTN1A	068F	087F
RTN11	0684	0641,067E,0689
RTN2	0691	067F,0698
RTN2A	0695	0880
RTN3	0699	0680,06A2
RTN3A	069F	0881
RTN4	06A6	06B8
RTN4A	06AF	0882
RTN4I	06A4	0681
RTN5A	06C2	0682,06CB,06D0,0883
RTN5B	06C4	
RTN5D	06D0	
RTTBL	067E	0661,067A,067C,067D
SAVIT	07E9	07A3,07A5,07C5
SINT	05F1	0626,0627
SORTS	087F	0783

PAPER TAPE READER/PUNCH FUNCTION TEST

TABLE OF CONTENTS

1. PURPOSE

THE 1132 FUNCTION TEST IS DESIGNED TO CHECK THE OPERATING PERFORMANCE OF THE 1132 PRINTER ANC TO AID IN ITS PROPER ADJUSTMENT.

2. PREREQUISITES

2.1*** PROGRAM PREREQUISITES

DIAGNOSTIC MONITOR II

2.2*** EQUIPMENT PREREQUISITES

1. 1131 CPU WITH PROGRAM LOAD FROM CARDS OR PAPER TAPE AND THE FOLLOWING EC'S 419622, 419625, 419633.
2. 1132 PRINTER WITH EC 419621.
3. AT LEAST 2000 WORDS OF AVAILABLE CORE STORAGE.
4. ANY CARRIAGE TAPE. SEE SECTION 5.2.2.8

****

3. OPERATING PROCEDURE

THESE OPERATING PROCEDURES APPLY TO SINGLE PROGRAM OPERATION ONLY. FOR OVERLAP OPERATION REFER TO SECTION 3.2.3 OF THE 1130 DIAGNOSTIC MONITOR II DOCUMENTATION.

3.1*** PROGRAM LOADING

STANDARD MONITOR LOADING PROCEDURES APPLY

THESE PROCEDURES ARE SUMMARIZED HERE. SEE DM USE PROCEDURE FOR DETAILS.

1. SET FIRST TYPEWRITER TAB 20 CHARACTERS FROM LEFT MARGIN.
2. SET BIT SWITCH 15 OFF - LOAD AND GO
   ON - TO HALT AFTER LOADING

   IF HALTED AFTER LOADING, SELECT PROGRAM OPTIONS THEN TURN OFF HALT SWITCH OR FOLLOW NORMAL RESTART PROCEDURE (SEC 3.5)

3. LOAD DIAGNOSTIC MONITOR, AND 1132 FUNCTION TEST.

******

3.2*** PROGRAM OPERATION.

3.2.1 PROGRAM CONTROL - FUNCTION 0

1. SET SWITCHES 0-7 TO 01.
2. SET SWITCHES 8-15 FOR DESIRED FUNCTION.

SW	FUNCTION
8	RESTART
9	ROUTINE START MESSAGE
10	LOCK ON FUNCTION
11	LOOP PROGRAM
12	LOOP ON ERROR
13	BYPASS ERROR PRINTOUT AND 1132 PRINT
14	HALT ON ERROR
15	HALT

3. PRESS INT REQ KEY ON CONSOLE.

**

3.2.2 ROUTINE SELECTION - FUNCTION 1

THE SELECTED ROUTINE WILL LOOP UNTIL A NEW ROUTINE IS SELECTED.

1. TO SET ROUTINE SELECTION
   A. SET SWITCHES 0-7 TO 41.
   B. SET ROUTINE NUMBER IN SWITCHES 12-15.

41

RTN		DESCRIPTION	
1		EMIT SEQUENCE	NORMAL ROUTINES-
2		PRINT SCAN CHECK INDICATOR	THE PROGRAM STARTS WITH
3		SPACE WITH PRINTER OFF	ROUTINE 1, RUNS EACH
4		SPACE WITH PRINTER ON	ROUTINE IN SEQUENCE
5		RIPPLE PRINT	THEN TERMINATES AFTER
6		PRINT ALL CHARACTERS	ROUTINE A.
7		STRESS TEST	
8		CHANNEL IDENTIFICATION	
9	*	SKIP WITH PRINTER OFF	
A	*	SKIP WITH PRINTER ON	
B	*	BIT SWITCH CONTROL	OPTIONAL ROUTINES - RUN ONLY IF SELECTED

* = REFER TO SECTION 3.2.3 FOR SPECIAL INSTRUCTIONS.

   C. PRESS INT REQ KEY ON CONSOLE.

2. TO RESET ROUTINE SELECTION SET AS IF SELECTING ROUTINE ZERO.

**

3.2.3 OPTIONAL CONTROL

1. PRINT ANY CHARACTER

   TEST ROUTINE B ALLOWS THE C.E. TO SPECIFY THROUGH THE BIT SWITCHES THE CHARACTER HE DESIRES TO PRINT AND THE COLUMN IN WHICH IT WILL BE PRINTED. ONLY ONE CHARACTER WILL BE PRINTED ON EACH LINE.

   TO SPECIFY THE CHARACTER AFTER SELECTING ROUTINE B

   A. SET COLUMN NUMBER (IN BINARY) IN SWITCHES 1-7.
   B. SET THE CHARACTER CODE IN SWITCHES 8-15.
   C. TURN ON SWITCH 0.

2. MODIFY SPACE IDLE TIME

   IN ALL ROUTINES THE PROGRAM WILL NORMALLY TAKE 16 IDLES BEFORE SPACING AFTER PRINT. THIS IDLE TIME CAN BE INCREASED OR DECREASED AS FOLLOWS.

   A. SET SWITCHES 0-7 TO C1.
   B. SET SWITCHES 8-15 TO DESIRED NUMBER OF IDLES (IN BINARY)
   C. PRESS INT REG KEY.

3. SPECIFY CHANNEL TO SKIP TO

   IN ROUTINES 9 AND A, A CHANNEL CAN BE SELECTED BY A FUNCTION 2 SWITCH ENTRY. THE ROUTINE WILL THEN SKIP TO THAT CHANNEL ONLY. AFTER ENTERING THE ROUTINE, THE CHANNEL IS SPECIFIED BY SETTING THE BIT SWITCHES TO B1XXX WHERE XX EQUALS THE DSW BIT CODE FOR THE DESIRED CHANNEL.

CHARACTER EMITTER CODE			
CHARACTER	EMIT CODE	CHARACTER	EMIT CODE
1	F1	J	D1
2	F2	K	D2
3	F3	L	D3
4	F4	M	D4
5	F5	N	D5
6	F6	O	D6
7	F7	P	D7
8	F8	Q	D8
9	F9	R	D9
0	F0	E	C5
=	7E	G	C7
$	5B	W	E6
.	4B	X	E7
'	7D	Y	E8
,	6B	Z	E9
)	5D	A	C1
-	60	B	C2
(	4D	C	C3
+	4E	D	C4
/	6I	F	C6
*	5C	H	C8
+	5D	I	C9
		S	E2
		T	E3
		U	E4
		V	E5

NOTE - THIS TABLE GIVES THE CHARACTERS IN THE NORMAL EMIT CODE SEQUENCE.

**

3.2.4 LOCK ON FUNCTION CONTROL

LOCK ON FUNCTION WILL LOOP ON THE PRIMARY FUNCTION IN EACH ROUTINE AS FOLLOWS.

RTN	FUNCTION
1	IDLE TO CHECK EMIT SEQUENCE
2	IDLE WITH SCAN CHECK
3	LOCK ON 1,2,3,9 OR 39 SPACES
4	SAME AS RTN 3
5	PRINT RIPPLE WITHOUT ADVANCING PATTERN
6	PRINT WITHOUT ADVANCING DATA.
7	LOOP ON PRINT
8	LOCK ON SPACE TO CHANNEL OR LOCK ON SKIP TO CHANNEL
9	LOCK ON SKIP TO SAME CHANNEL.
A	SAME AS RTN 9

NOTE - IN ROUTINE 3 OR 4, THE 39 SPACES EQUALS ONE REVOLUTION OF THE PLATTEN WHEN THE CARRIAGE IS SET TO 6 LINES PER INCH.

******

3.3*** PROGRAM HALTS

3.3.1 NORMAL HALTS

HALT NO. (B REG)	DESCRIPTION	RESTART ACTION
3001	PROGRAM STOP OR ADDRESS STOP	PRESS START
3002	HALT ON ERROR	DISPLAY MODE-PRESS START. RUN MODE-PRESS START

**

3.3.2 ERROR HALTS

HALT NO. (B REG)	DESCRIPTION	RESTART ACTION
30F1	CHECK SUM ERROR ON FIRST CARD OF LOADER	RELOAD
30F2	READER DSW ERROR WHEN LOADING LOADER	RELOAD
30F3	CARD 2 OF LOADER DID NOT LOAD	RELOAD
30F4	CAN NOT CLEAR CORE - DUE TO ERROR IN ADDRESSING UPPER CORE.	
30F5	READER CHECK WHEN LOADING MONITOR OR TEST PROGRAM	NPRO THEN PLACE CARDS RUN OUT IN FRONT OF REMAINING DECK AND PRESS START.
30F6	MONITOR DID NOT LOAD	RELOAD
30F7	CHECK SUM WHEN LOADING MONITOR	RELOAD
30F8	READER NOT READY	MAKE READER READY
30F9	INVALID INTERRUPT WHICH WILL NOT RESET	PRESS RESET AND START
30FA	CONSOLE PRINTER HANG UP - BUSY WILL NOT GO OFF	FIX THE CONSOLE PRINTER OR NOP THIS WAIT

******

3.4*** PROGRAM TERMINATION

IF LOOP PROGRAM HAS NOT BEEN SPECIFIED THE PROGRAM WILL TERMINATE AT THE END OF ROUTINE A. ROUTINE B WILL RUN ONLY IF SELECTED.

IF ANY ROUTINE IS SELECTED THAT ROUTINE WILL LOOP AND WILL NOT TERMINATE.

******

3.5*** RESTART

1. SET SWITCHES 0-7 TO 01.
2. TURN ON SWITCH 8.
3. SET DESIRED CONTROL IN SWITCHES 9-14.
4. PRESS INTERRUPT REQUEST KEY.

4. PRINTOUTS

ALL PRINTOUTS ARE IN THE STANDARD FORMAT.

```
APPNN OORR AAAA                (MESSAGE)
OR
EPPNN OORR AAAA                (MESSAGE)
```

WHERE
- A IDENTIFIES STATUS MESSAGES
- E IDENTIFIES ERROR MESSAGES
- PP IS THE ID OF THE PROGRAM CAUSING THE MESSAGE

  THIS WILL BE EITHER 00 FOR MESSAGES ORIGINATED BY THE MONITOR OR 0C FOR MESSAGES ORIGINATED BY THIS PROGRAM.
- NN IS THE MESSAGE SEQUENCE NUMBER
- RR IS THE ROUTINE NUMBER
- AAAA IS THE ADDRESS OF THE ROUTINE
- MESSAGE IS ANY VARIABLE INFORMATION

4.1*** STATUS MESSAGES

```
A0000                          NUM  PID  ADRS REL  LD
                               XXXX XXXX XXXX XXXX
```

THIS MESSAGE IS PRINTED FOLLOWING THE LOADING OF ANY PROGRAM (EXCEPT MONITOR). THE MESSAGE GIVES THE LOAD SEQUENCE NUMBER, THE PROGRAM ID, THE ADDRESS INTO WHICH THE PROGRAM WAS LOADED, AND THE RELOCATION FACTOR.

```
A0001                          SWS  PID
                               XXXX XXXX
```

THIS MESSAGE IS PRINTED EACH TIME A VALID SWITCH ENTRY IS READ BY THE MONITOR. THE MESSAGE CONTAINS THE SWITCH SETTING READ TOGETHER WITH THE PROGRAM ID OF THE PROGRAM INTO WHICH THE CONTENTS OF SWITCHES 8-15 WERE STORED. IF THE SWITCH ENTRY CALLED FOR HALT OF ANY PROGRAM, THE WORD HALT WILL FOLLOW THE MESSAGE.

```
A0C00 000R AAAA
```

ROUTINE START MESSAGE - IF SWITCH 9, FUNCTION 0, IS TURNED ON, THIS MESSAGE WILL BE PRINTED BEFORE THE START OF EACH ROUTINE. R IS THE NUMBER OF THE NEXT ROUTINE AND AAAA IS THE STARTING ADDRESS.

```
A0C01 000R AAAA                NRDY
                               1132
```

THE 1132 IS NOT READY.

4.2*** ERROR MESSAGES

THE DSW IS CHECKED FOR ABSOLUTE CORRECTNESS AT ALL TIMES. IF AN ERROR IS DETECTED ONE OF THE MESSAGES BELOW WILL INDICATE THE PROBLEM. IT IS LEFT TO THE OPERATOR TO ANALYZE THE DSW FOR THE SPECIFIC PROBLEM AREA.

THE 1132 DSW	
BIT	
0	READ EMITTER RESPONSE
1	SKIP RESPONSE
2	SPACE RESPONSE
3	CARRIAGE BUSY
4	PRINT SCAN CHECK
5	PRINTER NOT READY
6	PRINTER BUSY
7	NOT USED
8	CHANNEL 1
9	CHANNEL 2
10	CHANNEL 3
11	CHANNEL 4
12	CHANNEL 5
13	CHANNEL 6
14	CHANNEL 9
15	CHANNEL 12

E0001 SWS INVLD
XXXX

THE SETTING OF SWITCHES 4-7 DID NOT EQUAL THE LOAD SEQUENCE NUMBER OF ANY PROGRAM IN CORE.

E0003 OVR CORE

THE PROGRAM WHICH THE LOADER WAS ATTEMPTING TO LOAD EXCEEDED AVAILABLE CORE. LOADING WAS TERMINATED.

E0004 CKSUM

A CHECK SUM ERROR WAS DETECTED WHILE LOADING THE PROGRAM. THIS ERROR OCCURS UNDER ANY OF THE FOLLOWING CONDITIONS.

1. A CARD IS MISSING OR IS OUT OF SEQUENCE.
2. THERE IS AN EXTRA CARD IN THE DECK.
3. THE PUNCHED INFORMATION ON THE CARD IS NOT CORRECT.
4. DATA WAS LOST OR PICKED UP DUE TO A MACHINE MALFUNCTION.
5. DUE TO A CPU MALFUNCTION, THE CHECK SUM WAS NOT CORRECTLY CALCULATED.

WHEN THIS ERROR OCCURS ATTEMPT TO RELOAD THE PROGRAM.

E0005 000N XXXX

THIS ERROR WILL OCCUR IF AN INTERRUPT OCCURS, BUT THE ILSW WAS NOT CORRECT. N IS THE INTERRUPT LEVEL AND XXXX IS THE ILSW. THIS PRINTOUT WILL ONLY OCCUR IF THE INTERRUPT IS RESET BY A BOSI. NO ATTEMPT IS MADE BY THE ERROR ROUTINE TO RESET THE REQUEST BIT.

E0C01 000R AAAA WAS S/B - STATIC DSW ERR
XXXX 0000

SOME BIT OTHER THAN NOT READY OR A CHANNEL BIT WAS ON WHEN THE DSW WAS SENSED BEFORE GIVING AN 1132 CONTROL COMMAND. USE THE ABOVE DSW TABLE TO IDENTIFY THE BIT, THEN TAKE APPROPRIATE CORRECTIVE ACTION.

E0C02 000R AAAA LAST OP - CCCC
WAS S/B - BUSY DSW ERR
XXXX XXXX

THIS DSW WAS SENSED IMMEDIATELY AFTER THE 1132 CONTROL COMMAND IDENTIFIED BY CCCC WAS GIVEN. IF THE COMMAND WAS START PRINTER THE PRINTER BUSY BIT (6) SHOULD BE ON. IF THE LAST OP WAS SPACE OR SKIP THE CARRIAGE BUSY BIT (3) SHOULD BE ON. THE EXPECTED DSW IS IDENTIFIED BY S/B.

E0C03 000R AAAA LAST OP - CCCC
DSW - NO INTRPT
XXXX

NO INTERRUPT WAS RECEIVED FOLLOWING THE LAST 1132 CONTROL COMMAND IDENTIFIED BY CCCC. THE DSW WAS SENSED AFTER A TWO SECOND DELAY. IF THE COMMAND WAS NOT RECEIVED, A BUSY ERROR (E0C02) WILL ALSO BE PRINTED.

E0C04 000R AAAA LAST OP - CCCC
DSW - PRINTER STOPPED
XXXX

THE PRINTER WAS TURNED ON, SOME EMIT INTERRUPTS WERE DETECTED, THE PRINTER STOPPED. NO PRINTER STOP COMMAND WAS GIVEN. THE DSW XXXX WAS SENSED 2 SECONDS AFTER THE LAST INTERRUPT OCCURRED.

E0C05 000R AAAA LAST OP - CCCC
WAS S/B - LEVI DSW ERR
XXXX YYYY

THIS DSW (XXXX) WAS SENSED IN INTERRUPT FOLLOWING THE 1132 CONTROL COMMAND IDENTIFIED BY CCCC. YYYY IS THE EXPECTED DSW.

E0C06 000R AAAA EMIT BIT FAILURE
XX00 YY00

THIS ERROR WILL OCCUR IF ANY EMIT BIT IS ALWAYS MISSING (OPEN) OR ALWAYS ON (SHORT). XX WILL BE EQUAL TO FF IF NO BITS ARE MISSING. ANY OPEN BIT WILL BE IDENTIFIED BY A ZERO IN THAT BIT POSITION. YY SHOULD BE 00... ANY SHORTED BIT WILL BE IDENTIFIED BY A 1 IN THAT BIT POSITION.

E0C07 000R AAAA EMIT INVALD
XXXX

THE FIRST EMIT CHARACTER AFTER A START PRINTER WAS NOT VALID. THE XXXX EQUALS THE EMIT CHARACTER READ.

IF THIS ERROR PERSISTS, BYPASS THE ERROR TYPE OUT (SWITCH 13). THE PRINTER WILL THEN PRINT, AND IN ROUTINES 4 AND 5, ANY LINE BEGINNING WITH AN INVALID CHARACTER WILL BE SKIPPED.

E0C08 000R AAAA WAS S/B - EMIT SEQ ERR
XXXX YY00

THE LAST EMIT CODE WAS EITHER INVALID OR OCCURRED IN THE WRONG SEQUENCE. YY IDENTIFIES THE EXPECTED EMIT CODE. SECTION 5.4 CONTAINS A TABLE OF EMIT CODES.

E0C09 000R AAAA PRINTER DID NOT TURN OFF

A STOP COMMAND WAS GIVEN TO THE PRINTER BUT THE PRINTER DID NOT GO OFF.

E0C10 000R AAAA MULT SPACE INTERRUPTS

MORE THAN ONE SPACE INTERRUPT OCCURRED AFTER A SPACE COMMAND, OR AN UNEXPECTED SPACE INTERRUPT OCCURRED.

E0C11 000R AAAA MULT SKIP INTERRUPTS

AN UNEXPECTED SKIP INTERRUPT OCCURRED.

E0C12 000R AAAA MISSING CHANNEL
XXXXX

ROUTINE 8 SPACES TO A CHANNEL PUNCH IN THE CARRIAGE TAPE, IDENTIFIES THAT CHANNEL, THEN GOES TO THE NEXT CHANNEL. THIS IS REPEATED UNTIL 16 CHANNELS HAVE BEEN IDENTIFIED. IF ANY OF THE 8 CHANNELS IS NOT SENSED, THIS MESSAGE WILL IDENTIFY THAT CHANNEL. CHECK THE TAPE TO DETERMINE IF THAT CHANNEL WAS PUNCHED. FURTHER ANALYSIS OF THE CARRIAGE CONTROL (RTNS 9 + A) WILL ASSUME THAT THE CHANNEL WAS NOT PUNCHED IN THE CARRIAGE TAPE.

E0C13 0008 AAAA CHANNEL SEQ ER

ROUTINE 8 SPACES TO A CHANNEL PUNCH IN THE CARRIAGE TAPE, IDENTIFIES THAT CHANNEL THEN GOES TO THE NEXT CHANNEL AFTER 16 CHANNELS HAVE BEEN IDENTIFIED, THE PROCESS IS REPEATED WITH SKIPS. THE CARRIAGE IS STOPPED AFTER EACH SKIP INTERRUPT AND THE CHANNEL COMPARED WITH SEQUENCE DETECTED WHEN SPACING. THIS MESSAGE IS PRINTED WHEN ANY DIFFERENCE IN SEQUENCE IS DETECTED (USUALLY DUE TO A MISSED CHANNEL INTERRUPT OR A CHANNEL NOT DETECTED WHEN SPACING). THE CHANNEL SEQUENCE CAN BE DETERMINED FROM THE 1132 PRINTOUT.

E0C14 000R AAAA MULT CHANNEL BITS
XXXX

MORE THAN ONE CHANNEL BIT WAS ON IN THE DSW (XXXX).

E0C15 000R AAAA CHANNEL SENSE ER
XXXX YYYY

CHANNEL BITS SENSED IN INTERRUPT AFTER A SPACE RESPONSE (XXXX) ARE NOT EQUAL TO CHANNEL BITS SENSED APPROXIMATELY 1 MILLISEC LATER IN MAINLINE (YYYY). SINCE NO CARRIAGE COMMAND HAS BEEN GIVEN, THE CHANNEL BITS SHOULD BE THE SAME.

E0C16 000R AAAA CHANNEL SENSE ER
XXXX YYYY

THE CHANNEL BITS SENSED 1 MILLISECOND AFTER A SPACE RESPONSE (XXXX), ARE NOT EQUAL TO THE CHANNEL BITS SENSED IMMEDIATELY BEFORE THE NEXT EXECUTION OF SPACE COMMAND.

E0C17 000R AAAA CARRIAGE BSY

THE CARRIAGE WAS FOUND BUSY BEFORE GIVING A START PRINTER. THE START PRINTER COMMAND WAS NOT GIVEN. THE PROGRAM WILL WAIT IN A LOOP UNTIL THE CARRIAGE GOES NOT BUSY. THE NRDY MESSAGE (A0C01) WILL BE PRINTED EACH 10 SECONDS. IF THE LAST COMMAND WAS SKIP, THE CARRIAGE DID NOT STOP ON A STOP CARRIAGE COMMAND.

---

5. COMMENTS

5.1*** TYPICAL PROGRAM PASS

IF NO OPTIONS ARE SELECTED, THE 1132 FUNCTION TEST WILL RUN ROUTINES 1 THROUGH A THEN TERMINATE.

5.2*** TEST PROCEDURE

5.2.1 TEST ORGANIZATION

TESTS ARE ORGANIZED AS FOLLOWS.

1. INITIALIZE THE TEST ROUTINE

   A. CLEAR THE BUFFER
   B. STOP THE PRINTER
   C. CHECK FOR READY
   D. PRINT HEADER ON 1132
   E. SET ROUTINE TERMINATION CONTROL

2. INITIALIZE FOR THIS PASS THROUGH THE ROUTINE.

3. EXECUTE CONTROL COMMAND

4. CHECK FOR ERRORS

   A. CHECK DSW FOR BUSY
   B. WAIT FOR TIMED PERIOD - TIME OUT IF NO INTERRUPT.
   C. CHECK EMITS FOR VALIDITY AND PROPER SEQUENCE.
   D. CHECK INTERRUPT DSW
   E. CHECK CHANNEL BITS

5. ANALYZE ERROR DATA AND PRINT ERROR MESSAGES.

6. GO TO 2 ABOVE IF LOCK ON FUNCTION.

7. ADVANCE FOR NEXT PASS THROUGH THE TEST ROUTINE.

8. GO REPEAT THE ROUTINE IF NOT END OF ROUTINE.

5.2.2 ERROR CHECKING

ALL TEST ROUTINES CONTAIN THE FOLLOWING ERROR CHECKING.

1. DEVICE STATUS CHECK - THE DEVICE STATUS IS READ AND CHECKED AS FOLLOWS (THIS ANALYSIS IGNORES THE CHANNEL BITS - SEE 5.2.2-3).

   A. BEFORE A TEST ROUTINE IS STARTED. THE DSW SHOULD BE ZERO. ANY BITS ON OTHER THAN NOT READY OR A CHANNEL BIT WILL BE IDENTIFIED BY A MESSAGE (E0C01). IF NOT READY, THE NRDY MESSAGE (A0C01) WILL BE PRINTED.

   B. IMMEDIATELY AFTER ANY OPERATION. THE DSW SHOULD SHOW THE PRINTER BUSY AFTER A START PRINTER OR THE CARRIAGE BUSY AFTER A SPACE OR START SKIP. ALL OTHER BITS SHOULD BE OFF. THIS DSW IS SAVED AND CHECKED FOR ERRORS AFTER THE OPERATION IS COMPLETED. A MESSAGE (E0C02) WILL IDENTIFY ANY ERRORS.

   C. IN INTERRUPT. THIS DSW IS COMPARED WITH THE EXPECTED DSW AND AN ERROR BIT SET IDENTIFYING ANY DIFFERENCES. THE MESSAGE (E0C05) IDENTIFYING ANY ERROR IS PRINTED IN MAIN-LINE. IF THE INTERRUPT IS EMITTER RESPONSE, THE DSW SHOULD SHOW PRINTER BUSY. IF CARRIAGE RESPONSE, THE DSW SHOULD SHOW CARRIAGE BUSY. IF SPACE RESPONSE, NO BUSY SHOULD BE ON UNLESS THE SPACE WAS GIVEN WITH THE PRINTER ON (ROUTINE4).

   D. BEFORE A START PRINTER COMMAND TO ASSURE THAT THE CARRIAGE IS NOT BUSY. START PRINTER IS IGNORED IF THE CARRIAGE IS BUSY AND AN ERROR MESSAGE (E0C17) IS PRINTED AND THE PROGRAM WILL WAIT IN A LOOP, PRINTING THE NRDY MESSAGE (A0C01) EVERY 10 SECONDS.

2. EMIT CHECK

   WHEN THE PRINTER IS ON AN EMIT RESPONSE OCCURS EVERY 11 MILLISECONDS. THE EMIT CODE FOR THE FIRST RESPONSE AFTER INTERRUPT IS CHECKED FOR A VALID CODE. ALL SUBSEQUENT EMITS ARE CHECKED FOR VALID CODE AND FOR PROPER SEQUENCE.

   THE FIRST 100 EMITS AFTER THE FIRST START PRINTER ARE ALSO CHECKED FOR OPEN OR SHORTED EMIT BITS.

3. CHANNEL BIT CHECK

   THE CHANNEL CODE SHOULD NOT CHANGE FROM THE END OF ONE CARRIAGE COMMAND TO THE START OF THE NEXT. THE CHANNEL CODE IS SENSED IN INTERRUPT, ON RETURN TO MAINLINE FOLLOWING A SPACE RESPONSE INTERRUPT, AND BEFORE THE NEXT SPACE COMMAND. IF ANY CHANGE IN THE CHANNEL CODE IS DETECTED, AN ERROR MESSAGE WILL BE PRINTED (E0C15 OR E0C16).

4. INTERRUPT CHECK

   A. FOLLOWING ANY CONTROL COMMAND, THE PROGRAM WILL WAIT IN A TIMED LOOP FOR THE INTERRUPT. EACH TIME AN INTERRUPT OCCURS, THE TIMER IS RESET. THE NUMBER OF INTERRUPTS FOR ANY ONE CONTROL COMMAND IS COUNTED IN INTERRUPT. THE COMPLETION OF ALL OPERATIONS IS DETERMINED IN INTERRUPT.

      IF ANY CONTROL COMMAND SHOULD FAIL TO CAUSE AN INTERRUPT RESPONSE, THE INTERRUPT WAIT ROUTINE WILL TIME OUT AND AN ERROR MESSAGE WILL BE PRINTED. IF ANY OPERATION ENDS ABNORMALLY (PRINTER GOES OFF, CARRIAGE STOPS) AN ERROR MESSAGE WILL BE PRINTED.

   B. THE FOLLOWING FAILURES TO GET INTERRUPT ARE DETECTED.

      (1) NO RESPONSE AFTER A CONTROL COMMAND.

      (2) PRINTER STOPPED BUT A PRINTER STOP COMMAND WAS NOT GIVEN.

      (3) CARRIAGE STOPPED BUT A CARRIAGE STOP COMMAND WAS NOT GIVEN.

   C. THE FOLLOWING EXTRA INTERRUPT WILL BE DETECTED.

      (1) MORE THAN ONE SPACE RESPONSE AFTER A SPACE COMMAND.

      (2) EMIT RESPONSE AFTER A PRINTER STOP COMMAND.

      (3) SKIP RESPONSE AFTER A CARRIAGE STOP COMMAND.

5.3*** ROUTINE DESCRIPTION

THIS SECTION CONTAINS A DESCRIPTION OF THE PROGRAM ROUTINES AND SUBROUTINES IN APPROXIMATELY THE ORDER IN WHICH THEY APPEAR IN THE PROGRAM AS FOLLOWS -

1. TEST SEQUENCE CONTROL ROUTINE
2. NORMAL TEST ROUTINES
3. OPTIONAL TEST ROUTINES
4. TEST SUBROUTINES
5. ERROR CONTROL ROUTINES
6. INTERRUPT ROUTINES

5.3.1 TEST SEQUENCE CONTROL ROUTINE - CNTRL

THIS ROUTINE CHECKS THE ROUTINE SELECTION SWITCH (SWI IN THE PROGRAM CONTROL TABLE) AND DETERMINES WHICH TEST ROUTINE IS TO BE RUN NEXT. IF A TEST ROUTINE HAS BEEN SELECTED IT ESTABLISHES A TRANSFER TO THAT ROUTINE. IF NO ROUTINE IS SELECTED A TRANSFER IS ESTABLISHED TO THE NEXT TEST ROUTINE IN SEQUENCE.

THE ROUTINE ADDRESS TABLE (RTTBC) WHICH IS PART OF CNTRL, CONTAINS THE ROUTINE ADDRESS FOR ALL TEST ROUTINES IN THE SEQUENCE IN WHICH THEY ARE TO BE RUN.

THE LAST TEST ROUTINE IN THE NORMAL SEQUENCE IS IDENTIFIED BY THE LABLE NRTN. AFTER THIS ROUTINE IS RUN CNTRL WILL TRANSFER TO MONITOR END AND TERMINATE THE PROGRAM. ROUTINES FOLLOWING THE LABLE NRTN ARE CALLED OPTIONAL TEST ROUTINES AND WILL ONLY BE RUN IF SELECTED.

5.3.2 NORMAL TEST ROUTINES

IF NO TEST ROUTINE IS SELECTED, THESE ELEVEN TEST ROUTINES WILL RUN IN SEQUENCE THEN THE PROGRAM WILL TERMINATE.

1. TEST ROUTINE 1 - EMIT SEQUENCE TEST.

   THIS TEST ROUTINE IDLES THE PRINTER FOR 200 READ EMITTER RESPONSE INTERRUPTS. IT CHECKS THAT NO EMIT BITS ARE OPEN OR SHORTED, AND THAT ALL EMITS CODES ARE VALID AND IN THE PROPER SEQUENCE.

2. TEST ROUTINE 2 - PRINT SCAN CHECK INDICATOR TEST.

   THIS TEST ROUTINE IDLES FOR THE PRINTER FOR 100 READ EMITTER RESPONSE INTERRUPTS, WITH THE SCAN CHECK BIT (BIT 15 IN CORE LOCATION /0027) SET TO ZERO. THIS WILL FORCE A PRINT SCAN CHECK ERROR. IF NO SCAN CHECK OCCURS AN E0C05 ERROR WILL PRINT.

3. TEST ROUTINE 3 - SPACE WITH PRINTER OFF.

   THIS TEST ROUTINE CHECKS FOR PROPER SPACE RESPONSE FOR BOTH SINGLE AND MULTIPLE SPACES. THE PROGRAM WAITS FOR THE SPACE INTERRUPT AND TURNS OFF THE PRINTER BEFORE GIVING THE NEXT SPACE COMMAND. LOCK ON FUNCTION WILL LOOP ANY SINGLE GROUP OF SPACES.

4. TEST ROUTINE 4 - SPACE WITH PRINTER ON.

   SAME AS ROUTINE 3 EXCEPT THAT THE PRINTER IS TURNED ON BEFORE THE SPACE COMMAND IS GIVEN.

5. TEST ROUTINE 5 - RIPPLE TEST

   THIS TEST ROUTINE PRINTS A RIPPLE PATTERN OF ALL CHARACTERS IN EMIT SEQUENCE. THE PATTERN IS PRINTED BY FLOATING A 'ONE' BIT ACROSS THE PRINT BUFFER (CORE ADDRESSES /0020-/0027). THIS CAUSES ONLY ONE CHARACTER TO BE PRINTED FOR EACH EMIT RESPONSE. TO PRINT ONE LINE 120 EMIT RESPONSES ARE REQUIRED. THE PROGRAM WILL THEN IDLE FOR 16 EMITS BEFORE THE SPACE COMMAND IS GIVEN (THIS SPACE IDLE TIME CAN BE CHANGED BY A FUNCTION 3 SWITCH SETTING). AFTER EACH LINE THE PATTERN IS ROTATED, THUS ALL CHARACTERS WILL BE PRINTED IN EVERY POSITION. EACH LINE REQUIRES 144 EMIT CYCLES. THIS RESULTS IN AN AVERAGE PRINT SPEED OF APPROXIMATELY 37 LINES PER MINUTE.

6. TEST ROUTINE 6 - PRINT ALL CHARACTERS

   THIS TEST ROUTINE PRINTS LINES OF ALL ONE CHARACTER. ALL CHARACTERS ARE PRINTED AT THE SAME TIME. THE PROGRAM WILL IDLE 16 EMITS BEFORE THE SPACE COMMAND IS GIVEN (THIS SPACE IDLE TIME CAN BE CHANGED BY A FUNCTION 3 SWITCH SETTING). SINCE CHARACTERS ARE PRINTED IN EMIT SEQUENCE, 48 EMIT CYCLES ARE REQUIRED FOR EACH LINE. THIS RESULTS IN AN AVERAGE PRINT SPEED OF ABOUT 110 LINES PER MINUTE FOR THIS ROUTINE.

7. TEST ROUTINE 7 - STRESS TEST

   THIS ROUTINE PRINTS LINES OF ONE CHARACTER WITH A MINIMUM OF TIME BETWEEN LINES. THE ROUTINE SETS THE BUFFER TO ONES AND PRINTS WITH NO DATA CONTROL. AFTER EACH LINE THE ROUTINE WILL IDLE FOR 16 EMIT CYCLES, SPACE, THEN IDLE AN ADDITIONAL 16 EMIT CYCLES BEFORE PRINTING THE NEXT LINE. THIS RESULTS IN AN AVERAGE SPEED OF APPROXIMATELY 150 LINES PER MINUTE. FAILURES SHOWN BY THIS TEST ARE USUALLY THE RESULT OF LOADING OF THE POWER SUPPLY.

8. TEST ROUTINE 8 - CHANNEL IDENTIFICATION

   THIS TEST ROUTINE CHECKS FOR PROPER DETECTION OF THE PUNCHES IN THE CHANNEL TAPE BOTH WHEN SPACING AND SKIPPING. THE CARRIAGE CONTROL TAPE MAY BE OF ANY LENGTH WITH ANY SEQUENCE OF PUNCHES SO LONG AS THE TOTAL NUMBER OF PUNCHES DOES NOT EXCEED 16.

   THE ROUTINE FIRST SPACES TO EACH CHANNEL PUNCHED IN THE CARRIAGE TAPE, IDENTIFIES THAT CHANNEL BY A MESSAGE PRINTED ON THE 1132, THEN RECORDS THE SEQUENCE IN WHICH THE CHANNELS OCCUR.

   AFTER SPACING TO 16 CHANNELS, THE ROUTINE WILL SKIP TO EACH OF THESE CHANNELS. THE CARRIAGE IS STOPPED AFTER EACH CHANNEL RESPONSE INTERRUPT, THE CHANNEL IS IDENTIFIED BY A MESSAGE PRINTED ON THE 1132, THEN THE SEQUENCE OF THE CHANNEL RESPONSE IS COMPARED TO THE SEQUENCE SEEN WHEN SPACING. IF THESE SEQUENCES DO NOT AGREE AN ERROR MESSAGE IS PRINTED.

9. TEST ROUTINE 9 - SKIP WITH PRINTER OFF.

   THIS ROUTINE CHECKS SKIP TO A SPECIFIC CHANNEL. A START SKIP COMMAND IS GIVEN AND EACH CHANNEL RESPONSE CHECKED FOR THE DESIRED CHANNEL. WHEN A MATCH IS FOUND A STOP CARRIAGE IS GIVEN AND THE CHANNEL IDENTIFIED BY AN 1132 MESSAGE. THE CARRIAGE WILL ALSO BE STOPPED AFTER 16 CHANNEL RESPONSES WITHOUT A MATCH.

10. TEST ROUTINE A - SKIP WITH PRINTER ON.

    THIS ROUTINE IS THE SAME AS TEST ROUTINE 9 WITH THE EXCEPTION THAT THE PRINTER IS TURNED ON BEFORE THIS SKIP COMMAND IS GIVEN AND KEPT ON WHILE SKIPPING. THIS TESTS FOR INTERACTION BETWEEN READ EMITTER AND SKIP RESPONSES.

5.3.3 OPTIONAL TEST ROUTINE -

TEST ROUTINE B - BIT SWITCH CONTROL

THIS TEST ROUTINE ALLOWS THE CE TO SPECIFY THROUGH THE BIT SWITCHES THE CHARACTER HE DESIRES TO PRINT AND THE COLUMN IN WHICH HE WILL PRINT THAT CHARACTER. ONLY ONE CHARACTER WILL BE PRINTED ON EACH LINE.

THE COLUMN NUMBER MUST BE ENTERED IN SWITCHES 1-7, AND THE CHARACTER CODE IN SWITCHES 8-15. PRINTING WILL START WHEN SWITCH 0 IS TURNED ON.

5.3.4 TEST SUBROUTINES

THE FOLLOWING FUNCTIONS ARE PERFORMED BY SUBROUTINES IN THE PROGRAM.

1. INITIALIZE - CLEAR THE BUFFER, STOP THE PRINTER, CHECK FOR READY, AND PRINT THE ROUTINE HEADING ON THE 1132.

2. PRINT - CHECK FOR CARRIAGE BUSY, SET THE SCAN COUNT, START THE PRINTER, CHECK THE BUSY DSW, THEN WAIT FOR THE SCAN COUNT TO GO TO ZERO.

3. IDLE - SET THE IDLE COUNT, CHECK FOR CARRIAGE BUSY, START THE PRINTER, CHECK THE BUSY DSW, THEN WAIT FOR THE IDLE COUNT TO GO TO ZERO.

4. SPACE - STOP THE PRINTER, CHECK FOR CHANGE IN CHANNEL CODE, START SPACE, CHECK THE BUSY DSW, THEN WAIT FOR THE SPACE INTERRUPT.

5. SKIP - SET DESIRED CHANNEL CODE, START SKIP, CHECK BUSY DSW, THEN WAIT UNTIL A CARRIAGE STOP IS GIVEN IN INTERRUPT.

6. STOP THE PRINTER - STOP THE PRINTER AND RESET ALL PRINTER TEST CONTROL WORDS.

7. PRINT 1132 MESSAGE - SET UP THE MESSAGE BUFFER USING A MESSAGE CODE IN THE CALLING SEQUENCE. THIS MESSAGE CODE IDENTIFIES THE PHRASES CONTAINED IN THE MESSAGE TABLE WHICH ARE TO BE USED IN THE MESSAGE.

8. RIPPLE PATTERN - IDLE UNTIL MATCH BETWEEN EMIT AND FIRST CHARACTER IN NEXT LINE. WHEN MATCH FOUND SET FIRST BIT IN BUFFER, INITIALIZE FOR PRINT RIPPLE, THEN GO TO PRINT SUBROUTINE.

9. CLEAR BUFFER - CLEARS BOTH THE 1132 MESSAGE BUFFER AND

THE PRINT BUFFER-CORE LOCATIONS /0020-/0027. ALSO SETS THE SCAN COMPLETE BIT - BIT 15 IN CORE LOCATION /0027.

10. SET BUFFER TO ONES - SETS ALL BITS ON IN CORE LOCATIONS /0020 TO /0027.

11. READY - CHECKS 1132 FOR READY. PRINTS AN ERROR MESSAGE IF ANY BIT OTHER THAN NOT READY ON. PRINTS NRDY IF NOT READY BIT ON.

12. FORM CHECK - CHECKS FOR FORMS CHECK AFTER SPACE OR SKIP. PRINTS NRDY IF FORM CHECK.

5.3.5 ERROR CONTROL ROUTINES

1. INTERRUPT WAIT ROUTINE

   ALL SUBROUTINES COME HERE AFTER THE START OF AN I/O OPERATION FROM WHICH AN INTERRUPT IS EXPECTED. THIS ROUTINE RESETS ALL ERROR CONTROL WORDS, SENSES AND STORES THE BUSY DSW, THEN WAITS IN A TIMED LOOP (AT LEAST 2 SECONDS) FOR THE OP COMPLETE INTERRUPT.

   IF NO OP COMPLETE INTERRUPT IS RECEIVED THE FOLLOWING ERROR MESSAGES ARE PRINTED.

   A. E0C02 IF BUSY DSW ERROR

   B. E0C03 IF NO INTERRUPT

   IF AN INTERRUPT IS RECEIVED THIS ROUTINE WILL CHECK FOR PROPER PERFORMANCE OF THE OPERATION. THE FOLLOWING CHECKS ARE MADE AND ERROR MESSAGES PRINTED IF APPROPRIATE.

   A. E0C02 IF BUSY DSW ERROR

   B. E0C05 IF INTERRUPT DSW ERROR

   C. E0C06, E0C07 OR E0C08 IF EMIT ERROR

   D. E0C15, IF CHANNEL CODE CHANGED AFTER SPACE RESPONSE.

   THE ROUTINE WILL THEN CHECK FOR NOT READY (USUALLY DUE TO FORM CHECK). IF NOT READY, NRDY IS PRINTED. IF READY, THE ROUTINE WILL RETURN TO THE I/O SUBROUTINE FROM WHICH IT WAS ENTERED.

2. PRINT ERROR MESSAGES

   THIS ROUTINE PRINTS ALL THE ERROR MESSAGES. IF THE MESSAGE IS THE FIRST ERROR MESSAGE FOLLOWING AN I/O CONTROL COMMAND A LAST OP MESSAGE WILL PRECEED THE ERROR MESSAGE. THIS LAST OP MESSAGE WILL IDENTIFY THE LAST I/O CONTROL OPERATION EXECUTED. THE ERROR MESSAGE FOLLOWING REFERS TO ERRORS DETECTED IN THAT OPERATION.

5.3.6 INTERRUPT ROUTINE

ALL INTERRUPTS ARE HANDLED BY A COMMON INTERRUPT ROUTINE. THIS ROUTINE SENSES AND STORES THE DSW, SERVICES THE APPROPRIATE RESPONSE, CHECKS THE DSW FOR EXPECTED BITS, THEN RETURNS TO THE MONITOR INTERRUPT ROUTINE.

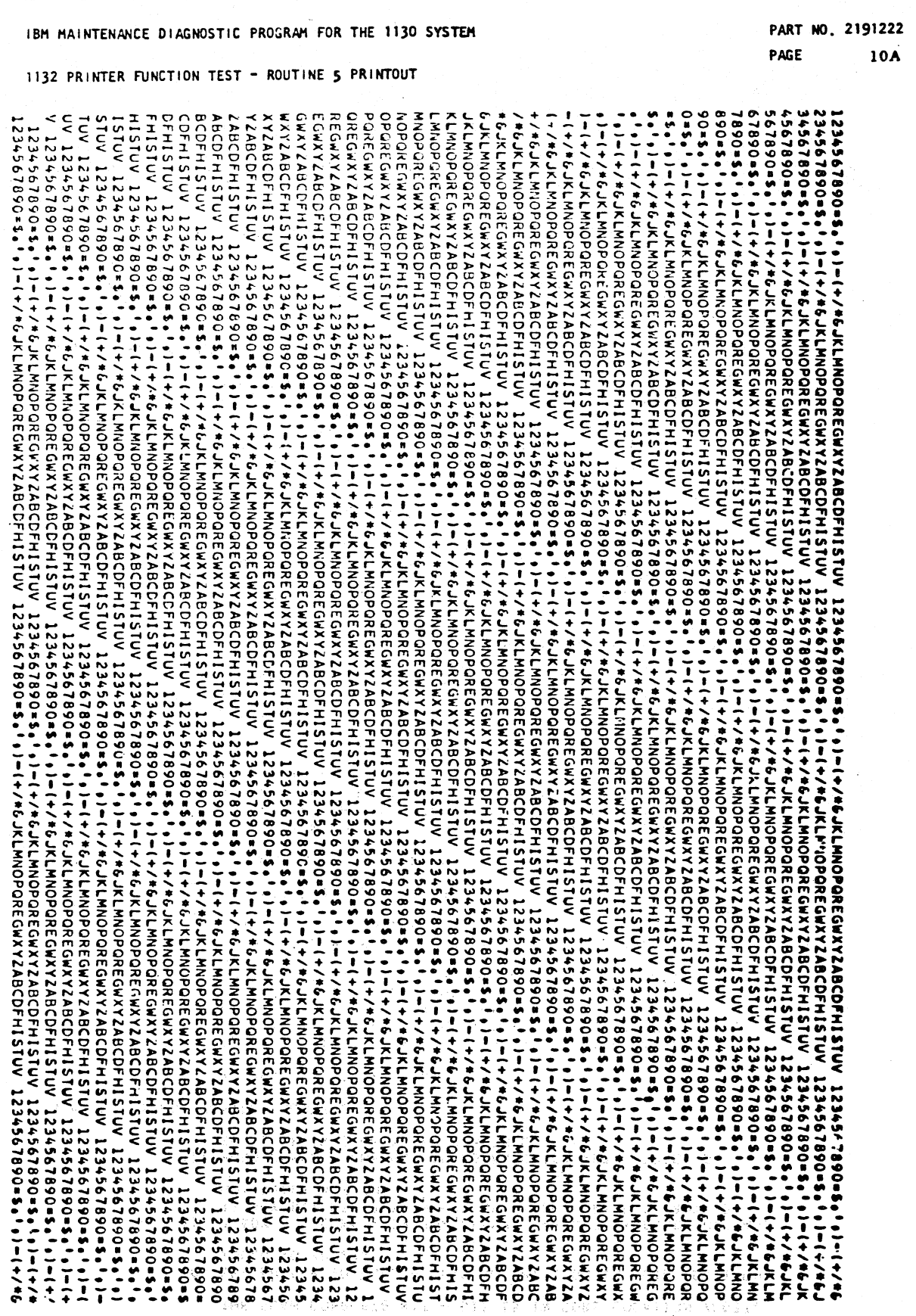
1. READ EMIT RESPONSE

ALL EMIT CODES ARE CHECKED FOR VALIDITY AND FOR PROPER SEQUENCE. THE PRINT BUFFER IS THEN SET UP UNDER CONTROL OF THREE CODE WORDS AS FOLLOWS.

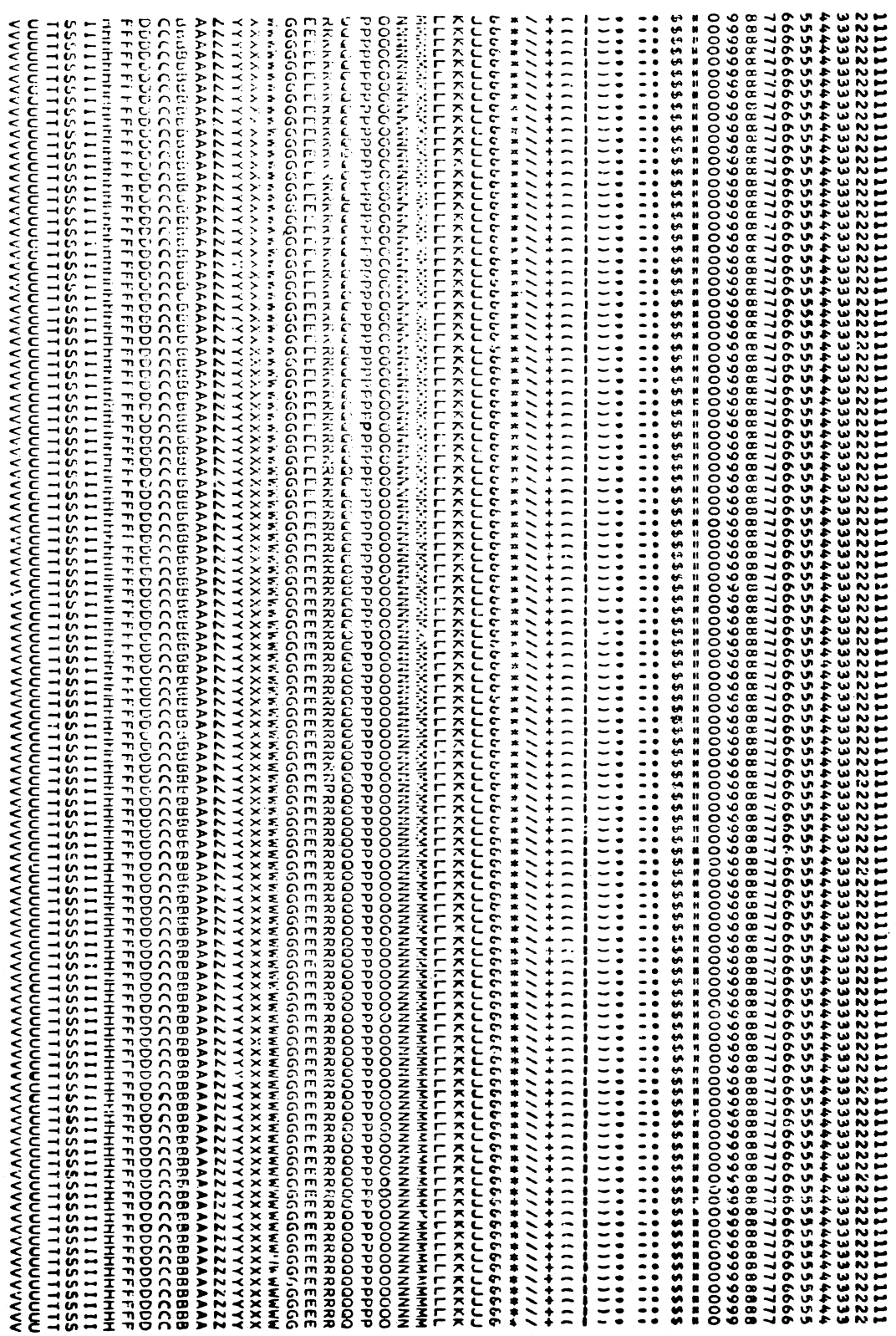
LABEL	DESCRIPTION	FUNCTION
SCNCT	SCAN COUNT	PRINT IF GREATER THAN 1 CLEAR BUFFER IF =1 IDLE IF = 0
MSGSW	MESSAGE SWITCH	PRINT MESSAGE IF ON AND SCNCT GREATER THAN 1
IDLCT	IDLE COUNT	IDLE IF GREATER THAN 0. STOP PRINTER AND RETURN TO MAINLINE IF = 0

2. SKIP RESPONSE

SKIP IS CONTROLLED BY THE SKIP TO SWITCH (SKPTO). IF THIS SWITCH IS ZERO, THE SKIP RESPONSE ROUTINE WILL STOP THE CARRIAGE AFTER EACH SKIP RESPONSE. IF SKPTO IS NOT ZERO, IT CONTAINS THE CHANNEL CODE OF THE DESIRED CHANNEL. THE CARRIAGE IS STOPPED WHEN A MATCH IS FOUND. IF AFTER 16 SKIP RESPONSES NO MATCH IS FOUND, THE CARRIAGE WILL BE STOPPED.



1132 PRINTER FUNCTION TEST - ROUTINE 6 PRINTOUT



```
**********************************************************************
                 *
                 *  THIS ENGINEERING CHANGE REFLECTS MAJOR
                 *  CHANGES TO THE DIAGNOSTIC MONITOR.  PREVIOUS
                 *  TESTS WILL NOT RUN WITH DIAGNOSTIC MONITOR II.
                 *
                 *  THIS TEST WILL NOT RUN WITH PREVIOUS MONITORS.
                 *
                 *  TESTS PRIOR TO EC 419643 DATED NOV 15, 1966
                 *  WILL NOT OPERATE PROPERLY WITH DIAGNOSTIC
                 *  MONITOR II.
                 *
**********************************************************************
                 ******************************************
                 *-----------------------------------------
                 *    1130 - 1132 PRINTER FUNCTION TEST
                 *-----------------------------------------
                 ******************************************
                 *
                 *
                 *
                 ******************************************
                 *             EQUATE TABLE
                 ******************************************
                 *    THIS TABLE EQUATES TEST PROGRAM LABLES
                 *    TO THEIR EQUIVALENT DIAGNOSTIC MONITOR
                 *    ADDRESSES.
                 *
                 *-----------------------------------------
                 *    MONITOR ENTRY ADDRESSES
                 *-----------------------------------------
0160             BEGIN EQU   /160      BEGIN ROUTINE
0161             START EQU   BEGIN+1   SUPERVISOR ROUTINE
0162             ERROR EQU   START+1   ERROR LOG ROUTINE
0163             LOG   EQU   ERROR+1   STATUS LOG ROUTINE
0164             END   EQU   LOG+1     END ROUTINE
                 *
                 *-----------------------------------------
                 *    MONITOR CONTROL WORD ADDRESSES
                 *-----------------------------------------
0165             RTNSW EQU   END+1     ROUTINE START SW
0166             ERLCK EQU   END+2     LOCK ON ERROR CONTROL
0167             LOGBY EQU   END+3     I/O BUSY SW ADDRS
                 *
                 *-----------------------------------------
                 *    INTERRUPT TRANSFER VECTOR ADDRESSES
                 *-----------------------------------------
017A             IL0   EQU   /17A      INTERRUPT LEVEL ZERO
018A             IL1   EQU   IL0+16    INTERRUPT LEVEL ONE
019A             IL2   EQU   IL1+16    INTERRUPT LEVEL TWO
01AA             IL3   EQU   IL2+16    INTERRUPT LEVEL THREE
01BA             IL4   EQU   IL3+16    INTERRUPT LEVEL FOUR
01BB             RQTY  EQU   IL4+1     CONSOLE PRINTER REQUEST
01BC             RQKB  EQU   RQTY+1    USE KEYBOARD REQUEST
01BD             SVKB  EQU   RQKB+1    KB SERVICE REQUEST
                 *
                 ******************************************
0000                   ORG   *+/05DC
                 *
                 *-----------------------------------------
                 *    THE MONITOR USES CORE LOCATIONS 0-05DC.
                 *    FOR CONTENTS OF THESE ADDRESSES REFER
                 *    TO THE DIAGNOSTIC MONITOR LISTING.
                 *-----------------------------------------
                 *
                 *
                 *
                 *
```



```
                    *******************************************
                    *           PROGRAM CONTROL TABLE
                    *******************************************
                    *
05DC 0  030C        PID   DC       /030C     PROGRAM ID
05DD 0  0000        RID   DC       *-*       POUTINE ID
05DE 0  0000        RAD   DC       *-*       ROUTINE ADDRS
05DF 0  0000        SW0   DC       *-*       PROGRAM CONTROL
05E0 0  0000        SW1   DC       *-*       ROUTINE SELECTION
05E1 0  0000        SW2   DC       *-*       SCAN START CHARACTER
05E2 0  0012        SW3   DC       18        SPACE AFTER PRINT DLY
05E3 1  05EB              DC       STRT
05E4 1  05EB              DC       STRT      RESTART ADDRESS
                    *
05E5 0  0000        MLSCF DC       *-*       SET BY WAIT RTN AND MON
05E6 0  0000              DC       *-*       SET BY CNTRL AND INRTPT
05E7 0  FFFF              DC       /FFFF     TERMINATOR
                    *
                    *******************************************
                    *           TEST INITIALIZATION
                    *******************************************
                    *
05E8 00 44800160    BGIN  BSI   I  BEGIN
05EA 1  05DC              DC       PID       PCT ADDRESS
                    *
                    *------------------------------------------
                    *  START OF TEST AND SINGLE PASS INITIALIZATION
                    *------------------------------------------
                    *
05EB 0  6100        STRT  LDX   1  0         SET TO START WITH
05EC 0  69F0              STX   1  RID        FIRST ROUTINE
05ED 0  69F3              STX   1  SW2       RESET CHAR SELECT
05EE 01 6D000AE6          STX  L1  WAIT
05F0 01 6D00077F          STX  L1  SW89A
05F2 0  6164              LDX   1  100
05F3 01 6D000C08          STX  L1  EMTCT     SET EMIT CHECK CNT
05F5 01 CC000BF8          LDD   L  ANDOR
05F7 01 DC000BF6          STD   L  ANDEM     SET EMIT CK CONSTANT
05F9 0  6112              LDX   1  18
05FA 0  69E7              STX   1  SW3       RESET SPACE DELAY
05FB 01 65C00870          LDX  L1  PIRT
05FD 00 6D00018A          STX  L1  IL1       SET INTERRUPT ADRS
05FF 0  4000              BSI      CNTRL     GO TO CONTROL RTN
                    *
                    *******************************************
                    *           SEQUENCE CONTROL ROUTINE
                    *******************************************
                    * THIS ROUTINE CHECKS SWITCHES AND CONTROLS
                    * SEQUENCE IN WHICH TEST ROUTINES ARE RUN.
                    *------------------------------------------
                    *
0600 0  0000        CNTRL DC       *-*
0601 0  C0DE              LD       SW1
0602 01 4C08060B          BSC   L  CN20,+    BR IF NO RTN SELECTD
                    *
0604 0  D008        CN10  STO      RID       SAVE NEW RTN NUMBER
0605 0  9015              S        RIDCK
0606 01 4C080611          BSC   L  CN30,+    BR IF VALID RTN
0608 0  1810              SRA      16
0609 0  D0D6              STO      SW1       IF INVALID RTN GO
060A 0  D0D2              STO      RID        TO RTN ONE
                    *
060B 01 740105DD    CN20  MDX   L  RID,1     ADV TO NEXT RTN
060D 0  C0CF              LD       RID       CHECK FOR END OF
060E 0  900D              S        RTNUM      NORMAL SEQUENCE
060F 00 44800164          BSI   I  END,-Z    END OF PROGRAM
                    *
0611 01 658005DD    CN30  LDX  I1  RID
```

1132 PRINTER FUNCTION TEST

```
0613 01 C500061C          LD   L1 RTTBL-1    FETCH RETURN ADRS          30C01390
0615 0  D0C8              STO    RAD                                     30C01400
0616 00 D4000165          STO  L  RTNSW       SET RTN START SW           30C01410
0618 0  D0CD              STO     MLSCF+1     SET MLSCF FOR RETURN       30C01420
0619 00 44800161          BSI  I  START       GO TO MONITOR              30C01430
                          *                                              30C01440
0618 0  0008        RIDCK DC      LRTN-RTTBL+1                           30C01450
061C 0  000A        RTNOM DC      NRTN-RTTBL+1                           30C01460
                          *                                              30C01470
                          *-------------------------------------------   30C01480
                          * ROUTINE ADDRESS TABLE                        30C01490
                          *-------------------------------------------   30C01500
061D 1  0628        RTTBL DC      TST1        EMIT SEQUENCE TEST         30C01510
061E 1  063C              DC      TST2        SCAN CHECK TEST            30C01520
061F 1  0652              DC      TST3        SPACE TEST                 30C01530
0620 1  0688              DC      TST4        SKIP TEST                  30C01540
0621 1  0680              DC      TST5        ROTATING PAT TEST          30C01550
0622 1  06CA              DC      TST6        ALL CHARACTERS TEST        30C01560
0623 1  06F5              DC      TST7        FAST PRINT TEST            30C01570
0624 1  0780              DC      TST8        CHANNEL SEQUENCE TEST      30C01580
0625 1  07F7              DC      TST9        SKIP- PRINTER OFF          30C01590
0626 1  0825        NRTN  DC      TSTA        SKIP- PRINTER ON           30C01600
0627 1  085D        LRTN  DC      TSTB        MANUAL CONTROL             30C01610
                          *                                              30C01620
                          ********************************************** 30C01630
                          *            TEST ROUTINE 1                  * 30C01640
                          ********************************************** 30C01650
                          * CHECK EMIT SEQUENCE AND NORMAL PRINT DSW     30C01660
                          *-------------------------------------------   30C01670
                          *                                              30C01680
0628 01 440008AD    TST1  BSI  L  INTLZ       GO INITIALIZE ROUTINE      30C01690
062A 0  0048              DC     /0048        EMIT TEST                  30C01700
062B 0  6164              LDX    1 100                                   30C01710
062C 01 6D0006C8          STX  L1 LPCNT       SET LOOP COUNT             30C01720
                          *                                              30C01730
062E 01 6C000ACB          STX  L  LOOP        SET LOOP ADDRS             30C01740
0630 00 66008200    T01A  LDX  L2 /8200                                  30C01750
0632 0  6101              LDX    1 1          SET IDLE CNT               30C01760
0633 01 440008D1          BSI  L  IDLE                                   30C01770
0635 01 440009EF          BSI  L  LOCK        CK FOR LOCK ON FUNCTION    30C01780
0637 01 74FF06C8          MDX  L  LPCNT,-1    ADV LOOP CNT               30C01790
0639 0  70F6              MDX     T01A                                   30C01800
063A 01 44000600          BSI  L  CNTRL       GO TO CONTROL RTN          30C01810
                          *                                              30C01820
                          ********************************************** 30C01830
                          *            TEST ROUTINE 2                  * 30C01840
                          ********************************************** 30C01850
                          * CHECK PRINT SCAN CHECK INDICATOR             30C01860
                          *-------------------------------------------   30C01870
                          *                                              30C01880
063C 01 440008AD    TST2  BSI  L  INTLZ       GO INITIALIZE ROUTINE      30C01890
063E 0  0088              DC     /0088        SCAN CHECK TEST            30C01900
063F 0  6164              LDX    1 100                                   30C01910
0640 01 6D0006C8          STX  L1 LPCNT       SET LOOP COUNT             30C01920
                          *                                              30C01930
0642 01 6C000ACB          STX  L  LOOP        SET LOOP ADDRS             30C01940
0644 0  1810        T02A  SRA    16                                      30C01950
0645 00 D4000027          STO  L  39          CLEAR BIT 15 LOC 39        30C01960
0647 00 66008A00          LDX  L2 /8A00       SET TO CK FOR SCAN CK      30C01970
0649 0  6101              LDX    1 1          SET IDLE CNT               30C01980
064A 01 440008D1          BSI  L  IDLE                                   30C01990
064C 01 440009EF          BSI  L  LOCK        CK FOR LOCK ON FUNCTION    30C02000
064E 01 74FF06C8          MDX  L  LPCNT,-1    ADV LOOP CNT               30C02010
0650 0  70F3              MDX     T02A                                   30C02020
0651 0  40AE              BSI     CNTRL       GO TO CONTROL RTN          30C02030
                          *                                              30C02040
                          *                                              30C02050
                          ********************************************** 30C02060
```


1132 PRINTER FUNCTION TEST

```
                          *            TEST ROUTINE 3                  * 30C02070
                          ********************************************** 30C02080
                          * THIS ROUTINE CHECKS FOR SPACE RESPONSES      30C02090
                          * AND CHECKS THE DSW                           30C02100
                          *-------------------------------------------   30C02110
                          *                                              30C02120
0652 01 440008AD    TST3  BSI  L  INTLZ       GO INITIALIZE ROUTINE      30C02130
0654 0  011D              DC     /011D        SPACE TEST -PRINTER OFF    30C02140
0655 0  63F4              LDX    3 -12                                   30C02150
0656 0  6B22              STX    3 T3CTL      SET TEST CONTROL           30C02160
                          *                                              30C02170
0657 01 6C000ACB          STX  L  LOOP        SET LOOP ADDRS             30C02180
0659 01 67800679    T03A  LDX  I3 T3CTL       LD CONTROL                 30C02190
065B 01 C7000686          LD   L3 T3CTL+13    LD MSG CONTROL             30C02200
065D 0  D011              STO     T03B                                   30C02210
065E 01 C7000687          LD   L3 T3CTL+14    LD NO. OF LOOPS + SPACES   30C02220
0660 0  1888              SRT     8                                      30C02230
0661 01 D40006C8          STO  L  LPCNT                                  30C02240
0663 0  1090              SLT     16                                     30C02250
0664 0  1808              SRA     8                                      30C02260
0665 0  D021              STO     SAVE3       SAVE NUMBER OF SPACES      30C02270
                          *                                              30C02280
0666 0  C020        T03A1 LD      SAVE3       LD NUMBER OF SPACES        30C02290
0667 0  D01E              STO     SCNT                                   30C02300
                          *                                              30C02310
                          *                                              30C02320
0668 01 440008F7    T03C  BSI  L  SPACE                                  30C02330
                          *                                              30C02340
066A 01 74FF0686          MDX  L  SCNT,-1     CNT SPACES                 30C02350
066C 0  70FB              MDX     T03C                                   30C02360
066D 01 44000946          BSI  L  PMSG        PRINT 1132 MSG             30C02370
066F 0  0000        T03B  DC      *-*                                    30C02380
0670 01 440009EF          BSI  L  LOCK        CK FOR LOCK ON FUNCTION    30C02390
                          *                                              30C02400
0672 01 74FF06C8          MDX  L  LPCNT,-1                               30C02410
0674 0  70F1              MDX     T03A1                                  30C02420
                          *                                              30C02430
0675 01 74020679          MDX  L  T3CTL,2     ADV CONTROL                30C02440
0677 0  70E1              MDX     T03A                                   30C02450
0678 0  4087              BSI     CNTRL       GO TO CONTROL RTN          30C02460
                          *                                              30C02470
0679 0  0000        T3CTL DC      *-*         TEST 3 AND 4 CONTROL       30C02480
067A 0  9002              DC      /9002       SPACE 1                    30C02490
067B 0  0501              DC      /0501                                  30C02500
067C 0  9004              DC      /9004       SPACE 2                    30C02510
067D 0  0502              DC      /0502                                  30C02520
067E 0  9008              DC      /9008       SPACE 3                    30C02530
067F 0  0303              DC      /0303                                  30C02540
0680 0  9010              DC      /9010       SPACE 4                    30C02550
0681 0  0304              DC      /0304                                  30C02560
0682 0  9080              DC      /9080       SPACE 9                    30C02570
0683 0  0109              DC      /0109                                  30C02580
0684 0  9200              DC      /9200       SPACE 39                   30C02590
0685 0  0127              DC      /0127                                  30C02600
0686 0  0000        SCNT  DC      *-*                                    30C02610
0687 0  0000        SAVE3 DC      *-*                                    30C02620
                          *                                              30C02630
                          ********************************************** 30C02640
                          *            TEST ROUTINE 4                  * 30C02650
                          ********************************************** 30C02660
                          *  THIS ROUTINE EXECUTES SPACE COMMANDS IN     30C02670
                          *  INTERRUPT WITH THE PRINTER ON. CHECK IS MADE 30C02680
                          *  FOR SPACE RESPONSE AND FOR PROPER DSW       30C02690
                          ********************************************** 30C02700
                          *                                              30C02710
0688 01 440008AD    TST4  BSI  L  INTLZ       GO INITIALIZE ROUTINE      30C02720
068A 0  021E              DC     /021E        SPACE TEST -PRINTER ON     30C02730
                          *                                              30C02740
```

```
0688 0  63F4          LDX   3 -12                          30C02750
068C 0  6BEC          STX   3 T3CTL       SET TEST CONTROL 30C02760
                      *                                    30C02770
068D 01 6C000ACB      STX   L LOOP        SET LOOP ADDRS   30C02780
068F 01 67800679 T04A LDX   I3 T3CTL      LD CONTROL       30C02790
0691 01 C7000686      LD    L3 T3CTL+13   LD MSG CONTROL    30C02800
0693 0  D011          STO     T04B                         30C02810
0694 01 C7000687      LD    L3 T3CTL+14   LD NO. OF LOOPS + SPACES 30C02820
0696 0  1888          SRT     8                            30C02830
0697 0  D030          STO     LPCNT                        30C02840
0698 0  1090          SLT     16                           30C02850
0699 0  1808          SRA     8                            30C02860
069A 0  D0EC          STO     SAVE3       SAVE NUMBER OF SPACES 30C02870
                      *                                    30C02880
0698 0  C0E8      T04A1 LD      SAVE3       LD NUMBER OF SPACES 30C02890
069C 01 D4000C03      STO   L SPCSX       SET TO SPACE IN INT 30C02900
069E 0  6101          LDX   1 1                            30C02910
069F 00 66008200      LDX   L2 /8200                       30C02920
06A1 01 440008D1      BSI   L IDLE                         30C02930
                      *                                    30C02940
06A3 01 44000946      BSI   L PMSG        PRINT 1132 MSG   30C02950
06A5 0  0000      T04B DC     *-*                          30C02960
                      *                                    30C02970
06A6 01 440009EF      BSI   L LOCK        CK FOR LOCK ON FUNCTION 30C02980
                      *                                    30C02990
06A8 01 74FF06C8      MDX   L LPCNT,-1                     30C03000
06AA 0  70F0          MDX     T04A1                        30C03010
                      *                                    30C03020
06AB 01 74020679      MDX   L T3CTL,2     ADV CONTROL      30C03030
06AD 0  70E1          MDX     T04A                         30C03040
06AE 01 44000600      BSI   L CNTRL       GO TO CONTROL RTN 30C03050
                      *                                    30C03060
                      ********************************************** 30C03070
                      *              TEST ROUTINE 5                * 30C03080
                      ********************************************** 30C03090
                      * THIS ROUTINE PRINTS A ROTATING PATTERN. THE  30C03100
                      * PATTERN IS GENERATED BY FLOATING A BIT ACROSS 30C03110
                      * THE PRINT BUFFER.                           30C03120
                      *------------------------------------------- 30C03130
                      *                                            30C03140
06B0 01 440008AD  TST5 BSI   L INTLZ       GO INITIALIZE ROUTINE 30C03150
06B2 0  0408          DC      /0408         RIPPLE PATTERN TEST  30C03160
                      *                                          30C03170
06B3 0  61CF          LDX   1 -49                                30C03180
06B4 01 6D00098C      STX   L1 RIPL3+1      SET EMIT CHAR CNT    30C03190
                      *                                          30C03200
06B6 0  6132      T05A LDX    1 50          SET LINE COUNT       30C03210
06B7 0  690E           STX    1 LINES                           30C03220
                      *                                          30C03230
06B8 01 6C000ACB       STX   L LOOP         SET LOOP ADDRS       30C03240
                      *                                          30C03250
                      *                                          30C03260
06BA 01 44000982  T05C BSI   L RIPL         GO PRINT ONE RIPPLE LINE 30C03270
06BC 01 440009EF       BSI   L LOCK         CK FOR LOCK ON FUNCTION 30C03280
                      *                                          30C03290
06BE 01 7401098C  T05D MDX   L RIPL3+1,1    ADV CHAR FOR NXT SCAN 30C03300
06C0 0  1000           NOP                  SAFETY NOP           30C03310
06C1 01 74FF06C6       MDX   L LINES,-1     ADV LINE CNT         30C03320
06C3 0  70F6           MDX     T05C                              30C03330
                      *                                          30C03340
06C4 01 44000600       BSI   L CNTRL        GO TO CONTROL RTN    30C03350
                      *                                          30C03360
06C6 0  0000      LINES DC      0            LINE COUNT           30C03370
06C7 0  0031      NO49  DC      49                                30C03380
06C8 0  0000      LPCNT DC      0            LOOP COUNT           30C03390
06C9 0  0032      NO50  DC      50                                30C03400
                      *                                          30C03410
                      *                                          30C03420
```



```
                      ********************************************** 30C03430
                      *              TEST ROUTINE 6                * 30C03440
                      ********************************************** 30C03450
                      *                                            30C03460
                      * THIS ROUTINE PRINTS LINES OF ONE CHAR      30C03470
                      * UNTIL ALL 48 CHARACTERS HAVE BEEN PRINTED  30C03480
                      *------------------------------------------- 30C03490
                      *                                            30C03500
06CA 01 440008AD  TST6 BSI   L INTLZ       GO INITIALIZE ROUTINE 30C03510
06CC 0  0808           DC      /0808        ALL CHARACTERS       30C03520
                      *                                          30C03530
06CD 0  61D0      T06A LDX    1 -48                              30C03540
06CE 0  690A           STX    1 T06D+1      SET CHAR CNT         30C03550
06CF 01 6C000ACB       STX   L LOOP         SET LOOP ADDRS       30C03560
                      *                                          30C03570
06D1 0  6132      T06B LDX    1 50          SET EMIT LOOP CNT    30C03580
06D2 0  69F5           STX    1 LPCNT                           30C03590
                      *                                          30C03600
06D3 00 66008200  T06C LDX    L2 /8200      SET DSW S/B          30C03610
06D5 0  6101           LDX    1 1           SET IDLE CNT         30C03620
06D6 01 440008D1       BSI   L IDLE                            30C03630
                      *                                          30C03640
06D8 00 65000000  T06D LDX    L1 *-*        XR1=EMIT TABLE POSITION 30C03650
06DA 01 C4000C0A       LD     L EMIT        CHECK IF CHARACTER IS 30C03660
06DC 01 D40009EE       STO   L A1EM         STORE EMIT           30C03670
06DE 01 95000CEA       S     L1 CHAR+48     TO BE PRINTED        30C03680
06E0 01 4C1806E9       BSC   L T06E,+-      YES IF BRANCH        30C03690
                      *                                          30C03700
06E2 01 74FF081A       MDX   L ICNT,-1      SKIP IF INTRPT CNT=1 30C03710
06E4 0  70EC           MDX     T06B                              30C03720
06E5 01 74FF06C8       MDX   L LPCNT,-1     AFTER 50 CONSECUTIVE 30C03730
06E7 0  70EB           MDX     T06C           EMITS - SPACE      30C03740
06E8 0  7002           MDX     T06E+2         THEN CONTINUE      30C03750
                      *                                          30C03760
06E9 01 440009CF  T06E BSI   L A1           SET PRINT BUFR TO ONES 30C03770
06EB 0  6101           LDX    1 1           SET SCAN CNT         30C03780
06EC 01 440008C6       BSI   L PRINT                           30C03790
06EE 01 440009EF       BSI   L LOCK         CK FOR LOCK ON FUNCTION 30C03800
                      *                                          30C03810
06F0 01 740106D9       MDX   L T06D+1,1     ADV TO NXT CHAR      30C03820
06F2 0  70DE           MDX     T06B                              30C03830
06F3 01 44000600       BSI   L CNTRL        GO TO CONTROL RTN    30C03840
                      *                                          30C03850
                      *                                          30C03860
                      ********************************************** 30C03870
                      *              TEST ROUTINE 7                * 30C03880
                      ********************************************** 30C03890
                      * THIS ROUTINE PRINTS LINES OF ALL ONE CHARACTER 30C03900
                      *------------------------------------------- 30C03910
                      *                                            30C03920
06F5 01 440008AD  TST7 BSI   L INTLZ       GO INITIALIZE ROUTINE 30C03930
06F7 0  8021           DC      /8021        STRESS TEST          30C03940
                      *                                          30C03950
06F8 0  6164           LDX    1 100         SET LINE COUNT       30C03960
06F9 0  69CC           STX    1 LINES                            30C03970
                      *                                          30C03980
06FA 01 6C000ACB       STX   L LOOP         SET LOOP ADDRS       30C03990
06FC 01 440009CF  T07A BSI   L A1           SET PRINT AREA TO ONES 30C04000
06FE 0  6101           LDX    1 1           SET SCAN CNT         30C04010
06FF 01 440008C6       BSI   L PRINT        GO PRINT             30C04020
0701 0  6110           LDX    1 16          SET FOR 16 IDLES     30C04030
0702 00 66008200       LDX   L2 /8200       SET DSW S/B          30C04040
0704 01 440008D1       BSI   L IDLE                            30C04050
0706 01 C4000C0A       LD     L EMIT                           30C04060
0708 01 D40009EE       STO   L A1EM                            30C04070
                      *                                          30C04080
070A 01 440009EF       BSI   L LOCK         CK FOR LOCK ON FUNCTION 30C04090
                      *                                          30C04100
```

```
070C 01 74FF06C6          MDX  L  LINES,-1    UPDATE LINE COUNT          30C04110
070E 0  70ED              MDX     T07A                                   30C04120
070F 01 44000600          BSI  L  CNTRL       GO TO CONTROL RTN          30C04130
                     *                                                   30C04140
                     *****************************************          30C04150
                     * INITIALIZATION FOR ROUTINES 8,9, AND A  *          30C04160
                     *****************************************          30C04170
                     * THIS ROUTINE IDENTIFIES THE SEQUENCE OF PUNCHES   30C04180
                     * IN THE CHANNEL CONTROL TAPE.                      30C04190
                     *-------------------------------------------       30C04200
                     *                                                   30C04210
0711 0  0000         IN89A DC       *-*                                 30C04220
0712 0  C06C              LD        SW89A                                30C04230
0713 01 4C2C0775          BSC  L    I89AX,Z     BR IF INITIALIZED        30C04240
0715 0  6869              STX       SW89A                                30C04250
0716 01 440008AD          BSI  L    INTLZ       GO INITIALIZE ROUTINE    30C04260
0718 0  7000              DC        /7000                                30C04270
                     *                                                   30C04280
0719 00 65000080          LDX  L1   176         SET FOR 176 SPACES       30C04290
071B 0  69AC              STX   1   LPCNT                                30C04300
071C 0  1810              SRA       16                                   30C04310
071D 0  610F              LDX   1   15                                   30C04320
071E 01 D50007BE          STO  L1   CH12S-1                              30C04330
0720 0  71FF              MDX   1   -1                                   30C04340
0721 0  70FC              MDX       *-4                                  30C04350
0722 0  6101              LDX   1   1                                    30C04360
0723 0  6945              STX   1   T08D+1                               30C04370
0724 01 6D0007CA          STX  L1   SHIFT                                30C04380
0726 01 6D0007CB          STX  L1   SHFT2                                30C04390
0728 01 C4000984          LD   L    K8000                                30C04400
072A 01 D40007C7          STO  L    SEQSW       SET SEQ SW               30C04410
                     *                                                   30C04420
                     *-------------------------------------------       30C04430
                     *  SPACE TO CHANNELS                                30C04440
                     *-------------------------------------------       30C04450
                     *                                                   30C04460
072C 01 44000946          BSI  L    PMSG        MSG- SPACE TO CHANNEL    30C04470
072E 0  9C00              DC        /9C00       MSG CONTROL              30C04480
                     *                                                   30C04490
072F 01 6C000ACB    T08A  STX  L    LOOP        SET LOOP ADDRS           30C04500
0731 01 4400093A          BSI  L    STOP        STOP THE PRINTER         30C04510
0733 01 440008F7          BSI  L    SPACE                                30C04520
0735 01 0C0001BA          XIO  L    SENSE-1     RECORD CHANL PUNCH IF    30C04530
0737 01 EC000BEE          OR   L    WAS          DETEC IN INTRPT         30C04540
                     *                           OR MAINLINE             30C04550
0739 0  1008              SLA       8                                    30C04560
073A 01 4C18075C          BSC  L    T08B,+-     BR IF CHANL BIT OFF      30C04570
                     *                                                   30C04580
073C 01 440007CE          BSI  L    CHMSG       PRINT CHANL ID MSG       30C04590
073E 0  8500              DC        /8500                                30C04600
                     *                                                   30C04610
073F 01 EC0007CD          OR   L    VCHNL       RECORD EACH CHANNEL      30C04620
0741 01 D40007CD          STO  L    VCHNL        DETECTED                30C04630
0743 01 C40007C7          LD   L    SEQSW                                30C04640
0745 0  1001              SLA       1                                    30C04650
0746 01 4C08075C          BSC  L    T08B,+                               30C04660
                     *                                                   30C04670
                     *  AFTER SECOND CHANNEL, CHECK FIRST 16 CHANNELS    30C04680
                     *  FOR REPEAT OF CHANNEL SEQUENCE.                  30C04690
                     *                                                   30C04700
0748 01 668007CA    T08A1 LDX  I2   SHIFT       XR 2=CHAN BEFORE REPEAT  30C04710
074A 01 C40007CC          LD   L    LTSEQ       LOAD LAST SEQUENCE       30C04720
074C 0  1200              SLA   2   0            CHECK FOR REPEAT        30C04730
074D 01 E40007CC          AND  L    LTSEQ       ZERO IF NOT REPEAT       30C04740
074F 01 4C20075A          BSC  L    T08A2,Z     BR IF REPEAT             30C04750
0751 01 668007CB          LDX  I2   SHFT2                                30C04760
0753 0  C077              LD        SHFT2                                30C04770
0754 0  F075              EOR       SHIFT                                30C04780
```



```
0755 0  6A74              STX   2 SHIFT                                 30C04790
0756 01 4C200748          BSC  L    T08A),Z     BR FOR 2ND CHECK         30C04800
0758 01 740107CA          MDX  L    SHIFT,1                              30C04810
075A 01 740107CB    T08A2 MDX  L    SHFT2,1                              30C04820
                     *                                                   30C04830
075C 01 440009EF    T08B  BSI  L    LOCK        CK LOCK SW               30C04840
075E 0  C068              LD        SEQSW                                30C04850
075F 01 4C180764          BSC  L    T08C,+-                              30C04860
0761 01 74FF06C8          MDX  L    LPCNT,-1    DEC LOOP CNT             30C04870
0763 0  70CB              MDX       T08A                                 30C04880
                     *                                                   30C04890
0764 0  C068        T08C  LD        VCHNL                                30C04900
0765 01 F4000BFF          EOR  L    KFF00                                30C04910
0767 0  D060              STO       TEMP8                                30C04920
                     *                                                   30C04930
0768 00 65000000    T08D  LDX  L1   *-*         XR1=CHANNEL NUMBER       30C04940
076A 01 44280A5B          BSI  L    ERR12,+Z    PRINT MISSING CHAN MSG   30C04950
076C 01 74010769          MDX  L    T08D+1,1    ADV TO CK NEXT CHAN      30C04960
076E 0  C059              LD        TEMP8                                30C04970
076F 0  1001              SLA       1           SHIFT TO NEXT CHAN       30C04980
0770 0  D057              STO       TEMP8                                30C04990
0771 01 4C200768          BSC  L    T08D,Z      BR IF MORE ERRORS        30C05000
                     *                                                   30C05010
                     *                                                   30C05020
0773 0  1810              SRA       16                                   30C05030
0774 0  D052              STO       SEQSW                                30C05040
                     *                                                   30C05050
0775 01 440008F7    I89AX BSI  L    SPACE       ADVANCE TO THE NEXT      30C05060
0777 01 0C0001BA          XIO  L    SENSE-1      CHANNEL PUNCH BEFORE    30C05070
0779 01 EC000BEE          OR   L    WAS          STARTING TEST ROUTINE   30C05080
077B 0  1008              SLA       8                                    30C05090
077C 01 4CA00711          BSC  I    IN89A,Z                              30C05100
077E 0  70F6              MDX       I89AX                                30C05110
                     *                                                   30C05120
077F 0  0000        SW89A DC        *-*                                 30C05130
                     *                                                   30C05140
                     *****************************************          30C05150
                     *              TEST ROUTINE 8             *         30C05160
                     *****************************************          30C05170
                     * THIS TEST CHECKS THAT EACH CHANNEL                30C05180
                     * PUNCH WILL GENERATE A SKIP INTERRUPT.             30C05190
                     *-------------------------------------------       30C05200
                     *                                                   30C05210
0780 01 440008AD    TST8  BSI  L    INTLZ                                30C05220
0782 0  E401              DC        /E401                                30C05230
0783 0  408D              BSI       IN89A       INITIALIZE               30C05240
0784 0  6202              LDX   2   2                                    30C05250
0785 01 6E0006C8          STX  L2   LPCNT                                30C05260
0787 01 440008F7          BSI  L    SPACE                                30C05270
0789 01 44000946          BSI  L    PMSG                                 30C05280
078B 0  AC00              DC        /AC00                                30C05290
078C 0  62FF              LDX   2   -1                                   30C05300
078D 0  6A3A              STX   2   TEMP8       SET TEMP8 TO ALL BITS    30C05310
                     *                                                   30C05320
078E 01 6C000ACB          STX  L    LOOP        SET LOOP ADDRS           30C05330
0790 01 658007CA    T08E  LDX  I1   SHIFT       LD SHIFT FACTOR          30C05340
                     *                                                   30C05350
0792 0  6908        T08F  STX   1   T08X1+1     STO XR1                  30C05360
                     *                                                   30C05370
0793 01 4400093A          BSI  L    STOP        STOP THE PRINTER         30C05380
0795 0  1810              SRA       16          SET SKIP TO SW           30C05390
0796 00 66005000          LDX  L2   /5000       SET BUSY DSW S/B         30C05400
0798 01 44000919          BSI  L    SKIP                                 30C05410
                     *                                                   30C05420
079A 00 65000000    T08X1 LDX  L1   *-*         RESTORE XR1              30C05430
079C 01 668007CA          LDX  I2   SHIFT                                30C05440
079E 01 C4000BEE          LD   L    WAS         LD DSW                   30C05450
07A0 0  1008              SLA       8                                    30C05460
```

```
07A1 0  6308          LDX   3 8                                      30C05470
07A2 0  1340          SLCA  3 0          IDENTIFY CODE               30C05480
07A3 0  00A0          SLT     32                                     30C05490
07A4 01 C70007BE      LD    L3 CH12S-1   LD SEQUENCE FOR THIS CHAN   30C05500
07A6 0  1AC0          RTE   2 0                                      30C05510
07A7 01 EF0007BE      OR    L3 CH12S-1                               30C05520
07A9 0  19C0          RTE   1 0          RTE BY SHIFT FACTOR         30C05530
07AA 0  1280          SLT   2 0                                      30C05540
07AB 0  E01C          AND     TEMP8      CK FOR PROPER SEQ           30C05550
07AC 01 44180A6D      BSI   L ERR13,+-   BR IF SEQ ERR               30C05560
07AE 0  D019          STO     TEMP8                                  30C05570
                      *                                              30C05580
07AF 01 C40008EE      LD    L WAS        LD DSW                      30C05590
07B1 0  1008          SLA     8                                      30C05600
07B2 0  401B          BSI     CHMSG      MSG- CHANNEL X              30C05610
07B3 0  8500          DC      /8500                                  30C05620
07B4 01 65800798      LDX   I1 T08X1+1                               30C05630
                      *                                              30C05640
07B6 0  71FF          MDX   1 -1                                     30C05650
07B7 0  70DA          MDX     T08F                                   30C05660
                      *                                              30C05670
07B8 01 440009EF      BSI   L LOCK       CK FOR LOCK ON FUNCTION     30C05680
07BA 01 74FF06C8      MDX   L LPCNT,-1   DEC LOOP COUNT              30C05690
07BC 0  70D3          MDX     T08E       BR IF NOT FINISHED          30C05700
                      *                                              30C05710
07BC 01 44000600      BSI   L CNTRL                                  30C05720
                      *                                              30C05730
                      *-------------------------------------         30C05740
                      *          CHANNEL SEQUENCE TABLE              30C05750
                      *-------------------------------------         30C05760
                      *                                              30C05770
07BF 0  0000          CH12S DC      *-*                              30C05780
07C0 0  0000          CH9SQ DC      *-*                              30C05790
07C1 0  0000          CH6SQ DC      *-*                              30C05800
07C2 0  0000          CH5SQ DC      *-*                              30C05810
07C3 0  0000          CH4SQ DC      *-*                              30C05820
07C4 0  0000          CH3SQ DC      *-*                              30C05830
07C5 0  0000          CH2SQ DC      *-*                              30C05840
07C6 0  0000          CH1SQ DC      *-*                              30C05850
07C7 0  0000          SEQSW DC      *-*        SEQ SW                30C05860
07C8 0  0000          TEMP8 DC      *-*                              30C05870
07C9 0  0000                DC      *-*                              30C05880
07CA 0  0000          SHIFT DC      *-*                              30C05890
07CB 0  0000          SHFT2 DC      *-*                              30C05900
07CC 0  0000          LTSEQ DC      *-*                              30C05910
07CD 0  0000          VCHNL DC      *-*        BIT SET FOR EACH CHAN DET 30C05920
                      *                                              30C05930
                      *-------------------------------------         30C05940
                      *          PRINT CHANNEL MESSAGE               30C05950
                      *-------------------------------------         30C05960
                      *                                              30C05970
07CE 0  0000          CHMSG DC      *-*                              30C05980
07CF 01 4C1807EB            BSC   L  CHM2,+-                         30C05990
07D1 0  D0F7                STO      TEMP8+1   SAVE CHANNEL CODE     30C06000
07D2 0  6107                LDX   1 7                                30C06010
07D3 0  1140                SLCA  1 0          IDENTIFY BIT          30C06020
07D4 0  1001                SLA     1                                30C06030
07D5 01 4C200A76            BSC   L  ERR14,Z   ERR IF MORE THAN 1 BIT 30C06040
                            *                                        30C06050
07D7 0  C0EF                LD       SEQSW     LD SEQ SW             30C06060
07D8 01 ED0007BF            OR    L1 CH12S                           30C06070
07DA 01 D50007BF            STO   L1 CH12S                           30C06080
07DC 0  D0EF                STO      LTSEQ                           30C06090
07DD 0  C0E9                LD       SEQSW     LD SEQ SW             30C06100
07DE 0  1801                SRA      1         ADV SEQ               30C06110
07DF 0  D0E7                STO      SEQSW                           30C06120
                            *                                        30C06130
07E0 01 C50007EF            LD    L1 CHTBL     LD MSG                30C06140
```



```
07E2 01 D4000E57            STO   L  PMG26                          30C06150
07E4 01 C48007CE            LD    I  CHMSG                          30C06160
07E6 0  D002                STO      CHM1                           30C06170
07E7 01 44000946            BSI   L  PMSG       PRINT 1132 MSG      30C06180
07E9 0  0000          CHM1  DC       *-*        MSG CONTROL         30C06190
                      *                                             30C06200
07EA 0  CODE                LD       TEMP8+1                        30C06210
07EB 01 740107CE      CHM2  MDX   L  CHMSG,1                        30C06220
07ED 01 4C8007CE            BSC   I  CHMSG                          30C06230
                      *                                             30C06240
07EF 0  F1F2          CHTBL DC       /F1F2      12                  30C06250
07F0 0  F900                DC       /F900       9                  30C06260
07F1 0  F600                DC       /F600       6                  30C06270
07F2 0  F500                DC       /F500       5                  30C06280
07F3 0  F400                DC       /F400       4                  30C06290
07F4 0  F300                DC       /F300       3                  30C06300
07F5 0  F200                DC       /F200       2                  30C06310
07F6 0  F100                DC       /F100       1                  30C06320
                      *                                             30C06330
                      *********************************************** 30C06340
                      *          TEST ROUTINE 9                     * 30C06350
                      *********************************************** 30C06360
                      *  THIS ROUTINE WILL SKIP TO EACH CHANNEL IN  * 30C06370
                      *  ORDER, STARTING WITH CHANNEL ONE. PRINTER IS * 30C06380
                      *  OFF DURING THE SKIP OPERATION.             * 30C06390
                      *---------------------------------------------- 30C06400
                      *                                             30C06410
07F7 01 440008AD      TST9  BSI   L  INTLZ      GO INITIALIZE ROUTINE 30C06420
07F9 0  202D                DC       /202D      MSG CONTROL         30C06430
07FA 0  202D                DC       /202D      MSG CONTROL         30C06440
07FB 01 44000711            BSI   L  IN89A                          30C06450
                      *                                             30C06460
07FD 01 C40009B4            LD    L  K8000                          30C06470
07FF 0  D0C8                STO      TEMP8                          30C06480
                      *                                             30C06490
0800 01 6C000ACB            STX   L  LOOP       SET LOOP ADDRS      30C06500
0802 01 440008F7      T09A  BSI   L  SPACE                          30C06510
0804 01 C40005E1            LD    L  SW2        LD SELECT CHANNEL SWS 30C06520
0806 0  1008                SLA      8                              30C06530
0807 01 4C20080D            BSC   L  T09B,Z     BR IF SW ENTRY      30C06540
                      *                                             30C06550
0809 0  C0BE                LD       TEMP8      LD SKIP SEQ SW      30C06560
080A 0  E0C2                AND      VCHNL      CHECK FOR VALID CHNL 30C06570
080B 01 4C180810            BSC   L  T09C,+-                        30C06580
                      *                                             30C06590
080D 0  40C0          T09B  BSI      CHMSG      MSG- SKIP TO X      30C06600
080E 0  AD00                DC       /AD00      MSG CONTROL         30C06610
080F 01 4400093A            BSI   L  STOP       STOP THE PRINTER    30C06620
                      *                                             30C06630
0811 0  C0B7                LD       TEMP8+1    LD SKIP SEQ SW      30C06640
0812 00 66005000            LDX   L2 /5000      SET BUSY DSW S/B    30C06650
0814 01 44000919            BSI   L  SKIP                           30C06660
                      *                                             30C06670
                      *                                             30C06680
0816 01 C40008EE            LD    L  WAS        LD DSW              30C06690
0818 0  1008                SLA      8          LOOK AT CHANNEL BITS 30C06700
0819 0  40B4                BSI      CHMSG      MSG- CHANNEL X      30C06710
081A 0  85C0                DC       /8500      MSG CONTROL         30C06720
081B 01 440009EF            BSI   L  LOCK       CK FOR LOCK ON FUNCTION 30C06730
                      *                                             30C06740
081D 0  C0AA          T09C  LD       TEMP8      LD SKIP SEQ SW      30C06750
081E 0  1801                SRA      1          SHIFT FOR NEXT CHANNEL 30C06760
081F 0  D0A8                STO      TEMP8                          30C06770
0820 0  1808                SRA      8                              30C06780
0821 01 4C200802            BSC   L  T09A,Z     LOOP IF NOT ZERO    30C06790
0823 01 44000600            BSI   L  CNTRL                          30C06800
                      *                                             30C06810
                      *********************************************** 30C06820
```

1132 PRINTER FUNCTION TEST

```
                  *               TEST ROUTINE A                          30C06830
                  *********************************************           30C06840
                  *  THIS ROUTINE WILL SKIP TO EACH CHANNEL IN            30C06850
                  *  ORDER, STARTING WITH CHANNEL ONE. PRINTER IS         30C06860
                  *  ON DURING THE SKIP OPERATION.                        30C06870
                  *-------------------------------------------            30C06880
                  *                                                       30C06890
0825 01 440008AD  TSTA BSI  L  INTLZ     GO INITIALIZE ROUTINE            30C06900
0827 0  102E           DC      /102E     MSG CONTROL                      30C06910
0828 01 44000711       BSI  L  IN89A                                      30C06920
                  *                                                       30C06930
082A 01 C40009B4       LD   L  K8000                                      30C06940
082C 0  D098           STO     TEMP8                                      30C06950
                  *                                                       30C06960
082D 01 6C000ACB       STX  L  LOOP      SET LOOP ADDRS                   30C06970
082F 01 440008F7  TOAA BSI  L  SPACE                                      30C06980
0831 01 C40005E1       LD   L  SW2       LD SELECT CHANNEL SWS            30C06990
0833 0  1008           SLA     8                                          30C07000
0834 01 4C20083A       BSC  L  TOAB,Z    BR IF SW ENTRY                   30C07010
                  *                                                       30C07020
0836 0  C091           LD      TEMP8     LD SKIP SEQ SW                   30C07030
0837 0  E095           AND     VCHNL     CHECK FOR VALID CHNL             30C07040
0838 01 4C180853       BSC  L  TOAC,+-                                    30C07050
                  *                                                       30C07060
083A 0  4093      TOAB BSI     CHMSG     MSG- SKIP TO X                   30C07070
083B 0  AD00           DC      /AD00     MSG CONTROL                      30C07080
                  *                                                       30C07090
083C 0  6101           LDX   1 1                                          30C07100
083D 00 66008200       LDX  L2 /8200                                      30C07110
083F 01 440008D1       BSI  L  IDLE      GO START THE PRINTER             30C07120
                  *                                                       30C07130
0841 00 650003E8       LDX  L1 1000      SET IDLCT TO KEEP                30C07140
0843 01 6D0008FD       STX  L1 IDLCT      PRINTER GOING                   30C07150
                  *                                                       30C07160
0845 01 C40007C9       LD   L  TEMP8+1   LD SKIP SEQ SW                   30C07170
0847 00 66005200       LDX  L2 /5200     SET BUSY DSW S/B                 30C07180
0849 01 44000919       BSI  L  SKIP                                       30C07190
                  *                                                       30C07200
084B 01 C4000BEE       LD   L  WAS       LD DSW                           30C07210
084D 0  1008           SLA     8         LOOK AT CHANNEL BITS             30C07220
084E 01 440007CE       BSI  L  CHMSG     MSG- CHANNEL X                   30C07230
0850 0  8500           DC      /8500     MSG CONTROL                      30C07240
0851 01 440009EF       BSI  L  LOCK      CK FOR LOCK ON FUNCTION          30C07250
                  *                                                       30C07260
0853 01 C40007C8  TOAC LD   L  TEMP8     LD SKIP SEQ SW                   30C07270
0855 0  1801           SRA     1         SHIFT FOR NEXT CHANNEL           30C07280
0856 01 D40007C8       STO  L  TEMP8                                      30C07290
0858 0  1808           SRA     8                                          30C07300
0859 01 4C20082F       BSC  L  TOAA,Z    LOOP IF NOT ZERO                 30C07310
085B 01 44000600       BSI  L  CNTRL                                      30C07320
                  *                                                       30C07330
                  *********************************************           30C07340
                  *               TEST ROUTINE B                          30C07350
                  *********************************************           30C07360
                  *  THIS ROUTINE ENABLES BIT SWITCH CONTROL OF THE       30C07370
                  *  CHARACTER AND THE COLUMN TO BE PRINTED. ONLY         30C07380
                  *  ONE CHARACTER WILL BE PRINTED ON EACH LINE.          30C07390
                  *  THE COLUMN NUMBER MUST BE ENTERED IN SWITCHES        30C07400
                  *  1-7, AND THE CHARACTER ID IN SWITCHES 8-15.          30C07410
                  *  PRINTING WILL START WHEN SWITCH 0 IS TURNED ON.      30C07420
                  *-------------------------------------------            30C07430
                  *                                                       30C07440
085D 01 440008AD  TSTB BSI  L  INTLZ     GO INITIALIZE ROUTINE            30C07450
085F 0  0000           DC      /0000                                      30C07460
                  *                                                       30C07470
0860 00 44800163       BSI  I  LOG       PRINT SET UP MSG                 30C07480
0862 1  08A8           DC      SETUP                                      30C07490
                  *                                                       30C07500
```


1132 PRINTER FUNCTION TEST

```
0863 0  083C      TOBA XIO     RBSWS     READ THE BIT SWS                 30C07510
0864 0  C03F           LD      BSWS                                       30C07520
0865 01 4C28086D       BSC  L  TOBB,+Z   USE SWS IF SW ZERO ON            30C07530
                  *                                                       30C07540
0867 01 67000863       LDX  L3 TOBA      LOOP UNTIL SW ZERO ON            30C07550
0869 01 6F0005E6       STX  L3 MLSCF+1                                    30C07560
086B 01 4C000B10       BSC  L  WAIT4                                      30C07570
                  *                                                       30C07580
086D 0  1001      TOBB SLA     1         REMOVE SW ZERO                   30C07590
086E 0  1801           SRA     1                                          30C07600
086F 0  1888           SRT     8         PUT 8-15 IN EXT                  30C07610
0870 0  D034           STO     PCOLM     STO COLUMN NO. SWS 1-7           30C07620
0871 0  1868           SRT     8                                          30C07630
0872 0  1098           SLT     24                                         30C07640
0873 0  D035           STO     CHID      STO CHAR ID                      30C07650
0874 01 4C18089A       BSC  L  TOBF,+-   BYPASS PRINT UNLESS A            30C07660
                  *                       VALID CHARACTER ID              30C07670
                  *                                                       30C07680
0876 01 6C000ACB       STX  L  LOOP      SET LOOP ADDRS                   30C07690
0878 0  6132           LDX   1 50        SET EMIT LOOP CNT                30C07700
0879 01 6D0006C8       STX  L1 LPCNT                                      30C07710
                  *                                                       30C07720
087B 00 66008200  TOBC LDX  L2 /8200     SET DSW S/B                      30C07730
087D 0  6101           LDX   1 1         SET IDLE CNT                     30C07740
087E 01 440008D1       BSI  L  IDLE                                       30C07750
                  *                                                       30C07760
0880 01 C4000C0A  TOBD LD   L  EMIT      CHECK IF CHARACTER IS            30C07770
0882 0  9026           S       CHID       TO BE PRINTED                   30C07780
0883 01 4C18088C       BSC  L  TOBE,+-   YES IF BRANCH                    30C07790
                  *                                                       30C07800
0885 01 74FF0B1A       MDX  L  ICNT,-1   SKIP IF INTRPT CNT=1             30C07810
0887 0  70DB           MDX     TOBA      BR IF MISSED AN EMIT             30C07820
0888 01 74FF06C8       MDX  L  LPCNT,-1  LOOP FOR 50 SEQUENTIAL           30C07830
088A 0  70F0           MDX     TOBC       EMITS                           30C07840
088B 0  700E           MDX     TOBF      SPACE IF NO MATCH                30C07850
                  *                                                       30C07860
088C 0  C018      TOBE LD      PCOLM     LD COL NO.                       30C07870
088D 0  1890           SRT     16                                         30C07880
088E 0  A817           D       X16                                        30C07890
088F 01 DC0008A2       STD  L  TEMPB                                      30C07900
0891 01 658008A3       LDX  I1 TEMPB+1   XR1=BUF WORD BIT POSITION        30C07910
0893 01 668008A2       LDX  I2 TEMPB     XR2=BUF WORD NUMBER              30C07920
                  *                                                       30C07930
0895 01 C40009B4       LD   L  K8000                                      30C07940
0897 0  1900           SRA   1 0                                          30C07950
0898 0  EA20           OR    2 32                                         30C07960
0899 0  D220           STO   2 32        SET BIT IN BUFFER                30C07970
                  *                                                       30C07980
089A 0  6101      TOBF LDX   1 1         SET SCAN CNT                     30C07990
089B 01 440008C6       BSI  L  PRINT                                      30C08000
089D 01 440009EF       BSI  L  LOCK      CK FOR LOCK ON FUNCTION          30C08010
                  *                                                       30C08020
089F 0  70C3           MDX     TOBA                                       30C08030
                  *                                                       30C08040
08A0    0000           BSS  E  0                                          30C08050
08A0 1  08A4      RBSWS DC     BSWS                                       30C08060
08A1 0  3A00           DC      /3A00     IOCC TO READ BIT SWS             30C08070
08A2 0  0000      TEMPB DC     *-*                                        30C08080
08A3 0  0000           DC      *-*                                        30C08090
08A4 0  0000      BSWS DC      *-*                                        30C08100
08A5 0  0000      PCOLM DC     *-*       PRINT COL STORED HERE            30C08110
08A6 0  0010      X16  DC      16                                         30C08120
08A7 0  0030      K0030 DC     /0030                                      30C08130
08A8 0  0002      SETUP DC     2                                          30C08140
08A9 0  0000      CHID DC      *-*                                        30C08150
08AA 0  0000           DC      0                                          30C08160
08AB 1  0088           DC      ABSW                                       30C08170
08AC 0  0000           DC      0                                          30C08180
```

1132 PRINTER FUNCTION TEST

```
                   *
                   *********************************************
                   *              INITIALIZE SUBROUTINE
                   *********************************************
                   *
08AD 0  0000       INTLZ DC        *-*
08AE 01 4400093A         BSI  L  STOP        STOP THE PRINTER
                   *
08B0 01 4400098A         BSI  L  CLEAR       SET PRINT BUF TO ZERO
08B2 01 D4000ACB         STO  L  LOOP        RESET LOOP ADDRS
                   *
08B4 01 44000B39         BSI  L  READY       CK FOR READY
                   *
08B6 0  4040             BSI     SPACE
08B7 0  403F             BSI     SPACE
                   *
08B8 01 C48008AD         LD   I  INTLZ       LD MSG CONTROL
08BA 01 4C1808C2         BSC  L  INT2,+-     BR IF MSG CONTROL=ZERO
                   *
08BC 0  D002             STO     INT1        SET CONTROL
08BD 01 44000946         BSI  L  PMSG        PRINT 1132 MSG
08BF 0  0000       INT1  DC      *-*         MSG CONTROL
                   *
08C0 0  4036             BSI     SPACE
08C1 0  4035             BSI     SPACE
                   *
08C2 01 740108AD   INT2  MDX  L  INTLZ,1
08C4 01 4C8008AD         BSC  I  INTLZ       RETURN
                   *
                   *********************************************
                   *              PRINT SUBROUTINE
                   *********************************************
                   *
08C6 0  0000       PRINT DC        *-*
08C7 01 C40005E2         LD   L  SW3
08C9 01 D4000BFD         STO  L  IDLCT       SET FOR PRINT
08CB 00 66008200         LDX  L2 /8200       SET FOR PRINT DSW
08CD 0  400A             BSI     PRCOM
08CE 0  4028             BSI     SPACE
08CF 01 4C8008C6         BSC  I  PRINT
                   *
                   *********************************************
                   *              IDLE SUBROUTINE
                   *********************************************
                   *
08D1 0  0000       IDLE  DC        *-*
08D2 01 6D000BFD         STX  L1 IDLCT       SET IDLE CNT
08D4 0  6100             LDX   1 0
08D5 0  4002             BSI     PRCOM
08D6 01 4C8008D1         BSC  I  IDLE
                   *
                   *--------------------------------------------
                   *              PRINT COMMON
                   *--------------------------------------------
                   *
08D8 0  0000       PRCOM DC        *-*
08D9 01 6D000BF0         STX  L1 SCNCT       SET SCNCT FOR IDLE
08DB 01 6E000BFA         STX  L2 EXPCT
                   *
08DD 01 0C00081A   PRC1  XIO  L  SENSE-1     SENSE DSW
08DF 01 D4000ADD         STO  L  DSWW        STO IN MSG
08E1 0  1003             SLA     3
08E2 01 4C1008E7         BSC  L  PRC2,-      BR IF CARG NOT BUSY
08E4 01 44000A92         BSI  L  ERR17       PRINT ERR MSG
08E6 0  70F6             MDX     PRC1
                   *
08E7 01 44000853   PRC2  BSI  L  FORMS
08E9 01 66000D5E         LDX  L2 APRT
```


1132 PRINTER FUNCTION TEST

```
08EB 01 6E000AD0         STX  L2 OPSW        SET LAST OP SW
08ED 00 67000200         LDX  L3 /0200       BUSY DSW S/B
08EF 01 6F00081C         STX  L3 TBDSW       SAVE BUSY DSW S/B
08F1 01 0C0009B2         XIO  L  STPRT-1     START THE PRINTER
08F3 01 44000AE6         BSI  L  WAIT        WAIT FOR INTERRUPT
08F5 01 4C8008D8         BSC  I  PRCOM
                   *
                   *********************************************
                   *              SPACE SUBROUTINE
                   *********************************************
                   *
08F7 0  0000       SPACE DC        *-*
08F8 0  4041             BSI     STOP        STOP THE PRINTER
08F9 01 C4000AE6         LD   L  WAIT
08FB 01 4C180909         BSC  L  SPC1,+-     BR ON FIRST SPACE
08FD 0  6116             LDX   1 /16         ERROR NUMBER
08FE 01 0C000B1A         XIO  L  SENSE-1     SENSE DSW
0900 01 D4000AE4         STO  L  CHWAS+1
0902 01 F4000AE3         EOR  L  CHWAS       CHECK FOR CHANGE
0904 0  1008             SLA     8            IN CHANNEL BITS
0905 01 44200A8B         BSI  L  ERR16,Z     ERROR IF CHANGE
0907 01 44000853         BSI  L  FORMS
                   *
0909 00 66002000   SPC1  LDX  L2 /2000
090B 01 6E000BFB         STX  L2 EXPCT+1     SET EXPCT FOR SPACE
090D 01 66000D54         LDX  L2 ASPC
090F 01 6E000AD0         STX  L2 OPSW        SET LAST OP SW
0911 01 0C000BF4         XIO  L  STSPA-1     START SPACE
0913 01 C40009B9         LD   L  K1000       LD CARRIAGE BUSY BIT
0915 01 44000AE6         BSI  L  WAIT        WAIT FOR INTERRUPT
                   *
0917 01 4C8008F7         BSC  I  SPACE       RETURN
                   *
                   *********************************************
                   *              SKIP
                   *********************************************
                   *
0919 0  0000       SKIP  DC        *-*
091A 0  D01D             STO     SKPTO       SET CHANNEL CODE IN SKPTO
091B 01 6E000BFB         STX  L2 EXPCT+1     SET FOR SKIP INTRPT
091D 01 44000853         BSI  L  FORMS
091F 0  6210             LDX   2 16
0920 0  6A18             STX   2 SKCNT       SET FOR MAX OF 16 SKIPS
0921 01 C40009B9         LD   L  K1000
0923 01 EC000BFA         OR   L  EXPCT       SET FOR SKIP WITH
0925 01 D4000BFA         STO  L  EXPCT        PRINTER ON
0927 01 66000D5B         LDX  L2 ASKP        SET LAST OP SW
0929 01 6E000AD0         STX  L2 OPSW         FOR SKIP
092B 01 0C0009B4         XIO  L  STCAR-1     START SKIP
092D 01 C40009B9         LD   L  K1000       LD CARRIAGE BUSY BIT
092F 01 44000AE6         BSI  L  WAIT
                   *
0931 0  4008             BSI     STOP
0932 01 0C000B1A   SKP1  XIO  L  SENSE-1     SENSE DSW
0934 0  1003             SLA     3           LOOP HERE UNTIL
0935 01 4C900919         BSC  I  SKIP,-       CARRIAGE BUSY GOES OFF
0937 0  70FA             MDX     SKP1
                   *
0938 0  0000       SKPTO DC        *-*       SKIP TO CONTROL
0939 0  0000       SKCNT DC        *-*       SKIP COUNT
                   *
                   *********************************************
                   *              STOP THE PRINTER
                   *********************************************
                   *
093A 0  0000       STOP  DC        *-*
093B 01 0C000BEC         XIO  L  STPPT-1     STOP PRINTER
093D 0  1810             SRA     16
```

1132 PRINTER FUNCTION TEST

```
093E 01 D40008F4          STO  L  EMTSW        RESET 1ST EMIT SW
0940 01 D40008FA          STO  L  EXPCT
0942 01 D400081C          STO  L  TBDSW
0944 01 4C80093A          BSC  I  STOP         RETURN
                    *
                    *********************************************
                    *         PRINT 1132 MESSAGE SUBROUTINE
                    *********************************************
                    *
0946 0  0000        PMSG  DC      *-*
0947 01 C40005DF          LD   L  SW0          DO NOT PRINT IF
0949 0  100D              SLA     13            BYPASS MESSAGE SWITCH
094A 01 4C280974          BSC  L  PMS4,+Z       IS ON
                    *
094C 0  40ED              BSI     STOP
                    *
094D 0  10A0              SLT     32
094E 01 C4800946          LD   I  PMSG         LD MESSAGE CONTROL
0950 0  610E              LDX   1 14
0951 0  4828              BSC     +Z           CK FOR EXTENDED TABLE
0952 0  710F              MDX   1 15
0953 0  1001              SLA     1
0954 0  D05D              STO     SAVE
0955 01 67000DAE          LDX  L3 BUF          XR3=BUFFER ADDRS
0957 0  7001              MDX     PMS1+1
                    *
0958 0  7301        PMS1  MDX   3 1            PUT SPACE IN MSG
0959 0  C058              LD      SAVE         LD MESSAGE CONTROL
095A 0  1140              SLCA  1 0            SCAN CONTROL
095B 01 4C180974          BSC  L  PMS4,+-      BR IF CONTROL ZERO
095D 0  F056              EOR     K8000
095E 0  D053              STO     SAVE         SAVE CONTROL FOR NXT SCAN
095F 01 C5000DCE          LD   L1 PMTAB        LD MSG ADDRS
0961 0  D001              STO     *+1
                    *
0962 00 C4000000    PMS2  LD   L  *-*          LD MSG CHAR
0964 0  F052              EOR     TERM         CK FOR TERMINATOR
0965 01 4C180958          BSC  L  PMS1,+-      BR IF TERM
                    *
0967 0  F04F              EOR     TERM         RESTORE CHAR
0968 0  18C8              RTE     8            SHIFT OUT 2ND CHAR
0969 0  1008              SLA     8
096A 0  D300              STO   3 0            STO CHAR IN BUF
                    *
096B 0  1090              SLT     16           BRING IN 2ND CHAR
096C 01 4C180970          BSC  L  PMS3,+-      BR IF ZERO
096E 0  7301              MDX   3 1            ADV BUF ADDRS
096F 0  D300              STO   3 0            STO CHAR IN BUF
                    *
0970 0  7301        PMS3  MDX   3 1
0971 01 74010963          MDX  L  PMS2+1,1     ADV MSG ADDRS
0973 0  70EE              MDX     PMS2
                    *
0974 0  6131        PMS4  LDX   1 49           LD SCAN CNT
0975 00 66008200          LDX  L2 /8200        LD EXPECTED INTRPT DSW
0977 0  6310              LDX   3 16           SET FOR 16 IDLES
0978 01 6F0008FD          STX  L3 IDLCT         BEFORE SPACE
097A 01 6C0009B8          STX  L  MSGSW        SET MSG SW
097C 01 440008D8          BSI  L  PRCOM        GO PRINT MSG
                    *
097E 01 74010946    PMS5  MDX  L  PMSG,1
0980 01 4C800946          BSC  I  PMSG         RETURN
                    *
                    *********************************************
                    *         RIPPLE PATTERN SUBROUTINE
                    *********************************************
                    *
0982 0  0000        RIPL  DC      *-*
```


1132 PRINTER FUNCTION TEST

```
0983 0  6132        RIPL1 LDX   1 50           SET EMIT LOOP CNT
0984 01 6D0006C6          STX  L1 LPCNT
                    *
0986 00 66008200    RIPL2 LDX  L2 /8200        SET DSW S/B
0988 0  6101              LDX   1 1            SET IDLE CNT
0989 01 440008D1          BSI  L  IDLE
                    *
098B 00 67000000    RIPL3 LDX  L3 *-*          COMPARE START SCAN
098D 01 C7000CEB          LD   L3 CHAR+49       CHAR WITH LAST
098F 01 94000C0A          S    L  EMIT          EMIT CHAR
0991 01 4C18099B          BSC  L  RIPL4,+-     LOOP IF NOT EQUAL
0993 01 74FF0B1A          MDX  L  ICNT,-1      SKIP IF INTRPT CNT=1
0995 0  70ED              MDX     RIPL1
                    *
0996 01 74FF06C8          MDX  L  LPCNT,-1     IF AFTER 50 CONSECUTIVE
0998 0  70ED              MDX     RIPL2          EMITS A MATCH IS NOT
0999 0  1810              SRA     16             FOUND, LEAVE SPACE
099A 0  7001              MDX     RIPL4+1        THEN CONTINUE
                    *
099B 0  C018        RIPL4 LD      K8000        SET BUFFER WITH FIRST BIT
099C 0  61F0              LDX   1 -16          SET SHIFT REGISTER
099D 0  62F8              LDX   2 -8           SET STORAGE REGISTER
099F 0  7301              MDX   3 1
099F 0  7005              MDX     RIPL5
09A0 0  63CE              LDX   3 -50
09A1 0  6BEA              STX   3 RIPL3+1      RESET EMIT CHAR CNT
09A2 0  1801              SRA     1            SHIFT LAST LINE
09A3 0  7101              MDX   1 1              IN PATTERN
09A4 0  7302              MDX   3 2
                    *
09A5 01 6F000BEC    RIPL5 STX  L3 BLANK        SET FOR PATTERN SPACE
09A7 01 6D000BD0          STX  L1 PI5+1
09A9 01 6E000BD2          STX  L2 PI6+1
09AB 0  6176              LDX   1 118          SET SCAN COUNT
09AC 00 D4000020          STO  L  32           SET 1ST BUFR WORD
09AE 01 440008C6          BSI  L  PRINT        GO PRINT
09B0 01 4C800982          BSC  I  RIPL
                    *
09B2      0000            BSS  E
09B2 0  0000        SAVE  DC      *-*
09B3 0  3480        STPRT DC      /3480        START PRINTER
09B4 0  8000        K8000 DC      /8000
09B5 0  3404        STCAR DC      /3404        START CARRIAGE
09B6 0  FFFF        ONES  DC      /FFFF
09B7 0  FFFF        TERM  DC      /FFFF
09B8 0  0000        MSGSW DC      *-*          PRINTER MSG SW
09B9 0  1000        K1000 DC      /1000
                    *
                    *********************************************
                    *         CLEAR BUFFER SUBROUTINE
                    *********************************************
                    *  THIS SUBROUTINE CLEARS 32-39 AND
                    *  SETS BIT 15, LOC 39.
                    *--------------------------------------------
                    *
09BA 0  0000        CLEAR DC      0
09BB 0  63F8              LDX   3 -8           PRINT AREA
09BC 0  10A0              SLT     32
09BD 01 D4000C03          STO  L  SPCSX        CLEAR SPACE SW
09BF 00 DF000028    CL10  STO  L3 40
09C1 0  7302              MDX   3 2
09C2 0  70FC              MDX     CL10
09C3 0  6301              LDX   3 1            SET SCAN COMP BIT
09C4 00 6F000027          STX  L3 39
09C6 01 D40009B8          STO  L  MSGSW        RESET MSG SW
09C8 0  63E0              LDX   3 -32
09C9 01 D7000DCE    CL20  STO  L3 BUF+32
09CB 0  7301              MDX   3 1
```

```
09CC 0  70FC            MDX     CL20                                    30C10910
09CD 01 4C8009BA        BSC  I  CLEAR                                   30C10920
                        *                                               30C10930
                        *****************************************       30C10940
                        *           SET PRINT BUFFER TO ONES    *       30C10950
                        *****************************************       30C10960
                        *                                               30C10970
09CF 0  0000    A1      DC      0                                       30C10980
09D0 01 C4000B1A        LD   L  ICNT                                    30C10990
09D2 0  D01A            STO     A1SW                                    30C11000
09D3 0  63F8            LDX  3  -8                                      30C11010
09D4 01 CC0009B6        LDD  L  ONES            SET PRINT               30C11020
09D6 00 DF000028 A110   STD  L3 40              AREA TO ALL ONES        30C11030
09D8 0  7302            MDX  3  2                                       30C11040
09D9 0  70FC            MDX     A110                                    30C11050
09DA 01 C4000B1A        LD   L  ICNT                                    30C11060
09DC 0  F010            EOR     A1SW                                    30C11070
09DD 01 4C2009E1        BSC  L  A120,Z          BR IF INT OCCURRED      30C11080
09DF 01 4C8009CF        BSC  I  A1              LEAVE                   30C11090
09E1 0  4008    A120    BSI     CLEAR           CLEAR BUFFER            30C11100
09E2 00 66008200 A130   LDX  L2 /8200                                   30C11110
09E4 0  6101            LDX  1  1                                       30C11120
09E5 01 440008D1        BSI  L  IOLE                                    30C11130
09E7 01 C4000C0A        LD   L  EMIT                                    30C11140
09E9 0  F004            EOR     A1EM                                    30C11150
09EA 0  4820            BSC     Z               SKIP IF PROPER EMIT     30C11160
09EB 0  70F6            MDX     A130            LOOP IF NOT             30C11170
09EC 0  70E3            MDX     A1+1            REPEAT LINE             30C11180
                        *                                               30C11190
09ED 0  0000    A1SW    DC      *-*             INT COUNT SW            30C11200
09EE 0  0000    A1EM    DC      *-*             EMIT SAVE               30C11210
                        *                                               30C11220
                        *****************************************       30C11230
                        *           LOCK ON FUNCTION ROUTINE    *       30C11240
                        *****************************************       30C11250
                        *                                               30C11260
09EF 0  0000    LOCK    DC      *-*                                     30C11270
09F0 01 C40005DF        LD   L  SWO             LD SWO                  30C11280
09F2 00 EC800166        OR   I  ERLCK           COMB WITH MONITOR SWO   30C11290
09F4 0  100A            SLA     10              CK LOCK ON FNC SW       30C11300
09F5 01 4C9009EF        BSC  I  LOCK,-          BR IF NOT LOCK ON FNC   30C11310
09F7 01 4C800ACB        BSC  I  LOOP            LOOP ON LAST FUNCTION   30C11320
                        *                                               30C11330
                        *****************************************       30C11340
                        *           ERROR MESSAGE SETUP         *       30C11350
                        *****************************************       30C11360
                        *                                               30C11370
09F9 0  0000    ERR1    DC      *-*             STATIC DSW ERR          30C11380
09FA 0  6101            LDX  1  1               SET MSG NO.             30C11390
09FB 0  6260            LDX  2  /0060           SET DATA CONTROL        30C11400
09FC 01 CC000A9A        LDD  L  MSG1            LD ALPHA MSG            30C11410
09FE 01 44000ABA        BSI  L  ETYPE           GO PRINT MSG            30C11420
0A00 01 4C8009F9        BSC  I  ERR1            RETURN                  30C11430
                        *                                               30C11440
0A02 0  0000    ERR2    DC      *-*             BUSY DSW ERR            30C11450
0A03 0  6102            LDX  1  2               SET MSG NO.             30C11460
0A04 00 66000180        LDX  L2 /0180           SET DATA CONTROL        30C11470
0A06 01 CC000A9C        LDD  L  MSG2            LD ALPHA MSG            30C11480
0A08 01 44000ABA        BSI  L  ETYPE           GO PRINT MSG            30C11490
0A0A 01 4C800A02        BSC  I  ERR2            RETURN                  30C11500
                        *                                               30C11510
0A0C 0  6103    ERR3    LDX  1  3               NO INTRPT               30C11520
0A0D 0  6220            LDX  2  /0020           SET DATA CONTROL        30C11530
0A0E 01 CC000A9E        LDD  L  MSG3            LD ALPHA MSG            30C11540
                        *                                               30C11550
0A10 01 74000BF8        MDX  L  EXPCT+1         CK FOR EXPCT SPACE/SKIP 30C11560
0A12 0  7003            MDX     ERR3X           BR IF SPACE/SKIP        30C11570
0A13 01 74000B1A        MDX  L  ICNT            CK FOR SOME INTRPTS     30C11580
```



```
0A15 0  7004            MDX     ERR4            BR IF SOME              30C11590
                        *                                               30C11600
0A16 01 44000ABA ERR3X  BSI  L  ETYPE           GO PRINT MSG            30C11610
0A18 01 4C800AE6        BSC  I  WAIT            RETURN                  30C11620
                        *                                               30C11630
0A1A 0  6104    ERR4    LDX  1  4               PRINTER STOPPED         30C11640
0A1B 01 CC000AA0        LDD  L  MSG4            LD ALPHA MSG            30C11650
0A1D 0  70F8            MDX     ERR3X                                   30C11660
                        *                                               30C11670
0A1E 0  0000    ERR5    DC      *-*             LEVEL 1 DSW ERR         30C11680
0A1F 0  6105            LDX  1  5               SET MSG NO.             30C11690
0A20 00 66000600        LDX  L2 /0600           SET DATA CONTROL        30C11700
0A22 0  C87F            LDD     MSG5            LD ALPHA MSG            30C11710
0A23 01 44000ABA        BSI  L  ETYPE           GO PRINT MSG            30C11720
                        *                                               30C11730
0A25 01 74FF0B1A        MDX  L  ICNT,-1         CK FOR MULT INTRPTS     30C11740
0A27 0  7001            MDX     *+1                                     30C11750
0A28 0  700A            MDX     ERR5X                                   30C11760
                        *                                               30C11770
0A29 01 C4000B1D        LD   L  EBITS           LD DSW ERROR BITS       30C11780
0A2B 01 4C280A4C        BSC  L  ERR9,+Z         BR IF PRINT RESPONSE ON 30C11790
0A2D 0  1001            SLA     1                                       30C11800
0A2E 01 4C280A56        BSC  L  ERR11,+Z        BR IF SKIP RESPONSE ON  30C11810
0A30 0  1001            SLA     1                                       30C11820
0A31 01 4C280A51        BSC  L  ERR10,+Z        BR IF SPACE RESPONSE ON 30C11830
                        *                                               30C11840
0A33 01 4C800A1E ERR5X  BSC  I  ERR5            RETURN                  30C11850
                        *                                               30C11860
0A35 0  0000    ERR6    DC      *-*             EMIT BIT FAILURE        30C11870
0A36 0  6106            LDX  1  6               SET MSG NO.             30C11880
0A37 0  6203            LDX  2  /0003           SET DATA CONTROL        30C11890
0A38 0  C868            LDD     MSG6            LD ALPHA MSG            30C11900
0A39 01 44000ABA        BSI  L  ETYPE           GO PRINT MSG            30C11910
0A3B 01 4C800A35        BSC  I  ERR6            RETURN                  30C11920
                        *                                               30C11930
0A3D 0  0000    ERR7    DC      *-*             EMIT INVALID            30C11940
0A3E 0  6107            LDX  1  7               SET MSG NO.             30C11950
0A3F 0  6208            LDX  2  /0008           SET DATA CONTROL        30C11960
0A40 0  C865            LDD     MSG7            LD ALPHA MSG            30C11970
0A41 01 44000ABA        BSI  L  ETYPE           GO PRINT MSG            30C11980
0A43 01 4C800A3D        BSC  I  ERR7            RETURN                  30C11990
                        *                                               30C12000
0A45 0  0000    ERR8    DC      *-*             EMIT SEQ ERR            30C12010
0A46 0  6108            LDX  1  8               SET MSG NO.             30C12020
0A47 0  6218            LDX  2  /0018           SET DATA CONTROL        30C12030
0A48 0  C85F            LDD     MSG8            LD ALPHA MSG            30C12040
0A49 0  4070            BSI     ETYPE           GO PRINT MSG            30C12050
0A4A 01 4C800A45        BSC  I  ERR8            RETURN                  30C12060
                        *                                               30C12070
0A4C 0  6109    ERR9    LDX  1  9               PRINTER DID NOT TURN OFF 30C12080
0A4D 0  6200            LDX  2  0               SET FOR NO DATA         30C12090
0A4E 0  C85B            LDD     MSG9            LD ALPHA MSG            30C12100
0A4F 0  406A            BSI     ETYPE           GO PRINT MSG            30C12110
0A50 0  70E2            MDX     ERR5X                                   30C12120
                        *                                               30C12130
0A51 0  6110    ERR10   LDX  1  /10             MULT SPACE INTRPTS      30C12140
0A52 0  6200            LDX  2  0               SET FOR NO DATA         30C12150
0A53 0  C858            LDD     MSG10           LD ALPHA MSG            30C12160
0A54 0  4065            BSI     ETYPE           GO PRINT MSG            30C12170
0A55 0  70DD            MDX     ERR5X                                   30C12180
                        *                                               30C12190
0A56 0  6111    ERR11   LDX  1  /11             MULT SKIP INTRPTS       30C12200
0A57 0  6200            LDX  2  0               SET FOR NO DATA         30C12210
0A58 0  C855            LDD     MSG11           LD ALPHA MSG            30C12220
0A59 0  4060            BSI     ETYPE           GO PRINT MSG            30C12230
0A5A 0  70D8            MDX     ERR5X                                   30C12240
                        *                                               30C12250
0A5B 0  0000    ERR12   DC      *-*             MISSING CHANNEL         30C12260
```

```
0A5C 01 C5000A64          LD    L1 CHNUM-1    LD CHANNEL NO.              30C12270
0A5E 0  D078              STO     CHANL       SET IN MSG                  30C12280
0A5F 0  6112              LDX   1 /12         SET MSG NO.                 30C12290
0A60 0  6204              LDX   2 /0004       SET DATA CONTROL            30C12300
0A61 0  C84E              LDD     MSG12       LD ALPHA MSG                30C12310
0A62 0  4057              BSI     ETYPE       GO PRINT MSG                30C12320
0A63 01 4C800A5B          BSC   I ERR12       RETURN                      30C12330
                        *                                                 30C12340
0A65 0  0001            CHNUM DC      1                                   30C12350
0A66 0  0002                  DC      2                                   30C12360
0A67 0  0003                  DC      3                                   30C12370
0A68 0  0004                  DC      4                                   30C12380
0A69 0  0005                  DC      5                                   30C12390
0A6A 0  0006                  DC      6                                   30C12400
0A6B 0  0009                  DC      9                                   30C12410
0A6C 0  000C                  DC      12                                  30C12420
                        *                                                 30C12430
0A6D 0  0000            ERR13 DC      *-*         CHANNEL SEQ ERR         30C12440
0A6E 0  6113                  LDX   1 /13         SET MSG NO.             30C12450
0A6F 0  6200                  LDX   2 0           SET DATA CONTROL        30C12460
0A70 0  C841                  LDD     MSG13       LD ALPHA MSG            30C12470
0A71 0  4048                  BSI     ETYPE       GO PRINT MSG            30C12480
0A72 01 C4000986              LD    L ONES                                30C12490
0A74 01 4C800A6D              BSC   I ERR13       RETURN                  30C12500
                        *                                                 30C12510
0A76 0  6114            ERR14 LDX   1 /14         MULT CHANNEL BITS       30C12520
0A77 0  6220                  LDX   2 /0020                               30C12530
0A78 01 C40007C9              LD    L TEMP8+1     LD INVALID CHANNEL CODE 30C12540
0A7A 0  1808                  SRA     8                                   30C12550
0A7B 0  D061                  STO     DSWW                                30C12560
0A7C 0  C837                  LDD     MSG14       LD ALPHA MSG            30C12570
0A7D 0  403C                  BSI     ETYPE       GO PRINT MSG            30C12580
0A7E 01 4C0007EB              BSC   L CHN2        RETURN                  30C12590
                        *                                                 30C12600
0A80 0  0000            ERR15 DC      *-*         CHANNEL SENSE ERR       30C12610
0A81 00 66000801              LDX   L2 /0801      SET DATA CONTROL        30C12620
0A83 01 C4000BEE              LD    L WAS         LD INTRPT DSW           30C12630
0A85 0  E05F                  AND     KOOFF       MASK ALL BUT CHAN BITS  30C12640
0A86 0  D051                  STO     ERM4        STO IN MSG              30C12650
0A87 0  C82E                  LDD     MSG15       LD ALPHA MSG            30C12660
0A88 0  4031                  BSI     ETYPE       GO PRINT MSG            30C12670
0A89 01 4C800A80              BSC   I ERR15       RETURN                  30C12680
0A8B 0  0000            ERR16 DC      *-*                                 30C12690
0A8C 00 66001800              LDX   L2 /1800                              30C12700
0A8E 0  C827                  LDD     MSG15                               30C12710
0A8F 0  402A                  BSI     ETYPE                               30C12720
0A90 01 4C800A8B              BSC   I ERR16                               30C12730
                        *                                                 30C12740
0A92 0  0000            ERR17 DC      *-*                                 30C12750
0A93 0  6117                  LDX   1 /17                                 30C12760
0A94 0  6220                  LDX   2 /0020                               30C12770
0A95 0  C822                  LDD     MSG17                               30C12780
0A96 0  4023                  BSI     ETYPE                               30C12790
0A97 01 4C800A92              BSC   I ERR17                               30C12800
                        *                                                 30C12810
0A9A    0000                  BSS   E 0                                   30C12820
0A9A 1  0CEB            MSG1  DC      AWAS        WAS S/B                 30C12830
0A9B 1  0CF1                  DC      ASDSW       STATIC DSW              30C12840
0A9C 1  0CEB            MSG2  DC      AWAS        WAS S/B                 30C12850
0A9D 1  0CFA                  DC      ABDSW       BUSY DSW ERR            30C12860
0A9E 1  0D0A            MSG3  DC      ADSW        DSW                     30C12870
0A9F 1  0D0D                  DC      ANINT       NO INTRPT               30C12880
0AA0 1  0D14            MSG4  DC      ADPR        DSW PRINTER             30C12890
0AA1 1  0D18                  DC      ASTPD       STOPPED                 30C12900
0AA2 1  0CEB            MSG5  DC      AWAS        WAS S/B                 30C12910
0AA3 1  0D02                  DC      ADSW1       LEV1 DSW ERR            30C12920
0AA4 1  0D29            MSG6  DC      AEBF        EMIT BIT FAILURE        30C12930
0AA5 0  0000                  DC      /0000                               30C12940
```



```
0AA6 1  0D38            MSG7  DC      AEMT        EMIT INVALD             30C12950
0AA7 0  0000                  DC      /0000                               30C12960
0AA8 1  0CEB            MSG8  DC      AWAS        WAS S/B                 30C12970
0AA9 1  0D3F                  DC      AESER       EMIT SEQ ERR            30C12980
0AAA 1  0D17            MSG9  DC      APRTR       PRINTER                 30C12990
0AAB 1  0D20                  DC      ADNTO       DID NOT TURN OFF        30C13000
0AAC 1  0D51            MSG10 DC      AMSP        MULT SPACE              30C13010
0AAD 1  0D10                  DC      AINT        INTRPT                  30C13020
0AAE 1  0D58            MSG11 DC      AMSK        MULT SKIP               30C13030
0AAF 1  0D10                  DC      AINT        INTRPT                  30C13040
0AB0 1  0D48            MSG12 DC      AMC         MISSING CHANNEL         30C13050
0AB1 0  0000                  DC      /0000                               30C13060
0AB2 1  0D4C            MSG13 DC      ACHAN       CHANNEL                 30C13070
0AB3 1  0D43                  DC      ASER        SEQ ERR                 30C13080
0AB4 1  0D71            MSG14 DC      AINVC       INVALD CHANNEL CODE     30C13090
0AB5 0  0000                  DC      /0000                               30C13100
0AB6 1  0D4C            MSG15 DC      ACHAN       CHANNEL                 30C13110
0AB7 1  0D6B                  DC      ASNER       SENSE ERR               30C13120
0AB8 1  0D0A            MSG17 DC      ADSW                                30C13130
0AB9 1  0DA6                  DC      ACBSY                               30C13140
                        *                                                 30C13150
                        *****************************************       30C13160
                        *          PRINT ERROR MESSAGES         *       30C13170
                        *****************************************       30C13180
                        *                                                 30C13190
0ABA 0  0000            ETYPE DC      *-*                                 30C13200
0ABB 0  6917                  STX   1 TABLE       SET ID IN MESSAGE TABLE 30C13210
0ABC 0  6A18                  STX   2 TABLE+2     STO DATA WORD CNTRL     30C13220
0ABD 0  D818                  STD     ALPHA                               30C13230
0ABE 01 4400093A              BSI   L STOP        STOP THE PRINTER        30C13240
                        *                                                 30C13250
0AC0 01 74000AC6              MDX   L OPMSW                               30C13260
0AC2 0  7005                  MDX     ETYP1                               30C13270
0AC3 00 44800162              BSI   I ERROR       PRINT LAST OP           30C13280
0AC5 1  0ACC                  DC      ETYP2                               30C13290
0AC6 0  0000            OPMSW DC      *-*         MUST BE ZERO FOR OP MSG 30C13300
0AC7 0  68FE                  STX     OPMSW                               30C13310
                        *                                                 30C13320
0AC8 00 44800162        ETYP1 BSI   I ERROR                               30C13330
0ACA 1  0AD3                  DC      TABLE                               30C13340
0ACB 0  0000            LOOP  DC      0           LOOP ON ERROR           30C13350
                        *                                                 30C13360
0ACC 01 4C800ABA        ETYP2 BSC   I ETYPE       RETURN                  30C13370
0ACE 0  8000                  DC      /8000                               30C13380
0ACF 1  0D7F                  DC      ALOP                                30C13390
0AD0 0  0000            OPSW  DC      *-*                                 30C13400
                        *                                                 30C13410
                        *-------------------------------------------      30C13420
                        *  ERROR MESSAGE TABLE                            30C13430
                        *-------------------------------------------      30C13440
                        *                                                 30C13450
0AD2    0001                  BSS   E 1                                   30C13460
0AD3 0  0000            TABLE DC      *-*         MESSAGE NUMBER          30C13470
0AD4 0  0004                  DC      /0004       HEX/DECIMAL SW          30C13480
0AD5 0  0000                  DC      *-*         DATA WORD ID            30C13490
0AD6 0  0000            ALPHA DC      *-*         1ST ALPHA MESSAGE ADDRESS 30C13500
0AD7 0  0000            ERM3  DC      *-*         2ND ALPHA MESSAGE ADDRESS 30C13510
                        *                                                 30C13520
0AD8 0  0000            ERM4  DC      *-*         MODIFIERS               30C13530
0AD9 0  0000                  DC      *-*                                 30C13540
0ADA 0  0000            CHANL DC      *-*         STORE ERR CHANNEL       30C13550
0ADB 0  0000            EMTWS DC      *-*         STORE EMIT WAS          30C13560
0ADC 0  0000            EMTSB DC      *-*         STORE EMIT S/B          30C13570
0ADD 0  0000            DSWW  DC      *-*         STORE DSW WAS           30C13580
0ADE 0  0000            DSWSB DC      /0000       STORE DSW S/B           30C13590
0ADF 0  0000            BDSW  DC      *-*         BUSY DSW WAS            30C13600
0AE0 0  0000                  DC      *-*         BUSY DSW S/B            30C13610
0AE1 0  0000            IDSW  DC      *-*         INTRPT DSW WAS          30C13620
```

```
0AE2 0  0000          DC      *-*         INTRPT DSW S/B              30C13630
0AE3 0  0000    CHWAS DC      *-*         CHANNEL DSW WAS             30C13640
0AE4 0  0000          DC      *-*                                     30C13650
0AE5 0  00FF    K00FF DC      /00FF                                   30C13660
                *                                                     30C13670
                *****************************************           30C13680
                *          INTERRUPT WAIT ROUTINE           *       30C13690
                *****************************************           30C13700
                *                                                     30C13710
0AE6 0  0000    WAIT  DC      *-*                                     30C13720
0AE7 0  E834          OR      TBDSW       BUILD BUSY DSW S/B          30C13730
0AE8 0  D0F7          STO     BDSW+1      SET IN S/B                  30C13740
0AE9 01 C4000C03      LD   L  SPCSX       SET SPACE COUNT             30C13750
0AEB 01 D4000C02      STO  L  SPCSW                                   30C13760
0AED 0  082C          XIO     SENSE-1     SENSE BUSY DSW              30C13770
0AEE 01 E4000C00      AND  L  K7F00                                   30C13780
0AF0 0  D0EE          STO     BDSW        SAVE BUSY DSW               30C13790
                *                                                     30C13800
0AF1 0  1010          SLA     16                                      30C13810
0AF2 0  D0D3          STO     OPNSW                                   30C13820
0AF3 0  D026          STO     ICNT        RESET ICNT                  30C13830
0AF4 0  D028          STO     EBITS       RESET EBITS                 30C13840
0AF5 01 D4000C07      STO  L  CKESW       RESET CKESW                 30C13850
0AF7 01 D4000C03      STO  L  SPCSX                                   30C13860
                *                                                     30C13870
0AF9 00 65001000      LDX  L1 /1000       SET INTERRUPT               30C13880
0AFB 0  6922          STX   1 WCNT         WAIT CNT                   30C13890
                *                                                     30C13900
0AFC 01 65000B05    WAIT1 LDX  L1 WAIT3                               30C13910
0AFE 01 740005E6      MDX  L  MLSCF+1     CK FOR INTERRUPT            30C13920
0B00 0  700F          MDX     WAIT4       BR IF INTERRUPT OCCURED     30C13930
                *                                                     30C13940
0B01 01 6D0005E5    WAIT2 STX  L1 MLSCF     SET RETURN ADDRESS        30C13950
0B03 00 44800161      BSI  I  START       GO TO MONITOR               30C13960
                *                                                     30C13970
0B05 01 74FF0B1E    WAIT3 MDX  L  WCNT,-1   DECREMENT WAIT CNT          30C13980
0B07 0  70F4          MDX     WAIT1                                   30C13990
                *                                                     30C14000
0B08 0  0811          XIO     SENSE-1     SENSE NO INTRPT DSW         30C14010
0B09 0  D0D3          STO     DSWW        SET IN MSG                  30C14020
0B0A 0  C005          LD      BDSW+1      LD BUSY DSW S/B             30C14030
0B0B 0  F0D3          EOR     BDSW        COMPARE WITH BUSY DSW       30C14040
0B0C 01 44200A02      BSI  L  ERR2,Z      BR IF BUSY DSW ERR          30C14050
                *                                                     30C14060
0B0E 01 4C000A0C      BSC  L  ERR3        GO PRINT NO INTRPT MSG      30C14070
                *                                                     30C14080
0B10 01 C40005E0    WAIT4 LD   L  SW1                                 30C14090
0B12 00 44880161      BSI  I  START,+     CK FOR RTN SELECT           30C14100
0B14 01 940005DD      S    L  RID         CK FOR NEW ROUTINE          30C14110
0B16 00 44980161      BSI  I  START,+-    BR IF NOT NEW RTN           30C14120
0B18 01 44000600      BSI  L  CNTRL                                   30C14130
                *                                                     30C14140
0B1A    0000          BSS  E                                          30C14150
0B1A 0  0000    ICNT  DC      *-*                                     30C14160
0B1B 0  3700    SENSE DC      /3700       SENSE WITHOUT RESET         30C14170
0B1C 0  0000    TBDSW DC      *-*                                     30C14180
0B1D 0  0000    EBITS DC      *-*         INT DSW ER BITS             30C14190
0B1E 0  0000    WCNT  DC      *-*                                     30C14200
                *                                                     30C14210
                *-------------------------------------------          30C14220
                *  ENTER HERE AFTER INTERRUPT                         30C14230
                *-------------------------------------------          30C14240
                *                                                     30C14250
0B1F 0  C0C0    RTRN  LD      BDSW+1      LD BUSY DSW S/B             30C14260
0B20 0  F0BE          EOR     BDSW        COMPARE WITH BUSY DSW       30C14270
0B21 01 44200A02      BSI  L  ERR2,Z      BR IF BUSY DSW ERR          30C14280
                *                                                     30C14290
0B23 0  C0F9          LD      EBITS       CK FOR INTRPT DSW ER        30C14300
```



```
0B24 01 44200A1E      BSI  L  ERR5,Z                                 30C14310
                *                                                     30C14320
0B26 01 C4000C07      LD   L  CKESW                                   30C14330
0B28 0  D001          STO     *+1                                     30C14340
0B29 00 44200000      BSI  L  *-*,Z       BR IF EMIT ERR              30C14350
                *                                                     30C14360
0B2B 0  08EE          XIO     SENSE-1                                 30C14370
0B2C 0  E088          AND     KOOFF       MASK ALL BUT CHAN BITS      30C14380
0B2D 0  D0B5          STO     CHWAS       STO IN ERR MSG              30C14390
0B2E 01 F4000BEE      EOR  L  WAS         COMPARE WITH INTRPT DSW      30C14400
0B30 0  1002          SLA     2                                       30C14410
0B31 01 4C100B37      BSC  L  RTRN1,-     BR UNLESS AFTER SPACE       30C14420
                *                                                     30C14430
0B33 0  1006          SLA     6           LOOK AT CHANNEL BITS        30C14440
0B34 0  6115          LDX   1 /15         LD MSG NUMBER               30C14450
0B35 01 44200A80      BSI  L  ERR15,Z     BR IF NOT EQUAL             30C14460
                *                                                     30C14470
0B37 01 4C800AE6    RTRN1 BSC  I  WAIT                                30C14480
                *                                                     30C14490
                *****************************************           30C14500
                *          CHECK READY                      *       30C14510
                *****************************************           30C14520
                * THIS SUBROUTINE CHECKS THE DSW FOR                  30C14530
                * READY CONDITIONS                                    30C14540
                *-------------------------------------------          30C14550
                *                                                     30C14560
0B39 0  0000    READY DC      *-*                                     30C14570
0B3A 0  61FD          LDX   1 -3                                      30C14580
0B3B 0  692D          STX   1 DLYCT                                   30C14590
0B3C 0  08DD    RDY1  XIO     SENSE-1     SENSE DSW                   30C14600
0B3D 01 E4000BFF      AND  L  KFF00       CK BITS 0-7                 30C14610
0B3F 0  D09D          STO     DSWW        STORE DSW IN MSG TABLE      30C14620
0B40 01 4C980B39      BSC  I  READY,+-    READY IF BRANCH             30C14630
0B42 0  E025          AND     RDYMK       MSK NRDY BIT                30C14640
0B43 01 74030869      MDX  L  DLYCT,3                                 30C14650
0B45 0  7007          MDX     RDY2                                    30C14660
                *                                                     30C14670
0B46 01 442009F9      BSI  L  ERR1,Z      TYPE ERROR MESSAGE          30C14680
                *                                                     30C14690
0B48 00 44800163      BSI  I  LOG         TYPE                        30C14700
0B4A 1  0B6A          DC      STM         MESSAGE                     30C14710
                *                                                     30C14720
0B4B 0  1810          SRA     16          SET TO DELAY FOR            30C14730
0B4C 0  D01C          STO     DLYCT        TEN SECONDS                30C14740
0B4D 01 65000B3C    RDY2  LDX  L1 RDY1                                30C14750
0B4F 01 6D0005E6      STX  L1 MLSCF+1                                 30C14760
0B51 01 4C000B10      BSC  L  WAIT4       CK ROUTINE SELECT SWS       30C14770
                *                                                     30C14780
                *****************************************           30C14790
                *          FORM CHECK                       *       30C14800
                *****************************************           30C14810
                *     THIS  SUBROUTINE CHECKS FOR A FORM CHECK        30C14820
                *     AFTER A SPACE OR SKIP COMMAND                   30C14830
                *-------------------------------------------          30C14840
                *                                                     30C14850
0B53 0  0000    FORMS DC      *-*                                     30C14860
0B54 0  61FD          LDX   1 -3                                      30C14870
0B55 0  6913          STX   1 DLYCT                                   30C14880
0B56 0  08C3    FORM1 XIO     SENSE-1                                 30C14890
0B57 0  1005          SLA     5                                       30C14900
0B58 01 4C900B53      BSC  I  FORMS,-     BR IF NO FORMS CK           30C14910
                *                                                     30C14920
0B5A 01 74030869      MDX  L  DLYCT,3                                 30C14930
0B5C 0  7005          MDX     FORM2                                   30C14940
0B5D 00 44800163      BSI  I  LOG         TYPE                        30C14950
0B5F 1  0B6A          DC      STM         MESSAGE                     30C14960
                *                                                     30C14970
0B60 0  1810          SRA     16          SET TO DELAY FOR            30C14980
```

```
0861 0  D007          STO     DLYCT       TEN SECONDS                30C14990
                      *                                              30C15000
                      *                                              30C15010
0862 01 65000B56      FORM2 LDX   L1 FORM1                           30C15020
0864 01 6D0005E6            STX   L1 MLSCF+1                         30C15030
0866 01 4C000810            BSC   L  WAIT4      CK ROUTINE SELECT SWS  30C15040
                      *                                              30C15050
0868 0  FB00          RDYMK DC      /FB00                            30C15060
0869 0  0000          DLYCT DC      0             DELAY COUNTER      30C15070
                      *                                              30C15080
086A 0  0001          STM   DC      1             MESSAGE NUMBER     30C15090
086B 0  0000                DC      /0000         HEX/DECIMAL SW     30C15100
086C 0  0001                DC      /0001         DATA WORD ID       30C15110
086D 1  0D85                DC      ANRDY                            30C15120
086E 0  0000                DC      0                                30C15130
086F 0  1132                DC      /1132         MACHINE TYPE       30C15140
                      *                                              30C15150
                      *                                              30C15160
                      ********************************************** 30C15170
                      *           INTERRUPT ROUTINE                * 30C15180
                      ********************************************** 30C15190
                      *                                              30C15200
0870 0  0000          PIRT  DC      *-*                              30C15210
0871 01 6E000C3D            STX   L2 IOUT2+1    SAVE XR2             30C15220
0873 0  1810                SRA     16                               30C15230
0874 01 D40008FC            STO   L  EXPCT+2                         30C15240
0876 00 670005DC            LDX   L3 1500       RESET INTERRUPT      30C15250
0878 0  6BA5                STX     3 WCNT        WAIT COUNTER         30C15260
0879 01 74010B1A            MDX   L  ICNT,1     CNT INTERRUPTS       30C15270
087B 0  1000                NOP                                      30C15280
                      *                                              30C15290
087C 01 0C000BEE            XIO   L  SRSET-1    SENSE AND RESET DSW  30C15300
087E 0  D06F                STO      WAS        SAVE DSW             30C15310
087F 01 D4000C04            STO   L  RTRNS                           30C15320
0881 01 4C100C0B            BSC   L  SKINT,-    BR IF NOT PRINT RESP 30C15330
                      *                                              30C15340
                      *--------------------------------------------- 30C15350
                      *           READ EMIT INTERRUPT               * 30C15360
                      *--------------------------------------------- 30C15370
                      *                                              30C15380
0883 0  086E          PINT  XIO     RDEMT       READ EMIT            30C15390
0884 0  C075                LD      EXPCT                            30C15400
0885 0  D076                STO     EXPCT+2     BUILD EXPECTED DSW   30C15410
0886 01 44000C4D            BSI   L CKEMT       CK EMIT SEQUENCE     30C15420
                      *                                              30C15430
0888 0  C067                LD      SCNCT       CHECK FOR PRINT      30C15440
0889 01 4C3008BC            BSC   L PI3,Z-      BR IF PRINT          30C15450
                      *                                              30C15460
088B 0  C071                LD      IDLCT       CK FOR IDLE          30C15470
088C 01 4C2008B6            BSC   L PI1,Z       BR IF IDLE           30C15480
                      *                                              30C15490
088E 01 74FF0C05            MDX   L STPCT,-1                         30C15500
0890 0  707A                MDX     SKINT                            30C15510
                      *                                              30C15520
                      *--------------------------------------------- 30C15530
                      *           STOP PRINTER                      * 30C15540
                      *--------------------------------------------- 30C15550
                      *                                              30C15560
0891 0  D068                STO     EXPCT                            30C15570
0892 0  D089                STO     TBDSW                            30C15580
0893 0  D060                STO     EMTSW       RESET 1ST EMIT SW    30C15590
0894 0  0857                XIO     STPPT-1     STOP PRINTER         30C15600
0895 0  7075                MDX     SKINT                            30C15610
                      *                                              30C15620
0896 01 74FF08FD      PI1   MDX   L IDLCT,-1    DEC IDLE CNT         30C15630
0898 0  7072                MDX     SKINT                            30C15640
                      *                                              30C15650
                      *--------------------------------------------- 30C15660
```



```
                      *           IDLE CNT=0, SET TO RETURN         * 30C15670
                      *--------------------------------------------- 30C15680
                      *                                              30C15690
0B99 0  1810                SRA     16                               30C15700
0B9A 0  6310                LDX     3 16          SET FOR 16 EMITS   30C15710
0B9B 01 74000C02            MDX   L SPCSW,0     CK SPACE-PRINT ON SW 30C15720
0B9D 0  7003                MDX     PI2                              30C15730
                      *                                              30C15740
0B9E 0  D065                STO     RTRNS       SET TO RETURN TO MAINLN 30C15750
0B9F 0  6B65                STX     3 STPCT      THEN TURN PRINT OFF 30C15760
0BA0 0  706A                MDX     SKINT                            30C15770
                      *                                              30C15780
                      *--------------------------------------------- 30C15790
                      *           SPACE WITH PRINTER ON             * 30C15800
                      *--------------------------------------------- 30C15810
                      *                                              30C15820
0BA1 01 74FF0C02      PI2   MDX   L SPCSW,-1    DEC SPACE COUNT      30C15830
0BA3 0  1000                NOP                                      30C15840
0BA4 0  6B60                STX     3 STPCT                          30C15850
0BA5 0  C063                LD      K1200                            30C15860
0BA6 01 EC000B1C            OR    L TBDSW       BIULD BUSY DSW       30C15870
0BA8 01 D4000AE0            STO   L BDSW+1                           30C15880
0BAA 00 67002200            LDX   L3 /2200      SET EXPECTED SPACE   30C15890
0BAC 0  6B4E                STX     3 EXPCT+1    RESPONSE DSW        30C15900
0BAD 00 67009200            LDX   L3 /9200      SET EXPECTED EMIT    30C15910
0BAF 0  6B4A                STX     3 EXPCT      RESPONSE DSW         30C15920
0BB0 01 66000D62            LDX   L2 ASPIN                           30C15930
0BB2 01 6E000AD0            STX   L2 OPSW       SET LAST OP SW       30C15940
                      *                                              30C15950
0BB4 0  083F                XIO     STSPA-1     SPACE                30C15960
                      *                                              30C15970
0BB5 01 0C000B1A            XIO   L SENSE-1     SENSE BUSY DSW       30C15980
0BB7 0  E048                AND     K7F00       MASK EMIT RESPONSE AND 30C15990
                      *                          CHANNEL BITS        30C16000
0BB8 01 D4000ADF            STO   L BDSW        SAVE BUSY DSW        30C16010
0BBA 01 4C000C3C            BSC   L IOUT2                            30C16020
                      *                                              30C16030
0BBC 01 74FF0BF0      PI3   MDX   L SCNCT,-1    DEC SCAN CNT         30C16040
0BBE 0  7006                MDX     PI4         GO SET UP PRINT BUFFER 30C16050
                      *                                              30C16060
                      *--------------------------------------------- 30C16070
                      *           END OF PRINT                      * 30C16080
                      *--------------------------------------------- 30C16090
                      *                                              30C16100
0BBF 01 440009BA            BSI   L CLEAR       SET BUFFER TO ZERO   30C16110
0BC1 00 67008200            LDX   L3 /8200      SET EXPCT FOR        30C16120
0BC3 0  6B36                STX     3 EXPCT       NORMAL PRINT DSW   30C16130
0BC4 0  7046                MDX     SKINT                            30C16140
                      *                                              30C16150
                      *--------------------------------------------- 30C16160
                      *           SET UP PRINT BUFFER               * 30C16170
                      *--------------------------------------------- 30C16180
                      *                                              30C16190
0BC5 0  10A0          PI4   SLT       32                             30C16200
0BC6 01 C4000B88            LD    L MSGSW       CK MSG SW            30C16210
0BC8 01 4C200C9F            BSC   L MSCAN,Z     IF SW ON- GO SET UP MSG 30C16220
0BCA 01 678005E1            LDX   I3 SW2                             30C16230
0BCC 0  1847                SRA     71                               30C16240
0BCD 0  73FF                MDX     3 -1                             30C16250
0BCE 0  70FD                MDX     *-3                              30C16260
0BCF 00 67000000      PI5   LDX   L3 *-*          INITIALIZED TO -16   30C16270
0BD1 00 66000000      PI6   LDX   L2 *-*          INITIALIZED TO -8    30C16280
0BD3 0  C228                LD      2 40        LD WORD TO SHIFT     30C16290
0BD4 0  18C1                RTE     1           SHIFT BIT            30C16300
0BD5 0  D228                STO     2 40                             30C16310
0BD6 0  7301                MDX     3 1         DECREMENT WORD CNT   30C16320
0BD7 0  7007                MDX     PI7                              30C16330
0BD8 0  7201                MDX     2 1         ADV TO NEXT WORD     30C16340
```

1132 PRINTER FUNCTION TEST

```
08D9 0  7001            MDX     *+1
08DA 0  70E4            MDX     PI3+3       FINISHED- STOP PRINT
                *
08DB 0  63F0            LDX   3 -16         RESET SHIFT CNT
08DC 0  1090            SLT     16
08DD 00 D6000028        STO   L2 40         SET NEXT WORD
                *
08DF 0  C021    PI7     LD      K0001
08E0 00 EC000027        OR    L 39          RESTORE SCAN COMP BIT
08E2 00 D4000027        STO   L 39
08E4 0  6BE8            STX   3 PI5+1       SAVE XR1
08E5 0  6AEC            STX   2 PI6+1       SAVE XR2
08E6 01 74010BEC        MDX   L BLANK,1     WHEN ZERO- PUT BLANK
08E8 0  7022            MDX     SKINT        IN PATTERN
                *
08E9 0  63CF            LDX   3 -49         PUT BLANK
08EA 0  6801            STX   3 BLANK         IN PATTERN
08EB 0  7009            MDX     PI4
                *
                *-------------------------------------
                * CONSTANTS AND STORAGE
                *-------------------------------------
                *
08EC    0000            BSS   E
08EC 0  0000    BLANK   DC      *-*         PATTERN BLANK CNT
08ED 0  3440    STPPT   DC      /3440       STOP PRINTER
08EE 0  0000    WAS     DC      *-*         INTERRUPT DSW
08EF 0  3701    SRSET   DC      /3701       SENSE AND RESET DSW
08F0 0  0000    SCNCT   DC      *-*         SCAN COUNT
08F1 0  3402    STPCA   DC      /3402       STOP CARRIAGE
08F2 1  0C0A    RDEMT   DC      EMIT        READ COUNTER
08F3 0  3200            DC      /3200       SCANNED
08F4 0  0000    EMTSW   DC      *-*         FIRST EMIT SW
08F5 0  3401    STSPA   DC      /3401       START SPACE
08F6 0  0000    ANDEM   DC      *-*
08F7 0  0000    OREM    DC      *-*
08F8 0  BF00    ANDOR   DC      /BF00       EMIT CK CONSTANT
08F9 0  0000            DC      /0000
08FA 0  0000    EXPCT   DC      *-*         EXPECTED INTRPT DSW
08FB 0  0000            DC      *-*
08FC 0  0000            DC      *-*
08FD 0  0000    IDLCT   DC      *-*         IDLE COUNT
08FE 0  EF00    KEF00   DC      /EF00
08FF 0  FF00    KFF00   DC      /FF00
0C00 0  7F00    K7F00   DC      /7F00
0C01 0  0001    K0001   DC      /0001
0C02 0  0000    SPCSW   DC      *-*         SPACE WITH PRINT ON SW
0C03 0  0000    SPCSX   DC      *-*
0C04 0  0000    RTRNS   DC      *-*
0C05 0  0000    STPCT   DC      *-*         STOP PRINTER COUNT
0C06 0  0000    CHARC   DC      *-*         TEMPORARY STORAGE
0C07 0  0000    CKESW   DC      *-*         ERROR SWITCH
0C08 0  0000    EMTCT   DC      *-*         EMIT COUNTER
0C09 0  1200    K1200   DC      /1200
0C0A 0  0000    EMIT    DC      *-*
                *
                *-------------------------------------
                *           SKIP INTERRUPT
                *-------------------------------------
                *
0C0B 0  C0E2    SKINT   LD      WAS         LD DSW
0C0C 0  1001            SLA     1
0C0D 01 4C100C23        BSC   L SPINT,-     BR IF NOT SKIP
                *
0C0F 0  C0EB            LD      EXPCT+1     LD EXPCT SKIP DSW
0C10 0  E8EB            OR      EXPCT+2     BUILD EXPECTED DSW
0C11 0  D0EA            STO     EXPCT+2
0C12 01 74000938        MDX   L SKPTO       CK SKIP TO
```


1132 PRINTER FUNCTION TEST

```
0C14 0  7001            MDX     SKIN1
0C15 0  7003            MDX     SKIN2
                *
0C16 01 74FF0939SKIN1   MDX   L SKCNT,-1    STOP CARRIAGE AFTER 16
0C18 0  7003            MDX     SKIN3        SKIP INTRPTS WITHOUT
                *                            A MATCH
0C19 01 0C0008F0SKIN2   XIO   L STPCA-1     STOP CARRIAGE
0C1B 0  7016            MDX     SPIN2
                *
0C1C 0  C0D1    SKIN3   LD      WAS
0C1D 0  1008            SLA     8           COMPARE PRESENT CHANNEL
0C1E 01 F4000938        EOR   L SKPTO        WITH DESIRED
0C20 01 4C200C3C        BSC   L IOUT2,Z     BR IF NOT EQUAL
0C22 0  70F6            MDX     SKIN2
                *
                *-------------------------------------
                *           SPACE INTERRUPT
                *-------------------------------------
                *
0C23 0  C0CA    SPINT   LD      WAS
0C24 0  1002            SLA     2
0C25 01 4C100C35        BSC   L IOUT,-      BR IF NOT SPACE
0C27 0  6310            LDX   3 16          SET TO HOLD PRNTR ON
0C28 0  C0D2            LD      EXPCT+1     LD EXPCT SPACE DSW
0C29 0  E8D2            OR      EXPCT+2     BUILD EXPECTED DSW
0C2A 0  E0D3            AND     KEF00
0C2B 0  D0D0            STO     EXPCT+2
0C2C 0  C0D5            LD      SPCSW       CK SPACE-PRINT ON SW
0C2D 01 4C2008A1        BSC   L PI2,Z       BR IF ON
                *
0C2F 0  C0CE    SPIN1   LD      KEF00
0C30 0  E0C9            AND     EXPCT       REMOVE CARRIAGE BUSY
0C31 0  D0C8            STO     EXPCT
0C32 0  1810    SPIN2   SRA     16
0C33 0  D0C7            STO     EXPCT+1     RESET SKIP/SPACE EXPCT
0C34 0  7003            MDX     IOUT1
                *
                *-------------------------------------
                *           RETURN FROM INTERRUPT
                *-------------------------------------
                *
0C35 0  C0CE    IOUT    LD      RTRNS
0C36 01 4C280C3C        BSC   L IOUT2,Z+    GO RTRN IF NOT PRINT
                *
0C38 01 6700081F IOUT1  LDX   L3 RTRN
0C3A 01 6F0005E6        STX   L3 MLSCF+1    SET MLSCF
                *
0C3C 00 66000000IOUT2   LDX   L2 *-*        RESTORE XR2
0C3E 01 7400091D        MDX   L EBITS       SKIP IF NO DSW ER
0C40 0  700A            MDX     IOUT3
                *
0C41 0  C0AC            LD      WAS         LD DSW
0C42 01 D4000AE1        STO   L IDSW        STO DSW WAS
0C44 0  F0B7            EOR     EXPCT+2     COMPARE WITH EXPECTED DSW
0C45 0  E0B8            AND     KEF00
0C46 01 D4000B1D        STO   L EBITS       SAVE ER BITS
0C48 0  F0A5            EOR     WAS         BUILD DSW S/B
0C49 01 D4000AE2        STO   L IDSW+1      STO DSW S/B
0C4B 01 4C800B70IOUT3   BSC   I PIRT
                *
                ***************************************
                *           CHECK EMIT
                ***************************************
                * THIS SUBROUTINE FINDS THE FIRST CHARACTER
                * EMITTED IN THE TABLE
                *-------------------------------------
                *
0C4D 0  0000    CKEMT   DC      *-*
```

```
0C4E 0  C0B8            LD     CKESW                                 30C17710
0C4F 01 4CA00C4D        BSC  I CKEMT,Z                               30C17720
0C51 0  C0B8            LD     EMIT                                  30C17730
0C52 01 D4000ADB        STO  L EMTWS     STO EMIT WAS                 30C17740
                        *                                            30C17750
0C54 01 74000BF4        MDX  L EMTSW     CK FOR FIRST EMIT            30C17760
0C56 0  7038            MDX    CKEM6     BR IF NOT FIRST              30C17770
                        *                                            30C17780
0C57 0  C0B2            LD     EMIT                                  30C17790
0C58 0  E89E            OR     OREM      CK FOR MISSING EMIT BITS     30C17800
0C59 0  D09D            STO    OREM      FF00 IF OK                   30C17810
0C5A 0  C0AF            LD     EMIT                                  30C17820
0C5B 0  E09A            AND    ANDEM     CK FOR SHORTED EMIT BITS     30C17830
0C5C 0  D099            STO    ANDEM     0000 IF OK                   30C17840
0C5D 0  F09B            EOR    OREM      CK FOR EMIT BITS OK          30C17850
0C5E 0  F0A0            EOR    KFF00                                  30C17860
0C5F 01 4C200C75        BSC  L CKEM5,Z   CONT IF ALL EMIT BITS OK     30C17870
                        *                                            30C17880
0C61 0  63D0            LDX    3 -48     FIND FIRST CHARACTER         30C17890
0C62 01 C7000CEA  CKEM1 LD   L3 CHAR+48    EMITTED IN                 30C17900
0C64 0  90A5            S      EMIT       SEQUENCE TABLE             30C17910
0C65 01 4C180C6D        BSC  L CKEM2,+-   FOUND IF BR                 30C17920
0C67 0  7301            MDX    3 1       GO TO NEXT TABLE ENTRY       30C17930
0C68 0  70F9            MDX    CKEM1                                  30C17940
0C69 01 67000A3D        LDX  L3 ERR7                                   30C17950
0C6B 0  6B9B            STX    3 CKESW                                 30C17960
0C6C 0  7006            MDX    CKEM4                                   30C17970
                        *                                            30C17980
0C6D 0  6886      CKEM2 STX      EMTSW     RESET 1ST SCAN SW          30C17990
0C6E 0  7301            MDX    3 1       DECREMENT XR FOR NEXT CHAR   30C18000
0C6F 0  7001            MDX    CKEM3       AND SAVE                   30C18010
0C70 0  63D0            LDX    3 -48     IF XR3 = 0, RESET            30C18020
0C71 01 6F000C06  CKEM3 STX  L3 CHARC                                  30C18030
0C73 01 4C800C4D  CKEM4 BSC  I CKEMT                                   30C18040
                        *                                            30C18050
0C75 01 74FF0C08  CKEM5 MDX  L EMTCT,-1   CNT 100 EMITS                30C18060
0C77 0  70C4            MDX    IOUT2       THEN SKIP                  30C18070
0C78 01 67000A35        LDX  L3 ERR6                                   30C18080
0C7A 0  6B8C            STX    3 CKESW    SET ER SW FOR ER 6          30C18090
0C7B 01 CC000BF6        LDD  L ANDEM      LD ERROR CODE               30C18100
0C7D 01 DC000AD8        STD  L ERM4       SET IN MESSAGE              30C18110
0C7F 01 CC000BF8        LDD  L ANDOR      REINITIALIZE EMIT           30C18120
0C81 01 DC000BF6        STD  L ANDEM        CHECK WORD                30C18130
0C83 0  6364            LDX    3 100                                   30C18140
0C84 0  6B83            STX    3 EMTCT     RESET EMIT CK CNT           30C18150
0C85 01 0C000BEC        XIO  L STPPT-1    STOP PRINTER                 30C18160
0C87 0  1810            SRA    16                                      30C18170
0C88 01 D4000BFA        STO  L EXPCT                                   30C18180
0C8A 01 D4000B1C        STO  L TBDSW                                   30C18190
0C8C 01 D4000BF4        STO  L EMTSW      RESET 1ST EMIT SW            30C18200
0C8E 0  70A9            MDX    IOUTI                                   30C18210
                        *                                            30C18220
                        *-------------------------------------       30C18230
                        * THIS SUBROUTINE CHECKS THE CHARACTER EMITTED 30C18240
                        * WITH THE TABLE OF CHARACTERS IN THE PROPER SEQ 30C18250
                        *-------------------------------------       30C18260
                        *                                            30C18270
0C8F 01 67800C06  CKEM6 LDX  I3 CHARC     RESET XR3 AND  CHECK IF      30C18280
0C91 01 C7000CEA        LD   L3 CHAR+48   CHAR EMITTED                 30C18290
0C93 01 D4000ADC        STO  L EMTSB      STO EMIT S/B                 30C18300
0C95 01 94000C0A        S    L EMIT       IS IN THE PROPER SEQUENCE    30C18310
0C97 01 4C180C6D        BSC  L CKEM2,+-   YES, IF BRANCH               30C18320
0C99 01 67000A45        LDX  L3 ERR8                                   30C18330
0C9B 01 6F000C07        STX  L3 CKESW     SET ERROR SW                 30C18340
0C9D 01 4C800C4D        BSC  I CKEMT                                   30C18350
                        *                                            30C18360
                        *********************************************  30C18370
                        *            MESSAGE SET UP                    30C18380
```



```
                        *********************************************  30C18390
                        *  THIS SUBROUTINE SCANS THE PRINTER MESSAGE  30C18400
                        *  AND SETS THE PRINT BUFFER FOR THE NEXT EMIT. 30C18410
                        *-------------------------------------------  30C18420
                        *                                            30C18430
0C9F 0  63E0      MSCAN LDX    3 -32      SET TO SCAN BUFFER          30C18440
0CA0 0  10A0            SLT    32                                     30C18450
0CA1 00 DC000020        STD  L 32                                     30C18460
                        *                                            30C18470
0CA3 0  6200            LDX    2 0                                    30C18480
0CA4 01 4C200CA9  MS1   BSC  L MS2,Z      CK FOR NEXT BUF WORD        30C18490
0CA6 0  7201            MDX    2 1                                    30C18500
0CA7 01 C40009B4        LD   L K8000                                  30C18510
                        *                                            30C18520
0CA9 0  D00F      MS2   STO      TEMP     SAVE MSG CHAR POSITION      30C18530
0CAA 01 C7000DCE        LD   L3 BUF+32    LD NEXT MSG CHARACTER       30C18540
0CAC 01 F4000C0A        EOR  L EMIT       COMPARE CHAR WITH EMIT      30C18550
0CAE 01 4C200CB3        BSC  L MS3,Z      BR IF NOT EQUAL             30C18560
0CB0 0  C008            LD     TEMP       IF EQUAL SET BIT IN         30C18570
0CB1 0  EA1F            OR     2 31        PRINT BUFFER               30C18580
0CB2 0  D21F            STO    2 31                                   30C18590
                        *                                            30C18600
0CB3 0  C005      MS3   LD       TEMP     SHIFT TO NEXT MSG           30C18610
0CB4 0  1801            SRA    1           CHAR POSITION               30C18620
0CB5 0  7301            MDX    3 1       ADV TO NEXT CHAR              30C18630
0CB6 0  70ED            MDX    MS1                                     30C18640
0CB7 01 4C000C35        BSC  L IOUT                                    30C18650
                        *                                            30C18660
0CB9 0  0000      TEMP  DC       *-*                                   30C18670
                        *                                            30C18680
                        *********************************************  30C18690
                        *              EMIT CHARACTERS                 30C18700
                        *********************************************  30C18710
                        * THIS IS THE TABLE OF CHARACTERS IN THE       30C18720
                        * PROPER SCAN EMIT SEQUENCE                    30C18730
                        *-------------------------------------------  30C18740
                        *                                            30C18750
0CBA 0  F100      CHAR  DC       /F100    1                           30C18760
0CBB 0  F200            DC       /F200    2                           30C18770
0CBC 0  F300            DC       /F300    3                           30C18780
0CBD 0  F400            DC       /F400    4                           30C18790
0CBE 0  F500            DC       /F500    5                           30C18800
0CBF 0  F600            DC       /F600    6                           30C18810
0CC0 0  F700            DC       /F700    7                           30C18820
0CC1 0  F800            DC       /F800    8                           30C18830
0CC2 0  F900            DC       /F900    9                           30C18840
0CC3 0  F000            DC       /F000    0                           30C18850
0CC4 0  7E00            DC       /7E00    =                           30C18860
0CC5 0  5B00            DC       /5B00    $                           30C18870
0CC6 0  4B00            DC       /4B00    .                           30C18880
0CC7 0  7D00            DC       /7D00    @                           30C18890
0CC8 0  6B00            DC       /6B00    ,                           30C18900
0CC9 0  5D00            DC       /5D00    )                           30C18910
0CCA 0  6000            DC       /6000    -                           30C18920
0CCB 0  4D00            DC       /4D00    (                           30C18930
0CCC 0  4E00            DC       /4E00    +                           30C18940
0CCD 0  6100            DC       /6100    /                           30C18950
0CCE 0  5C00            DC       /5C00    *                           30C18960
0CCF 0  5000            DC       /5000    &                           30C18970
0CD0 0  D100            DC       /D100    J                           30C18980
0CD1 0  D200            DC       /D200    K                           30C18990
0CD2 0  D300            DC       /D300    L                           30C19000
0CD3 0  D400            DC       /D400    M                           30C19010
0CD4 0  D500            DC       /D500    N                           30C19020
0CD5 0  D600            DC       /D600    O                           30C19030
0CD6 0  D700            DC       /D700    P                           30C19040
0CD7 0  D800            DC       /D800    Q                           30C19050
0CD8 0  D900            DC       /D900    R                           30C19060
```

```
0CD9 0  C500          DC    /C500     E                30C19070
0CDA 0  C700          DC    /C700     G                30C19080
0CDB 0  E600          DC    /E600     M                30C19090
0CDC 0  E700          DC    /E700     X                30C19100
0CDD 0  E800          DC    /E800     Y                30C19110
0CDE 0  E900          DC    /E900     Z                30C19120
0CDF 0  C100          DC    /C100     A                30C19130
0CE0 0  C200          DC    /C200     B                30C19140
0CE1 0  C300          DC    /C300     C                30C19150
0CE2 0  C400          DC    /C400     D                30C19160
0CE3 0  C600          DC    /C600     F                30C19170
0CE4 0  C800          DC    /C800     H                30C19180
0CE5 0  C900          DC    /C900     I                30C19190
0CE6 0  E200          DC    /E200     S                30C19200
0CE7 0  E300          DC    /E300     T                30C19210
0CE8 0  E400          DC    /E400     U                30C19220
0CE9 0  E500          DC    /E500     V                30C19230
0CEA 0  F100          DC    /F100     1                30C19240
                *                                      30C19250
                ****************************************30C19260
                *          ALPHA MESSAGES              *30C19270
                ****************************************30C19280
                *                                      30C19290
0CEB 0  923E    AWAS  DC    /923E     WAS S/B          30C19300
0CEC 0  9A21          DC    /9A21                      30C19310
0CED 0  219A          DC    /219A                      30C19320
0CEE 0  BC1A          DC    /BC1A                      30C19330
0CEF 0  2100          DC    /2100                      30C19340
0CF0 0  FFFF          DC    /FFFF                      30C19350
                *                                      30C19360
0CF1 0  2184    ASDSW DC    /2184     STATIC DSW ERR   30C19370
0CF2 0  9A9E          DC    /9A9E                      30C19380
0CF3 0  3E9E          DC    /3E9E                      30C19390
0CF4 0  221E          DC    /221E                      30C19400
0CF5 0  2132          DC    /2132                      30C19410
0CF6 0  9A92          DC    /9A92                      30C19420
0CF7 0  2136          DC    /2136                      30C19430
0CF8 0  6262          DC    /6262                      30C19440
0CF9 0  FFFF          DC    /FFFF                      30C19450
                *                                      30C19460
0CFA 0  2184    ABDSW DC    /2184     BUSY DSW ERR     30C19470
0CFB 0  1AB2          DC    /1AB2                      30C19480
0CFC 0  9AA6          DC    /9AA6                      30C19490
0CFD 0  2132          DC    /2132                      30C19500
0CFE 0  9A92          DC    /9A92                      30C19510
0CFF 0  2136          DC    /2136                      30C19520
0D00 0  6262          DC    /6262                      30C19530
0D01 0  FFFF          DC    /FFFF                      30C19540
                *                                      30C19550
0D02 0  2184    ADSW1 DC    /2184     LEV1 DSW ERR     30C19560
0D03 0  5E36          DC    /5E36                      30C19570
0D04 0  B6FC          DC    /B6FC                      30C19580
0D05 0  2132          DC    /2132                      30C19590
0D06 0  9A92          DC    /9A92                      30C19600
0D07 0  2136          DC    /2136                      30C19610
0D08 0  6262          DC    /6262                      30C19620
0D09 0  FFFF          DC    /FFFF                      30C19630
                *                                      30C19640
0D0A 0  329A    ADSW  DC    /329A     DSW              30C19650
0D0B 0  9221          DC    /9221                      30C19660
0D0C 0  FFFF          DC    /FFFF                      30C19670
                *                                      30C19680
0D0D 0  2121    AINT  DC    /2121     NO INTRPT        30C19690
0D0E 0  8476          DC    /8476                      30C19700
0D0F 0  5221          DC    /5221                      30C19710
                *                                      30C19720
0D10 0  2276    AINT  DC    /2276                      30C19730
0D11 0  9E62          DC    /9E62                      30C19740
```



```
0D12 0  569E          DC    /569E                      30C19750
0D13 0  FFFF          DC    /FFFF                      30C19760
                *                                      30C19770
0D14 0  329A    ADPR  DC    /329A     DSW -PRINTER     30C19780
0D15 0  9221          DC    /9221                      30C19790
0D16 0  2184          DC    /2184                      30C19800
                *                                      30C19810
0D17 0  5662    APRTR DC    /5662     PRINTER          30C19820
0D18 0  769E          DC    /769E                      30C19830
0D19 0  6200          DC    /6200                      30C19840
0D1A 0  FFFF          DC    /FFFF                      30C19850
                *                                      30C19860
0D1B 0  9A9E    ASTPD DC    /9A9E     STOPPED          30C19870
0D1C 0  5256          DC    /5256                      30C19880
0D1D 0  5636          DC    /5636                      30C19890
0D1E 0  3200          DC    /3200                      30C19900
0D1F 0  FFFF          DC    /FFFF                      30C19910
                *                                      30C19920
0D20 0  3222    ADNTO DC    /3222     DID NOT TURN OFF 30C19930
0D21 0  3221          DC    /3221                      30C19940
0D22 0  7652          DC    /7652                      30C19950
0D23 0  9E21          DC    /9E21                      30C19960
0D24 0  9EB2          DC    /9EB2                      30C19970
0D25 0  6276          DC    /6276                      30C19980
0D26 0  2152          DC    /2152                      30C19990
0D27 0  1212          DC    /1212                      30C20000
0D28 0  FFFF          DC    /FFFF                      30C20010
                *                                      30C20020
0D29 0  5256    AEBF  DC    /5256     EMIT BIT FAILURE 30C20030
0D2A 0  3676          DC    /3676                      30C20040
0D2B 0  219A          DC    /219A                      30C20050
0D2C 0  2652          DC    /2652                      30C20060
0D2D 0  629E          DC    /629E                      30C20070
0D2E 0  2184          DC    /2184                      30C20080
0D2F 0  3672          DC    /3672                      30C20090
0D30 0  229E          DC    /229E                      30C20100
0D31 0  211A          DC    /211A                      30C20110
0D32 0  229E          DC    /229E                      30C20120
0D33 0  2112          DC    /2112                      30C20130
0D34 0  3E22          DC    /3E22                      30C20140
0D35 0  5EB2          DC    /5EB2                      30C20150
0D36 0  6236          DC    /6236                      30C20160
0D37 0  FFFF          DC    /FFFF                      30C20170
                *                                      30C20180
0D38 0  3672    AEMT  DC    /3672     EMIT INVALD      30C20190
0D39 0  229E          DC    /229E                      30C20200
0D3A 0  2184          DC    /2184                      30C20210
0D3B 0  2276          DC    /2276                      30C20220
0D3C 0  B63E          DC    /B63E                      30C20230
0D3D 0  5E32          DC    /5E32                      30C20240
0D3E 0  FFFF          DC    /FFFF                      30C20250
                *                                      30C20260
0D3F 0  2184    AESER DC    /2184     EMIT SEQ ERR     30C20270
0D40 0  3672          DC    /3672                      30C20280
0D41 0  229E          DC    /229E                      30C20290
0D42 0  2100          DC    /2100                      30C20300
0D43 0  9A36    ASER  DC    /9A36                      30C20310
0D44 0  6621          DC    /6621                      30C20320
0D45 0  3662          DC    /3662                      30C20330
0D46 0  6200          DC    /6200                      30C20340
0D47 0  FFFF          DC    /FFFF                      30C20350
                *                                      30C20360
0D48 0  7222    AMC   DC    /7222     MISSING CHANNEL  30C20370
0D49 0  9A9A          DC    /9A9A                      30C20380
0D4A 0  2276          DC    /2276                      30C20390
0D4B 0  1621          DC    /1621                      30C20400
0D4C 0  1E26    ACHAN DC    /1E26                      30C20410
0D4D 0  3E76          DC    /3E76                      30C20420
```

1132 PRINTER FUNCTION TEST

```
004E 0 7636          DC    /7636                          30C20430
004F 0 5E00          DC    /5E00                          30C20440
0050 0 FFFF          DC    /FFFF                          30C20450
                     *                                    30C20460
0051 0 72B2    AMSP  DC    /72B2    MULT SPACE            30C20470
0052 0 5E9E          DC    /5E9E                          30C20480
0053 0 2100          DC    /2100                          30C20490
                     *                                    30C20500
0054 0 9A56    ASPC  DC    /9A56    SPACE                 30C20510
0055 0 3E1E          DC    /3E1E                          30C20520
0056 0 3600          DC    /3600                          30C20530
0057 0 FFFF          DC    /FFFF                          30C20540
                     *                                    30C20550
0058 0 72B2    AMSK  DC    /72B2    MULT SKIP             30C20560
0059 0 5E9E          DC    /5E9E                          30C20570
005A 0 2100          DC    /2100                          30C20580
                     *                                    30C20590
005B 0 9A5A    ASKP  DC    /9A5A    SKIP                  30C20600
005C 0 2256          DC    /2256                          30C20610
005D 0 FFFF          DC    /FFFF                          30C20620
                     *                                    30C20630
005E 0 5662    APRT  DC    /5662    PRINT                 30C20640
005F 0 2276          DC    /2276                          30C20650
0060 0 9E00          DC    /9E00                          30C20660
0061 0 FFFF          DC    /FFFF                          30C20670
                     *                                    30C20680
0062 0 9A56    ASPIN DC    /9A56    SPACE- PRINT ON       30C20690
0063 0 3E1E          DC    /3E1E                          30C20700
0064 0 3684          DC    /3684                          30C20710
0065 0 2156          DC    /2156                          30C20720
0066 0 6222          DC    /6222                          30C20730
0067 0 769E          DC    /769E                          30C20740
0068 0 2152          DC    /2152                          30C20750
0069 0 7600          DC    /7600                          30C20760
006A 0 FFFF          DC    /FFFF                          30C20770
                     *                                    30C20780
006B 0 9A36    ASNER DC    /9A36    SENSE ERR             30C20790
006C 0 769A          DC    /769A                          30C20800
006D 0 3621          DC    /3621                          30C20810
006E 0 3662          DC    /3662                          30C20820
006F 0 6200          DC    /6200                          30C20830
0070 0 FFFF          DC    /FFFF                          30C20840
                     *                                    30C20850
0071 0 923E    AINVC DC    /923E    WAS -INVALD CHANNEL CODE 30C20860
0072 0 9A21          DC    /9A21                          30C20870
0073 0 2184          DC    /2184                          30C20880
0074 0 2276          DC    /2276                          30C20890
0075 0 B63E          DC    /B63E                          30C20900
0076 0 5E32          DC    /5E32                          30C20910
0077 0 211E          DC    /211E                          30C20920
0078 0 263E          DC    /263E                          30C20930
0079 0 7676          DC    /7676                          30C20940
007A 0 365E          DC    /365E                          30C20950
007B 0 211E          DC    /211E                          30C20960
007C 0 5232          DC    /5232                          30C20970
007D 0 3600          DC    /3600                          30C20980
007E 0 FFFF          DC    /FFFF                          30C20990
                     *                                    30C21000
007F 0 095E    ALOP  DC    /095E    LAST OP-              30C21010
0080 0 3E9A          DC    /3E9A                          30C21020
0081 0 9E21          DC    /9E21                          30C21030
0082 0 5256          DC    /5256                          30C21040
0083 0 8421          DC    /8421                          30C21050
0084 0 FFFF          DC    /FFFF                          30C21060
                     *                                    30C21070
0085 0 7662    ANRDY DC    /7662    NRDY                  30C21080
0086 0 32A6          DC    /32A6                          30C21090
0087 0 FFFF          DC    /FFFF                          30C21100
```


1132 PRINTER FUNCTION TEST

```
                     *                                    30C21110
0088 0 9A36    ABSW  DC    /9A36    SET SW 1-7 TO COL     30C21120
0089 0 9E21          DC    /9E21                          30C21130
008A 0 9A92          DC    /9A92                          30C21140
008B 0 21FC          DC    /21FC                          30C21150
008C 0 84D4          DC    /84D4                          30C21160
008D 0 2112          DC    /2112                          30C21170
008E 0 5262          DC    /5262                          30C21180
008F 0 211E          DC    /211E                          30C21190
0090 0 525E          DC    /525E                          30C21200
0091 0 21E4          DC    /21E4    8-15 FOR CHAR         30C21210
0092 0 84FC          DC    /84FC                          30C21220
0093 0 F421          DC    /F421                          30C21230
0094 0 1252          DC    /1252                          30C21240
0095 0 6221          DC    /6221                          30C21250
0096 0 1E26          DC    /1E26                          30C21260
0097 0 3E62          DC    /3E62                          30C21270
0098 0 8141          DC    /8141    TURN ON 0 TO START PRINT 30C21280
0099 0 9EB2          DC    /9EB2                          30C21290
009A 0 6276          DC    /6276                          30C21300
009B 0 2152          DC    /2152                          30C21310
009C 0 7621          DC    /7621                          30C21320
009D 0 C421          DC    /C421                          30C21330
009E 0 9E52          DC    /9E52                          30C21340
009F 0 219A          DC    /219A                          30C21350
00A0 0 9E3E          DC    /9E3E                          30C21360
00A1 0 629E          DC    /629E                          30C21370
00A2 0 2156          DC    /2156                          30C21380
00A3 0 6222          DC    /6222                          30C21390
00A4 0 769E          DC    /769E                          30C21400
00A5 0 FFFF          DC    /FFFF                          30C21410
                     *                                    30C21420
00A6 0 2184    ACBSY DC    /2184    CARRIAGE BSY          30C21430
00A7 0 1E3E          DC    /1E3E                          30C21440
00A8 0 6262          DC    /6262                          30C21450
00A9 0 223E          DC    /223E                          30C21460
00AA 0 1636          DC    /1636                          30C21470
00AB 0 211A          DC    /211A                          30C21480
00AC 0 9AA6          DC    /9AA6                          30C21490
00AD 0 FFFF          DC    /FFFF                          30C21500
                     *                                    30C21510
                     ********************************************* 30C21520
                     *          PRINTER MSG BUFFER AND TABLE       30C21530
                     ********************************************* 30C21540
                     *                                    30C21550
00AE     0020        BUF   BSS   32         PRINTER MSG BUFFER 30C21560
                     *                                    30C21570
00CE 1 0E44          PMTAB DC    PMG16      PRINTER MESSAGE TABLE 30C21580
00CF 1 0E47          DC    PMG17                          30C21590
00D0 1 0E3F          DC    PMG15                          30C21600
00D1 1 0E30          DC    PMG11                          30C21610
00D2 1 0E33          DC    PMG12                          30C21620
00D3 1 0E37          DC    PMG13                          30C21630
00D4 1 0DEC          DC    PMG01                          30C21640
00D5 1 0DF2          DC    PMG02                          30C21650
00D6 1 0DFC          DC    PMG03                          30C21660
00D7 1 0DFF          DC    PMG04                          30C21670
00D8 1 0E02          DC    PMG05                          30C21680
00D9 1 0E0E          DC    PMG06                          30C21690
00DA 1 0E2D          DC    PMG10                          30C21700
00DB 1 0E2A          DC    PMG09                          30C21710
00DC 1 0E21          DC    PMG08                          30C21720
00DD 1 0E30          DC    PMG11                          30C21730
00DE 1 0E4B          DC    PMG19                          30C21740
00DF 1 0E4D          DC    PMG20                          30C21750
00E0 1 0E4F          DC    PMG21                          30C21760
00E1 1 0E51          DC    PMG22                          30C21770
CDE2 1 0E1A          DC    PMG07                          30C21780
```

1132 PRINTER FUNCTION TEST

```
00E3 1  0E53              DC      PMG24                        30C21790
00E4 1  0E55              DC      PMG25                        30C21800
00E5 1  0E57              DC      PMG26                        30C21810
00E6 1  0E59              DC      PMG27                        30C21820
00E7 1  0E3A              DC      PMG14                        30C21830
00E8 1  0E49              DC      PMG18                        30C21840
00E9 1  0E33              DC      PMG12                        30C21850
00EA 1  0E37              DC      PMG13                        30C21860
00EB 1  0E27              DC      PMG08                        30C21870
                   *                                           30C21880
00EC 0  D9E3       PMG01  DC      /D9E3     RT1 EMIT           30C21890
00ED 0  F100              DC      /F100                        30C21900
00EE 0  0000              DC      /0000                        30C21910
00EF 0  C5D4              DC      /C5D4                        30C21920
00F0 0  C9E3              DC      /C9E3                        30C21930
00F1 0  FFFF              DC      /FFFF                        30C21940
                   *                                           30C21950
00F2 0  D9E3       PMG02  DC      /D9E3     RT2 SCAN CHECK     30C21960
00F3 0  F200              DC      /F200                        30C21970
00F4 0  0000              DC      /0C00                        30C21980
00F5 0  E2C3              DC      /E2C3                        30C21990
00F6 0  C1D5              DC      /C1D5                        30C22000
00F7 0  0000              DC      /0000                        30C22010
00F8 0  C3C8              DC      /C3C8                        30C22020
00F9 0  C5C3              DC      /C5C3                        30C22030
00FA 0  D200              DC      /D200                        30C22040
00FB 0  FFFF              DC      /FFFF                        30C22050
                   *                                           30C22060
00FC 0  D9E3       PMG03  DC      /D9E3     RT3                30C22070
00FD 0  F300              DC      /F300                        30C22080
00FE 0  FFFF              DC      /FFFF                        30C22090
                   *                                           30C22100
00FF 0  D9E3       PMG04  DC      /D9E3     RT4                30C22110
0E00 0  F400              DC      /F400                        30C22120
0E01 0  FFFF              DC      /FFFF                        30C22130
                   *                                           30C22140
0E02 0  D9E3       PMG05  DC      /D9E3     RT5 RIPPLE PATTERN 30C22150
0E03 0  F500              DC      /F500                        30C22160
0E04 0  0000              DC      /0000                        30C22170
0E05 0  D9C9              DC      /D9C9                        30C22180
0E06 0  D7D7              DC      /D7D7                        30C22190
0E07 0  D3C5              DC      /D3C5                        30C22200
0E08 0  0000              DC      /0000                        30C22210
0E09 0  D7C1              DC      /D7C1                        30C22220
0E0A 0  E3E3              DC      /E3E3                        30C22230
0E0B 0  C5D9              DC      /C5D9                        30C22240
0E0C 0  D500              DC      /D500                        30C22250
0E0D 0  FFFF              DC      /FFFF                        30C22260
                   *                                           30C22270
0E0E 0  D9E3       PMG06  DC      /D9E3     RT6 ALL CHARACTERS 30C22280
0E0F 0  F600              DC      /F600                        30C22290
0E10 0  0000              DC      /0000                        30C22300
0E11 0  C1D3              DC      /C1D3                        30C22310
0E12 0  D300              DC      /D300                        30C22320
0E13 0  0000              DC      /0000                        30C22330
0E14 0  C3C8              DC      /C3C8                        30C22340
0E15 0  C1D9              DC      /C1D9                        30C22350
0E16 0  C1C3              DC      /C1C3                        30C22360
0E17 0  E3C5              DC      /E3C5                        30C22370
0E18 0  D9E2              DC      /D9E2                        30C22380
0E19 0  FFFF              DC      /FFFF                        30C22390
                   *                                           30C22400
0E1A 0  D9E3       PMG07  DC      /D9E3     RT7 STRESS         30C22410
0E1B 0  F700              DC      /F700                        30C22420
0E1C 0  0000              DC      /0000                        30C22430
0E1D 0  E2E3              DC      /E2E3                        30C22440
0E1E 0  D9C5              DC      /D9C5                        30C22450
0E1F 0  E2E2              DC      /E2E2                        30C22460
```


1132 PRINTER FUNCTION TEST

```
0E20 0  FFFF              DC      /FFFF                        30C22470
                   *                                           30C22480
0E21 0  C9D5       PMG8I  DC      /C9D5                        30C22490
0E22 0  C9E3              DC      /C9E3                        30C22500
0E23 0  C9C1              DC      /C9C1                        30C22510
0E24 0  D3C9              DC      /D3C9                        30C22520
0E25 0  E9C5              DC      /E9C5                        30C22530
0E26 0  0000              DC      /0000                        30C22540
0E27 0  D9E3       PMG08  DC      /D9E3     RT8                30C22550
0E28 0  F800              DC      /F800                        30C22560
0E29 0  FFFF              DC      /FFFF                        30C22570
                   *                                           30C22580
0E2A 0  D9E3       PMG09  DC      /D9E3     RT9                30C22590
0E2B 0  F900              DC      /F900                        30C22600
0E2C 0  FFFF              DC      /FFFF                        30C22610
                   *                                           30C22620
0E2D 0  D9E3       PMG10  DC      /D9E3     RTA                30C22630
0E2E 0  C100              DC      /C100                        30C22640
0E2F 0  FFFF              DC      /FFFF                        30C22650
                   *                                           30C22660
0E30 0  E3C5       PMG11  DC      /E3C5     TEST               30C22670
0E31 0  E2E3              DC      /E2E3                        30C22680
0E32 0  FFFF              DC      /FFFF                        30C22690
                   *                                           30C22700
0E33 0  E2D7       PMG12  DC      /E2D7     SPACE              30C22710
0E34 0  C1C3              DC      /C1C3                        30C22720
0E35 0  C500              DC      /C500                        30C22730
0E36 0  FFFF              DC      /FFFF                        30C22740
                   *                                           30C22750
0E37 0  E2D2       PMG13  DC      /E2D2     SKIP               30C22760
0E38 0  C9D7              DC      /C9D7                        30C22770
0E39 0  FFFF              DC      /FFFF                        30C22780
                   *                                           30C22790
0E3A 0  C3C8       PMG14  DC      /C3C8     CHANNEL            30C22800
0E3B 0  C1D5              DC      /C1D5                        30C22810
0E3C 0  D5C5              DC      /D5C5                        30C22820
0E3D 0  D3C0              DC      /D300                        30C22830
0E3E 0  FFFF              DC      /FFFF                        30C22840
                   *                                           30C22850
0E3F 0  60D7       PMG15  DC      /60D7     -PRINTER           30C22860
0E40 0  D9C9              DC      /D9C9                        30C22870
0E41 0  D5E3              DC      /D5E3                        30C22880
0E42 0  C5D9              DC      /C5D9                        30C22890
0E43 0  FFFF              DC      /FFFF                        30C22900
                   *                                           30C22910
0E44 0  D6C6       PMG16  DC      /D6C6     OFF                30C22920
0E45 0  C600              DC      /C600                        30C22930
0E46 0  FFFF              DC      /FFFF                        30C22940
                   *                                           30C22950
0E47 0  D6D5       PMG17  DC      /D6D5     ON                 30C22960
0E48 0  FFFF              DC      /FFFF                        30C22970
                   *                                           30C22980
0E49 0  E3D6       PMG18  DC      /E3D6     TO                 30C22990
0E4A 0  FFFF              DC      /FFFF                        30C23000
                   *                                           30C23010
0E4B 0  F100       PMG19  DC      /F100     1                  30C23020
0E4C 0  FFFF              DC      /FFFF                        30C23030
                   *                                           30C23040
0E4D 0  F200       PMG20  DC      /F200     2                  30C23050
0E4E 0  FFFF              DC      /FFFF                        30C23060
                   *                                           30C23070
0E4F 0  F300       PMG21  DC      /F300     3                  30C23080
0E50 0  FFFF              DC      /FFFF                        30C23090
                   *                                           30C23100
0E51 0  F400       PMG22  DC      /F400     4                  30C23110
0E52 0  FFFF              DC      /FFFF                        30C23120
                   *                                           30C23130
                   *                                           30C23140
```

1132 PRINTER FUNCTION TEST

```
0E53 0  F600        PMG24 DC    /F600     6          30C23150
0E54 0  FFFF              DC    /FFFF                30C23160
                    *                                30C23170
0E55 0  F900        PMG25 DC    /F900     9          30C23180
0E56 0  FFFF              DC    /FFFF                30C23190
                    *                                30C23200
0E57 0  F1F2        PMG26 DC    /F1F2     12         30C23210
0E58 0  FFFF              DC    /FFFF                30C23220
                    *                                30C23230
0E59 0  F3F9        PMG27 DC    /F3F9     39         30C23240
0E5A 0  FFFF              DC    /FFFF                30C23250
                    *                                30C23260
0E5C    0538              END   BGIN                 30C23270
```


1132 PRINTER FUNCTION TEST

CROSS REFERENCE LISTING

```
SYMBOL  VALUE   REFERENCES
ABDSW   0CFA    0A9D
ABSW    0D88    08AB
ACBSY   0DA6    0AB9
ACHAN   0D4C    0AB2,0AB6
ADNTO   0D20    0AAB
ADPR    0D14    0AA0
ADSW    0D0A    0A9E,0AB8
ADSW1   0D02    0AA3
AEBF    0D29    0AA4
AEMT    0D38    0AA6
AESER   0D3F    0AA9
AINT    0D10    0AAD,0AAF
AINVC   0D71    0AB4
ALOP    0D7F    0ACF
ALPHA   0AD6    0ABD
AMC     0D48    0AB0
AMSK    0D58    0AAE
AMSP    0D51    0AAC
ANDEM   0BF6    05F7,0C58,0C5C,0C7B,0C81
ANDOR   0BF8    05F5,0C7F
ANINT   0D0D    0A9F
ANRDY   0D85    0B6D
APRT    0D5E    08E9
APRTR   0D17    0AAA
ASDSW   0CF1    0A9B
ASER    0D43    0AB3
ASKP    0D5B    0927
ASNER   0D6B    0AB7
ASPC    0D54    090D
ASPIN   0D62    08B0
ASTPD   0D1B    0AA1
AWAS    0CE6    0A9A,0A9C,0AA2,0AA8
A1      09CF    06E9,06FC,09DF,09EC
A1EM    09EE    06DC,0708,09E9
A1SW    09ED    09D2,09DC
A110    J9D6    09D9
A120    09E1    09DD
A130    09E2    09E8
BDSW    0ADF    0AE8,0AF0,0B0A,0B0B,0B1F,0B20,0BA8,0BB8
BEGIN   0160    0000,05E8
BGIN    05E8    0E5B
BLANK   08EC    09A5,08E6,08EA
BSWS    08A4    0864,08A0
BUF     0DAE    0955,09C9,0CAA
CHANL   0ADA    0A5E
CHAR    0CBA    06DE,098D,0C62,0C91
CHARC   0C06    0C71,0C8F
CHID    08A9    0873,0882
CHMSG   07CE    073C,07B2,07E4,07EB,07ED,080D,0819,083A,084E
CHM1    07E9    07E6
CHM2    07EB    07CF,0A7E
CHNUM   0A65    0A5C
CHTBL   07EF    07E0
CHWAS   0AE3    0900,0902,082D
CH1SQ   07C6
CH12S   078F    071E,07A4,07A7,07D8,07DA
CH2SQ   07C5
CH3SQ   07C4
CH4SQ   07C3
CH5SQ   07C2
CH6SQ   07C1
CH9SQ   07C0
CKEMT   0C4D    0B86,0C4F,0C73,0C9D
CKEM1   0C62    0C68
CKEM2   0C6D    0C65,0C97
```

CKEM3	0C71	0C6F
CKEM4	0C73	0C6C
CKEM5	0C75	0C5F
CKEM6	0C8F	0C56
CKESW	0C07	0AF5,0B26,0C4E,0C6B,0C7A,0C9B
CLEAR	09BA	08B0,09CD,09E1,0BBF
CL10	09BF	09C2
CL20	09C9	09CC
CNTRL	0600	05FF,063A,0651,0678,06AE,06C4,06F3,070F,07BD,0823, 0858,0B18
CN10	0604	
CN20	060B	0602
CN30	0611	0606
DLYCT	0869	0B38,0B43,0B4C,0B55,0B5A,0B61
DSWSB	0ADE	
DSWW	0ADD	08DF,0A78,0B09,0B3F
EBITS	0B1D	0A29,0AF4,0B23,0C3E,0C46
EMIT	0C0A	06DA,0706,0880,098F,09E7,0BF2,0C51,0C57,0C5A,0C64, 0C95,0CAC
EMTCT	0C08	05F3,0C75,0C84
EMTSB	0ADC	0C93
EMTSW	0BF4	093E,0B93,0C54,0C6D,0C8C
EMTWS	0ADB	0C52
END	0164	0000,0000,0000,060F
ERLCK	0166	09F2
ERM3	0AD7	
ERM4	0AD8	0A86,0C7D
ERROR	0162	0000,0AC3,0AC8
ERR1	09F9	0A00,0B46
ERR10	0A51	0A31
ERR11	0A56	0A2E
ERR12	0A5B	076A,0A63
ERR13	0A6D	07AC,0A74
ERR14	0A76	07D5
ERR15	0A80	0A89,0B35
ERR16	0A8B	0905,0A90
ERR17	0A92	08E4,0A97
ERR2	0A02	0A0A,0B0C,0B21
ERR3	0A0C	0B0E
ERR3X	0A16	0A12,0A1D
ERR4	0A1A	0A15
ERR5	0A1E	0A33,0B24
ERR5X	0A33	0A28,0A50,0A55,0A5A
ERR6	0A35	0A38,0C78
ERR7	0A3D	0A43,0C69
ERR8	0A45	0A4A,0C99
ERR9	0A4C	0A28
ETYPE	0ABA	09FE,0A08,0A16,0A23,0A39,0A41,0A49,0A4F,0A54,0A59, 0A62,0A71,0A7D,0A88,0A8F,0A96,0ACC
ETYP1	0AC8	0AC2
ETYP2	0ACC	0AC5
EXPCT	0BFA	08D8,0908,0918,0923,0925,0940,0A10,0B74,0B84,0B85, 0B91,0BAC,0BAF,0BC3,0C0F,0C10,0C11,0C28,0C29,0C2B, 0C30,0C31,0C33,0C44,0C88
FORMS	0B53	08E7,0907,091D,0B58
FORM1	0B56	0B62
FORM2	0B62	0B5C
ICNT	0B1A	06E2,0885,0993,09D0,09DA,0A13,0A25,0AF3,0B79
IDLCT	0BF0	0843,08C9,08D2,0978,0B88,0B96
IDLE	08D1	0633,064A,06A1,06D6,0704,083F,087E,08D6,0989,09E5
IDSW	0AE1	0C42,0C49
IL0	017A	0000
IL1	018A	0000,05FD
IL2	019A	0000
IL3	01AA	0000
IL4	01BA	0000
INTLZ	08AD	0628,063C,0652,0688,06B0,06CA,06F5,0716,0780,07F7, 0825,085D,0888,08C2,08C4

INT1	08BF	08BC
INT2	08C2	08BA
IN89A	0711	077C,0783,07F8,0828
IOUT	0C35	0C25,0CB7
IOUT1	0C38	0C34,0C8E
IOUT2	0C3C	0B71,0BBA,0C20,0C36,0C77
IOUT3	0C4B	0C40
I89AX	0775	0713,077E
KEF00	0BFE	0C2A,0C2F,0C45
KFF00	0BFF	0765,083D,0C5E
K00FF	0AE5	0A85,0B2C
K0001	0C01	0BDF
K0030	08A7	
K1000	09B9	0913,0921,092D
K1200	0C09	08A5
K7F00	0C00	0AEE,0BB7
K8000	0984	0728,07FD,082A,0895,095D,099B,0CA7
LINES	06C6	06B7,06C1,06F9,070C
LOCK	09EF	0635,064C,0670,06A6,068C,06EE,070A,075C,0788,081B, 0851,089D,09F5
LOG	0163	0000,0860,0B48,0B5D
LOGBY	0167	
LOOP	0ACB	062E,0642,0657,068D,0688,06CF,06FA,072F,078E,0800, 082D,0876,08B2,09F7
LPCNT	06C8	062C,0637,0640,064E,0661,0672,0697,06A8,06D2,06E5, 071B,0761,0785,07BA,0879,0888,0984,0996
LRTN	0627	0618
LTSEQ	07CC	074A,074D,07DC
MLSCF	05E5	0618,0869,0AFE,0B01,084F,0B64,0C3A
MSCAN	0C9F	0BC8
MSGSW	09B8	097A,09C6,0BC6
MSG1	0A9A	09FC
MSG10	0AAC	0A53
MSG11	0AAE	0A58
MSG12	0AB0	0A61
MSG13	0AB2	0A70
MSG14	0AB4	0A7C
MSG15	0AB6	0A87,0B8E
MSG17	0AB8	0A95
MSG2	0A9C	0A06
MSG3	0A9E	0A0E
MSG4	0AA0	0A1B
MSG5	0AA2	0A22
MSG6	0AA4	0A38
MSG7	0AA6	0A40
MSG8	0AA8	0A48
MSG9	0AAA	0A4E
MS1	0CA4	0CB6
MS2	0CA9	0CA4
MS3	0CB3	0CAE
NO49	06C7	
NO50	06C9	
NRTN	0626	061C
ONES	09B6	09D4,0A72
OPMSW	0AC6	0AC0,0AC7,0AF2
OPSW	0AD0	08E8,090F,0929,0BB2
OREM	0BF7	0C58,0C59,0C5D
PCOLM	08A5	0870,088C
PID	05DC	05EA
PINT	0883	
PIRT	0B70	05F8,0C48
PI1	0B96	0B8C
PI2	0BA1	089D,0C2D
PI3	0BBC	0889,08DA
PI4	0BC5	0B8E,0BEB
PI5	0BCF	09A7,0BE4
PI6	0BD1	09A9,0BE5
PI7	0BDF	0BD7

PMG01	0DEC	0DD4
PMG02	0DF2	0DD5
PMG03	0DFC	0DD6
PMG04	0DFF	0DD7
PMG05	0E02	0DD8
PMG06	0E0E	0DD9
PMG07	0E1A	0DE2
PMG08	0E27	0DE8
PMG09	0E2A	0DDB
PMG10	0E2D	0DDA
PMG11	0E30	0DD1,0DDD
PMG12	0E33	0DD2,0DE9
PMG13	0E37	0DD3,0DEA
PMG14	0E3A	0DE7
PMG15	0E3F	0DD0
PMG16	0E44	0DCE
PMG17	0E47	0DCF
PMG18	0E49	0DE8
PMG19	0E4B	0DDE
PMG20	0E4D	0DDF
PMG21	0E4F	0DE0
PMG22	0E51	0DE1
PMG24	0E53	0DE3
PMG25	0E55	0DE4
PMG26	0E57	07E2,0DE5
PMG27	0E59	0DE6
PMG81	0E21	0DDC
PMSG	0946	066D,06A3,072C,0789,07E7,08BD,094E,097E,0980
PMS1	0958	0957,0965
PMS2	0962	0971,0973
PMS3	0970	096C
PMS4	0974	094A,0958
PMS5	097E	
PMTAB	0DCE	095F
PRCOM	08D8	08CD,08D5,08F5,097C
PRC1	08DD	08E6
PRC2	08E7	08E2
PRINT	08C6	06EC,06FF,0898,08CF,09AE
RAD	05DE	0615
RBSWS	08A0	0863
RDEMT	08F2	0883
RDYMK	0868	0842
RDY1	083C	084D
RDY2	084D	0845
READY	0839	0884,0840
RID	05DD	05EC,0604,060A,0608,060D,0611,0814
RIDCK	0618	0605
RIPL	0982	068A,0980
RIPL1	0983	0995
RIPL2	0986	0998
RIPL3	098B	0684,06BE,09A1
RIPL4	099B	0991,099A
RIPL5	09A5	099F
RQKB	01BC	0000
RQTY	01BB	0000
RTNOM	061C	060E
RTNSW	0165	0616
RTRN	0B1F	0C38
RTRNS	0C04	087F,0[illegible],0C35
RTRN1	0B37	0B31
RTTBL	061D	0613,0616,061C
SAVE	0982	0954,0959,095E
SAVE3	0687	0665,0666,069A,069B
SCNCT	0BF0	08D9,0888,088C
SCNT	0686	0667,066A
SENSE	0B1B	0735,0777,08DD,08FE,0932,0AED,0B08,0828,083C,0856,0BB5
SEQSW	07C7	072A,0743,075E,0774,07D7,07DD,07DF

SETUP	08A8	0862
SHFT2	07CB	0726,0751,0753,075A
SHIFT	07CA	0724,0748,0754,0755,0758,0790,079C
SKCNT	0939	0920,0C16
SKINT	0C0B	0881,0B90,0B95,0898,08A0,08C4,08E8
SKIN1	0C16	0C14
SKIN2	0C19	0C15,0C22
SKIN3	0C1C	0C18
SKIP	0919	0798,0814,0849,0935
SKPTO	0938	091A,0C12,0C1E
SKP1	0932	0937
SPACE	08F7	0668,0733,0775,0787,0802,082F,0886,0887,08C0,08C1,08CE,0917
SPCSW	0C02	0AE8,0B9B,0BA1,0C2C
SPCSX	0C03	069C,098D,0AE9,0AF7
SPC1	0909	08F8
SPINT	0C23	0C0D
SPIN1	0C2F	
SPIN2	0C32	0C18
SRSET	08EF	0B7C
START	0161	0000,0619,0B03,0812,0B16
STCAR	09B5	0928
STM	086A	084A,0B5E
STOP	093A	0731,0793,080F,08AE,08F8,0931,0944,094C,0ABE
STPCA	08F1	0C19
STPCT	0C05	088E,089F,08A4
STPPT	08ED	093B,0894,0C85
STPRT	09B3	08F1
STRT	05E8	05E3,05E4
STSPA	08F5	0911,08B4
SWKB	01BD	
SW0	05DF	0947,09F0
SW1	05E0	0601,0609,0B10
SW2	05E1	05ED,0B04,0831,08CA
SW3	05E2	05FA,08C7
SW89A	077F	05F0,0712,0715
TABLE	0AD3	0ABB,0ABC,0ACA
TBDSW	0B1C	08EF,0942,0AE7,0892,08A6,0C8A
TEMP	0CB9	0CA9,0CB0,0CB3
TEMPB	08A2	088F,0891,0893
TEMP8	07C8	0767,076E,0770,078D,07AB,07AE,07D1,07EA,07FF,0809,0811,081D,081F,082C,0836,0845,0853,0856,0A78
TERM	09B7	0964,0967
TSTA	0825	0626
TSTB	085D	0627
TST1	0628	061D
TST2	063C	061E
TST3	0652	061F
TST4	0688	0620
TST5	06B0	0621
TST6	06CA	0622
TST7	06F5	0623
TST8	0780	0624
TST9	07F7	0625
TOAA	082F	0859
TOAB	083A	0834
TOAC	0853	0838
TOBA	0863	0867,0887,089F
TOBB	086D	0865
TOBC	0878	088A
TOBD	0880	
TOBE	088C	0883
TOBF	089A	0874,0888
TO1A	0630	0639
TO2A	0644	0650
TO3A	0659	0677
TO3A1	0666	0674
TO3B	066F	065D

1132 PRINTER FUNCTION TEST

TABLE OF CONTENTS

1. PURPOSE

THE 1442 CARD READ/PUNCH DIAGNOSTIC PROGRAM CHECKS THE OPERATING PERFORMANCE OF THE 1442 CARD READ/PUNCH.

2. PREREQUISITES

2.1**** PROGRAM PREREQUISITES

1130 DIAGNOSTIC MONITOR II.

2.2**** EQUIPMENT PREREQUISITES

THE FOLLOWING EQUIPMENT IS REQUIRED.

A. 1131 CENTRAL PROCESSING UNIT (CPU) WITH PROGRAM LOAD FROM CARD OR PAPER READER.
B. 1442 CARD READ/PUNCH MOD 6 OR 7.
C. AT LEAST 1400 WORDS OF AVAILABLE CORE STORAGE.

****

3. OPERATING PROCEDURE

THESE OPERATING PROCEDURES APPLY TO SINGLE PROGRAM OPERATION ONLY. FOR OVERLAP OPERATION REFER TO SECTION 3.2.3 OF THE 1130 DIAGNOSTIC MONITOR II DOCUMENTATION.

3.1**** PROGRAM LOADING

STANDARD MONITOR LOADING PROCEDURES APPLY

THESE PROCEDURES ARE SUMMARIZED HERE. SEE DM USE PROCEDURE FOR DETAILS.

1. SET FIRST TYPEWRITER TAB 20 CHARACTERS FROM LEFT MARGIN.
2. SET BIT SWITCH 15 OFF - LOAD AND GO
   ON - TO SPECIFY OPTIONS BEFORE RUNNING.

   IF HALTED AFTER LOADING, SELECT PROGRAM OPTIONS THEN TURN OFF HALT SWITCH OR FOLLOW NORMAL RESTART PROCEDURE (SECTION 3.5).
3. LOAD DIAGNOSTIC MONITOR AND THIS PROGRAM.
4. SELECT PROGRAM OPTIONS, IF DESIRED.

****

3.2**** PROGRAM OPERATION.

3.2.1 PROGRAM CONTROL OPTIONS - FUNCTION 0

1. SET SWITCHES 0-7 TO 01.
2. SET SWITCHES 8-15 AS DESIRED.

SW	FUNCTION
8	RESTART
9	SINGLE CYCLE CONTROL AND ROUTINE START MESSAGE
10	LOCK ON FUNCTION
11	LOOP PROGRAM
12	LOOP ON ERROR
13	BYPASS ERROR PRINTOUT
14	HALT ON ERROR
15	HALT

3. PRESS INT REQ KEY ON CONSOLE.

3.2.2 ROUTINE SELECTION - FUNCTION 1

THE SELECTED ROUTINE WILL LOOP UNTIL A NEW ROUTINE IS SELECTED.

1. TO SET ROUTINE SELECTION
   A. SET SWITCHES 0-7 TO 41.
   B. SET ROUTINE NUMBER IN SWITCHES 12-15.

RTN		DESCRIPTION	
1		PUNCH AND FEED	NORMAL ROUTINES-
2		READ ROTATE PATTERN	THE PROGRAM STARTS WITH
3		PUNCH 40 COLUMNS	ROUTINE 1, RUNS EACH
4		PUNCH FLIPPED PATTERN	ROUTINE IN SEQUENCE
5		READ FLIPPED PATTERN	THEN TERMINATES AFTER
6	*	CLUTCH TEST	ROUTINE 6.
7	*	PUNCH FROM SWITCHES	OPTIONAL ROUTINES
8		GANG PUNCH	THESE ROUTINES RUN
			ONLY IF SELECTED.

* = REFER TO SECTION 3.2.3 FOR SPECIAL INSTRUCTIONS.

   C. PRESS INT REQ KEY ON CONSOLE.

2. TO RESET ROUTINE SELECTION SET AS IF SELECTING ROUTINE ZERO.

3.2.3 OPTIONAL CONTROL

1. SELECT CLUTCH DELAY

   IN THE CLUTCH TEST (RTN 6) THE DELAY BETWEEN START READ COMMANDS CAN BE SPECIFIED BY THE SWITCHES. TO DO THIS, SET SWITCHES 0-7 TO 81, 8-15 FOR THE DESIRED DELAY, THEN PRESS THE INTERRUPT REQUEST KEY. EACH BINARY INCREMENT SET IN THE SWITCHES INCREASES THE DELAY BY 8 MILLISECONDS.

2. PUNCH FROM SWITCHES

   ROUTINE 7 WILL PUNCH ALL CARDS WITH THE PATTERN SET IN SWITCHES 0-11. AFTER THE ROUTINE IS SELECTED, FOLLOW INSTRUCTIONS IN THE SET UP MESSAGE. THE NUMBER OF COLUMNS TO BE PUNCHED CAN BE SPECIFIED BY A SWITCH ENTRY WITH THE SWITCHES SET TO 81XX WHERE XX EQUALS THE NUMBER OF COLUMNS IN HEX.

3. MODIFY PUNCH DATA

   ROUTINE 9 WILL READ IN ONE CARD AND REPLACE THE PUNCH DATA TABLE WITH THE DATA PATTERN PUNCHED IN THAT CARD. THE PROGRAM WILL THEN AUTOMATICALLY RESTART FROM ROUTINE 1.

****

3.3*** PROGRAM HALTS

3.3.1 NORMAL HALTS

HALT NO. (B REG).	DESCRIPTION	RESTART ACTION
3001	PROGRAM STOP OR ADDRESS STOP	PRESS START
3002	HALT ON ERROR	DISPLAY MODE-PRESS START. RUN MODE-PRESS START

**

3.3.2 ERROR HALTS

HALT NO. (B REG).	DESCRIPTION	RESTART ACTION
30F1	CHECK SUM ERROR ON FIRST	RELOAD
30F2	READER DSW ERROR WHEN LOADING LOADER	RELOAD
30F3	CARD 2 OF LOADER DID NOT LOAD	RELOAD
30F4	CAN NOT CLEAR CORE - DUE TO ERROR IN ADDRESSING UPPER CORE.	
30F5	READER CHECK WHEN LOADING MONITOR OR TEST PROGRAM	NPRO THEN PLACE CARDS RUN OUT IN FRONT OF REMAINING DECK AND PRESS. START.
30F6	MONITOR DID NOT LOAD	RELOAD
30F7	CHECK SUM WHEN LOADING MONITOR	RELOAD
30F8	READER NOT READY	MAKE READER READY
30F9	INVALID INTERRUPT WHICH WILL NOT RESET	PRESS RESET AND START
30FA	CONSOLE PRINTER HANG UP - BUSY WILL NOT GO OFF	FIX THE CONSOLE PRINTER

****

3.4**** PROGRAM TERMINATION

IF LOOP PROGRAM HAS NOT BEEN SPECIFIED THE PROGRAM WILL TERMINATE AT THE END OF ROUTINE 6. ROUTINE 7,8 AND 9 WILL RUN ONLY IF SELECTED.

IF ANY ROUTINE IS SELECTED THAT ROUTINE WILL LOOP AND WILL NOT TERMINATE.

3.5**** RESTART

1. SET SWITCHES 0-7 TO 01.
2. TURN ON SWITCH 8.
3. SET DESIRED CONTROL IN SWITCHES 9-14.
4. PRESS INTERRUPT REQUEST KEY.

****

4. PRINTOUTS

ALL PRINTOUTS ARE IN THE STANDARD FORMAT.

APPNN OORR AAAA (MESSAGE)
OR
EPPNN OORR AAAA (MESSAGE)

WHERE A IDENTIFIES STATUS MESSAGES
E IDENTIFIES ERROR MESSAGES
PP IS THE PID OF THE PROGRAM CAUSING THE MESSAGE

THIS WILL BE EITHER 00 FOR MESSAGES ORIGINATED BY MONITOR OR OF FOR MESSAGES ORIGINATED BY THIS PROGRAM.

NN IS THE MESSAGE SEQUENCE NUMBER
RR IS THE ROUTINE NUMBER
AAAA IS THE ADDRESS OF THE ROUTINE
MESSAGE IS ANY VARIABLE INFORMATION

4.1**** STATUS MESSAGES

A0000 NUM PID ADRS RELF LD
XXXX XXXX XXXX XXXX

THIS MESSAGE IS PRINTED FOLLOWING THE LOADING OF ANY PROGRAM (EXCEPT MONITOR), THE MESSAGE GIVES THE LOAD SEQUENCE NUMBER, THE PROGRAM ID, THE ADDRESS INTO WHICH THE PROGRAM WAS LOADED, AND THE RELOCATION FACTOR.

A0001 SWS PID
XXXX XXXX

THIS MESSAGE IS PRINTED EACH TIME A VALID SWITCH ENTRY IS READ BY THE MONITOR. THE MESSAGE CONTAINS THE SWITCH SETTING READ TOGETHER WITH THE PROGRAM ID OF THE PROGRAM INTO WHICH THE CONTENTS OF SWITCHES 8-15 WERE STORED. IF THE SWITCH ENTRY CALLED FOR HALT OF ANY PROGRAM THE WORD HALT WILL FOLLOW THE MESSAGE.

A0F00 000R AAAA

ROUTINE START MESSAGE - IF SWITCH 9, FUNCTION 0, IS TURNED ON, THIS MESSAGE WILL BE PRINTED BEFORE THE START OF EACH ROUTINE. R IS THE NUMBER OF THE NEXT ROUTINE AND AAAA IS THE STARTING ADDRESS.

A0F01 000R AAAA LOAD BLANKS

LOAD THE 1442 HOPPER WITH BLANK CARDS THEN PRESS 1442 START.

A0F02 000R AAAA LOAD FROM STK2

LOAD THE CARDS IN STACKER 2 (PUNCHED BY PREVIOUS ROUTINE) IN THE 1442 HOPPER, THEN PRESS 1442 START. THIS DECK WAS PUNCHED WITH A ROTATING PATTERN. IT MUST BE LOADED IN THE SAME ORDER AS PUNCHED. THERE MUST BE NO CARDS MISSING FROM THE DECK.

A0F03 000R AAAA LOAD ANY PATTERN PLUS BLANKS

IF ROUTINE 8 - THE PATTERN IN THE FIRST CARD WILL BE PUNCHED IN THE FOLLOWING BLANK CARDS.

IF ROUTINE 9 - THE ROTATE DATA TABLE WILL BE REPLACED BY THE PATTERN IN THE FIRST CARD. THE ROUTINE WILL THEN RESTART THE PROGRAM AT ROUTINE ONE.

A0F04 0006 AAAA LD GANG PUNCHED CARDS

LOAD ANY GANG PUNCHED DECK. THIS DECK CAN BE PUNCHED BY ROUTINE 8. THE FIRST CARD WILL BE READ AND ALL FOLLOWING CARDS COMPARED TO IT.

A0F05 000R AAAA NRDY - PRESS 1442 START

THIS MESSAGE WILL BE PRINTED IF THE 1442 IS NOT READY FOR ANY REASON. THE PROGRAM WILL LOOP WAITING FOR READY. TO CONTINUE, CLEAR ANY ERROR CONDITIONS AND MAKE THE 1442 READY.

A0F06 000R AAAA LAST CARD

THE LAST CARD INDICATOR WAS ON AT THE COMPLETION OF THE LAST 1442 CONTROL OPERATION. A FEED COMMAND WAS GIVEN TO RUN OUT THE LAST CARD. THE ROUTINE WILL THEN TERMINATE. IF NO ROUTINE HAS BEEN SELECTED, THE PROGRAM WILL ADVANCE TO THE NEXT ROUTINE. IF A ROUTINE HAS BEEN SELECTED, THE PROGRAM WILL RESTART THAT ROUTINE.

A0F07 0007 AAAA SET PATT IN SW 0-11
THEN TN SW 12

THIS IS THE SET UP MESSAGE FOR ROUTINE 7. IT INSTRUCTS THE CE TO SET ANY DESIRED DATA PATTERN IN SWITCHES 0-11. WHEN SWITCH 12 IS TURNED ON, THIS PATTERN WILL BE PUNCHED. THE NUMBER OF COLUMNS PUNCHED CAN BE CONTROLLED BY A FUNCTION 2 SWITCH ENTRY WITH THE DESIRED NUMBER OF COLUMNS SET IN SWITCHES 8-15 (FOR SINGLE PROGRAM OPERATION SET SWITCHES TO 81XX WHERE XX EQUALS NUMBER OF COLUMNS IN HEX).

4.2*** ERROR MESSAGES

THE DSW IS CHECKED FOR ABSOLUTE CORRECTNESS AT ALL TIMES. IF AN ERROR IS DETECTED ONE OF THE MESSAGES BELOW WILL INDICATE THE PROBLEM. IT IS LEFT TO THE OPERATOR TO ANALYZE THE DSW FOR THE SPECIFIC PROBLEM AREA.

THE 1442 DSW

BIT	
0	READ RESPONSE
1	PUNCH RESPONSE
2	ERROR CHECK
3	LAST CARD
4	OPERATION COMPLETE
5	NOT USED
6	NOT USED
7	FEED CHECK AT READ STATION
8	NOT USED
9	NOT USED
10	NOT USED
11	NOT USED
12	NOT USED
13	NOT USED
14	BUSY
15	NOT READY OR BUSY

E0001 SWS INVLD
XXXX

THE SETTING OF SWITCHES 4-7 DID NOT EQUAL THE LOAD SEQUENCE NUMBER OF ANY PROGRAM IN CORE.

E0003 OVR CORE

THE PROGRAM WHICH THE LOADER WAS ATTEMPTING TO LOAD EXCEEDED AVAILABLE CORE. LOADING WAS TERMINATED.

E0004 CKSUM

A CHECK SUM ERROR WAS DETECTED WHILE LOADING A TEST PROGRAM. THIS ERROR OCCURS UNDER ANY OF THE FOLLOWING CONDITIONS.

1. A CARD IS MISSING OR IS OUT OF SEQUENCE.
2. THERE IS AN EXTRA CARD IN THE DECK.
3. THE PUNCHED INFORMATION ON THE CARD IS NOT CORRECT.
4. DATA WAS LOST OR PICKED UP DUE TO A MACHINE MALFUNCTION.
5. DUE TO A CPU MALFUNCTION, THE CHECK SUM WAS NOT CORRECTLY CALCULATED.

WHEN THIS ERROR OCCURS ATTEMPT TO RELOAD THE PROGRAM.

E0005 000N XXXX

THIS ERROR WILL OCCUR IS AN INTERRUPT OCCURS, BUT THE ILSW WAS NOT CORRECT. N IS THE INTERRUPT LEVEL AND XXXX IS THE ILSW. THIS PRINTOUT WILL ONLY OCCUR IF THE INTERRUPT IS RESET BY A BOSC. NO ATTEMPT IS MADE BY THE ERROR ROUTINE TO RESET THE REQUEST BIT.

E0F00 000R AAAA CARD NOT BLANK

A PRE-PUNCHED CARD WAS DETECTED BY A PUNCH ROUTINE. THIS CARD WAS NOT PUNCHED BUT WAS REJECTED. THIS CARD WILL BE FEED OUT INTO STACKER 1.

E0F01 000R AAAA WAS S/B - STATIC DSW ERR
XXXX 0000

A BIT, IN ADDITION TO NOT READY, WAS ON IN THE DSW WHEN IT WAS SENSED BEFORE GIVING A CONTROL COMMAND TO THE 1442. USE THE ABOVE DSW TABLE TO IDENTIFY THE BIT, THEN TAKE APPROPRIATE CORRECTIVE ACTION.

E0F02 000R AAAA LAST OP - CCCC
WAS S/B - BUSY DSW ERR
XXXX 0003

THIS DSW WAS SENSED IMMEDIATELY AFTER THE 1442 CONTROL COMMAND WAS IDENTIFIED BY CCCC WAS GIVEN. THAT COMMAND SHOULD MAKE THE 1442 BUSY AND NOT READY. NO OTHER BITS SHOULD BE ON.

E0F03 000R AAAA LAST OP - CCCC
DSW - NO INTRPT - LEV4
XXXX

NO OP COMPLETE INTERRUPT WAS RECEIVED FOLLOWING THE LAST CONTROL COMMAND, COMMAND, IDENTIFIED BY CCCC. THE COMMAND WAS RECEIVED BY THE 1442 IF AN E0F02 MESSAGE WAS NOT PRINTED.

E0F04 000R AAAA
WAS S/B - LEV0 DSW ERR
XXXX X003

THIS DSW WAS SENSED IN THE LEVEL ZERO INTERRUPT ROUTINE. THE RESPONSE FOR THE LAST CONTROL COMMAND (IDENTIFIED BY CCCC) SHOULD BE ON, TOGETHER WITH BUSY AND NOT READY.

LAST OP - CCCC
E0F05 000R AAAA
WAS S/B - LEV4 DSW ERR
XXXX X80X

THIS DSW WAS SENSED IN THE LEVEL 4 INTERRUPT ROUTINE. OP COMPLETE BIT SHOULD BE ON. THE LAST CARD AND NOT READY BITS MAY BE ON. ALL OTHER BITS SHOULD BE OFF.

LAST OP - PUNCH
E0F06 000R AAAA
WAS S/B - PCH CK
XXXX 0000

A PUNCH ECHO CHECK OCCURRED WHILE PUNCHING THE LAST CARD. XXXX IS THE PUNCH ECHO THAT WAS READ FROM THE 1442 BUFFER REGISTER FOLLOWING THE PUNCH CHECK. ANY BIT THAT IS ON THIS WORD IDENTIFIES A DESCREPANCY BETWEEN THE PUNCH DIE ECHO AND THE DATA WHICH WAS TO BE PUNCHED IN THE COLUMN. PUNCHING IS TERMINATED WHEN THIS ERROR IS DETECTED; THUS, THE ERROR OCCURRED IN THE LAST COLUMN PUNCHED. IF PUNCHING A ROTATE PATTERN DISCARD THE CARDS PUNCHED AND RESTART THE ROUTINE.

LAST OP - CCCC
E0F07 000R AAAA
WAS S/B - ER CK
XXXX 0000

AN ERROR CHECK OCCURRED DURING THE LAST OPERATION. IF THE LAST OPERATION WAS READ OR PUNCHED, THIS MESSAGE SHOULD BE FOLLOWED BY AN E0F08 MESSAGE WHICH WILL IDENTIFY THE NUMBER OF COLUMNS PROCESSED BEFORE THE ERROR WAS DETECTED. TO CONTINUE, CLEAR ALL CARDS FROM THE 1442 THEN PRESS START. IF PUNCHING A ROTATING PATTERN TO BE READ BY THE NEXT ROUTINE, DISCARD THE CARDS PUNCHED AND RESTART THE ROUTINE.

E0F08 000R AAAA
WAS S/B - COL CNT ER
XXXXX YYYYY

XXXXX IDENTIFIES THE NUMBER OF COLUMN INTERRUPTS THAT OCCURRED DURING THE LAST OPERATION. YYYYY IDENTIFIES THE EXPECTED NUMBER OF INTERRUPTS. IF AN ERROR CHECK OCCURRED DURING THE LAST OPERATION (IDENTIFIED BY AN E0F06 OR E0F07 MESSAGE) THE OPERATION WILL TERMINATE AT THE TIME THE ERROR OCCURS. THUS, THIS ERROR MESSAGE WILL IDENTIFY THE COLUMN BEING PROCESSED WHEN THE ERROR WAS DETECTED.

E0F09 000R AAAA
WAS S/B COL - DATA ERR
XXXX YYYY 000ZZ

THE DATA XXXX READ FROM COLUMN ZZ(IN DECIMAL) DOES NOT AGREE WITH THE EXPECTED DATA YYYY FOR THAT COLUMN. CHECK CARD FOR CORRECT DATA. IF DATA IS CORRECT THEN A READ ERROR OCCURRED. IF THE DATA IS NOT CORRECT, A PUNCH ERROR OCCURED. IN THE LATTER CASE, IF NO PUNCH CHECK WAS DETECTED WHILE PUNCHING THE CARD, THE PUNCH ECHO CHECK IS NOT FUNCTIONING.

LAST OP - CCCC
E0F10 000R AAAA
DSW - NO INTRPT - LEV0
XXXX

NO LEVEL 0 (COLUMN) INTERRUPT WAS RECEIVED FOLLOWING THE LAST CONTROL COMMAND, IDENTIFIED BY CCCC. THE COMMAND WAS RECEIVED BY THE 1442 IF ON E0F02 MESSAGE WAS NOT PRINTED.

---

5. COMMENTS

5.1*** TEST PROCEDURE

5.1.1 TEST ORGANIZATION

TESTS ARE ORGANIZED AS FOLLOWS

1. INITIALIZE THE TEST
   - A. SET FOR START OF PATTERN
   - B. PRINT SET UP MESSAGE.
2. INITIALIZE FOR NEXT CARD
   - A. IF PUNCH TEST - READ THE CARD AND CHECK FOR BLANK.
   - B. SET EXPECTED COLUMN INTERRUPT COUNT.
   - C. SET LOOP ADDRESS
   - D. CHECK DSW FOR READY
3. EXECUTE CONTROL COMMAND
4. CHECK FOR ERRORS
   - A. CHECK DSW FOR BUSY
   - B. WAIT FOR TIMED PERIOD - TIME OUT IF NO INTERRUPT
   - C. CHECK COLUMN INTERRUPT DSW.
   - D. CHECK FOR CORRECT NUMBER OF COLUMN INTERRUPTS.
   - E. CHECK OP COMPLETE DSW.
5. ANALYZE ERROR DATA AND PRINT ERROR MESSAGES.
6. GO TO 2 ABOVE IF LOCK ON FUNCTION.
7. ADVANCE FOR NEXT CARD.
   - A. ROTATE PATTERN
   - B. INCREASE DELAY FOR ROUTINE 5.
   - C. CHECK FOR PATTERN OR DELAY RESET.
8. GO TO NEXT CARD (2 ABOVE).

5.1.2 ERROR CHECKING

ALL TEST ROUTINES CONTAIN THE FOLLOWING COMMON ERROR CHECKING.

1. DEVICE STATUS CHECK - THE DEVICE STATUS IS READ AND CHECKED AS FOLLOWS:

   A. BEFORE AN OPERATION IS INITIATED, THE DSW SHOULD BE ZERO. ANY BITS ON WILL BE IDENTIFIED BY A MESSAGE (E0F01).

   B. IMMEDIATELY AFTER AN OPERATION, THE DSW SHOULD SHOW THE DEVICE TO BE BUSY AND NOT READY. ALL OTHER BITS SHOULD BE OFF. THIS DSW IS SAVED AND CHECKED FOR ERRORS AFTER THE OPERATION IS COMPLETED. A MESSAGE IS PRINTED IDENTIFING ANY ERROR DETECTED (E0F02).

   C. IN INTERRUPT LEVEL ZERO, COLUMN INTERRUPT. THIS DSW SHOULD SHOW THE DEVICE BUSY AND NOT READY WITH THE CORRECT RESPONSE BIT ON. ALL ERRORS DETECTED FOR A CARD ARE OR'D TOGETHER. THUS THE DSW PRINTED IN THE ERROR MESSAGE (E0F04) CONTAINS ALL ERROR BITS WHICH WHERE FOUND ON IN ANY COLUMN DSW AND WILL BE MISSING ANY NORMAL BIT WHICH WAS FOUND OFF IN ANY COLUMN DSW.

   D. IN INTERRUPT LEVEL FOUR OP COMPLETE INTERRUPT. THIS DSW SHOULD SHOW THE DEVICE READY (UNLESS THE HOPPER IS EMPTY) AND NOT BUSY, AND THE OP COMPLETE RESPONSE BIT SHOULD BE ON. A MESSAGE (E0F05) IS PRINTED IDENTIFYING ANY ERROR. NOT READY AND LAST CARD ARE ALSO IDENTIFIED BY UNIQUE MESSAGES. (A0F05 AND A0F06)

2. INTERRUPT CHECK-BOTH COLUMN INTERRUPT AND OP COMPLETE INTERRUPT ARE CHECKED AS FOLLOWS.

   A. COLUMN INTERRUPT - ALL COLUMN INTERRUPTS ARE COUNTED AND COMPARED AGAINST THE EXPECTED NUMBER. A MESSAGE IS PRINTED IF THESE DO NOT AGREE. (E0F08)

   B. OP COMPLETE INTERRUPT - AFTER THE CONTROL COMMAND IS GIVEN, THE PROGRAM GOES TO THE INTERRUPT WAIT ROUTINE. THIS ROUTINE WAITS IN A TIMED LOOP FOR AT LEAST 2 SECONDS. IF NO OP COMPLETE INTERRUPT HAS OCCURRED AT THE END OF THAT TIME, AN ERROR MESSAGE IS PRINTED (E0F03).

3. DATA CHECK

   A. PUNCH - ANY PUNCH ERROR SHOULD BE DETECTED BY THE PUNCH ECHO CIRCUITS IN THE 1442. WHEN A PUNCH ECHO CHECK OCCURS, A MESSAGE IS PRINTED (E0F06) INCLUDING THE ECHO READ BACK FROM THE 1442 BUFFER. THE BITS ON IN THE ECHO WORD IDENTIFY THE BITS IN ERROR. ANY PUNCH ERRORS NOT DETECTED BY THE PUNCH ECHO CHECK WILL CAUSE A READ DATA ERROR IN THE FOLLOWING ROUTINE.

   B. READ - ALL READ TESTS USE DECKS PREPARED BY THE PREVIOUS PUNCH ROUTINE (EXPECT TEST 6). THE READ TEST COMPARES THE DATA READ AGAINST THE DATA PUNCHED. THE EXCEPTION, TEST 6, COMPARES ALL CARDS AGAINST THE FIRST CARD READ.

5.2**** ROUTINE DESCRIPTION

THIS SECTION CONTAINS A DESCRIPTION OF THE PROGRAM ROUTINES AND SUBROUTINES IN APPROXIMATELY THE ORDER IN WHICH THEY APPEAR IN THE PROGRAM AS FOLLOWS -

1. TEST SEQUENCE CONTROL ROUTINE
2. NORMAL TEST ROUTINES
3. OPTIONAL TEST ROUTINES
4. TEST SUBROUTINES
5. ERROR CONTROL ROUTINES
6. INTERRUPT ROUTINES

5.2.1 TEST SEQUENCE CONTROL ROUTINE - CNTRL

THIS ROUTINE CHECKS THE ROUTINE SELECTION SWITCH (SW1 IN THE PROGRAM CONTROL TABLE) AND DETERMINES WHICH TEST ROUTINE IS TO BE RUN NEXT. IF A TEST ROUTINE HAS BEEN SELECTED, IT ESTABLISHED A TRANSFER TO THAT ROUTINE. IF NO ROUTINE IS SELECTED, A TRANSFER IS ESTABLISHED TO THE NEXT TEST ROUTINE IN SEQUENCE.

THE ROUTINE ADDRESS TABLE (RTTBC) WHICH IS PART OF CNTRL, CONTAINS THE ROUTINE ADDRESS FOR ALL TEST ROUTINES IN THE SEQUENCE IN WHICH THEY ARE TO BE RUN.

THE LAST TEST ROUTINE IN THE NORMAL SEQUENCE IS IDENTIFIED BY THE TABLE NRTN. AFTER THIS ROUTINE IS RUN , CNTRL WILL TRANSFER TO MONITOR END AND TERMINATE THE PROGRAM. ROUTINES FOLLOWING THE TABLE NRTN ARE CALLED OPTIONAL TEST ROUTINES AND WILL ONLY BE RUN IF SELECTED.

5.2.2 NORMAL TEST ROUTINES

IF NO TEST ROUTINE IS SELECTED, THESE SIX ROUTINES WILL RUN IN SEQUENCE THEN THE PROGRAM WILL TERMINATE.

1. TEST ROUTINE 1 - PUNCH AND FEED

   THIS ROUTINE READS A CARD, CHECKS TO SEE THAT IT IS BLANK, IF BLANK PUNCHES IT WITH THE PATTERN SET IN THE ROTATE DATA TABLE, THEN SELECTS STACKER TWO AND FEEDS THE PUNCHED CARD OUT. REPEATING THIS SEQUENCE WILL CAUSE A BLANK CARD TO FIRST BE FED INTO STACKER 1 BY THE READ COMMAND THEN A PUNCHED CARD WILL BE FED INTO STACKER 2 BY THE FEED COMMAND. THE CARDS ARE PUNCHED WITH A ROTATING PATTERN, I.E., THE PATTERN IS SHIFTED ONE COLUMN TO THE LEFT FOR EACH SUCCEEDING CARD PUNCHED.

   LOCK ON FUNCTION - THE PROGRAM WILL LOCK IN THE PUNCH OPERATION. ONLY PUNCH CONTROL COMMANDS WILL BE GIVEN. THE DATA PATTERN WILL ALSO LOCK WITH THE LAST PATTERN PRIOR TO SETTING THE LOCK SWITCH.

2. TEST ROUTINE 2 - READ ROTATE PATTERN

   THIS ROUTINE READS THE CARDS PUNCHED BY ROUTINE 1. THE DATA READ IS COMPARED TO THE DATA PUNCHED. ANY ERROR DETECTED WILL BE PRINTED.

   LOCK ON FUNCTION - NOT APPLICABLE.

3. TEST ROUTINE 3 - PUNCH 40 COLUMNS

   THIS ROUTINE WILL PUNCH THE ROTATING PATTERN IN THE FIRST 40 COLUMNS OF EACH CARD. EACH CARD IS CHECKED FOR BLANK BEFORE IT IS PUNCHED. ALL PUNCHED CARDS ARE SELECTED TO STACKER 2.

   LOCK ON FUNCTION - LOCK IN THE PUNCH FUNCTION ONLY. CARDS WILL NOT BE CHECKED FOR BLANK AND THE PATTERN WILL NOT ROTATE.

4. TEST ROUTINE 4 - PUNCH FLIPPED PATTERN

   THIS ROUTINE READS THE ROTATE PATTERN PUNCHED BY ROUTINE 3 AND COMPARES IT WITH THE DESIRED PATTERN. IT WILL THEN PUNCH THE MIRROR IMAGE OF THAT PATTERN IN COLUMNS 41-80.

   LOCK ON FUNCTION - NOT APPLICABLE.

5. TEST ROUTINE 5 - READ FLIPPED PATTERN

   THIS ROUTINE READS THE PATTERNS PUNCHED BY ROUTINES 3 AND 4. IT WILL THEN COMPARE THIS DATA WITH THE DESIRED PATTERNS.

   LOCK ON FUNCTION - NOT APPLICABLE.

6. TEST ROUTINE 6 - CLUTCH TEST

   THIS ROUTINE READS GANG PUNCHED CARDS (MAY BE BLANKS) WITH AN INCREASING DELAY BETWEEN EACH START READ COMMAND. ALL CARDS READ ARE COMPARED WITH THE FIRST CARD. THE DELAY IS INCREASED BY 1 MILLI SECOND FOR EACH CARD READ TO A MAXIMUM OF 125 MILLISECONDS. THE DELAY IS THEN RESET TO ZERO AND THE CYCLE REPEATED.

   LOCK ON FUNCTION - LOCK ON READ WITH NO CHANGE IN DELAY BETWEEN START READ COMMANDS.

   SPECIFY DELAY - THE DELAY CAN BE SPECIFIED BY A FUNCTION 2 BIT SWITCH ENTRY. THIS DELAY IS INCREASED BY APPROXIMATELY 8K (5K FOR 2.2 MSEC MEMORY) FOR EACH BINARY INCREMENT SET IN SWITCHES 8-15.

5.2.3 OPTIONAL TEST ROUTINES

1. TEST ROUTINE 7 - PUNCH FROM SWITCHES

   THIS ROUTINE WILL PUNCH ALL CARDS WITH THE DATA SET IN SWITCHES 0-11. THE NUMBER OF COLUMNS TO BE PUNCHED CAN BE SPECIFIED BY A FUNCTION 2 BIT SWITCH ENTRY. IF THE NUMBER OF COLUMNS IS NOT SPECIFIED, 80 COLUMNS WILL BE PUNCHED. CARDS ARE NOT CHECKED FOR BLANK BEFORE PUNCHING.

   LOCK ON FUNCTION - NOT APPLICABLE.

2. TEST ROUTINE 8 - GANG PUNCH

   THIS ROUTINE WILL READ THE FIRST CARD THEN PUNCH ALL FOLLOWING CARDS WITH THE DATA READ FROM THE FIRST CARD. EACH CARD WILL BE READ TO CHECK FOR BLANK.

   LOCK ON FUNCTION - WILL BYPASS THE CHECK FOR BLANK CARDS.

3. TEST ROUTINE 9 - MODIFIED PUNCH DATA

   THIS ROUTINE WILL READ IN ONE CARD AND REPLACE THE PUNCH DATA TABLE WITH THE DATA PATTERN PUNCHED IN THAT CARD. THE PROGRAM WILL THEN AUTOMATICALLY RESTART FROM ROUTINE 1.

5.2.4 TEST SUBROUTINES

1. ROTATE THE DATA TABLE

   THIS SUBROUTINE ADVANCES THE PUNCH AND READ COMPARE ADDRESSES THROUGH A DOUBLE DATA TABLE.

2. CHECK FOR BLANK CARDS

   THIS SUBROUTINE READS ONE CARD THEN CHECKS ALL COLUMNS FOR DATA. IF CARD IS NOT BLANK, AN ERROR MESSAGE IS PRINTED.

3. FEED A CARD

   THIS SUBROUTINE CHECKS FOR 1442 READY, THEN FEEDS ONE CARD. FOLLOWING THE FEED COMMAND, THE SUBROUTINE TRANSFERS TO THE WAIT ROUTINE UNTIL THE INTERRUPT IS RECEIVED.

4. READ A CARD

   THIS SUBROUTINE SETS EXPECTED COLUMN COUNT TO 80, CHECKS ON READY THEN EXECUTES A START READ COMMAND. THE SUBROUTINE TRANSFERS TO THE WAIT ROUTINE UNTIL THE INTERRUPT IS RECEIVED.

5. PUNCH A CARD

THIS SUBROUTINE SETS THE EXPECTED COLUMN COUNT, CHECKS ON READY, SELECTS STACKER 2, THEN EXECUTES A START PUNCH COMMAND. THE SUBROUTINE TRANSFERS TO THE WAIT ROUTINE UNTIL THE INTERRUPT IS RECEIVED.

6. COMPARE DATA READ

THIS SUBROUTINE COMPARES DATA READ WITH THE EXPECTED PATTERN FOR THAT CARD. IF THERE ARE ANY DISCREPANCIES, AN E0F09 MESSAGE IS PRINTED.

7. LOCK ON FUNCTION

THIS SUBROUTINE IS ENTERED AT THE COMPLETION OF EACH PUNCH ROUTINE BEFORE ADVANCING TO THE DATA FOR THE NEXT PASS. THE SUBROUTINE CHECKS THE LOCK ON FUNCTION SWITCH, SWITCH 10. IF THIS SWITCH IS ON THE SUBROUTINE GOES TO THE ADDRESS SET IN LOOP.

8. READY

THIS SUBROUTINE IS ENTERED BEFORE ANY 1442 CONTROL COMMAND IS GIVEN. IT READS THE 1442 DSW AND CHECKS IT FOR READY (ALL BITS OFF). ANY BIT ON OTHER THAN NOT READY (BIT 15) WILL BE IDENTIFIED BY AN E0F01 MESSAGE. IF ANY BIT IS ON, A NRDY MESSAGE (A0F05) WILL BE PRINTED. THIS ROUTINE STAYS IN A LOOP, PRINTING THE NRDY MESSAGE EACH 10 SECONDS, UNTIL ALL BITS IN THE DSW GO OFF.

9. LAST CARD

THIS SUBROUTINE IS ENTERED AFTER AN OPERATION IS COMPLETED IF THE LAST CARD INDICATOR WAS TURNED ON DURING THAT OPERATION. THE SUBROUTINE WILL FEED OUT THE LAST CARD, PRINT A MESSAGE INDICATING THAT THE LAST CARD INDICATOR WAS DETECTED, THEN GO TO CNTRL TO TERMINATE THE ROUTINE AND ADVANCE TO THE NEXT ROUTINE.

5.2.5 ERROR CONTROL ROUTINES

1. INTERRUPT WAIT ROUTINE

ALL SUBROUTINES COME HERE AFTER THE START OF AN I/O OPERATION FROM WHICH AN INTERRUPT IS EXPECTED. THIS ROUTINE RESETS ALL ERROR CONTROL WORDS, SENSES AND STORES THE BUSY DSW, THEN WAITS IN A TIMED LOOP (AT LEAST 2 SECONDS) FOR THE OP COMPLETE INTERRUPT.

IF NO OP COMPLETE INTERRUPT IS RECEIVED, THE FOLLOWING ERROR MESSAGES ARE PRINTED.

A. E0F02 IF BUSY DSW ERROR

B. E0F10 IF NO COLUMN INTERRUPTS

C. E0F03 - NO OP COMPLETE INTERRUPT.

IF OP COMPLETE INTERRUPT IS RECEIVED, THIS ROUTINE WILL CHECK FOR PROPER PERFORMANCE OF THE OPERATION. THE FOLLOWING CHECKS ARE MADE AND ERROR MESSAGES PRINTED IF APPROPRIATE.

A. E0F02 IF BUSY DSW ERROR

B. E0F04 IF COLUMN INTERRUPT DSW ERROR.

C. E0F05 IF OP COMPLETE DSW ERROR.

D. E0F10 IF NO COLUMN INTERRUPTS.

E. E0F08 IF INCORRECT NUMBER OF COLUMN INTERRUPTS.

THE ROUTINE WILL THEN CHECK FOR LAST CARD. IF THE LAST CARD INDICATOR IS ON, THIS ROUTINE WILL TRANSFER TO THE LAST CARD ROUTINE. IF NO LAST CARD, THE ROUTINE WILL RETURN TO THE I/O SUBROUTINE FROM WHICH IT WAS ENTERED.

2. PRINT ERROR MESSAGES

THIS ROUTINE PRINTS ALL THE ERROR MESSAGES. IF THE MESSAGE IS THE FIRST ERROR MESSAGE FOLLOWING AN I/O CONTROL COMMAND, A LAST OP MESSAGE WILL PRECEED THE ERROR MESSAGE. THIS LAST OP MESSAGE WILL IDENTIFY THE LAST I/O CONTROL OPERATION EXECUTED. THE ERROR MESSAGE FOLLOWING REFERS TO ERRORS DETECTED IN THAT OPERATION.

5.2.6 INTERRUPT ROUTINES

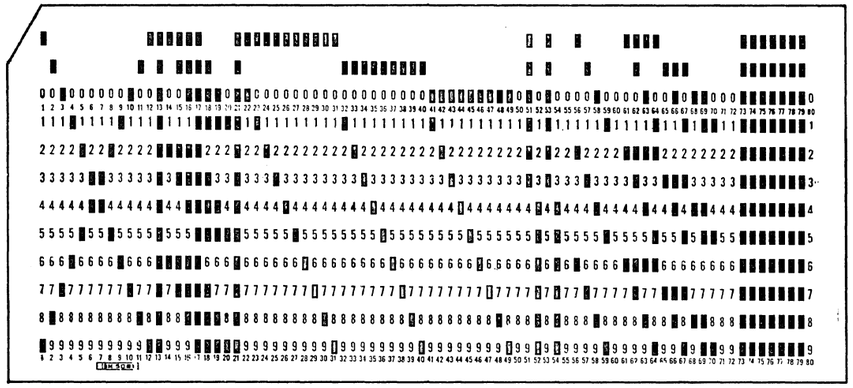
1. COLUMN INTERRUPT - LEVEL 0

THIS ROUTINE SENSES RESETS AND STORES THE DSW, THEN CHECKS FOR CORRECT DSW. ANY ERROR BITS ARE STORED. AFTER THE OPERATION IS COMPLETE, ALL ERROR BITS DETECTED DURING THAT OPERATION ARE AVAILABLE AND WILL BE PRINTED IN AN E0F04 MESSAGE.

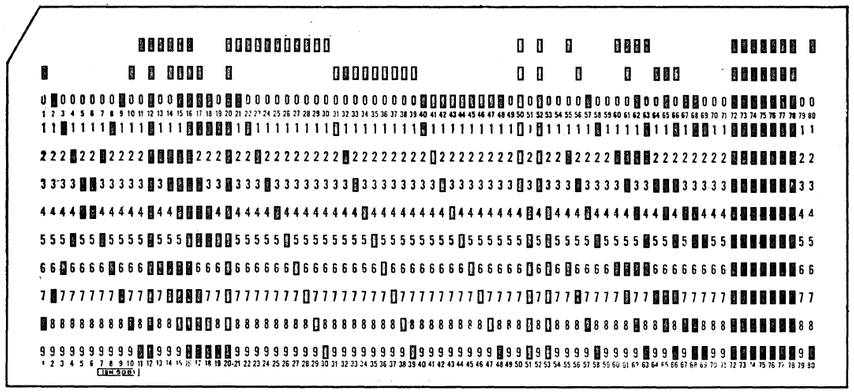
THE ROUTINE COUNTS THE NUMBER OF INTERRUPTS AND EXECUTES EITHER PUNCH OR READ COMMAND, THEN RETURNS TO THE MONITOR LEVEL 0 INTERRUPT ROUTINE.

2. OP - COMPLETE INTERRUPT - LEVEL4

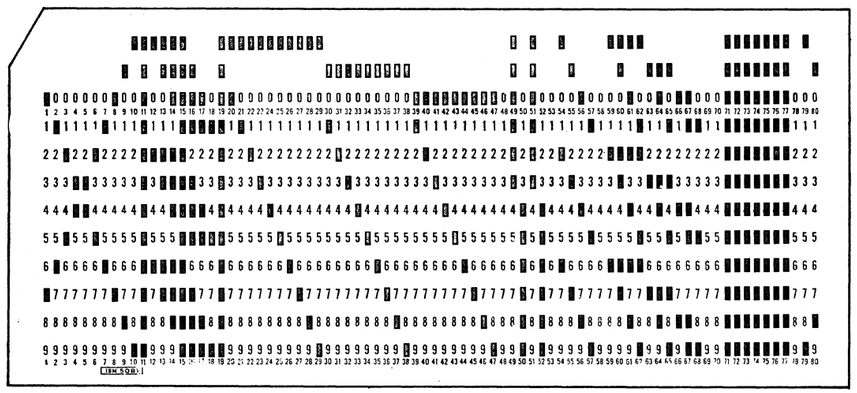
THIS ROUTINE SENSE, RESETS, AND STORES THE DSW, SETS A SWITCH INDICATING THAT THIS INTERRUPT WAS RECEIVED, THEN RETURNS TO THE MONITOR LEVEL 4 INTERRUPT ROUTINE.



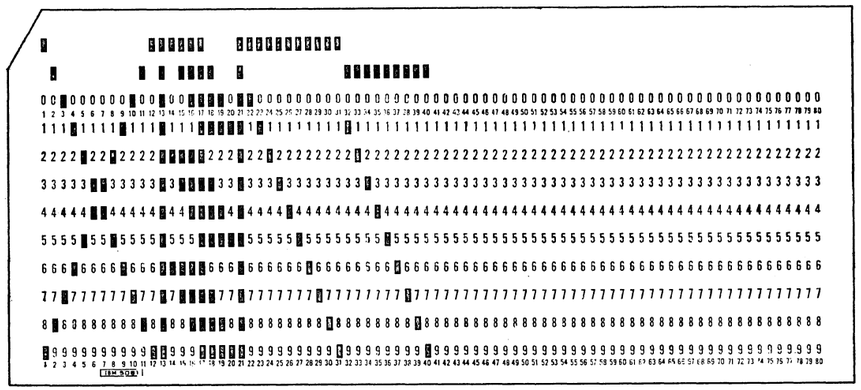
1ST CARD PUNCHED IN ROUTINE 1 AND USED IN ROUTINE 2.



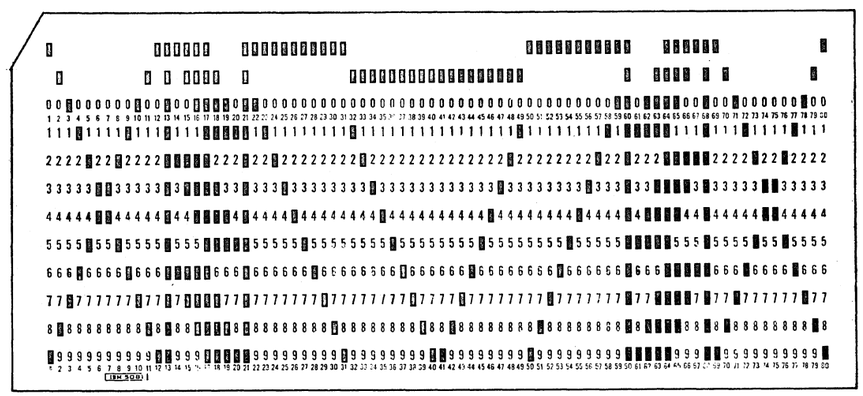
2ND CARD PUNCHED IN ROUTINE 1 AND USED IN ROUTINE 2.



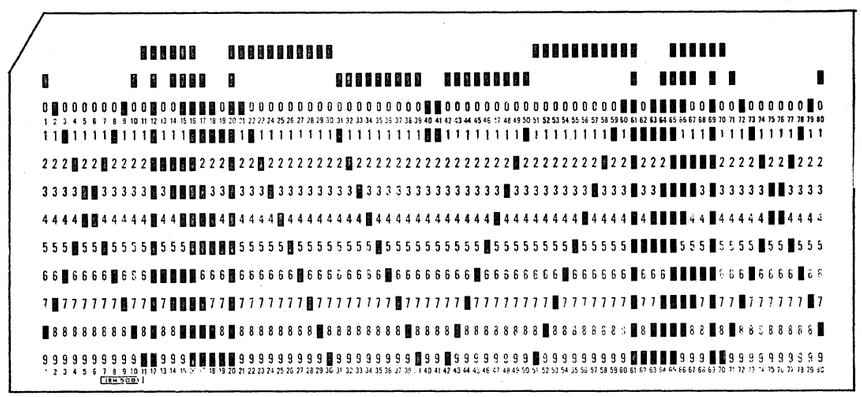
3RD CARD PUNCHED IN ROUTINE 1 AND USED IN ROUTINE 2.



1ST CARD PUNCHED IN ROUTINE 3 TO BE USED IN ROUTINE 4.



1ST CARD WITH COLUMNS 41 THROUGH 80 PUNCHED IN ROUTINE 4.



2ND CARD WITH COLUMNS 41 THROUGH 80 PUNCHED IN ROUTINE 4.

```
                ********************************************************** 30F00030
                *                                                        * 30F00040
                *  THIS ENGINEERING CHANGE REFLECTS MAJOR                * 30F00050
                *  CHANGES TO THE DIAGNOSTIC MONITOR.  PREVIOUS          * 30F00060
                *  TESTS WILL NOT RUN WITH DIAGNOSTIC MONITOR II.        * 30F00070
                *                                                        * 30F00080
                *  THIS TEST WILL NOT RUN WITH PREVIOUS MONITORS.        * 30F00090
                *                                                        * 30F00100
                *  TESTS PRIOR TO EC 419643 DATED NOV 15, 1966           * 30F00110
                *  WILL NOT OPERATE PROPERLY WITH DIAGNOSTIC             * 30F00120
                *  MONITOR II.                                           * 30F00130
                *                                                        * 30F00140
                ********************************************************** 30F00150
                ******************************************** 30F00160
                *------------------------------------------* 30F00170
                *     1130 - 1442 READER/PUNCH FUNCTION TEST * 30F00180
                *------------------------------------------* 30F00190
                ******************************************** 30F00200
                *              EQUATE TABLE                * 30F00210
                ******************************************** 30F00220
                *     THIS TABLE EQUATES TEST PROGRAM LABELS * 30F00230
                *     TO THEIR EQUIVALENT DIAGNOSTIC MONITOR * 30F00240
                *     ADDRESSES.                             * 30F00250
                *                                            * 30F00260
                *------------------------------------------* 30F00270
                *     MONITOR ENTRY ADDRESSES                * 30F00280
                *------------------------------------------* 30F00290
0160            BEGIN EQU     /160       BEGIN ROUTINE      30F00300
0161            START EQU     BEGIN+1    SUPERVISOR ROUTINE 30F00310
0162            ERROR EQU     START+1    ERROR LOG ROUTINE  30F00320
0163            LOG   EQU     ERROR+1    STATUS LOG ROUTINE 30F00330
0164            END   EQU     LOG+1      END ROUTINE        30F00340
                *                                            30F00350
                *------------------------------------------* 30F00360
                *     MONITOR CONTROL WORD ADDRESSES         * 30F00370
                *------------------------------------------* 30F00380
0165            RTNSW EQU     END+1      ROUTINE START SW   30F00390
0166            ERLCK EQU     END+2      LOCK ON ERROR CONTROL 30F00400
0167            LOGBY EQU     END+3      I/O BUSY SW ADDRS  30F00410
0168            RLCF  EQU     END+4      RELOCATION FACTOR ADDRS 30F00420
                *                                            30F00430
                *------------------------------------------* 30F00440
                *     INTERRUPT TRANSFER VECTOR ADDRESSES    * 30F00450
                *------------------------------------------* 30F00460
017A            IL0   EQU     /17A       INTERRUPT LEVEL ZERO 30F00470
018A            IL1   EQU     IL0+16     INTERRUPT LEVEL ONE 30F00480
019A            IL2   EQU     IL1+16     INTERRUPT LEVEL TWO 30F00490
01AA            IL3   EQU     IL2+16     INTERRUPT LEVEL THREE 30F00500
01BA            IL4   EQU     IL3+16     INTERRUPT LEVEL FOUR 30F00510
01BB            RQTY  EQU     IL4+1      CONSOLE PRINTER REQUEST 30F00520
01BC            RQKB  EQU     RQTY+1     USE KEYBOARD REQUEST 30F00530
01BD            SVKB  EQU     RQKB+1     KB SERVICE REQUEST 30F00540
                *                                            30F00550
                ********************************************** 30F00560
0000                ORG     **/05DC                          30F00570
                *                                            30F00580
                *------------------------------------------* 30F00590
                *     THE MONITOR USES CORE LOCATIONS 0-05DC. 30F00600
                *     FOR CONTENTS OF THESE ADDRESSES REFER  * 30F00610
                *     TO THE DIAGNOSTIC MONITOR LISTING.     * 30F00620
                *------------------------------------------* 30F00630
                *                                            * 30F00640
                *                                            * 30F00650
                *                                            * 30F00660
                ******************************************** 30F00670
                *              PROGRAM CONTROL TABLE       * 30F00680
                ******************************************** 30F00690
                *                                            30F00700
```



```
05DC 0 030F     PID   DC      /030F      PROGRAM ID          30F00710
05DD 0 0000     RID   DC      *-*        ROUTINE ID          30F00720
05DE 0 0000     RAD   DC      *-*        ROUTINE ADDRS       30F00730
05DF 0 0000     SW0   DC      *-*        PROGRAM CONTROL     30F00740
05E0 0 0000     SW1   DC      *-*        ROUTINE SELECTION   30F00750
05E1 0 0000     SW2   DC      *-*                            30F00760
05E2 0 0000     SW3   DC      *-*                            30F00770
05E3 1 05EB           DC      STRT       LOOP ADDRS          30F00780
05E4 1 05EB           DC      STRT       RESTART ADDRESS     30F00790
05E5 0 0000     MLSCF DC      *-*        SET BY WAIT RTN AND MON 30F00800
05E6 0 0000           DC      *-*        SET BY CNTRL AND INRTPT 30F00810
05E7 0 FFFF           DC      /FFFF      TERMINATOR          30F00820
                *                                           30F00830
                ********************************************** 30F00840
                *              TEST INITIALIZATION           * 30F00850
                ********************************************** 30F00860
                *                                           30F00870
05E8 00 44800160 BGIN BSI   I BEGIN                         30F00880
05EA 1 05DC           DC      PID        PCT ADDRESS         30F00890
                *                                           30F00900
                *------------------------------------------* 30F00910
                *  START OF TEST AND SINGLE PASS INITIALIZATION 30F00920
                *------------------------------------------* 30F00930
                *                                           30F00940
05EB 0 6100     STRT  LDX     1 0        SET TO START WITH   30F00950
05EC 0 69F0           STX     1 RID       FIRST ROUTINE      30F00960
05ED 01 65000911      LDX   L1 INTRO                        30F00970
05EF 00 6D00017A      STX   L1 ILO       SET COL INTRPT ADDRS 30F00980
05F1 01 6D000684      STX   L1 M         RESET MULT LINE CONTROL 30F00990
05F3 01 65000937      LDX   L1 INTR4                        30F01000
05F5 00 6D0001B8      STX   L1 IL4-2     SET OP COMP INTRPT ADDRS 30F01010
05F7 0 4000           BSI     CNTRL                         30F01020
                *                                           30F01030
                ****** ***************************************** 30F01040
                *              SEQUENCE CONTROL ROUTINE      * 30F01050
                ********************************************** 30F01060
                *     THIS ROUTINE CHECKS SW1 AND CONTROLS   * 30F01070
                *     THE SEQUENCE IN WHICH TEST ROUTINES    * 30F01080
                *     ARE RUN.                               * 30F01090
                *------------------------------------------* 30F01100
                *                                           30F01110
05F8 0 0000     CNTRL DC      *-*                           30F01120
05F9 0 C0E6           LD      SW1                           30F01130
05FA 01 4C080603      BSC   L CN20,+     BR IF NO RTN SELECTD 30F01140
                *                                           30F01150
05FC 0 D0E0     CN10  STO     RID        SAVE NEW RTN NUMBER 30F01160
05FD 0 9018           S       RIDCK                         30F01170
05FE 01 4C080609      BSC   L CN30,+     BR IF VALID RTN     30F01180
0600 0 1810           SRA     16                            30F01190
0601 0 D0DE           STO     SW1        IF INVALID RTN GO   30F01200
0602 0 D0DA           STO     RID         TO RTN ONE         30F01210
                *                                           30F01220
0603 01 740105DD CN20 MDX   L RID,1      ADV TO NEXT RTN     30F01230
0605 0 C0D7           LD      RID        CHECK FOR END OF    30F01240
0606 0 9010           S       RTNOM       NORMAL SEQUENCE    30F01250
0607 00 44800164      BSI   I END,-2     END OF PROGRAM      30F01260
                *                                           30F01270
0609 01 658005DD CN30 LDX   I1 RID       XR1=NEW ROUTINE NUMBER 30F01280
060B 01 C5000617      LD    L1 RTTBL-1   FETCH RETURN ADRS    30F01290
060D 0 D0D6           STO     RAD        STORE NEW RTN ADDRS 30F01300
060E 0 D0D7           STO     MLSCF+1    SET MLSCF FOR RETURN 30F01310
060F 00 D4000165      STO   L RTNSW      SET RTN START SW    30F01320
0611 0 1810           SRA     16                            30F01330
0612 01 D4000894      STO   L LOOP                          30F01340
0614 00 44800161      BSI   I START      GO TO MONITOR       30F01350
                *                                           30F01360
0616 0 0009     RIDCK DC      LRTN-RTTBL+1                  30F01370
0617 0 0006     RTNOM DC      NRTN-RTTBL+1                  30F01380
```

```
                    *-----------------------------------------------        30F01390
                    *     ROUTINE ADDRESS TABLE                             30F01400
                    *-----------------------------------------------        30F01410
                    *                                                       30F01420
0618 1  0621        RTTBL DC      RT1        PUNCH AND FEED                 30F01430
0619 1  0638              DC      RT2        READ ROTATE PATTERN            30F01440
061A 1  0654              DC      RT3        PUNCH 40 COLUMNS               30F01450
061B 1  0669              DC      RT4        PUNCH FLIPPED PATTERN          30F01460
061C 1  0694              DC      RT5        READ FLIPPED PATTERN           30F01470
061D 1  06AB        NRTN  DC      RT6        READ ANY CARD                  30F01480
061E 1  06E6              DC      RT7        PUNCH FROM BIT SWS             30F01490
061F 1  071A              DC      RT8        GANG PUNCH                     30F01500
0620 1  0731        LRTN  DC      RT9        MODIFY ROTATE PATTERN          30F01510
                    *                                                       30F01520
                    *                                                       30F01530
                    ***********************************************         30F01540
                    *          ROUTINE 1 - PUNCH AND FEED                   30F01550
                    ***********************************************         30F01560
                    * THIS ROUTINE WILL READ A CARD, CHECK THAT THE         30F01570
                    * CARD IS BLANK, PUNCH THE CARD WITH A ROTATING         30F01580
                    * PATTERN, THEN FEED A CARD. ALL PUNCHED CARDS          30F01590
                    * WILL GO TO STACKER 2, ALL BLANK CARDS WILL            30F01600
                    * GO TO STACKER 1.                                      30F01610
                    *-----------------------------------------------        30F01620
                    *                                                       30F01630
0621 01 65000A33    RT1   LDX  L1 WAREA      SET FOR START OF               30F01640
0623 01 6D000784          STX  L1 DADRS       ROTATE PATTERN                30F01650
0625 0  6101              LDX   1 1          MESSAGE NUMBER                 30F01660
0626 01 670009EB          LDX  L3 ALDBK      LD BLANKS                      30F01670
0628 01 44000967          BSI  L  TYPE       PRINT MESSAGE                  30F01680
                    *                                                       30F01690
062A 01 4400074A    RT11  BSI  L  BLANK      CK FOR BLANK CARD              30F01700
062C 01 6C000894          STX  L  LOOP       SET LOOP FUNCTION ADDRS        30F01710
062E 0  6350              LDX   3 80         SET NUMBER OF COLUMNS          30F01720
062F 01 4400078D          BSI  L  PNCHR      PUNCH ONE CARD                 30F01730
0631 01 440007F0          BSI  L  LOCK       CHECK FOR LOCK ON FUNC         30F01740
                    *                                                       30F01750
0633 01 4400073D          BSI  L  ROTAT      ROTATE THE PATTERN             30F01760
0635 01 4400075B          BSI  L  FEED       FEED A CARD                    30F01770
0637 0  70F2              MDX     RT11                                      30F01780
                    *                                                       30F01790
                    ***********************************************         30F01800
                    *          ROUTINE 2 - READ ROTATE PATTERN              30F01810
                    ***********************************************         30F01820
                    * THIS ROUTINE WILL READ THE ROTATE PATTERN             30F01830
                    * PUNCHED BY ROUTINE 3. IT WILL COMPARE THE             30F01840
                    * PATTERN ON EACH CARD WITH THE DESIRED PATTERN         30F01850
                    * FOR THAT CARD.                                        30F01860
                    *-----------------------------------------------        30F01870
                    *                                                       30F01880
0638 01 65000A33    RT2   LDX  L1 WAREA      SET FOR START OF               30F01890
063A 01 6D000784          STX  L1 DADRS       ROTATE PATTERN                30F01900
063C 0  6102              LDX   1 2          MESSAGE NUMBER                 30F01910
063D 01 67000A0D          LDX  L3 ASTOH      STK TO HOPPER                  30F01920
063F 01 44000967          BSI  L  TYPE       PRINT MESSAGE                  30F01930
                    *                                                       30F01940
0641 0  6350        RT21  LDX   3 80         SET ALL BITS IN                30F01950
0642 01 C4000768          LD   L  TERM        READ AREA                     30F01960
0644 01 D7000A83    RT22  STO  L3 RAREA-1                                   30F01970
0646 0  73FF              MDX   3 -1                                        30F01980
0647 0  70FC              MDX     RT22                                      30F01990
                    *                                                       30F02000
0648 01 65000A84    RT23  LDX  L1 RAREA                                     30F02010
064A 01 4400076C          BSI  L  READR      READ ONE CARD                  30F02020
064C 01 4C100648          BSC  L  RT23,-     REPEAT IF NO OP COMP           30F02030
064E 0  6350              LDX   3 80         SET NUMBER OF COLUMNS          30F02040
064F 01 440007A3          BSI  L  COMPR      COMPARE DATA READ              30F02050
                    *                         WITH DATA PUNCHED             30F02060
```



```
                    *                                                       30F02070
0651 01 4400073D          BSI  L  ROTAT      ROTATE THE PATTERN             30F02080
0653 0  70ED              MDX     RT21                                      30F02090
                    *                                                       30F02100
                    ***********************************************         30F02110
                    *          ROUTINE 3 - PUNCH 40 COLUMNS                 30F02120
                    ***********************************************         30F02130
                    * THIS ROUTINE WILL PUNCH THE ROTATING PATTERN          30F02140
                    * IN THE FIRST 40 COLUMNS OF EACH CARD. ALL             30F02150
                    * CARDS WILL GO TO STACKER 2.                           30F02160
                    *-----------------------------------------------        30F02170
                    *                                                       30F02180
0654 01 65000A33    RT3   LDX  L1 WAREA      SET FOR START OF               30F02190
0656 01 6D000784          STX  L1 DADRS       ROTATE PATTERN                30F02200
0658 0  6101              LDX   1 1          MESSAGE NUMBER                 30F02210
0659 01 670009EB          LDX  L3 ALDBK      LD BLANKS                      30F02220
065B 01 44000967          BSI  L  TYPE       PRINT MESSAGE                  30F02230
                    *                                                       30F02240
065D 01 4400074A    RT31  BSI  L  BLANK      CK FOR BLANK CARD              30F02250
065F 01 6C000894          STX  L  LOOP       SET LOOP FUNCTION ADDRS        30F02260
0661 0  6328              LDX   3 40         SET NUMBER OF COLUMNS          30F02270
0662 01 4400078D          BSI  L  PNCHR      PUNCH ONE CARD                 30F02280
0664 01 440007F0          BSI  L  LOCK       CHECK FOR LOCK ON FUNC         30F02290
                    *                                                       30F02300
0666 01 4400073D          BSI  L  ROTAT      ROTATE THE PATTERN             30F02310
0668 0  70F4              MDX     RT31                                      30F02320
                    *                                                       30F02330
                    ***********************************************         30F02340
                    *          ROUTINE 4 - PUNCH FLIPPED PATTERN            30F02350
                    ***********************************************         30F02360
                    * THIS ROUTINE WILL READ THE ROTATE PATTERN             30F02370
                    * PUNCHED BY ROUTINE 3 AND COMPARE IT WITH              30F02380
                    * THE DESIRED PATTERN. IT WILL THEN PUNCH THE           30F02390
                    * MIRROR IMAGE OF THAT PATTERN IN COLUMNS 41-80.        30F02400
                    *-----------------------------------------------        30F02410
                    *                                                       30F02420
0669 01 65000A33    RT4   LDX  L1 WAREA      SET FOR START OF               30F02430
066B 01 6D000784          STX  L1 DADRS       ROTATE PATTERN                30F02440
066D 0  6102              LDX   1 2          MESSAGE NUMBER                 30F02450
066E 01 67000A0D          LDX  L3 ASTOH      STK TO HOPPER                  30F02460
0670 01 44000967          BSI  L  TYPE       PRINT MESSAGE                  30F02470
                    *                                                       30F02480
0672 01 65000A84    RT41  LDX  L1 RAREA                                     30F02490
0674 01 4400076C          BSI  L  READR      READ ONE CARD                  30F02500
0676 01 4C100672          BSC  L  RT41,-     REPEAT IF NO OP COMP           30F02510
0678 0  6328              LDX   3 40         SET NUMBER OF COLUMNS          30F02520
0679 01 440007A3          BSI  L  COMPR      COMPARE DATA READ              30F02530
                    *                         WITH DATA PUNCHED             30F02540
                    *                                                       30F02550
067B 01 4400073D          BSI  L  ROTAT      ROTATE THE PATTERN             30F02560
                    *                                                       30F02570
067D 0  63FE        RT42  LDX   3 -2         LOAD XR 3                      30F02580
067E 0  62D8              LDX   2 -40        LOAD XR 2                      30F02590
                    *                                                       30F02600
067F 01 C6000AAC    FLIP  LD   L2 RAREA+40   DATA READ                      30F02610
0681 01 D7000AD5          STO  L3 RAREA+81   NEW LOCATION                   30F02620
0683 0  73FF              MDX   3 -1         ADJ XR 3                       30F02630
0684 0  7201              MDX   2 1          ADJ XR 2                       30F02640
0685 0  70F9              MDX     FLIP                                      30F02650
                    *                                                       30F02660
0686 0  62D8              LDX   2 -40        LOAD XR 2                      30F02670
0687 0  1011              SLA     17         CLEAR ACC                      30F02680
0688 01 D6000AAC    CLEAR STO  L2 RAREA+40   CLEAR COL 1 TO 40              30F02690
068A 0  7201              MDX   2 1                                         30F02700
068B 0  70FC              MDX     CLEAR                                     30F02710
                    *                                                       30F02720
068C 01 65000A84          LDX  L1 RAREA                                     30F02730
068E 01 6D000784          STX  L1 DADRS      SET PUNCH DATA ADRS            30F02740
```

```
0690 0  6350            LDX   3 80          SET NUMBER OF COLUMNS          30F02750
0691 01 440007BD        BSI   L  PNCHR      PUNCH ONE CARD                 30F02760
0693 0  70DE            MDX      RT41                                      30F02770
                *                                                         30F02780
                *****************************************               30F02790
                *            ROUTINE 5 - READ FLIPPED PATTERN             30F02800
                *****************************************               30F02810
                *  THIS ROUTINE WILL READ THE FLIPPED PATTERN             30F02820
                *  PUNCHED BY ROUTINES 3 AND 4, THEN COMPARE              30F02830
                *  WITH DESIRED PATTERN.                                  30F02840
                *---------------------------------------                30F02850
                *                                                         30F02860
0694 01 65000A33 RT5    LDX   L1 WAREA      SET FOR START OF              30F02870
0696 01 6D000784        STX   L1 DADRS       ROTATE PATTERN               30F02880
0698 0  6102            LDX      1 2        MESSAGE NUMBER                30F02890
0699 01 67000A0D        LDX   L3 ASTOH      STK TO HOPPER                 30F02900
069B 01 44000967        BSI   L  TYPE       PRINT MESSAGE                 30F02910
                *                                                         30F02920
069D 01 65000A84 RT51   LDX   L1 RAREA                                    30F02930
069F 01 4400076C        BSI   L  READR      READ ONE CARD                 30F02940
06A1 01 4C10069D        BSC   L  RT51,-     REPEAT IF NO OP COMP          30F02950
06A3 0  6328            LDX      3 40       SET NUMBER OF COLUMNS         30F02960
06A4 01 6C000780        STX   L  FLIPS      SET FLIP SW                   30F02970
06A6 01 440007A3        BSI   L  COMPR      COMPARE DATA READ             30F02980
                *                            WITH DATA PUNCHED            30F02990
                *                                                         30F03000
06A8 01 4400073D        BSI   L  ROTAT      ROTATE THE PATTERN            30F03010
06AA 0  70F2            MDX      RT51                                      30F03020
                *                                                         30F03030
                *****************************************               30F03040
                *            ROUTINE 6 - CLUTCH TEST                      30F03050
                *****************************************               30F03060
                *  THIS ROUTINE WILL READ GANG PUNCHED CARDS WITH         30F03070
                *  AND INCREASING DELAY BETWEEN EACH START READ           30F03080
                *  COMMAND. ALL CARDS READ WILL BE COMPARED WITH          30F03090
                *  THE FIRST CARD.                                        30F03100
                *---------------------------------------                30F03110
                *                                                         30F03120
06AB 0  6104    RT6     LDX      1 4        MESSAGE NUMBER                30F03130
06AC 01 67000A27        LDX   L3 ALACD      OR GANG PUNCH                 30F03140
06AE 01 6F000974        STX   L3 ALPHA+1                                  30F03150
06B0 01 670009EB        LDX   L3 ALDBK      LD BLANKS                     30F03160
06B2 01 44000967        BSI   L  TYPE       PRINT MESSAGE                 30F03170
                *                                                         30F03180
06B4 01 65000AD4        LDX   L1 RAREB                                    30F03190
06B6 01 4400076C        BSI   L  READR      READ ONE CARD                 30F03200
                *                                                         30F03210
06B8 0  1810    RT61    SRA      16                                       30F03220
06B9 01 D40006E3        STO   L  DFACT      RESET CLUTCH DELAY FACTOR     30F03230
06BB 0  637D            LDX      3 125      INITIALIZE PASS COUNT         30F03240
06BC 0  6B28            STX      3 T6CNT                                  30F03250
                *                                                         30F03260
06BD 01 6C000894        STX   L  LOOP       SET LOOP FUNCTION ADDRS       30F03270
06BF 01 C40005E1 RT62   LD    L  SW2        CK SW2 FOR CONSTANT DELAY     30F03280
06C1 0  1003            SLA      3                                        30F03290
06C2 0  4808            BSC      +                                        30F03300
06C3 0  C01F            LD       DFACT      LD DELAY FACTOR               30F03310
06C4 0  D01F            STO      DLYCT      SET DELAY COUNTER             30F03320
                *                                                         30F03330
06C5 01 650006CB RT63   LDX   L1 RT64                                     30F03340
06C7 01 6D0005E6        STX   L1 MLSCF+1    SET RETURN ADDRS              30F03350
06C9 01 4C0008DA        BSC   L  WAIT4      GO TO MONITOR                 30F03360
                *                                                         30F03370
06CB 01 74FF06E4 RT64   MDX   L  DLYCT,-1   DEC COUNTER                   30F03380
06CD 0  70F7            MDX      RT63                                     30F03390
                *                                                         30F03400
06CE 01 65000AD4 RT65   LDX   L1 RAREB      SET FOR COMPARE               30F03410
06D0 01 6D000784        STX   L1 DADRS                                    30F03420
```



```
06D2 01 65000A84        LDX   L1 RAREA                                    30F03430
06D4 01 4400076C        BSI   L  READR      READ ONE CARD                 30F03440
06D6 01 4C1006CE        BSC   L  RT65,-     REPEAT IF NO OP COMP          30F03450
06D8 0  6350            LDX      3 80       SET NUMBER OF COLUMNS         30F03460
06D9 01 440007A3        BSI   L  COMPR      COMPARE DATA READ             30F03470
                *                            WITH DATA PUNCHED            30F03480
06DB 01 440007F0        BSI   L  LOCK       CK FOR LOCK ON FUNCTION       30F03490
                *                                                         30F03500
06DC 01 740106E3        MDX   L  DFACT,1    ADV CLUTCH DELAY FACTOR       30F03510
06DF 01 74FF06E5        MDX   L  T6CNT,-1   DEC COUNT                     30F03520
06E1 0  70DD            MDX      RT62                                     30F03530
06E2 0  70D5            MDX      RT61       RESET DELAY                   30F03540
                *                                                         30F03550
06E3 0  0000    DFACT   DC       *-*                                      30F03560
06E4 0  0000    DLYCT   DC       *-*                                      30F03570
06E5 0  0000    T6CNT   DC       *-*                                      30F03580
                *                                                         30F03590
                *****************************************               30F03600
                *            ROUTINE 7 - PUNCH FROM SWITCHES              30F03610
                *****************************************               30F03620
                *  THIS ROUTINE WILL PUNCH ALL CARD COLUMNS               30F03630
                *  WITH THE DATA SET IN BIT SWITCHES 0-11.                30F03640
                *---------------------------------------                30F03650
                *                                                         30F03660
06E6 01 65000A84 RT7    LDX   L1 RAREA      SET TO PUNCH FROM             30F03670
06E8 01 6D000784        STX   L1 DADRS       RAREA                        30F03680
06EA 0  6107            LDX      1 7                                      30F03690
06EB 01 670009EB        LDX   L3 ALDBK      LD BLANKS                     30F03700
06ED 01 44000967        BSI   L  TYPE       PRINT MESSAGE                 30F03710
                *                                                         30F03720
06EF 01 44000942        BSI   L  READY                                    30F03730
06F1 0  6107            LDX      1 7                                      30F03740
06F2 01 67000A15        LDX   L3 ASETP      SET PATT                      30F03750
06F4 01 44000967        BSI   L  TYPE       PRINT MESSAGE                 30F03760
                *                                                         30F03770
06F6 01 0C000782 RT71   XIO   L  SNSWS      READ BIT SWS                  30F03780
06F8 0  C020            LD       RT7SW      LD SW SETTING                 30F03790
06F9 0  100C            SLA      12         CHECK BIT 12                  30F03800
06FA 01 4C280702        BSC   L  RT72,+Z    BR IF 12 ON                   30F03810
                *                                                         30F03820
06FC 01 650006F6        LDX   L1 RT71                                     30F03830
06FE 01 6D0005E6        STX   L1 MLSCF+1                                  30F03840
0700 01 4C0008DA        BSC   L  WAIT4                                    30F03850
                *                                                         30F03860
0702 0  C016    RT72    LD       RT7SW      LD PATTERN                    30F03870
0703 0  1804            SRA      4          REMOVE 12 BIT                 30F03880
0704 0  1004            SLA      4                                        30F03890
0705 0  D013            STO      RT7SW                                    30F03900
0706 0  6150            LDX      1 80                                     30F03910
0707 01 D5000A83 RT73   STO   L1 RAREA-1    FILL RAREA                    30F03920
0709 0  71FF            MDX      1 -1        WITH PATTERN                  30F03930
070A 0  70FC            MDX      RT73                                     30F03940
                *                                                         30F03950
070B 01 678005E1 RT74   LDX   I3 SW2        CK COL CNT OPTION             30F03960
070D 0  7300            MDX      3 0                                      30F03970
070E 0  7001            MDX      *+1                                      30F03980
070F 0  6350            LDX      3 80       SKIP IF SW2 SET               30F03990
0710 01 4400078D        BSI   L  PNCHR      PUNCH ONE CARD                30F04000
                *                                                         30F04010
0712 0  086F            XIO      SNSWS      READ BIT SWS                  30F04020
0713 0  C005            LD       RT7SW                                    30F04030
0714 01 F4000A84        EOR   L  RAREA      CK FOR CHANGE OF SWS          30F04040
0716 01 4C2006F6        BSC   L  RT71,Z     BR IF SW CHANGED              30F04050
0718 0  70F2            MDX      RT74                                     30F04060
                *                                                         30F04070
0719 0  0000    RT7SW   DC       *-*        BIT SW STORAGE                30F04080
                *                                                         30F04090
                *****************************************               30F04100
```

1442 READER/PUNCH FUNCTION TEST

```
                    *              ROUTINE 8 - GANG PUNCH
                    ***********************************************
                    *  THIS ROUTINE WILL READ ONE CARD THEN PUNCH
                    *  ALL FOLLOWING CARDS WITH DATA READ FROM FIRST
                    *  CARD.
                    *---------------------------------------------
                    *
071A 01 65000A84    RT8   LDX  L1 RAREA         SET TO PUNCH
071C 01 6D000784          STX  L1 DADRS          DATA READ
071E 0  6103              LDX   1 3             MESSAGE NUMBER
071F 01 670009F1          LDX  L3 ANYP          LD ANY PATTERN PLUS BLANKS
0721 01 44000967          BSI  L  TYPE          PRINT MESSAGE
                    *
0723 01 65000A84          LDX  L1 RAREA
0725 01 4400076C          BSI  L  READR         READ ONE CARD
                    *
0727 01 4400074A    RT81  BSI  L  BLANK         CK FOR BLANK CARD
0729 01 6C000894          STX  L  LOOP          SET LOOP FUNCTION ADDRS
072B 0  6350              LDX   3 80            SET NUMBER OF COLUMNS
072C 01 4400078D          BSI  L  PNCHR         PUNCH ONE CARD
072E 01 440007F0          BSI  L  LOCK          CHECK FOR LOCK ON FUNC
0730 0  70F6              MDX     RT81
                    *
                    ***********************************************
                    *              ROUTINE 9 - MODIFY ROTATE PATTERN
                    ***********************************************
                    *  THIS ROUTINE WILL REPLACE THE ROTATE DATA
                    *  TABLE WITH ANY DESIRED PATTERN- THEN START
                    *  WITH ROUTINE 1.
                    *---------------------------------------------
                    *
0731 0  6103        RT9   LDX   1 3             MESSAGE NUMBER
0732 01 670009F1          LDX  L3 ANYP          LD ANY PATTERN PLUS BLANKS
0734 01 44000967          BSI  L  TYPE          PRINT MESSAGE
                    *
0736 01 65000A33          LDX  L1 WAREA
0738 0  4033              BSI     READR         READ ONE CARD
                    *
0739 01 6C0005E0          STX  L  SW1           SET CONTROL TO RESTART
073B 01 440005F8          BSI  L  CNTRL         GO TO CONTROL
                    *
                    ***********************************************
                    *              ROTATE THE DATA TABLE ADDRESS
                    ***********************************************
                    *
073D 0  0000        ROTAT DC      *-*
073E 01 74010784          MDX  L  DADRS,1       ADVANCE THE DATA ADDRS
0740 01 C4800784          LD   I  DADRS         CHECK FOR DATA
0742 0  F045              EOR     TERM           TABLE TERMINATOR
0743 01 4CA0073D          BSC  I  ROTAT,Z       RETURN IF NO TERM
0745 01 65000A33          LDX  L1 WAREA         IF TERM - RESET TO
0747 0  693C              STX   1 DADRS          START OF TABLE
0748 01 4C80073D          BSC  I  ROTAT
                    *
                    ***********************************************
                    *              CHECK FOR BLANK CARD
                    ***********************************************
                    * THIS SUBROUTINE WILL READ A CARD AND CHECK
                    * THAT IT IS BLANK.
                    *---------------------------------------------
                    *
074A 0  0000        BLANK DC      *-*
074B 01 65000AD4          LDX  L1 RAREB
074D 0  1810              SRA     16
074E 01 D4000894          STO  L  LOOP          SET FOT NO LOOP
0750 0  401B              BSI     READR         READ ONE CARD
                    *
0751 01 668008AC          LDX  I2 COLCT         CHECK FOR BLANK CARD
```


1442 READER/PUNCH FUNCTION TEST

```
0753 01 C6000AD3    BLK1  LD   L2 RAREB-1
0755 01 4C2007FE          BSC  L  ERRO,Z        BR IF NOT BLANK
0757 0  72FF              MDX   2 -1
0758 0  70FA              MDX     BLK1
0759 01 4C80074A          BSC  I  BLANK
                    *
                    ***********************************************
                    *              FEED A CARD
                    ***********************************************
                    *
075B 0  0000        FEED  DC      *-*
075C 01 44000942          BSI  L  READY
075E 01 D4000894          STO  L  LOOP          SET FOR NO LOOP
0760 01 650009DC          LDX  L1 AFD
0762 01 6D00089A          STX  L1 OP
0764 0  6100              LDX   1 0             SET INTRPT DSW S/B
0765 01 6D0008AD          STX  L1 COLCT+1       SET FOR NO COL INTRPTS
0767 0  081C              XIO     FDACD-1       FEED A CARD
0768 01 440008AF          BSI  L  WAIT          WAIT FOR INTERRUPT
076A 01 4C80075B          BSC  I  FEED
                    *
                    ***********************************************
                    *              READ A CARD
                    ***********************************************
                    * THIS SUBROUTINE WILL READ A CARD THEN CHECK THAT
                    * 80 COLUMNS WERE READ AND CHECK THE BUSY, INTRPT,
                    * AND OPERATION COMPLETE DSWS.
                    *---------------------------------------------
                    *
076C 0  0000        READR DC      *-*
076D 01 6D000904          STX  L1 READ          SET READ BUFFER ADDRS
076F 0  6350              LDX   3 80
0770 01 6F0008AD          STX  L3 COLCT+1       SET COL COUNT S/B
0772 0  1011              SLA     17
0773 0  D018              STO     FLIPS         RESET FLIP SW
0774 01 44000942          BSI  L  READY
                    *
0776 01 650009D5          LDX  L1 ARD
0778 01 6D00089A          STX  L1 OP
077A 00 65008003          LDX  L1 /8003         SET INTRPT DSW S/B
077C 0  0809              XIO     RDRST-1       START THE READER
077D 01 440008AF          BSI  L  WAIT
                    *
077F 01 4C80076C          BSC  I  READR         RETURN
                    *
0782    0000              BSS  E  0
0782 1  0719        SNSWS DC      RT7SW         READ BIT SWS
0783 0  3A00              DC      /3A00
0784 0  0000        DADRS DC      *-*
0785 0  1402        FDACD DC      /1402         FEED A CARD
0786 0  0000        PDATA DC      *-*           PUNCH ADDRS BUFFER
0787 0  1404        RDRST DC      /1404         START READER
0788 0  FFFF        TERM  DC      /FFFF
0789 0  1401        PCHST DC      /1401         START PUNCH
078A 0  0000        NCOL  DC      *-*           COL PUNCH OR COMPARE CNT
078B 0  1480        STACK DC      /1480         SELECT =2 STACKER
078C 0  0000        FLIPS DC      *-*           FLIP SW
                    *
                    ***********************************************
                    *              PUNCH A CARD
                    ***********************************************
                    * THIS SUBROUTINE WILL PUNCH A CARD THEN CHECK
                    * THAT THE PROPER NUMBER OF COLUMNS WERE PUNCHED,
                    * AND CHECK THE BUSY, INTERRUPT, AND OPERATION
                    * COMPLETE DSWS.
                    *---------------------------------------------
                    *
078D 0  0000        PNCHR DC      *-*
```

```
078E 01 6F0008AD          STX  L3 COLCT+1     SET COL COUNT S/B          30F05470
                          *                                              30F05480
0790 01 44000942    PNCH1 BSI  L  READY                                  30F05490
0792 0  08F7              XIO    STACK-1      SELECT STACKER 2           30F05500
                          *                                              30F05510
0793 01 C40008AD          LD   L COLCT+1                                  30F05520
0795 0  D0F4              STO    NCOL         SET PUNCH COL COUNT        30F05530
0796 0  C0ED              LD     DADRS        SET FOR START OF           30F05540
0797 0  D0EE              STO    PDATA         NEXT PATTERN              30F05550
0798 01 650009D8          LDX  L1 APCH                                    30F05560
079A 01 6D00089A          STX  L1 OP                                      30F05570
079C 00 65004003          LDX  L1 /4003        SET INTRPT DWS S/B         30F05580
079E 0  08E9              XIO    PCHST-1      START THE PUNCH            30F05590
079F 01 440008AF          BSI  L  WAIT         WAIT FOR INTERRUPTS        30F05600
                          *                                              30F05610
07A1 01 4C80078D          BSC  I  PNCHR                                   30F05620
                          *                                              30F05630
                          ********************************************   30F05640
                          *            COMPARE DATA READ               *  30F05650
                          ********************************************   30F05660
                          * THIS SUBROUTINE WILL COMPARE THE DATA READ WITH 30F05670
                          * THE PATTERN EXPECTED FOR THAT CARD.          30F05680
                          *-------------------------------------------   30F05690
                          *                                              30F05700
07A3 0  0000        COMPR DC     *-*                                      30F05710
07A4 0  6BE5              STX    3 NCOL       SET NUMBER OF COLUMNS      30F05720
07A5 00 67007401          LDX  L3 /7401       SET FOR POSITIVE INCR      30F05730
07A7 0  6812              STX    3 INCR                                   30F05740
07A8 0  C0DB              LD     DADRS        SET FOR START OF           30F05750
07A9 0  D0DC              STO    PDATA         NEXT PATTERN              30F05760
07AA 0  1011              SLA    17                                       30F05770
07AB 01 D4000884          STO  L M            SET FOR FIRST ERROR        30F05780
07AD 0  6101              LDX    1 1          XR1=COLUMN COUNT           30F05790
                          *                                              30F05800
07AE 01 6D0008AE    COM1  STX  L1 COL          SAVE COL COUNT             30F05810
07B0 01 C4800786          LD   I  PDATA        LD NEXT DATA WORD          30F05820
07B2 0  1803              SRA    3                                        30F05830
07B3 0  1003              SLA    3                                        30F05840
07B4 01 D40008AB          STO  L DATA+1       SAVE IN DATA S/B           30F05850
07B6 01 F5000A83          EOR  L1 RAREA-1     COMPARE WITH DATA READ     30F05860
07B8 01 44200851          BSI  L  ERR9,Z      BR IF ERROR                30F05870
07BA 01 74010786    INCR  MDX  L  PDATA,1     ADV DATA ADRS              30F05880
07BC 0  7101              MDX    1 1          ADV COLUMN COUNT           30F05890
07BD 0  1000              NOP                                            30F05900
07BE 01 C4800786          LD   I  PDATA        CK FOR DATA TABLE          30F05910
07C0 0  F0C7              EOR    TERM          TERMINATOR                 30F05920
07C1 01 4C2007C6          BSC  L  COM2,Z      BR IF NC TERM              30F05930
07C3 01 67000A33          LDX  L3 WAREA       RESET TO START             30F05940
07C5 0  6BC0              STX    3 PDATA      OF TABLE                   30F05950
                          *                                              30F05960
07C6 01 C40008AE    COM2  LD   L  COL          CHECK FOR LAST COL READ    30F05970
07C8 01 940008AC          S    L  COLCT                                   30F05980
07CA 01 4C1007E2          BSC  L  COM4,-      BR IF LAST COL             30F05990
07CC 01 74FF078A          MDX  L  NCOL,-1     COUNT COLUMNS SHOULD       30F06000
07CE 0  70DF              MDX       COM1       HAVE READ                 30F06010
                          *                                              30F06020
07CF 01 7400078C    COM3  MDX  L  FLIPS,0     CK FLIP SW                 30F06030
07D1 0  7015              MDX       COM5       ER IF FLIP                30F06040
                          *                                              30F06050
07D2 0  1011              SLA    17           THE REST OF CARD           30F06060
07D3 01 D40008AB          STO  L DATA+1        SHOULD BE ZERO            30F06070
07D5 01 6D0008AE          STX  L1 COL                                     30F06080
07D7 01 F5000A83          EOR  L1 RAREA-1                                 30F06090
07D9 01 44200851          BSI  L  ERR9,Z                                  30F06100
07DB 0  7101              MDX    1 1                                      30F06110
07DC 01 C40008AE          LD   L  COL                                     30F06120
07DE 01 940008AC          S    L  COLCT                                   30F06130
07E0 01 4C2807CF          BSC  L  COM3,+Z                                 30F06140
```



```
07E2 0  1011        COM4  SLA    17                                       30F06150
07E3 01 D4000864          STO  L M            RESET MULT LINE CONTROL    30F06160
07E5 01 4C8007A3          BSC  I  COMPR                                   30F06170
                          *                                              30F06180
07E7 01 67000AAB    COM5  LDX  L3 RAREA+39    SET TO COMPARE LAST        30F06190
07E9 0  6B9C              STX    3 PDATA      HALF WITH 1ST HALF         30F06200
07EA 00 670074FF          LDX  L3 /74FF       SET FOR NEGATIVE INCR      30F06210
07EC 0  6BCD              STX    3 INCR                                   30F06220
07ED 0  6228              LDX    2 40         COMPARE NEXT               30F06230
07EE 0  6A9B              STX    2 NCOL        40 COLUMNS                30F06240
07EF 0  70BE              MDX       COM1                                  30F06250
                          *                                              30F06260
                          ********************************************   30F06270
                          *            LOCK ON FUNCTION                *  30F06280
                          ********************************************   30F06290
                          *                                              30F06300
07F0 0  0000        LOCK  DC     *-*                                      30F06310
07F1 01 C40005DF          LD   L  SWO          LD SWO                     30F06320
07F3 00 EC800166          OR   I  ERLCK        COMB WITH MONITOR SWO      30F06330
07F5 0  100A              SLA    10           CHECK LOCK SW              30F06340
07F6 01 4C9007F0          BSC  I  LOCK,-      BR IF NOT LOCK ON FUNC     30F06350
07F8 01 C4000894          LD   L  LOOP         LOAD LOOP ADDRS            30F06360
07FA 01 4CA00894          BSC  I  LOOP,Z       LOOP ON LAST FUNC         30F06370
07FC 01 4C8007F0          BSC  I  LOCK          IF LOOP ADDRS IS NOT ZERO 30F06380
                          *                                              30F06390
                          ********************************************   30F06400
                          *            ERROR MESSAGE SETUP             *  30F06410
                          ********************************************   30F06420
                          *                                              30F06430
07FE 0  6100        ERR0  LDX    1 0          CARD NOT BLANK             30F06440
07FF 0  6200              LDX    2 /0000                                  30F06450
0800 0  C86D              LDD       MSG0                                  30F06460
0801 01 6C000890          STX  L OPMSW                                    30F06470
0803 01 44000866          BSI  L  ETYPE        PRINT ERR MSG              30F06480
0805 01 4C000748          BSC  L  BLANK+1                                 30F06490
                          *                                              30F06500
0807 0  0000        ERR1  DC     *-*          STATIC DSW ERROR           30F06510
0808 01 74000885          MDX  L  ERR5S,0      IF PREVIOUS ERR5           30F06520
080A 0  7006              MDX       ERR1A       DO NOT PRINT THIS MSG    30F06530
080B 0  6101              LDX    1 1                                      30F06540
080C 0  6203              LDX    2 /3                                     30F06550
080D 0  C862              LDD       MSG1                                  30F06560
080E 01 6C000890          STX  L OPMSW                                    30F06570
0810 0  4075              BSI       ETYPE      PRINT ERR MSG              30F06580
                          *                                              30F06590
0811 0  1011        ERR1A SLA    17                                       30F06600
0812 0  D072              STO       ERR5S      RESET ERR5 SW              30F06610
0813 01 4C800807          BSC  I  ERR1                                    30F06620
                          *                                              30F06630
0815 0  0000        ERR2  DC     *-*          BUSY DSW ERROR             30F06640
0816 0  6102              LDX    1 2                                      30F06650
0817 0  620C              LDX    2 /C                                     30F06660
0818 0  C859              LDD       MSG2                                  30F06670
0819 0  406C              BSI       ETYPE      PRINT ERROR MESSAGE        30F06680
081A 01 4C800815          BSC  I  ERR2                                    30F06690
                          *                                              30F06700
081C 0  0000        ERR4  DC     *-*          INTRPT 0 DSW ERROR         30F06710
081D 01 F40008A7          EOR  L  DSWSB        RESTORE DSW WAS            30F06720
081F 01 D400C8A6          STO  L  DSW0                                    30F06730
0821 0  6104              LDX    1 4                                      30F06740
0822 0  6230              LDX    2 /30                                    30F06750
0823 0  C852              LDD       MSG4                                  30F06760
0824 0  4061              BSI       ETYPE      PRINT ERR MSG              30F06770
0825 01 4C80081C          BSC  I  ERR4                                    30F06780
                          *                                              30F06790
0827 0  0000        ERR5  DC     *-*          INTRPT 4 DSW ERROR         30F06800
0828 0  685C              STX       ERR5S      SET ERROR 5 SW             30F06810
0829 00 660000C0          LDX  L2 /C0          SET DATA ID               30F06820
```

```
082B 0  FC7C          EOR     DSW4      GET DSW S/B                30F06830
082C 0  D07C          STO     DSW4+1    SET IN MSG                 30F06840
082D 0  C07A          LD      DSW4                                 30F06850
082E 0  1002          SLA     2         LOOK FOR ERR CK            30F06860
082F 01 4C280836      BSC  L  ERR6,+Z   BR IF ERR CK               30F06870
                      *                                            30F06880
0831 0  6105          LDX  1  5                                    30F06890
0832 0  C845          LDD     MSG5                                 30F06900
0833 0  4052          BSI     ETYPE     PRINT ERR MSG              30F06910
0834 01 4C800827  ERR5R BSC  I  ERR5                               30F06920
                      *                                            30F06930
0836 0  C07D      ERR6 LD       DSWSB     CK FOR PUNCH OPERATION     30F06940
0837 01 4C080845      BSC  L  ERR7,+    BR IF NOT PUNCH            30F06950
0839 01 0C000904      XIO  L  READ      RD ECHO BITS               30F06960
083B 01 C4800904      LD   I  READ                                 30F06970
083D 01 4C180845      BSC  L  ERR7,+-   BR IF NOT PUNCH CK         30F06980
083F 0  D062          STO     DSW       STO ECHO IN MSG            30F06990
C840 0  6106          LDX  1  6                                    30F07000
C841 0  6203          LDX  2  /3                                   30F07010
0842 0  C837          LDD     MSG6                                 30F07020
0843 0  4042          BSI     ETYPE     PRINT ERR MSG              30F07030
0844 0  70EF          MDX     ERR5R                                30F07040
                      *                                            30F07050
0845 0  6107      ERR7 LDX  1  7         ERR CK                     30F07060
0846 0  C835          LDD     MSG7                                 30F07070
0847 0  403E          BSI     ETYPE     PRINT ERR MSG              30F07080
0848 0  70EB          MDX     ERR5R                                30F07090
                      *                                            30F07100
0849 0  0000      ERR8 DC       *-*       COL COUNT ERROR            30F07110
084A 0  6108          LDX  1  8                                    30F07120
084B 00 66000C00      LDX  L2 /C00                                 30F07130
084D 0  C830          LDD     MSG8                                 30F07140
084E 0  4037          BSI     ETYPE     PRINT ERR MSG              30F07150
084F 01 4C800849      BSC  I  ERR8                                 30F07160
                      *                                            30F07170
0851 0  0000      ERR9 DC       *-*       DATA COMPARE ERROR         30F07180
0852 0  F058          EOR     DATA+1    RESTORE TO DATA WAS        30F07190
C853 0  D056          STO     DATA                                 30F07200
0854 0  690D          STX  1  RX1+1     SAVE XR1                   30F07210
0855 0  10A0          SLT     32                                   30F07220
0856 00 66009300      LDX  L2 /9300     SET FOR MULTI LINE MSG     30F07230
0858 01 74000884      MDX  L  M         CHECK FOR MULTI LINE       30F07240
085A 0  7005          MDX     ERR9A     BR IF FIRST LINE           30F07250
085B 0  6828          STX     M         SET MULTI LINE WORD        30F07260
C85C 0  6109          LDX  1  9         MESSAGE NUMBER             30F07270
085D 00 66001300      LDX  L2 /1300     SET WORD CNTL              30F07280
085F 0  C820          LDD     MSG9                                 30F07290
0860 0  4025      ERR9A BSI     ETYPE     ERROR TYPE OUT           30F07300
0861 00 65000000  RX1  LDX  L1 *-*       RESTORE XR1                30F07310
0863 01 0C00076A      XIO  L  STACK-1   SELECT ERROR CARD           30F07320
0865 01 4C800851      BSC  I  ERR9      RETURN                     30F07330
                      *                                            30F07340
0867 0  0000      ERR10 DC      *-*                                30F07350
0868 0  6110          LDX  1  /10                                  30F07360
0869 0  6240          LDX  2  /40                                  30F07370
086A 0  C817          LDD     MSG10                                30F07380
086B 0  401A          BSI     ETYPE                                30F07390
086C 01 4C800867      BSC  I  ERR10                                30F07400
                      *                                            30F07410
                      *     ALPHA MESSAGE ADDRESSES                30F07420
                      *                                            30F07430
086E    0000          BSS  E  0                                    30F07440
086E 1  0976      MSG0 DC       ACNBK     CARD NOT BLANK           30F07450
086F 0  0000          DC      0000                                 30F07460
0870 1  097E      MSG1 DC       AWAS                               30F07470
C871 1  098A          DC      ASDSW                                30F07480
0872 1  097E      MSG2 DC       AWAS                               30F07490
C873 1  0993          DC      ABDSW                              30F07500
```



```
0874 1  09A3      MSG3 DC       ANINT                              30F07510
0875 1  09AB           DC       ALV4                               30F07520
0876 1  097E      MSG4 DC       AWAS                               30F07530
0877 1  0A05           DC       ADSW0                              30F07540
0878 1  097E      MSG5 DC       AWAS                               30F07550
0879 1  099B           DC       ADSW4                              30F07560
087A 1  097E      MSG6 DC       AWAS                               30F07570
087B 1  0983           DC       APCK                               30F07580
087C 1  097E      MSG7 DC       AWAS                               30F07590
087D 1  0989           DC       AECK                               30F07600
087E 1  0983      MSG8 DC       ADWAS                              30F07610
C87F 1  098E           DC       ACCNT                              30F07620
0880 1  097E      MSG9 DC       AWAS                               30F07630
0881 1  09C5           DC       ADATA                              30F07640
0882 1  09A3      MSG10 DC      ANINT                              30F07650
0883 1  09AF           DC       ALV0                               30F07660
0884 0  0000      M    DC       *-*       MULTI LINE CONTROL WORD  30F07670
0885 0  0000      ERR5S DC      *-*       ERR5 SW                  30F07680
                  *                                                30F07690
                  ************************************************ 30F07700
                  *           PRINT ERROR MESSAGE                * 30F07710
                  ************************************************ 30F07720
                  *     THIS ROUTINE PRINTS ALL THE ERROR MESSAGES. 30F07730
                  *     UPON ENTRY THE MSG NO. MUST BE SET IN XR1,  30F07740
                  *     THE DATA ID IN XR2, AND THE ALPHA ADDRS IN  30F07750
                  *     THE ACCUM AND EXT.                          30F07760
                  *------------------------------------------      30F07770
                  *                                                30F07780
C886 0  0000      ETYPE DC      *-*                                30F07790
0887 0  6915          STX  1 TABLE      MSG NUMBER                 30F07800
C888 0  6A16          STX  2 TABLE+2    DATA ID                    30F07810
0889 0  D816          STD    AMSG       ALPHA MESSAGE              30F07820
                  *                                                30F07830
088A 01 74000890      MDX  L OPMSW      PRINT LAST OP MSG IF       30F07840
088C 0  7004          MDX    ETYP1       FIRST ERROR MSG AFTER      30F07850
088D 00 44800162      BSI  I ERROR       A CONTROL OP               30F07860
088F 1  0896          DC     ETYP2                                 30F07870
0890 0  0000      OPMSW DC      *-*       MUST BE ZERO FOR OP MSG  30F07880
                  *                                                30F07890
0891 00 44800162  ETYP1 BSI  I ERROR     PRINT ERROR MESSAGE        30F07900
C893 1  089D          DC     TABLE                                 30F07910
C894 0  0000      LOOP DC       *-*                                30F07920
C895 0  68FA          STX    OPMSW                                 30F07930
                  *                                                30F07940
0896 01 4C800886  ETYP2 BSC  I ETYPE     RETURN                     30F07950
                  *                                                30F07960
C898 0  8000          DC     /8000                                 30F07970
0899 1  09CF          DC     ALOP                                  30F07980
089A 0  0000      OP   DC       *-*                                30F07990
                  *                                                30F08000
                  *------------------------------------------      30F08010
                  *     ERROR MESSAGE TABLE                        30F08020
                  *------------------------------------------      30F08030
C89C    0001          BSS  E 1                                     30F08040
089D 0  0000      TABLE DC      *-*       MESSAGE NUMBER           30F08050
089E 0  1C00          DC     /1C00      HEX/DECIMAL SW             30F08060
C89F 0  0000          DC     *-*        DATA WORD ID               30F08070
08A0 0  0000      AMSG DC       *-*       ALPHA ADDRS 1            30F08080
08A1 0  0000           DC       *-*       ALPHA ADDRS 2            30F08090
                  *                                                30F08100
08A2 0  0000      DSW  DC       *-*       STATIC DSW WAS           30F08110
08A3 0  0000      ZERO DC       /0000        S/B                   30F08120
08A4 0  0000      BDSW DC       *-*       BUSY DSW WAS             30F08130
08A5 0  0003           DC       /0003        S/B                   30F08140
08A6 0  0000      DSW0 DC       *-*       INT 0 DSW WAS            30F08150
08A7 0  0000      DSWSB DC      *-*          S/B                   30F08160
08A8 0  0000      DSW4 DC       *-*       INT 4 DSW WAS            30F08170
08A9 0  0000           DC       *-*          S/B                   30F08180
```

```
08AA 0  0000      DATA  DC     *-*        DATA READ WAS                30F08190
08AB 0  0000            DC     *-*              S/B                    30F08200
08AC 0  0000      COLCT DC     *-*        COLUMN COUNT WAS             30F08210
08AD 0  0050            DC     80               S/B                    30F08220
08AE 0  0000      COL   DC     *-*        COLUMN IN ERROR              30F08230
                  *                                                    30F08240
                  ********************************************       30F08250
                  *          INTERRUPT WAIT ROUTINE          *         30F08260
                  ********************************************       30F08270
                  *     THIS SUBROUTINE WAITS FOR INTERRUPT.         30F08280
                  *     WHEN THE INTERRUPT IS RECEIVED IT WILL       30F08290
                  *     CHECK THE ROUTINE SELECTION SWITCH.          30F08300
                  *     IF A NEW ROUTINE HAS BEEN SELECTED IT        30F08310
                  *     WILL BRANCH TO THE CONTROL ROUTINE.          30F08320
                  *-------------------------------------------       30F08330
                  *                                                    30F08340
08AF 0  0000      WAIT  DC     *-*                                     30F08350
08B0 0  69F6            STX    1 DSWSB    SAVE INT 0 DSW S/B           30F08360
08B1 00 65001000        LDX    L1 /1000   SET INTERRUPT                30F08370
08B3 0  695C            STX    1 WCNT      WAIT CNT                    30F08380
08B4 0  0851            XIO    SENSE      SENSE BUSY DSW               30F08390
08B5 0  D0EE            STO    BDSW                                    30F08400
08B6 0  1011            SLA    17                                      30F08410
08B7 0  D0F4            STO    COLCT      RESET CCL COUNT              30F08420
08B8 0  D056            STO    EBITS      RESET INT 0 DSW ERR BITS     30F08430
08B9 0  D0D6            STO    OPMSW      RESET OP MSG SW              30F08440
                  *                                                    30F08450
08BA 01 650008C3  WAIT1 LDX    L1 WAIT3                                30F08460
08BC 01 740005E6        MDX    L  MLSCF+1 CK FOR INTERRUPT             30F08470
08BE 0  7015            MDX       WAIT4   BR IF INTERRUPT CCCURED      30F08480
                  *                                                    30F08490
08BF 01 6D0005E5  WAIT2 STX    L1 MLSCF   SET RETURN ADDRESS           30F08500
08C1 00 44800161        BSI    I  START   GO TO MONITOR                30F08510
                  *                                                    30F08520
08C3 01 74FFC910  WAIT3 MDX    L  WCNT,-1 DECREMENT WAIT CNT           30F08530
08C5 0  70F4            MDX       WAIT1                               30F08540
                  *                                                    30F08550
08C6 0  C0DD            LD        BDSW    CK BUSY DSW                30F08560
08C7 0  F0DD            EOR       BDSW+1                             30F08570
08C8 01 44200815        BSI    L  ERR2,Z  BR IF ER                    30F08580
08CA 0  083B            XIO       SENSE   SENSE DSW                  30F08590
08CB 0  D0DC            STO       DSW4    STORE DSW IN MSG           30F08600
08CC 0  C0E0            LD        COLCT+1 CK FOR FEED OP             30F08610
08CD 01 4C0808D2        BSC    L  WAT3A,+ BR IF FEED OP                30F08620
08CF 0  C0DC            LD        COLCT                              30F08630
08D0 01 44080867        BSI    L  ERR10,+                            30F08640
08D2 0  6103      WAT3A LDX    1  3                                    30F08650
08D3 0  6240            LDX    2  /40                                 30F08660
08D4 0  C89F            LDD       MSG3                               30F08670
08D5 0  4080            BSI       ETYPE   PRINT ERR MSG              30F08680
08D6 01 678008AF        LDX    I3 WAIT    SET TO CONTINUE FUNCTION    30F08690
08D8 01 6F0005E6        STX    L3 MLSCF+1                             30F08700
                  *                                                    30F08710
08DA 01 C40005E0  WAIT4 LD     L  SW1                                 30F08720
08DC 00 44880161        BSI    I  START,+ CK FOR RTN SELECT           30F08730
08DE 01 940005DD        S      L  RID     CK FOR NEW ROUTINE          30F08740
08E0 01 442005F8        BSI    L  CNTRL,Z BR IF NEW RTN               30F08750
08E2 00 44800161        BSI    I  START   GO TO MONITOR                30F08760
                  *                                                    30F08770
                  *-------------------------------------------       30F08780
                  *  COME TO HERE FROM INTERRUPT AND CHECK FOR        30F08790
                  *  ERRORS BEFORE RETURNING TO TEST ROUTINE          30F08800
                  *-------------------------------------------       30F08810
                  *                                                    30F08820
08E4 0  10A0      RTRN  SLT      32                                    30F08830
08E5 0  C0BE            LD        BDSW    CK BUSY DSW                30F08840
08E6 0  F0BE            EOR       BDSW+1                             30F08850
08E7 01 44200815        BSI    L  ERR2,Z  BR IF ER                    30F08860
```



```
                  *                                                    30F08870
08E9 0  C025            LD        EBITS   CK INT 0 DSW               30F08880
08EA 0  E023            AND       KEFFF                              30F08890
08EB 01 44200810        BSI    L  ERR4,Z  BR IF ERR                   30F08900
                  *                                                    30F08910
08ED 0  C0BA            LD        DSW4    CK INT 4 DSW               30F08920
08EE 0  F01D            EOR       K0800   REMOVE RESPONSE BIT         30F08930
08EF 0  E01D            AND       KEFFE   MASK LAST CD AND NRDY      30F08940
08F0 01 44200827        BSI    L  ERR5,Z  BR IF ERR                   30F08950
08F2 0  C03A            LD        COLCT+1 CK FOR FEED CP             30F08960
08F3 01 4C0808FC        BSC    L  RTRN1,+ BR IF FEED OP                30F08970
                  *                                                    30F08980
08F5 0  C036            LD        COLCT                              30F08990
08F6 01 44080867        BSI    L  ERR10,+                            30F09000
08F8 0  C093            LD        COLCT   CK COLUMN COUNT            30F09010
08F9 0  F0B3            EOR       COLCT+1 COMPARE WITH S/B           30F09020
08FA 01 44200849        BSI    L  ERR8,Z  BR IF CCL COUNT ER          30F09030
                  *                                                    30F09040
                  *                                                    30F09050
08FC 0  C0AB      RTRN1 LD        DSW4    CK FOR LAST CARD           30F09060
08FD 0  1004            SLA       4                                  30F09070
08FE 01 4C02095F        BSC    L  LSTCD,C BR IF LAST CARD             30F09080
0900 01 4C8008AF        BSC    I  WAIT    RETURN TO TEST RTN          30F09090
                  *                                                    30F09100
0902    0000            BSS    E  0                                   30F09110
0902 1  090A      PUNCH DC        PBUF    PUNCH                      30F09120
0903 0  1100            DC        /1100                              30F09130
0904 1  0A84      READ  DC        RAREA   READ                       30F09140
0905 0  1200            DC        /1200                              30F09150
0906 0  0000      SENSE DC        /0000   SENSE DSW                  30F09160
0907 0  1700            DC        /1700                              30F09170
0908 0  0008      K0008 DC        /0008                              30F09180
0909 0  1701      SNRSO DC        /1701                              30F09190
090A 0  0000      PBUF  DC        *-*     PRINT DATA BUFFER          30F09200
090B 0  1702      SNRS4 DC        /1702                              30F09210
090C 0  0800      K0800 DC        /0800                              30F09220
090D 0  EFFE      KEFFE DC        /EFFE                              30F09230
090E 0  EFFF      KEFFF DC        /EFFF                              30F09240
090F 0  0000      EBITS DC        *-*     INT 0 DSW ER BITS          30F09250
0910 0  0000      WCNT  DC        *-*                                30F09260
                  *                                                    30F09270
                  ********************************************       30F09280
                  *          INTRPT 0 SERVICE ROUTINE        *         30F09290
                  ********************************************       30F09300
                  *                                                    30F09310
0911 0  0000      INTRO DC        *-*                                30F09320
0912 0  08F5            XIO       SNRSO-1 SENSE DSW                  30F09330
0913 0  F093            EOR       DSWSB   CK FOR CORRECT DSW         30F09340
0914 0  E8FA            OR        EBITS                              30F09350
0915 0  D0F9            STO       EBITS   SAVE ERROR BITS            30F09360
0916 0  F090            EOR       DSWSB   RESTORE DSW                30F09370
0917 0  1000            NOP       0       USE FOR TRAP               30F09380
                  *                                                    30F09390
0918 01 740108AC        MDX    L  COLCT,1 ADV COLUMN COUNT            30F09400
091A 01 4C280932        BSC    L  CKRDR,+Z CK RDR IF BO -             30F09410
091C 01 C4800786        LD     I  PDATA   LD PUNCH DATA               30F09420
091E 01 74FFC78A        MDX    L  NCCL,-1 CK FOR LAST COL             30F09430
0920 0  7001            MDX       *+1                                30F09440
0921 0  E8E6            OR        K0008   SET PUNCH TERMINATOR       30F09450
0922 0  D0E7            STO       PBUF    STO PUNCH DATA IN BUFFER   30F09460
0923 0  08DE            XIO       PUNCH   PCH A COLUMN               30F09470
0924 01 74010786        MDX    L  PDATA,1 INCREASE PCH ADDR           30F09480
0926 01 C4800786        LD     I  PDATA   LD NEXT PUNCH DATA          30F09490
0928 01 F4000788        EOR    L  TERM    CK FOR END OF TABLE         30F09500
092A 01 4CA00911        BSC    I  INTRO,Z RETURN IF NOT END           30F09510
092C 01 67000A33        LDX    L3 WAREA   RETURN TO START OF          30F09520
092E 01 6F000786        STX    L3 PDATA    PUNCH DATA TABLE           30F09530
0930 01 4C800911        BSC    I  INTRO                              30F09540
```

```
                      *
0932 0  08D1          CKRDR XIO     READ        READ COMMAND
0933 01 74010904            MDX  L  READ,1      INCREASE RD ADDR
0935 01 4C800911            BSC  I  INTRO
                      *
                      *********************************************
                      *             INTRPT 4 SERVICE ROUTINE
                      *********************************************
                      *
0937 0  0000          INTR4 DC      *-*
0938 0  08D1                XIO     SNRS4-1     SENSE DSW
0939 0  1000                NOP     0           USE FOR TRAP
                      *
093A 01 D40008A8            STO  L  DSW4        SAVE DSW BITS
093C 01 670008E4            LDX  L3 RTRN
093E 01 6F0005E6            STX  L3 MLSCF+1     SET FOR RETURN
0940 01 4C800937            BSC  I  INTR4
                      *
                      *********************************************
                      *             CHECK READY
                      *********************************************
                      *
0942 0  0000          READY DC      *-*
0943 0  08C2                XIO     SENSE       SENSE DSW
0944 01 D40008A2            STO  L  DSW         STORE DSW
0946 01 4C980942            BSC  I  READY,+-    NO BITS FOUND
0948 0  1801                SRA     1           REMOVE NRDY
0949 01 44200807            BSI  L  ERR1,Z      BR IF OTHER THAN NRDY
                      *
094B 0  1011          BOX   SLA     17
094C 0  D011                STO     BCNT        RESET BOX CNT
                      *
094D 01 65000953      BOX1  LDX  L1 BOX2        LD REENTRY ADDRS
094F 01 6D0005E6            STX  L1 MLSCF+1     SET MLSCF
0951 01 4C0008DA            BSC  L  WAIT+       GO TO MONITOR
                      *
0953 0  08B2          BOX2  XIO     SENSE       SENSE DSW
0954 01 4C980942            BSC  I  READY,+-    RETURN IF READY
0956 01 7403C95E            MDX  L  BCNT,3
0958 0  70F4                MDX     BOX1
                      *
C959 0  6105          NRDY  LDX   1 5           MESSAGE NUMBER
095A 01 670009DF            LDX  L3 ANRDY       NOT READY
095C 0  400A                BSI     TYPE        PRINT MESSAGE
095D 0  70ED                MDX     BOX
                      *
095E 0  0000          BCNT  DC      *-*
                      *
                      *********************************************
                      *             FEED LAST CARD
                      *********************************************
                      *
095F 01 0C000784      LSTCD XIO  L  FDACD-1     FEED COMMAND
0961 0  6106                LDX   1 6           MESSAGE NUMBER
0962 01 670009FF            LDX  L3 ALCD        LAST CARD
0964 0  4002                BSI     TYPE        PRINT MESSAGE
0965 01 440005F8            BSI  L  CNTRL       GO TO NEXT ROUTINE
                      *
                      *********************************************
                      *             PRINT STATUS MESSAGE
                      *********************************************
                      *
C967 0  0000          TYPE  DC      *-*
0968 0  6907                STX   1 SMSG        NEW MSG NUMBER
0969 0  6809                STX   3 ALPHA       UPDATE MESSAGE
                      *
096A 00 44800163            BSI  I  LOG         CALL ON LOG
096C 1  0970                DC      SMSG        ADDR OF MSG
```



```
                      *
096D 0  D006                STO     ALPHA+1
096E 01 4C800967            BSC  I  TYPE        RETURN
                      *
C970 0  0000          SMSG  DC      *-*         MESSAGE NUMBER
0971 0  0000                DC      /0000       HEX/DECIMAL SW
0972 0  0001                DC      /0001       DATA WORD ID
0973 0  0000          ALPHA DC      *-*         ALPHA ADDRS 1
C974 0  0000                DC      *-*         ALPHA ADDRS 2
0975 0  1442                DC      /1442
                      *
                      *********************************************
                      *             ALPHA MESSAGES
                      *********************************************
                      *
0976 0  1E3E          ACNBK DC      /1E3E       CARD NOT BLANK
0977 0  6232                DC      /6232
0978 0  2176                DC      /2176
0979 0  529E                DC      /529E
097A 0  211A                DC      /211A
097B 0  5E3E                DC      /5E3E
097C 0  765A                DC      /765A
097D 0  FFFF                DC      /FFFF
                      *
097E 0  923E          AWAS  DC      /923E       WAS S/B
097F 0  9A21                DC      /9A21
0980 0  219A                DC      /219A
0981 0  BC1A                DC      /BC1A
0982 0  FFFF                DC      /FFFF
                      *
0983 0  923E          ADWAS DC      /923E       WAS S/B
0984 0  9A21                DC      /9A21
0985 0  2121                DC      /2121
0986 0  9ABC                DC      /9ABC
0987 0  1A21                DC      /1A21
0988 0  2121                DC      /2121
0989 0  FFFF                DC      /FFFF
                      *
098A 0  2184          ASDSW DC      /2184       -STATIC DSW ERR
098B 0  9A9E                DC      /9A9E
098C 0  3E9E                DC      /3E9E
098D 0  221E                DC      /221E
098E 0  2132                DC      /2132
098F 0  9A92                DC      /9A92
0990 0  2136                DC      /2136
0991 0  6262                DC      /6262
0992 0  FFFF                DC      /FFFF
                      *
0993 0  2184          ABDSW DC      /2184       -BUSY DSW ERR
0994 0  1AB2                DC      /1AB2
0995 0  9AA6                DC      /9AA6
0996 0  2132                DC      /2132
0997 0  9A92                DC      /9A92
0998 0  2136                DC      /2136
0999 0  6262                DC      /6262
C99A 0  FFFF                DC      /FFFF
                      *
099B 0  2184          ADSW4 DC      /2184       -LEV4 DSW ERR
099C 0  5E36                DC      /5E36
099D 0  86F0                DC      /86F0
099E 0  2132                DC      /2132
099F 0  9A92                DC      /9A92
09A0 0  2136                DC      /2136
09A1 0  6262                DC      /6262
09A2 0  FFFF                DC      /FFFF
                      *
09A3 0  329A          ANINT DC      /329A       DSW
09A4 0  9221                DC      /9221
```

```
09A5 0  2176            DC      /2176     NO INTRPT      30F10910
09A6 0  5221            DC      /5221                    30F10920
09A7 0  2276            DC      /2276                    30F10930
09A8 0  9E62            DC      /9E62                    30F10940
09A9 0  569E            DC      /569E                    30F10950
09AA 0  FFFF            DC      /FFFF                    30F10960
                *                                        30F10970
09AB 0  2184    ALV4    DC      /2184     -LEV4          30F10980
09AC 0  5E36            DC      /5E36                    30F10990
09AD 0  B6F0            DC      /B6F0                    30F11000
09AE 0  FFFF            DC      /FFFF                    30F11010
                *                                        30F11020
09AF 0  2184    ALV0    DC      /2184     -LEV0          30F11030
09B0 0  5E36            DC      /5E36                    30F11040
09B1 0  B6C4            DC      /B6C4                    30F11050
09B2 0  FFFF            DC      /FFFF                    30F11060
                *                                        30F11070
09B3 0  2184    APCK    DC      /2184     PCH CK         30F11080
09B4 0  56B2            DC      /56B2                    30F11090
09B5 0  761E            DC      /761E                    30F11100
09B6 0  2621            DC      /2621                    30F11110
09B7 0  1E5A            DC      /1E5A                    30F11120
09B8 0  FFFF            DC      /FFFF                    30F11130
                *                                        30F11140
09B9 0  2184    AECK    DC      /2184     ERR CK         30F11150
09BA 0  3662            DC      /3662                    30F11160
09BB 0  6221            DC      /6221                    30F11170
09BC 0  1E5A            DC      /1E5A                    30F11180
09BD 0  FFFF            DC      /FFFF                    30F11190
                *                                        30F11200
09BE 0  2184    ACCNT   DC      /2184     COL CNT ER     30F11210
09BF 0  1E52            DC      /1E52                    30F11220
09C0 0  5E21            DC      /5E21                    30F11230
09C1 0  1E76            DC      /1E76                    30F11240
09C2 0  9E21            DC      /9E21                    30F11250
09C3 0  3662            DC      /3662                    30F11260
09C4 0  FFFF            DC      /FFFF                    30F11270
                *                                        30F11280
09C5 0  2121    ADATA   DC      /2121     COL   DATA ERR 30F11290
09C6 0  1E52            DC      /1E52                    30F11300
09C7 0  5E21            DC      /5E21                    30F11310
09C8 0  2121            DC      /2121                    30F11320
09C9 0  2184            DC      /2184                    30F11330
09CA 0  323E            DC      /323E                    30F11340
09CB 0  9E3E            DC      /9E3E                    30F11350
09CC 0  2136            DC      /2136                    30F11360
09CD 0  6262            DC      /6262                    30F11370
09CE 0  FFFF            DC      /FFFF                    30F11380
                *                                        30F11390
09CF 0  095E    ALOP    DC      /095E     LAST OP-       30F11400
09D0 0  3E9A            DC      /3E9A                    30F11410
09D1 0  9E21            DC      /9E21                    30F11420
09D2 0  5256            DC      /5256                    30F11430
09D3 0  8421            DC      /8421                    30F11440
09D4 0  FFFF            DC      /FFFF                    30F11450
                *                                        30F11460
09D5 0  6236    ARD     DC      /6236     READ           30F11470
09D6 0  3E32            DC      /3E32                    30F11480
09D7 0  FFFF            DC      /FFFF                    30F11490
                *                                        30F11500
09D8 0  5682    APCH    DC      /5682     PUNCH          30F11510
09D9 0  761E            DC      /761E                    30F11520
09DA 0  2600            DC      /2600                    30F11530
09DB 0  FFFF            DC      /FFFF                    30F11540
                *                                        30F11550
09DC 0  1236    AFD     DC      /1236     FEED           30F11560
09DD 0  3632            DC      /3632                    30F11570
09DE 0  FFFF            DC      /FFFF                    30F11580
```



```
                                                         30F11590
                *-                                       30F11600
09DF 0  7662    ANRDY   DC      /7662     NRDY - PRESS 1442 START 30F11610
09E0 0  32A6            DC      /32A6                    30F11620
09E1 0  2184            DC      /2184                    30F11630
09E2 0  5662            DC      /5662                    30F11640
09E3 0  369A            DC      /369A                    30F11650
09E4 0  9A21            DC      /9A21                    30F11660
09E5 0  FCF0            DC      /FCF0                    30F11670
09E6 0  F0D8            DC      /F0D8                    30F11680
09E7 0  219A            DC      /219A                    30F11690
09E8 0  9E3E            DC      /9E3E                    30F11700
09E9 0  629E            DC      /629E                    30F11710
09EA 0  FFFF            DC      /FFFF                    30F11720
                *                                        30F11730
09EB 0  5E32    ALDBK   DC      /5E32     LOAD BLANKS    30F11740
09EC 0  2100            DC      /2100                    30F11750
09ED 0  1A5E            DC      /1A5E                    30F11760
09EE 0  3E76            DC      /3E76                    30F11770
09EF 0  5A9A            DC      /5A9A                    30F11780
09F0 0  FFFF            DC      /FFFF                    30F11790
                *                                        30F11800
09F1 0  5E32    ANYP    DC      /5E32     LD ANY PATTERN PLUS BLANKS 30F11810
09F2 0  213E            DC      /213E                    30F11820
09F3 0  76A6            DC      /76A6                    30F11830
09F4 0  2156            DC      /2156                    30F11840
09F5 0  3E9E            DC      /3E9E                    30F11850
09F6 0  9E36            DC      /9E36                    30F11860
09F7 0  6276            DC      /6276                    30F11870
09F8 0  2156            DC      /2156                    30F11880
09F9 0  5EB2            DC      /5EB2                    30F11890
09FA 0  9A21            DC      /9A21                    30F11900
09FB 0  1A5E            DC      /1A5E                    30F11910
09FC 0  3E76            DC      /3E76                    30F11920
09FD 0  5A9A            DC      /5A9A                    30F11930
09FE 0  FFFF            DC      /FFFF                    30F11940
                *                                        30F11950
09FF 0  5E3E    ALCD    DC      /5E3E     LAST CARD      30F11960
0A00 0  9A9E            DC      /9A9E                    30F11970
0A01 0  211E            DC      /211E                    30F11980
0A02 0  3E62            DC      /3E62                    30F11990
0A03 0  3200            DC      /3200                    30F12000
0A04 0  FFFF            DC      /FFFF                    30F12010
                *                                        30F12020
0A05 0  2184    ADSW0   DC      /2184     -LEV0 DSW ERR  30F12030
0A06 0  5E36            DC      /5E36                    30F12040
0A07 0  B6C4            DC      /B6C4                    30F12050
0A08 0  2132            DC      /2132                    30F12060
0A09 0  9A92            DC      /9A92                    30F12070
0A0A 0  2136            DC      /2136                    30F12080
0A0B 0  6262            DC      /6262                    30F12090
0A0C 0  FFFF            DC      /FFFF                    30F12100
                *                                        30F12110
0A0D 0  5E32    ASTOH   DC      /5E32     LOAD FRCM STK 2 30F12120
0A0E 0  2112            DC      /2112                    30F12130
0A0F 0  6252            DC      /6252                    30F12140
0A10 0  7221            DC      /7221                    30F12150
0A11 0  9A9E            DC      /9A9E                    30F12160
0A12 0  5A21            DC      /5A21                    30F12170
0A13 0  D821            DC      /D821                    30F12180
0A14 0  FFFF            DC      /FFFF                    30F12190
                *                                        30F12200
0A15 0  9A36    ASETP   DC      /9A36     SET PATT IN SW 0-11 30F12210
0A16 0  9E21            DC      /9E21     T              30F12220
0A17 0  563E            DC      /563E     PA             30F12230
0A18 0  9E9E            DC      /9E9E     TT             30F12240
0A19 0  2122            DC      /2122      I             30F12250
0A1A 0  7621            DC      /7621     N              30F12260
0A1B 0  9A92            DC      /9A92     SW
```

```
0A1C 0  21C4          DC    /21C4     0                          30F12270
0A1D 0  84FC          DC    /84FC     -1                         30F12280
0A1E 0  FC21          DC    /FC21     1                          30F12290
0A1F 0  9E26          DC    /9E26     THEN TN SW 12              30F12300
0A20 0  3676          DC    /3676     EN                         30F12310
0A21 0  219E          DC    /219E      T                         30F12320
0A22 0  7621          DC    /7621     N                          30F12330
0A23 0  9A92          DC    /9A92     SW                         30F12340
0A24 0  21FC          DC    /21FC      1                         30F12350
0A25 0  D821          DC    /D821     2                          30F12360
0A26 0  FFFF          DC    /FFFF                                30F12370
                      *                                          30F12380
0A27 0  5262    ALACD DC    /5262     OR GANG PUNCHED CARDS      30F12390
0A28 0  2116          DC    /2116                                30F12400
0A29 0  3E76          DC    /3E76                                30F12410
0A2A 0  1621          DC    /1621                                30F12420
0A2B 0  5682          DC    /5682                                30F12430
0A2C 0  761E          DC    /761E                                30F12440
0A2D 0  2636          DC    /2636                                30F12450
0A2E 0  3221          DC    /3221                                30F12460
0A2F 0  1E3E          DC    /1E3E                                30F12470
0A30 0  6232          DC    /6232                                30F12480
0A31 0  9A00          DC    /9A00                                30F12490
0A32 0  FFFF          DC    /FFFF                                30F12500
                      *                                          30F12510
                      ********************************************30F12520
                      *            PUNCH DATA TABLE              30F12530
                      ********************************************30F12540
                      *                                          30F12550
0A33 0  8010    WAREA DC    /8010     COLUMN 1                   30F12560
0A34 0  4020          DC    /4020                                30F12570
0A35 0  2040          DC    /2040                                30F12580
0A36 0  1080          DC    /1080                                30F12590
0A37 0  0900          DC    /0900                                30F12600
0A38 0  0600          DC    /0600                                30F12610
0A39 0  0600          DC    /0600                                30F12620
0A3A 0  0900          DC    /0900                                30F12630
0A3B 0  1080          DC    /1080                                30F12640
0A3C 0  2040          DC    /2040                                30F12650
0A3D 0  4020          DC    /4020                                30F12660
0A3E 0  8010          DC    /8010                                30F12670
0A3F 0  FFF7          DC    /FFF7                                30F12680
0A40 0  8880          DC    /8880                                30F12690
0A41 0  CCC0          DC    /CCC0                                30F12700
0A42 0  EEE0          DC    /EEE0                                30F12710
0A43 0  FFF0          DC    /FFF0                                30F12720
0A44 0  7777          DC    /7777                                30F12730
0A45 0  3333          DC    /3333                                30F12740
0A46 0  1111          DC    /1111                                30F12750
0A47 0  FFF7          DC    /FFF7     COL 21                     30F12760
0A48 0  A000          DC    /A000                                30F12770
0A49 0  9000          DC    /9000     ALPHA RIPPLE               30F12780
0A4A 0  8800          DC    /8800                                30F12790
0A4B 0  8400          DC    /8400                                30F12800
0A4C 0  8200          DC    /8200     COL 26                     30F12810
0A4D 0  8100          DC    /8100                                30F12820
0A4E 0  8080          DC    /8080                                30F12830
0A4F 0  8040          DC    /8040                                30F12840
0A50 0  8020          DC    /8020                                30F12850
0A51 0  8010          DC    /8010                                30F12860
0A52 0  5000          DC    /5000                                30F12870
0A53 0  4800          DC    /4800                                30F12880
0A54 0  4400          DC    /4400                                30F12890
0A55 0  4200          DC    /4200                                30F12900
0A56 0  4100          DC    /4100                                30F12910
0A57 0  4080          DC    /4080                                30F12920
0A58 0  4040          DC    /4040                                30F12930
0A59 0  4020          DC    /4020                                30F12940
```



```
0A5A 0  4010          DC    /4010     COL 40 WAREA+39            30F12950
0A5B 0  3000          DC    /3000                                30F12960
0A5C 0  2800          DC    /2800                                30F12970
0A5D 0  2400          DC    /2400                                30F12980
0A5E 0  2200          DC    /2200                                30F12990
0A5F 0  2100          DC    /2100                                30F13000
0A60 0  2080          DC    /2080                                30F13010
0A61 0  2040          DC    /2040                                30F13020
0A62 0  2020          DC    /2020                                30F13030
0A63 0  2010          DC    /2010                                30F13040
0A64 0  0000          DC    /0000                                30F13050
0A65 0  FC00          DC    /FC00                                30F13060
0A66 0  03F0          DC    /03F0                                30F13070
0A67 0  FC00          DC    /FC00                                30F13080
0A68 0  03F0          DC    /03F0                                30F13090
0A69 0  0000          DC    /0000                                30F13100
0A6A 0  8887          DC    /8887                                30F13110
0A6B 0  4444          DC    /4444                                30F13120
0A6C 0  2222          DC    /2222                                30F13130
0A6D 0  1111          DC    /1111                                30F13140
0A6E 0  0007          DC    /0007                                30F13150
0A6F 0  8880          DC    /8880                                30F13160
0A70 0  CCC4          DC    /CCC4                                30F13170
0A71 0  AAA2          DC    /AAA2                                30F13180
0A72 0  9991          DC    /9991                                30F13190
0A73 0  4444          DC    /4444                                30F13200
0A74 0  6666          DC    /6666                                30F13210
0A75 0  5555          DC    /5555                                30F13220
0A76 0  2222          DC    /2222                                30F13230
0A77 0  3333          DC    /3333                                30F13240
0A78 0  1111          DC    /1111                                30F13250
0A79 0  0005          DC    /0005     CHECK PCH TERM             30F13260
0A7A 0  0006          DC    /0006                                30F13270
0A7B 0  FFF7          DC    /FFF7                                30F13280
0A7C 0  FFF7          DC    /FFF7                                30F13290
0A7D 0  FFF7          DC    /FFF7                                30F13300
0A7E 0  FFF0          DC    /FFF0                                30F13310
0A7F 0  FFF0          DC    /FFF0                                30F13320
0A80 0  FFF0          DC    /FFF0                                30F13330
0A81 0  FFF0          DC    /FFF0                                30F13340
0A82 0  0000          DC    /0000     COLUMN 80                  30F13350
0A83 0  FFFF          DC    /FFFF     TERMINATOR                 30F13360
                      *                                          30F13370
                      ********************************************30F13380
                      *            READ AREA                     30F13390
                      ********************************************30F13400
                      *                                          30F13410
0A84    0050    RAREA BSS   80                                   30F13420
0AD4    0051    RAREB BSS   81                                   30F13430
                      *                                          30F13440
0B26    05E8          END   BGIN                                 30F13450
```

1442 READER/PUNCH FUNCTION TEST

CROSS REFERENCE LISTING

SYMBOL	VALUE	REFERENCES
ABDSW	0993	0873
ACCNT	09BE	087F
ACNBK	0976	086E
ADATA	09C5	0881
ADSWC	0A05	0877
ADSW4	099B	0879
ADWAS	0983	087E
AECK	0939	087D
AFD	09DC	0760
ALACC	0A27	06AC
ALCD	09FF	0962
ALDBK	09EB	0626,0659,06B0,06EB
ALOP	09CF	0899
ALPHA	0973	06AE,0969,096D
ALVU	09AF	0883
ALV4	09AB	0875
AMSG	08A0	0889
ANINT	09A3	0874,0882
ANRDY	09DF	095A
ANYP	09F1	071F,0732
APCH	09D8	0798
APCK	09B3	087B
ARD	09D5	0776
ASDSW	098A	0871
ASETP	0A15	06F2
ASTOH	0A0D	063D,066E,0699
AWAS	097E	0870,0872,0876,0878,087A,087C,0880
BCNT	095E	094C,0956
BDSW	08A4	08B5,08C6,08C7,08E5,08E6
BEGIN	0160	0000,05E8
BGIN	05E8	0B25
BLANK	074A	062A,065D,0727,0759,0E05
BLK1	0753	0758
BOX	094B	095D
BOX1	094D	0958
BOX2	0953	094D
CKRDR	0932	091A
CLEAR	068B	068B
CNTRL	05F8	05F7,073B,08E0,0965
CN10	05FC	
CN20	0603	05FA
CN30	0609	05FE
COL	08AE	07AE,07C6,07D5,07DC
COLCT	08AC	0751,0765,0770,078E,0793,07C8,07DE,08B7,08CC,08CF, 08F2,08F5,08F8,08F9,0918
COMPR	07A3	064F,0679,C6A6,06D9,07E5
COM1	07AE	07CE,07EF
COM2	07C6	07C1
COM3	07CF	07E0
COM4	07E2	07CA
COM5	07E7	07D1
DADRS	0784	0623,063A,C656,066B,068E,0696,06D0,06E8,071C,073E, 0740,0747,C796,07A8
DATA	08AA	07B4,07D3,C852,0853
DFACT	06E3	06B9,06C3,06DD
DLYCT	06E4	06C4,06CB
DSW	08A2	083F,0944
DSWSB	08A7	081D,0836,0880,0913,0916
DSWO	08A6	081F
DSW4	08A8	082B,082C,082D,08CB,08ED,08FC,093A
EBITS	090F	0858,08E9,0914,0915
END	0164	0000,0000,0000,0000,0607
ERLCK	0166	07F3
ERROR	0162	0000,088D,0891
ERRO	07FE	0755

1442 READER/PUNCH FUNCTION TEST

ERR1	0807	0813,0949
ERR1A	0811	080A
ERR10	0867	086C,08D0,08F6
ERR2	0815	081A,08C8,08E7
ERR4	081C	0825,08EB
ERR5	0827	0834,08F0
ERR5R	0834	0844,0848
ERR5S	0885	0808,0812,0828
ERR6	0836	082F
ERR7	0845	0837,083D
ERR8	0849	084F,08FA
ERR9	0851	07B8,07D9,0865
ERR9A	08c0	085A
ETYPE	0886	0803,0810,0819,0824,0833,0843,0847,084E,0860,086B, 0896,08D5
ETYP1	0891	088C
ETYP2	0896	088F
FDACD	0785	0767,095F
FEED	075B	0635,076A
FLIP	067F	0685
FLIPS	078C	06A4,0773,07CF
IL0	017A	0000,05EF
IL1	018A	0000
IL2	019A	0000
IL3	01AA	0000
IL4	018A	0000,05F5
INCR	078A	07A7,07EC
INTRC	0911	05ED,C92A,0930,0935
INTR4	0937	05F3,0940
KEFFE	090D	08EF
KEFFF	090E	08EA
KO008	0908	0921
KO80C	090C	08EE
LOCK	07F0	0631,0664,06DB,072E,07F6,07FC
LOG	0163	0000,096A
LOGBY	0167	
LOOP	0894	0612,062C,065F,06BD,0729,074E,075E,07F8,07FA
LRTN	0620	0616
LSTCC	095F	08FE
M	0884	05F1,07AB,07E3,0858,085B
MLSCF	05E5	060E,06C7,06FE,08BC,08BF,08D8,093E,094F
MSG0	086E	0800
MSG1	0870	080D
MSG10	0882	086A
MSG2	0872	0818
MSG3	0874	08D4
MSG4	0876	0823
MSG5	0878	0832
MSG6	087A	0842
MSG7	087C	0846
MSG8	087E	084D
MSG9	0880	085F
NCOL	078A	0795,07A4,07CC,07EE,091E
NRDY	0959	
NRTN	061D	0617
OP	089A	0762,0778,C79A
OPMSW	0890	0801,080E,088A,0895,08B9
PBUF	090A	0902,0922
PCHST	0789	079E
PDATA	0786	0797,07A9,07B0,07BA,07BE,07C5,07E9,091C,0924,0926, 092E
PID	05DC	05EA
PNCHR	078D	062F,0662,0691,0710,072C,07A1
PNCH1	0790	
PUNCH	0902	0923
RAD	05DE	060D
RAREA	0A84	0644,0648,0672,067F,0681,0688,068C,069D,06D2,06E6, 0707,0714,071A,0723,0786,07D7,07E7,0904

RAREE	0AD4	0664,06CE,074B,0753
RDRST	0787	077C
READ	0904	076D,0839,083B,0932,0933
READR	076C	064A,0674-069F,06B6,06D4,0725,0738,0750,077F
READY	0942	06EF,075C-0774,0790,0946,0954
RID	05DD	05EC,05FC-0602,0603,0605,0609,08DE
RIDCK	0616	05FD
RLCF	0168	
ROTAT	073D	0633,0651,0666,067B,06A8,0743,0748
RQKB	01BC	0000
RQTY	01BB	0000
RTNCM	0617	0606
RTNSW	0165	060F
RTRN	08E4	093C
RTRN1	08FC	08F3
RTTBL	0618	0608,0616,0617
RT1	0621	0618
RT11	062A	0637
RT2	0638	0619
RT21	0641	0653
RT22	0644	0647
RT23	0648	064C
RT3	0654	061A
RT31	065D	0668
RT4	0669	0618
RT41	0672	0676,0693
RT42	067D	
RT5	0694	061C
RT51	069D	06A1,06AA
RT6	06AB	061D
RT61	0688	06E2
RT62	06BF	06E1
RT63	06C5	06CD
RT64	06CB	06C5
RT65	06CE	06D6
RT7	06E6	061E
RT7SW	0719	06F8,0702,0705,0713,0782
RT71	06F6	06FC,0716
RT72	0702	06FA
RT73	0707	070A
RT74	070B	0718
RT8	071A	061F
RT81	0727	0730
RT9	0731	0620
RX1	0861	0854
SENSE	0906	08B4,08CA,0943,0953
SMSG	0970	0968,096C
SNRS0	0909	0912
SNRS4	090B	0938
SNSWS	0782	06F6,0712
STACK	078B	0792,0863
START	0161	0000,0614,08C1,08DC,08E2
STRT	05EB	05E3,05E4
SVKB	018D	
SW0	05DF	07F1
SW1	05E0	05F9,0601,0739,08DA
SW2	05E1	06BF,070B
SW3	05E2	
TABLE	089D	0887,0888,0893
TERM	0788	0642,0742,07C0,0928
TYPE	0967	0628,063F,065B,0670,0698,06B2,06ED,06F4,0721,0734, 095C,0964,096E
T6CNT	06E5	06BC,06DF
WAIT	08AF	0768,077D,079F,08D6,0900
WAIT1	08BA	08C5
WAIT2	08BF	
WAIT3	08C3	08BA
WAIT4	08DA	05C9,07C0,08BE,0951

WAREA	0A33	0621,0638,0654,0669,0694,0736,0745,07C3,092C
WAT3A	08D2	08CD
WCNT	0910	08B3,08C3
ZERO	08A3	

TABLE OF CONTENTS

NOTE - DO NOT RUN THIS PROGRAM IN OVERLAP.

1. PURPOSE

THE 1442 TIMING TEST IS DESIGNED TO CHECK THE FOLLOWING CONDITIONS.

A. READ AND PUNCH COLUMN TIMING TOLERANCES.
B. PUNCH COLUMN DELAY TOLERANCE.
C. PROPER DSW RESPONSES.
D. READ REGISTRATION OR COMPARE ERRORS.
E. PUNCH ECHO CHECK ERRORS.
F. CORRECT COLUMN INTERRUPT COUNTS.

THE PROGRAM WILL NOT CHECK THE FOLLOWING ITEMS WHICH MUST BE CHECKED BY SCOPING WHILE PROGRAM IS RUNNING.

A. READ CELL DURATION
B. EMITTER TIMING
C. READ OR PUNCH SINGLE SHOT TIMING (LOGIC PAGE XR301)

2. PREREQUISTIES

2.1*** PROGRAM PREREQUISITES

1130 DIAGNOSTIC MONITOR II
THIS TEST MAY NOT BE RUN IN OVERLAP WITH ANY OTHER PROGRAM.

2.2*** EQUIPMENT PREREQUISITES

1. 1131 CPU WITH PROGRAM LOAD FROM CARD OR PAPER TAPE READER.
2. 1442 MOD 5, 6, OR 7.

2.3*** MODEL NUMBER

THE 1442 MODEL NUMBER MUST BE KNOWN IN ORDER TO USE THIS PROGRAM. THIS DATA MAY BE ENTERED VIA THE BIT SWITCHES AS OUTLINED IN SECTION 3.1 OR THIS DATA MAY BE ENTERED VIA A PATCH CARD AS FOLLOWS.

COL 1 - 10	+05E1 000M
COL 11 - 19	BLANK
COL 20 - 35	1442 MOD M

WHERE M = MOD NUMBER 5, 6, OR 7

3. OPERATING PROCEDURE

3.1*** PROGRAM LOADING

STANDARD MONITOR LOADING PROCEDURES APPLY
THESE PROCEDURES ARE SUMMARIZED HERE. SEE DM USE PROCEDURE FOR DETAILS.

1. SET FIRST TYPEWRITER TAB 20 CHARACTERS FROM LEFT MARGIN.
2. SET BIT SWITCH 15 OFF - LOAD AND GO
   ON - TO HALT AFTER LOADING

   IF HALTED AFTER LOADING, SELECT PROGRAM OPTIONS THEN TURN OFF HALT SWITCH OR FOLLOW NORMAL RESTART PROCEDURE (SECTION 3.5).
3. LOAD DIAGNOSTIC MONITOR AND THIS PROGRAM.
4. IF MODEL NUMBER CARD IS NOT IN DECK, THE MODEL NUMBER MUST BE ENTERED BEFORE THE PROGRAM WILL RUN.

   A. SET SWITCHES TO 810X WHERE X EQUALS THE MODEL NUMBER
   B. PRESS THE INTERRUPT REQUEST KEY.
5. SELECT PROGRAM OPTIONS, IF DESIRED.

******

3.2*** PROGRAM OPERATION.

STANDARD MONITOR OPERATING PROCEDURES APPLY.
THESE PROCEDURES ARE SUMMARIZED HERE. SEE DM USE PROCEDURE FOR DETAILS.

NOTE - DO NOT RUN THIS PROGRAM IN OVERLAP

3.2.1 PROGRAM CONTROL OPTIONS - FUNCTION 0

1. SET SWITCHES 0-7 TO 01.
2. SET SWITCHES 8-15 AS DESIRED.

SW	FUNCTION
8	RESTART
9	ROUTINE START MESSAGE AND AVG INTERRUPT TIME IN RTNS 1 + 2
10	LOCK ON FUNCTION
11	LOOP PROGRAM
12	LOOP ON ERROR
13	BYPASS ERROR PRINTOUT
14	HALT ON ERROR
15	HALT

3. PRESS INT REQ KEY ON CONSOLE.

**

3.2.2 ROUTINE SELECTION - FUNCTION 1

THE SELECTED ROUTINE WILL LOOP UNTIL A NEW ROUTINE IS SELECTED OR ROUTINE SELECTION IS RESET.

1. TO SET ROUTINE SELECTION

   A. SET SWITCHES 0-7 TO 41.
   B. SET ROUTINE NUMBER IN SWITCHES 12-15.

RTN		DESCRIPTION	
1	*	DELAY PUNCH + CHECK COL INTR TIME	NORMAL ROUTINES-
2		READ + CHECK COL INTRPT TIME.	THE PROGRAM STARTS WITH
3	*	PUNCH COL INTRPT TIME GRAPH	ROUTINE 1, RUNS EACH
4	*	READ COL INTRPT TIME GRAPH	ROUTINE IN SEQUENCE
			THEN TERMINATES AFTER
			ROUTINE 4.
5	*	MODIFY DATA	OPTIONAL ROUTINES-
			THESE ROUTINES RUN
			ONLY IF SELECTED.

* = REFER TO SECTION 3.2.3 FOR SPECIAL INSTRUCTIONS.

   C. PRESS INT REQ KEY ON CONSOLE.

2. TO RESET ROUTINE SELECTION, SET AS IF SELECTING ROUTINE ZERO.

**

3.2.3 OPTIONAL CONTROL

1. SPECIFY PUNCH DELAY

   THE PUNCH DELAY IN ROUTINE ONE CAN BE CONTROLLED BY A SWITCH ENTRY WITH THE SWITCHES SET TO 81XX WHERE XX IS THE PUNCH DELAY INCREMENT IN HEX.

2. GRAPH SCALE FACTOR

   IF NO GRAPH IS PUNCHED BY ROUTINE 3 OR 4 IT IS PROBABLE THAT THE READER OR PUNCH TIMING IS SO FAR OFF THAT THE GRAPH DOES NOT PUNCH ON THE CARD. THE GRAPH SCALE IS NORMALLY 38 USEC PER CARD ROW. THIS SCALE FACTOR CAN BE INCREASED BY A SWITCH ENTRY WITH THE SWITCHES SET TO C10X WHERE THE NEW SCALE IS EQUAL TO 38X USEC.

3. MODIFY PUNCH DATA

   ROUTINE 9 WILL READ IN ONE CARD AND REPLACE THE PUNCH DATA TABLE WITH THE DATA PATTERN PUNCHED IN THAT CARD. THE PROGRAM WILL THEN RESTART FROM ROUTINE 1.

******

3.3*** PROGRAM HALTS

3.3.1 NORMAL HALTS

HALT NO. (B REG)	DESCRIPTION	RESTART ACTION
3001	PROGRAM STOP OR ADDRESS STOP	PRESS START
3002	HALT ON ERROR	DISPLAY MODE-PRESS START. RUN MODE - PRESS START

**

3.3.2 ERROR HALTS

HALT NO. (B REG)	DESCRIPTION	RESTART ACTION
30F1	CHECK SUM ERROR ON FIRST	RELOAD
30F2	READER DSW ERROR WHEN LOADING LOADER	RELOAD
30F3	CARD 2 OF LOADER DID NOT LOAD	RELOAD
30F4	CAN NOT CLEAR CORE - DUE TO ERROR IN ADDRESSING UPPER CORE.	
30F5	READER CHECK WHEN LOADING MONITOR OR TEST PROGRAM	NPRO THEN PLACE CARDS RUN OUT IN FRONT OF REMAINING DECK AND PRESS START.
30F6	MONITOR DID NOT LOAD	RELOAD
30F7	CHECK SUM WHEN LOADING MONITOR	RELOAD
30F8	READER NOT READY	MAKE READER READY
30F9	INVALID INTERRUPT WHICH WILL NOT RESET	PRESS RESET AND START
30FA	CONSOLE PRINTER HANG UP - BUSY WILL NOT GO OFF	FIX THE CONSOLE PRINTER OR NOP THIS WAIT

******

3.4*** PROGRAM TERMINATION

IF LOOP PROGRAM HAS NOT BEEN SPECIFIED THE PROGRAM WILL TERMINATE AT THE END OF ROUTINE 4. ROUTINE 5 WILL ONLY RUN IF SELECTED.

IF ANY ROUTINE IS SELECTED THAT ROUTINE WILL LOOP AND WILL NOT TERMINATE.

******

3.5*** RESTART

1. SET SWITCHES 0-7 TO 01.
2. TURN ON SWITCH 8.
3. SET DESIRED CONTROL IN SWITCHES 9-14.
4. PRESS INTERRUPT REQUEST KEY.

****

4. PRINTOUTS

ALL PRINTOUTS ARE IN THE STANDARD FORMAT.

APPNN OORR AAAA (MESSAGE)
OR
EPPNN OORR AAAA (MESSAGE)

WHERE
- A IDENTIFIES STATUS MESSAGES
- E IDENTIFIES ERROR MESSAGES
- PP IS THE PID OF THE PROGRAM CAUSING THE MESSAGE

  THIS WILL BE EITHER 00 FOR MESSAGES ORIGINATED BY THE MONITOR OR 2F FOR MESSAGES ORIGINATED BY THIS PROGRAM
- NN IS THE MESSAGE SEQUENCE NUMBER
- RR IS THE ROUTINE NUMBER
- AAAA IS THE ADDRESS OF THE ROUTINE
- MESSAGE IS ANY VARIABLE INFORMATION

4.1*** STATUS MESSAGES

A0000 NUM PID ADRS RELF LD
XXXX XXXX XXXX XXXX

THIS MESSAGE IS PRINTED FOLLOWING THE LOADING OF ANY PROGRAM (EXCEPT MONITOR), THE MESSAGE GIVES THE LOAD SEQUENCE NUMBER, THE PROGRAM ID, THE ADDRESS INTO WHICH THE PROGRAM WAS LOADED, AND THE RELOCATION FACTOR.

A0001 SWS PID
XXXX XXXX

THIS MESSAGE IS PRINTED EACH TIME A VALID SWITCH ENTRY IS READ BY THE MONITOR. THE MESSAGE CONTAINS THE SWITCH SETTING READ TOGETHER WITH THE PROGRAM ID OF THE PROGRAM INTO WHICH THE CONTENTS OF SWITCHES 8-15 WERE STORED. IF THE SWITCH ENTRY CALLED FOR HALT OF ANY PROGRAM, THE WORD HALT WILL FOLLOW THE MESSAGE.

A2F00 OOOR AAAA

ROUTINE START MESSAGE - IF SWITCH 9, FUNCTION 0, IS TURNED ON, THIS MESSAGE WILL BE PRINTED BEFORE THE START OF EACH ROUTINE. R IS THE NUMBER OF THE NEXT ROUTINE AND AAAA IS THE STARTING ADDRESS.

A2F01 ENTER MOD NUMBER

THIS MESSAGE REQUESTS THAT THE 1442 MOD NUMBER BE ENTERED INTO THE PROGRAM. TO DO THIS, SET THE BIT SWITCHES TO 810M WHERE M = MOD NUMBER

A2F02 OOOR AAAA LOAD BLANKS

LOAD THE 1442 HOPPER WITH BLANK CARDS THEN PRESS 1442 START.

A2F04 OOOR AAAA LOAD PCHED CARDS

LOAD THE CARDS PUNCHED BY ROUTINE 1 INTO 1442 HOPPER. THIS DECK WAS PUNCHED WITH A ROTATING PATTERN. IT MUST BE LOADED IN THE SAME ORDER AS PUNCHED. THERE MUST BE NO CARDS MISSING FROM THE DECK.

A2F04 OOOR AAAA LAST CARD

THE LAST CARD INDICATOR WAS ON AT THE COMPLETION OF THE LAST 1442 CONTROL OPERATION. A FEED COMMAND WAS GIVEN TO RUN OUT THE LAST CARD. THE ROUTINE WILL THEN TERMINATE. IF NO ROUTINE HAS BEEN SELECTED, THE PROGRAM WILL ADVANCE TO THE NEXT ROUTINE. IF A ROUTINE HAS BEEN SELECTED, THE PROGRAM WILL RESTART THAT ROUTINE.

A2F05 OOOR AAAA NRDY - PRESS 1442 START

THIS MESSAGE WILL BE PRINTED IF THE 1442 IS NOT READY FOR ANY REASON. THE PROGRAM WILL LOOP WAITING FOR READY. TO CONTINUE, CLEAR ANY ERROR CONDITIONS AND MAKE THE 1442 READY.

A2F06 0001 AAAA PUNCH DELAY - X
XXXXX

ROUTINE 1 VARIES THE TIME BETWEEN RECEIVING THE PUNCH RESPONSE AND ISSUEING THE PUNCH DATA COMMAND. THE DELAY STARTS AT MAXIMUM AND IS REDUCED IN STEPS TO MINIMUM. THIS MESSAGE IDENTIFIES THE DELAY FOR THE NEXT 80 CARDS. X = THE DELAY INCREMENT AND XXXX EQUALS THE DELAY IN USEC.

A2F07 OOOR AAAA AVG COL INTRPT TIME
XXXXX YYYYY

THIS MESSAGE IS PRINTED IN ROUTINES 1 AND 2 AFTER 80 CARDS HAVE BEEN READ OR PUNCHED, OR WHEN THE ROUTINE TERMINATES.

- XXXXX = AVERAGE TIME IN USEC BETWEEN COLUMN INTERRUPTS FOR ALL CARDS READ OR PUNCHED SINCE THIS AVERAGE MESSACE WAS LAST PRINTED.
- YYYYY = NORMAL AVERAGE TIME IN USEC.

******

4.2*** ERROR MESSAGES

THE DSW IS CHECKED FOR ABSOLUTE CORRECTNESS AT ALL TIMES. IF AN ERROR IS DETECTED ONE OF THE MESSAGES BELOW WILL INDICATE THE PROBLEM. IT IS LEFT TO THE OPERATOR TO ANALYZE THE DSW FOR THE SPECIFIC PROBLEM AREA.

THE 1442 DSW

BIT	
0	PUNCH RESPONSE
1	READ RESPONSE
2	ERROR CHECK
3	LAST CARD
4	OPERATION COMPLETE
5	NOT USED
6	NOT USED
7	FEED CHECK AT READ STATION
8	NOT USED
9	NOT USED
10	NOT USED
11	NOT USED
12	NOT USED
13	NOT USED
14	BUSY
15	NOT READY OR BUSY

E0001 SWS INVLD
XXXX

THE SETTING OF SWITCHES 4-7 DID NOT EQUAL THE LOAD SEQUENCE NUMBER OF ANY PROGRAM IN CORE.

E0003 OVR CORE

THE PROGRAM WHICH THE LOADER WAS ATTEMPTING TO LOAD EXCEEDED AVAILABLE CORE. LOADING WAS TERMINATED.

E0004 CKSUM

A CHECK SUM ERROR WAS DETECTED WHILE LOADING A TEST PROGRAM. THIS ERROR OCCURS UNDER ANY OF THE FOLLOWING CONDITIONS.

1. A CARD IS MISSING OR IS OUT OF SEQUENCE.
2. THERE IS AN EXTRA CARD IN THE DECK.
3. THE PUNCHED INFORMATION ON THE CARD IS NOT CORRECT.
4. DATA WAS LOST OR PICKED UP DUE TO A MACHINE MALFUNCTION.
5. DUE TO A CPU MALFUNCTION, THE CHECK SUM WAS NOT CORRECTLY CALCULATED.

WHEN THIS ERROR OCCURS ATTEMPT TO RELOAD THE PROGRAM.

E0005 000N XXXX

THIS ERROR WILL OCCUR IS AN INTERRUPT OCCURS, BUT THE ILSW WAS NOT CORRECT. N IS THE INTERRUPT LEVEL AND XXXX IS THE ILSW. THIS PRINTOUT WILL ONLY OCCUR IF THE INTERRUPT IS RESET BY A BOSI. NO ATTEMPT IS MADE BY THE ERROR ROUTINE TO RESET THE REQUEST BIT.

E2F00 000R AAAA CARD NOT BLANK

A PRE-PUNCHED CARD WAS DETECTED BY A PUNCH ROUTINE. THIS CARD WAS NOT PUNCHED BUT WAS REJECTED. THIS CARD WILL BE FED OUT INTO STACKER 1.

E2F01 000R AAAA WAS S/B - STATIC DSW ERR
XXXX 0000

A BIT, IN ADDITION TO NOT READY, WAS ON IN THE DSW WHEN IT WAS SENSED BEFORE GIVING A CONTROL COMMAND TO THE 1442. USE THE ABOVE DSW TABLE TO IDENTIFY THE BIT, THEN TAKE APPROPRIATE CORRECTIVE ACTION.

E2F01 000R AAAA LAST OP - CCCC
WAS S/B - BUSY DSW ERR
XXXX 0003

THIS DSW WAS SENSED IMMEDIATELY AFTER THE 1442 CONTROL COMMAND WAS IDENTIFIED BY CCCC GIVEN. THAT COMMAND SHOULD MAKE THE 1442 BUSY AND NOT READY. NO OTHER BITS SHOULD BE ON.

E2F03 000R AAAA LAST OP - CCCC
DSW - NO INTRPT - LEV4
XXXX

NO OP COMPLETE INTERRUPT WAS RECEIVED FOLLOWING THE LAST CONTROL COMMAND, IDENTIFIED BY CCCC. THE COMMAND WAS RECEIVED BY THE 1442 IF AN E0F02 MESSAGE WAS NOT PRINTED.

E2F04 000R AAAA LAST OP - CCCC
WAS S/B - LEV0 DSW ERR
XXXX X003

THIS DSW WAS SENSED IN THE LEVEL ZERO INTERRUPT ROUTINE. THE RESPONSE FOR THE LAST CONTROL COMMAND (IDENTIFIED BY CCCC) SHOULD BE ON, TOGETHER WITH BUSY AND NOT READY.

E2F05 000R AAAA LAST OP - CCCC
WAS S/B - LEV4 DSW ERR
XXXX X80X

THIS DSW WAS SENSED IN THE LEVEL 4 INTERRUPT ROUTINE. OP COMPLETE BIT SHOULD BE ON. THE LAST CARD AND NOT READY BITS MAY BE ON. ALL OTHER BITS SHOULD BE OFF.

E0F06 000R AAAA LAST OP - PUNCH
WAS S/B - PCH CK
XXXX 0000

A PUNCH ECHO CHECK OCCURRED WHILE PUNCHING THE LAST CARD. XXXX IS THE PUNCH ECHO THAT WAS READ FROM THE 1442 BUFFER REGISTER FOLLOWING THE PUNCH CHECK. ANY BIT ON IN THIS WORD IDENTIFIES A DESCREPANCY BETWEEN THE PUNCH DIE ECHO AND THE DATA WHICH WAS TO BE PUNCHED IN THE COLUMN. PUNCHING IS TERMINATED WHEN THIS ERROR IS DETECTED, THUS, THE ERROR OCCURRED IN THE LAST COLUMN PUNCHED. IF PUNCHING A ROTATE PATTERN DISCARD THE CARDS PUNCHED AND RESTART THE ROUTINE.

THIS ERROR WILL OCCUR IN ROUTINE 1 IF THE PUNCH DELAY EXCEEDS THE DURATION OF THE PUNCH RESPONSE TRIGGER. THIS TRIGGER SHOULD STAY ON FOR AT LEAST 300 USEC.

```
                                LAST  OP - CCCC
E2F07  000R  AAAA               WAS  S/B - ER CK
                                XXXX 0000
```

AN ERROR CHECK OCCURRED DURING THE LAST OPERATION. IF THE LAST OPERATION WAS READ OR PUNCHED, THIS MESSAGE SHOULD BE FOLLOWED BY AN EOF08 MESSAGE WHICH WILL IDENTIFY THE NUMBER OF COLUMNS PROCESSED BEFORE THE ERROR WAS DETECTED. TO CONTINUE, CLEAR ALL CARDS FROM THE 1442, THEN PRESS START. IF PUNCHING A ROTATING PATTERN TO BE READ BY THE NEXT ROUTINE, DISCARD THE CARDS PUNCHED AND RESTART THE ROUTINE.

```
E2F08  000R  AAAA               WAS   S/B  - COL CNT ER
                                XXXXX YYYYY
```

XXXXX IDENTIFIES THE NUMBER OF COLUMN INTERRUPTS THAT OCCURRED DURING THE LAST OPERATION. YYYYY IDENTIFIES THE EXPECTED NUMBER OF INTERRUPTS. IF AN ERROR CHECK OCCURRED DURING THE LAST OPERATION (IDENTIFIED BY AN EOF06 OR EOF07 MESSAGE), THE OPERATION WILL TERMINATE AT THE TIME THE ERROR OCCURRS. THUS, THIS ERROR MESSAGE WILL IDENTIFY THE COLUMN BEING PROCESSED WHEN THE ERROR WAS DETECTED.

```
E2F09  000R  AAAA               WAS  S/B  COL - DATA ERR
                                XXXX YYYY 000ZZ
```

THE DATA XXXX READS FROM COLUMN ZZ(IN DECIMAL) DOES NOT AGREE WITH THE EXPECTED DATA YYYY FOR THAT COLUMN. CHECK CARD FOR CORRECT DATA. IF DATA IS CORRECT, THEN A READ ERROR OCCURRED. IF THE DATA IS NOT CORRECT, A PUNCH ERROR OCCURRED. IN THE LATTER CASE, IF NO PUNCH CHECK WAS DETECTED WHILE PUNCHING THE CARD, THE PUNCH ECHO CHECK IS NOT FUNCTIONING.

```
                                LAST  OP -  CCCC
E2F10  000R  AAAA               WAS   MAX   COL  - INTRPT SLOW
                                XXXXX YYYYY ZZZZZ
```

XXXXX EQUALS THE COLUMN INTERRUPT TIME FOR THE COLUMN IDENTIFIED BY ZZZZZ. THE EXPECTED MAXIMUM TIME FOR THIS OPERATION ON THIS MODEL 1442 IS GIVEN BY YYYYY.

CHECK THE ADJUSTMENT AND LUBRICATION OF THE FEED AND READ CLUTCH. ALSO CHECK THE PUNCH INCREMENTAL DRIVE.

```
                                LAST  OP -  CCCC
E2F11  000R  AAAA               WAS   MAX   COL  - INTRPT FAST
                                XXXXX YYYYY ZZZZZ
```

XXXXX EQUALS THE COLUMN INTERRUPT TIME FOR THE COLUMN IDENTIFIED BY ZZZZZ. THE EXPECTED MAXIMUM TIME FOR THIS OPERATION ON THIS MODEL 1442 IS GIVEN BY YYYYY.

CHECK THE ADJUSTMENT AND LUBRICATION OF THE FEED AND READ CLUTCH. ALSO CHECK THE PUNCH INCREMENTAL DRIVE.

---

5. COMMENTS

5.1*** TEST PROCEDURE

5.1.1 TEST ORGANIZATION

THE TEST ROUTINES FOLLOW THE SAME BASIC ORGANIZATION AS THE 1442 FUNCTION TEST. THE TIMING CAPABILITY IS PART OF THE INTERRUPT ROUTINE. AFTER THE COMPLETION OF EACH OPERATION, THE TIMING RESULTS ARE AVAILABLE TO THE TEST ROUTINE FOR ANALYSIS.

5.1.2 ERROR CHECKING

SAME ERROR CHECKING AS THE 1442 FUNCTION TEST WITH THE EXCEPTION THAT THE LEVEL 0 DSW IS NOT CHECK.

IN ADDITION, THE TIMING TEST ATTEMPTS TO FORCE PUNCH DELAY ERRORS (THESE ARE DETECTED AS PUNCH CHECKS), AND IT CALCULATES THE READ AND PUNCH RESPONSE TIMES COMPARING THEM TO MIMIMUM AND MAXIMUM VALUES FOR THE APPROPRIATE 1442 MODEL.

5.2*** ROUTINE DESCRIPTION

THIS SECTION CONTAINS A DESCRIPTION OF THE PROGRAM ROUTINES AND SUBROUTINES IN APPROXIMATELY THE ORDER IN WHICH THEY APPEAR IN THE PROGRAM AS FOLLOWS -

1. TEST SEQUENCE CONTROL ROUTINE
2. NORMAL TEST ROUTINES
3. OPTIONAL TEST ROUTINES
4. TEST SUBROUTINES
5. ERROR CONTROL ROUTINES
6. INTERRUPT ROUTINE

5.2.1 TEST SEQUENCE CONTROL ROUTINE - CNTRL

THIS ROUTINE CHECKS THE ROUTINE SELECTION SWITCH (SW1 IN THE PROGRAM CONTROL TABLE) AND DETERMINES WHICH TEST ROUTINE IS TO BE RUN NEXT. IF A TEST ROUTINE HAS BEEN SELECTED, IT ESTABLISHES A TRANSFER TO THAT ROUTINE. IF NO ROUTINE IS SELECTED, A TRANSFER IS ESTABLISHED TO THE NEXT TEST ROUTINE IN SEQUENCE.

THE ROUTINE ADDRESS TABLE (RTTBL) WHICH IS PART OF CNTRL CONTAINS THE ROUTINE ADDRESS FOR ALL TEST ROUTINES IN THE SEQUENCE IN WHICH THEY ARE TO BE RUN.

THE LAST TEST ROUTINE IN THE NORMAL SEQUENCE IS IDENTIFIED BY THE TABLE NRTN. AFTER THIS ROUTINE IS RUN, CNTRL WILL TRANSFER TO MONITOR END AND TERMINATE THE PROGRAM. ROUTINES FOLLOWING THE TABLE NRTN ARE CALLED OPTIONAL TEST ROUTINES AND WILL ONLY BE RUN IF SELECTED.

5.2.2 NORMAL TEST ROUTINES

IF NO TEST ROUTINE IS SELECTED, THESE FOUR ROUTINES WILL RUN IN SEQUENCE THEN THE PROGRAM WILL TERMINATE.

1. TEST ROUTINE 1 - DELAY PUNCH

THIS ROUTINE PUNCHES CARDS USING DATA PREVIOUSLY SET IN THE DATA TABLE. THE DATA IS ROTATED BY ONE COLUMN FOR EACH CARD PUNCHED. EACH CARD IS READ AND CHECKED FOR BLANK BEFORE IT IS PUNCHED. THE ROUTINE PUNCHES THE FIRST 80 CARDS WITH A MAXIMUM PUNCH DELAY OF 330 USEC (PUNCH DELAY IS THE TIME BETWEEN THE PUNCH RESPONSE INTERRUPT AND THE PUNCH DATA COMMAND). THE DELAY IS DECREASED BY 38 USEC. FOR EACH SUCCEEDING 80 CARDS. WHEN MINIMUM DELAY IS REACHED, THE PUNCH DELAY IS RESET TO 330 USEC, AND THE CYCLE REPEATED UNTIL ALL CARDS IN THE HOPPER HAVE BEEN PUNCHED.
IS REACHED, THE PUNCH DELAY IS RESET TO 330 USEC, AND THE CYCLE REPEATED UNTIL ALL CARDS IN THE HOPPER HAVE BEEN PUNCHED.

AT THE START OF THE ROUTINE AND AT EACH CHANGE IN PUNCH DELAY, A MESSAGE IS PRINTED (A2F06) STATING THE PUNCH DELAY AND A PUNCH DELAY INCREMENT. THE DELAY IS RESET WHEN THIS INCREMENT GOES TO ZERO.

THE TIME BETWEEN COLUMN INTERRUPTS IS DETERMINED BY THE INTERRUPT ROUTINE. IF THIS TIME FALLS OUTSIDE THE FOLLOWING LIMITS, AN ERROR MESSAGE (E2F10 OR E2F11) IS PRINTED.

MODEL	MIN USEC	MAX USEC	AVG USEC
6	10600	14300	12200
5 OR 7	5300	7180	6000

AFTER PUNCHING 80 CARDS OR AT THE COMPLETION OF THE ROUTINE, AN AVERAGE COLUMN TIME MESSAGE IS PRINTED SPECIFYING THE AVERAGE TIME SINCE THE LAST AVERAGE MESSAGE WAS PRINTED.

2. TEST ROUTINE 2 - READ

THIS ROUTINE READS THE CARDS THAT WERE PUNCHED BY ROUTINE ONE. THE DATA READ IS COMPARED TO THE DATA PUNCHED. IF THESE ARE NOT EQUAL, AN ERROR MESSAGE (E2F09) IS PRINTED.

THE TIME BETWEEN COLUMN INTERRUPTS IS DETERMINED BY THE INTERRUPT ROUTINE. IF THIS TIME FALLS OUTSIDE THE FOLLOWING LIMITS, AN ERROR MESSAGE (E2F10 OR E2F11) IS PRINTED.

MODEL	MIN USEC	MAX USEC	AVG USEC
6	900	1600	1300
5 OR 7	700	1300	1000

AFTER READING 80 CARDS OR AT THE COMPLETION OF THE ROUTINE, AN AVERAGE COLUMN TIME MESSAGE IS PRINTED SPECIFYING THE AVERAGE TIME SINCE THE LAST AVERAGE MESSAGE WAS PRINTED.

3. TEST ROUTINE 3 - PUNCH TIME GRAPH

THIS TEST WILL STORE THE TIME BETWEEN PUNCH COLUMN INTERRUPTS WHILE PUNCHING A CARD. ON THE NEXT CARD, IT WILL PUNCH A GRAPH WHICH DISPLAYS THE VARIATIONS IN COLUMN INTERRUPT TIME FROM COLUMN TO COLUMN. THIS PROCESS WILL BE REPEATED UNTIL THE LAST CARD INDICATOR IS SENSED.

4. TEST ROUTINE 4 - READ TIME GRAPH -

THIS TEST WILL READ A BLANK CARD, STORE THE TIME BETWEEN READ COLUMN INTERRUPTS, THEN PUNCH A GRAPH DISPLAYING THE VARIATION IN COLUMN INTERRUPT TIME FROM COLUMN TO COLUMN. THIS PROCESS WILL BE REPEATED UNTIL THE LAST CARD INDICATOR IS SENSED.

5.2.3 OPTIONAL TEST ROUTINE

1. TEST ROUTINE 5 - MODIFY DATA

THIS ROUTINE WILL READ ONE DATA CARD AND REPLACE THE PUNCH DATA TABLE WITH THE DATA CONTAINED ON THAT CARD. THE ROUTINE WILL THEN RESTART THE PROGRAM FROM ROUTINE ONE.

5.2.4 TEST SUBROUTINES

1. PUNCH

THIS SUBROUTINE PUNCHES ONE CARD THEN CHECKS FOR PUNCH ERRORS.

2. READ

THIS SUBROUTINE READS ONE CARD THEN CHECKS FOR READ ERRORS.

3. COMPARE COLUMN TIME

THIS SUBROUTINE CHECKS THAT COLUMN TIME FALLS WITHIN MINIMUM AND MAXIMUM LIMITS. IT ALSO ADDS ALL COLUMN TIMES AND KEEPS COUNT OF THE TOTAL NUMBER OF COLUMNS FOR CALCULATION OF THE COLUMN TIME AVERAGE.

4. PRINT COLUMN INTERRUPT AVERAGE TIME

THIS SUBROUTINE CALCULATES THE COLUMN INTERRUPT TIME AVERAGE AND PRINTS THE AVERAGE MESSAGE.

5. CHECK FOR BLANKS

THIS SUBROUTINE CHECKS EACH CARD BEFORE IT IS PUNCHED TO VERIFY THAT IT IS BLANK.

6. GRAPH SETUP

THIS SUBROUTINE WILL CALCULATE A GRAPH POINT FOR EACH COLUMN TIME. THIS SET OF GRAPH POINTS WILL BE PUNCHED ON THE NEXT CARD. THE SCALE CAN BE CHANGED WITH A FUNCTION 3 BIT SWITCH ENTRY.

7. READY

THIS SUBROUTINE IS ENTERED BEFORE ANY 1442 CONTROL COMMAND IS GIVEN. IT READS THE 1442 DSW AND CHECKS IT FOR READY (ALL BITS OFF). ANY BIT ON OTHER THAN NOT READY (BIT 15) WILL BE IDENTIFIED BY AN E2F01 MESSAGE. IF ANY BIT IS ON, A NRDY MESSAGE (A2F05) WILL BE PRINTED. THIS ROUTINE STAYS IN A LOOP, PRINTING THE NRDY MESSAGE EACH 10 SECONDS UNTIL ALL BITS IN THE DSW GO OFF.

8. LAST CARD

THIS SUBROUTINE IS ENTERED AFTER AN OPERATION IS COMPLETED IF THE LAST CARD INDICATOR WAS TURNED ON DURING THAT OPERATION. THE SUBROUTINE WILL FEED OUT THE LAST CARD, PRINT A MESSAGE INDICATING THAT THE LAST CARD INDICATOR WAS DETECTED, THEN GO TO CNTRL TO TERMINATE THE ROUTINE AND ADVANCE TO THE NEXT ROUTINE.

5.2.5 ERROR CONTROL ROUTINES

1. INTERRUPT WAIT ROUTINE

ALL SUBROUTINES COME HERE AFTER THE START OF AN I/O OPERATION FROM WHICH AN INTERRUPT IS EXPECTED. THIS ROUTINE RESETS ALL ERROR CONTROL WORDS, SENSES AND STORES THE BUSY DSW, THEN WAITS IN A TIMED LOOP (AT LEAST 20 SECONDS) FOR THE OP COMPLETE INTERRUPT.

IF NO OP COMPLETE INTERRUPT IS RECEIVED THE FOLLOWING ERROR MESSAGES ARE PRINTED.

A. E2F02 IS BUSY DSW ERROR

B. E2F03 - NO OP COMPLETE INTERRUPT

IF OP COMPLETE INTERRUPT IS RECEIVED THIS ROUTINE WILL CHECK FOR PROPER PERFORMANCES OF THE OPERATION. THE FOLLOWING CHECKS ARE MADE AND ERROR MESSAGES PRINTED IF APPROPRIATE.

A. E2F02 IF BUSY DSW ERROR

B. E2F05 IF OP COMPLETE DSW ERROR

C. E2F08 IF INCORRECT NUMBER OF COLUMN INTERRUPTS

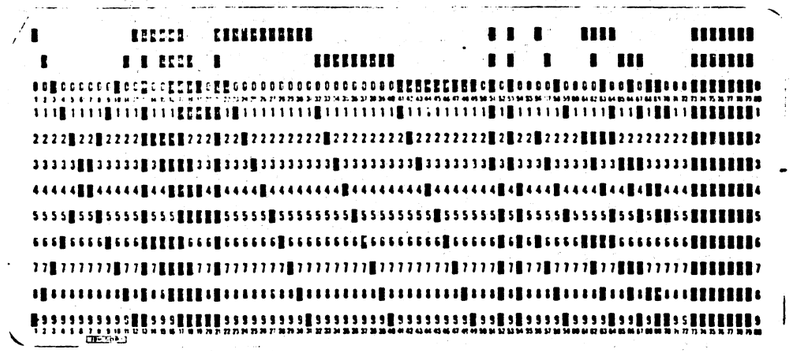
THE ROUTINE WILL THEN CHECK FOR LAST CARD IF THE LAST CARD INDICATOR IS ON THIS ROUTINE WILL TRANSFER TO THE LAST CARD ROUTINE. IF NO LAST CARD THE ROUTINE WILL RETURN TO THE I/O SUBROUTINE FROM WHICH IT WAS ENTERED.

2. PRINT ERROR MESSAGES

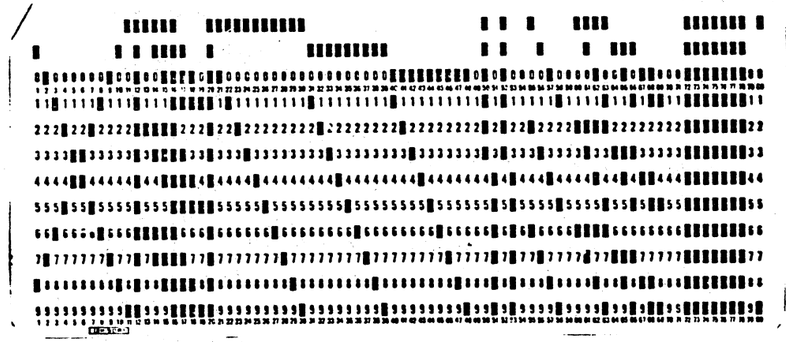
THIS ROUTINE PRINTS ALL THE ERROR MESSAGES. IF THE MESSAGE IS THE FIRST ERROR MESSAGE FOLLOWING AN I/O CONTROL COMMAND A LAST OP MESSAGE WILL PRECEED THE ERROR MESSAGE. THIS LAST OP MESSAGE WILL IDENTIFY THE LAST I/O CONTROL OPERATION EXECUTED. THE ERROR MESSAGE FOLLOWING REFERS TO ERRORS DETECTED IN THAT OPERATION.

5.2.6 INTERRUPT ROUTINES

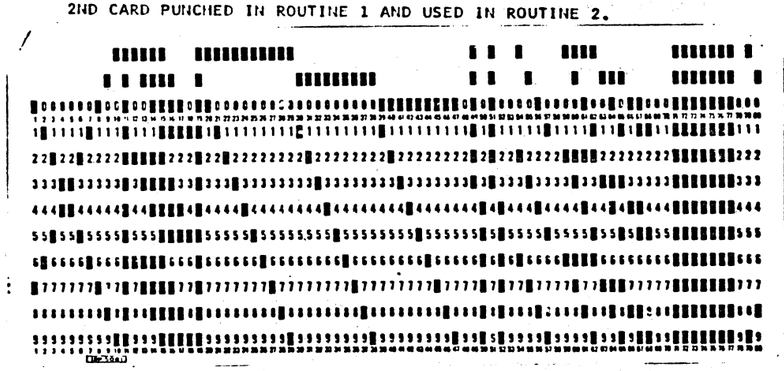
THE COLUMN INTERRUPT TIMING IS DONE IN THIS ROUTINE. THE PROGRAM TRANSFERS HERE ON THE FIRST COLUMN INTERRUPT. ALL FOLLOWING READ OR PUNCH RESPONSES ARE SENSED IN THIS INTERRUPT ROUTINE. THE ROUTINE DOES NOT BRANCH OUT OF INTERRUPT UNTIL AN OP COMPLETE RESPONSE IS SENSED.



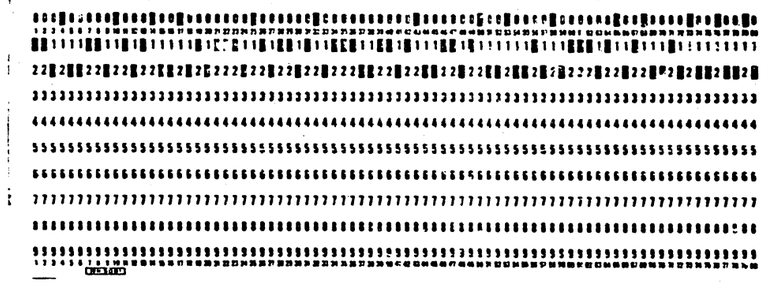
1ST CARD PUNCHED IN ROUTINE 1 AND USED IN ROUTINE 2.



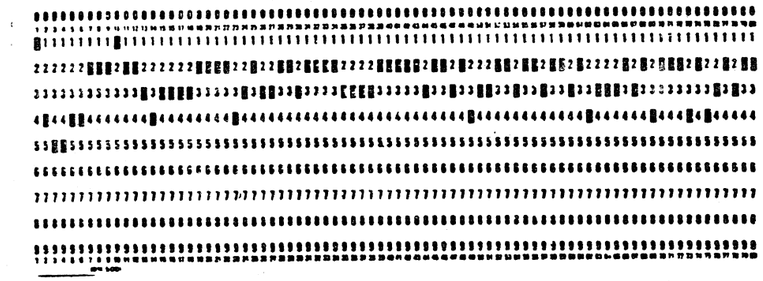
2ND CARD PUNCHED IN ROUTINE 1 AND USED IN ROUTINE 2.



3RD CARD PUNCHED IN ROUTINE 1 AND USED IN ROUTINE 2.



GRAPH OF PUNCH TIME BETWEEN COLUMN INTERRUPT



GRAPH OF READ TIME BETWEEN COLUMN INTERRUPTS

1442 TIMING TEST

```
****************************************************************************
                   *
                   *  THIS ENGINEERING CHANGE REFLECTS MAJOR
                   *  CHANGES TO THE DIAGNOSTIC MONITOR.  PREVIOUS
                   *  TESTS WILL NOT RUN WITH DIAGNOSTIC MONITOR II.
                   *
                   *  THIS TEST WILL NOT RUN WITH PREVIOUS MONITORS.
                   *
                   *  TESTS PRIOR TO EC 419643 DATED NOV 15, 1966
                   *  WILL NOT OPERATE PROPERLY WITH DIAGNOSTIC
                   *  MONITOR II.
                   *
****************************************************************************
                   ******************************************
                   *-----------------------------------------
                   *     1130 - 1442 READER/PUNCH TIMING TEST
                   *-----------------------------------------
                   *
                   *
                   *
                   ******************************************
                   *            EQUATE TABLE
                   ******************************************
                   *     THIS TABLE EQUATES TEST PROGRAM LABELS
                   *     TO THEIR EQUIVALENT DIAGNOSTIC MONITOR
                   *     ADDRESSES.
                   *
                   *-----------------------------------------
                   *     MONITOR ENTRY ADDRESSES
                   *-----------------------------------------
0160               BEGIN EQU   /160      BEGIN ROUTINE
0161               START EQU   BEGIN+1   SUPERVISOR ROUTINE
0162               ERROR EQU   START+1   ERROR LOG ROUTINE
0163               LOG   EQU   ERROR+1   STATUS LOG ROUTINE
0164               END   EQU   LOG+1     END ROUTINE
                   *
                   *-----------------------------------------
                   *     MONITOR CONTROL WORD ADDRESSES
                   *-----------------------------------------
0165               RTNSW EQU   END+1     ROUTINE START SW
0166               ERLCK EQU   END+2     LOCK ON ERROR CONTROL
0167               LOGBY EQU   END+3     I/O BUSY SW ADDRS
                   *
                   *-----------------------------------------
                   *     INTERRUPT TRANSFER VECTOR ADDRESSES
                   *-----------------------------------------
017A               IL0   EQU   /17A      INTERRUPT LEVEL ZERO
018A               IL1   EQU   IL0+16    INTERRUPT LEVEL ONE
019A               IL2   EQU   IL1+16    INTERRUPT LEVEL TWO
01AA               IL3   EQU   IL2+16    INTERRUPT LEVEL THREE
01BA               IL4   EQU   IL3+16    INTERRUPT LEVEL FOUR
01BB               RQTY  EQU   IL4+1     CONSOLE PRINTER REQUEST
01BC               RQKB  EQU   RQTY+1    USE KEYBOARD REQUEST
01BD               SVKB  EQU   RQKB+1    KB SERVICE REQUEST
                   *
                   ******************************************
0000                     ORG   *+/05DC
                   *-----------------------------------------
                   *     THE MONITOR USES CORE LOCATIONS 0-05DC.
                   *     FOR CONTENTS OF THESE ADDRESSES REFER
                   *     TO THE DIAGNOSTIC MONITOR LISTING.
                   *-----------------------------------------
                   *
                   ******************************************
                   *           PROGRAM CONTROL TABLE
                   ******************************************
                   *
05DC 0  032F       PID   DC    /032F     PROGRAM ID
```


1442 TIMING TEST

```
05DD 0  0000       RID   DC       /0000    ROUTINE ID
05DE 0  0000       RAD   DC       /0000    ROUTINE ADDRS
05DF 0  0000       SW0   DC       /0000    PROGRAM CONTROL
05E0 0  0000       SW1   DC       /0000    ROUTINE SELECTION
05E1 0  0000       SW2   DC       /0000
05E2 0  0000       SW3   DC       /0000
05E3 1  05EB             DC       STRT
05E4 1  05EB             DC       STRT     RESTART ADDRESS
05E5 0  0000       MLSCF DC       *-*      SET BY WAIT RTN AND MON
05E6 0  0000             DC       *-*      SET BY CNTRL AND INRTPT
05E7 0  FFFF             DC       /FFFF    TERMINATOR
                   *
                   ******************************************
                   *           TEST INITIALIZATION
                   ******************************************
                   *
05E8 00 44800160   BGIN  BSI   I  BEGIN
05EA 1  05DC             DC       PID      PCT ADDRESS
                   *
                   *-----------------------------------------
                   *  START OF TEST AND SINGLE PASS INITIALIZATION
                   *-----------------------------------------
                   *
05EB 0  6100       STRT  LDX   1 0         SET TO START WITH
05EC 0  69F0             STX   1 RID        FIRST ROUTINE
05ED 01 6D000683         STX  L1 PONLY     RESET PUNCH ONLY SW
05EF 01 6500096E         LDX  L1 INTR
05F1 00 6D00017A         STX  L1 IL0       STO INTERRUPT TRANSFER
05F3 01 65000993         LDX  L1 INTR2      VECTOR ADDRESSES
05F5 00 6D000168         STX  L1 IL4-2
05F7 01 C4000682         LD   L  MODNM     CK FOR MOD NUM ENTRY
05F9 01 44200654         BSI  L  CNTRL,Z   BR IF MOD NUM ENTERED
                   *
05FB 0  C0E5             LD      SW2       CHECK FOR MOD NUMBER
05FC 01 4C20060B         BSC  L  SP,Z      BR IF MOD NUMBER ENTERED
05FE 0  6101             LDX   1 1
05FF 01 66000AA9         LDX  L2 AMOD
0601 01 440009F2         BSI  L  TYPE      PRINT - ENTER MOD NUMBER
                   *
0603 0  C0DD       STRT1 LD      SW2
0604 01 4C2005EB         BSC  L  STRT,Z    LOOP UNTIL NUMBER ENTERED
0606 01 65000603         LDX  L1 STRT1
0608 0  69DC             STX   1 MLSCF     RETURN TO THE MONITOR
0609 00 44800161         BSI  I  START      TO ALLOW MSG TO PRINT
                   *
060B 01 D4000682   SP    STO  L  MODNM     STO MOD NUM
060D 0  6100             LDX   1 0
060E 0  69D2             STX   1 SW2       CLEAR SW2
060F 0  0840             XIO     TYP
0610 0  0841       SP1   XIO     SENTY
0611 0  7101             MDX   1 1
0612 0  1004             SLA     4
0613 01 4C280610         BSC  L  SP1,+Z
0615 00 7500F900         MDX  L1 -/700
0617 0  7001             MDX     *+1
0618 0  7017             MDX     MOD
0619 0  6376             LDX   3 118
061A 01 6F000973         STX  L3 SPD1+1    SET NEW BASE TIME
061C 00 67000090         LDX  L3 144
061E 01 6F00097D         STX  L3 SPD2+1
0620 0  6309             LDX   3 9         SET FOR 9 PUNCH
0621 01 6F0006E4         STX  L3 PDMAX     DELAY INCREMENTS
0623 00 67007117         LDX  L3 /7117     SET INCR TIME TO 23 USEC
0625 01 6F0009A8         STX  L3 DLPCH
0627 01 6F0009B5         STX  L3 SPD3
0629 0  6317             LDX   3 23
062A 01 6F0006E5         STX  L3 DINCR
062C 00 67000087         LDX  L3 135
```

```
062E 01 6F0006E6          STX  L3 PDBAS                                32F01390
                          *                                            32F01400
0630 0  C051        MOD   LD      MODNM     LD THE MOD NUMBER          32F01410
0631 0  100C              SLA     12                                   32F01420
0632 0  180C              SRA     12                                   32F01430
0633 0  9051              S       FIVE                                 32F01440
0634 01 4C200638          BSC  L  MOD6,Z                               32F01450
0636 0  684C              STX     PONLY     IF MOD  SET CNTRL TO       32F01460
0637 0  401C              BSI     CNTRL      RUN PUNCH RTN ONLY        32F01470
                          *                                            32F01480
0638 01 94000684    MOD6  S    L  ONE       CHECK FOR MOD6             32F01490
063A 01 4C200649          BSC  L  MOD7,Z                               32F01500
063C 0  C83F              LDD     P6TM      IF MOD6 SET FOR            32F01510
063D 01 DC000912          STD  L  PCMAX      MOD6 TIMING               32F01520
063F 0  C83E              LDD     R6TM                                 32F01530
0640 01 DC000914          STD  L  RDMAX                                32F01540
0642 0  C03D              LD      P6AVG                                32F01550
0643 01 D4000A02          STO  L  PAVG                                 32F01560
0645 0  C03B              LD      R6AVG                                32F01570
0646 01 D4000A03          STO  L  RAVG                                 32F01580
0648 0  400B              BSI     CNTRL                                32F01590
                          *                                            32F01600
0649 0  903A        MOD7  S       ONE       CHECK FOR MOD7             32F01610
064A 01 44180654          BSI  L  CNTRL,+-                             32F01620
064C 0  1810              SRA     16        IF NOT MOD7 MOD NUMBER     32F01630
064D 0  D093              STO     SW2        ERROR. GO REQUEST         32F01640
064E 0  709C              MDX     STRT       NEW MOD NUMBER            32F01650
                          *                                            32F01660
0650    0000              BSS  E  0                                    32F01670
0650 1  0652        TYP   DC      SENTY                                32F01680
0651 0  0900              DC      /0900                                32F01690
0652 0  0500        SENTY DC      /0500                                32F01700
0653 0  0F01              DC      /0F01                                32F01710
                          *                                            32F01720
                          ********************************************32F01730
                          *          SEQUENCE CONTROL ROUTINE        *32F01740
                          ********************************************32F01750
                          * THIS ROUTINE CHECKS SWITCHES AND CONTROLS  32F01760
                          * SEQUENCE IN WHICH TEST ROUTINES ARE RUN.   32F01770
                          *-------------------------------------------32F01780
                          *                                            32F01790
0654 0  0000        CNTRL DC      /0000                                32F01800
0655 0  C08A              LD      SW1                                  32F01810
0656 01 4C080662          BSC  L  CN20,+    BR IF NO RTN SELECTD       32F01820
                          *                                            32F01830
0658 01 D40005DD    CN10  STO  L  RID       SAVE NEW RTN NUMBER        32F01840
065A 0  901A              S       RIDCK                                32F01850
065B 01 4C080669          BSC  L  CN30,+    BR IF VALID RTN            32F01860
065D 0  1810              SRA     16                                   32F01870
065E 01 D40005E0          STO  L  SW1       IF INVALID RTN GO          32F01880
0660 01 D40005DD          STO  L  RID        TO RTN ONE                32F01890
                          *                                            32F01900
0662 01 7401C5DD    CN20  MDX  L  RID,1     ADV TO NEXT RTN            32F01910
0664 01 C40005DD          LD   L  RID       CHECK FOR END OF           32F01920
0666 0  900F              S       RTNOM      NORMAL SEQUENCE     *1    32F01930
0667 00 44800164          BSI  I  END,-Z    END OF PROGRAM             32F01940
                          *                                            32F01950
0669 01 658005DD    CN30  LDX  I1 RID       XR1=NEW ROUTINE NUMBER     32F01960
066B 01 C5000676          LD   L1 RTTBL-1   FETCH RETURN ADRS           32F01970
066D 01 D40005DE          STO  L  RAD       STORE NEW RTN ADDRS        32F01980
066F 01 D40005E6          STO  L  MLSCF+1   SET MLSCF FOR RETURN       32F01990
0671 00 D4000165          STO  L  RTNSW     SET RTN START SW           32F02000
0673 00 44800161          BSI  I  START     GO TO MONITOR              32F02010
                          *                                            32F02020
0675 0  0005        RIDCK DC      LRTN-RTTBL+1                         32F02030
0676 0  0004        RTNOM DC      NRTN-RTTBL+1                  *2     32F02040
                          *-------------------------------------------32F02050
                          *     ROUTINE ADDRESS TABLE                  32F02060
```



```
                          *-------------------------------------------32F02070
0677 1  0686        RTTBL DC      TST01     DELAY PUNCH DATA           32F02080
0678 1  06E7              DC      TST02     READ AND COMPARE           32F02090
0679 1  0721              DC      TST03     GRAPH PUNCH TIME           32F02100
067A 1  073C        NRTN  DC      TST04     GRAPH READ TIME            32F02110
067B 1  0752        LRTN  DC      TST05     MODIFY DATA                32F02120
                          *                                            32F02130
                          *          1442 MODEL 6 COLUMN INTRPT TIMES  32F02140
                          *                                            32F02150
067C    0000              BSS  E                                       32F02160
067C 0  37DC        P6TM  DC      14300                                32F02170
067D 0  2968              DC      10600     MIN PUNCH TIME             32F02180
067E 0  0640        R6TM  DC      1600      MAX READ TIME              32F02190
067F 0  0384              DC      900       MIN READ TIME              32F02200
0680 0  2FA8        P6AVG DC      12200     AVG PUNCH TIME             32F02210
0681 0  0514        R6AVG DC      1300      AVG READ TIME              32F02220
                          *                                            32F02230
0682 0  0000        MODNM DC      *-*       MOD NUM + SPEED SW         32F02240
0683 0  0000        PONLY DC      0         PUNCH ONLY SW              32F02250
0684 0  0001        ONE   DC      1                                    32F02260
0685 0  0005        FIVE  DC      5                                    32F02270
                          *                                            32F02280
                          *                                            32F02290
                          ********************************************32F02300
                          *          TEST ROUTINE 01 - DELAY PUNCH   *32F02310
                          ********************************************32F02320
                          *     THIS ROUTINE PUNCHES CARDS USING DATA  32F02330
                          *     PREVIOUSLY SET IN THE DATA TABLE.  IT PUNCHES 32F02340
                          *     THE FIRST 80 CARDS WITH MAXINUM PUNCH DELAY. 32F02350
                          *     THE DELAY IS THEN DECREASED ONE INCREMENT 32F02360
                          *     FOR EACH 80 CARDS PUNCHED.  PUNCH COLUMN 32F02370
                          *     INTERRUPT TIME IS ALSO CHECKED.        32F02380
                          *-------------------------------------------32F02390
                          *                                            32F02400
0686 0  6102        TST01 LDX     1 2                                  32F02410
0687 01 66000A72          LDX  L2 ALDBK                                32F02420
0689 01 440009F2          BSI  L  TYPE      PRINT MSG- LOAD BLANKS     32F02430
068B 0  10A0              SLT     32                                   32F02440
068C 01 DC000618          STD  L  TAVG                                 32F02450
068E 01 D400081A          STO  L  AVGCT                                32F02460
                          *                                            32F02470
0690 0  C053        T010  LD      PDMAX                                32F02480
0691 0  D04F              STO     PDLAY     RESET PUNCH DELAY          32F02490
0692 0  684F              STX     PDWAS                                32F02500
                          *                                            32F02510
0693 0  6150        T011  LDX     1 80      INITIALIZE PUNCH TABLE     32F02520
0694 01 C5000AD2          LD   L1 PDATA-1                              32F02530
0696 0  1804              SRA     4         CLEAR TERM BITS            32F02540
0697 0  1004              SLA     4                                    32F02550
0698 01 D5000AD2          STO  L1 PDATA-1                              32F02560
069A 01 D5000B22          STO  L1 PDATA+79  STO IN IMAGE TABLE         32F02570
069C 0  71FF              MDX     1 -1                                 32F02580
069D 0  70F6              MDX     T011+1                               32F02590
                          *                                            32F02600
069E 01 65000AD3    T012  LDX  L1 PDATA     SET FOR START OF           32F02610
06A0 0  6927              STX     1 T014+1   ROTATE PATTERN            32F02620
                          *                                            32F02630
06A1 01 C40005E1    T013  LD   L  SW2       CK SW2 FOR CONSTANT DELAY  32F02640
06A3 0  100C              SLA     12        CLEAR HIGH ORDER BITS      32F02650
06A4 0  180C              SRA     12                                   32F02660
06A5 0  4820              BSC     Z                                    32F02670
06A6 0  D03A              STO     PDLAY                                32F02680
                          *                                            32F02690
06A7 01 74000683          MDX  L  PONLY     SKIP IF NOT MOD            32F02700
06A9 0  7002              MDX     *+2                                  32F02710
06AA 01 440007D7          BSI  L  CKBLK     CK FOR BLANK CARD          32F02720
                          *                                            32F02730
06AC 0  C034              LD      PDLAY                                32F02740
```

```
06AD 0  F034          EOR     PDWAS     IF PUNCH DELAY CHANGED     32F02750
06AE 01 4C1806C7      BSC  L  T014,+-    PRINT MSG                  32F02760
0680 01 678006E1      LDX  I3 PDLAY     XR3=PUNCH DELAY FACTOR     32F02770
0682 0  6B2F          STX  3  PDWAS     SAVE LAST PUNCH DELAY      32F02780
06B3 01 C7000AC3      LD   L3 ADFCT+2   LD 1053 CODE               32F02790
06B5 01 D4000AC1      STO  L  ADFCT     STC DLY FACT CODE IN MSG   32F02800
06B7 0  C02D          LD      DINCR     LD PNCH DLY INCR           32F02810
06B8 0  A028          M       PDLAY     MULT BY PNCH DLY FACTOR    32F02820
06B9 0  1090          SLT     16                                   32F02830
06BA 0  8028          A       PDBAS     ADD PNCH DELAY BASE        32F02840
06BB 01 D4000A00      STO  L  MAXPD     SET MAX PNCH DLY IN MSG    32F02850
06BD 0  6106          LDX  1  6         MSG NUMBER                 32F02860
06BE 01 66000ABA      LDX  L2 APDLY                                32F02870
06C0 0  6301          LDX  3  1                                    32F02880
06C1 01 6F0009FD      STX  L3 SMSG+2    SET MSG DATA CONTROL       32F02890
06C3 01 440009F2      BSI  L  TYPE      PRINT MSG- PUNCH DELAY     32F02900
                      *                                            32F02910
06C5 01 6C0008FD      STX  L  LOOP      SET LOOP ADDRS             32F02920
06C7 00 67000000 T014 LDX  L3 *-*       SET TO PUNCH DATA          32F02930
06C9 01 44000765      BSI  L  PUNCH                                32F02940
                      *                                            32F02950
06CB 01 44000796      BSI  L  COMPR     CCMPARE COL INTRPT TIMES   32F02960
06CD 1  0912          DC      PCMAX                                32F02970
06CE 1  0913          DC      PCMIN                                32F02980
06CF 01 44000822      BSI  L  LOCK      CK FOR LOCK ON FUNCTION    32F02990
                      *                                            32F03000
06D1 01 740106C8      MDX  L  T014+1,1  ADV PUNCH ADDRS            32F03010
06D3 0  C0F4          LD      T014+1    CK FOR END OF PUNCH        32F03020
06D4 0  900E          S       ENDPD      DATA TABLE                32F03030
06D5 01 4C0806A1      BSC  L  T013,+    CONTINUE IF NOT END        32F03040
                      *                                            32F03050
                      *         DEC PUNCH DELAY THEN RESTART       32F03060
                      *         PUNCH PATTERN                      32F03070
                      *                                            32F03080
06D7 01 C40005DF      LD   L  SWO                                  32F03090
06D9 0  1009          SLA     9         LOOK AT FORCE LOG SW       32F03100
06DA 0  6306          LDX  3  6         SET MSG DATA CONTROL       32F03110
06DB 01 441007C6      BSI  L  TYAVG,-   PRINT AVG COL TIME MSG     32F03120
                      *                                            32F03130
06DD 01 74FF06E1      MDX  L  PDLAY,-1                             32F03140
06DF 0  703E          MDX     T012                                 32F03150
06E0 0  70AF          MDX     T010      IF ZERO RESET              32F03160
                      *                                            32F03170
06E1 0  0000 PDLAY DC       *-*         PUNCH DELAY FACTOR         32F03180
06E2 0  0000 PDWAS DC       *-*         LAST PUNCH DELAY SAVED     32F03190
06E3 1  0B22 ENDPD DC       PDATA+79                               32F03200
06E4 0  0004 PDMAX DC       4           MAX PUNCH DELAY INCR       32F03210
                      *                                            32F03220
                      *                                            32F03230
06E5 0  0025 DINCR DC       37                                     32F03240
                      *                                            32F03250
06E6 0  0089 PDBAS DC       185                                    32F03260
                      *                                            32F03270
                      *                                            32F03280
                      ********************************************32F03290
                      *         TEST ROUTINE 02 - READ AND COMPARE 32F03300
                      ********************************************32F03310
                      *    THIS ROUTINE READS THE CARD WHICH WERE  32F03320
                      *    PUNCHED BY ROUTINE ONE. IT COMPARE THE DATA 32F03330
                      *    WITH THE PUNCH DATA. IT ALSO CHECK THE READ 32F03340
                      *    COLUMN INTERRUPT TIME.                  32F03350
                      *--------------------------------------------32F03360
                      *                                            32F03370
06E7 0  C09B TST02 LD       PONLY       SKIP IF NOT MOD            32F03380
06E8 01 44200654      BSI  L  CNTRL,Z   BR IF MOD                  32F03390
06EA 0  6103          LDX  1  3         SET MSG NUMBER             32F03400
06EB 01 66000AB2      LDX  L2 ALPC                                 32F03410
06ED 01 440009F2      BSI  L  TYPE      PRINT MSG- LOAD PNCHC CDS  32F03420
```



```
06EF 0  10A0          SLT     32                                   32F03430
06F0 01 DC000618      STD  L  TAVG                                 32F03440
06F2 01 D400081A      STO  L  AVGCT                                32F03450
                      *                                            32F03460
06F4 01 65000AD2 T021 LDX  L1 PDATA-1   SET FOR START OF PATTERN   32F03470
06F6 0  6907          STX     1 T023+1                             32F03480
                      *                                            32F03490
06F7 01 44000784 T022 BSI  L  READ                                 32F03500
                      *                                            32F03510
06F9 0  1810          SRA     16                                   32F03520
06FA 01 D40008E4      STO  L  M         SET FOR FIRST ERROR        32F03530
06FC 0  6101          LDX     1 1       XR3=COLUMN COUNT           32F03540
                      *                                            32F03550
06FD 00 C5000000 T023 LD   L1 *-*       LD DATA PUNCHED            32F03560
06FF 01 6D000918      STX  L1 COL       STO COLUMN COUNT           32F03570
0701 0  1804          SRA     4         CLEAR STOP PUNCH BIT       32F03580
0702 0  1004          SLA     4                                    32F03590
0703 01 D400090F      STO  L  DATA+1    STO DATA S/B               32F03600
0705 01 F5000B74      EOR  L1 RTBL      CCMPARE WITH DATA READ     32F03610
0707 01 4420088B      BSI  L  ERR9,Z    BR IF ERROR                32F03620
0709 0  7101          MDX     1 1       ADV TO NEXT COLUMN         32F03630
                      *                                            32F03640
070A 01 C4000918      LD   L  COL       CHECK FCR LAST COL READ    32F03650
070C 01 9400090C      S    L  COLCT                                32F03660
070E 01 4C2806FD      BSC  L  T023,+Z   LOOP UNTIL LAST COL        32F03670
                      *                                            32F03680
0710 01 44000796 T024 BSI  L  COMPR     COMPARE COL INTRPT TIMES   32F03690
0712 1  0914          DC      RDMAX                                32F03700
0713 1  0915          DC      RDMIN                                32F03710
                      *                                            32F03720
0714 01 740106FE      MDX  L  T023+1,1  ADV COMPARE ADRS           32F03730
0716 0  C0E7          LD      T023+1    CK FOR END OF TABLE        32F03740
0717 0  90CB          S       ENDPD                                32F03750
0718 01 4C2806F7      BSC  L  T022,+Z   CONTINUE TO END CF PATTERN 32F03760
                      *                                            32F03770
071A 01 C40005DF      LD   L  SWO                                  32F03780
071C 0  1009          SLA     9         LOOK AT FORCE LOG SW       32F03790
071D 0  630A          LDX  3  /A        SET MSG DATA CONTROL       32F03800
071E 01 441007C6      BSI  L  TYAVG,-   PRINT AVG COL TIME MSG     32F03810
0720 0  70D3          MDX     T021      REINITIALIZE               32F03820
                      *                                            32F03830
                      ********************************************32F03840
                      *         TEST ROUTINE 03 - PUNCH TIME GRAPH 32F03850
                      ********************************************32F03860
                      *    THIS TEST WILL STORE THE TIME BETWEEN PUNCH 32F03870
                      *    COLUMN INTERRUPTS WHILE PUNCHING A CARD. ON 32F03880
                      *    THE NEXT CARD IT WILL PUNCH A GRAPH WHICH 32F03890
                      *    DISPLAYS THE VARIATION IN COLUMN INT TIME FRM 32F03900
                      *    COLUMN TO COLUMN. THIS PROCESS WILL BE  32F03910
                      *    REPEATED UNTIL THE LAST CARD INDICATOR IS 32F03920
                      *    SENSED.                                 32F03930
                      *--------------------------------------------32F03940
                      *                                            32F03950
0721 0  6102 TST03 LDX     1 2                                     32F03960
0722 01 66000A72      LDX  L2 ALDBK                                32F03970
0724 01 440009F2      BSI  L  TYPE      PRINT MSG- LOAD BLANKS     32F03980
                      *                                            32F03990
0726 0  1810          SRA     16                                   32F04000
0727 01 D40006E1      STO  L  PDLAY     RESET PUNCH DELAY          32F04010
                      *                                            32F04020
0729 0  6150          LDX     1 80                                 32F04030
072A 01 D5000B74 T031 STO  L1 RTBL                                 32F04040
072C 0  71FF          MDX     1 -1                                 32F04050
072D 0  70FC          MDX     T031                                 32F04060
072E 01 67000B75      LDX  L3 RTBL+1    SET TO PUNCH BLANKS        32F04070
0730 01 44000765      BSI  L  PUNCH                                32F04080
0732 01 6C0008FD T032 STX  L  LOOP      SET LOOP ADDRS             32F04090
0754 01 67800A02      LDX  I3 PAVG                                 32F04100
```

```
0764 C  0000        PTERM DC      *-*                                32F04790
                    *                                                32F04800
                    ************************************************ 32F04810
                    *                PUNCH                           32F04820
                    ************************************************ 32F04830
                    *     THIS SUBROUTINE PUNCHES ONE CARD           32F04840
                    *     THEN CHECKS FOR PUNCH ERRORS               32F04850
                    *     THE ADDRESS OF THE PUNCH DATA TABLE MUST BE 32F04860
                    *     IN XR3 UPON ENTRY.                         32F04870
                    *------------------------------------------      32F04880
                    *                                                32F04890
0765 C  0000        PUNCH DC      *-*                                32F04900
0766 01 6F000960          STX  L3 COLPC     SET TO PUNCH 1ST COL     32F04910
0768 0  734F              MDX  3 79         SET TERMINATOR IN        32F04920
0769 0  6BFA              STX  3 PTERM       PUNCH DATA              32F04930
076A 0  C300              LD   3 0                                   32F04940
076B 01 EC000821          OR   L KO0008                              32F04950
076D 0  D300              STD  3 0                                   32F04960
                    *                                                32F04970
076E 01 440009B8          BSI  L READY      CK FOR READY             32F04980
0770 01 65000A5F          LDX  L1 APCH                               32F04990
0772 01 6D000903          STX  L1 OP                                 32F05000
0774 01 6C0008E6          STX  L RPSW       SET RD/PCH SW TO PCH     32F05010
0776 0  6150              LDX  1 80         SET COL COUNT            32F05020
0777 0  08EA              XIO    STPCH      START PUNCH              32F05030
0778 01 44000919          BSI  L WAIT       WAIT FOR INTERRUPT       32F05040
077A 01 4C9008FD          BSC  I LOOP,-                              32F05050
                    *                                                32F05060
077C 01 C4800764          LD   I PTERM      REMOVE TERMINATOR        32F05070
077E 0  1804              SRA    4                                   32F05080
077F 0  1004              SLA    4                                   32F05090
0780 01 D4800764          STO  I PTERM                               32F05100
                    *                                                32F05110
0782 01 4C800765          BSC  I PUNCH      RETURN                   32F05120
                    *                                                32F05130
                    ************************************************ 32F05140
                    *                READ                            32F05150
                    ************************************************ 32F05160
                    *     THIS SUBROUTINE READS ONE CARD THEN        32F05170
                    *     CHECKS FOR READ ERRORS.                    32F05180
                    *------------------------------------------      32F05190
                    *                                                32F05200
0784 0  0000        READ  DC      *-*                                32F05210
0785 01 44000988          BSI  L READY      CHECK FOR READY          32F05220
0787 01 65000A5C          LDX  L1 ARD                                32F05230
0789 01 6D000903          STX  L1 OP                                 32F05240
078B 0  1010              SLA    16                                  32F05250
078C 01 D40008E6          STO  L RPSW       SET RD/PCH SW TO RD      32F05260
078E 0  6150              LDX  1 80         SET COL COUNT            32F05270
078F 01 0C000760          XIO  L STRD       START READ               32F05280
0791 01 44000919          BSI  L WAIT       WAIT FOR INTERRUPT       32F05290
                    *                                                32F05300
0793 01 4CA80784          BSC  I READ,+Z    RETURN                   32F05310
0795 0  70EF              MDX    READ+1                              32F05320
                    *                                                32F05330
                    *                                                32F05340
                    ************************************************ 32F05350
                    *             COMPARE COLUMN TIME                32F05360
                    ************************************************ 32F05370
                    *     THIS SUBROUTINE CHECKS THAT COLUMN TIME    32F05380
                    *     FALLS WITHIN MINIMUM AND MAXIMUN LIMITS.   32F05390
                    *     IT ALSO ADDS ALL COLUMN TIMES AND KEEPS    32F05400
                    *     COUNT OF THE NUMBER COLUMNS FOR            32F05410
                    *     CALCULATION OF COLUMN TIME AVERAGE.        32F05420
                    *------------------------------------------      32F05430
                    *                                                32F05440
0796 0  0000        COMPR DC      *-*                                32F05450
                    *                                                32F05460
```



```
                    *                  MCD6 PAVG = 12200            32F04110
                    *                  MCD7 PAVG = 6000             32F04120
                    *                                               32F04130
0736 01 440007E5          BSI  L GRAPH      SET UP GRAPH             32F04140
0738 01 67000BC9          LDX  L3 TIME+2    SET TO PUNCH GRAPH       32F04150
073A 0  402A              BSI    PUNCH                              32F04160
                    *                                               32F04170
                    *                                               32F04180
073B 0  70F6              MDX    T032       REPEAT UNTIL LAST CARD   32F04190
                    *                                               32F04200
                    ************************************************ 32F04210
                    *          TEST ROUTINE 04 - READ TIME GRAPH     32F04220
                    ************************************************ 32F04230
                    *     THIS TEST WILL READ A BLANK CARD, STORE THE 32F04240
                    *     TIME BETWEEN READ COLUMN INTERRUPTS, THEN  32F04250
                    *     PUNCH A GRAPH DISPLAYING THE VARIATION IN  32F04260
                    *     COLUMN INTERRUPT TIME FROM COLUMN TO COLUMN. 32F04270
                    *     THIS PROCESS WILL BE REPEATED UNTIL THE LAST 32F04280
                    *     CARD INDICATOR IS SENSED.                  32F04290
                    *------------------------------------------      32F04300
                    *                                               32F04310
073C 01 C4000683    TST04 LD    L PONLY                             32F04320
073E 01 44200654          BSI  L CNTRL,Z    BR IF MCD 5              32F04330
0740 0  6102              LDX    1 2                                32F04340
0741 01 66000A72          LDX  L2 ALDBK                             32F04350
0743 01 440009F2          BSI  L TYPE       PRINT MSG- LOAD BLANKS   32F04360
0745 0  1810              SRA    16                                 32F04370
0746 01 D40006E1          STO  L PDLAY      RESET PUNCH DELAY        32F04380
                    *                                               32F04390
0748 01 440007D7    T041  BSI  L CKBLK      READ A BLANK CARD        32F04400
                    *                                               32F04410
074A 01 67800A03          LDX  I3 RAVG      XR3=READ TIME AVG        32F04420
                    *                  MCD6 RAVG = 1300             32F04430
                    *                  MCD7 RAVG = 1000             32F04440
                    *                                               32F04450
074C 01 440007E5          BSI  L GRAPH      SET UP GRAPH             32F04460
074E 01 67000BC9          LDX  L3 TIME+2    SET TO PUNCH GRAPH       32F04470
0750 0  4014              BSI    PUNCH                              32F04480
                    *                                               32F04490
0751 0  70F6              MDX    T041       REPEAT UNTIL LAST CARD   32F04500
                    *                                               32F04510
                    ************************************************ 32F04520
                    *          TEST ROUTINE 05 - MODIFY DATA         32F04530
                    ************************************************ 32F04540
                    *     THIS ROUTINE WILL READ ONE DATA CARD AND   32F04550
                    *     REPLACE THE PUNCH DATA TABLE WITH THE DATA 32F04560
                    *     CONTAINED ON THAT CARD. THE ROUTINE WILL   32F04570
                    *     THEN RESTART THE PROGRAM FROM ROUTINE ONE. 32F04580
                    *------------------------------------------      32F04590
                    *                                               32F04600
0752 0  4031        TST05 BSI    READ       READ A CARD              32F04610
                    *                                               32F04620
C753 01 6780090C          LDX  I3 COLCT     XR3=COLUMN COUNT         32F04630
0755 01 C7000B74    T051  LD    L3 RTBL     LOAD DATA READ           32F04640
0757 01 D7000AD2          STO  L3 PDATA-1   STO IN PUNCH TABLE       32F04650
0759 0  73FF              MDX  3 -1         GO TO NEXT COLUMN        32F04660
075A C  70FA              MDX    T051       LOOP UNTIL LAST COL      32F04670
                    *                                               32F04680
075B 01 6C0005E0          STX  L SW1        SET CNTRL TO RESTART RTN 1 32F04690
075D 01 44000654          BSI  L CNTRL      GO TO CNTRL RTN          32F04700
                    *                                               32F04710
                    *------------------------------------------      32F04720
                    *                                               32F04730
                          BSS  E                                    32F04740
C760 0  0000        STRD  DC      *-*                               32F04750
0761 0  1404              DC      /1404     START READ IOCC          32F04760
0762 0  0000        STPCH DC      *-*                               32F04770
0763 0  1401              DC      /1401     START PUNCH IOCC         32F04780
```

1442 TIMING TEST

```
                        *                                             32F06150
07DB 01 6780090C              LDX  I3 COLCT       VERIFY THAT CARD    32F06160
07DD 01 C7000B74        CKB01 LD   L3 RTBL         IS BLANK BEFORE    32F06170
07DF 01 4C20082C              BSC  L  ERR0,Z       PUNCHING IT        32F06180
07E1 0  73FF                  MDX   3 -1                              32F06190
07E2 0  70FA                  MDX     CKB01       LOOP UNTIL LAST COL 32F06200
07E3 01 4C8007D7              BSC  I  CKBLK       RETURN              32F06210
                        *                                             32F06220
                        ******************************************    32F06230
                        *             GRAPH SETUP                     32F06240
                        ******************************************    32F06250
                        *     THIS SUBROUTINE WILL CALCULATE A GRAPH  32F06260
                        *     POINT FOR EACH COLUMN TIME.  THIS SET OF 32F06270
                        *     GRAPH POINTS WILL BE PUNCHED ON THE NEXT 32F06280
                        *     CARD.  THE SCALE CAN BE CHANGED WITH A  32F06290
                        *     FNC 3 BIT SWITCH ENTRY.                 32F06300
                        *-----------------------------------------    32F06310
                        *                                             32F06320
07E5 0  0000            GRAPH DC      *-*                             32F06330
07E6 0  6B36                  STX   3 AVG         STO AVG TIME        32F06340
07E7 0  6201                  LDX   2 1                               32F06350
07E8 0  6A33                  STX   2 TEMP+1      SET SCALE FACTOR    32F06360
                        *                                             32F06370
07E9 01 C40005E2              LD   L  SW3         CK FOR NEW SCALE ENTRY 32F06380
07EB 0  100C                  SLA     12          CLEAR UNWANTED BITS 32F06390
07EC 0  180C                  SRA     12                              32F06400
07ED 0  4820                  BSC     Z           SKIP IF NO NEW SCALE 32F06410
07EE 0  D02D                  STO     TEMP+1                          32F06420
                        *                                             32F06430
07EF 01 6780090C              LDX  I3 COLCT       XR3=COL CNT         32F06440
07F1 0  73FF                  MDX   3 -1                              32F06450
07F2 0  C029                  LD      TEMP+1      LOAD SCALE FACTOR   32F06460
07F3 0  A02B                  M       HUND        CAL SCALE           32F06470
07F4 0  1090                  SLT     16                              32F06480
07F5 0  D028                  STO     SCALE       SAVE SCALE          32F06490
                        *                                             32F06500
07F6 0  C026            GRPH1 LD      AVG         LD AVG TIME         32F06510
07F7 01 970008C8              S    L3 TIME+1      SUB ACTUAL TIME     32F06520
07F9 0  1890                  SRT     16                              32F06530
07FA 0  A823                  D       SCALE       DIVIDE BY SCALE     32F06540
07FB 0  D01F                  STO     TEMP                            32F06550
07FC 01 6580081B              LDX  I1 TEMP                            32F06560
07FE 0  7104                  MDX   1 4           XR1=GRAPH BIT POSITION 32F06570
07FF 0  1000                  NOP                                     32F06580
0800 0  C01F                  LD      K8000       LD A BIT            32F06590
0801 0  1900                  SRA   1 0           SHIFT TO GRAPH POSITION 32F06600
0802 0  1804                  SRA     4                               32F06610
0803 0  1004                  SLA     4                               32F06620
0804 01 D7000BC9              STO  L3 TIME+2      STO GRAPH BIT IN PNCH BUF 32F06630
0806 0  73FF                  MDX   3 -1          ADV TO NEXT COL     32F06640
0807 0  70EE                  MDX     GRPH1       LOOP UNTIL LAST COL 32F06650
0808 01 6780090C              LDX  I3 COLCT                           32F06660
080A 01 C7000BC8              LD   L3 TIME+1                          32F06670
080C 0  E814                  OR      K0008       SET LAST COL BIT    32F06680
080D 01 D7000BC8              STO  L3 TIME+1                          32F06690
                        *                                             32F06700
080F 01 6580081C              LDX  I1 TEMP+1      XR1=SCALE FACTOR    32F06710
0811 0  7102                  MDX   1 2                               32F06720
0812 0  C00D                  LD      K8000       CONVERT SCALE FACTOR 32F06730
0813 0  1900                  SRA   1 0            TO CARD IMAGE      32F06740
0814 01 D4000BC9              STO  L  TIME+2      SET TO PUNCH IN CD COL ONE 32F06750
0816 01 4C8007E5              BSC  I  GRAPH       RETURN              32F06760
                        *                                             32F06770
0818    0000                  BSS  E  0                               32F06780
0818 0  0000            TAVG  DC      *-*         TOTAL COL TIME      32F06790
0819 0  0000                  DC      *-*                             32F06800
081A 0  0000            AVGCT DC      *-*         COL CNT FOR AVG     32F06810
081B 0  0000            TEMP  DC      *-*                             32F06820
```


1442 TIMING TEST

```
0797 01 65800796              LDX  I1 COMPR       XR1=CALL ADDRS+1    32F05470
0799 0  6301                  LDX   3 1           XR3=COL NUMBER      32F05480
                        *                                             32F05490
079A 0  7301            COMP1 MDX   3 1           ADV COL NUMBER      32F05500
079B 01 6F000918              STX  L3 COL                             32F05510
079D 01 C4000918              LD   L  COL         LD COL NUMBER       32F05520
079F 01 9400090C              S    L  COLCT       COMPARE WITH COL CNT 32F05530
07A1 01 4C3007BB              BSC  L  COMP3,-Z    CK ON PRINT AVG     32F05540
                        *                                             32F05550
07A3 00 C5800000              LD   I1 0           LD MAX COL TIME     32F05560
07A5 01 97000BC7              S    L3 TIME        COMPARE WITH ACTUAL 32F05570
07A7 01 440808A3              BSI  L  ERR10,+     BR IF TC LONG       32F05580
                        *                                             32F05590
07A9 00 C5800001              LD   I1 1           LD MIN COL TIME     32F05600
07AB 01 97000BC7              S    L3 TIME        COMPARE WITH ACTUAL 32F05610
07AD 01 441008B0              BSI  L  ERR11,-     BR IF TC SHORT      32F05620
                        *                                             32F05630
07AF 01 C7000BC7        COMP2 LD   L3 TIME        TOTAL ALL COL TIME FOR AVG 32F05640
07B1 0  1890                  SRT     16                              32F05650
07B2 0  8865                  AD      TAVG                            32F05660
07B3 0  D864                  STD     TAVG                            32F05670
07B4 01 7401081A              MDX  L  AVGCT,1     ADV COL CNT FOR AVG CALC 32F05680
07B6 0  70E3                  MDX     COMP1                           32F05690
                        *                                             32F05700
07B7 0  10A0                  SLT     32          RESET IF OVER FLOW COL CNT 32F05710
07B8 0  D061                  STO     AVGCT                           32F05720
07B9 0  D85E                  STD     TAVG                            32F05730
07BA 0  70DF                  MDX     COMP1                           32F05740
                        *                                             32F05750
07BB 01 C40005DF        COMP3 LD   L  SW0                             32F05760
07BD 0  1009                  SLA     9           LOOK AT FORCE LOG SW 32F05770
07BE 00 67008002              LDX  L3 /8002       SET DATA CONTROL    32F05780
07C0 01 442807C6              BSI  L  TYAVG,+Z    PRINT AVG COL TIME MSG 32F05790
                        *                                             32F05800
07C2 01 7402C796              MDX  L  COMPR,2                         32F05810
07C4 01 4C800796              BSC  I  COMPR                           32F05820
                        *                                             32F05830
                        ******************************************    32F05840
                        *     PRINT COLUMN INTERRUPT AVERAGE TIME     32F05850
                        ******************************************    32F05860
                        *     THIS SUBROUTINE CALCULATES THE COLUMN TIME 32F05870
                        *     AVERAGE THEN PRINTS THE AVERAGE MESSAGE. 32F05880
                        *-----------------------------------------    32F05890
                        *                                             32F05900
07C6 0  0000            TYAVG DC      *-*                             32F05910
07C7 0  C850                  LDD     TAVG        CALCULATE AVG       32F05920
07C8 0  A851                  D       AVGCT                           32F05930
07C9 01 D4000A01              STO  L  CTAVG       SET IN MSG          32F05940
07CB 0  6107                  LDX   1 7           SET MSG NUMBER      32F05950
07CC 01 66000A9E              LDX  L2 ACOLT                           32F05960
07CE 01 6F0009FD              STX  L3 SMSG+2      SET MSG DATA CONTROL 32F05970
07D0 01 440009F2              BSI  L  TYPE                            32F05980
                        *                                             32F05990
07D2 0  10A0                  SLT     32                              32F06000
07D3 0  D844                  STD     TAVG                            32F06010
07D4 0  D045                  STO     AVGCT                           32F06020
07D5 01 4C8007C6              BSC  I  TYAVG       RETURN              32F06030
                        *                                             32F06040
                        ******************************************    32F06050
                        *             CHECK FOR BLANKS                32F06060
                        ******************************************    32F06070
                        *     THIS SUBROUTINE CHECKS EACH CARD BEFORE 32F06080
                        *     IT IS PUNCHED TO VERIFY THAT IT IS BLANK. 32F06090
                        *-----------------------------------------    32F06100
                        *                                             32F06110
07D7 0  0000            CKBLK DC      0                               32F06120
07D8 01 6C0008FD              STX  L  LOOP                            32F06130
07DA 0  40A9                  BSI     READ        READ A CARD         32F06140
```

```
C81C 0  0000          DC      *-*                                    32F06830
C81D 0  0000    AVG   DC      *-*                                    32F06840
081E 0  0000    SCALE DC      *-*                                    32F06850
081F 0  0026    HUND  DC      38                                     32F06860
0820 0  8000    K8000 DC      /8000                                  32F06870
0821 0  0008    K0008 DC      /0008                                  32F06880
                *                                                    32F06890
                ********************************************         32F06900
                *            LOCK ON FUNCTION ROUTINE        *       32F06910
                ********************************************         32F06920
                *                                                    32F06930
0822 0  0000    LOCK  DC      *-*                                    32F06940
0823 01 C40005DF      LD    L SW0         LD SW0                     32F06950
0825 00 EC800166      OR    I ERLCK       COMB WITH MONITOR SW0      32F06960
0827 0  100A          SLA     10          CHECK LOCK SW              32F06970
0828 01 4C900822      BSC   I LOCK,-      BR IF NOT LOCK ON FUNC     32F06980
082A 01 4C80C8FD      BSC   I LOOP        LOOP ON LAST FUNC          32F06990
                *                                                    32F07000
                *                                                    32F07010
                ********************************************         32F07020
                *            ERROR MESSAGE SETUP             *       32F07030
                ********************************************         32F07040
                *                                                    32F07050
082C 0  6100    ERR0  LDX     1 0           CARD NOT BLANK           32F07060
082D 0  6200          LDX     2 /0000                                32F07070
082E 01 CC0008CE      LDD   L MSG0                                   32F07080
0830 01 6C0006F9      STX   L OPMSW                                  32F07090
0832 01 440008EC      BSI   L ETYPE       PRINT ERR MSG              32F07100
0834 01 0C0008E6      XIO   L STACK-1                                32F07110
0836 01 4C8007D7      BSC   I CKBLK                                  32F07120
                *                                                    32F07130
0838 0  0000    ERR1  DC      *-*         STATIC DSW ERROR           32F07140
0839 01 740008E5      MDX   L ERR5S,0     IF PREVIOUS ERR5           32F07150
083B 0  7008          MDX     ERR1A       DO NOT PRINT THIS MSG      32F07160
083C 0  6101          LDX     1 1                                    32F07170
083D 0  6203          LDX     2 /3                                   32F07180
083E 01 CC0008D0      LDD   L MSG1                                   32F07190
0840 01 6C0008F9      STX   L OPMSW                                  32F07200
0842 01 440008EC      BSI   L ETYPE       PRINT ERR MSG              32F07210
                *                                                    32F07220
0844 0  1011    ERR1A SLA     17                                     32F07230
0845 01 D40008E5      STD   L ERR5S       RESET ERR5 SW              32F07240
0847 01 4C800838      BSC   I ERR1                                   32F07250
                *                                                    32F07260
0849 0  0000    ERR2  DC      *-*         BUSY DSW ERROR             32F07270
084A 01 CC0008E8      LDD   L BDSW                                   32F07280
084C 01 DC00090A      STD   L DSW         SET BUSY DSW IN MSG        32F07290
084E 0  6102          LDX     1 2                                    32F07300
084F 0  6203          LDX     2 3                                    32F07310
0850 01 CC0008D2      LDD   L MSG2                                   32F07320
0852 01 440008EC      BSI   L ETYPE       PRINT ERR MSG              32F07330
0854 01 4C80C849      BSC   I ERR2                                   32F07340
                *                                                    32F07350
0856 0  0000    ERR5  DC      *-*         INTRPT 4 DSW ERROR         32F07360
0857 01 6C0008E5      STX   L ERR5S       SET ERROR 5 SW             32F07370
0859 00 66000003      LDX   L2 3          SET DATA IC                32F07380
085B 01 F40008EA      EOR   L DSW4        GET DSW S/B                32F07390
085D 01 D40008EB      STD   L DSW4+1      SET IN MSG                 32F07400
085F 01 CC0008EA      LDD   L DSW4                                   32F07410
0861 01 DC00090A      STD   L DSW         SET DSW IN MSG             32F07420
0863 0  1002          SLA     2           LOCK FOR ERR CK            32F07430
0864 01 4C28086D      BSC   L ERR6,+Z     BR IF ERR CK               32F07440
                *                                                    32F07450
0866 0  6105          LDX     1 5                                    32F07460
0867 01 CC0008D6      LDD   L MSG5                                   32F07470
0869 01 440008EC      BSI   L ETYPE       PRINT ERR MSG              32F07480
086B 01 4C800856  ERR5R BSC I ERR5                                   32F07490
                *                                                    32F07500
```



```
086D 01 C40008E6  ERR6  LD    L RPSW        CK FOR PUNCH OPERATION     32F07510
086F 01 4C08087F        BSC   L ERR7,+      BR IF NOT PUNCH            32F07520
0871 01 0C00095E        XIO   L COLRD       RD ECHO BITS               32F07530
0873 01 C480095E        LD    I COLRD                                  32F07540
0875 01 4C18087F        BSC   L ERR7,+-     BR IF NOT PUNCH CK         32F07550
0877 01 D400090A        STO   L DSW         STO ECHO IN MSG            32F07560
0879 0  6106            LDX     1 6                                    32F07570
087A 0  6203            LDX     2 /3                                   32F07580
087B 0  C85C            LDD     MSG6                                   32F07590
087C 01 440008EC        BSI   L ETYPE       PRINT ERR MSG              32F07600
087E 0  70EC            MDX     ERR5R                                  32F07610
                *                                                      32F07620
087F 0  6107    ERR7  LDX     1 7           ERR CK                     32F07630
0880 0  C859            LDD     MSG7                                   32F07640
0881 01 440008EC        BSI   L ETYPE       PRINT ERR MSG              32F07650
0883 0  70E7            MDX     ERR5R                                  32F07660
                *                                                      32F07670
0884 0  0000    ERR8  DC      *-*           COL COUNT ERROR            32F07680
0885 0  6108            LDX     1 8                                    32F07690
0886 0  620C            LDX     2 /C                                   32F07700
0887 0  C854            LDD     MSG8                                   32F07710
0888 0  4063            BSI     ETYPE       PRINT ERR MSG              32F07720
0889 01 4C800884        BSC   I ERR8                                   32F07730
                *                                                      32F07740
088B 0  0000    ERR9  DC      *-*           DATA COMPARE ERROR         32F07750
088C 01 F400090F        EOR   L DATA+1      RESTORE TO DATA WAS        32F07760
088E 01 D400090E        STO   L DATA                                   32F07770
0890 0  690D            STX     1 RX1+1     SAVE XR1                   32F07780
0891 0  10A0            SLT     32                                     32F07790
0892 00 6600C030        LDX   L2 /C030      SET FOR MULTI LINE MSG     32F07800
0894 01 740008E4        MDX   L M           CHECK FOR MULTI LINE       32F07810
0896 0  7005            MDX     ERR9A       BR IF FIRST LINE           32F07820
0897 0  684C            STX     M           SET MULTI LINE WORD        32F07830
0898 0  6109            LDX     1 9         MESSAGE NUMBER             32F07840
0899 00 66004030        LDX   L2 /4030      SET WORD CNTL              32F07850
089B 0  C842            LDD     MSG9                                   32F07860
089C 0  404F    ERR9A BSI       ETYPE       ERROR TYPE OUT             32F07870
089D 00 65000000  RX1   LDX   L1 *-*        RESTORE XR1                32F07880
089F 01 0C0008E6        XIO   L STACK-1     SELECT ERROR CARD          32F07890
08A1 01 4C800885        BSC   I ERR9        RETURN                     32F07900
                *                                                      32F07910
                *                                                      32F07920
08A3 0  0000    ERR10 DC      *-*                                      32F07930
08A4 0  6923            STX     1 EXR1+1    STO XR1                    32F07940
08A5 0  6B24            STX     3 EXR3+1    STO XR3                    32F07950
08A6 0  6110            LDX     1 /10       COL INTRPT SLOW            32F07960
08A7 0  C838            LDD     MSG10                                  32F07970
                *                                                      32F07980
08A8 00 66004180        LDX   L2 /4180      SET FOR PUNCH MSG          32F07990
08AA 01 740008E6        MDX   L RPSW        CK PUNCH/READ SW           32F08000
08AC 0  7010            MDX     ERX         BR IF PUNCH                32F08010
08AD 00 66004480        LDX   L2 /4480      SET FOR READ MSG           32F08020
08AF 0  700D            MDX     ERX                                    32F08030
                *                                                      32F08040
08B0 0  0000    ERR11 DC      *-*                                      32F08050
08B1 0  6916            STX     1 EXR1+1    STO XR1                    32F08060
08B2 0  6B17            STX     3 EXR3+1    STO XR3                    32F08070
08B3 0  6111            LDX     1 /11       COL INTRPT FAST            32F08080
08B4 0  C82D            LDD     MSG11                                  32F08090
                *                                                      32F08100
08B5 00 66004280        LDX   L2 /4280      SET FOR PUNCH MSG          32F08110
08B7 01 740008E6        MDX   L RPSW        CK PUNCH/READ SW           32F08120
08B9 0  7003            MDX     ERX         BR IF PUNCH                32F08130
08BA 00 66004880        LDX   L2 /4880      SET FOR READ MSG           32F08140
08BC 0  7000            MDX     ERX                                    32F08150
                *                                                      32F08160
08BD 01 740008E4  ERX   MDX   L M                                      32F08170
08BF 0  7001            MDX     ERX1                                   32F08180
```

1442 TIMING TEST

```
08C0 0  7004          MDX     ERX2
                      *
08C1 0  18A0    ERX1  SRT     32
08C2 00 76008000        MDX   L2 /8000
08C4 0  1000          NOP
                      *
08C5 0  4026    ERX2  BSI     ETYPE     PRINT ERR MSG
08C6 0  681D          STX     M
08C7 00 65000000 EXR1 LDX     L1 *-*    RESTORE XR1
08C9 00 67000000 EXR3 LDX     L3 *-*    RESTORE XR3
08CB 01 4C0007AF      BSC     L  COMP2
                      *
08CE    0000          BSS     E
08CE 1  0A04    MSG0  DC      ACNBK     CARD NOT BLANK
08CF 0  0000          DC      /0000
08D0 1  0A0C    MSG1  DC      AWAS      STATIC DSW ERROR
08D1 1  0A1B          DC      ASDSW
08D2 1  0A0C    MSG2  DC      AWAS      BUSY DSW ERRCR
08D3 1  0A24          DC      ABDSW
08D4 1  0A18    MSG3  DC      ADSW      NC INTERRUPT
08D5 1  0A34          DC      ANINT
08D6 1  0A0C    MSG5  DC      AWAS      LEVEL 4  DSW ERROR
08D7 1  0A2C          DC      ADSW4
08D8 1  0A0C    MSG6  DC      AWAS      PUNCH CHECK
08D9 1  0A3A          DC      APCK
08DA 1  0A0C    MSG7  DC      AWAS      ERROR CHECK
08DB 1  0A40          DC      AECK
08DC 1  0A11    MSG8  DC      ADWAS     COLUMN COUNT ERROR
08DD 1  0A45          DC      ACCNT
08DE 1  0A0C    MSG9  DC      AWAS      COLUMN DATA ERROR
08DF 1  0A4C          DC      ADATA
08E0 1  0A7E    MSG10 DC      ATL       COL INTRPT SLOW
08E1 0  0000          DC      /0000
08E2 1  0A8E    MSG11 DC      ATS       COL INTRPT FAST
08E3 0  0000          DC      /0000
                      *
08E4 0  0000    M     DC      *-*       MULTI LINE CONTROL WORD
08E5 0  0000    ERR5S DC      *-*       ERR5 SW
08E6 0  0000    RPSW  DC      *-*       READ/PUNCH SW
08E7 0  1480    STACK DC      /1480     SELECT =2 STACKER
08E8 0  0000    BDSW  DC      *-*       BUSY DSW WAS
08E9 0  0003          DC      /0003           S/B
08EA 0  0000    DSW4  DC      *-*       INT 4 DSW WAS
08EB 0  0000          DC      *-*             S/B
                      *
                      *****************************************
                      *             PRINT ERROR MESSAGE
                      *****************************************
                      *     THIS ROUTINE PRINTS ALL THE ERROR MESSAGES.
                      *     UPON ENTRY THE MSG NO. MUST BE SET IN XR1,
                      *     THE DATA ID IN XR2, AND THE ALPHA ADDRS IN
                      *     THE ACCUM AND EXT.
                      *---------------------------------------
                      *
08EC 0  0000    ETYPE DC      *-*
08ED 0  6917          STX   1 EMSG      SET MSG NUMBER
08EE 0  6A18          STX   2 EMSG+2    SET DATA ID
08EF 0  D818          STD     EMSG+3    SET ALPHA ADDRS
08F0 01 C7000BC7      LD    L3 TIME
08F2 0  D01E          STO     TIMWS
                      *
08F3 01 740008F9      MDX   L OPMSW     PRINT LAST OP MSG IF
08F5 0  7004          MDX     ETYP1      FIRST ERROR MSG AFTER
08F6 00 44800162      BSI   I ERROR      A CONTROL OP
08F8 1  08FF          DC      ETYP2
08F9 0  0000    OPMSW DC      *-*       MUST BE ZERO FOR OP MSG
                      *
08FA 00 44800162 ETYP1 BSI  I ERROR     PRINT ERROR MESSAGE
```


1442 TIMING TEST

```
08FC 1  0905          DC      EMSG
08FD 0  0000    LOOP  DC      *-*       LOOP ADDRS SET HERE
08FE 0  68FA          STX     OPMSW
                      *
08FF 01 4C8008EC ETYP2 BSC  I ETYPE     RETURN
                      *
0901 0  8000          DC      /8000
0902 1  0A56          DC      ALOP
0903 0  0000    OP    DC      *-*
                      *
                      *---------------------------------------
                      *     ERROR MESSAGE TABLE
                      *---------------------------------------
0904    0001          BSS   E 1
0905 0  0000    EMSG  DC      *-*       MESSAGE NUMBER
0906 0  7F8C          DC      /7F8C     HEX/DEC SW
0907 0  0000          DC      *-*       DATA I/D
0908 0  0000          DC      *-*       ALPHA ADDRS1
0909 0  0000          DC      *-*       ALPHA ADDRS2
                      *
090A 0  0000    DSW   DC      *-*       DSW WAS
090B 0  0000          DC      *-*       DSW S/B
090C 0  0000    COLCT DC      *-*       COLUMN COUNT WAS
090D 0  0050          DC      80        COLUMN COUNT S/B
090E 0  0000    DATA  DC      *-*       READ OR PUNCH ECHO WAS
090F 0  0000          DC      *-*       READ DATA S/B
0910 0  0000          DC      0000      NOT USED
0911 0  0000    TIMWS DC      *-*       TIME WAS
0912 0  1C0C    PCMAX DC      7180      MAX PUNCH COL TIME
0913 0  14B4    PCMIN DC      5300      MIN PUNCH COL TIME
0914 0  0514    RDMAX DC      1300      MAX READ COL TIME
0915 0  028C    RDMIN DC      700       MIN READ COL TIME
0916 0  0000          DC      0000      NOT USED
0917 0  0000          DC      0000      NOT USED
0918 0  0000    COL   DC      *-*       COL IN ERROR
                      *
                      *****************************************
                      *          INTERRUPT WAIT ROUTINE
                      *****************************************
                      *     THIS SUBROUTINE WAITS FOR INTERRUPT.
                      *     WHEN THE INTERRUPT IS RECEIVED IT WILL
                      *     CHECK THE ROUTINE SELECTION SWITCH.
                      *     IF A NEW ROUTINE HAS BEEN SELECTED IT
                      *     WILL BRANCH TO THE CONTROL ROUTINE.
                      *---------------------------------------
                      *
0919 0  0000    WAIT  DC      *-*
091A 0  1810          SRA     16
091B 0  D0C8          STO     M         RESET MULT LINE CONTROL
091C 0  D0EF          STO     COLCT     RESET COLUMN COUNT
091D 0  D0DB          STO     OPMSW     RESET OP MSG SW
091E 0  69EE          STX   1 COLCT+1
091F 00 65001000      LDX   L1 /1000    SET INTERRUPT
0921 0  6926          STX   1 WCNT       WAIT CNT
0922 0  0841          XIO     SENSE     SENSE BUSY DSW
0923 0  D0C4          STO     BDSW
                      *
0924 01 6500092D WAIT1 LDX  L1 WAIT3
0926 01 740005E6      MDX   L MLSCF+1   OK FOR INTERRUPT
0928 0  7015          MDX     WAIT4     BR IF INTERRUPT OCCURED
                      *
0929 01 6D0005E5 WAIT2 STX  L1 MLSCF     SET RETURN ADDRESS
092B 00 44800161      BSI   I START     GO TO MONITOR
                      *
092D 01 74FFC948 WAIT3 MDX  L WCNT,-1    DECREMENT WAIT CNT
092F 0  70F4          MDX     WAIT1
0930 0  C087          LD      BDSW      CK BUSY DSW
0931 0  F087          EOR     BDSW+1
```

```
0932 01 44200849          BSI  L  ERR2,Z     BR IF ER                    32F09550
0934 0  C82F              XIO      SENSE      SENSE DSW                   32F09560
0935 0  D0D4              STO      DSW        STORE DSW IN MSG            32F09570
0936 0  6103        ERR3  LDX   1  3          MESSAGE NUMBER              32F09580
0937 0  6201              LDX   2  /0001      SET WORD CNTL               32F09590
0938 0  C8C8              LDD      MSG3       MSG- NO INTRPT              32F09600
0939 0  40B2              BSI      ETYPE      PRINT ERR MSG               32F09610
093A 01 67800919          LDX   I3 WAIT       SET TO RETRY FUNCTION       32F09620
093C 01 6F0005E6          STX   L3 MLSCF+1                               32F09630
                          *                                              32F09640
093E 01 C40005E0    WAIT4 LD    L  SW1                                   32F09650
0940 00 44880161          BSI   I  START,+    CK FOR RTN SELECT           32F09660
0942 01 940005DD          S     L  RID        CK FOR NEW ROUTINE          32F09670
0944 01 44200654          BSI   L  CNTRL,Z    BR IF NEW RTN               32F09680
0946 00 44800161          BSI   I  START                                  32F09690
                          *                                              32F09700
0948 0  0000        WCNT  DC       *-*                                    32F09710
                          *                                              32F09720
                          *              ERROR ANALYSIS                  32F09730
                          ************************************************32F09740
                          ************************************************32F09750
                          *  COME TO HERE FROM INTERRUPT AND CHECK FOR   *32F09760
                          *  ERRORS BEFORE RETURNING TO TEST ROUTINE     *32F09770
                          *-----------------------------------------------*32F09780
                          *                                              32F09790
094A 0  10A0        RTRN  SLT      32                                     32F09800
094A 0  C09D              LD       BDSW       CK BUSY DSW                 32F09810
094B 0  F09D              EOR      BDSW+1                                 32F09820
094C 01 44200849          BSI   L  ERR2,Z     BR IF ER                    32F09830
                          *                                              32F09840
                          *                                              32F09850
094E 0  C09B              LD       DSW4       CK INT 4 DSW                32F09860
094F 0  F01A              EOR      K0800      REMOVE RESPONSE BIT         32F09870
0950 0  E01B              AND      KEFFE      MASK LAST CD AND NRDY       32F09880
0951 01 44200856          BSI   L  ERR5,Z     BR IF ERR                   32F09890
                          *                                              32F09900
0953 0  C088              LD       COLCT      CK COLUMN COUNT             32F09910
0954 0  F089              EOR      COLCT+1    COMPARE WITH S/B            32F09920
0955 01 44200884          BSI   L  ERR8,Z     BR IF CCL COUNT ER          32F09930
                          *                                              32F09940
                          *                                              32F09950
0957 0  C092              LD       DSW4       CK FOR LAST CARD            32F09960
0958 0  1004              SLA      4                                      32F09970
0959 01 4C0209D6          BSC   L  LSTCD,C    BR IF LAST CARD             32F09980
095B 01 4C800919          BSC   I  WAIT       RETURN TO TEST RTN          32F09990
                          *                                              32F10000
095E    0000              BSS   E                                        32F10010
095E 1  0962        COLRD DC       RDATA                                  32F10020
095F 0  1200              DC       /1200      READ CCL IOCC               32F10030
0960 0  0000        COLPC DC       *-*                                    32F10040
0961 0  1100              DC       /1100      PUNCH IOCC                  32F10050
0962 0  0000        RDATA DC       0000       LAST READ DATA              32F10060
0963 0  1701        SNCOL DC       /1701      SENSE AND RESET DSW IOCC    32F10070
0964 0  0000        SENSE DC       0                                      32F10080
0965 0  1700              DC       /1700      SENSE DSW IOCC              32F10090
0966 1  0968        STOP  DC       TERM                                   32F10100
0967 0  1100              DC       /1100                                  32F10110
0968 0  FFFF        TERM  DC       /FFFF                                  32F10120
0969 0  1402        FEED  DC       /1402      FEED IOCC                   32F10130
096A 0  0800        K0800 DC       /0800                                  32F10140
096B 0  1702        SNCOM DC       /1702                                  32F10150
096C 0  EFFE        KEFFE DC       /EFFE                                  32F10160
096D 0  C800        KC800 DC       /C800                                  32F10170
                          *                                              32F10180
                          ************************************************32F10190
                          *              INTERRUPT ROUTINE               *32F10200
                          ************************************************32F10210
                          *                                              32F10220
```



```
096E 0  0000        INTR  DC       *-*                                    32F10230
096F 0  691E              STX   1  SVXR1+1     SAVE XR1                    32F10240
0970 0  6A1F              STX   2  SVXR2+1     SAVE XR2                    32F10250
0971 0  6201              LDX   2  1           RESET CCL CNT               32F10260
0972 00 650000E1    SPD1  LDX   L1 225         RESET TIMER                 32F10270
0974 0  08EF              XIO      SENSE       SENSE DSW                   32F10280
0975 01 4C08099D          BSC   L  RDCOL,+     BR IF READ COL INT          32F10290
0977 0  102D              SLA      45          TIMING ADJUST               32F10300
0978 0  7034              MDX      PCH                                     32F10310
                          *                                              32F10320
0979 0  7201        INTR1 MDX   2  1           ADV COL CNT                 32F10330
097A 01 6D0006C7          STX   L1 TIME                                    32F10340
097C 00 650006EE    SPD2  LDX   L1 190         RESET TIMER                 32F10350
097E 01 C4006EC7          LD    L  TIME        LD TIMER CNT                32F10360
0980 01 D6006BC7          STO   L2 TIME        STO TIME/COLUMN             32F10370
0982 0  08E1              XIO      SENSE       SENSE DSW                   32F10380
0983 0  180E              SRA      14                                      32F10390
0984 01 4C0409A3          BSC   L  PCCOL,E     BR IF PUNCH COL INT         32F10400
0986 0  1801              SRA      1                                       32F10410
0987 01 4C04099D          BSC   L  RDCOL,E     BR IF READ COL INT          32F10420
                          *                                              32F10430
                          *     OP COMPLETE                              32F10440
                          *                                              32F10450
0989 0  72FF              MDX   2  -1          DEC FOR CORRECT COL CNT     32F10460
098A 0  1000              NOP                                             32F10470
098B 01 6E00C90C          STX   L2 COLCT       STO COL CNT                 32F10480
098D 00 65000000    SVXR1 LDX   L1 *-*         RESTORE XR1                 32F10490
098F 00 66000000    SVXR2 LDX   L2 *-*         RESTORE XR2                 32F10500
0991 01 4C80C96E          BSC   I  INTR        BR OUT OF INTR              32F10510
                          *                                              32F10520
0993 0  000C        INTR2 DC       *-*                                    32F10530
0994 0  08D5              XIO      SNCOM-1     SENSE-RESET DSW             32F10540
0995 01 D40008EA          STO   L  DSW4        STO DSW                     32F10550
0997 01 67000949          LDX   L3 RTRN                                    32F10560
0999 01 6F0005E6          STX   L3 MLSCF+1     SET FOR RETURN              32F10570
099B 01 4C800993          BSC   I  INTR2       BR OUT OF INTR              32F10580
                          *                                              32F10590
                          *     READ COLUMN INTERRUPT                    32F10600
                          *                                              32F10610
099D 0  08C0        RDCOL XIO      COLRD       READ A COLUMN               32F10620
099E 0  C0C3              LD       RDATA       LD DATA                     32F10630
099F 01 D6000B74          STO   L2 RTBL        STO DATA/CCL                32F10640
09A1 0  101B              SLA      27          TIMING ADJUSTMENT           32F10650
09A2 0  700D              MDX      INTR3                                   32F10660
                          *                                              32F10670
                          *     PUNCH COLUMN INTERRUPT                   32F10680
                          *                                              32F10690
09A3 01 678006E1    PCCOL LDX   I3 PDLAY       LD DELAY CNT                32F10700
09A5 0  7300              MDX   3  0           CK FOR MIN DELAY            32F10710
09A6 0  7001              MDX      DLPCH                                   32F10720
09A7 0  7005              MDX      PCH                                     32F10730
09A8 0  7125        DLPCH MDX   1  37          ADV TIMER                   32F10740
09A9 0  100C              SLA      12          TIMING ADJUSTMENT           32F10750
09AA 0  73FF              MDX   3  -1          DECR DELAY CNT              32F10760
09AB 0  70FC              MDX      DLPCH       LOOP UNTIL CNT ZERO         32F10770
09AC 0  1006              SLA      6           TIMING ADJUSTMENT           32F10780
                          *                                              32F10790
09AD 0  0882        PCH   XIO      COLPC       PUNCH COLUMN                32F10800
09AE 01 74010960          MDX   L  COLPC,1     ADV FOR NEXT COL.           32F10810
                          *                                              32F10820
                          *-----------------------------------------------*32F10830
                          *     TIMER - THIS SUBROUTINE DETEMINES THE    *32F10840
                          *     TIME BETWEEN COLUMN INTERRUPTS           *32F10850
                          *-----------------------------------------------*32F10860
                          *                                              32F10870
09B0 0  0881        INTR3 XIO      SNCOL-1     SENSE-RESET DSW             32F10880
                          *                                              32F10890
09B1 0  08B2        TIMER XIO      SENSE       SENSE DSW                   32F10900
```

```
09B2 0  E08A          AND     KC600       MASK ALL BUT 0,1,4          32F10910
09B3 01 4C200979      BSC  L  INTR1,Z     BR IF INTERRUPT             32F10920
09B5 0  7126    SPD3  MDX   1 38          ADV TIMER                   32F10930
09B6 0  70FA          MDX     TIMER       LOOP FOR 30 MSEC            32F10940
09B7 0  70D5          MDX     SVXR1                                   32F10950
                      *                                               32F10960
                      ********************************************* 32F10970
                      *           CHECK READY                       * 32F10980
                      ********************************************* 32F10990
                      *                                               32F11000
09B8 0  0000    READY DC      *-*                                     32F11010
09B9 0  10A0          SLT     32                                      32F11020
09BA 0  08A9          XIC     SENSE       SENSE DSW                   32F11030
09BB 01 DC00090A      STD  L  DSW         STORE DSW                   32F11040
09BD 01 4C9809B8      BSC  I  READY,+-    NO BITS FOUND               32F11050
09BF 0  1801          SRA     1           REMOVE NRDY                 32F11060
09C0 01 44200836      BSI  L  ERR1,Z      BR IF OTHER THAN NRDY       32F11070
                      *                                               32F11080
09C2 0  1011    BOX   SLA     17                                      32F11090
09C3 0  D011          STO     BCNT        RESET BOX CNT               32F11100
                      *                                               32F11110
09C4 01 650009CA BOX1 LDX  L1 BOX2        LD REENTRY ADDRS            32F11120
09C6 01 6D0005E6      STX  L1 MLSCF+1     SET MLSCF                   32F11130
09C8 01 4C00093E      BSC  L  WAIT4       GO TO MONITOR               32F11140
                      *                                               32F11150
09CA 0  0899    BOX2  XIO     SENSE       SENSE DSW                   32F11160
09CB 01 4C9809B8      BSC  I  READY,+-    RETURN IF READY             32F11170
09CD 01 7403C9D5      MDX  L  BCNT,3                                  32F11180
09CF 0  70F4          MDX     BOX1                                    32F11190
                      *                                               32F11200
09D0 0  6105    NRDY  LDX   1 5           MESSAGE NUMBER              32F11210
09D1 01 66000A66      LDX  L2 ANRDY       NOT READY                   32F11220
09D3 0  401E          BSI     TYPE        PRINT MESSAGE               32F11230
09D4 0  70ED          MDX     BOX                                     32F11240
                      *                                               32F11250
09D5 0  0000    BCNT  DC      *-*                                     32F11260
                      *                                               32F11270
                      ********************************************* 32F11280
                      *           FEED LAST CARD                    * 32F11290
                      ********************************************* 32F11300
                      *                                               32F11310
09D6 01 67000A63 LSTCD LDX  L3 AFD                                    32F11320
09D8 01 6F000903      STX  L3 OP                                      32F11330
09DA 0  088D          XIO     FEED-1      FEED LAST CARD              32F11340
                      *                                               32F11350
09DB 0  6104          LDX   1 4                                       32F11360
09DC 01 66000A78      LDX  L2 ALCD                                    32F11370
09DE 0  4013          BSI     TYPE        PRINT MSG- LAST CARD        32F11380
                      *                                               32F11390
09DF 0  1810          SRA     16                                      32F11400
09E0 01 D40005E1      STO  L  SW2         RESET DELAY FACTOR          32F11410
09E2 01 D40005E2      STO  L  SW3         RESET GRAPH SCALE           32F11420
                      *                                               32F11430
09E4 01 C40005DD      LD   L  RID         LD LAST RTN NUMBER          32F11440
09E6 0  900A          S       TWO         CK FOR ROUTINE 1 OR 2       32F11450
09E7 01 44300654      BSI  L  CNTRL,-Z    BR IF NOT 1 OR 2            32F11460
                      *                                               32F11470
09E9 01 C40005DF      LD   L  SW0                                     32F11480
09EB 0  1009          SLA     9           LOOK AT FORCE LOG SW        32F11490
09EC 0  6302          LDX     3 2         SET FOR AVG ONLY            32F11500
09ED 01 441007C6      BSI  L  TYAVG,-     PRINT AVG COL TIME MSG      32F11510
                      *                                               32F11520
09EF 01 44000654      BSI  L  CNTRL       GO TO CNTRL RTN             32F11530
09F1 0  0002    TWO   DC      2                                       32F11540
                      *                                               32F11550
                      ********************************************* 32F11560
                      *           PRINT STATUS MESSAGE              * 32F11570
                      ********************************************* 32F11580
```



```
                      *     THIS SUBROUTINE PRINTS ALL THE STATUS     32F11590
                      *     MESSAGES. THE MESSAGE NUMBER MUST BE SET  32F11600
                      *     IN XR1 AND THE ALPHA ADDRESS IN XR2 UPON  32F11610
                      *     ENTRY.                                    32F11620
                      *-------------------------------------------    32F11630
                      *                                               32F11640
09F2 0  0000    TYPE  DC      *-*                                     32F11650
09F3 0  6907          STX   1 SMSG        SET MSG NO.                 32F11660
09F4 0  6A09          STX   2 SMSG+3      SET ALPHA ADDRS             32F11670
09F5 00 44800163      BSI  I  LOG         PRINT MSG                   32F11680
09F7 1  09F8          DC      SMSG                                    32F11690
                      *                                               32F11700
09F8 0  D004          STO     SMSG+2      RESET DATA CONTROL          32F11710
09F9 01 4C8009F2      BSC  I  TYPE        RETURN                      32F11720
09FB 0  0000    SMSG  DC      *-*         MSG NO.SET HERE             32F11730
09FC 0  000F          DC      /000F                                   32F11740
09FD 0  0000          DC      *-*                                     32F11750
09FE 0  0000          DC      *-*         ALPHA ADDRS SET HERE        32F11760
09FF 0  0000          DC      /0000                                   32F11770
                      *                                               32F11780
0A00 0  0000    MAXPD DC      *-*         MAX PUNCH DELAY             32F11790
0A01 0  0000    CTAVG DC      *-*         COLUMN TIME AVERAGE         32F11800
0A02 0  1770    PAVG  DC      6000        PUNCH AVERAGE S/B           32F11810
0A03 0  03E8    RAVG  DC      1000        READ AVERAGE S/B            32F11820
                      *                                               32F11830
                      *                                               32F11840
                      ********************************************* 32F11850
                      *           ALPHA MESSAGES                    * 32F11860
                      ********************************************* 32F11870
                      *                                               32F11880
0A04 0  1E3E    ACNBK DC      /1E3E       CARD NOT BLANK              32F11890
0A05 0  6232          DC      /6232                                   32F11900
0A06 0  2176          DC      /2176                                   32F11910
0A07 0  529E          DC      /529E                                   32F11920
0A08 0  211A          DC      /211A                                   32F11930
0A09 0  5E3E          DC      /5E3E                                   32F11940
0A0A 0  765A          DC      /765A                                   32F11950
0A0B 0  FFFF          DC      /FFFF                                   32F11960
                      *                                               32F11970
0A0C 0  923E    AWAS  DC      /923E       WAS S/B                     32F11980
0A0D 0  9A21          DC      /9A21                                   32F11990
0A0E 0  219A          DC      /219A                                   32F12000
0A0F 0  BC1A          DC      /BC1A                                   32F12010
0A10 0  FFFF          DC      /FFFF                                   32F12020
                      *                                               32F12030
0A11 0  923E    ADWAS DC      /923E       WAS S/B                     32F12040
0A12 0  9A21          DC      /9A21                                   32F12050
0A13 0  2121          DC      /2121                                   32F12060
0A14 0  9ABC          DC      /9ABC                                   32F12070
0A15 0  1A21          DC      /1A21                                   32F12080
0A16 0  2121          DC      /2121                                   32F12090
0A17 0  FFFF          DC      /FFFF                                   32F12100
                      *                                               32F12110
0A18 0  329A    ADSW  DC      /329A       DSW                         32F12120
0A19 0  9221          DC      /9221                                   32F12130
0A1A 0  FFFF          DC      /FFFF                                   32F12140
                      *                                               32F12150
0A1B 0  2184    ASDSW DC      /2184       -STATIC DSW ERR             32F12160
0A1C 0  9A9E          DC      /9A9E                                   32F12170
0A1D 0  3E9E          DC      /3E9E                                   32F12180
0A1E 0  221E          DC      /221E                                   32F12190
0A1F 0  2132          DC      /2132                                   32F12200
0A20 0  9A92          DC      /9A92                                   32F12210
0A21 0  2136          DC      /2136                                   32F12220
0A22 0  6262          DC      /6262                                   32F12230
0A23 0  FFFF          DC      /FFFF                                   32F12240
                      *                                               32F12250
0A24 0  2184    ABDSW DC      /2184       -BUSY DSW ERR               32F12260
```

```
0A25 0  1AB2          DC    /1AB2                          32F12270
0A26 0  9AA6          DC    /9AA6                          32F12280
0A27 0  2132          DC    /2132                          32F12290
0A28 0  9A92          DC    /9A92                          32F12300
0A29 0  2136          DC    /2136                          32F12310
0A2A 0  6262          DC    /6262                          32F12320
0A2B 0  FFFF          DC    /FFFF                          32F12330
                      *                                    32F12340
0A2C 0  2184  ADSW4   DC    /2184  -LEV4 DSW ERR           32F12350
0A2D 0  5E36          DC    /5E36                          32F12360
0A2E 0  B6F0          DC    /B6F0                          32F12370
0A2F 0  2132          DC    /2132                          32F12380
0A30 0  9A92          DC    /9A92                          32F12390
0A31 0  2136          DC    /2136                          32F12400
0A32 0  6262          DC    /6262                          32F12410
0A33 0  FFFF          DC    /FFFF                          32F12420
                      *                                    32F12430
0A34 0  2176  ANINT   DC    /2176  NO INTRPT               32F12440
0A35 0  5221          DC    /5221                          32F12450
0A36 0  2276          DC    /2276                          32F12460
0A37 0  9E62          DC    /9E62                          32F12470
0A38 0  569E          DC    /569E                          32F12480
0A39 0  FFFF          DC    /FFFF                          32F12490
                      *                                    32F12500
0A3A 0  2184  APCK    DC    /2184  PCH CK                  32F12510
0A3B 0  56B2          DC    /56B2                          32F12520
0A3C 0  761E          DC    /761E                          32F12530
0A3D 0  2621          DC    /2621                          32F12540
0A3E 0  1E5A          DC    /1E5A                          32F12550
0A3F 0  FFFF          DC    /FFFF                          32F12560
                      *                                    32F12570
0A40 0  2184  AECK    DC    /2184  ERR CK                  32F12580
0A41 0  3662          DC    /3662                          32F12590
0A42 0  6221          DC    /6221                          32F12600
0A43 0  1E5A          DC    /1E5A                          32F12610
0A44 0  FFFF          DC    /FFFF                          32F12620
                      *                                    32F12630
0A45 0  2184  ACCNT   DC    /2184  COL CNT ER              32F12640
0A46 0  1E52          DC    /1E52                          32F12650
0A47 0  5E21          DC    /5E21                          32F12660
0A48 0  1E76          DC    /1E76                          32F12670
0A49 0  9E21          DC    /9E21                          32F12680
0A4A 0  3662          DC    /3662                          32F12690
0A4B 0  FFFF          DC    /FFFF                          32F12700
                      *                                    32F12710
0A4C 0  2121  ADATA   DC    /2121  CCL   DATA ERR          32F12720
0A4D 0  1E52          DC    /1E52                          32F12730
0A4E 0  5E21          DC    /5E21                          32F12740
0A4F 0  2121          DC    /2121                          32F12750
0A50 0  2184          DC    /2184                          32F12760
0A51 0  323E          DC    /323E                          32F12770
0A52 0  9E3E          DC    /9E3E                          32F12780
0A53 0  2136          DC    /2136                          32F12790
0A54 0  6262          DC    /6262                          32F12800
0A55 0  FFFF          DC    /FFFF                          32F12810
                      *                                    32F12820
0A56 0  095E  ALDP    DC    /095E  LAST OP-                32F12830
0A57 0  3E9A          DC    /3E9A                          32F12840
0A58 0  9E21          DC    /9E21                          32F12850
0A59 0  5256          DC    /5256                          32F12860
0A5A 0  8421          DC    /8421                          32F12870
0A5B 0  FFFF          DC    /FFFF                          32F12880
                      *                                    32F12890
0A5C 0  6236  ARD     DC    /6236  READ                    32F12900
0A5D 0  3E32          DC    /3E32                          32F12910
0A5E 0  FFFF          DC    /FFFF                          32F12920
                      *                                    32F12930
0A5F 0  56B2  APCH    DC    /56B2  PUNCH                   32F12940
```



```
0A60 0  761E          DC    /761E                          32F12950
0A61 0  2600          DC    /2600                          32F12960
0A62 0  FFFF          DC    /FFFF                          32F12970
0A63 0  1236  AFD     DC    /1236  FEED                    32F12980
0A64 0  3632          DC    /3632                          32F12990
0A65 0  FFFF          DC    /FFFF                          32F13000
                      *                                    32F13010
0A66 0  7602  ANRDY   DC    /7602  NRDY - PRESS 1442 START  32F13020
0A67 0  32A6          DC    /32A6                          32F13030
0A68 0  2184          DC    /2184                          32F13040
0A69 0  5662          DC    /5662                          32F13050
0A6A 0  369A          DC    /369A                          32F13060
0A6B 0  9A21          DC    /9A21                          32F13070
0A6C 0  FCF0          DC    /FCF0                          32F13080
0A6D 0  F0D8          DC    /F0D8                          32F13090
0A6E 0  219A          DC    /219A                          32F13100
0A6F 0  9E3E          DC    /9E3E                          32F13110
0A70 0  629E          DC    /629E                          32F13120
0A71 0  FFFF          DC    /FFFF                          32F13130
                      *                                    32F13140
0A72 0  5E32  ALDBK   DC    /5E32  LOAD BLANKS             32F13150
0A73 0  2100          DC    /2100                          32F13160
0A74 0  1A5E          DC    /1A5E                          32F13170
0A75 0  3E76          DC    /3E76                          32F13180
0A76 0  5A9A          DC    /5A9A                          32F13190
0A77 0  FFFF          DC    /FFFF                          32F13200
                      *                                    32F13210
0A78 0  5E3E  ALCD    DC    /5E3E  LAST CARD               32F13220
0A79 0  9A9E          DC    /9A9E                          32F13230
0A7A 0  211E          DC    /211E                          32F13240
0A7B 0  3E62          DC    /3E62                          32F13250
0A7C 0  3200          DC    /3200                          32F13260
0A7D 0  FFFF          DC    /FFFF                          32F13270
                      *                                    32F13280
0A7E 0  923E  ATL     DC    /923E  WAS MAX -CCL INTRPT SLOW 32F13290
0A7F 0  9A21          DC    /9A21                          32F13300
0A80 0  2121          DC    /2121                          32F13310
0A81 0  723E          DC    /723E                          32F13320
0A82 0  9621          DC    /9621                          32F13330
0A83 0  2121          DC    /2121                          32F13340
0A84 0  1E52          DC    /1E52                          32F13350
0A85 0  5E21          DC    /5E21                          32F13360
0A86 0  2184          DC    /2184                          32F13370
0A87 0  2276          DC    /2276                          32F13380
0A88 0  9E62          DC    /9E62                          32F13390
0A89 0  569E          DC    /569E                          32F13400
0A8A 0  219A          DC    /219A                          32F13410
0A8B 0  5E52          DC    /5E52                          32F13420
0A8C 0  9200          DC    /9200                          32F13430
0A8D 0  FFFF          DC    /FFFF                          32F13440
                      *                                    32F13450
0A8E 0  923E  ATS     DC    /923E  WAS MIN -CCL INTRPT FAST 32F13460
0A8F 0  9A21          DC    /9A21                          32F13470
0A90 0  2121          DC    /2121                          32F13480
0A91 0  7222          DC    /7222                          32F13490
0A92 0  7621          DC    /7621                          32F13500
0A93 0  2121          DC    /2121                          32F13510
0A94 0  1E52          DC    /1E52                          32F13520
0A95 0  5E21          DC    /5E21                          32F13530
0A96 0  2184          DC    /2184                          32F13540
0A97 0  2276          DC    /2276                          32F13550
0A98 0  9E62          DC    /9E62                          32F13560
0A99 0  569E          DC    /569E                          32F13570
0A9A 0  2112          DC    /2112                          32F13580
0A9B 0  3E9A          DC    /3E9A                          32F13590
0A9C 0  9E00          DC    /9E00                          32F13600
0A9D 0  FFFF          DC    /FFFF                          32F13610
                      *                                    32F13620
```


REA 1335#29

1442 TIMING TEST

```
0A9E 0 3E00      ACOLT DC    /3E00     AVG COL INTRPT TIME      32F13630
0A9F 0 B616            DC    /B616                              32F13640
0AA0 0 211E            DC    /211E                              32F13650
0AA1 0 525E            DC    /525E                              32F13660
0AA2 0 2122            DC    /2122                              32F13670
0AA3 0 769E            DC    /769E                              32F13680
0AA4 0 6256            DC    /6256                              32F13690
0AA5 0 9E21            DC    /9E21                              32F13700
0AA6 0 9E22            DC    /9E22                              32F13710
0AA7 0 723E            DC    /7236                              32F13720
0AA8 0 FFFF            DC    /FFFF                              32F13730
                       *                                        32F13740
0AA9 0 3676      AMOD  DC    /3676     ENTER MCD NUMBER         32F13750
0AAA 0 9E36            DC    /9E36                              32F13760
0AAB 0 6221            DC    /6221                              32F13770
0AAC 0 7252            DC    /7252                              32F13780
0AAD 0 3221            DC    /3221                              32F13790
0AAE 0 76B2            DC    /76B2                              32F13800
0AAF 0 721A            DC    /721A                              32F13810
0AB0 0 3662            DC    /3662                              32F13820
0AB1 0 FFFF            DC    /FFFF                              32F13830
                       *                                        32F13840
0AB2 0 5E32      ALPC  DC    /5E32     LD PCHED CARDS           32F13850
0AB3 0 2156            DC    /2156                              32F13860
0AB4 0 1E26            DC    /1E26                              32F13870
0AB5 0 3632            DC    /3632                              32F13880
0AB6 0 211E            DC    /211E                              32F13890
0AB7 0 3E62            DC    /3E62                              32F13900
0AB8 0 329A            DC    /329A                              32F13910
0AB9 0 FFFF            DC    /FFFF                              32F13920
                       *                                        32F13930
0ABA 0 56B2      APDLY DC    /56B2     PUNCH DELAY - X          32F13940
0ABB 0 761E            DC    /761E                              32F13950
0ABC 0 2621            DC    /2621                              32F13960
0ABD 0 3236            DC    /3236                              32F13970
0ABE 0 5E3E            DC    /5E3E                              32F13980
0ABF 0 A621            DC    /A621                              32F13990
0AC0 0 8421            DC    /8421                              32F14000
0AC1 0 0000      ADFCT DC    *-*       DELAY FACTOR             32F14010
0AC2 0 FFFF            DC    /FFFF                              32F14020
0AC3 0 C400            DC    /C400      0                       32F14030
0AC4 0 FC00            DC    /FC00      1                       32F14040
0AC5 0 D800            DC    /D800      2                       32F14050
0AC6 0 DC00            DC    /DC00      3                       32F14060
0AC7 0 F000            DC    /F000      4                       32F14070
0AC8 0 F400            DC    /F400      5                       32F14080
0AC9 0 D000            DC    /D000      6                       32F14090
0ACA 0 D400            DC    /D400      7                       32F14100
0ACB 0 E400            DC    /E400      8                       32F14110
0ACC 0 E000            DC    /E000      9                       32F14120
0ACD 0 FCC4            DC    /FCC4     10                       32F14130
0ACE 0 FCFC            DC    /FCFC     11                       32F14140
0ACF 0 FCD8            DC    /FCD8     12                       32F14150
0AD0 0 FCDC            DC    /FCDC     13                       32F14160
0AD1 0 FCF0            DC    /FCF0     14                       32F14170
0AD2 0 FCF4            DC    /FCF4     15                       32F14180
                       *                                        32F14190
                       *                                        32F14200
                       ****************************************  32F14210
                       *          PUNCH DATA TABLE              * 32F14220
                       ****************************************  32F14230
                       *                                        32F14240
0AD3 0 8C10      PDATA DC    /8010     COLUMN 1                 32F14250
0AD4 0 4020            DC    /4020                              32F14260
0AD5 0 2040            DC    /2040                              32F14270
0AD6 0 1080            DC    /1080                              32F14280
0AD7 0 0900            DC    /0900                              32F14290
0AD8 0 0600            DC    /0600                              32F14300
```


1442 TIMING TEST

```
0AD9 0 0600            DC    /0600                              32F14310
0ADA 0 0900            DC    /0900                              32F14320
0ADB 0 1080            DC    /1080                              32F14330
0ADC 0 2040            DC    /2040                              32F14340
0ADD 0 4020            DC    /4020                              32F14350
0ADE 0 8010            DC    /8010                              32F14360
0ADF 0 FFF0            DC    /FFF0                              32F14370
0AE0 0 8880            DC    /8880                              32F14380
0AE1 0 CCC0            DC    /CCC0                              32F14390
0AE2 0 EEE0            DC    /EEE0                              32F14400
0AE3 0 FFF0            DC    /FFF0                              32F14410
0AE4 0 7770            DC    /7770                              32F14420
0AE5 0 3330            DC    /3330                              32F14430
0AE6 0 1110            DC    /1110                              32F14440
0AE7 0 FFF0            DC    /FFF0     COL 21                   32F14450
0AE8 0 A000            DC    /A000                              32F14460
0AE9 0 9000            DC    /9000     ALPHA RIPPLE             32F14470
0AEA 0 8800            DC    /8800                              32F14480
0AEB 0 8400            DC    /8400                              32F14490
0AEC 0 8200            DC    /8200     COL 26                   32F14500
0AED 0 8100            DC    /8100                              32F14510
0AEE 0 8080            DC    /8080                              32F14520
0AEF 0 8040            DC    /8040                              32F14530
0AF0 0 8020            DC    /8020                              32F14540
0AF1 0 8010            DC    /8010                              32F14550
0AF2 0 5000            DC    /5000                              32F14560
0AF3 0 4800            DC    /4800                              32F14570
0AF4 0 4400            DC    /4400                              32F14580
0AF5 0 4200            DC    /4200                              32F14590
0AF6 0 4100            DC    /4100                              32F14600
0AF7 0 4080            DC    /4080                              32F14610
0AF8 0 4040            DC    /4040                              32F14620
0AF9 0 4020            DC    /4020                              32F14630
0AFA 0 4010            DC    /4010     COL 40 WAREA+39          32F14640
0AFB 0 3000            DC    /3000                              32F14650
0AFC 0 2800            DC    /2800                              32F14660
0AFD 0 2400            DC    /2400                              32F14670
0AFE 0 2200            DC    /2200                              32F14680
0AFF 0 2100            DC    /2100                              32F14690
0B00 0 2080            DC    /2080                              32F14700
0B01 0 2040            DC    /2040                              32F14710
0B02 0 2020            DC    /2020                              32F14720
0B03 0 2010            DC    /2010                              32F14730
0B04 0 0000            DC    /0000                              32F14740
0B05 0 FC00            DC    /FC00                              32F14750
0B06 0 03F0            DC    /03F0                              32F14760
0B07 0 FC00            DC    /FC00                              32F14770
0B08 0 03F0            DC    /03F0                              32F14780
0B09 0 0000            DC    /0000                              32F14790
0B0A 0 8880            DC    /8880                              32F14800
0B0B 0 4440            DC    /4440                              32F14810
0B0C 0 2220            DC    /2220                              32F14820
0B0D 0 1110            DC    /1110                              32F14830
0B0E 0 0000            DC    /0000                              32F14840
0B0F 0 8880            DC    /8880                              32F14850
0B10 0 CCC0            DC    /CCC0                              32F14860
0B11 0 AAA0            DC    /AAA0                              32F14870
0B12 0 9990            DC    /9990                              32F14880
0B13 0 4440            DC    /4440                              32F14890
0B14 0 6660            DC    /6660                              32F14900
0B15 0 5550            DC    /5550                              32F14910
0B16 0 2220            DC    /2220                              32F14920
0B17 0 3330            DC    /3330                              32F14930
0B18 0 1110            DC    /1110                              32F14940
0B19 0 0000            DC    /0000                              32F14950
0B1A 0 0000            DC    /0000                              32F14960
0B1B 0 FFF0            DC    /FFF0                              32F14970
0B1C 0 FFF0            DC    /FFF0                              32F14980
```

1442 TIMING TEST

```
0B1D U  FFF0            DC      /FFF0                           32F14990
0B1E U  FFF0            DC      /FFF0                           32F15000
0B1F 0  FFF0            DC      /FFF0                           32F15010
0B20 0  FFF0            DC      /FFF0                           32F15020
0B21 0  FFF0            DC      /FFF0                           32F15030
0B22 0  0000            DC      /0000       COLUMN 80           32F15040
0B23    0051            BSS     81                              32F15050
                        *                                       32F15060
                        ****************************************32F15070
                        *           STORAGE BUFFERS            32F15080
                        ****************************************32F15090
                        *                                       32F15100
0B74    0053    RTBL    BSS     83          READ BUFFER         32F15110
                        *                                       32F15120
0BC7    0052    TIME    BSS     82          INTERRUPT TIME BUFFER 32F15130
0C19 0  FFFF            DC      /FFFF                           32F15140
0C1A    05E8            END     BGIN                            32F15150
```


1442 TIMING TEST

CROSS REFERENCE LISTING

ERR11	08B0	07AD
ERR2	0849	0854,0932,094C
ERR3	0936	
ERR5	0856	086B,0951
ERR5R	0866	087E,0883
ERR5S	08E5	0839,0845,0857
ERR6	086D	0864
ERR7	087F	086F,0875
ERR8	0884	0889,0955
ERR9	088B	0707,08A1
ERR9A	089C	0896
ERX	088D	08AC,08AF,0889,088C
ERX1	08C1	08BF
ERX2	08C5	08C0
ETYPE	08EC	0832,0842,0852,0869,087C,0881,0888,089C,08C5,08FF, 0939
ETYP1	08FA	08F5
ETYP2	08FF	08F8
EXR1	08C7	08A4,0881
EXR3	08C9	08A5,08B2
FEED	0969	09DA
FIVE	0685	0633
GRAPH	07E5	0736,074C,0816
GRPH1	07F6	0807
FUND	081F	07F3
IL0	017A	0000,05F1
IL1	018A	0000
IL2	019A	0000
IL3	01AA	0000
IL4	01BA	0000,05F5
INTR	096E	05EF,0991
INTR1	0979	09B3
INTR2	0993	05F3,099B
INTR3	0980	09A2
KC80C	096D	09B2
KEFFE	096C	0950
KOOO8	0821	076B,080C
KO80C	096A	094F
K800C	0820	0800,0812
LOCK	0822	06CF,0828
LOG	0163	0000,09F5
LOGBY	0167	
LOOP	08FD	06C5,0732,077A,07D8,082A
LRTN	0676	0675
LSTCC	0906	0959
M	08E4	06FA,0894,0897,08BD,08C6,091B
MAXPD	0A00	06BB
MLSCF	05E5	0608,066F,0926,0929,093C,0999,09C6
MODNM	0682	05F7,0603,C630
MOD	0630	0618
MOD6	0638	0634
MOD7	0649	063A
MSG0	08CE	082E
MSG1	08D0	083E
MSG10	08E0	08A7
MSG11	08E2	08B4
MSG2	08D2	0850
MSG3	08D4	0938
MSG5	08D6	0867
MSG6	08D8	087B
MSG7	08DA	0860
MSG8	08DC	0887
MSG9	08DE	089B
NRDY	09D0	
NRTN	067A	0676
ONE	0684	0638,0649
OP	0903	0772,0789,09D8
OPMSW	08F9	0830,0840,C8F3,08FE,091D

PAVG	0A02	0643,0734
PCCOL	09A3	0984
PCH	09AD	0978,09A7
PCMAX	0912	063D,06CD
PCMIN	0913	06CE
PDATA	0AD3	0694,0698,069A,069E,06E3,06F4,0757
PDBAS	06E6	062E,06BA
PDLAY	06E1	0691,06A6,06AC,06B0,06B8,06DD,0727,0746,09A3
PDMAX	06E4	0621,0690
PDWAS	06E2	0692,06AD,06B2
PID	05DC	05EA
PONLY	0683	05ED,0636,06A7,06E7,073C
PTERM	0764	0769,077C,0780
PUNCH	0765	06C9,0730,073A,0750,0782
P6AVG	0680	0642
P6TM	067C	063C
RAD	05DE	066D
RAVG	0A03	0646,074A
RDATA	0962	095E,099E
RDCOL	099D	0975,0987
RDMAX	0914	0640,0712
RDMIN	0915	0713
READ	0784	06F7,0752,0793,0795,07DA
READY	0988	076E,0785,09BD,09CB
RID	05DD	05EC,C658,0660,0662,0664,0669,0942,09E4
RIDCK	0675	065A
RPSW	08E6	0774,078C,086D,08AA,08B7
RQKB	013C	0000
RQTY	013B	0000
RTBL	0B74	0705,072A,072E,0755,07DD,099F
RTNDM	0676	0666
RTNSW	0165	0671
RTRN	0949	0997
RTTBL	0677	066B,0675,0676
RX1	089D	0890
R6AVG	0681	0645
R6TM	067E	063F
SCALE	081E	07F5,07FA
SENSE	0964	0922,0934,0974,0982,0981,098A,09CA
SENTY	0652	0610,0650
SMSG	09FB	06C1,07CE,09F3,09F4,09F7,09F8
SNCOL	0963	09B0
SNCOM	096B	0994
SP	060B	05FC
SPD1	0972	061A
SPD2	097C	061E
SPD3	0985	0627
SP1	0610	0613
STACK	08E7	0834,089F
START	0161	0000,0609,0673,0928,0940,0946
STOP	0966	
STPCH	0762	0777
STRD	0760	078F
STRT	05EB	05E3,05E4,0604,064E
STRT1	0603	0606
SVKB	013D	
SVXR1	098D	096F,09B7
SVXR2	098F	0970
SW0	05DF	06D7,071A,07BB,0823,09E9
SW1	05E0	0655,065E,075B,093E
SW2	05E1	05FB,C603,060E,064D,06A1,09E0
SW3	05E2	07E9,09E2
TAVG	0B1B	068C,06F0,0732,07B3,07B9,07C7,07D3
TEMP	081B	07E8,07EE,07F2,07FB,07FC,080F
TERM	0968	0966
TIME	08C7	0738,074E,07A5,07AB,07AF,07F7,0804,080A,080D,0814, 08F0,097A,097E,0980
TIMER	0981	0986

1442 TIMING TEST

TIMWS	0911	08F2
TST01	0686	0677
TST02	06E7	0678
TST03	0721	0679
TST04	073C	067A
TST05	0752	067B
TWO	09F1	09E6
TYAVG	07C6	06DB,071E,07C0,07D5,09ED
TYP	0650	060F
TYPE	09F2	0601,0689,06C3,06ED,0724,0743,07D0,09D3,09DE,09F9
T010	0690	06E0
T011	0693	069D
T012	069E	06DF
T013	06A1	06D5
T014	06C7	06A0,06AE,06D1,06D3
T021	06F4	0720
T022	06F7	0718
T023	06FD	06F6,070E,0714,0716
T024	0710	
T031	072A	072D
T032	0732	073B
T041	0748	0751
T051	0755	075A
WAIT	0919	0778,0791,C93A,095B
WAIT1	0924	092F
WAIT2	0929	
WAIT3	092D	0924
WAIT4	093E	0928,09C8
WCNT	0948	0921,092D

TABLE OF CONTENTS

1. PURPOSE

TO CHECK THE OPERATING PERFORMANCE OF THE 2501 READER AND THE 1442 MOD 5 PUNCH. THE PUNCH ROUTINES WILL RUN ON ANY 1442, BUT WILL CHECK ONLY THOSE FUNCTIONS WHICH ARE AVAILABLE ON 1442 MOD 5.

2. PREREQUISITES

2.1 THIS TEST MUST BE RUN UNDER CONTROL OF DIAGNOSTIC MONITOR II.

2.1 THE FOLLOWING EQUIPMENT IS REQUIRED

1. 1131 CPU.
2. 2501 CARD READER.
3. 1442 CARD PUNCH.

****

3. OPERATING PROCEDURE

3.1*** PROGRAM LOADING

STANDARD MONITOR LOADING PROCEDURES APPLY
THESE PROCEDURES ARE SUMMARIZED HERE. SEE DM USE PROCEDURE FOR DETAILS.

1. SET FIRST TYPEWRITER TAB 20 CHARACTERS FROM LEFT MARGIN.
2. SET BIT SWITCH 15 OFF - LOAD AND GO
   ON - TO SPECIFY OPTIONS BEFORE RUNNING.

   IF HALT AFTER LOADING, SELECT PROGRAM OPTIONS THEN TURN OFF HALT SWITCH OR FOLLOW NORMAL RESTART PROCEDURE (SECTION 3.5).
3. LOAD DIAGNOSTIC MONITOR AND THIS PROGRAM.
4. SELECT PROGRAM OPTIONS, IF DESIRED.

******

3.2*** PROGRAM OPERATION.

THESE OPERATING PROCEDURES APPLY TO SINGLE PROGRAM OPERATION ONLY. FOR OVERLAP OPERATION, REFER TO SECTION 3.2.3 OF THE 1130 DIAGNOSTIC MONITOR II DOCUMENTATION.

NOTE TO RUN 1442 IN OVERLAP WITH THE 2501, USE 1442 TIMING TEST. THE 2501/1442 TEST MUST BE LOADED FIRST. SELECT THE DESIRED 2501 ROUTINE BEFORE STARTING THE 1442. ROUTINES IN THIS TEST WILL NOT OPERATE PROPERLY.

TIMING FROM 1442 TIMING TEST WILL NOT BE ACCURATE WHEN THE TEST IS OVERLAPPED.

3.2.1 PROGRAM CONTROL - FUNCTION 0

1. SET SWITCHES 0-7 TO 01.
2. SET SWITCHES 8-15 AS DESIRED.

SW	FUNCTION
8	RESTART
9	ROUTINE START MESSAGE
10	LOCK ON FUNCTION
11	LOOP PROGRAM
12	LOOP ON ERROR
13	BYPASS ERROR PRINTOUT
14	HALT ON ERROR
15	HALT

3. PRESS INT REQ KEY ON CONSOLE.

**

3.2.2 ROUTINE SELECTION - FUNCTION 1

THE SELECTED ROUTINE WILL LOOP UNTIL A NEW ROUTINE IS SELECTED.

1. TO SET ROUTINE SELECTION
   A. SET SWITCHES 0-7 TO 41.
   B. SET ROUTINE NUMBER IN SWITCHES 12-15.

RTN	DESCRIPTION	
1	PUNCH ROTATE PATTERN	NORMAL ROUTINES-
2	READ ORTATE PATTERN	THE PROGRAM STARTS WITH
3	READ COLUMN COUNT CONTROL	ROUTINE 1, RUNS EACH ROUTINE IN SEQUENCE THEN TERMINATES AFTER ROUTINE 3.
4	GANG PUNCH	OPTIONAL ROUTINES
5	READ GANG PUNCHED DECK	THESE ROUTINES RUN
6	PUNCH SELECTED PATTERN	ONLY IF SELECTED.
7	READ SELECTED PATTERN	
8	REPRODUCE	
9	REPLACE ROTATE PATTERN	

   C. PRESS INT REQ KEY ON CONSOLE.

2. TO RESET ROUTINE SELECTION, SET AS IT SELECTING ROUTINE ZERO.

3.2.3 COLUMN COUNT CONTROL, ROUTINES 6 + 7. FUNCTION 10.

THIS FUNCTION ALLOWS SELECTION OF THE NUMBER OF COLUMNS PUNCH OR READ IN ROUTINES 6 + 7. THE DESIRED NUMBER OF COLUMNS IN BINARY IS SET IN SWITCHES 8 - 15. IF NO ENTRY IS MADE, OR THE FUNCTION CLEARED, 80 COLUMNS ARE ASSUMED.

1. SET SWITCHES 0-1 TO 10.
2. SET PROGRAM LOAD SEQUENCE NUMBER IN SW 4-7.
3. SET THE NUMBER OF COLUMNS DESIRED IN BINARY IN SW 8-15.
4. PRESS INT REQ KEY.

**

3.2.4 ERROR PRINT CONTROL, FUNCTION 11

THIS FUNCTION PROVIDES CONTROL OF DATA COMPARE ERROR PRINTOUTS. IF THIS FUNCTION IS SET TO ZERO, ALL ERRORS WILL PRINT FOR EACH CARD. IF IT IS SET TO ANY OTHER VALUE, ONLY THE FIRST ERROR IN EACH CARD IS TYPED.

1. SET SW 0-1 ON.
2. SET PROGRAM LOAD SEQUENCE NUMBER IN SW 4-7.
3. IF ONLY ONE MESSAGE PER CARD IS DESIRED, SET ANY VALUE IN SW 8-15.
4. PRESS INT REQ KEY.

**

3.2.5 SPECIAL SWITCH FUNCTION, ROUTINES 6 +7.

ROUTINES 6 + 7 CALL FOR THE SELECTED PUNCH PATTERN TO BE PLACED IN THE SWITCHES. SWITCHES 0-11 REPRESENT PUNCH ROWS 12-9 RESPECTIVELY, AND SWITCH 12 SIGNALS THAT THE SETTING IS COMPLETE.

******

3.3*** PROGRAM HALTS

3.3.1 NORMAL HALTS

HALT NO. (B REG).	DESCRIPTION	RESTART ACTION
3001	PROGRAM STOP OR ADDRESS STOP	PRESS START
3002	HALT ON ERROR	DISPLAY MODE-PRESS START. RUN MODE-PRESS START

**

3.3.2 ERROR HALTS

HALT NO. (B REG).	DESCRIPTION	RESTART ACTION
30F1	CHECK SUM ERROR ON FIRST CARD OF LOADER	RELOAD
30F2	READER DSW ERROR WHEN LOADING LOADER	RELOAD
30F3	CARD 2 OF LOADER DID NOT LOAD	RELOAD
30F4	CAN NOT CLEAR CORE - DUE TO ERROR IN ADDRESSING UPPER CORE.	
30F5	READER CHECK WHEN LOADING MONITOR OR TEST PROGRAM	NPRO THEN PLACE CARDS RUN OUT IN FRONT OF REMAINING DECK AND PRESS START.
30F6	MONITOR DID NOT LOAD	RELOAD
30F7	CHECK SUM WHEN LOADING MONITOR	RELOAD
30F8	READER NOT READY	MAKE READER READY
30F9	INVALID INTERRUPT WHICH WILL NOT RESET	PRESS RESET AND START
30FA	CONSOLE PRINTER HANG UP - BUSY WILL NOT GO OFF	FIX THE CONSOLE PRINTER OR NOP THIS WAIT

******

3.4*** PROGRAM TERMINATION

IF LOOP PROGRAM HAS NOT BEEN SPECIFIED THE PROGRAM WILL TERMINATE AT THE END OF ROUTINE 3. ROUTINE 4 THRU A WILL ONLY RUN SELECTED.

IF ANY ROUTINE IS SELECTED THAT ROUTINE WILL LOOP AND WILL NOT TERMINATE.

******

3/5*** RESTART

1. SET SWITCHES 0-7 TO 01.
2. TURN ON SWITCH 8.
3. SET DESIRED CONTROL IN SWITCHES 9-14.
4. PRESS INTERRUPT REQUEST KEY.

****

4. PRINTOUTS

ALL PRINTOUTS ARE IN THE STANDARD FORMAT.

```
APPNN OORR AAAA              (MESSAGE)
OR
EPPNN OORR AAAA              (MESSAGE)
```

WHERE
- A IDENTIFIES STATUS MESSAGES
- E IDENTIFIES ERROR MESSAGES
- PP IS THE PID OF THE PROGRAM CAUSING THE MESSAGE
  THIS WILL BE EITHER 00 FOR MESSAGES ORIGINATED BY THE MONITOR OR OE FOR MESSAGES ORIGINATED BY THIS PROGRAM.
- NN IS THE MESSAGE SEQUENCE NUMBER
- RR IS THE ROUTINE NUMBER
- AAAA IS THE ADDRESS OF THE ROUTINE
- MESSAGE IS ANY VARIABLE INFORMATION
- MMMM IS THE MACHINE TYPE

4.1*** STATUS MESSAGES

```
A0000                        NUM  PID  ADRS RELF  LD
                             XXXX XXXX XXXX XXXX
```

THIS MESSAGE IS PRINTED FOLLOWING THE LOADING OF ANY PROGRAM (EXCEPT MONITOR), THE MESSAGE GIVES THE LOAD SEQUENCE NUMBER, THE PROGRAM ID, THE ADDRESS INTO WHICH THE PROGRAM WAS LOADED, AND THE RELOCATION FACTOR.

```
A0001                        SWS  PID
                             XXXX XXXX
```

THIS MESSAGE IS PRINTED EACH TIME A VALID SWITCH ENTRY IS READ BY THE MONITOR. THE MESSAGE CONTAINS THE SWITCH SETTING READ TOGETHER WITH THE PROGRAM ID OF THE PROGRAM INTO WHICH THE CONTENTS OF SWITCHES 8-15 WERE STORED. IF THE SWITCH ENTRY CALLED FOR HALT OF ANY PROGRAM THE WORD HALT WILL FOLLOW THE MESSAGE.

```
A0E00 000R AAAA
```

ROUTINE START MESSAGE - IF SWITCH 9, FUNCTION 0, IS TURNED ON, THIS MESSAGE WILL BE PRINTED BEFORE THE START OF EACH ROUTINE. R IS THE NUMBER OF THE NEXT ROUTINE AND AAAA IS THE STARTING ADDRESS.

```
A0E01 OORR AAAA              LOAD AND MAKE RDY
                             MMMM
```

THIS MESSAGE IS PRINTED WHEN THE PROGRAM IS INITIALIZING A MACHINE IN ANY ROUTINE. LOAD THE PROPER CARDS IN THE MACHINE AND PRESS START.

```
A0E02 OORR AAAA              NRDY
                             MMMM
```

THE PROGRAM IS WAITING FOR READY ON A MACHINE BEFORE INITIATING AN OPERATION. PRESS START. IF THE MESSAGE PERSISTS EVEN THOUGH THE READY LIGHT ON THE DEVICE IS ON, THE NOT READY BIT (15) IN THE DSW IS PROBABLY STAYING ON.

A0E03 00RR AAAA LAST CARD
MMMM

THE LAST CARD BIT WAS ON THE DSW SENSED ON THE LAST OP COMPLETE INTERRUPT. THIS SHOULD OCCUR ONLY ON THE OPERATION AFTER THE START KEY WAS DEPRESSED WITH THE HOPPER EMPTY AND A CARD IN THE PREREAD STATION. IF THIS MESSAGE OCCURS AT ANY OTHER TIME, CHECK PROPER OPERATION OF DSW BIT 3.

A0E04 0006 AAAA SET PATT IN SW 0-11 THEN TN SW 12.

THIS MESSAGE FROM ROUTINE 6, 'PUNCH SELECTED PATTERN' CALLS FOR THE OPERATOR TO SET THE DESIRED PATTERN IN THE SWITCHES. SWITCHES 0-11 REPRESENT PUNCH ROWS 12-9 RESPECTIVELY. WHEN THE SETTING IS COMPLETE, TURN ON SWITCH 12 TO SIGNAL THE PROGRAM. PUNCHING WILL THEN START. IF THE SWITCH SETTING IS CHANGED, THE PATTERN WILL CHANGE SO LONG AS SWITCH 12 IS ON. IF SWITCH 12 IS TURNED OFF, AND THE PATTERN CHANGED, PUNCHING WILL STOP UNTIL SWITCH 12 IS AGAIN TURNED ON.

A0E05 0007 AAAA SET PATT IN SW 0-11 THEN TN SW 12

THIS MESSAGE FROM ROUTINE 7, 'READ SELECTED PATTERN' CALLS FOR THE OPERATOR TO SET THE PATTERN OF THE DECK HE INTENDS TO USE INTO THE BIT SWITCHES. SWITCHES 0-11 REPRESENT ROWS 12-9 RESPECITIVELY. WHEN THE SETTING IS COMPLETE, TURN ON SWITCH 12 TO SIGNAL THE PROGRAM. THE PROGRAM WILL READ CARDS, COMPARING THE DATA READ TO THE BIT SWITCH SETTING. NO PROVISION IS MADE FOR CHANGING THE SWITCHES EXCEPT AT THE BEGINNING OF ROUTINE 7.

4.2*** ERROR MESSAGES

THE DSW IS CHECKED FOR ABSOLUTE CORRECTNESS AT ALL TIMES. IF AN ERROR IS DETECTED ONE OF THE MESSAGES BELOW WILL INDICATE THE PROBLEM. IT IS LEFT TO THE OPERATOR TO ANALYZE THE DSW FOR THE SPECIFIC PROBLEM AREA.

THE 2501/1442 DSW

BIT	
0	READ COLUMN (1442)
1	PUNCH COLUMN (1442)
2	ERROR
3	LAST CARD
4	OPERATION COMPLETE
5	NOT USED
6	NOT USED
7	NOT USED
8	NOT USED
9	NOT USED
10	NOT USED
11	NOT USED
12	NOT USED
13	NOT USED
14	BUSY
15	BUSY OR NOT READY

E0001 SWS INVLD
XXXX

THE SETTING OF SWITCHES 4-7 DID NOT EQUAL THE LOAD SEQUENCE NUMBER OF ANY PROGRAM IN CORE.

E0003 OVR CORE

THE PROGRAM WHICH THE LOADER WAS ATTEMPTING TO LOAD EXCEEDED AVAILABLE CORE. LOADING WAS TERMINATED.

E0004 CKSUM

A CHECK SUM ERROR WAS DETECTED WHILE LOADING A TEST PROGRAM. THIS ERROR OCCURS UNDER ANY OF THE FOLLOWING CONDITIONS.

1. A CARD IS MISSING OR IS OUT OF SEQUENCE.
2. THERE IS AN EXTRA CARD IN THE DECK.
3. THE PUNCHED INFORMATION ON THE CARD IS NOT CORRECT.
4. DATA WAS LOST OR PICKED UP DUE TO A MACHINE MALFUNCTION.
5. DUE TO A CPU MALFUNCTION, THE CHECK SUM WAS NOT CORRECTLY CALCULATED.

WHEN THIS ERROR OCCURS ATTEMPT TO RELOAD THE PROGRAM.

E0005 00ON XXXX

THIS ERROR WILL OCCUR IS AN INTERRUPT OCCURS, BUT THE ILSW WAS NOT CORRECT. N IS THE INTERRUPT LEVEL AND XXXX IS THE ILSW. THIS PRINTOUT WILL ONLY OCCUR IF THE INTERRUPT IS RESET BY A BOSI. NO ATTEMPT IS MADE BY THE ERROR ROUTINE TO RESET THE REQUEST BIT.

E0E01 00RR AAAA WAS S/B DSW ERR LEVEL 4
DDDD DDDD MMMM

AN UNEXPECTED CONDITION HAS BEEN DETECTED IN THE DSW FOR MACHINE (MMMM) ON INTERRUPT LEVEL 4. DATA MODIFIERS (DDDD) SHOW THE DETECTED DSW, AND WHAT IT SHOULD BE, IN HEX.

E0E02 00RR AAAA WAS S/B DSW ERR LEVEL 0
DDDD DDDD MMMM

SAME AS E0E01 EXCEPT FOR LEVEL 0

E0E03 00RR AAAA NO INTRPT
MMMM

AN OPERATION WAS STARTED ON THE MACHINE (MMMM) AND NO OP COMPLETE INTERRUPT WAS RECEIVED DURING A 15 SECOND TIMEOUT. THE ROUTINE RR WILL BE STARTED AGAIN FROM THE BEGINNING. THIS MESSAGE INDICATES A FAILURE OF EITHER THE INTERRUPT GENERATION CIRCUITS OR THE READY CIRCUITS.

E0EF 00RR AAAA WAS S/B DSW ERR INITIALIZING
4444 4444 MMMM

THE DSW FROM MACHINE (MMMM) WAS RESET, THEN SENSED BEFORE ANY OPERATION WAS STARTED IN ROUTINE (RR), AND AN UNEXPECTED CONDITION WAS PRESENT. DATA MODIFIERS (DDDD) SHOW THE DETECTED DSW, AND WHAT IT SHOULD BE IN HEX. THE PROGRAM WILL REPEAT THE RESET AND SENSE DSW OPERATION CONTINUOUSLY, AND RETYPE THE MESSAGE EVERY 15 SECONDS. NO OPERATION WILL BE STARTED UNTIL THE INITIAL DSW IS CORRECT.

E0E06 0ORR AAAA WAS S/B COL COUNT ERR.
DDDDD DDDDD 1442

AFTER PUNCHING A CARD, A COMPARISON WAS MADE OF THE ADDRESSES OF THE PUNCH TERMINATOR AND THE LAST COLUMN PUNCHED. THE DATA MODIFIERS (DDDD) SHOW THE NUMBER OF COLUMNS PUNCHED, AND THE NUMBER WHICH SHOULD HAVE PUNCHED, IN DECIMAL. A PUNCH CHECK WILL NORMALLY PRODUCE THIS ERROR, SINCE PUNCHING IS STOPPED AT THE COLUMN WHICH YIELDS THE CHECK.

E0E07 0ORR AAAA WAS S/B COL COUNT ERR
DDDDD DDDDD 2501

AFTER READING A CARD, THE READ AREA IS CHECKED FOR THE PROPER NUMBER OF CHARACTERS. THE DATA MODIFIERS (DDDDD) SHOW THE NUMBER READ, AND THE NUMBER EXPECTED. THIS MESSAGE COULD BE CAUSED BY FAILURES OF THE CR WORD COUNT REGISTER, CYCLE STEAL CIRCUITRY, OR THE CR ADDRESS REGISTER.

E0E08 0ORR AAAA WAS S/B COL DATA ERR
DDDD DDDD DDDDD

AFTER READING A CARD, THE DATA READ DOES NOT EQUAL THE DATA EXPECTED. THE DATA MODIFIERS (DDDD) SHOW THE DATA READ, AND THE DATA EXPECTED IN HEX. AND THE COLUMN NUMBER IN DECIMAL. THIS ERROR CAN COME FROM ROUTINES 2, 5 OR 7.

5. COMMENTS

5.1*** ROUTINE DESCRIPTIONS

THERE ARE TEN TEST ROUTINES IN THE 2501/1442 FUNCTION TEST. THE FIRST THREE ARE 'NORMAL ROUTINES', IE THEY ARE RUN WHEN NO ROUTINE SELECTION IS MADE, AND CONSTITUTE A COMPLETE FUNCTIONAL CHECK OF THE 2501 AND 1442. ROUTINES 4, 5, 6, 7 AND A RUN ONLY IF SELECTED, AND PROVIDE A MEANS OF EXERCISING CERTAIN FUNCTIONS, AND/OR BIT LINES. ROUTINES 8 AND 9 ARE UTILITY ROUTINES. ALL OF THE TEST ROUTINES FOLLOW THE SAME GENERAL ORGANIZATION, UTILIZING THE SERVICE SUBROUTINES.

GENERAL ORGANIZATION OF TEST ROUTINES

1. INITIALIZE THE DEVICE (INPCH, INROR).
2. SET UP DATA FOR PUNCHING OR COMPARE.
3. CHECK STATUS. (CHK14, CHK25).
4. INITIATE I/O OPERATION (PNCH, RDACD)
5. CHECK DATA.
6. SET UP DATA FOR NEXT OPERATION.
7. RETURN TO (3). CHECK STATUS.

5.1.1 OPERATION OF NORMAL ROUTINES

A. ROUTINE 1------ PUNCH ROTATING PATTERN.

THIS ROUTINE PUNCHES A ROTATING PATTERN IN 80 COLUMNS. THE PATTERN REMAINS FIXED IN STORAGE AND THE BEGINNING ADDRESS IS INCREMENTED THRU THE FIRST 79 POSITIONS OF THE 160 WORD FIELD. THE ADDRESS IS THEN RE-INITIALIZED, AND THE PROCESS REPEATED.

B. ROUTINE 2------ READ ROTATING PATTERN.

THIS ROUTINE READS THE DECK PUNCHED BY ROUTINE ONE. DATA IS COMPARED IN THE SAME MANNER AS IT WAS PUNCHED.

C. ROUTINE 3------ READ COLUMN COUNT CONTROL

THIS ROUTINE READS CARDS, VARYING THE WORD COUNT FROM 1 TO 80. THE LENGTH CHECK IS PERFORMED BY THE RDACD SERVICE SUBROUTINE.

D. ROUTINE 4------ GANG PUNCH.

THIS ROUTINE READS ONE CARD IN THE 2501 AND PUNCHES THAT DATA CONTINOUSLY ON THE 1442. THIS ALLOWS PUNCHING ANY PATTERN FOR ADJUSTMENT OR SCOPING PURPOSES.

E. ROUTINE 5------- READ GANG PUNCHED DECK.

THIS ROUTINE READS THE FIRST CARD INTO A COMPARE AREA, AND READS THE REMAINING CARDS INTO THIS READ AREA, COMPARING THE DATA TO THAT FROM THE FIRST CARD. THIS ALLOWS READING ANY PATTERN FOR ADJUSTMENT OR SCOPING PURPOSES.

F. ROUTINE 6------ PUNCH SELECTED PATTERN.

THIS ROUTINE READS THE CONSOLE SWITCHES AND PLACES THE SETTING OF SWITCHES 0-11 IN THE PUNCH AREA. SWITCH 12 SIGNALS THE PROGRAM THAT THE SETTING IS COMPLETE. THE SETTING MAY BE CHANGED AT ANY TIME, AND THE PUNCHED PATTERN WILL CHANGE ON THE NEXT CARD. IF SWITCH 12 IS LEFT ON, PUNCHING WILL CONTINUE. IF SWITCH 12 IS OFF AND THE PATTERN CHANGED, PUNCHING IS STOPPED UNTIL THE PATTERN IS SET AND SWITCH 12 TURNED ON. THE NUMBER OF COLUMNS PUNCHED MAY BE VARIED, BY MAKING AN ENTRY TO FUNCTION 10, WITH THE NUMBER OF COLUMNS (IN BINARY) IN THE DATA SWITCHES.

G. ROUTINE 7 ------- READ SELECTED PATTERN.

THIS ROUTINE READS THE CONSOLE SWITCHES, AND COMPARES THE DATA READ TO THE SETTING OF SWITCHES 0-11. THIS SETTING IS MADE IN THE SAME MANNER AS IN ROUTINE SIX, BUT WILL NOT CHANGE EXCEPT AT THE BEGINNING OF THE ROUTINE. THE NUMBER OF COLUMNS READ AND CHECKED MAY BE VARIED, AS IN ROUTINE SIX.

H. ROUTINE 8 ------- REPRODUCE.

THIS ROUTINE WILL REPRODUCE A DECK FROM THE 2501 TO THE 1442. ALL CHECKS ARE PERFORMED IN THE SERVICE SUBROUTINES.

I. ROUTINE 9 ------ REPLACE ROTATE PATTERN.

THIS ROUTINE READS ONE CARD FROM THE 2501 AND REPLACES THE DATA IN THE ROTATE PATTERN TABLE WITH THAT READ FROM THE CARD. LINKAGE IS MADE DIRECTLY TO ROUTINE ONE AND NORMAL TESTING FOLLOWS AS IF NO SELECTION HAD BEEN MADE.

J. ROUTINE A --- READ VARIABLE DELAY.

THIS ROUTINE CHECKS THE 2501 FEED MECHANISM WITH VARYING DELAY BETWEEN READ COMMANDS. IT BEGINS READING CARDS WITH MINIMUM DELAY, AND INCREMENTS THE DELAY XX MSEC AFTER EACH CARD. IF DESIRED, A FACTOR MAY BE SET IN THE CONSOLE SWITCHES. IF ANY CONSOLE SWITCHES ARE SET, A DELAY OF THEIR VALUE TIMES XX MSEC IS GENERATED. IF THE CONSOLE SWITCHES ARE ALL OFF, THE DELAY FACTOR IS INCREMENTED FROM 1 BY 1 UNTIL THE LAST CARD IS READ.

5.2*** SERVICE SUBROUTINES

A. CNTRL -- SEQUENCE CONTROL

THIS SUBROUTINE CHECKS FOR ROUTINE SELECTION, AND CONTROLS THE SEQUENCE IN WHICH THE TEST ROUTINES ARE RUN.

B. DSW1A --- LEVEL 0 1442 INTERRUPT SERVICE

THIS SUBROUTINE SERVICES THE PUNCH COLUMN INTERRUPT FROM THE 1442. IT ISSUES THE PUNCH COMMAND, INCREMENTS THE PUNCH ADDRESS, AND CHECKS THE DSW FOR ERRORS. IT IS NOT POSSIBLE TO TYPE THE ERRORS DURING PUNCHING, SO THEY ARE ACCUMULATED FOR CHECKING AFTER OP COMPLETE.

C. DSW4A --- LEVEL 4 1442 INTERRUPT SERVICE

THIS SUBROUTINE SERVICES THE OP COMPLETE INTERRUPT FROM THE 1442. IT SAVES THE DSW AND SETS UP THE LINKAGE FOR RETURN TO THE DSW ANALYSIS SUBROUTINE.

D. DSW4B --- LEVEL 4 2501 INTERRUPT SERVICE

THIS SUBROUTINE PERFORMS THE SAME FUNCTIONS AS DSW4A, EXCEPT FOR THE 2501.

E. DSWAN --- DSW ANALYSIS

THIS SUBROUTINE IS ENTERED ON RETURN FROM EITHER 2501 OR 1442 OP COMPLETE INTERRUPT. IT FIRST CHECKS FOR ANY LEVEL 0 DSW ERRORS AND THEN ANY LEVEL 4 DSW ERROR, GENERATES THE ERROR MESSAGE, IF ANY, AND RETURNS TO THE TEST ROUTINE.

F. TYPE AND E TYPE --- MESSAGE OUT

THIS SUBROUTINE CONTAINS THE INSTRUCTIONS NECESSARY TO LINK TO MONITORS LOG ROUTINES, AND THE MESSAGE AREA.

G. WAIT --- INTERRUPT WAIT.

THIS SUBROUTINE IS ENTERED IMMEDIATELY AFTER INITIATING A READ OR PUNCH OPERATION. IT CONTAINS A TIMING LOOP, WITH A RETURN TO MONITOR TO ALLOW OTHER PROGRAMS TO OPERATE IN OVERLAP. IF NO OP COMPLETE INTERRUPT OCCURS, THE LOOP WILL TIME OUT AND THE SUBROUTINE WILL GENERATE THE NO INTERRUPT MESSAGE. WHEN THE INTERRUPT OCCURS, IT WILL CHECK THE ROUTINE SELECTION SWITCH. IF A NEW ROUTINE IS SELECTED, IT WILL LINK TO CONTROL. IF NOT, IT WILL RETURN, VIA MONITOR, TO DSWAN.

H. INPCH, INRDR --- INITIALIZE PUNCH AND INITIALIZE READER

THE PROPER SUBROUTINE IS LINKED TO FROM EACH TEST ROUTINE WHICH USES THE DEVICE, BEFORE ANY OPERATION IS STARTED ON THAT DEVICE. IT FIRST GENERATES THE LOAD MESSAGE, THEN ISSUES A SENSE DSW COMMAND TO RESET THE DEVICE, THEN ANOTHER SENSE DSW. THE SECOND DSW IS CHECKED FOR ANY BITS OTHER THAN NOT READY OR LAST CARD. IF ANY ARE PRESENT A DSW ERROR MESSAGE IS GENERATED AND THE CHECK RETRIED. THE SUBROUTINE WILL NOT RETURN TO THE TEST ROUTINE UNTIL A PROPER DSW IS SENSED.

I. CHK14, CHK25. --- CHECK STATUS

THE PROPER SUBROUTINE IS LINKED TO FROM THE TEST ROUTINE BEFORE EACH OPERATION IS STARTED ON THE DEVICE. IT CHECKS THE DSW WORD FROM THE LAST OP COMPLETE FOR LAST CARD, AND GENERATES THE MESSAGE AND LINKS TO CNTRL IF IT IS ON. IF NOT, IT CHECKS FOR READY CONDITION, WAITS UNTIL THE DEVICE IS READY, THE RETURNS TO THE TEST ROUTINE.

J. PNCH --- PUNCH A CARD

THIS SUBROUTINE CONTAINS THE INSTRUCTIONS NECESSARY TO SET UP THE PUNCH TERMINATOR, INITIATE THE PUNCH OPERATION, AND CHECK THAT PUNCHING THE PROPER NUMBER OF COLUMNS WERE PUNCHED. IF AN ERROR MESSAGE, BEFORE RETURNING TO THE TEST ROUTINE.

K. RDACD --- READ A CARD

THIS SUBROUTINE FIRST FILLS THE READ IN AREA WITH WORDS CONTAINING ONLY BIT 15, FOR LENGTH CHECKING. IT THEN INITIATES A READ OPERATION AND LINKS TO WAIT. ON RETURN FROM OP COMPLETE INTERRUPT, IT CHECKS THAT THE PROPER NUMBER OF COLUMNS WERE TRANSFERRED, GENERATES THE THE ERROR MESSAGE, IF ANY, AND RETURNS TO THE TEST ROUTINE.

5.3*** MACHINE DISCOVERED ERRORS

THE FOLLOWING ARE EXAMPLES OF WHAT MESSAGES TO EXPECT FOR CERTAIN MACHINE CHECKS. THE LIST IS NOT COMPLETE BUT IS SUPPLIED TO FAMILIARIZE THE USER WITH THE ERROR CHECKING PHILOSOPHY.

1. READ CHECK WHILE RUNNING ROUTINE 2

```
E0E01 0002 04EA              WAS S/B DSW ERR LEVEL 4
                             2801 0801 2501
    (THE DSW SHOWS AN ERROR BIT)

E0E08 0002 06EA              WAS S/B COL DATA ERR
                             4020 4060 00010

    (THE DATA DID NOT COMPARE BECAUSE A SEVEN PUNCH
     WAS DROPPED IN COL 10.  THIS MAY NOT OCCUR ON A READ
     CHECK.)

A0E02 0002 06EA              NRDY
                             2501

    (THE MACHINE WENT NOT READY WITH THE READ CHECK
     TRIGGER ON)
```

2. A FEED CHECK WOULD YIELD A DSW ERROR AND NOT READY IN SIMILAR FASHION.

3. PUNCH ECHO CHECK WHILE RUNNING ROUTINE 4

```
E0E02   0004   0739          WAS S/B DSW ERR LEVEL 0
                             6003 4003 1442
    (THE LEVEL 0 DSW SHOWS THE ERROR BIT)

E0E01   0004 0739            WAS S/B DSW ERR LEVEL 4
                             2801  00080 1442
    (SO DOES THE LEVEL 4 DSW)

E0E06   0004 0739            WAS S/B COL COUNT ERR
                             00056 00080 1442
    (THE ERROR OCCURRED IN COL 56, TERMINATING THE
     PUNCHING.)

A0E02 0004 0739          NRDY
                         1442
    (READY DROPPED DUE TO THE PUNCH CHECK)
```

4. FEED CHECK ON 1442 WOULD YIELD DSW ERRORS AND NOT READY IN SIMILAR FASHION.

5.4*** ERROR CHECKING BY ROUTINE

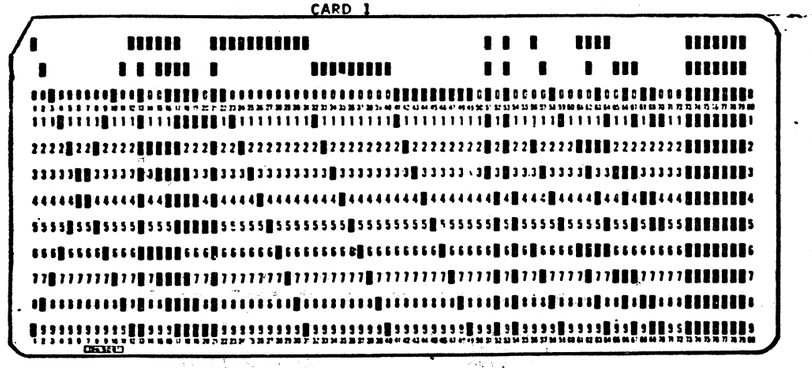
EACH ROUTINE OR SUBROUTINE WILL PRODUCE ITS OWN ERROR MESSAGE. SINCE EACH OF THE SERVICE SUBROUTINES SERVICE SEVERAL TEST ROUTINES, THEIR MESSAGES MAY OCCUR IN ANY TEST ROUTINE. THE FOLLOWING IS A LIST OF THE ERROR MESSAGES, AND ITS SOURCE.

ROUTINE/SUBROUTINE	MESSAGES
DSW ANALYSIS (DSWAN)	E0E01
	E0E02
WAIT FOR INTERRUPT (WAIT)	E0E03
INITIALIZATION (INPCH, INRDR)	E0E05
PUNCH A CARD (PNCH)	E0E06
READ A CARD (RDACD)	E0E07
ROUTINES 2, 5, 7	E0E08
MONITOR	E0001
	E0002
	E0003
	E0005
	E0004

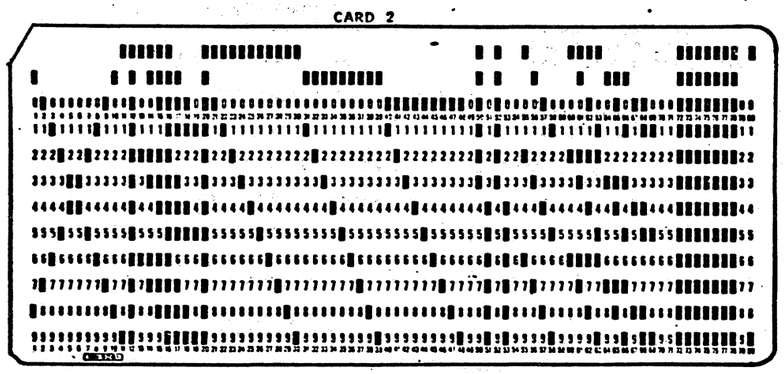
2501 READER/1442 MOD 5 PUNCH FUNCTION TEST

5.4 EXAMPLE OF ROTATE CARD DECK

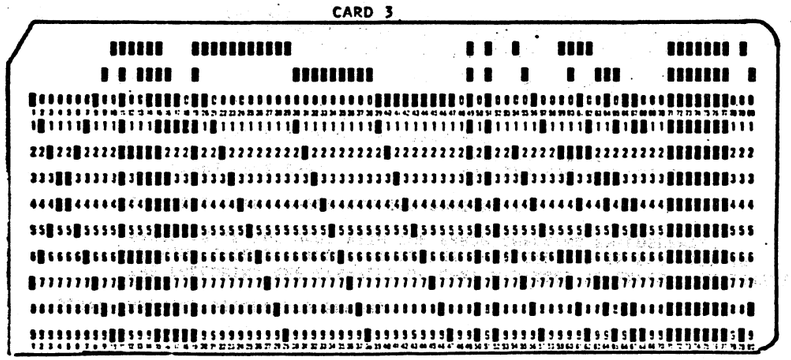
CARD 1



CARD 2



CARD 3



```
                         ************************************************
                         *                EQUATE TABLE
                         ************************************************
                         *    THIS TABLE EQUATES TEST PROGRAM LABELS
                         *    TO THEIR EQUIVALENT DIAGNOSTIC MONITOR
                         *    ADDRESSES.
                         *
                         *-----------------------------------------------
                         *    MONITOR ENTRY ADDRESSES
                         *-----------------------------------------------
0160                     BEGIN EQU    /0160      BEGIN ROUTINE
0161                     START EQU    BEGIN+1    SUPERVISOR ROUTINE
0162                     ERROR EQU    START+1    ERROR LOG ROUTINE
0163                     LOG   EQU    ERROR+1    STATUS LOG ROUTINE
0164                     END   EQU    LOG+1      END ROUTINE
                         *
                         *-----------------------------------------------
                         *    MONITOR CONTROL WORD ADDRESSES
                         *-----------------------------------------------
0165                     RTNSW EQU    END+1      ROUTINE START SW
0166                     ERLCK EQU    END+2      LOCK ON ERROR CONTROL
0167                     LOGBY EQU    END+3      I/O BUSY SW ADDRS
0168                     RLCF  EQU    END+4      RELOCATION FACTOR ADDRS
                         *
                         *-----------------------------------------------
                         *    INTERRUPT TRANSFER VECTOR ADDRESSES
                         *-----------------------------------------------
017A                     IL0   EQU    /017A      INTERRUPT LEVEL ZERO
018A                     IL1   EQU    IL0+16     INTERRUPT LEVEL ONE
019A                     IL2   EQU    IL1+16     INTERRUPT LEVEL TWO
01AA                     IL3   EQU    IL2+16     INTERRUPT LEVEL THREE
01BA                     IL4   EQU    IL3+16     INTERRUPT LEVEL FOUR
01BB                     RQTY  EQU    IL4+1      CONSOLE PRINTER REQUEST
01BC                     RQKB  EQU    RQTY+1     USE KEYBOARD REQUEST
01BD                     SVKB  EQU    RQKB+1     KB SERVICE REQUEST
                         *
                         ************************************************
0000                           ORG    *+/05DC
                         *-----------------------------------------------
                         *    THE MONITOR USES CORE LOCATIONS 0-05DC.
                         *    FOR CONTENTS OF THESE ADDRESSES REFER
                         *    TO THE DIAGNOSTIC MONITOR LISTING.
                         *-----------------------------------------------
                         *
                         ************************************************
                         *           PROGRAM CONTROL TABLE
                         ************************************************
                         *
05DC 0 030E              PID   DC     /030E
05DD 0 0000              RID   DC     /0000      ROUTINE ID
05DE 0 0000              RAD   DC     /0000      ROUTINE ADDRS
05DF 0 0000              SW0   DC     /0000      PROGRAM CONTROL
05E0 0 0000              SW1   DC     /0000      ROUTINE SELECTION
05E1 0 0000              SW2   DC     /0000
05E2 0 0000              SW3   DC     /0000
05E3 1 05EB                    DC     STRT       LOOP ADDRESS
05E4 1 05EB                    DC     STRT       RESTART ADDRESS
05E5 1 05EB              MLSCF DC     STRT       ENTRY SET IN MAINLINE
05E6 0 0000                    DC     /0000           IN INTERRUPT
05E7 0 FFFF                    DC     /FFFF      TERMINATOR
                         *
                         ************************************************
                         *           INITIALIZATION AND START
                         ************************************************
                         *
05E8 0 4480 0160         BGIN  BSI  I BEGIN
05EA 1 05DC                    DC     PID        PCT ADDRESS
                         *
```



```
05EB 0 6100              STRT  LDX   1 0
05EC 0 69F0                    STX   1 RID
05ED 1 6500 0630               LDX  L1 DSW1A      1442 COL INT
05EF 0 6D00 017A               STX  L1 IL0
05F1 1 6500 063F               LDX  L1 DSW4A      1442 OP COMP
05F3 0 6D00 01B8               STX  L1 IL4-2
05F5 1 6500 064A               LDX  L1 DSW4B      2501 OP COMP
05F7 0 6D00 01B7               STX  L1 IL4-3
05F9 0 4000                    BSI     CNTRL
                         *
                         ************************************************
                         *           SEQUENCE CONTROL ROUTINE
                         ************************************************
                         *    THIS ROUTINE CHECKS SW1 AND CONTROLS
                         *    THE SEQUENCE IN WHICH TEST ROUTINES
                         *    ARE RUN.
                         *-----------------------------------------------
                         *
05FA 0 0000              CNTRL DC      /0000
05FB 0 C0E4                    LD      SW1
05FC 1 4C08 0605               BSC  L  CN20,+     BR IF NO RTN SELECTD
                         *
05FE 0 D0DE              CN10  STO     RID        SAVE NEW RTN NUMBER
05FF 0 9015                    S       RIDCK
0600 1 4C08 060B               BSC  L  CN30,+     BR IF VALID RTN
0602 0 1810                    SRA     16
0603 0 D0DC                    STO     SW1        IF INVALID RTN GO
0604 0 D0D8                    STO     RID         TO RTN ONE
                         *
0605 1 7401 05DD         CN20  MDX  L  RID,1      ADV TO NEXT RTN
0607 0 C0D5                    LD      RID        CHECK FOR END OF
0608 0 900D                    S       RTNOM       NORMAL SEQUENCE      *1
0609 0 4480 0164               BSI  I  END,-Z     END OF PROGRAM
                         *
060B 1 6580 05DD         CN30  LDX  I1 RID        XR1=NEW ROUTINE NUMBER
060D 1 C500 0616               LD   L1 RTTBL-1    FETCH RETURN ADRS
060F 0 D0CE                    STO     RAD        STORE NEW RTN ADDRS
0610 0 D0D5                    STO     MLSCF+1    SET MLSCF FOR RETURN
0611 0 D400 0165               STO  L  RTNSW      SET RTN START SW
0613 0 4480 0161               BSI  I  START      GO TO MONITOR
                         *
0615 0 000A              RIDCK DC      LRTN-RTTBL+1
0616 0 0003              RTNOM DC      NRTN-RTTBL+1                     *2
                         *
                         *-----------------------------------------------
                         *           ROUTINE ADDRESS TABLE
                         *-----------------------------------------------
                         *
                         *           NORMAL ROUTINES
0617 1 06C6              RTTBL DC      RT1        PUNCH ROTATING PATT
0618 1 06E4                    DC      RT2        READ ROTATING PATTERN
0619 1 072C              NRTN  DC      RT3        READ COL COUNT CONTROL
                         *           SELECTIVE ROUTINES
061A 1 073D                    DC      RT4        GANG PUNCH
061B 1 074E                    DC      RT5        READ GANG PUNCHED DECK
061C 1 078D                    DC      RT6        PUNCH SELECTED PATTERN
061D 1 07CE                    DC      RT7        READ SELECTED PATTERN
061E 1 0824                    DC      RT8        REPRODUCE ROUTINE
061F 1 083D                    DC      RT9        REPLACE ROTATE PATTERN
0620 1 0853              LRTN  DC      RTA        2501  VAR DELAY READ
                         *
                         ************************************************
                         *           I/O CONTROL COMMANDS
                         ************************************************
                         *
0622   0000                    BSS  E  0
0622 0 0000              FDACD DC      /0000      FEED A CARD
0623 0 1402                    DC      /1402
```

```
0624 0 0000          PCHST DC    /0000       START PUNCH                30E01360
0625 0 1401                DC    /1401                                  30E01370
0626 1 0A29          PUNCH DC    WAREA       PUNCH                      30E01380
0627 0 1100                DC    /1100                                  30E01390
0628 0 0000          SNS1  DC    /0000                                  30E01400
0629 0 1703                DC    /1703       SENSE 1442 DSW             30E01410
062A 0 0000          SNS2  DC    /0000       SENSE DSW                  30E01420
062B 0 4F03                DC    /4F03       ON 2501                    30E01430
062C 1 099F          IREAD DC    RAREA       INITIATE READ              30E01440
062D 0 4EC0                DC    /4E00       ON 2501                    30E01450
062E 0 0000          SNSWS DC    *-*         READ CONSOLE SWITCHE       30E01460
062F 0 3A00                DC    /3A00                                  30E01470
                     *                                                  30E01480
                     ****************************************************30E01490
                     *          INTERRUPT SERVICE SUBROUTINES           30E01500
                     ****************************************************30E01510
                     *                                                  30E01520
                     *--------------------------------------------------30E01530
                     *          DSW CHECK FOR LEVEL 0                   30E01540
                     *--------------------------------------------------30E01550
                     *                                                  30E01560
0630 0 0000          DSW1A DC    *-*                                    30E01570
0631 0 08F6                XIO   SNS1        SENSE DSW                  30E01580
0632 1 D400 0AE6           STO L WAS0                                   30E01590
0634 0 1000                NOP               USE FOR TRAP               30E01600
0635 0 08F0                XIO   PUNCH       PUNCH A COLUMN             30E01610
0636 1 7401 0626           MDX L PUNCH,+1    INCRE PUNCH ADDR.          30E01620
0638 1 C400 0AE6           LD  L WAS0        CHECK FOR LOST OR          30E01630
063A 0 F01A                EOR   K4003       EXTRANEOUS BITS            30E01640
063B 0 E81F                OR    XERR        ACCUMULATE ALL ERRORS      30E01650
063C 0 D01E                STO   XERR                                   30E01660
063D 1 4C80 0630           BSC I DSW1A       RETURN                     30E01670
                     *                                                  30E01680
                     *--------------------------------------------------30E01690
                     *          DSW CHECK FOR LEVEL 4 1442              30E01700
                     *--------------------------------------------------30E01710
                     *                                                  30E01720
063F 0 0000          DSW4A DC    *-*                                    30E01730
0640 0 08E7                XIO   SNS1        SENSE 1442 DSW             30E01740
0641 1 D400 0AE7           STO L WAS4                                   30E01750
0643 0 1000                NOP               USE FOR TRAP               30E01760
0644 1 6700 065C           LDX L3 DSWAN      ADRESS OF ANALYSIS ROUT    30E01770
0646 1 6F00 05E6           STX L3 MLSCF+1    SET MONITOR RETURN         30E01780
0648 1 4C80 063F           BSC I DSW4A       RETURN                     30E01790
                     *                                                  30E01800
                     *--------------------------------------------------30E01810
                     *          DSW CHECK FOR LEVEL 4 2501              30E01820
                     *--------------------------------------------------30E01830
                     *                                                  30E01840
064A 0 0000          DSW4B DC    *-*                                    30E01850
064B 0 08DE                XIO   SNS2        SENSE DSW                  30E01860
064C 1 D400 0AE7           STO L WAS4                                   30E01870
064E 0 1000                NOP               USE FOR TRAP               30E01880
064F 1 6700 065C           LDX L3 DSWAN                                 30E01890
0651 1 6F00 05E6           STX L3 MLSCF+1                               30E01900
0653 1 4C80 064A           BSC I DSW4B                                  30E01910
                     *                                                  30E01920
                     *--------------------------------------------------30E01930
                     *                                                  30E01940
0655 0 4003          K4003 DC    /4003                                  30E01950
0656 0 FFF7          KFFF7 DC    /FFF7                                  30E01960
0657 0 0008          K0008 DC    /0008                                  30E01970
0658 0 FFFE          KFFFE DC    /FFFE                                  30E01980
0659 0 FFF0          KFFF0 DC    /FFF0                                  30E01990
065A 0 0050          K0C50 DC    /0050                                  30E02000
065B 0 0000          XERR  DC    0                                      30E02010
                     *                                                  30E02020
                     ****************************************************30E02030
```



```
                     *          ANALYSIS ROUTINE FOR DSW                30E02040
                     ****************************************************30E02050
                     *                                                  30E02060
                     *          THIS SUBROUTINE ANALYZES THE DSW        30E02070
                     *          AFTER ANY LEVEL FOUR INTERRUPT AND      30E02080
                     *          RETURNS TO THE ROUTINE VIA THE          30E02090
                     *          ENTRY POINT OF THE WAIT SUBROUTINE      30E02100
                     *--------------------------------------------------30E02110
                     *                                                  30E02120
065C 0 C0FE          DSWAN LD    XERR        LEVEL 0 ERRORS             30E02130
065D 1 4420 067B           BSI L DSWEO,Z     BR IF ANY                  30E02140
                     *                                                  30E02150
065F 1 C400 0AE7           LD  L WAS4        LAST DSW                   30E02160
0661 0 F016                EOR   K0800       OP COMP BIT                30E02170
0662 1 4C98 069C           BSC I WAIT,+-     BR IF NORMAL LVL 4 DSW     30E02180
                     *                                                  30E02190
0664 0 E014                AND   KEFFE       REMOVE L/C + NRDY BITS     30E02200
0665 1 4C98 069C           BSC I WAIT,+-     BR IF OTHERWISE NORMAL     30E02210
                     *                                                  30E02220
0667 1 F400 0AE7           EOR L WAS4        TO GET PROPER DSW          30E02230
0669 1 D400 0AEA           STO L D2BE                                   30E02240
066B 0 6101                LDX   1 1         MSG NO                     30E02250
066C 0 6600 0112           LDX   L2 /0112    WAS4--D2BE                 30E02260
066E 1 6700 0B03           LDX   L3 ALVL4    LEVEL 4                    30E02270
0670 1 6F00 0AE5           STX   L3 ALPH2                               30E02280
0672 1 6700 0B0D           LDX   L3 ADSWE    DSW ERROR                  30E02290
0674 1 4400 0ACC           BSI L ETYPE                                  30E02300
                     *                                                  30E02310
0676 1 4C80 069C           BSC I WAIT        RETURN TO PROGRAM          30E02320
                     *                                                  30E02330
0678 0 0800          K0800 DC    /0800                                  30E02340
0679 0 EFFE          KEFFE DC    /EFFE                                  30E02350
067A 0 1000          K1000 DC    /1000                                  30E02360
                     *                                                  30E02370
                     *--------------------------------------------------30E02380
                     *          DSW ERROR OCCURRED ON LEVEL 0           30E02390
                     *--------------------------------------------------30E02400
067B 0 0000          DSWEO DC    *-*                                    30E02410
067C 1 F400 067A           EOR L K1000                                  30E02420
067E 1 4C18 0696           BSC L EOLCC,+-    BR IF L/C ONLY             30E02430
                     *                                                  30E02440
0680 0 C0DA          EOTYP LD    XERR                                   30E02450
0681 0 F0D3                EOR   K4003       ERROR AND PROPER BITS      30E02460
0682 1 D400 0AE6           STO L WAS0        DSW WAS                    30E02470
0684 0 C0D0                LD    K4003       PROPER DSW                 30E02480
0685 1 D400 0AEA           STO L D2BE        SHOULD BE                  30E02490
0687 0 6102                LDX   1 2         MSG NO                     30E02500
0688 0 6600 0111           LDX   L2 /0111    WAS0--D2BE                 30E02510
068A 1 6700 0B08           LDX   L3 ALVL0    LEVEL 0                    30E02520
068C 1 6F00 0AE5           STX   L3 ALPH2                               30E02530
068E 1 6700 0B0D           LDX   L3 ADSWE    WAS  S/B  DSW ERROR        30E02540
0690 1 4400 0ACC           BSI L ETYPE                                  30E02550
                     *                                                  30E02560
0692 0 1010          EORTN SLA   16                                     30E02570
0693 0 0GC7                STO   XERR                                   30E02580
0694 1 4C80 067B           BSC I DSWEO       RETURN TO ANAL ROUTINE     30E02590
                     *                                                  30E02600
0696 1 C400 0AE7     EOLCC LD  L WAS4        CHK IF L/C ON LEVEL  4     30E02610
0698 0 1003                SLA   3                                      30E02620
0699 1 4C28 0692           BSC L EORTN,+Z    BR IF L/C PROPER           30E02630
069B 0 70E4                MDX   EOTYP       BR IF NOT PROPER           30E02640
                     *                                                  30E02650
                     ****************************************************30E02660
                     *          INTERRUPT WAIT ROUTINE                  30E02670
                     ****************************************************30E02680
                     *                                                  30E02690
                     *    THIS SUBROUTINE WAITS FOR INTERRUPT.          30E02700
                     *    WHEN THE INTERRUPT IS RECEIVED IT WILL        30E02710
```

```
                        *     CHECK THE ROUTINE SELECTION SWITCH.          30E02720
                        *     IF A NEW ROUTINE HAS BEEN SELECTED IT        30E02730
                        *     WILL BRANCH TO THE CONTROL ROUTINE.          30E02740
                        *--------------------------------------------      30E02750
                        *                                                  30E02760
069C 0 0000             WAIT  DC      /0000                                30E02770
069D 0 6500 1000              LDX   L1 /1000      SET INTERRUPT            30E02780
069F 0 6925                   STX    1 WCNT       WAIT CNT                 30E02790
                        *                                                  30E02800
06A0 1 6500 06A9        WAIT1 LDX   L1 WAIT3                               30E02810
06A2 1 7400 05E6              MDX   L  MLSCF+1    CK FOR INTERRUPT         30E02820
06A4 9 7008                   MDX      WAIT4      BR IF INTERRUPT OCCURED  30E02830
                        *                                                  30E02840
06A5 1 6D00 05E5        WAIT2 STX   L1 MLSCF      SET RETURN ADDRESS       30E02850
06A7 0 4480 0161              BSI   I  START      GO TO MONITOR            30E02860
                        *                                                  30E02870
06A9 1 74FF 06C5        WAIT3 MDX   L  WCNT,-1    DECREMENT WAIT CNT       30E02880
06AB 0 70F4                   MDX      WAIT1                               30E02890
06AC 0 700A                   MDX      WAIT5      BR IF NO INTERRUPT       30E02900
                        *                                                  30E02910
06AD 1 C400 05E0        WAIT4 LD    L  SW1                                 30E02920
06AF 0 4488 0161              BSI   I  START,+    CK FOR RTN SELECT        30E02930
06B1 1 9400 05DD              S     L  RID        CK FOR NEW ROUTINE       30E02940
06B3 1 4420 05FA              BSI   L  CNTRL,Z    BR IF NEW RTN            30E02950
06B5 0 4480 0161              BSI   I  START      GO TO MONITOR            30E02960
                        *                                                  30E02970
06B7 0 6103             WAIT5 LDX    1 3          MSG NO                   30E02980
06B8 0 6600 0100              LDX   L2 /0100                               30E02990
06BA 1 6700 0B03              LDX   L3 ALVL4      LEVEL 4                  30E03000
06BC 1 6F00 0AE5              STX   L3 ALPH2                               30E03010
06BE 1 6700 0B4A              LDX   L3 ANINT      NO INTERRUPT             30E03020
06C0 1 4400 0ACC              BSI   L  ETYPE                               30E03030
06C2 1 6580 05DE              LDX   I1 RAD        START ROUTINE OVER       30E03040
06C4 0 70E0                   MDX      WAIT2      RETURN VIA MONITOR       30E03050
                        *                                                  30E03060
06C5 0 0000             WCNT  DC      0           WAIT COUNT STORED HERE   30E03070
                        *                                                  30E03080
                        *********************************************      30E03090
                        *           ROUTINE ONE - PUNCH ROTATING PATT.     30E03100
                        *********************************************      30E03110
                        *                                                  30E03120
                        *           THIS ROUTINE PUNCHES A ROTATING        30E03130
                        *           PATTERN. NORMAL TERMINATION IS         30E03140
                        *           AFTER THE LAST CARD IS PUNCHED         30E03150
                        *                                                  30E03160
                        *                                                  30E03170
06C6 1 4400 0877        RT1   BSI   L  INPCH      TO INITIALIZE PUNCH      30E03180
                        *                                                  30E03190
06C8 0 6150             RT1C  LDX    1 80         INITIALIZE PUNCH AREA    30E03200
06C9 1 C500 0A78        RT1A  LD    L1 WARA2-1    FOR ROTATING PATTERN     30E03210
06CB 1 D500 0A28              STO   L1 WAREA-1                             30E03220
06CD 0 71FF                   MDX    1 -1                                  30E03230
06CE 0 70FA                   MDX      RT1A                                30E03240
                        *                                                  30E03250
06CF 1 6500 0A29              LDX   L1 WAREA      INITIALIZE PUNCH ADDR    30E03260
06D1 0 6904                   STX    1 PCHA1                               30E03270
                        *                                                  30E03280
06D2 1 4400 08FC        RT1B  BSI   L  CHK14      CHECK STATUS             30E03290
                        *                                                  30E03300
06D4 1 4400 095D              BSI   L  PNCH       TO PUNCH A CARD          30E03310
06D6 0 0000             PCHA1 DC      *-*         PUNCH BEGINNING ADDR     30E03320
06D7 0 0050             NCOL1 DC      80                                   30E03330
06D8 0 70F9                   MDX      RT1B       ERROR RETURN POINT       30E03340
                        *                                                  30E03350
06D9 1 7401 06D6              MDX   L  PCHA1,+1   INCRE PUNCH ADDR         30E03360
06DB 1 C400 095C              LD    L  TERAD      HAS ROTATION REACHED     30E03370
06DD 1 F400 0AC9              EOR   L  WAREN      END OF WRITE AREA        30E03380
06DF 1 4C20 06D2              BSC   L  RT1B,Z     BR IF NOT                30E03390
```



```
06E1 0 70E6                   MDX      RT1C       BR IF YES                30E03400
                        *                                                  30E03410
                        **************************************************30E03420
                        *           ROUTINE TWO. READ ROTATING PATT        30E03430
                        **************************************             30E03440
                        *                                                  30E03450
                        *           THIS ROUTINE READS THE ROTATE DECK     30E03460
                        *           PUNCHED IN ROUTINE ONE, CHECKING THE   30E03470
                        *           DATA AGAINST THE PUNCH PATTERN         30E03480
                        *--------------------------------------------      30E03490
                        *                                                  30E03500
                        *                                                  30E03510
06E2 1 0A79             RT2CC DC      WARA2       FOR AREA END CHACK       30E03520
06E3 0 0000             RT2CS DC      *-*         COMPARE START ADDR       30E03530
                        *                                                  30E03540
06E4 1 4400 08B9        RT2   BSI   L  INRDR      TO INITIALIZE READR      30E03550
                        *                                                  30E03560
06E6 0 6150                   LDX    1 80                                  30E03570
06E7 1 C500 0A78        RT2A  LD    L1 WARA2-1    INITIALIZE ROTATE        30E03580
06E9 1 D500 0A28              STO   L1 WAREA-1    PATTERN IN PUNCH         30E03590
06EB 0 71FF                   MDX    1 -1         AREA FOR COMPARE         30E03600
06EC 0 70FA                   MDX      RT2A                                30E03610
                        *                                                  30E03620
06ED 1 6500 0A29        RT2D  LDX   L1 WAREA      INITIALIZE COMPARE STAR  30E03630
06EF 0 69F3                   STX    1 RT2CS      ADDRESS                  30E03640
                        *                                                  30E03650
06F0 0 6100             RT2C  LDX    1 0                                   30E03660
06F1 1 6D00 0ACB              STX   L1 LN1SW      CLEAR FIRST LN SW        30E03670
06F3 1 4400 092D              BSI   L  CHK25      CHECK STATUS             30E03680
                        *                                                  30E03690
06F5 1 4400 09F1              BSI   L  RDACD      TO READ A CARD           30E03700
06F7 0 0050                   DC       80         NO OF COLS               30E03710
                        *                                                  30E03720
06F8 0 61B0                   LDX    1 -80                                 30E03730
06F9 1 6680 06E3              LDX   I2 RT2CS      COMPARE START ADDRESS    30E03740
06FB 1 C500 09F0        RT2B  LD    L1 RAREA+81   CHAR READ                30E03750
06FD 0 F200                   EOR    2 0          PROPER CHAR              30E03760
06FE 1 E400 0659              AND   L  KFFF0      REMVE UNWANTED BITS      30E03770
0700 1 4C20 070C              BSC   L  RT2DA,Z    BR IF DATA ERROR         30E03780
                        *                                                  30E03790
0702 0 7201             RT2E  MDX    2 +1         TO NEXT COMP CHAR        30E03800
0703 0 7101                   MDX    1 +1         TO NXT CHAR              30E03810
0704 0 70F6                   MDX      RT2B       CONTINUE                 30E03820
                        *                                                  30E03830
0705 0 C0DC             RT2F  LD       RT2CC      LAST ADDRESS             30E03840
0706 0 F0DC                   EOR      RT2CS      COMP TO THIS TIME        30E03850
0707 1 4C18 06ED              BSC   L  RT2D,+-     BR IF END OF PATTERN     30E03860
                        *                                                  30E03870
0709 1 7401 06E3              MDX   L  RT2CS,+1   INCRE COMP START ADDR     30E03880
070B 0 70E4                   MDX      RT2C       BR TO CONTINUE           30E03890
                        *                                                  30E03900
                        *           DATA ERROR                             30E03910
                        *--------------------------------------------      30E03920
                        *                                                  30E03930
070C 1 6D00 0AEB        RT2DA STX   L1 COL        STO ERROR COLUMN         30E03940
070E 1 7451 0AEB              MDX   L  COL,+81                               30E03950
0710 0 1000                   NOP                SKIPPED BY MDX           30E03960
0711 0 C200                   LD     2 0         PROPER CHAR              30E03970
0712 1 D400 0AEA              STO   L  028E                                  30E03980
0714 1 C500 09F0              LD    L1 RAREA+81   ERROR CHAR               30E03990
0716 1 D400 0AE9              STO   L  WASD                                  30E04000
0718 0 690F                   STX    1 RT2D1+1    SAVE XR1                 30E04010
0719 0 6A10                   STX    2 RT2D2+1    SAVE XR2                 30E04020
071A 0 6108                   LDX    1 8                                   30E04030
071B 0 6600 0138              LDX   L2 /0138                               30E04040
071D 1 6700 0B1E              LDX   L3 ADTAE                               30E04050
071F 1 4400 0ACC              BSI   L  ETYPE                               30E04060
                        *                                                  30E04070
```

```
0721 1 C400 05E2          LD   L  SW3                                    30E04080
0723 1 4C20 0705          BSC  L  RT2F,Z     BR IF 1 LN OPTION SEL       30E04090
0725 1 6D00 0ACB          STX  L1 LN1SW      SET FIRST LINE SW           30E04100
0727 0 6500 0000 RT2D1    LDX  L1 *-*        RESTORE XR1                 30E04110
0729 0 6600 0000 RT2D2    LDX  L2 *-*        RESTORE XR2                 30E04120
0728 0 70D6               MDX     RT2E       READ ANOTHER CARD           30E04130
                          *                                              30E04140
                          ********************************************** 30E04150
                          *          ROUTINE THREE                       30E04160
                          ********************************************** 30E04170
                          *                                              30E04180
                          *          THIS ROUTINE READS CARDS VARYING    30E04190
                          *          THE COLUMN COUNT FROM ONE TO EIGHTY 30E04200
                          *------------------------------------------- 30E04210
                          *                                              30E04220
                          *                                              30E04230
072C 1 4400 08B9 RT3      BSI  L  INRDR      INITIALIZE READER           30E04240
                          *                                              30E04250
072E 0 6101      RT3D     LDX     1 1        INITIALIZE NUMBER           30E04260
072F 0 6904               STX     1 NCOL3    F COLUMNS                   30E04270
0730 1 4400 092D RT3A     BSI  L  CHK25      CHECK STATUS                30E04280
                          *                                              30E04290
0732 1 4400 09F1          BSI  L  RDACD      READ A CARD                 30E04300
0734 0 0000      NCOL3    DC      *-*                                    30E04310
                          *                                              30E04320
0735 0 C0FE      RT3E     LD      NCOL3      NUMBER OF COLS              30E04330
0736 1 F400 065A          EOR  L  K0050                                  30E04340
0738 1 4C18 072E          BSC  L  RT3D,+-    BR IF COL COUNT = 80        30E04350
073A 1 7401 0734          MDX  L  NCOL3,+1   INCRE NO OF COLS            30E04360
073C 0 70F3               MDX     RT3A                                   30E04370
                          *                                              30E04380
                          ********************************************** 30E04390
                          *          ROUTINE FOUR--GANG PUNCH            30E04400
                          ********************************************** 30E04410
                          *                                              30E04420
                          *          THIS ROUTINE READS ONE CARD         30E04430
                          *          PATTERN REPEATEDLY ON THE 1442      30E04450
                          *------------------------------------------- 30E04460
                          *                                              30E04470
                          *                                              30E04480
073D 1 4400 08B9 RT4      BSI  L  INRDR      INITIALIZE READER           30E04490
073F 1 4400 092D          BSI  L  CHK25      CHECK STATUS                30E04500
0741 1 4400 09F1          BSI  L  RDACD      READ CARD                   30E04510
0743 0 0050               DC      80         COL COUNT                   30E04520
0744 1 4400 0877          BSI  L  INPCH      INITIALIZE PUNCH            30E04530
                          *                                              30E04540
0746 1 4400 08FC RT4A     BSI  L  CHK14      CHECK STATUS                30E04550
0748 1 4400 095D          BSI  L  PNCH       PUNCH CARD                  30E04560
074A 1 09A0               DC      RAREA+1    FROM READ AREA              30E04570
074B 0 0050               DC      80         COL COUNT                   30E04580
074C 0 7000               MDX     *          ERROR RETURN                30E04590
074D 0 70F8               MDX     RT4A                                   30E04600
                          *                                              30E04610
                          ********************************************** 30E04620
                          *          ROUTINE FIVE--READ GANG PUNCHED DECK 30E04630
                          ********************************************** 30E04640
                          *                                              30E04650
                          *          THIS ROUTINE READS CARDS, COMPARING 30E04660
                          *          THE DATA FROM EACH CARD WITH THAT   30E04670
                          *          FROM THE FIRST                      30E04680
                          *------------------------------------------- 30E04690
                          *                                              30E04700
                          *                                              30E04710
074E 1 4400 08B9 RT5      BSI  L  INRDR      INITIALIZE READER           30E04720
0750 1 4400 092D          BSI  L  CHK25      CHECK STATUS                30E04730
0752 1 4400 09F1          BSI  L  RDACD      READ FIRST CARD             30E04740
0754 0 0050               DC      80         COL COUNT                   30E04750
```



```
                          *                                              30E04760
0755 0 6150               LDX     1 80                                   30E04770
0756 1 C500 099F RT5A     LD   L1 RAREA      MOVE COMPARE DATA           30E04780
0758 1 D500 0A28          STO  L1 WAREA-1    TO WAREA FOR COMPARE        30E04790
075A 0 71FF               MDX     1 -1                                   30E04800
075B 0 70FA               MDX     RT5A                                   30E04810
                          *                                              30E04820
075C 1 6D00 0ACB RT5B     STX  L1 LN1SW      RESET LN 1 SW               30E04830
075E 1 4400 092D          BSI  L  CHK25                                  30E04840
0760 1 4400 09F1          BSI  L  RDACD      READ CARD                   30E04850
0762 0 0050               DC      80         COLCOUNT                    30E04860
0763 0 61B0               LDX     1 -80      FOR COMP                    30E04870
                          *                                              30E04880
0764 1 C500 09F0 RT5C     LD   L1 RAREA+81   CHAR READ                   30E04890
0766 1 F500 0A79          EOR  L1 WAREA+80   COMP CHAR                   30E04900
0768 1 E400 0659          AND  L  KFFF0      REMOVE UNWANTED BITS        30E04910
076A 1 4C20 076F          BSC  L  RT5D,Z     BR IF DATA ERROR            30E04920
076C 0 7101      RT5E     MDX     1 1                                    30E04930
076D 0 70F6               MDX     RT5C       CONTINUE SCAN               30E04940
076E 0 70ED               MDX     RT5B       READ ANOTHER CARD           30E04950
                          *                                              30E04960
076F 1 C500 09F0 RT5D     LD   L1 RAREA+81   CHAR READ                   30E04970
0771 1 D400 0AE9          STO  L  WASD                                   30E04980
0773 1 C500 0A79          LD   L1 WAREA+80   PROPER CHAR                 30E04990
0775 1 D400 0AEA          STO  L  O2BE                                   30E05000
0777 0 6912               STX     1 RT5D1+1  SAVE XR1                    30E05010
0778 0 7151               MDX     1 +81      TO COL NO                   30E05020
0779 0 1000               NOP                                            30E05030
077A 1 6D00 0AEB          STX  L1 COL                                    30E05040
077C 0 6108               LDX     1 8        MSG NO                      30E05050
077D 0 6600 0138          LDX  L2 /0138      DATA ID                     30E05060
077F 1 6700 0B1E          LDX  L3 ADTAE      DATA ERROR                  30E05070
0781 1 4400 0ACC          BSI  L  ETYPE                                  30E05080
                          *                                              30E05090
0783 1 C400 05E2          LD   L  SW3                                    30E05100
0785 1 4C20 075C          BSC  L  RT5B,Z     BR IF 1 LN ONLY OPTION SEL  30E05110
0789 0 6500 0000 RT5D1    LDX  L1 *-*        RESTORE XR1                 30E05130
078B 0 70E0               MDX     RT5E                                   30E05140
                          *                                              30E05150
                          ********************************************** 30E05160
                          *          ROUTINE SIX                         30E05170
                          ********************************************** 30E05180
                          *                                              30E05190
                          *          THIS ROUTINE PUNCHES A              30E05200
                          *          SELECTED PATTERN.                   30E05210
                          *------------------------------------------- 30E05220
                          *                                              30E05230
                          *                                              30E05240
078C 0 0000      RT6SW    DC      *-*        SWITCH SETTING              30E05250
                          *                                              30E05260
078D 1 4400 0877 RT6      BSI  L  INPCH      INITIALIZE PUNCH            30E05270
                          *                                              30E05280
078F 0 6500 3000 RT6A     LDX  L1 /3000      TIMING CONST FOR            30E05290
0791 1 6D00 0874          STX  L1 WTCNT      WAITING LOOP                30E05300
                          *                                              30E05310
0793 0 6104               LDX     1 4        MSG NO                      30E05320
0794 0 6200               LDX     2 0        NO  ATA                     30E05330
0795 1 6700 0B2B          LDX  L3 ASETP                                  30E05340
0797 1 4400 0AEF          BSI  L  TYPE       TYPE SET PATT MSG           30E05350
                          *                                              30E05360
0799 1 6500 078C          LDX  L1 RT6SW      DATA ADDR                   30E05370
079B 1 6D00 062E          STX  L1 SNSWS                                  30E05380
079D 1 0C00 062E RT6B     XIO  L  SNSWS      READ CONSOLE SWITCHE        30E05390
                          *                                              30E05400
079F 0 C0EC               LD      RT6SW      SWITCH SETTING              30E05410
07A0 0 1803               SRA     3          CHECK BIT 12                30E05420
07A1 0 4804               BSC     E          SKIP IF SW 12 NOT ON        30E05430
```

```
07A2 0 700A              MDX     RT6D      BRIF SW 12 ON                30E05440
                         *                                              30E05450
07A3 1 74FF 0874         MDX   L WTCNT,-1  SKIP WHEN COUNT ZERO         30E05460
07A5 0 7001              MDX     RT6C      BR TO DLY VIA MON            30E05470
07A6 0 70E8              MDX     RT6A      BR WHEN COUNT = 0            30E05480
                         *                                              30E05490
07A7 1 6500 079D RT6C    LDX   L1 RT6B      RETURN POINT                 30E05500
07A9 1 6D00 05E5         STX   L1 MLSCF                                 30E05510
07AB 0 4480 0161         BSI   I  START     VIA MONITOR                  30E05520
                         *                                              30E05530
07AD C CODE              RT6D  LD      RT6SW     PUNCH PATTERN          30E05540
07AE 1 E400 0656         AND   L KFFF7     REMOVE 12 BIT                30E05550
07B0 0 6150              LDX    1 80                                    30E05560
07B1 1 D500 0A28 RT6E    STO   L1 WAREA-1  FILL WRITE AREA              30E05570
07B3 0 71FF              MDX    1 -1       WITH SELECTED BITS           30E05580
07B4 0 70FC              MDX     RT6E                                   30E05590
                         *                                              30E05600
07B5 1 4400 08FC RT6F    BSI   L CHK14     CHECK STATUS                 30E05610
                         *                                              30E05620
07B7 1 C400 05E1         LD    L SW2       CHECK CC OPTION              30E05630
07B9 1 4C20 07CA         BSC   L RT6H,Z                                 30E05640
07BB 0 6150              LDX    1 80       MAKE COL COUNT 80            30E05650
07BC 0 6903              STX    1 NCOL6                                 30E05660
                         *                                              30E05670
07BD 1 4400 095D RT6G    BSI   L PNCH      PUNCH A CARD                 30E05680
07BF 1 0A29              DC      WAREA     PUNCH AREA                   30E05690
07C0 0 0050      NCOL6   DC      80        NO OF COLS                   30E05700
07C1 0 7000              MDX     *         ERROR RETURN                 30E05710
                         *                                              30E05720
07C2 1 0C00 062E         XIO   L SNSWS     READ CONS SWS                30E05730
                         *                                              30E05740
07C4 0 C0C7              LD      RT6SW                                  30E05750
07C5 1 F400 0A29         EOR   L WAREA     CHECK FOR CHANGES            30E05760
07C7 1 4C20 079D         BSC   L RT6B,Z    BR IF SWS CHANGED            30E05770
                         *                                              30E05780
07C9 0 70EB              MDX     RT6F      TO PUNCH ANOTHER CD          30E05790
                         *                                              30E05800
07CA 1 D400 07C0 RT6H    STO   L NCOL6     STO COLUMN COUNT             30E05810
07CC 0 70F0              MDX     RT6G                                   30E05820
                         *                                              30E05830
                         ************************************************30E05840
                         *          ROUTINE SEVEN                       30E05850
                         ************************************************30E05860
                         *                                              30E05870
                         *          READ SELECTED PATTERN               30E05880
                         *--------------------------------------------- 30E05890
                         *                                              30E05900
                         *                                              30E05910
07CD 0 0000      RT7SW   DC      *-*       SWITCH SETTING               30E05920
                         *                                              30E05930
07CE 1 4400 08B9 RT7     BSI   L INRDR     INITIALIZE READER            30E05940
                         *                                              30E05950
07D0 0 6500 3000 RT7A    LDX   L1 /3000    TIMING CONST FOR             30E05960
07D2 1 6D00 0874         STX   L1 WTCNT    WAITIBG LOOP                 30E05970
                         *                                              30E05980
07D4 0 6105              LDX    1 5        MSG NO.                      30E05990
07D5 0 6200              LDX    2 0        NO DATA                      30E06000
07D6 1 6700 0B2B         LDX   L3 ASETP                                 30E06010
07D8 1 4400 0AEF         BSI   L  TYPE     TYPE SET PATT MSG            30E06020
                         *                                              30E06030
07DA 1 6500 07CD         LDX   L1 RT7SW    DATA ADDR                    30E06040
07DC 1 6D00 062E         STX   L1 SNSWS                                 30E06050
07DE 1 0C00 062E RT7B    XIO   L  SNSWS    READ CONSOLE SWITCHE         30E06060
                         *                                              30E06070
07E0 0 C0EC              LD      RT7SW     SWITCH SETTING               30E06080
07E1 0 1803              SRA     3         CHECK BIT 12                 30E06090
07E2 0 4804              BSC     E         SKIP IF SW 12 NOT ON         30E06100
07E3 0 700A              MDX     RT7D      BRIF SW 12 ON                30E06110
```



```
                         *                                              30E06120
07E4 1 74FF 0874         MDX   L WTCNT,-1  SKIP WHEN COUNT ZERO         30E06130
07E6 0 7001              MDX     RT7C      BR TO DLY VIA MON            30E06140
07E7 0 70E8              MDX     RT7A      BR WHEN COUNT = 0            30E06150
07E8 1 6500 07DE RT7C    LDX   L1 RT7B      RETURN POINT                 30E06160
07EA 1 6D00 05E5         STX   L1 MLSCF                                 30E06170
07EC 0 4480 0161         BSI   I  START     VIA MONITOR                  30E06180
                         *                                              30E06190
07EE 1 4400 092D RT7D    BSI   L  CHK25     CHECK STATUS                 30E06200
                         *                                              30E06210
07F0 1 C400 05E1         LD    L  SW2       CHECK CC OPTION              30E06220
07F2 1 4C20 0821         BSC   L  RT7H,Z                                30E06230
07F4 0 6150              LDX    1 80       MAKE COL COUNT 80            30E06240
07F5 0 6905              STX    1 NCOL7                                 30E06250
07F6 0 6100              LDX    1 0                                     30E06260
07F7 1 6D00 0ACB         STX   L1 LN1SW     REST LN 1 SW                 30E06270
                         *                                              30E06280
07F9 1 4400 09F1 RT7G    BSI   L  RDACD     READ A CARD                  30E06290
07FB 0 0050      NCOL7   DC      80        NO OF COLS                   30E06300
                         *                                              30E06310
07FC 1 6580 07FB         LDX   I1 NCOL7                                 30E06320
07FE 1 C500 099F RT7E    LD    L1 RAREA     CHAR READ                    30E06330
0800 0 F0CC              EOR     RT7SW     SWITCH SETTING               30E06340
0801 1 E400 0656         AND   L KFFF7     REMOVE TERM BIT              30E06350
0803 1 4C20 0808         BSC   L RT7F,Z    BR IF DATA ERROR             30E06360
0805 0 71FF      RT7FR   MDX    1 -1                                    30E06370
0806 0 70F7              MDX     RT7E      CONTINUE SCAN                30E06380
0807 0 70E6              MDX     RT7D      READ ANOTHER CARD            30E06390
                         *                                              30E06400
0808 0 F0C4      RT7F    EOR     RT7SW     RESTORE CHAR READ            30E06410
0809 1 D400 0AE9         STO   L WASD                                   30E06420
080B 1 6D00 0AEB         STX   L1 COL       COL NUMBER                   30E06430
080D 0 C0BF              LD      RT7SW     PROPER CHAR                  30E06440
080E 1 D400 0AEA         STO   L  O2BE                                  30E06450
0810 0 690E              STX    1 RT7F1+1   SAVE XR1                     30E06460
0811 0 6108              LDX    1 8        MSG NO                       30E06470
0812 0 6600 0138         LDX   L2 /0138     DATA ID                      30E06480
0814 1 6700 0B1E         LDX   L3 ADTAE     DATA ERROR HDG               30E06490
0816 1 4400 0ACC         BSI   L  ETYPE                                  30E06500
                         *                                              30E06510
0818 1 C400 05E2         LD    L  SW3                                   30E06520
081A 1 4C20 07EE         BSC   L  RT7D,Z    BR IF 1 LN ONLY OPTION SEL   30E06530
081C 1 6D00 0ACB         STX   L1 LN1SW     SET LINE 1 SW                30E06540
081E 0 6500 0000 RT7F1   LDX   L1 *-*       RESTORE XR1                  30E06550
0820 0 70E4              MDX     RT7FR     CHECK FOR MORE ERRORS        30E06560
                         *                                              30E06570
0821 0 D0D9      RT7H    STO     NCOL7     STO COLUMN COUNT             30E06580
0822 0 70D6              MDX     RT7G                                   30E06590
                         *                                              30E06600
                         ************************************************30E06610
                         *          ROUTINE EIGHT                       30E06620
                         ************************************************30E06630
                         *                                              30E06640
                         *          REPRODUCE ROUTINE                   30E06650
                         *--------------------------------------------- 30E06660
                         *                                              30E06670
                         *                                              30E06680
0823 0 0000      RT8SA   DC      *-*       WAS4 SAVE AREA               30E06690
                         *                                              30E06700
0824 1 4400 08B9 RT8     BSI   L INRDR                                  30E06710
0826 1 4400 0877         BSI   L INPCH      INITIALIZE PUNCH             30E06720
0828 0 1010              SLA     16                                     30E06730
0629 0 D0F9              STO     RT8SA     CLEAR WAS4 SAVE AREA         30E06740
                         *                                              30E06750
082A 1 4400 08FC RT8A    BSI   L CHK14     CHECK STATUS                 30E06760
082C 0 C0F6              LD      RT8SA                                  30E06770
082D 1 D400 0AE7         STO   L WAS4       RESTORE WAS4 FOR CHK25       30E06780
082F 1 4400 092D         BSI   L CHK25      CHECK STATUS                 30E06790
```

```
0831 1 4400 09F1          BSI  L  RDACD      READ CARD                    30E06800
0833 0 0050                DC      80        COL COUNT                    30E06810
0834 1 C400 0AE7           LD   L  WAS4                                   30E06820
0836 0 D0EC                STO     RT8SA     SAVE STATUS FOR CHK25        30E06830
0837 1 4400 095D           BSI  L  PNCH      PUNCH CARD                   30E06840
0839 1 09A0                DC      RAREA+1   FROM READ AREA               30E06850
083A 0 0050                DC      80        COL COUNT                    30E06860
083B 0 7000                MDX     *         ERROR RETURN                 30E06870
083C 0 70ED                MDX     RT8A                                   30E06880
                      *                                                   30E06890
                      ***************************************************30E06900
                      *           ROUTINE NINE--REPLACE ROTATE PATTERN    30E06910
                      ***************************************************30E06920
                      *                                                   30E06930
                      *           THIS ROUTINE REPLACES THE ROTATE        30E06940
                      *           PATTERN WITH THAT FROM THE FIRST        30E06950
                      *           CARD IN THE 2501                        30E06960
                      *           IT THEN RETURNS TO ROUTINE ONE TO       30E06970
                      *           PUNCH THE PATTERN                       30E06980
                      *-------------------------------------------------- 30E06990
                      *                                                   30E07000
                      *                                                   30E07010
083D 1 4400 08B9      RT9   BSI  L  INRDR      INITIALIZE READER           30E07020
                      *                                                   30E07030
083F 1 4400 092D      RT9A  BSI  L  CHK25      CHECK STATUS                30E07040
0841 1 4400 09F1            BSI  L  RDACD      READ CARD                   30E07050
0843 0 0050                 DC      80         COL COUNT                   30E07060
0844 0 6150                 LDX     1 80                                   30E07070
                      *                                                   30E07080
0845 1 C500 099F      RT9B  LD   L1 RAREA      REPLACE CHAR                30E07090
0847 1 D500 0A78            STO  L1 WARA2-1    IN ROTATE CONSTANT AREA     30E07100
0849 0 71FF                 MDX     1 -1                                   30E07110
084A 0 70FA                 MDX     RT9B                                   30E07120
084B 0 6100                 LDX     1 0                                    30E07130
084C 1 6D00 05E0            STX  L1 SW1        ZERO ROUTINE SEL SW         30E07140
084E 1 4C00 05EB            BSC  L  STRT       RETURN TO START OF PROG     30E07150
                      *                                                   30E07160
                      ***************************************************30E07170
                      *           ROUTINE TEN                             30E07180
                      ***************************************************30E07190
                      *                                                   30E07200
                      *           READ WITH VARIABLE DELAY                30E07210
                      *           BETWEEN CARDS                           30E07220
                      *-------------------------------------------------- 30E07230
                      *                                                   30E07240
                      *                                                   30E07250
0850 0 0000           RTASW DC       *-*       SWITCH SETTING             30E07260
0851 0 0000           RTAPC DC       *-*       ROUTINE PASS COUNTER       30E07270
0852 0 0000           RTADC DC       *-*       DELAY COUNTER              30E07280
                      *                                                   30E07290
0853 1 4400 08B9      RTA   BSI  L  INRDR      INITIALIZE READER          30E07300
0855 1 6500 0850            LDX  L1 RTASW      INIT SENSE SWS IOCC        30E07310
0857 1 6D00 062E            STX  L1 SNSWS                                 30E07320
0859 0 6101                 LDX     1 1        INITIALIZE COUNTERS        30E07330
085A 0 69F6                 STX     1 RTAPC                               30E07340
085B 0 69F6                 STX     1 RTADC                               30E07350
                      *                                                   30E07360
085C 1 4400 092D      RTAA  BSI  L  CHK25      CHECK STATUS               30E07370
085E 1 0C00 062C            XIO  L  IREAD      READ A CARD                30E07380
0860 1 0C00 062A      RTAA1 XIO  L  SNS2       SENSE DSW                  30E07381
0862 0 4804                 BSC     E          SKIP IF NOT BUSY           30E07382
0863 0 70FC                 MDX     RTAA1      LOOP UNTIL OP COMP         30E07383
0864 0 1010                 SLA     16                                    30E07384
0865 1 D400 05E6            STO  L  MLSCF+1    NO INTERRUPT RET ENTRY     30E07385
0867 1 74FF 0852      RTAB  MDX  L  RTADC,-1   DECRE DELAY COUNT          30E07390
0869 0 70FD                 MDX     RTAB       BR TO DELAY                30E07400
086A 1 0C00 062E            XIO  L  SNSWS      SENSE CONSOLE SW           30E07410
086C 0 C0E3                 LD      RTASW      SWITCH SETTING             30E07420
```



```
086D 1 4C20 0872           BSC  L  RTAC,Z     BR IF SWS SET               30E07430
086F 1 7401 0851           MDX  L  RTAPC,+1   UPDATE PASS COUNT           30E07440
0871 0 C0DF                LD      RTAPC      LOAD NEW DELAY FACTOR       30E07450
0872 0 D0DF           RTAC STO     RTADC      STORE DELAY FACTOR          30E07460
0873 0 70E8                MDX     RTAA       BR TO READ NXT CD           30E07470
                      *                                                  30E07480
                      *-------------------------------------------------30E07490
                      ***************************************************30E07500
                      *****        SERVICE SUBROUTINES        *****      30E07510
                      ***************************************************30E07520
                      *-------------------------------------------------30E07530
                      *                                                  30E07540
                      *                                                  30E07550
                      ***************************************************30E07560
                      *           INITIALIZE 1442 SUBROUTINE            30E07570
                      ***************************************************30E07580
                      *                                                  30E07590
                      *           THIS SUBROUTINE INITIALIZES THE       30E07600
                      *           1442 PRIOR TO STARTING ANY ROUTINE    30E07610
                      *           AND TYPES A LOAD BLANKS MESSAGE       30E07620
                      *-------------------------------------------------30E07630
                      *                                                  30E07640
                      *                                                  30E07650
0874 0 0000           WTCNT DC       *-*                                 30E07660
0875 0 0000           K0000 DC       /0000                               30E07670
0876 0 0001           K0001 DC       /0001                               30E07680
                      *                                                  30E07690
0877 0 0000           INPCH DC       *-*                                 30E07700
0878 0 6500 1442            LDX  L1 /1442      MACH TYPE                   30E07710
087A 1 6D00 0AEE            STX  L1 MACH                                   30E07720
087C 0 6101                 LDX     1 1        MSG NO.                     30E07730
087D 0 6600 0100            LDX  L2 /0100      NO DATA                     30E07740
087F 1 6700 0B50            LDX  L3 ALDMR      LOAD AND MAKE RDY MSG       30E07750
0881 1 4400 0AEF            BSI  L  TYPE                                   30E07760
0883 0 1010                 SLA     16                                     30E07770
0884 1 D400 0AE7            STO  L  WAS4                                   30E07780
0886 1 0C00 0628      INRST XIO  L  SNS1       RESET UNSERVICED INT        30E07790
0888 0 6500 3000      INWAT LDX  L1 /3000      TIMING CONST                30E07800
088A 1 6D00 08FB            STX  L1 IWTCT      FOR TIMING LOOP             30E07810
088C 1 0C00 0628      WATFR XIO  L  SNS1       GET DSW                     30E07820
088E 1 D400 0AE8            STO  L  WAS1                                   30E07830
0890 0 1000                 NOP                USE FOR TRAP                30E07840
0891 1 4C98 0877            BSC  I  INPCH,+-   BR IF RDY AND NORMAL        30E07850
0893 1 E400 0658            AND  L  KFFFE                                  30E07860
0895 1 4C20 089F            BSC  L  DSWEI,Z    BR IF DSW INCORRECT         30E07870
0897 1 4C80 0877            BSC  I  INPCH                                  30E07880
0899 1 6500 088C      IRDYR LDX  L1 WATFR      SET RETURN POONT            30E07890
089B 1 6D00 05E6            STX  L1 MLSCF+1                                30E07900
089D 1 4C00 06AD            BSC  L  WAIT4      CHK SW1 + RET TO MONITOR    30E07910
                      *                                                  30E07920
089F 1 C400 0AE8      DSWEI LD   L  WAS1       INCORRECT DSW               30E07930
08A1 1 4C04 08B5            BSC  L  RDYER,E    BR IN NRDY BIT ON           30E07940
08A3 0 C0D2                 LD      K0001                                  30E07950
08A4 1 D400 0AEA            STO  L  O2BE       SHOULD BE                   30E07960
08A6 1 74FF 08FB      INMSG MDX  L  IWTCT,-1   DECRE COUNT                 30E07970
08A8 0 70F0                 MDX     IRDYR      BR TO MON                   30E07980
08A9 0 6105                 LDX     1 5        MSG NO                      30E07990
08AA 0 6600 0114            LDX  L2 /0114      WAS---O2BE                  30E08000
08AC 1 6700 0B17            LDX  L3 AINIT      INITIALIZING                30E08010
08AE 1 6F00 0AE5            STX  L3 ALPH2                                  30E08020
08B0 1 6700 0B0D            LDX  L3 ADSWE      DSW ERROR                   30E08030
08B2 1 4400 0ACC            BSI  L  ETYPE      TYPE ERROR MSG              30E08040
08B4 0 70D1                 MDX     INRST      BR TO RESET AND TRY AGN     30E08050
08B5 0 C0BF           RDYER LD       K0000                               30E08060
08B6 1 D400 0AEA            STO  L  O2BE       SHOULD BE                   30E08070
08B8 0 70ED                 MDX     INMSG                                  30E08080
                      *                                                  30E08090
                      ***************************************************30E08100
```

```
                          *              INITIALIZE 2501 SUBROUTINE              30E08110
                          ****************************************************** 30E08120
                          *                                                      30E08130
                          *              THIS ROUTINE INITIALIZES THE            30E08140
                          *              2501 PRIOR TO STARTING ANY ROUTINE      30E08150
                          *----------------------------------------------------- 30E08150
                          *                                                      30E08170
                          *                                                      30E08180
08B9 1 088A               INRDR DC    *- *                                       30E08190
08BA 0 6500 2501                LDX L1 /2501       MACH TYPE                     30E08200
08BC 1 6D00 0AEE                STX L1 MACH                                      30E08210
08BE 0 6101                     LDX  1 1           MSG NO                        30E08220
08BF 0 6600 0100                LDX L2 /0100       DATA ID                       30E08230
08C1 1 6700 0850                LDX L3 ALDMR       LOAD MSG                      30E08240
08C3 1 4400 0AEF                BSI L  TYPE                                      30E08250
                          *                                                      30E08260
08C5 0 1010                     SLA    16                                        30E08270
08C6 1 D400 0AE7                STO L  WAS4                                      30E08280
08C8 1 0C00 062A          RINRS XIO L  SNS2        RESET UNSERVICED INT          30E08290
08CA 0 6500 3000          RINWA LDX L1 /3000       TIMING CINST                  30E08300
08CC 1 6D00 08FB                STX L1 IWTCT       FOR TIMING LOOP               30E08310
                          *                                                      30E08320
08CE 1 0C00 062A          RWATF XIO L  SNS2        GET DSW                       30E08330
08D0 1 D400 0AE8                STO L  WASI                                      30E08340
08D2 0 1000                     NOP                USE FOR TRAP                  30E08350
08D3 1 4C98 08B9                BSC I  INRDR,+-    BR IF RDY AND NORMAL          30E08360
                          *                                                      30E08370
08D5 1 E400 0679                AND L  KEFFE       REMOVE L/C AND NRDY BITS      30E08380
08D7 1 4C20 08DB                BSC L  RDSWE,Z     BR IF DSW ERROR               30E08390
08D9 1 4C80 08B9                BSC I  INRDR       RETURN TO TEST ROUTINE        30E08400
08DB 1 C400 0AE8          RDSWE LD  L  WASI        GET ERROR DSW                 30E08410
08DD 1 4C04 08F1                BSC L  RRDYE,E     ERROR AND NRDY                30E08420
08DF 0 C096                     LD     K0001       PROPER DSW                    30E08430
08E0 1 D400 0AEA                STO L  02BE                                      30E08440
08E2 1 74FF 08FB          RINMS MDX L  IWTCT,-1    DEC COUNT                     30E08450
08E4 0 7010                     MDX    RIRDY                                     30E08460
08E5 0 6105                     LDX  1 5           MSG NO                        30E08470
08E6 0 6600 0114                LDX L2 /0114       DATA ID                       30E08480
08E8 1 6700 0B17                LDX L3 AINIT       INUTIALIZING                  30E08490
08EA 1 6F00 0AE5                STX L3 ALPH2                                     30E08500
08EC 1 6700 0B0D                LDX L3 ADSWE       DSW ERROR                     30E08510
08EE 1 4400 0ACC                BSI L  ETYPE                                     30E08520
                          *                                                      30E08530
08F0 0 70D7                     MDX    RINRS       TRY TO RESET AGAIN            30E08540
                          *                                                      30E08550
08F1 0 C083               RRDYE LD     K0000       READY DSW                     30E08560
08F2 1 D400 0AEA                STO L  02BE                                      30E08570
08F4 0 70ED                     MDX    RINMS                                     30E08580
                          *                                                      30E08590
08F5 1 6500 08CE          RIRDY LDX L1 RWATF       RETURN POINT                  30E08600
08F7 1 6D00 05E6                STX L1 MLSCF+1                                   30E08610
08F9 1 4C00 06AD                BSC L  WAIT4       CHK SW1 + RET TO MONITOR      30E08620
                          *                                                      30E08630
                          ****************************************************   30E08640
                          *              CHECK STATUS 1442 SUBROUTINE            30E08650
                          ****************************************************** 30E08660
                          *                                                      30E08670
                          *              THIS SUBROUTINE CHECKS FOR NRDY         30E08680
                          *              OR LAST CARD ON THE 1442. IF L/C,       30E08690
                          *              GO TO CONTROL FOR NEXT ROUTINE.         30E08700
                          *----------------------------------------------------- 30E08710
                          *                                                      30E08720
                          *                                                      30E08730
08FB 0 0000               IWTCT DC     *-*         WAIT LOOP COUNTER             30E08740
                          *                                                      30E08750
08FC 0 0000               CHK14 DC     *-*                                       30E08760
08FD 0 6500 1442                LDX L1 /1442       MACH TYPE                     30E08770
08FF 1 6D00 0AEE                STX L1 MACH                                      30E08780
```



```
0901 1 C400 0AE7                LD  L  WAS4        LAST OP COMP DSW              30E08790
0903 0 1003                     SLA    3           CHECK LAST CARD               30E08800
0904 1 4C10 0911                BSC L  CHRDY,-     BR IF NOT LAST CARD           30E08810
0906 1 0C00 0622                XIO L  FDACD       FEED LAST CARD OUT            30E08820
0908 0 6103                     LDX  1 3           MSG NO                        30E08830
0909 0 6600 0100                LDX L2 /0100       DATA ID                       30E08840
090B 1 6700 0AFA                LDX L3 ALCD        LAST CARD                     30E08850
090D 1 4400 0AEF                BSI L  TYPE                                      30E08860
090F 1 4400 05FA                BSI L  CNTRL       TO ROUTINE CONTROL            30E08870
0911 0 6500 3000          CHRDY LDX L1 /3000                                     30E08880
0913 1 6D00 08FB                STX L1 IWTCT       FOR TIMING LOOP               30E08890
0915 1 0C00 0628          CRDYL XIO L  SNS1        SENSE DSW                     30E08900
0917 1 4C04 091B                BSC L  CWTFR,E     BR IF NOT READY               30E08910
0919 1 4C80 08FC                BSC I  CHK14       RETURN IF READY               30E08920
                          *                                                      30E08930
                          *            TIMING LOOP FOR NOT READY                 30E08940
091B 1 74FF 08FB          CWTFR MDX L  IWTCT,-1    DECREMENT COUNT               30E08950
091D 0 7009                     MDX    CRDYR       LOOP UNTIL TIMEOUT            30E08960
091E 0 6102                     LDX  1 2           MSG NO                        30E08970
091F 0 6600 0100                LDX L2 /0100       DATA ID                       30E08980
0921 1 6700 0B00                LDX L3 ANRDY       NOT READY                     30E08990
0923 1 4400 0AEF                BSI L  TYPE                                      30E09000
0925 1 4C00 0911                BSC L  CHRDY                                     30E09010
                          *                                                      30E09020
0927 1 6500 0915          CRDYR LDX L1 CRDYL       SET RETURNTO MONITOR          30E09030
0929 1 6D00 05E6                STX L1 MLSCF+1                                   30E09040
092B 1 4C00 06AD                BSC L  WAIT4       CHK SW1 + RET TO MONITOR      30E09050
                          *                                                      30E09060
                          ****************************************************** 30E09070
                          *              CHECK STATUS 2501 SUBROUTINE            30E09080
                          ****************************************************** 30E09090
                          *                                                      30E09100
                          *              THIS SUBROUTINE CHECKS FOR NRDY OR      30E09110
                          *              LAST CARD ON THE 2501. IF L/C, IT       30E09120
                          *              LINKS TO THE CONTROL ROUTINE            30E09130
                          *----------------------------------------------------- 30E09140
                          *                                                      30E09150
                          *                                                      30E09160
092D 0 0000               CHK25 DC     *-*                                       30E09170
092E 0 6500 2501                LDX L1 /2501       MACH TYPE                     30E09180
0930 1 6D00 0AEE                STX L1 MACH                                      30E09190
0932 1 C400 0AE7                LD  L  WAS4                                      30E09200
0934 0 1003                     SLA    3           CHECK FOR LAST CARD           30E09210
0935 1 4C10 0940                BSC L  RCHRD,-     BR IF NOT LAST CARD           30E09220
0937 0 6103                     LDX  1 3           MSG NO                        30E09230
0938 0 6600 0100                LDX L2 /0100       DATA ID                       30E09240
093A 1 6700 0AFA                LDX L3 ALCD        LAST CARD                     30E09250
093C 1 4400 0AEF                BSI L  TYPE                                      30E09260
                          *                                                      30E09270
093E 1 4400 05FA                BSI L  CNTRL       RETURN TO SEQ CONTROL         30E09280
                          *                                                      30E09290
0940 0 6500 3000          RCHRD LDX L1 /3000                                     30E09300
0942 1 6D00 08FB                STX L1 IWTCT       FOR TIMING LOOP               30E09310
0944 1 0C00 062A          RCRDY XIO L  SNS2        SENSE 2501 DSW                30E09320
0946 1 4C04 094A                BSC L  RCWTF,E     BR IF NOT READY               30E09330
0948 1 4C80 092D                BSC I  CHK25       RETURN TO TEST ROUTINE        30E09340
                          *                                                      30E09350
094A 1 74FF 08FB          RCWTF MDX L  IWTCT,-1    DECREMENT COUNT               30E09360
094C 0 7008                     MDX    RCRYR                                     30E09370
094D 0 6102                     LDX  1 2           MSG NO                        30E09380
094E 0 6600 0100                LDX L2 /0100       DATA ID                       30E09390
0950 1 6700 0B00                LDX L3 ANRDY       NRDY                          30E09400
0952 1 4400 0AEF                BSI L  TYPE                                      3CE09410
                          *                                                      30E09420
0954 0 70EB                     MDX    RCHRD       TRY AGAIN                     30E09430
0955 1 6500 0944          RCRYR LDX L1 RCRDY       SET RETURN POINT              30E09440
0957 1 6D00 05E6                STX L1 MLSCF+1                                   30E09450
0959 1 4C00 06AD                BSC L  WAIT4       CHK SW1 + RET TO MONITOR      30E09460
```

```
                         *
                         ***********************************************
                         *                PUNCH A CARD ROUTINE
                         ***********************************************
                         *
                         *                THIS SUBROUTINE PUNCHES A CARD
                         *                AND CHECKS THAT THE PROPER NUMBER OF
                         *                COLUMNS WERE PUNCHED
                         *------------------------------------------------
                         *
                         *
095B 0 0000              PBGAD DC       *-*         BEGINNING ADDRESS
095C 1 0A29              TERAD DC       WAREA       TERMINATOR ADDRESS
095D 0 0000              PNCH  DC       *-*
095E 0 6500 1442               LDX  L1 /1442        MACH TYPE
0960 1 6D00 0AEE               STX  L1 MACH
0962 1 C480 095D               LD   I  PNCH         GET START ADDRESS
0964 1 D400 0626               STO  L  PUNCH        PLACE IN IOCC
0966 0 D0F4                    STO     PBGAD        BEGINNING ADDRESS
0967 1 7401 095D               MDX  L  PNCH,+1
0969 1 8480 095D               A    I  PNCH         ADD NO OF COLS
096B 1 9400 0876               S    L  K0001
096D 0 D0EE                    STO     TERAD        NEW ADDRESS
096E 1 7401 095D               MDX  L  PNCH,+1
                         *
0970 1 C480 095C               LD   I  TERAD        FETCH TERM CHAR
0972 1 EC00 0657               OR   L  K0008        APPLY TERM BIT
0974 1 D480 095C               STO  I  TERAD
                         *
0976 1 0C00 0624               XIO  L  PCHST        START PUNCH
0978 1 4400 069C               BSI  L  WAIT         WAIT FOR OP COMP
                         *
097A 1 74FF 0626               MDX  L  PUNCH,-1     TO LAST CHAR PUNCHED
097C 1 C480 095C               LD   I  TERAD        LOAD PROPER LAST CHAR
097E 1 F480 0626               EOR  I  PUNCH
0980 1 4C20 098C               BSC  L  PUNEN,Z      BR IF UNUSUAL END
0982 1 7401 095D               MDX  L  PNCH,+1      TO NORMAL RETURN
0984 1 C480 095C         PRTN  LD   I  TERAD
0986 1 E400 0656               AND  L  KFFF7        REMOVE PREVIOUS
0988 1 D480 095C               STO  I  TERAD        TERMINATOR
098A 1 4C80 095D               BSC  I  PNCH         RETURN
                         *
098C 1 C480 095D         PUNEN LD   I  PNCH         NO OF COLUMNS
098E 1 D400 0AED               STO  L  COLCT        COL COUNT SHOULD BE
0990 1 C400 0626               LD   L  PUNCH        LAST ADDRESSS
0992 0 90C8                    S       PBGAD        BEGIN ADDR
0993 1 8400 0876               A    L  K0001
0995 1 D400 0AEB               STO  L  COL          COL COUNT WAS
0997 0 6106                    LDX   1 6            MSG NO
0998 0 6600 01A0               LDX  L2 /01A0        DATA ID
099A 1 6700 0B3D               LDX  L3 ACCER        COL COUNT ERROR
099C 1 4400 0ACC               BSI  L  ETYPE
099E 0 70E5                    MDX     PRTN
                         *
                         ************************************************
                         *                READ A CARD ROUTINE
                         ***********************************************
                         *
                         *                THIS ROUTINE READS A CARD INTO
                         *                THE READ AREA.
                         *------------------------------------------------
                         *
                         *
099F 0 0000              RAREA DC       *-*         WORD COUNT
09A0   0050                    BSS      80          AREA
09F0 0 0001                    DC       /0001       TERMINATOR FOR LENGTH
09F1 0 0000              RDACD DC       *-*         RETURN ADDR
09F2 0 6500 2501               LDX  L1 /2501        MACH TYPE
```



```
09F4 1 6D00 0AEE               STX  L1 MACH
09F6 1 C400 0876               LD   L  K0001        TO CLEAR READ AREA TO
09F8 0 6150                    LDX   1 80           ALL TERMINATORS
09F9 1 D500 099F         RDACR STO  L1 RAREA
09FB 0 71FF                    MDX   1 -1
09FC 0 70FC                    MDX     RDACR
09FD 1 C480 09F1               LD   I  RDACD        FETCH NO OF COLS
09FF 1 D400 099F               STO  L  RAREA        STO AT WORD COUNT
0A01 1 7401 09F1               MDX  L  RDACD,+1     TO RETURN
0A03 1 0C00 062C               XIO  L  IREAD        INITIATE READ
0A05 1 4400 069C               BSI  L  WAIT         WAIT FOR OP COMP
                         **            CHECK FOR UNUSUAL END
0A07 1 6580 099F               LDX  I1 RAREA        ADDR OF LAXT CHAR
0A09 1 C500 099F               LD   L1 RAREA        LOAD LAST CHAR
0A0B 1 4C04 0A12               BSC  L  RUNEN,E      BR IF TERM STILL THERE
0A0D 0 7101                    MDX   1 +1           TO NEXT CHAR
0A0E 1 C500 099F               LD   L1 RAREA        POSITION AFTER LAST CHAR
0A10 1 4C84 09F1               BSC  I  RDACD,E      BR IF TERM NOT THERE
0A12 1 6580 099F         RUNEN LDX  I1 RAREA        NO OF COLUMNS
0A14 1 6D00 0AED               STX  L1 COLCT        SHOULD BE
0A16 0 6150                    LDX   1 80
0A17 1 C500 099F         RELD  LD   L1 RAREA        FIND LAST CHAR READ
0A19 1 4C04 0A26               BSC  L  RERFN,E      BR IF NOT LAST CHAR
0A1B 1 6D00 0AEB         RENON STX  L1 COL          COL COUNT WAS
0A1D 0 6107                    LDX   1 7            MSG NO
0A1E 0 6600 01A0               LDX  L2 /01A0        DATA ID
0A20 1 6700 0B3D               LDX  L3 ACCER        C08 COUNT ERROR
0A22 1 4400 0ACC               BSI  L  ETYPE
0A24 1 4C80 09F1               BSC  I  RDACD        RETURN TO TEST ROUTINE
                         *
0A26 0 71FF              RERFN MDX   1 -1
0A27 0 70EF                    MDX     RELD
0A28 0 70F2                    MDX     RENON
                         *
                         ***********************************************
                         *****            WRITE AREA FOR PUNCH
                         ***********************************************
                         *
0A29 0 8010              WAREA DC       /8010       COLUMN 1
0A2A 0 4020                    DC       /4020
0A2B 0 2040                    DC       /2040
0A2C 0 1080                    DC       /1080
0A2D 0 0900                    DC       /0900
0A2E 0 0600                    DC       /0600
0A2F 0 0600                    DC       /0600
0A30 0 0900                    DC       /0900
0A31 0 1080                    DC       /1080
0A32 0 2040                    DC       /2040
0A33 0 4020                    DC       /4020
0A34 0 8010                    DC       /8010
0A35 0 FFF7                    DC       /FFF7
0A36 0 8880                    DC       /8880
0A37 0 CCC0                    DC       /CCC0
0A38 0 EEE0                    DC       /EEE0
0A39 0 FFF0                    DC       /FFF0
0A3A 0 7777                    DC       /7777
0A3B 0 3333                    DC       /3333
0A3C 0 1111                    DC       /1111
0A3D 0 FFF7                    DC       /FFF7       COL 21
0A3E 0 A000                    DC       /A000
0A3F 0 9000                    DC       /9000       ALPHA RIPPLE
0A40 0 8800                    DC       /8800
0A41 0 8400                    DC       /8400
0A42 0 8200                    DC       /8200       COL 26
0A43 0 8100                    DC       /8100
0A44 0 8080                    DC       /8080
0A45 0 8040                    DC       /8040
0A46 0 8020                    DC       /8020
```

```
0A47 0 8010          DC    /8010                          30E10830
0A48 0 5000          DC    /5000                          30E10840
0A49 0 4800          DC    /4800                          30E10850
0A4A 0 4400          DC    /4400                          30E10860
0A4B 0 4200          DC    /4200                          30E10870
0A4C 0 4100          DC    /4100                          30E10880
0A4D 0 4080          DC    /4080                          30E10890
0A4E 0 4040          DC    /4040                          30E10900
0A4F 0 4020          DC    /4020                          30E10910
0A50 0 4010          DC    /4010    COL 40 WAREA+39       30E10920
0A51 0 3000          DC    /3000                          30E10930
0A52 0 2800          DC    /2800                          30E10940
0A53 0 2400          DC    /2400                          30E10950
0A54 0 2200          DC    /2200                          30E10960
0A55 0 2100          DC    /2100                          30E10970
0A56 0 2080          DC    /2080                          30E10980
0A57 0 2040          DC    /2040                          30E10990
0A58 0 2020          DC    /2020                          30E11000
0A59 0 2010          DC    /2010                          30E11010
0A5A 0 0000          DC    /0000                          30E11020
0A5B 0 FC00          DC    /FC00                          30E11030
0A5C 0 03F0          DC    /03F0                          30E11040
0A5D 0 FC00          DC    /FC00                          30E11050
0A5E 0 03F0          DC    /03F0                          30E11060
0A5F 0 0000          DC    /0000                          30E11070
0A60 0 8887          DC    /8887                          30E11080
0A61 0 4444          DC    /4444                          30E11090
0A62 0 2222          DC    /2222                          30E11100
0A63 0 1111          DC    /1111                          30E11110
0A64 0 0007          DC    /0007                          30E11120
0A65 0 8880          DC    /8880                          30E11130
0A66 0 CCC4          DC    /CCC4                          30E11140
0A67 0 AAA2          DC    /AAA2                          30E11150
0A68 0 9991          DC    /9991                          30E11160
0A69 0 4444          DC    /4444                          30E11170
0A6A 0 6666          DC    /6666                          30E11180
0A6B 0 5555          DC    /5555                          30E11190
0A6C 0 2222          DC    /2222                          30E11200
0A6D 0 3333          DC    /3333                          30E11210
0A6E 0 1111          DC    /1111                          30E11220
0A6F 0 0005          DC    /0005    CHECK PCH TERM        30E11230
0A70 0 0006          DC    /0006                          30E11240
0A71 0 FFF7          DC    /FFF7                          30E11250
0A72 0 FFF7          DC    /FFF7                          30E11260
0A73 0 FFF7          DC    /FFF7                          30E11270
0A74 0 FFF0          DC    /FFF0                          30E11280
0A75 0 FFF0          DC    /FFF0                          30E11290
0A76 0 FFF0          DC    /FFF0                          30E11300
0A77 0 FFF0          DC    /FFF0                          30E11310
0A78 0 0000          DC    /0000                          30E11320
0A79 0 8010    WARA2 DC    /8010    COL 1                 30E11330
0A7A 0 4020          DC    /4020                          30E11340
0A7B 0 2040          DC    /2040                          30E11350
0A7C 0 1080          DC    /1080                          30E11360
0A7D 0 0900          DC    /0900                          30E11370
0A7E 0 0600          DC    /0600                          30E11380
0A7F 0 0600          DC    /0600                          30E11390
0A80 0 0900          DC    /0900                          30E11400
0A81 0 1080          DC    /1080                          30E11410
0A82 0 2040          DC    /2040                          30E11420
0A83 0 4020          DC    /4020                          30E11430
0A84 0 8010          DC    /8010                          30E11440
0A85 0 FFF7          DC    /FFF7                          30E11450
0A86 0 8880          DC    /8880                          30E11460
0A87 0 CCC0          DC    /CCC0                          30E11470
0A88 0 EEE0          DC    /EEE0                          30E11480
0A89 0 FFF0          DC    /FFF0                          30E11490
0A8A 0 7777          DC    /7777                          30E11500
```



```
0A8B 0 3333          DC    /3333                          30E11510
0A8C 0 1111          DC    /1111                          30E11520
0A8D 0 FFF7          DC    /FFF7    COL 21                30E11530
0A8E 0 A000          DC    /A000                          30E11540
0A8F 0 9000          DC    /9000    ALPHA RIPPLE          30E11550
0A90 0 8800          DC    /8800                          30E11560
0A91 0 8400          DC    /8400                          30E11570
0A92 0 8200          DC    /8200    COL 26                30E11580
0A93 0 8100          DC    /8100                          30E11590
0A94 0 8080          DC    /8080                          30E11600
0A95 0 8040          DC    /8040                          30E11610
0A96 0 8020          DC    /8020                          30E11620
0A97 0 8010          DC    /8010                          30E11630
0A98 0 5000          DC    /5000                          30E11640
0A99 0 4800          DC    /4800                          30E11650
0A9A 0 4400          DC    /4400                          30E11660
0A9B 0 4200          DC    /4200                          30E11670
0A9C 0 4100          DC    /4100                          30E11680
0A9D 0 4080          DC    /4080                          30E11690
0A9E 0 4040          DC    /4040                          30E11700
0A9F 0 4020          DC    /4020                          30E11710
0AA0 0 4010          DC    /4010    COL 40 WAREA+39       30E11720
0AA1 0 3000          DC    /3000                          30E11730
0AA2 0 2800          DC    /2800                          30E11740
0AA3 0 2400          DC    /2400                          30E11750
0AA4 0 2200          DC    /2200                          30E11760
0AA5 0 2100          DC    /2100                          30E11770
0AA6 0 2080          DC    /2080                          30E11780
0AA7 0 2040          DC    /2040                          30E11790
0AA8 0 2020          DC    /2020                          30E11800
0AA9 0 2010          DC    /2010                          30E11810
0AAA 0 0000          DC    /0000                          30E11820
0AAB 0 FC00          DC    /FC00                          30E11830
0AAC 0 03F0          DC    /03F0                          30E11840
0AAD 0 FC00          DC    /FC00                          30E11850
0AAE 0 03F0          DC    /03F0                          30E11860
0AAF 0 0000          DC    /0000                          30E11870
0AB0 0 8887          DC    /8887                          30E11880
0AB1 0 4444          DC    /4444                          30E11890
0AB2 0 2222          DC    /2222                          30E11900
0AB3 0 1111          DC    /1111                          30E11910
0AB4 0 0007          DC    /0007                          30E11920
0AB5 0 8880          DC    /8880                          30E11930
0AB6 0 CCC4          DC    /CCC4                          30E11940
0AB7 0 AAA2          DC    /AAA2                          30E11950
0AB8 0 9991          DC    /9991                          30E11960
0AB9 0 4444          DC    /4444                          30E11970
0ABA 0 6666          DC    /6666                          30E11980
0ABB 0 5555          DC    /5555                          30E11990
0ABC 0 2222          DC    /2222                          30E12000
0ABD 0 3333          DC    /3333                          30E12010
0ABE 0 1111          DC    /1111                          30E12020
0ABF 0 0005          DC    /0005    CHECK PCH TERM        30E12030
0AC0 0 0006          DC    /0006                          30E12040
0AC1 0 FFF7          DC    /FFF7                          30E12050
0AC2 0 FFF7          DC    /FFF7                          30E12060
0AC3 0 FFF7          DC    /FFF7                          30E12070
0AC4 0 FFF0          DC    /FFF0                          30E12080
0AC5 0 FFF0          DC    /FFF0                          30E12090
0AC6 0 FFF0          DC    /FFF0                          30E12100
0AC7 0 FFF0          DC    /FFF0                          30E12110
0AC8 0 0000    COL80 DC    /0000                          30E12120
                     *                                    30E12130
0AC9 1 0AC8    WAREN DC    COL80                          30E12140
                     *                                    30E12150
                     ***************************************30E12160
                     *          MESSAGE OUT SUBROUTINE     30E12170
                     *************************************** 30E12180
```

```
                           *                                                  30E12190
                           *          THIS ROUTINE HANDLES LOG AND            30E12200
                           *          ERROR MESSAGES. LINKAGE TO EITHER       30E12210
                           *          ROUTINE VIA BSI WITH MESSAGE NUM        30E12220
                           *          IN XR1, DATA ID WORD IN XR2, AND        30E12230
                           *          ALPHA1 ADDRESS IN XR3. IF ALPHA2        30E12240
                           *          ADDRESS IS REQUIRES, IT MUST BE         30E12250
                           *          SET UP IN MAINLINE.                     30E12260
                           *--------------------------------------------------30E12270
                           *                                                  30E12280
                           *                                                  30E12290
OACA 0 8000                K8000 DC      /8000                                30E12300
OACB 0 0000                LN1SW DC      *-*        FIRST LINE SWITCH         30E12310
                           *                                                  30E12320
OACC 0 0000                ETYPE DC      *-*                                  30E12330
OACD 0 6913                      STX   1 MSGNO                                30E12340
OACE 0 6A14                      STX   2 DATID                                30E12350
OACF 0 6B14                      STX   3 ALPH1                                30E12360
OAD0 1 7400 OACB                 MDX  L  LN1SW,0    SKIP IF FIRST LINE        30E12370
OAD2 0 7008                      MDX     ETYP2      BR IF 2ND LINE            30E12380
OAD3 0 4480 0162           ETYP3 BSI  I  ERROR                                30E12390
OAD5 1 OAE1                      DC      MSGNO                                30E12400
OAD6 0 0000                REPT3 DC      *-*        LOOP ADDRESS              30E12410
OAD7 0 1010                      SLA     16         CLEAR ALPH2               30E12420
OAD8 0 D00C                      STO     ALPH2      FOR NEXT MAG              30E12430
OAD9 1 4C80 OACC                 BSC  I  ETYPE                                30E12440
                           *                                                  30E12450
OADB 0 C007                ETYP2 LD      DATID      FOR 2ND LINE              30E12460
OADC 0 E8ED                      OR      K8000      ADD MULT LINE BIT         30E12470
OADD 0 D005                      STO     DATID                                30E12480
OADE 0 1010                      SLA     16                                   30E12490
OADF 0 D004                      STO     ALPH1      CLEAR HEADING             30E12500
OAE0 0 70F2                      MDX     ETYP3                                30E12510
                           *                                                  30E12520
                           *--------------------------------------------------30E12530
                           *          MESSAGE AREA                            30E12540
                           *--------------------------------------------------30E12550
                           *                                                  30E12560
OAE1 0 0000                MSGNO DC      *-*        MESSAGE NUMBER            30E12570
OAE2 0 00E0                      DC      /00E0      HEX-DEC SWITCH            30E12580
OAE3 0 0000                DATID DC      *-*        DATA ID                   30E12590
OAE4 0 0000                ALPH1 DC      *-*        ALPHA ADDRESS 1           30E12600
OAE5 0 0000                ALPH2 DC      *-*        ALPHA ADRESS 2            30E12610
OAE6 0 0000                WASO  DC      *-*        DSW LEVEL 0 WAS           30E12620
OAE7 0 0000                WAS4  DC      *-*        DSW LEVEL 4 WAS           30E12630
OAE8 0 0000                WASI  DC      *-*        DSW INITIALLY WAS         30E12640
OAE9 0 0000                WASD  DC      *-*        DATA WAS                  30E12650
OAEA 0 0000                O2BE  DC      *-*        DSW SHOULD BE             30E12660
OAEB 0 0000                COL   DC      *-*        ERROR COLUMN              30E12670
OAEC 0 0000                WDCNT DC      *-*        WORD COUNT                30E12680
OAED 0 0000                COLCT DC      *-*        COLUMN COUNT S/B          30E12690
OAEE 0 0000                MACH  DC      *-*        MACHINE TYPE              30E12700
                           *                                                  30E12710
                           *                                                  30E12720
OAEF 0 0000                TYPE  DC      *-*                                  30E12730
OAF0 0 69F0                      STX   1 MSGNO                                30E12740
OAF1 0 6AF1                      STX   2 DATID                                30E12750
OAF2 0 6BF1                      STX   3 ALPH1                                30E12760
OAF3 0 4480 0163                 BSI  I  LOG                                  30E12770
OAF5 1 OAE1                      DC      MSGNO                                30E12780
OAF6 0 1010                      SLA     16                                   30E12790
OAF7 0 D0ED                      STO     ALPH2                                30E12800
OAF8 1 4C80 OAEF                 BSC  I  TYPE                                 30E12810
                           *                                                  30E12820
                           ********************************************       30E12830
                           *****          MESSAGE AREA *****************      30E12840
                           ********************************************       30E12850
                           *                                                  30E12860
```



```
                           *                                                  30E12870
OAFA 0 5E3E                ALCD  DC      /5E3E      LAST CARD                 30E12880
OAFB 0 9A9E                      DC      /9A9E      ST                        30E12890
OAFC 0 211E                      DC      /211E       C                        30E12900
OAFD 0 3E62                      DC      /3E62      AR                        30E12910
OAFE 0 3221                      DC      /3221      D                         30E12920
OAFF 0 FFFF                      DC      /FFFF                                30E12930
                           *                                                  30E12940
                           *                                                  30E12950
0B00 0 7662                ANRDY DC      /7662      NRDY                      30E12960
0B01 0 32A6                      DC      /32A6      DY                        30E12970
0B02 0 FFFF                      DC      /FFFF                                30E12980
                           *                                                  30E12990
0B03 0 5E36                ALVL4 DC      /5E36      LEVEL 4                   30E13000
0B04 0 B636                      DC      /B636      VE                        30E13010
0BC5 0 5E21                      DC      /5E21      L                         30E13020
0B06 0 F000                      DC      /F000      4                         30E13030
0B07 0 FFFF                      DC      /FFFF                                30E13040
                           *                                                  30E13050
0B08 0 5E36                ALVLO DC      /5E36      LEVEL 0                   30E13060
0B09 0 B636                      DC      /B636      VE                        30E13070
0B0A 0 5E21                      DC      /5E21      L                         30E13080
0B0B 0 C400                      DC      /C400      0                         30E13090
0B0C 0 FFFF                      DC      /FFFF                                30E13100
                           *                                                  30E13110
0B0D 0 923E                ADSWE DC      /923E      WAS  S/B  DSW ERR         30E13120
0B0E 0 9A21                      DC      /9A21      S                         30E13130
0B0F 0 219A                      DC      /219A       S                        30E13140
0B10 0 BC1A                      DC      /BC1A      /B                        30E13150
0B11 0 2121                      DC      /2121                                30E13160
0B12 0 329A                      DC      /329A      DS                        30E13170
0B13 0 9221                      DC      /9221      W                         30E13180
0B14 0 3662                      DC      /3662      ER                        30E13190
0B15 0 6200                      DC      /6200      R                         30E13200
0B16 0 FFFF                      DC      /FFFF                                30E13210
                           *                                                  30E13220
0B17 0 2276                AINIT DC      /2276      INITIALIZING              30E13230
0B18 0 229E                      DC      /229E      IT                        30E13240
0B19 0 223E                      DC      /223E      IA                        30E13250
0B1A 0 5E22                      DC      /5E22      LI                        30E13260
0B1B 0 A222                      DC      /A222      ZI                        30E13270
0B1C 0 7616                      DC      /7616      NG                        30E13280
0B1D 0 FFFF                      DC      /FFFF                                30E13290
                           *                                                  30E13300
0B1E 0 923E                ADTAE DC      /923E      WAS  S/B  COL  DATA ERR   30E13310
0B1F 0 9A21                      DC      /9A21      S                         30E13320
0B20 0 219A                      DC      /219A       S                        30E13330
0B21 0 BC1A                      DC      /BC1A      /B                        30E13340
0B22 0 2121                      DC      /2121                                30E13350
0B23 0 1E52                      DC      /1E52      CO                        30E13360
0B24 0 5E21                      DC      /5E21      L                         30E13370
0B25 0 2132                      DC      /2132       D                        30E13380
0B26 0 3E9E                      DC      /3E9E      AT                        30E13390
0B27 0 3E21                      DC      /3E21      A                         30E13400
0B28 0 3662                      DC      /3662      ER                        30E13410
0B29 0 6221                      DC      /6221      R                         30E13420
0B2A 0 FFFF                      DC      /FFFF                                30E13430
                           *                                                  30E13440
0B2B 0 9A36                ASETP DC      /9A36      SET PATT IN SW 0-11       30E13450
0B2C 0 9E21                      DC      /9E21      T                         30E13460
0B2D 0 563E                      DC      /563E      PA                        30E13470
0B2E 0 9E9E                      DC      /9E9E      TT                        30E13480
0B2F 0 2122                      DC      /2122       I                        30E13490
0B30 0 7621                      DC      /7621      N                         30E13500
0B31 0 9A92                      DC      /9A92      SW                        30E13510
0B32 0 21C4                      DC      /21C4       0                        30E13520
0B33 0 84FC                      DC      /84FC      -1                        30E13530
0B34 0 FC21                      DC      /FC21      1                         30E13540
```

```
0B35 0 9E26          DC    /9E26    THEN TN SW 12              30E13550
0B36 0 3676          DC    /3676    EN                         30E13560
0B37 0 219E          DC    /219E     T                         30E13570
0B38 0 7621          DC    /7621    N                          30E13580
0B39 0 9A92          DC    /9A92    SW                         30E13590
0B3A 0 21FC          DC    /21FC     1                         30E13600
0B3B 0 D821          DC    /D821    2                          30E13610
0B3C 0 FFFF          DC    /FFFF                               30E13620
                     *                                         30E13630
0B3D 0 923E  ACCER   DC    /923E    WAS  S/B  COL COUNT ERR    30E13640
0B3E 0 9A21          DC    /9A21    S                          30E13650
0B3F 0 219A          DC    /219A     S                         30E13660
0B40 0 BC1A          DC    /BC1A    /B                         30E13670
0B41 0 2121          DC    /2121                               30E13680
0B42 0 1E52          DC    /1E52    CO                         30E13690
0B43 0 5E21          DC    /5E21    L                          30E13700
0B44 0 1E52          DC    /1E52    CO                         30E13710
0B45 0 B276          DC    /B276    UN                         30E13720
0B46 0 9E21          DC    /9E21    T                          30E13730
0B47 0 3662          DC    /3662    ER                         30E13740
0B48 0 6221          DC    /6221    R                          30E13750
0B49 0 FFFF          DC    /FFFF                               30E13760
                     *                                         30E13770
0B4A 0 7652  ANINT   DC    /7652    NO INTRPT                  30E13780
0B4B 0 2122          DC    /2122     I                         30E13790
0B4C 0 769E          DC    /769E    NT                         30E13800
0B4D 0 6256          DC    /6256    RP                         30E13810
0B4E 0 9E21          DC    /9E21    T                          30E13820
0B4F 0 FFFF          DC    /FFFF                               30E13830
                     *                                         30E13840
0B50 0 5E52  ALDMR   DC    /5E52    LOAD AND MAKE RDY          30E13850
0B51 0 3E32          DC    /3E32    AD                         30E13860
0B52 0 213E          DC    /213E     A                         30E13870
0B53 0 7632          DC    /7632    ND                         30E13880
0B54 0 2172          DC    /2172     M                        30E13890
0B55 0 3E5A          DC    /3E5A    AK                         30E13900
0B56 0 3621          DC    /3621    E                          30E13910
0B57 0 6232          DC    /6232    RD                         30E13920
0B58 0 A621          DC    /A621    Y                          30E13930
0B59 0 FFFF          DC    /FFFF                               30E13940
0B5A   05E8          END   BGIN                                30E13950
 NO ERRORS IN ABOVE ASSEMBLY
```


C R O S S R E F E R E N C E

NAME	VALUE	REFERENCES
ACCER	0B3D	099A,0A20
ADSWE	0B0D	0672,068E,08B0,08EC
ADTAE	0B1E	071D,077F,0814
AINIT	0B17	08AC,08E8
ALCD	0AFA	090B,093A
ALDMR	0B50	087F,08C1
ALPH1	0AE4	0ACF,0ADF,0AF2
ALPH2	0AE5	0670,068C,068C,08AE,08EA,0AD8,0AF7
ALVLO	0B08	068A
ALVL4	0B03	066E,06BA
ANINT	0B4A	06BE
ANRDY	0B00	0921,0950
ASETP	0B2B	0795,07D6
BEGIN	0160	05E8
BGIN	05E8	0B5A
CHK14	08FC	06D2,0746,07B5,082A,0919
CHK25	092D	06F3,0730,073F,0750,075E,07EE,082F,083F,085C,0948
CHRDY	0911	0904,0925
CNTRL	05FA	05F9,06B3,090F,093E
CN10	05FE	
CN20	0605	05FC
CN30	060B	0600
COL	0AEB	070C,070E,077A,080B,0995,0A1B
COLCT	0AED	098E,0A14
COL80	0AC8	0AC9
CRDYL	0915	0927
CRDYR	0927	091D
CWTFR	091B	0917
DATID	0AE3	0ACE,0ADB,0ADD,0AF1
DSWAN	065C	0644,064F
DSWEI	089F	0895
DSWE0	067B	065D,0694
DSW1A	0630	05ED,0630
DSW4A	063F	05F1,0648
DSW4B	064A	05F5,0653
END	0164	0609
ERLCK	0166	
ERROR	0162	0AD3
ETYPE	0ACC	0674,0690,06C0,071F,0781,0816,08B2,08EE,099C,0A22,0AD9
ETYP2	0ADB	0AD2
ETYP3	0AD3	0AE0
EOLCC	0696	067E
EORTN	0692	0699
EOTYP	0680	0698
FDACD	0622	0906
IL0	017A	05EF
IL1	018A	
IL2	019A	
IL3	01AA	
IL4	01BA	05F3,05F7
INMSG	08A6	08B8
INPCH	0877	06C6,0744,078D,0826,0891,0897
INRDR	08B9	06E4,072C,073D,074E,07CE,0824,083D,0853,08D3,08D9
INRST	0886	08B4
INWAT	0888	
IRDYR	0899	08A8
IREAD	062C	085E,0A03
IWTCT	08FB	088A,08A6,08CC,08E2,0913,091B,0942,094A
KEFFE	0679	0664,08D5
KFFFE	0658	0893
KFFF8	0659	06FE,0768
KFFF7	0656	07AE,0801,0986
K0000	0875	08B5,08F1
K0001	0876	08A3,08DF,096B,0993,09F6
K0008	0657	0972
K0050	065A	0736

```
WAIT4   06AD  06A4,089D,08F9,092B,0959
WAIT5   06B7  06AC
WARA2   0A79  06C9,06E2,06E7,0847
WAREA   0A29  0626,06CB,06CF,06E9,06ED,0758,0766,0773,07B1,07BF,07C5,095C
WAREN   0AC9  06DD
WASD    0AE9  0716,0771,0809
WASI    0AE8  088E,089F,08D0,08DB
WASO    0AE6  0632,0638,0682
WAS4    0AE7  0641,064C,065F,0667,0696,082D,0834,0884,08C6,0901,0932
WATFR   088C  0899
WCNT    06C5  069F,06A9
WDCNT   0AEC
WTCNT   0874  0791,07A3,07D2,07E4
XERR    065B  063B,063C,065C,0680,0693

END OF ASSEMBLY
```

---------- LAST PAGE ----------

1627 PLOTTER FUNCTION TEST

TABLE OF CONTENTS

1627 PLOTTER FUNCTION TEST

1. PURPOSE

THE PURPOSE OF THE 1627 PLOTTER DIAGNOSTIC TEST IS TO EXECUTE THE DIFFERENT MOVEMENTS OF THE PLOTTER AND TO CHECK THE CABLES FOR CORRECT ADJUSTMENT.

2. PREREQUISITES

2.1 PROGRAM PREREQUISITES

THE 1627 PLOTTER DIAGNOSTIC PROGRAM MUST RUN UNDER CONTROL OF THE DIAGNOSTIC MONITOR.

2.2 EQUIPMENT PREREQUISITES

THE FOLLOWING EQUIPMENT IS REQUIRED.

A. 1131 CENTRAL PROCESSING UNIT (CPU).

B. 1627 PLOTTER MODEL 1 OR 2

3. USE PROCEDURE

3.1 LOADING

THIS PROGRAM FOLLOWS THE LOADING PROCEDURES ESTABLISHED BY THE 1130 DIAGNOSTIC MONITOR. REFER TO D. M. DOCUMENTATION.

3.2 OPERATION

3.2.1 PROGRAM EXECUTION

A. LOAD AND GO MODE

ALL ROUTINES WILL BE EXECUTED EXCEPT ROUTINE 5.
ALL DETECTED ERRORS WILL BE IDENTIFIED BY AN ERROR TYPEOUT.

B. SINGLE PROGRAM AND OVERLAP MODE

AFTER PROGRAM IS LOADED, THE MONITOR WILL WAIT TO ALLOW OPTIONS TO BE SPECIFIED.

1. SPECIFY DESIRED OPTIONS AS INSTRUCTED IN SECTION 3.2.2. IF NO OPTIONS ARE DESIRED, NO ENTRY IS REQUIRED. ALL ROUTINES WILL BE EXECUTED EXCEPT ROUTINE 5. TO EXECUTE ROUTINE 5 IT MUST BE SELECTED. THEN ROUTINE 5 AND ONLY ROUTINE 5 WILL EXECUTE.

2. TO START EXECUTION - EXECUTE MODE MUST BE SPECIFIED SET BIT SWITCHES FOR DESIRED MODE

SW. SETTING	CONTROL
0080	EXECUTE WITH NO OPTIONS
0088	LOOP ON ERROR
0084	BYPASS ALL ERROR PRINTOUTS
0082	HALT ON ANY ERROR
008C	LOOP ON ERROR AND BYPASS ALL ERROR PRINTOUTS
0090	LOOP ALL PROGRAMS
0092	LOOP ALL PROGRAMS AND HALT ON ERRORS

PRESS INTERRUPT REQUEST KEY.

3.2.2 PROGRAM OPTIONS

THE OPERATOR MAY MODIFY THE EXECUTION OF THE PROGRAM ANY TIME BEFORE OR AFTER IT HAS STARTED EXECUTION BY ENTERING PROGRAM CONTROL OPTIONS OR ROUTINE SELECTION OPTIONS.

A. PROGRAM CONTROL OPTIONS

1. TO SELECT PROGRAM OPTIONS SET BIT SWITCHES AS INDICATED

SW. SETTING	CONTROL
0500	RESET ALL CONTROL OPTIONS
0501	HALT THE 1627 PROGRAM (TO START AFTER HALT, SET SWS TO DESIRED CONTROL OPTION OR 0500, THEN PRESS INTERRUPT REQUEST KEY.)
0504	BYPASS ALL 1627 LOGS
0508	BYPASS ALL 1627 ERROR PRINTOUTS
0520	LOOP A 1627 ROUTINE
0524	LOOP ROUTINE AND BYPASS ALL 1627 LOGS.
0528	LOOP ROUTINE AND BYPASS 1627 ERROR PRINTOUTS.

2. PRESS INTERRUPT REQUEST KEY.

B. ROUTINE SELECTION

1. TO SELECT ROUTINE OPTIONS SET BIT SWITCHES AS INDICATED

SW. SETTING	ROUTINE
4500	ALL ROUTINES
4501	ROUTINE 1, PEN UP-DOWN TEST
4502	ROUTINE 2, REGISTRATION TEST
4503	ROUTINE 3, SWING TEST
4504	ROUTINE 4, STRESS TEST (WINDMILL)
4505	ROUTINE 5, MANUALLY SELECT COMMANDS

2. PRESS INTERRUPT REQUEST KEY.

C. COMMAND SELECT

ROUTINE 5 WILL LOOP ON ANY PLOTTER COMMAND, CAUSING THE PLOTTER TO MOVE IN THE DIRECTION SELECTED UNTIL A NEW COMMAND IS GIVEN. TO SET UP COMMAND SELECT-

1. SELECT ROUTINE 5 (4505)
2. SET THE BIT SWITCHES TO 85XX, WHERE SWITCHES 8-13 SPECIFY THE DESIRED COMMAND(S) AS FOLLOWS-

SW	COMMAND
8	PEN DOWN
9	PAPER DOWN
10	PAPER UP
11	PEN RIGHT
12	PEN LEFT
13	PEN UP

3. PRESS INTERRUPT REQUEST KEY.

3.3 TERMINATION

IF THERE ARE NO 'LOOP' CONTROL OPTIONS SELECTED, THE PROGRAM WILL TERMINATE AFTER ONE PASS. IF OPTIONS TO LOOP HAVE BEEN SELECTED, THE PROGRAM MAY BE TERMINATED BY-

1. REMOVE LOOP OPTIONS AND ALLOW NORMAL TERMINATION.
OR
2. SET ENTRY SWITCHES TO 4005 AND PRESS THE INTRPT REQ. KEY.

3.4 RESTART

TO RESTART THE PROGRAM.

1. SET SWITCHES TO 4085.
2. PRESS INTERRUPT REQUEST KEY.
3. SET SWITCHES TO 0080.
4. PRESS INTERRUPT REQUEST KEY.

NOTE

DEPENDING ON HOW THE PROGRAM WAS TERMINATED, THE LAST TWO STEPS MAY NOT BE REQUIRED.

4. PRINTOUTS

ALL PRINTOUTS ARE IN THE STANDARD FORMAT.

APPNN CORR (MESSAGE)
OR
EPPNN CORR (MESSAGE)

WHERE A IDENTIFIES STATUS MESSAGES
E IDENTIFIES ERROR MESSAGES
PP IS THE PID OF THE PROGRAM CAUSING THE MESSAGE
NN IS THE MESSAGE SEQUENCE NUMBER
RR IS THE ROUTINE NUMBER
MESSAGE IS ANY VARIABLE INFORMATION

4.1 STATUS MESSAGES

A0505 OORR NRDY
PLOTTER POWER IS TURNED OFF.

A0508 OORR PROG HALT
INDICATES PROGRAM HAS BEEN HALTED BY BIT SWITCH 15 FUNCTION 00 BEING SET ON. SET BIT 15 OFF TO CONTINUE.

4.2 ERROR MESSAGES

E0501 OORR BIT FAILED
THIS MESSAGE INDICATES THE BUSY BIT FAILED AFTER A WRITE COMMAND.

E0502 OORR BUSY
PLOTTER WAS BUSY WHEN DSW WAS SENSED.

E0504 OORR NO INTRPT
NO INTERRUPT WAS RECEIVED AFTER A WRITE COMMAND. THE PROGRAM WILL CONTINUE TO RUN.

E0507 OORR XXXX XXXX
WAS S/B
DSW ERROR MODIFIERS SHOW INCORRECT DSW FOLLOWED BY CORRECT DSW.

5. COMMENTS

5.1 ROUTINE 1 (PEN UP-PEN DOWN OCTAGON TEST)

THE PURPOSE OF THIS ROUTINE IS TO TEST THE CAPABILITY OF THE PLOTTER TO EXECUTE THE PEN UP AND PEN DOWN PLOTTER COMMANDS. IN THIS ROUTINE, AS IN THE OTHER PLOTTER PATTERN GENERATING ROUTINES, AN ADDRESS TABLE IS USED TO SELECT THE CORRECT PLOTTER COMMANDS. THE ADDRESS TABLE, IN TURN, POINTS TO A PAIR OF COMPUTER WORDS. ONE WORD CONTAINS A NUMBER WHICH INDICATES THE NUMBER OF TIMES THE OTHER WORD (THE PLOTTER COMMAND) IS TO BE EXECUTED.

THE PATTERN PLOTTED IN THIS FUNCTION TEST CONTAINS TWO ADJACENT OCTAGONS, WHOSE SIDES ARE ONE AND ONE HALF INCHES IN LENGTH. OCTAGON NO. 1 (LEFTMOST OCTAGON) IS PLOTTED IN A CLOCKWISE DIRECTION. OCTAGON NO. 2 (RIGHTMOST OCTAGON) IS PLOTTED IN A COUNTER CLOCKWISE DIRECTION.

THIS ROUTINE IS DESIGNED SO THAT, IF A PEN UP COMMAND IS NOT EXECUTED AS IT SHOULD BE, A LINE WILL BE DRAWN IN THE INNER PORTION OF THE OCTAGON. IF A PEN DOWN COMMAND IS NOT EXECUTED, A SIDE OF THE OCTAGON WILL BE MISSING. FIGURE 1 SHOWS AN EXAMPLE OF THE OUTPUT OF THIS ROUTINE.

5.2 ROUTINE 2 REGISTRATION TEST

THE FUNCTION OF THIS ROUTINE IS TO DETERMINE IF ANY ADJUSTMENTS ARE NEEDED IN THE PEN OR DRUM MOVEMENT MECHANISMS. FIGURE 2 SHOWS THE PATTERN GENERATED BY THIS ROUTINE. IF ANY OF THE LINES FAIL TO INTERSECT, SOME MECHANICAL ADJUSTMENT OF THE PLOTTER MAY BE NEEDED.

5.3 ROUTINE 3 SWING TEST

THE PURPOSE OF THIS ROUTINE IS TO TEST THE ABILITY OF THE PLOTTER TO PLOT LONG LINE SEGMENTS IN VARIOUS DIRECTIONS. THE PATTERN GENERATED BY THIS ROUTINE IS SO DESIGNED, THAT IF PLOTTER COMMANDS ARE NOT EXECUTED OR EXTRA COMMANDS ARE EXECUTED, THE CORNERS OF THE PATTERN WILL NOT JOIN. THIS TEST WILL ALSO SHOW UP ANY MALADJUSTMENT IN THE PEN OR DRUM MECHANISM.

THE METHOD USED IN GENERATING THE PATTERN IS AS FOLLOWS,

A. THE LEFT AND TOP SIDES OF A SERIES OF SQUARES ARE DRAWN AS A CONTINUOUS LINE, VARYING IN SIZE FROM 10 TO 2 INCHES.

B. THE RIGHT AND BOTTOM SIDES OF THE SERIES OF SQUARES ARE DRAWN IN ONE QUARTER INCH LINE SEGMENTS, JOINED TOGETHER, AND TOTALING THE LENGTH OF THE LEFT AND TOP SIDES.

C. ON COMPLETING THE PLOTTING OF THE SQUARES, LINES ARE DRAWN (BOTH SEGMENTED AND CONTINEOUS) THRU THE CORNERS OF THE SQUARES. ALL OF THESE DIAGONAL LINES SHOULD INTERSECT THE CORNERS OF THE SQUARES PERFECTLY.

FIGURE 3 SHOWS THE PLOTTER PATTERN GENERATED BY THIS ROUTINE.

5.4 ROUTINE 4 STRESS TEST (WINDMILL PATTERN)

THE PURPOSE OF THIS ROUTINE IS TO EXERCISE ALL OF THE MECHANICAL FUNCTIONS OF THE PLOTTER. THIS OBJECTIVE IS ACCOMPLISHED BY PLOTTING A PATTERN OF TRIANGLES, ROUGHLY RESEMBELING A WINDMILL. EACH SIDE OF THE TRIANGLE CONSISTS OF A SERIES OF SHORT SAWTOOTH-LIKE SEGMENTS, WHICH TESTS THE ABILITY OF THE PLOTTER TO PLOT SHORT LINE SEGMENTS WITH ABRUPT CHANGES IN DIRECTION. A SET OF FIVE TRIANGLES

IS PLOTTED, THE AXIS IS THEN ROTATED 90 DEGREES AND FIVE MORE TRIANGLES ARE PLOTTED IN THE SAME MANNER UNTIL, FINALLY, FOUR SETS OF TRIANGLES HAVE BEEN PLOTTED. WHEN THE TRIANGLES HAVE BEEN PLOTTED, A LINE IS DRAWN THRU THE INNERMOST POINTS OF THE TRIANGLES. THE RESULTANT PATTERN THEN APPEARS AS A WINDMILL WITH A DIAMOND SHAPED PATTERN CONNECTING THE INNER POINTS OF THE TRIANGLES. THE DIAMOND DESIGN SHOULD INTERSECT ALL OF THE INNER POINTS OF THE TRIANGLES IF THE PLOTTER IS ADJUSTED CORRECTLY. FIGURE 4 SHOWS THE PLOTTER PATTERN GENERATED BY THE ROUTINE.

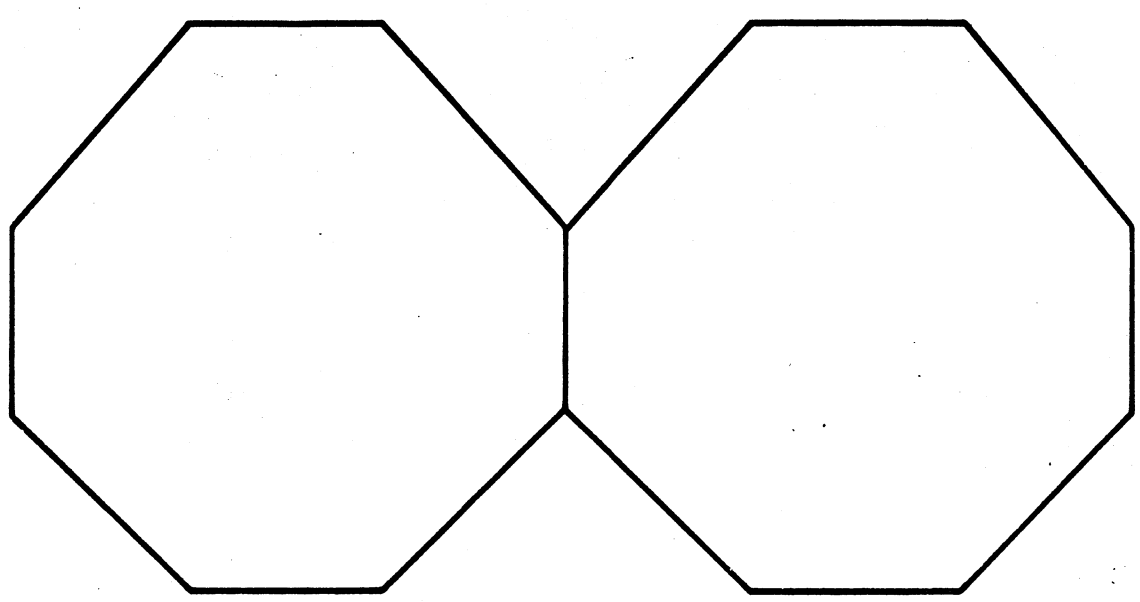
5.5 ROUTINE 5 (MANUALLY SELECTED PLOTTER COMMANDS)

TO USE ROUTINE 5 IT MUST BE SELECTED IN FUNCTION 01.
THE PURPOSE OF THIS ROUTINE IS TO PROVIDE TO THE FIELD ENGINEER THE CAPABILITY OF EXECUTING ANY PLOTTER COMMAND HE WISHES TO ON THE PLOTTER, BY MEANS OF ENTERING THE PLOTTER COMMAND IN THE CONSOLE BIT SWITCHES. THE PLOTTER WILL CONTINUE TO EXECUTE THE COMMAND UNTIL IT RECEIVES ANOTHER COMMAND FROM THE OPERATORS CONSOLE, OR A COMMAND OF ALL ZEROS IS RECEIVED WHICH WILL END THIS ROUTINE. THE ROUTINE MAY ALSO BE DESELECTED BY SELECTING ANOTHER ROUTINE. FOR COMMAND SETTING REFER TO TABLE 3 SECTION 3.3.3.

6. APPENDIX

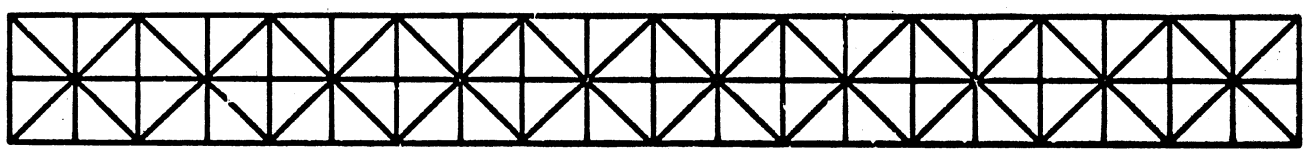
THE FOLLOWING PAGES CONTAIN THE PLOTTER OUTPUT PATTERNS.

FIGURE 1 PATTERN FOR PEN UP/PEN DOWN TEST



SCALE: 3/4 = 1

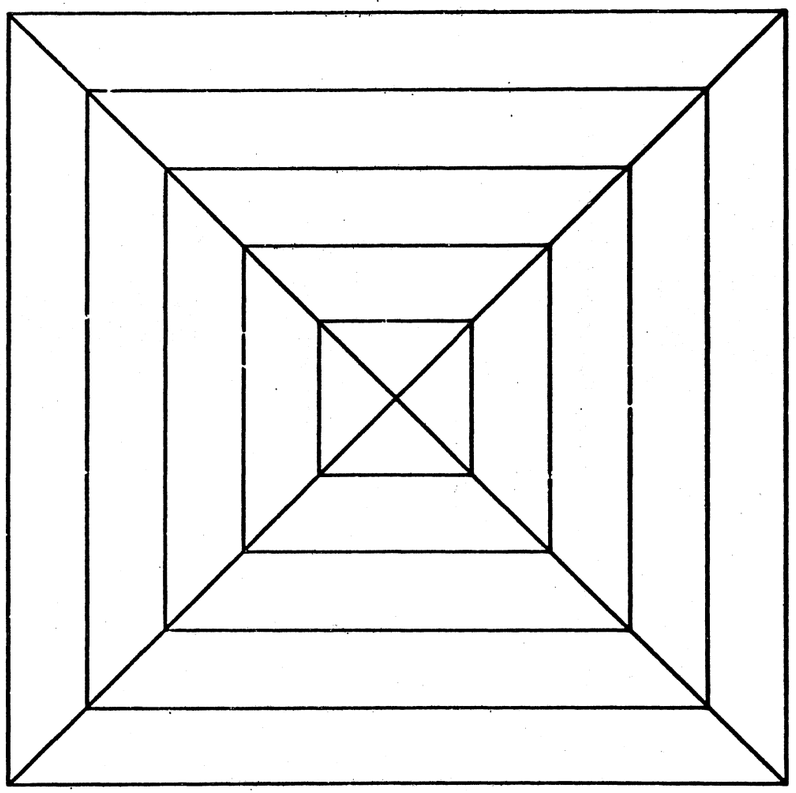
FIGURE 2 PATTERN FOR REGISTRATION TEST



SCALE: 3/4 = 1

FIGURE 3

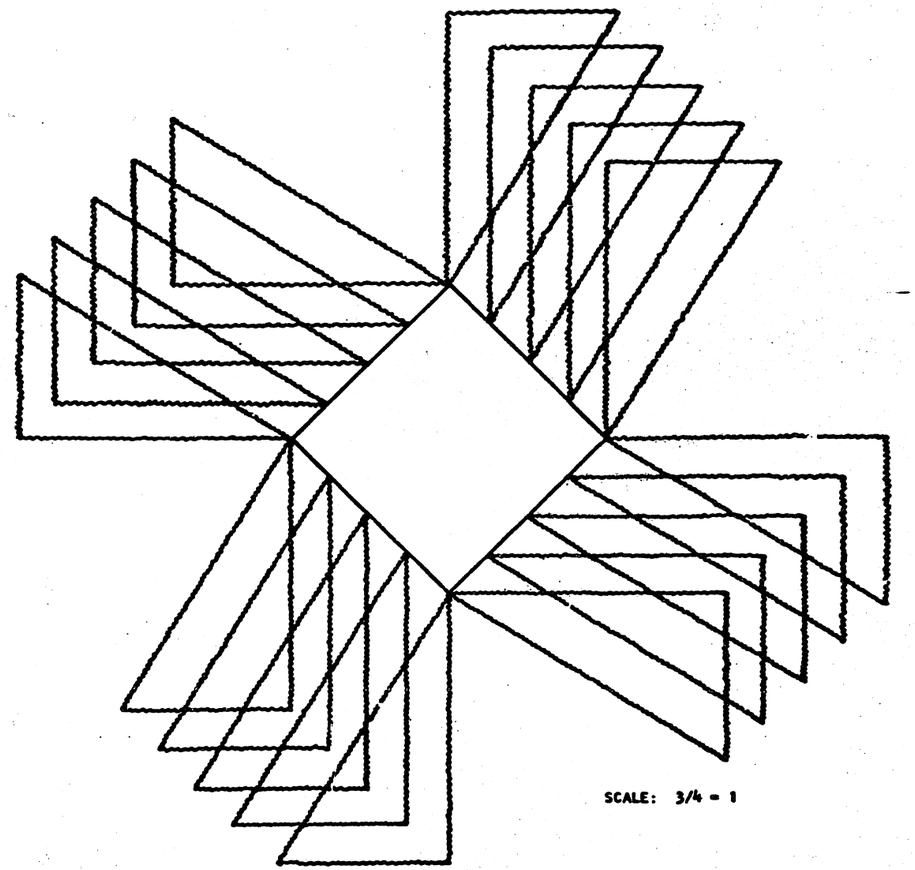
SWING TEST - PATTERN



SCALE: 3/4 = 1

FIGURE 4

STRESS TEST - WINDMILL PATTERN



SCALE: 3/4 = 1

1627 PLOTTER FUNCTION TEST

```
0000                ORG     *+1500
                    *                       PROG TRANSFER VECTOR        PLT00000
                    *                                                   PLT00010
0010                BEGIN EQU   16                                      PLT00020
0011                START EQU   BEGIN+1                                 PLT00030
0012                ERROR EQU   START+1                                 PLT00040
0013                LOG   EQU   ERROR+1                                 PLT00050
0014                HALT  EQU   LOG+1                                   PLT00060
0015                END   EQU   HALT+1                                  PLT00070
                    *                                                   PLT00080
0016                LOGBY EQU   END+1                                   PLT00090
0017                RSTKB EQU   LOGBY+1                                 PLT00100
0018                ETRAP EQU   RSTKB+1                                 PLT00110
0019                AQSA  EQU   ETRAP+1                                 PLT00120
                    *                                                   PLT00130
0028                ILO   EQU   40                                      PLT00140
0029                IL1   EQU   ILO+1                                   PLT00150
002A                IL2   EQU   IL1+1                                   PLT00160
002B                IL3   EQU   IL2+1                                   PLT00170
002C                IL4   EQU   IL3+1                                   PLT00180
0030                ILCRP EQU   IL4+4                                   PLT00190
0032                ILPAT EQU   ILCRP+2                                 PLT00200
0033                RQTY  EQU   ILPAT+1                                 PLT00210
0034                RQKB  EQU   RQTY+1                                  PLT00220
0035                SVKB  EQU   RQKB+1                                  PLT00230
0036                ILIR  EQU   SVKB+1                                  PLT00240
                    *                                                   PLT00250
0037                AEND  EQU   ILIR+1                                  PLT00260
0038                AIVD  EQU   AEND+4      INVLD                       PLT00270
003E                ALD   EQU   AIVD+3      LD                          PLT00280
0041                ANINT EQU   ALD+3       NO INTRPT                   PLT00290
0044                AINT  EQU   ANINT+3     INTRPT                      PLT00300
004B                ANRDY EQU   AINT+7      NRDY                        PLT00310
004C                ARDY  EQU   ANRDY+1     RDY                         PLT00320
0050                ASWS  EQU   ARDY+4      SWS                         PLT00330
0054                ASB   EQU   ASWS+4      S/B                         PLT00340
0058                ADSCT EQU   ASB+4                                   PLT00350
005A                ASCT  EQU   ADSCT+2     SELCT                       PLT00360
0060                AWAS  EQU   ASCT+6      WAS                         PLT00370
                    *                                                   PLT00380
                    *                                                   PLT00390
                    *****       PROGRAM STARTER TABLE *********         PLT00400
                    *                                                   PLT00410
05DC 0  0500        PID   DC    /0500       PROG IDENTIFICATION         PLT00420
05DD 0  0000        RID   DC    /0000       ROUTINE NUMBER              PLT00430
05DE 0  0000        BSW0  DC    /0000       BIT SWITCH FNC 0            PLT00440
05DF 0  0000        BSW1  DC    /0000       BIT SWITCH FNC 1            PLT00450
05E0 0  0C00        BSW2  DC    /0000       BIT SWITCH FNC 2            PLT00460
05E1 0  0000        BSW3  DC    /0000       BIT SWITCH FNC 3            PLT00470
05E2 1  05FB        ILP   DC    RTO         INITIALIZATION ADDR         PLT00480
05E3 1  0605        LPA   DC    GOT         LOOP PROG ADDR              PLT00490
05E4 0  0000        MLSCF DC    /0000       1ST MLSCF NORMAL            PLT00500
05E5 0  0000              DC    /0000       2ND MLSCF BUSY              PLT00510
05E6 0  0000              DC    /0000       3RD MLSCF INTR CK           PLT00520
05E7 0  FFFF              DC    /FFFF       TERMINATOR                  PLT00530
                    *                                                   PLT00540
                    ************  DSW TABLE  ***************************PLT00550
                    *                                                   PLT00560
                    *                                                   PLT00570
05E8 00 44800010    PLBGN BSI I BEGIN       CALL TO MONITOR             PLT00580
05EA 1  05DC              DC    PID                                     PLT00590
05EB 1  05ED              DC    RECEV       INTERRUPT ENTRY ADDR        PLT00600
05EC 0  FFFF              DC    /FFFF                                   PLT00610
                    *                                                   PLT00620
                    *                                                   PLT00630
                    *                                                   PLT00640
                    *****       ROUTINE INTERRUPT *************         PLT00650
                    *                                                   PLT00660
```


1627 PLOTTER FUNCTION TEST

```
05ED 0  0000        RECEV DC    /0000       RETURN ADDR             SE  PLT00670
05EE 01 0C000882          XIO   L  SENSE     SENSE DSW                   PLT00680
05F0 0  1000              NOP               USE FOR TRAP                PLT00690
05F1 01 F400089D          EOR   L  K8000     REMOVE SERVICE REQST        PLT00700
05F3 01 D40007F1          STO   L  ERBIT     SAVE DSW ERROR BITS         PLT00710
05F5 01 6500081C    RECSW LDX   L1 CONT      GET MLSCF                   PLT00720
05F7 01 6D0005E4          STX   L1 MLSCF     SET MLSCF                   PLT00730
05F9 01 4C8005ED          BSC   I  RECEV     RETURN TO MONITOR       SX  PLT00740
                    *                                                   PLT00750
                    *                                                   PLT00760
05FB 0  000C        R1O   DC    /0000       RETURN ADDR             SE  PLT00770
05FC 01 650005ED          LDX   L1 RECEV                                 PLT00780
05FE 00 6D000028          STX   L1 IL3                                   PLT00790
0600 01 6600078D          LDX   L2 RUNIT     LD XR2 WITH RE-ENTRY        PLT00800
0602 0  6AE1              STX    2 MLSCF     SET MLSCF                   PLT00810
0603 01 4C8005FB          BSC   I  RTO       RETURN TO MONITOR       SX  PLT00820
                    *                                                   PLT00830
                    *****       LOOP PROGRAM ADDRESS **********         PLT00840
                    *                                                   PLT00850
0605 01 440005FB    GOT   BSI   L  RTO       USE INITIALIZATION      SC  PLT00860
0607 00 4C800011          BSC   I  START     RETURN TO MONITOR       SX  PLT00870
                    *                                                   PLT00880
                    *                                                   PLT00890
                    *****       ROUTINE 1- OCTAGON PEN UP-DOWN          PLT00900
                    *                                                   PLT00910
0609 01 4400082E    RT1   BSI   L  READY                               SC  PLT00920
060B 01 C4000698          LD    L  K0150     CONSTANT OF 150             PLT00930
060D 0  62F1              LDX    2 -15       INSTR CT EQ 1.5 INCH        PLT00940
060E 01 D6000877    OCTGN STO   L2 NN+15     STORE MOVE COUNT            PLT00950
0610 0  7202              MDX    2 2                                     PLT00960
0611 0  70FC              MDX      OCTGN     FINISH STORING COUNT        PLT00970
0612 01 650008A1          LDX   L1 RT1ST                                 PLT00980
0614 01 6D00089E          STX   L1 LOOK                                  PLT00990
0616 01 440007F2          BSI   L  DISP      CALL DISPATCH RTNE      SC  PLT01000
                    *                                                   PLT01010
0618 01 7401089E          MDX   L  LOOK,1    BUMP INSTR ADDR PNTR        PLT01020
061A 01 440007F2          BSI   L  DISP      CALL DISPATCH RTNE      SC  PLT01030
                    *                                                   PLT01040
061C 01 44000794          BSI   L  BSWCK     CHECK BIT SWITCH        SC  PLT01050
061E 0  6202              LDX    2 2         LOAD NXT ROUTINE NO.        PLT01060
061F 01 4C0007C0          BSC   L  RTSET     GET NEXT ROUTINE            PLT01070
                    *                                                   PLT01080
                    *****       ROUTINE 2- REGISTRATION TEST **         PLT01090
                    *                                                   PLT01100
0621 01 4400082E    RT2   BSI   L  READY                               SC  PLT01110
                    *                                                   PLT01120
0623 00 67000064          LDX   L3 100       INITIALIZE INSTR CTRS       PLT01130
0625 01 6FC00876          STX   L3 NW        TO 100, EQUAL TO            PLT01140
0627 01 6F000874          STX   L3 SW        1 INCH OF PLTR O/P.         PLT01150
0629 01 6F000868          STX   L3 NN                                    PLT01160
062B 01 6FC0086A          STX   L3 S                                     PLT01170
062D 01 6F000870          STX   L3 NE                                    PLT01180
062F 01 6F000872          STX   L3 SE                                    PLT01190
0631 00 67000032          LDX   L3 50        INITIALIZE INSTR CTRS       PLT01200
0633 01 6F00086C          STX   L3 EE        TO 50, EQUAL TO             PLT01210
0635 01 6F00086E          STX   L3 WW        0.5 INCH OF PLTR O/P.       PLT01220
                    *                                                   PLT01230
0637 01 650008F4          LDX   L1 RT2ST     STRING ADDR                 PLT01240
0639 01 6D00089E          STX   L1 LOOK      RT TWO STRING               PLT01250
063B 0  63F8              LDX    3 -5                                    PLT01260
063C 01 6F000897          STX   L3 EXTRA     CTR STG                     PLT01270
063E 01 440007F2          BSI   L  DISP      CALL DISPATCH RTNE      SC  PLT01280
0640 01 7401089E          MDX   L  LOOK,1    BUMP INSTR ADDR PNTR        PLT01290
0642 00 670003E8          LDX   L3 1000      LOAD 10 INCH PLOT           PLT01300
0644 01 6FC0086C          STX   L3 EE        MOVEMENT TO EAST            PLT01310
0646 01 440007F2    REG01 BSI   L  DISP      CALL DISPATCH RTNE      SC  PLT01320
                    *                                                   PLT01330
0648 01 74FE089E          MDX   L  LOOK,-2   BACK UP ADDR POINTER        PLT01340
```

```
064A 01 74010897          MDX  L  EXTRA,1                                PLT01350
064C 0  70F9              MDX     REG01                                  PLT01360
064D 01 7403089E          MDX  L  LOOK,3                                 PLT01370
064F 0  63F8              LDX     3 -5                                   PLT01380
0650 01 6F000897          STX  L3 EXTRA                                  PLT0139C
                     *                                                   PLT01400
0652 01 440007F2  REG02   BSI  L  DISP       CALL DISPATCH RTNE    SC    PLT01410
0654 01 74FE089E          MDX  L  LOOK,-2    BACK UP ADDR POINTER         PLT01420
0656 01 74010897          MDX  L  EXTRA,1                                PLT01430
0658 0  70F9              MDX     REG02                                  PLT01440
                     *                                                   PLT01450
0659 0  63F6              LDX     3 -10      LOAD XR 3                   PLT01460
065A 01 6F000897          STX  L3 EXTRA                                  PLT01470
065C 01 7403089E          MDX  L  LOOK,3                                 PLT01480
                     *                                                   PLT01490
065E 01 440007F2  REG03   BSI  L  DISP       CALL DISPATCH RTNE    SC    PLT01500
0660 01 74F8089E          MDX  L  LOOK,-8    BACK UP ADDR POINTER         PLT01510
0662 01 74010897          MDX  L  EXTRA,1                                PLT01520
0664 0  70F9              MDX     REG03                                  PLT01530
                     *                                                   PLT01540
0665 01 7409089E          MDX  L  LOOK,9     BUMP ADDR POINTER            PLT01550
0667 0  6332              LDX     3 50                                   PLT01560
0668 01 6F00086A          STX  L3 S                                      PLT01570
066A 00 670003E8          LDX  L3 1000                                   PLT01580
066C 01 6F00086E          STX  L3 WW                                     PLT01590
066E 01 440007F2          BSI  L  DISP       CALL DISPATCH RTNE    SC    PLT01600
                     *                                                   PLT01610
0670 01 44000794          BSI  L  BSWCK      CHECK BIT SWITCH      SC    PLT01620
0672 0  6203              LDX     2 3        LOAD NXT ROUTINE NO.         PLT01630
0673 01 4C0007C0          BSC  L  RTSET      GET NEXT ROUTINE             PLT01640
                     *                                                   PLT01650
                     *                                                   PLT01660
                     *****          ROUTINE 3- SWING TEST *********      PLT01670
                     *                                                   PLT01680
                     *                                                   PLT01690
0675 01 4400082E  RT3      BSI  L  READY                          SC    PLT01700
0677 0  6328              LDX     3 40                                   PLT01710
0678 0  682C              STX     3 SWNG2+1  LINE LENGTH MODIFIED PRO1   PLT01720
0679 00 670000C8          LDX  L3 200                                    PLT01730
067B 01 6F000868          STX  L3 NN                                     PLT01740
067D 0  6364              LDX     3 100                                  PLT01750
067E 01 6F000870          STX  L3 NE                                     PLT01760
0680 0  6332              LDX     3 50                                   PLT01770
0681 01 6F00086C          STX  L3 EE                                     PLT01780
0683 01 65000913          LDX  L1 RT3ST      LOAD ADDR STRING ADDR        PLT01790
0685 01 6D00089E          STX  L1 LOOK       STO IN POINTER CTL WD        PLT01800
0687 01 440007F2          BSI  L  DISP                           SC    PLT01810
0689 01 7401089E          MDX  L  LOOK,1     BUMP INSTR ADDR PNTR         PLT01820
068B 00 670001F4          LDX  L3 500                                    PLT01830
068D 01 6F000876          STX  L3 NW                                     PLT01840
068F 01 6F000872          STX  L3 SE                                     PLT01850
0691 01 6F000874          STX  L3 SW                                     PLT01860
0693 0  6319              LDX     3 25                                   PLT01870
0695 01 6F00086A          STX  L3 S                                      PLT01880
0696 01 6F00086E          STX  L3 WW                                     PLT01890
0698 00 670003E8          LDX  L3 1000                                   PLT01900
069A 01 6F000868          STX  L3 NN                                     PLT01910
069C 01 6F00086C          STX  L3 EE                                     PLT01920
069E 0  6305              LDX     3 5                                    PLT01930
069F 01 6F00089F          STX  L3 SQRCT      INITIALIZE SQUARE CTR        PLT01940
                     *                                                   PLT01950
06A1 0  6302      SWNG1   LDX     3 2                                    PLT01960
06A2 01 6F0008A0          STX  L3 TRICT                                  PLT01970
06A4 00 67000028  SWNG2   LDX  L3 40         LINE LENGTH CTL       PM01  PLT01980
06A6 01 6F000897          STX  L3 EXTRA                                  PLT01990
06A8 01 440007F2  SWNG3   BSI  L  DISP       CALL DISPATCH RTNE    SC    PLT02000
06AA 01 74FF089E          MDX  L  LOOK,-1    BACK UP ADDR POINTER         PLT02010
06AC 01 74FF0897          MDX  L  EXTRA,-1                               PLT02020
```



```
06AE 0  70F9              MDX     SWNG3      PLT NXT LINE SEGMENT         PLT02030
06AF 01 7402089E          MDX  L  LOOK,2                                 PLT02040
06B1 01 74FF08A0          MDX  L  TRICT,-1                               PLT02050
06B3 0  70F0              MDX     SWNG2                                  PLT02060
06B4 01 749C0868          MDX  L  NN,-100                                PLT02070
06B6 01 749C0868          MDX  L  NN,-100                                PLT02080
06B8 01 749C086C          MDX  L  EE,-100                                PLT02090
06BA 01 749C086C          MDX  L  EE,-100                                PLT02100
06BC 01 74F806A5          MDX  L  SWNG2+1,-8 ADJUST LINE LENGTH          PLT02110
06BE 0  1000      KEEP    NOP                MDX WILL HOP THIS           PLT02120
06BF 01 440007F2          BSI  L  DISP       CALL DISPATCH RTNE    SC    PLT02130
06C1 01 74F7089E          MDX  L  LOOK,-9                                PLT02140
06C3 01 74FF089F          MDX  L  SQRCT,-1   REDUCE SQUARE CTR           PLT02150
06C5 0  70DB              MDX     SWNG1      RE-INITIALIZE               PLT02160
06C6 01 740A089E          MDX  L  LOOK,10    BUMP INSTR ADDR PNTR        PLT02170
06C8 00 670003E8          LDX  L3 1000                                   PLT02180
06CA 01 6F000868          STX  L3 NN                                     PLT02190
06CC 01 6F00086A          STX  L3 S                                      PLT02200
06CE 01 440007F2          BSI  L  DISP       CALL DISPATCH RTNE    SC    PLT02210
06D0 01 7401089E          MDX  L  LOOK,1     BUMP INSTR ADDR PNTR        PLT02220
06D2 0  6302              LDX     3 2                                    PLT02230
06D3 01 6F0008A0          STX  L3 TRICT                                  PLT02240
06D5 0  6319              LDX     3 25                                   PLT02250
06D6 01 6F000876          STX  L3 NW                                     PLT02260
06D8 01 6F000870          STX  L3 NE                                     PLT02270
06DA 0  6314      OLD     LDX     3 20                                   PLT02280
06DB 01 6F000897          STX  L3 EXTRA                                  PLT02290
06DD 01 440007F2  SWNG4   BSI  L  DISP       CALL DISPATCH RTNE    SC    PLT02300
06DF 01 74FF089E          MDX  L  LOOK,-1                                PLT02310
06E1 01 74FF0897          MDX  L  EXTRA,-1                               PLT02320
06E3 0  70F9              MDX     SWNG4                                  PLT02330
                     *                                                   PLT02340
06E4 01 7402089E          MDX  L  LOOK,2                                 PLT02350
06E6 01 74FF08A0          MDX  L  TRICT,-1                               PLT02360
06E8 0  70F1              MDX     OLD                                    PLT02370
                     *                                                   PLT02380
06E9 01 44000794          BSI  L  BSWCK      CHECK BIT SWITCHES    SC    PLT02390
06EB 0  6204              LDX     2 4        LOAD NXT ROUTINE NO.         PLT02400
06EC 01 4C0007C0          BSC  L  RTSET      GET NEXT ROUTINE             PLT02410
                     *                                                   PLT02420
                     *                                                   PLT02430
                     *****          ROUTINE 4- WINDMILL DESIGN ****      PLT02440
                     *                                                   PLT02450
                     *                                                   PLT02460
06EE 01 4400082E  RT4     BSI  L  READY      CHECK STATUS          SC    PLT02470
06F0 00 67000164          LDX  L3 356                                    PLT02480
06F2 01 6F000870          STX  L3 NE                                     PLT02490
06F4 01 6F000868          STX  L3 NN                                     PLT02500
06F6 01 67000930          LDX  L3 RT4ST      LD RT4 CMD STRNG ADDR       PLT02510
06F8 01 6F00089E          STX  L3 LOOK                                   PLT02520
06FA 01 440007F2          BSI  L  DISP       CALL DISPATCH RTNE    SC    PLT02530
06FC 01 7401089E          MDX  L  LOOK,1     BUMP INSTR ADDR PNTR        PLT02540
06FE 0  62F1              LDX     2 -15                                  PLT02550
06FF 01 C4000899          LD   L  K0002      MOVE COUNT                  PLT02560
0701 01 D6000877  WMIL1   STO  L2 NN+15      STORE MOVE COUNT            PLT02570
0703 0  7202              MDX     2 2                                    PLT02580
0704 0  70FC              MDX     WMIL1      FINISH LOADING COUNT        PLT02590
0705 01 67000870          LDX  L3 NE                                     PLT02600
0707 01 44000728          BSI  L  TCNTL                          SC    PLT02610
                     *                                                   PLT02620
0709 01 67000872          LDX  L3 SE                                     PLT02630
070B 01 44000728          BSI  L  TCNTL                          SC    PLT02640
                     *                                                   PLT02650
070D 01 67000874          LDX  L3 SW                                     PLT02660
070F 01 44000728          BSI  L  TCNTL                          SC    PLT02670
                     *                                                   PLT02680
0711 01 67000876          LDX  L3 NW                                     PLT02690
0713 01 44000728          BSI  L  TCNTL                          SC    PLT02700
```

```
                *                                                       PLT02710
0715 00 670000C8        LDX   L3 200                                    PLT02720
0717 01 6F000876        STX   L3 NW                                     PLT02730
0719 01 6F000870        STX   L3 NE                                     PLT02740
071B 01 6F000872        STX   L3 SE                                     PLT02750
071D 01 6F000874        STX   L3 SW                                     PLT02760
071F 01 74C1089E        MDX   L  LOOK,1     BUMP INSTR ADDR PNTR        PLT02770
                *                                                       PLT02780
0721 01 440007F2        BSI   L  DISP       DRAW SQUARE           SC    PLT02790
0723 01 44000794        BSI   L  BSWCK      CHECK BIT SWITCH      SC    PLT02800
0725 0  6206            LDX   2  6          NEW ROUTINE                 PLT02810
0726 01 4C0007C0        BSC   L  RTSET      GET NEXT ROUTINE            PLT02820
                *                                                       PLT02830
                *****           TRIANGLE CONTROL **************         PLT02840
                *                                                       PLT02850
0728 0  0000    TCNTL   DC      /0000                                 SE PLT02860
0729 01 6F000758        STX   L3 CHG1+1                                 PLT02870
072B 01 6F00075F        STX   L3 CHG2+1                                 PLT02880
072D 01 6F000767        STX   L3 CHG3+1                                 PLT02890
072F 0  6305            LDX   3  5          START TRIANGLE ONE          PLT02900
0730 01 6F0008A0        STX   L3 TRICT      TRIANGLE COUNT              PLT02910
                *                                                       PLT02920
0732 00 67000C56 RUN    LDX   L3 86         START TRIANGLE              PLT02930
0734 01 6F000897        STX   L3 EXTRA                                  PLT02940
                *                                                       PLT02950
0736 01 440007F2 SIDE1  BSI   L  DISP       PLOT SIDE ONE         SC    PLT02960
0738 01 74FE089E        MDX   L  LOOK,-2                                PLT02970
073A 01 74FF0897        MDX   L  EXTRA,-1                               PLT02980
073C 0  70F9            MDX      SIDE1                                  PLT02990
                *                                                       PLT03000
073D 01 7403089E        MDX   L  LOOK,3                                 PLT03010
073F 00 67000028        LDX   L3 43                                     PLT03020
0741 01 6F000897        STX   L3 EXTRA                                  PLT03030
                *                                                       PLT03040
0743 01 440007F2 SIDE2  BSI   L  DISP       PLOT SIDE TWO         SC    PLT03050
0745 01 74FE089E        MDX   L  LOOK,-2                                PLT03060
0747 01 74FF0897        MDX   L  EXTRA,-1                               PLT03070
0749 0  70F9            MDX      SIDE2                                  PLT03080
                *                                                       PLT03090
074A 01 7403089E        MDX   L  LOOK,3                                 PLT03100
074C 00 67000056        LDX   L3 86                                     PLT03110
074E 01 6F000897        STX   L3 EXTRA                                  PLT03120
                *                                                       PLT03130
0750 01 440007F2 SIDE3  BSI   L  DISP       PLOT SIDE THREE       SC    PLT03140
0752 01 74FD089E        MDX   L  LOOK,-3                                PLT03150
0754 01 74FF0897        MDX   L  EXTRA,-1                               PLT03160
0756 0  70F9            MDX      SIDE3                                  PLT03170
                *                                                       PLT03180
0757 01 74300870 CHG1   MDX   L  NE,48                                  PLT03190
0759 01 7404089E        MDX   L  LOOK,4                                 PLT03200
075B 01 74FF08A0        MDX   L  TRICT,-1   TRIANGLE COUNT              PLT03210
075D 0  7006            MDX      TOP                                    PLT03220
                *                                                       PLT03230
075E 01 74D00870 CHG2   MDX   L  NE,-48                                 PLT03240
0760 01 7403089E        MDX   L  LOOK,3                                 PLT03250
0762 01 4C800728        BSC   I  TCNTL                              SX  PLT03260
                *                                                       PLT03270
0764 01 440007F2 TOP    BSI   L  DISP                               SC  PLT03280
0766 01 74D00870 CHG3   MDX   L  NE,-48                                 PLT03290
0768 01 74F3089E        MDX   L  LOOK,-13                               PLT03300
076A 0  70C7            MDX      RUN        DO ANOTHER TRIANGLE         PLT03310
                *                                                       PLT03320
                *                                                       PLT03330
                *****           ROUTINE 5- MANUAL CONTROL               PLT03340
                *                                                       PLT03350
                *                                                       PLT03360
0768 01 67000975 RT5    LDX   L3 RT5ST      PLACE CNTR ADDR IN          PLT03370
076D 01 6F00089E        STX   L3 LOOK       O/P ROUTINE.                PLT03380
```



```
076F 01 740005E0        MDX   L  BSW2,0     CK FNC WORD 2 FOR 0.        PLT03390
0771 0  7008            MDX      RT5A       GO TO SEL. CMD. RTNE        PLT03400
0772 01 44000794        BSI   L  BSWCK      CK BIT SW FNC WORDS.  SC    PLT03410
0774 01 67000768        LDX   L3 RT5         PICK UP MLSCF ENTRY         PLT03420
0776 01 6F0005E4        STX   L3 MLSCF                                  PLT03430
0778 00 4C800011        BSC   I  START      LOOP THRU MONITOR     SC    PLT03440
                *                                                       PLT03450
077A 01 6700077A RT5A   LDX   L3 RT5A       MODIFY RETURN ADDR          PLT03460
077C 01 6F0005F6        STX   L3 RECSW+1    FOR INTERRUPT RTNE.         PLT03470
077E 01 C40005E0        LD    L  BSW2       FNC WRD 2 CONTAINS          PLT03480
0780 0  1802            SRA      2                                      PLT03490
0781 0  100A            SLA      10                                     PLT03500
0782 01 D400087F        STO   L  SBSW2                                  PLT03510
0784 01 442007F2        BSI   L  DISP,Z     TEST FOR END OF RTNE  SC    PLT03520
0786 01 6700081C        LDX   L3 CONT                                   PLT03530
0788 01 6F0005F6        STX   L3 RECSW+1    RESTORE RETURN ADDR.        PLT03540
078A 01 44000794        BSI   L  BSWCK      CK BIT SW FNC WORDS.  SC    PLT03550
                *                                                       PLT03560
078C 01 C40005DE RTOVR  LD    L  BSW0       LOAD FNC WORD ZERO.         PLT03570
078E 0  100B            SLA      11         TEST LOOP PROG. FNC.        PLT03580
078F 01 4C2807BD        BSC   L  RUNIT,+Z                               PLT03590
0791 00 44800015        BSI   I  END        GO TO MONITOR END     SC    PLT03600
0793 1  05DC            DC       PID                                    PLT03610
                *                                                       PLT03620
                ********************************************          PLT03630
                *                                          *          PLT03640
                ******          COMMON SUB ROUTINES ***********         PLT03650
                *                                                       PLT03660
                *                                                       PLT03670
                *****           ROUTINE BIT SWITCH CHECK ******         PLT03680
                *                                                       PLT03690
0794 0  0000    BSWCK   DC      /0000       RETURN ADDRESS        SE    PLT03700
0795 01 C40005DE FNC0   LD    L  BSW0       LD FNC WORD 0.              PLT03710
0797 01 4C0407AD        BSC   L  STOP,E     B 15 ON, BCH TO STOP        PLT03720
0799 0  100A            SLA      10                                     PLT03730
079A 01 4C2807AA        BSC   L  RLOOP,+Z   BR IF LOOP RTNE.            PLT03740
                *                                                       PLT03750
079C 01 C40005DF FNC1   LD    L  BSW1       LD FNC WORD 1.              PLT03760
079E 01 4C980794        BSC   I  BSWCK,+-   BCH ON ZERO           SX    PLT03770
07A0 01 E400089A        AND   L  K0007      SAVE ROUTINE NUMBER         PLT03780
07A2 01 D40005DD        STO   L  RID        STORE ROUTINE NUMBER        PLT03790
07A4 01 668005DD        LDX   I2 RID        LOAD XR 2 INDERCT           PLT03800
07A6 0  1010            SLA      16                                     PLT03810
07A7 01 D40005DF        STO   L  BSW1       RESET BSW1 TO ZERO.         PLT03820
07A9 0  7018            MDX      RERUN                                  PLT03830
                *                                                       PLT03840
                *                                                       PLT03850
07AA 01 668005DD RLOOP  LDX   I2 RID        GET LAST ROUTINE NUM        PLT03860
07AC 0  7015            MDX      RERUN                                  PLT03870
                *                                                       PLT03880
07AD 01 CC000890 STOP   LDD   L  MHALT      MSG- PROG HALT              PLT03890
07AF 01 4400084A        BSI   L  TYPE       USE TYPE ROUTINE      SC    PLT03900
07B1 01 67000787 HLTSW  LDX   L3 NOGO       LOAD RETURN ADDR            PLT03910
07B3 01 6F0005E4        STX   L3 MLSCF      STORE IN MLSCF              PLT03920
07B5 00 4C800011        BSC   I  START      RETURN TO MONITOR     SC    PLT03930
07B7 01 C40005DE NOGO   LD    L  BSW0       LOAD BIT SW WRD ZERO        PLT03940
07B9 01 4C0407B1        BSC   L  HLTSW,E    BCH BIT 15 ON               PLT03950
07BB 01 4C800794        BSC   I  BSWCK      RETURN TO PROG         SX   PLT03960
                *                                                       PLT03970
                *                                                       PLT03980
07BD 01 44000794 RUNIT  BSI   L  BSWCK      CHECK BIT SWITCHES    SC    PLT03990
07BF 0  6201     LDRT1  LDX     2  /0001     LD RT1 ID AND STORE         PLT04000
07C0 01 6E0005DD RTSET  STX   L2 RID        STORE ROUTINE NUMBER        PLT04010
07C2 01 C60007C8 RERUN  LD    L2 RTABL      GET ROUTINE ADDR AND        PLT04020
07C4 01 D40005E4        STO   L  MLSCF      SET MLSCF                   PLT04030
07C6 00 4C800011        BSC   I  START      RETURN TO MONITOR     SC    PLT04040
                ********************************************          PLT04050
                *                                                       PLT04060
```

```
                        *              ROUTINE ADDRESS TABLE          *      PLT04070
                        *                                             *      PLT04080
                        *                                             *      PLT04090
                        ***********************************************      PLT04100
                        *                                                    PLT04110
07C8 1  078F            RTABL DC       LDRT1       LOOP PROG TEST          PLT04120
07C9 1  0609                  DC       RT1         PEN UP-DOWN OCTAGON     PLT04130
07CA 1  0621                  DC       RT2         REGISTRATION TEST       PLT04140
07CB 1  0675                  DC       RT3         SWING TEST              PLT04150
07CC 1  06EE                  DC       RT4         WINDMILL TEST           PLT04160
07CD 1  076B                  DC       RT5         MANUAL CMD SELECTION    PLT04170
07CE 1  078C                  DC       RTOVR       TEST LOOP PROG.         PLT04180
                        *                                                    PLT04190
                        *                                                    PLT04200
                        *****          ROUTINE BUSY ******************       PLT04210
                        *                                                    PLT04220
                        *                                                    PLT04230
07CF 0  0000            BUSY  DC       /0000       RETURN ADDR          SE  PLT04240
07D0 01 CC000886              LDD  L   MBUSY       MSG- BUSY                PLT04250
07D2 01 440007D6              BSI  L   ERR1        USE ERROR ROUTINE    SC  PLT04260
07D4 01 4C8007CF              BSC  I   BUSY          TURN TO PROGRAM    SX  PLT04270
                        *                                                    PLT04280
                        *                                                    PLT04290
                        *****          ROUTINE ERROR TYPE OUT ********      PLT04300
                        *                                                    PLT04310
                        *                                                    PLT04320
07D6 0  0000            ERR1  DC       /0000       RETURN ADDR          SE  PLT04330
07D7 0  D816                  STD      ERMSG       SET ERROR MSG            PLT04340
07D8 01 C40005DE              LD   L   BSW0        LD BIT SW ZERO           PLT04350
07DA 0  100C                  SLA      12          TEST FOR BYPASS ERMSG    PLT04360
07DB 01 4CA807D6              BSC  I   ERR1,+Z     BYPASS ON MINUS          PLT04370
                        *                                                    PLT04380
07DD 00 44800012        ERBSY BSI  I   ERROR       CALL MONITOR ERROR   SC  PLT04390
07DF 1  07EC                  DC       ERRXX       MESSAGE LOCATION         PLT04400
07E0 1  07E5                  DC       REPT1       BUSY ADDR                PLT04410
07E1 1  07E5                  DC       REPT1       ERROR ADDR               PLT04420
07E2 01 658007D6              LDX  I1  ERR1                                 PLT04430
07E4 0  7002                  MDX      REPT1+2                              PLT04440
                        *                                                    PLT04450
07E5 01 650007DD        REPT1 LDX  L1  ERBSY                                PLT04460
07E7 01 600005E4              STX  L1  MLSCF                                PLT04470
07E9 00 4C800011              BSC  I   START                           SC  PLT04480
                        *                                                    PLT04490
07EC    0000                  BSS  E   0                                    PLT04500
07EC 0  0001            ERRXX DC       /0001       WORD COUNT               PLT04510
07ED 0  0C00                  DC       /0000       HEX CONTROL              PLT04520
07EE 0  0000            ERMSG DC       /0000       MSG NUMBER               PLT04530
07EF 0  0000                  DC       /0000       ALPHA 1                  PLT04540
07F0 0  0000                  DC       /0000       ALPHA 2                  PLT04550
07F1 0  0000            ERBIT DC       /0000       BITS IN ERROR            PLT04560
                        *                                                    PLT04570
                        *                                                    PLT04580
                        *****          ROUTINE DISPATCH ****************     PLT04590
                        *                                                    PLT04600
                        *                                                    PLT04610
07F2 0  0000            DISP  DC       /0000       RETURN ADDR          SE  PLT04620
07F3 01 6580089E        NEXT  LDX  I1  LOOK        RESTORE XR 1             PLT04630
07F5 01 6D00089E              STX  L1  LOOK        SAVE XR 1                PLT04640
07F7 00 CD800000              LDD  I1  0           GET COUNT + DIRECTION     PLT04650
07F9 01 DL000894              STD  L   COUNT                                PLT04660
                        *                                                    PLT04670
07F8 01 4C9807F2              BSC  I   DISP,+-     RETRN TO PROG ON ZERO SX PLT04680
07FD 01 0C000892        PLOT  XIO  L   MARK        MOVE COMMAND             PLT04690
07FF 01 0C000880              XIO  L   SENT        SENSE DSW                PLT04700
0801 01 F4000899              EOR  L   K0002       CHECK BUSY               PLT04710
0803 01 4C:80808              BSC  L   TIME,+-     BCH ON ZERO              PLT04720
0805 01 D40007F1              STO  L   ERBIT       SAVE ERROR BITS          PLT04730
0807 01 CC000884              LDD  L   MBITF       MSG- BIT FAILED          PLT04740
```



```
0809 01 440007D6              BSI  L   ERR1        USE ERROR ROUTINE    SC  PLT04750
                        *                                                    PLT04760
080B 00 65000700        TIME  LDX  L1  /0700       TIMING CONSTANT          PLT04770
080D 01 6D000896              STX  L1  CONST                                PLT04780
080F 01 65000815        HOPY  LDX  L1  HOP         GET MLSCF                PLT04790
0811 01 6D0005E6              STX  L1  MLSCF+2     SET MLSCF                PLT04800
0813 00 4C800011              BSC  I   START       RETURN TO MONITOR    SC  PLT04810
                        *                                                    PLT04820
0815 01 74FF0896        HOP   MDX  L   CONST,-1    REDUCE TIMER             PLT04830
0817 0  70F7                  MDX      HOPY                                 PLT04840
0818 01 CC00088A              LDD  L   MNINT       MSG- NO INTERRUPT        PLT04850
081A 01 440007D6              BSI  L   ERR1        USE ERROR ROUTINE    SC  PLT04860
                        *                                                    PLT04870
081C 01 0C000880        CONT  XIO  L   SENT                                  PLT04880
081E 0  1801                  SRA      1                                    PLT04890
081F 01 440407CF              BSI  L   BUSY,E      USE BUSY ROUTINE     SC  PLT04900
0821 01 74FF0894              MDX  L   COUNT,-1    REDUCE COUNT             PLT04910
0823 0  70D9                  MDX      PLOT                                 PLT04920
0824 01 7401089E              MDX  L   LOOK,1      BUMP INSTR ADDR PNTR     PLT04930
0826 0  70CC                  MDX      NEXT                                 PLT04940
                        *                                                    PLT04950
                        *                                                    PLT04960
                        *****          ROUTINE NOT READY *************       PLT04970
                        *                                                    PLT04980
                        *                                                    PLT04990
0827 0  0000            NRDY  DC       /0000       RETURN ADDR          SE  PLT05000
0828 01 CC00088C              LDD  L   MNRDY       MSG- NOT READY           PLT05010
082A 01 4400084A              BSI  L   TYPE        USE TYPE ROUTINE     SC  PLT05020
082C 01 4C800827              BSC  I   NRDY        RETURN TO PROGRAM    SX  PLT05030
                        *                                                    PLT05040
                        *                                                    PLT05050
                        *****          ROUTINE STATUS CHECK **********      PLT05060
                        *                                                    PLT05070
                        *                                                    PLT05080
082E 0  0000            READY DC       /0000       RETURN ADDR          SE  PLT05090
082F 01 0C000882              XIO  L   SENSE       SENSE DSW                PLT05100
0831 01 D40007F1              STO  L   ERBIT       SAVE DSW                 PLT05110
0833 01 44040827              BSI  L   NRDY,E      BCH IF BIT 15 ON     SC  PLT05120
0835 01 C40007F1              LD   L   ERBIT                                PLT05130
0837 0  1801                  SRA      1                                    PLT05140
0838 01 440407CF              BSI  L   BUSY,E      BCH IF BIT 14 ON     SC  PLT05150
                        *                                                    PLT05160
083A 01 C40007F1              LD   L   ERBIT       DSW ERR BITS             PLT05170
083C 01 E400089C              AND  L   K4003       CONSTANT                 PLT05180
083E 01 442007D6              BSI  L   ERR1,Z      BCH ON BITS          SC  PLT05190
0840 01 0C000882        NOT   XIO  L   SENSE       SENSE DSW                PLT05200
0842 01 4C98082E              BSC  I   READY,+-     RETURN TO PROG ON 0  SX  PLT05210
0844 01 65000840              LDX  L1  NOT         GET MLSCF                PLT05220
0846 01 6D0005E4              STX  L1  MLSCF       SET MLSCF                PLT05230
0848 00 4C800011              BSC  I   START       RETURN TO MONITOR    SC  PLT05240
                        *                                                    PLT05250
                        *****          ROUTINE TYPE ******************       PLT05260
                        *                                                    PLT05270
084A 0  0000            TYPE  DC       /0000       RETURN ADDR          SE  PLT05280
084B 0  D818                  STD      MSG         MSG AND NUMBER           PLT05290
084C 01 C40005DE              LD   L   BSW0        BIT SW STG               PLT05300
084E 0  100D                  SLA      13          TEST FOR BYPASS LOG      PLT05310
084F 01 4CA8084A              BSC  I   TYPE,+Z     BCH ON MINUS         SX  PLT05320
                        *                                                    PLT05330
0851 00 44800013        LOGAG BSI  I   LOG         CALL MONITOR LOG     SC  PLT05340
0853 1  0862                  DC       LOGM        ADDR OF MSG              PLT05350
0854 1  085C                  DC       LOGB        BUSY ADDR                PLT05360
0855 0  0000                  DC                                            PLT05370
0856 01 6580084A              LDX  I1  TYPE        GET MLSCF                PLT05380
0858 01 6D0005E4              STX  L1  MLSCF       SET MLSCF                PLT05390
085A 00 4C800011              BSC  I   START       RETURN TO MONITOR    SC  PLT05400
                        *                                                    PLT05410
085C 01 65000851        LOGB  LDX  L1  LOGAG                                PLT05420
```

```
085E 01 6D0005E5          STX  L1 MLSCF+1                          PLT05430
0860 00 4C800011          BSC  I  START                        SC  PLT05440
                          *                                        PLT05450
0862    0000              BSS  E  0                                PLT05460
0862 0  0000      LOGM    DC       /0000       WORD COUNT          PLT05470
0863 0  0000              DC       /0000       HEX                 PLT05480
0864 0  0000      MSG     DC       /0000       MESSAGE NUMBER      PLT05490
0865 0  0000              DC       /0000       ALPHA 1             PLT05500
0866 0  0000              DC       /0000                 2         PLT05510
                          ********************************************PLT05520
                          *                                        PLT05530
                          *****           STORAGE AREA ************** PLT05540
                          *                                        PLT05550
                          *                                        PLT05560
0868    0000              BSS  E  0                                PLT05570
0868 0  0000      NN      DC       /0000       MOVE COUNT          PLT05580
0869 0  4000              DC       /4000       DIRECTION           PLT05590
086A 0  0000      S       DC       /0000                           PLT05600
086B 0  2000              DC       /2000                           PLT05610
086C 0  0000      EE      DC       /0000                           PLT05620
086D 0  1000              DC       /1000                           PLT05630
086E 0  0000      WW      DC       /0000                           PLT05640
086F 0  0800              DC       /0800                           PLT05650
0870 0  0000      NE      DC       /0000                           PLT05660
0871 0  5000              DC       /5000                           PLT05670
0872 0  0000      SE      DC       /0000                           PLT05680
0873 0  3000              DC       /3000                           PLT05690
0874 0  0000      SW      DC       /0000                           PLT05700
0875 0  2800              DC       /2800                           PLT05710
0876 0  0000      NW      DC       /0000                           PLT05720
0877 0  4800              DC       /4800                           PLT05730
0878 0  0001      PENUP   DC       /0001                           PLT05740
0879 0  0400              DC       /0400                           PLT05750
087A 0  0001      PENDW   DC       /0001                           PLT05760
087B 0  8000              DC       /8000                           PLT05770
087C 0  044C      LEFT    DC       1100                            PLT05780
087D 0  0800              DC       /0800                           PLT05790
087E 0  1100      BSWCT   DC       /1100       CMD EXECUTE CNTR    PLT05800
087F 1  05E0      SBSW2   DC       BSW2        PLOT CMD STORAGE.   PLT05810
0880 0  0000      SENT    DC       /0000       SENSE DSW           PLT05820
0881 0  2F00              DC       /2F00                           PLT05830
0882 0  0000      SENSE   DC       /0000       SENSE DSW + RESET   PLT05840
0883 0  2F01              DC       /2F01                           PLT05850
0884 0  0001      MBITF   DC       1           MESSAGE NUMBER      PLT05860
0885 1  0977              DC       ABITF       MSG- BIT FAILED     PLT05870
0886 0  0002      MBUSY   DC       2           MESSAGE NUMBER      PLT05880
0887 1  0982              DC       ABUSY       MSG- BUSY           PLT05890
0888 0  0003      MEND    DC       3           MESSAGE NUMBER      PLT05900
0889 0  0037              DC       AEND        MSG- END OF TEST    PLT05910
088A 0  0004      MNINT   DC       4           MESSAGE NUMBER      PLT05920
088B 0  0041              DC       ANINT       MSG- NO INTERRUPT   PLT05930
088C 0  0005      MNRDY   DC       5           MESSAGE NUMBER      PLT05940
088D 0  0048              DC       ANRDY       MSG- NOT READY      PLT05950
088E 0  0007      MWASB   DC       7           MESSAGE NUMBER      PLT05960
088F 1  0987              DC       AWASB       MSG- WAS S/B        PLT05970
0890 0  0008      MHALT   DC       8           MESSAGE NUMBER      PLT05980
0891 1  098F              DC       AHALT       MSG- PROG HALT      PLT05990
                          *                                        PLT06000
0892 1  0895      MARK    DC       COMAD       DIRECTION COMMAND   PLT06010
0893 0  2900              DC       /2900                           PLT06020
0894 0  0000      COUNT   DC       /0000                           PLT06030
0895 0  0000      COMAD   DC       /0000                           PLT06040
0896 0  0000      CONST   DC       /0000                           PLT06050
0897 0  0000      EXTRA   DC       /0000                           PLT06060
0898 0  0000      K0000   DC       /0000       ZERO CONSTANT       PLT06070
0899 0  0002      K0002   DC       /0002                           PLT06080
089A 0  0007      K0007   DC       /0007                           PLT06090
089B 0  0096      K0150   DC       150         CONSTANT            PLT06100
```



```
089C 0  BFFC      K4003   DC       /BFFC       CONSTANT            PLT06110
089D 0  8000      K8000   DC       /8000                           PLT06120
089E 0  0000      LOOK    DC       /0000       START OF STRING     PLT06130
089F 0  0000      SQRCT   DC       /0000                           PLT06140
08A0 0  0000      TRICT   DC       /000        TRIANGLE COUNT      PLT06150
                          *                                        PLT06160
                          *                                        PLT06170
08A1 1  0878      RT1ST   DC       PENUP                           PLT06180
08A2 1  087C              DC       LEFT                            PLT06190
08A3 1  0870              DC       NE                              PLT06200
08A4 1  087A              DC       PENDW       START OCTAGON NO. 1 PLT06210
08A5 1  0868              DC       NN          1A                  PLT06220
08A6 1  0878              DC       PENUP                           PLT06230
08A7 1  086C              DC       EE                              PLT06240
08A8 1  0870              DC       NE                              PLT06250
08A9 1  087A              DC       PENDW                           PLT06260
08AA 1  0872              DC       SE          2A                  PLT06270
08AB 1  0878              DC       PENUP                           PLT06280
08AC 1  0874              DC       SW                              PLT06290
08AD 1  086A              DC       S                               PLT06300
08AE 1  087A              DC       PENDW                           PLT06310
08AF 1  086E              DC       WW          3A                  PLT06320
08B0 1  0878              DC       PENUP                           PLT06330
08B1 1  0868              DC       NN                              PLT06340
08B2 1  0876              DC       NW                              PLT06350
08B3 1  087A              DC       PENDW                           PLT06360
08B4 1  0870              DC       NE          4A                  PLT06370
08B5 1  0878              DC       PENUP                           PLT06380
08B6 1  0872              DC       SE                              PLT06390
08B7 1  086C              DC       EE                              PLT06400
08B8 1  087A              DC       PENDW                           PLT06410
08B9 1  086A              DC       S           5A                  PLT06420
08BA 1  0878              DC       PENUP                           PLT06430
08BB 1  086E              DC       WW                              PLT06440
08BC 1  0874              DC       SW                              PLT06450
08BD 1  087A              DC       PENDW                           PLT06460
08BE 1  0876              DC       NW          6A                  PLT06470
08BF 1  0878              DC       PENUP                           PLT06480
08C0 1  0870              DC       NE                              PLT06490
08C1 1  0868              DC       NN                              PLT06500
08C2 1  087A              DC       PENDW                           PLT06510
08C3 1  086C              DC       EE          7A                  PLT06520
08C4 1  0878              DC       PENUP                           PLT06530
08C5 1  086A              DC       S                               PLT06540
08C6 1  0872              DC       SE                              PLT06550
08C7 1  087A              DC       PENDW                           PLT06560
08C8 1  0874              DC       SW          8A                  PLT06570
08C9 1  0878              DC       PENUP                           PLT06580
08CA 1  086C              DC       EE                              PLT06590
08CB 1  0898              DC       K0000                           PLT06600
08CC 1  086C              DC       EE                              PLT06610
08CD 1  087A              DC       PENDW       START OCTAGON NO. 2 PLT06620
08CE 1  086C              DC       EE          1B                  PLT06630
08CF 1  0878              DC       PENUP                           PLT06640
08D0 1  0868              DC       NN                              PLT06650
08D1 1  0870              DC       NE                              PLT06660
08D2 1  087A              DC       PENDW       2B                  PLT06670
08D3 1  0876              DC       NW                              PLT06680
08D4 1  0878              DC       PENUP                           PLT06690
08D5 1  0874              DC       SW                              PLT06700
08D6 1  086E              DC       WW                              PLT06710
08D7 1  087A              DC       PENDW       3B                  PLT06720
08D8 1  086A              DC       S                               PLT06730
08D9 1  0878              DC       PENUP                           PLT06740
08DA 1  086C              DC       EE                              PLT06750
08DB 1  0872              DC       SE                              PLT06760
08DC 1  087A              DC       PENDW       4B                  PLT06770
08DD 1  0870              DC       NE                              PLT06780
```

```
08DE 1 0878          DC    PENUP                    PLT06790
08DF 1 0876          DC    NW                       PLT06800
08E0 1 0868          DC    NN                       PLT06810
08E1 1 087A          DC    PENDW     5B             PLT06820
08E2 1 086E          DC    WW                       PLT06830
08E3 1 0878          DC    PENUP                    PLT06840
08E4 1 086A          DC    S                        PLT06850
08E5 1 0874          DC    SW                       PLT06860
08E6 1 087A          DC    PENDW     6B             PLT06870
08E7 1 0872          DC    SE                       PLT06880
08E8 1 0878          DC    PENUP                    PLT06890
08E9 1 0870          DC    NE                       PLT06900
08EA 1 086C          DC    EE                       PLT06910
08EB 1 087A          DC    PENDW     7B             PLT06920
08EC 1 0868          DC    NN                       PLT06930
08ED 1 0878          DC    PENUP                    PLT06940
08EE 1 086E          DC    WW                       PLT06950
08EF 1 0876          DC    NW                       PLT06960
08F0 1 087A          DC    PENDW     8B             PLT06970
08F1 1 0874          DC    SW                       PLT06980
08F2 1 0878          DC    PENUP                    PLT06990
08F3 1 0898          DC    K0000     END OF ROUTINE PLT07000
                     *                              PLT07010
08F4 1 0878    RT2ST DC    PENUP                    PLT07020
08F5 1 087C          DC    LEFT      PUT PEN AT LEFT MARGIN PLT07030
08F6 1 0870          DC    NE        POSITION PEN FOR START PLT07040
08F7 1 0868          DC    NN                       PLT07050
08F8 1 086E          DC    WW                       PLT07060
08F9 1 0898          DC    K0000                    PLT07070
08FA 1 087A          DC    PENDW                    PLT07080
08FB 1 086C          DC    EE        MOVE 10 INCHES EAST PLT07090
08FC 1 0876          DC    NW        PLOT SAWTOOTH PATTERN PLT07100
08FD 1 0874          DC    SW        FROM EAST TO WEST PLT07110
08FE 1 0898          DC    K0000     REPEAT FIVE TIMES PLT07120
08FF 1 0868          DC    NN                       PLT07130
0900 1 0872          DC    SE        PLOT SAWTOOTH PATTERN PLT07140
0901 1 0870          DC    NE        FROM WEST TO EAST PLT07150
0902 1 0898          DC    K0000                    PLT07160
0903 1 086A          DC    S         PLOT PERPENDICULAR PLT07170
0904 1 0878          DC    PENUP      LINES, JOINING THE PLT07180
0905 1 086E          DC    WW           POINTS OF EACH PLT07190
0906 1 087A          DC    PENDW          SAWTOOTH.   PLT07200
0907 1 0868          DC    NN                       PLT07210
0908 1 0878          DC    PENUP                    PLT07220
0909 1 086E          DC    WW                       PLT07230
090A 1 087A          DC    PENDW                    PLT07240
090B 1 0898          DC    K0000     RPT ABOVE SEQ 10 TIMES PLT07250
090C 1 086C          DC    EE        PLOT TOP OF PATTERN PLT07260
090D 1 0878          DC    PENUP                    PLT07270
090E 1 086A          DC    S                        PLT07280
090F 1 087A          DC    PENDW                    PLT07290
0910 1 086E          DC    WW        PLOT LINE THRU CENTER PLT07300
0911 1 0878          DC    PENUP     OF PATTERN     PLT07310
0912 1 0898          DC    K0000     END OF ROUTINE PLT07320
                     *                              PLT07330
0913 1 0878    RT3ST DC    PENUP     RAISE PEN      PLT07340
0914 1 087C          DC    LEFT      PUT PEN AT LEFT MARGIN PLT07350
0915 1 086C          DC    EE        POSITION PEN TO START PLT07360
0916 1 0868          DC    NN        SWING TEST PATTERN. PLT07370
0917 1 0898          DC    K0000                    PLT07380
0918 1 087A          DC    PENDW                    PLT07390
0919 1 0868          DC    NN        PLOT LEFT SIDE OF SQ. PLT07400
091A 1 086C          DC    EE        PLOT TOP OF SQUARE. PLT07410
091B 1 086A          DC    S         PLOT 1/4 INCH SEGMENT PLT07420
091C 1 0898          DC    K0000                    PLT07430
091D 1 086E          DC    WW        PLOT 1/4 INCH SEGMENT PLT07440
091E 1 0898          DC    K0000                    PLT07450
091F 1 0878          DC    PENUP     POSITION PEN FOR NEXT PLT07460
```



```
0920 1 0870          DC    NE        SMALLER SQUARE. PLT07470
0921 1 0898          DC    K0000                    PLT07480
0922 1 087A          DC    PENDW     PLOT DIAGONAL LINES PLT07490
0923 1 0872          DC    SE        THRU THE SET OF PLT07500
0924 1 0878          DC    PENUP     SQUARES AND FINISH PLT07510
0925 1 0868          DC    NN        THE SWING TEST. PLT07520
0926 1 087A          DC    PENDW                    PLT07530
0927 1 0874          DC    SW                       PLT07540
0928 1 0898          DC    K0000                    PLT07550
0929 1 0876          DC    NW                       PLT07560
092A 1 0898          DC    K0000                    PLT07570
092B 1 0878          DC    PENUP                    PLT07580
092C 1 086A          DC    S                        PLT07590
092D 1 087A          DC    PENDW                    PLT07600
092E 1 0870          DC    NE                       PLT07610
092F 1 0898          DC    K0000     END OF ROUTINE 3. PLT07620
                     *                              PLT07630
0930 1 0878    RT4ST DC    PENUP     PICK UP PEN AND PUT PLT07640
0931 1 087C          DC    LEFT      IT AT LEFT MARGIN. PLT07650
0932 1 0870          DC    NE                       PLT07660
0933 1 0868          DC    NN        POSITION PEN TO START PLT07670
0934 1 0868          DC    NN        WINDMILL PATTERN PLT07680
0935 1 0898          DC    K0000                    PLT07690
0936 1 087A          DC    PENDW                    PLT07700
0937 1 0874          DC    SW        SIDE 1 TRI 1   PLT07710
0938 1 0876          DC    NW                       PLT07720
0939 1 0898          DC    K0000                    PLT07730
093A 1 0876          DC    NW        SIDE 2 TRI 1   PLT07740
093B 1 0870          DC    NE                       PLT07750
093C 1 0898          DC    K0000                    PLT07760
093D 1 0868          DC    NN        SIDE 3 TRI 1   PLT07770
093E 1 0872          DC    SE                       PLT07780
093F 1 0872          DC    SE                       PLT07790
0940 1 0898          DC    K0000                    PLT07800
0941 1 0878          DC    PENUP     MOVE TO NEW LOCATION PLT07810
0942 1 0870          DC    NE                       PLT07820
0943 1 0898          DC    K0000                    PLT07830
0944 1 087A          DC    PENDW                    PLT07840
0945 1 0876          DC    NW        SIDE 1 TRI 2   PLT07850
0946 1 0870          DC    NE                       PLT07860
0947 1 0898          DC    K0000                    PLT07870
0948 1 0870          DC    NE        SIDE 2 TRI 2   PLT07880
0949 1 0872          DC    SE                       PLT07890
094A 1 0898          DC    K0000                    PLT07900
094B 1 086C          DC    EE        SIDE 3 TRI 2   PLT07910
094C 1 0874          DC    SW                       PLT07920
094D 1 0874          DC    SW                       PLT07930
094E 1 0898          DC    K0000                    PLT07940
094F 1 0878          DC    PENUP                    PLT07950
0950 1 0872          DC    SE                       PLT07960
0951 1 0898          DC    K0000                    PLT07970
0952 1 087A          DC    PENDW                    PLT07980
0953 1 0870          DC    NE        SIDE 1 TRI 3   PLT07990
0954 1 0872          DC    SE                       PLT08000
0955 1 0898          DC    K0000                    PLT08010
0956 1 0872          DC    SE        SIDE 2 TRI 3   PLT08020
0957 1 0874          DC    SW                       PLT08030
0958 1 0898          DC    K0000                    PLT08040
0959 1 086A          DC    S         SIDE 3 TRI 3   PLT08050
095A 1 0876          DC    NW                       PLT08060
095B 1 0876          DC    NW                       PLT08070
095C 1 0898          DC    K0000                    PLT08080
095D 1 0878          DC    PENUP                    PLT08090
095E 1 0874          DC    SW                       PLT08100
095F 1 0898          DC    K0000                    PLT08110
0960 1 087A          DC    PENDW                    PLT08120
0961 1 0872          DC    SE        SIDE 1 TRI 4   PLT08130
0962 1 0874          DC    SW                       PLT08140
```

```
0963 1  0898            DC      K0000                           PLT08150
0964 1  0874            DC      SW          SIDE 2 TRI 4        PLT08160
0965 1  0876            DC      NW                              PLT08170
0966 1  0898            DC      K0000                           PLT08180
0967 1  086E            DC      WW          SIDE 3 TRI 4        PLT08190
0968 1  0870            DC      NE                              PLT08200
0969 1  0870            DC      NE                              PLT08210
096A 1  0898            DC      K0000                           PLT08220
096B 1  0878            DC      PENUP                           PLT08230
096C 1  0876            DC      NW                              PLT08240
096D 1  0898            DC      K0000                           PLT08250
096E 1  087A            DC      PENDW                           PLT08260
096F 1  0870            DC      NE                              PLT08270
097C 1  0872            DC      SE                              PLT08280
0971 1  0874            DC      SW                              PLT08290
0972 1  0876            DC      NW                              PLT08300
0973 1  0878            DC      PENUP                           PLT08310
0974 1  0898            DC      K0000                           PLT08320
                *                                               PLT08330
0975 1  087E    RT5ST   DC      BSWCT                           PLT08340
0976 1  0898            DC      K0000                           PLT08350
                *                                               PLT08360
0977 0  1A32    ABITF   DC      /1A32       BIT FAILED          PLT08370
0978 0  2239            DC      /2239       I                   PLT08380
0979 0  9E13            DC      /9E13       T                   PLT08390
097A 0  211A            DC      /211A        SPACE              PLT08400
097B 0  1236            DC      /1236       F                   PLT08410
097C 0  3E31            DC      /3E31       A                   PLT08420
097D 0  2239            DC      /2239       I                   PLT08430
097E 0  5E23            DC      /5E23       L                   PLT08440
097F 0  3636            DC      /3636       E                   PLT08450
0980 0  3234            DC      /3234       D                   PLT08460
0981 0  FFFF            DC      /FFFF                           PLT08470
                *                                               PLT08480
0982 0  1A32    ABUSY   DC      /1A32       BUSY                PLT08490
0983 0  B214            DC      /B214       U                   PLT08500
0984 0  9A12            DC      /9A12       S                   PLT08510
0985 0  A618            DC      /A618       Y                   PLT08520
0986 0  FFFF            DC      /FFFF                           PLT08530
                *                                               PLT08540
0987 0  9216    AWASB   DC      /9216       WAS  S/B            PLT08550
0988 0  3E31            DC      /3E31       A                   PLT08560
0989 0  9A12            DC      /9A12       S                   PLT08570
098A 0  211A            DC      /211A        SPACE              PLT08580
098B 0  9A12            DC      /9A12       S                   PLT08590
098C 0  BC11            DC      /BC11       /                   PLT08600
098D 0  1A32            DC      /1A32       B                   PLT08610
098E 0  FFFF            DC      /FFFF                           PLT08620
                *                                               PLT08630
098F 0  5627    AHALT   DC      /5627       PROG HALT           PLT08640
0990 0  6229            DC      /6229       R                   PLT08650
0991 0  5206            DC      /5206       O                   PLT08660
0992 0  1637            DC      /1637       G                   PLT08670
0993 0  211A            DC      /211A                           PLT08680
0994 0  2638            DC      /2638       H                   PLT08690
0995 0  3E31            DC      /3E31       A                   PLT08700
0996 0  5E23            DC      /5E23       L                   PLT08710
0997 0  9E13            DC      /9E13       T                   PLT08720
0998 0  FFFF            DC      /FFFFF                          PLT08730
099A    05E8            END     PLBGN                           PLT08740
```


CROSS REFERENCE LISTING

```
SYMBOL  VALUE   REFERENCES
ABITF   0977    0885
ABUSY   0982    0887
ADSCT   0058    05DC
AEND    0037    05DC,0889
AHALT   098F    0891
AINT    0044    05DC
AIVD    003B    05DC
ALD     003E    05DC
ANINT   0041    05DC,088B
ANRDY   0048    05DC,088D
AQ5A    0019
ARDY    004C    05DC
ASB     0054    05DC
ASCT    005A    05DC
ASWS    0050    05DC
AWAS    0060
AWASB   0987    088F
BEGIN   0010    05DC,05E8
BSWCK   0794    061C,0670,06E9,0723,0772,078A,079E,078B,078D
BSWCT   087E    0975
BSW0    05DE    078C,0795,07B7,07D8,084C
BSW1    05DF    079C,07A7
BSW2    05E0    076F,077E,087F
BSW3    05E1
BUSY    07CF    07D4,081F,0838
CHG1    0757    0729
CHG2    075E    072B
CHG3    0766    072D
COMAD   0895    0892
CONST   0896    080D,0815
CONT    081C    05F5,0786
COUNT   0894    07F9,0821
DISP    07F2    0616,061A,063E,0646,0652,065E,066E,0687,06A8,068F,
                06CE,06DD,06FA,0721,0736,0743,0750,0764,0784,07FB
EE      086C    0633,0644,0681,069C,0688,068A,08A7,0887,08C3,08CA,
                08CC,08CE,08DA,08EA,08FB,090C,0915,091A,094B
END     0015    05DC,0791
ERBIT   07F1    05F3,0805,0831,0835,083A
ERBSY   07DD    07E5
ERMSG   07EE    07D7
ERROR   0012    05DC,07DD
ERRXX   07EC    07DF
ERR1    07D6    07D2,07DB,07E2,0809,081A,083E
ETRAP   0018    05DC
EXTRA   0897    063C,064A,0650,0656,065A,0662,06A6,06AC,06DB,06E1,
                0734,073A,0741,0747,074E,0754
FNC0    0795
FNC1    079C
GOT     0605    05E3
HALT    0014    05DC
HLTSW   07B1    07B9
HOP     0815    080F
HOPY    080F    0817
ILCRP   0030    05DC
ILIR    0036    05DC
ILP     05E2
ILPAT   0032    05DC
IL0     0028    05DC
IL1     0029    05DC
IL2     002A    05DC
IL3     002B    05DC,05FE
IL4     002C    05DC
KEEP    068E
K0000   0898    08CB,08F3,08F9,08FE,0902,0908,0912,0917,091C,091E,
                0921,0928,092A,092F,0935,0939,093C,0940,0943,0947,
```

		094A,094E,0951,0955,0958,095C,095F,0963,0966,096A,096D,0974,0976
K0002	0899	06FF,0801
K0007	089A	07A0
K0150	0898	060B
K4003	089C	083C
K8000	089D	05F1
LDRT1	078F	07C8
LEFT	087C	08A2,08F5,0914,0931
LOG	0913	05DC,0851
LOGAG	0851	085C
LOGB	085C	0854
LOGBY	0916	05DC
LOGM	0862	0853
LOOK	089E	0614,0618,0639,0640,0648,064D,0654,065C,0660,0665,0685,0689,06AA,06AF,06C1,06C6,06D0,06DF,06E4,06F8,06FC,071F,0738,073D,0745,074A,0752,0759,0760,0768,076D,07F3,07F5,0824
LPA	05E3	
MARK	0892	07FD
MBITF	0884	0807
MBUSY	0886	07D0
MEND	0888	
MHALT	0890	07AD
MLSCF	05F4	05F7,0602,0776,07B3,07C4,07E7,0811,0846,0858,085E
MNINT	088A	0818
MNRDY	088C	0828
MSG	0864	0848
MWAS8	088E	
NE	0870	062D,067E,0608,06F2,0705,0719,0757,075E,0766,08A3,08A8,08B4,08C0,08D1,08DD,08E9,08F6,0901,0920,092E,0932,093B,0942,0946,0948,0953,0968,0969,096F
NEXT	07F3	0826
NN	0868	060E,0629,0678,069A,06B4,06B6,06CA,06F4,0701,08A5,08B1,08C1,08D0,08E0,08EC,08F7,08FF,0907,0916,0919,0925,0933,0934,093D
NOGO	0787	0781
NOT	0840	0844
NRDY	0827	082C,0833
NW	0876	0625,0680,0696,0711,0717,0882,088E,08D3,08DF,08EF,08FC,0929,0938,093A,0945,095A,0958,0965,096C,0972
OCTGN	06CE	0611
OLD	06DA	06E8
PENDW	087A	08A4,09A9,08AE,08B3,0888,08BD,08C2,08C7,08CD,08D2,08D7,08DC,08E1,08E6,08E8,08F0,08FA,0906,090A,090F,0918,0922,0926,092D,0936,0944,0952,0960,096E
PENUP	0878	08A1,08A6,08AB,08B0,08B5,08BA,08BF,08C4,08C9,08CF,08D4,08D9,08DE,08E3,08E8,08ED,08F2,08F4,0904,0908,090D,0911,0913,091F,0924,092B,0930,0941,094F,095D,0968,0973
PID	05DC	05EA,0793
PLBGN	05E8	0999
PLOT	07FD	0823
READY	082E	0609,0621,0675,06EE,0842
RECEV	05ED	05E8,05F9,05FC
RECSW	05F5	077C,0788
REG01	0646	064C
REG02	0652	0658
REG03	065E	0664
REPT1	07E5	07E0,07E1,07E4
RERUN	07C2	07A9,07AC
RID	05D0	07A2,07A4,07AA,07C0
RLOOP	07AA	079A
RQKB	0034	05DC
RQTY	0033	05DC
RSTKB	0017	05DC
RTABL	07C8	07C2
RTOVR	078C	07CE

RTSET	07C0	061F,0673,06EC,0726
RT0	05FB	05E2,0603,0605
RT1	0609	07C9
RT1ST	08A1	0612
RT2	0621	07CA
RT2ST	08F4	0637
RT3	0675	07C9
RT3ST	0913	0683
RT4	06EE	07CC
RT4ST	0930	06F6
RT5	0768	0774,07CD
RT5A	077A	0771,077A
RT5ST	0975	0768
RUN	0732	076A
RUNIT	078D	0600,078F
S	086A	062B,0668,C694,06CC,08AD,08B9,08C5,08D8,03E4,0903,090E,091B,092C,0959
SBSW2	087F	0782
SE	0872	062F,068F,0709,071B,08AA,08B6,08C6,08DB,08E7,0900,0923,093E,093F,0949,0950,0954,0956,0961,0970
SENSE	0882	05EE,082F,0840
SENT	0880	07FF,081C
SIDE1	0736	073C
SIDE2	0743	0749
SIDE3	0750	0756
SORCT	089F	069F,06C3
START	0811	05DC,0607,0778,0785,07C6,07E9,0813,0848,085A,0860
STOP	074D	0797
SWKB	0035	05DC
SW	0874	0627,0691,070D,071D,084C,088C,08C8,08D5,08E5,08F1,08FD,0927,0937,094C,094D,0957,095E,0962,0964,0971
SWNG1	06A1	06C5
SWNG2	06A4	0678,0683,068C
SWNG3	06A8	06AE
SWNG4	06DD	06E3
TCNTL	0728	0707,070B,070F,0713,0762
TIME	0808	0803
TOP	0764	075D
TRICT	08A0	06A2,06B1,06D3,06E6,0730,075B
TYPE	084A	07AF,082A,084F,0856
WMIL1	0701	0704
WW	096E	0635,066C,C696,08AF,08BB,08D6,08E2,08EE,08F8,0905,0909,C910,091D,0967

PAPER TAPE READER/PUNCH FUNCTION TEST

TABLE OF CONTENTS

PAPER TAPE READER/PUNCH FUNCTION TEST

1. PURPOSE

THE FUNCTION TEST IS DESIGNED (1) TO TEST FOR PROPER OPERATION OF THE PAPER-TAPE STATUS INDICATORS AND (2) TO TEST FOR ACCURATE DATA HANDLING BY THE PAPER-TAPE READER AND PAPER-TAPE PUNCH WHEN OVERLAPPED WITH OTHER ELEMENTS OF THE 1130 COMPUTING SYSTEM.

2. PREREQUISITES

2.1 PROGRAM PREREQUISITES

THE FUNCTION TEST MUST RUN UNDER CONTROL OF THE DIAGNOSTIC MONITOR.

2.2 DECK CUSTOMIZATION

IF THE SYSTEM HAS A PAPER TAPE READER OR A PAPER TAPE PUNCH BUT NOT BOTH, THIS PROCEDURE WILL SELECT AN INITIAL ROUTINE TO BE LOOPED UNTIL THE OPERATOR SELECTS A DIFFERENT ROUTINE OR TERMINATES THE PROGRAM. THIS INFORMATION MAY BE MADE A PERMANENT PART OF THE PAPER TAPE FUNCTION TEST OBJECT DECK BY INSERTING AN EDIT CARD IN FRONT OF THE LAST CARD OF THE DECK.

THE EDIT CARD SHOULD BE PUNCHED AS FOLLOWS,

FOR PUNCH ONLY	FOR READER ONLY
COLS 1-10, +05DF 0001	COLS 1-10, +05DF 0002
COLS 11-19, BLANK	COLS 11-19, BLANK
COLS 20-29, PUNCH ONLY	COLS 20-29, READER ONLY

IF THE EDIT CARDS ARE NOT IN THE DECK, READ/PUNCH ONLY CAN BE SPECIFIED BY THE BIT SWITCHES AS IS OUTLINED IN SECTION 3.2.1-B.

2.3 EQUIPMENT PREREQUISITES

A. A PAPER-TAPE READER AND/OR PAPER-TAPE PUNCH.

3. USE PROCEDURE

3.1 LOADING

THIS PROGRAM FOLLOWS THE LOADING PROCEDURES ESTABLISHED BY THE 1130 DIAGNOSTIC MONITOR. REFER TO D. M. DOCUMENTATION.
LOAD THE PAPER TAPE PUNCH WITH BLANK TAPE. LOAD TEST TAPE PRODUCED BY PUNCH INTO THE READER.
FOR THE CONVENIENCE OF 'READER ONLY' SYSTEMS, THE TEST PATTERN HAS BEEN INCLUDED ON THE END OF THE PAPER TAPE PROGRAM TAPE AND MAY BE IDENTIFIED BY COMPARING WITH THE SAMPLE TAPE, SECTION 6.1.

3.2 OPERATION

3.2.1 PROGRAM EXECUTION

A. LOAD AND GO MODE

ALL ROUTINES WILL BE EXECUTED EXCEPT ROUTINE 4 AND 5.
ANY DETECTED ERRORS WILL BE IDENTIFIED BY AN ERROR TYPEOUT.

B. SINGLE PROGRAM AND OVERLAP MODE

AFTER PROGRAM IS LOADED,THE MONITOR WILL WAIT
TO ALLOW OPTIONS TO BE SPECIFIED.

1. SPECIFY DESIRED OPTIONS AS INSTRUCTED IN SECTION 3.2.2.
IF NO OPTIONS ARE DESIRED, NO ENTRY IS REQUIRED.
TO EXECUTE ROUTINE 4 OR 5, THE DESIRED ROUTINE MUST BE
SELECTED. THEN THAT ROUTINE AND ONLY THAT ROUTINE
WILL EXECUTE.

2. IF A READER ONLY OR A PUNCH ONLY IS TO BE TESTED AND
NO EDIT CARDS HAVE BEEN ADDED TO THE DECK, SELECT THE PROPER
ROUTINE AS FOLLOWS,

SW. SETTING		ROUTINE
4B01	1	PUNCH TEST
4B02	2	READER TEST

PRESS INTERRUPT REQUEST KEY

3. TO START EXECUTION - EXECUTE MODE MUST BE SPECIFIED
SET BIT SWITCHES FOR DESIRED MODE

SW. SETTING	CONTROL
0C80	EXECUTE WITH NO OPTIONS
0C88	LOOP ON ERROR
0C84	BYPASS ALL ERROR PRINTOUTS
0C82	HALT ON ANY ERROR
008C	LOOP ON ERROR AND BYPASS ALL ERROR PRINTOUTS
0C90	LOOP ALL PROGRAMS
0092	LOOP ALL PROGRAMS AND HALT ON ERRORS

PRESS INTERRUPT REQUEST KEY.

3.2.2 PROGRAM OPTIONS

THE OPERATOR MAY MODIFY THE EXECUTION OF THE PROGRAM ANY TIME BEFORE
OR AFTER IT HAS STARTED EXECUTION BY ENTERING PROGRAM CONTROL OPTIONS
OR ROUTINE SELECTION OPTIONS.

A. PROGRAM CONTROL OPTIONS

1. TO SELECT PROGRAM OPTIONS SET BIT SWITCHES AS INDICATED

SW. SETTING	CONTROL
0800	RESET ALL CONTROL OPTIONS
0801	HALT PAPER TAPE PROGRAM (TO START AFTER HALT, SET SWS TO DESIRED CONTROL OPTION OR 0800, THEN PRESS INTERRUPT REQUEST KEY.)
0840	REALIGN PAPER TAPE IN READER
0880	MANUALLY ALIGN TAPE IN READER

2. PRESS INTERRUPT REQUEST KEY.

B. ROUTINE SELECTION

THE SELECTED ROUTINE WILL LOOP UNTIL THE SELECTION IS CHANGED.

1. TO SELECT ROUTINE OPTIONS SET BIT SWITCHES AS INDICATED

SW. SETTING		ROUTINE
4B00		ALL ROUTINES
4B01	1	PUNCH TEST
4B02	2	READER TEST
4B03	3	PUNCH-READ-COMPARE
OPTIONAL ROUTINES		
4B04	4	REPRODUCE TAPE
4B05	5	PUNCH FROM BIT SWITCHES (SEE SEC) 5.5)

2. PRESS INTERRUPT REQUEST KEY.

NOTE

ROUTINE 4 AND 5 ARE LOOPING ROUTINES WITH NO
TERMINATION. THEY WILL BE EXECUTED ONLY IF
SELECTED.

3.3 TERMINATION

IF THERE ARE NO 'LOOP' CONTROL OPTIONS SELECTED, THE PROGRAM WILL
TERMINATE AFTER ONE PASS. IF OPTIONS TO LOOP HAVE BEEN SELECTED,
THE PROGRAM MAY BE TERMINATED BY-

1. REMOVE LOOP OPTIONS AND ALLOW NORMAL TERMINATION.
OR
2. SET ENTRY SWITCHES TO 400B AND PRESS THE INTRPT REQ. KEY.

3.4 RESTART

TO RESTART THE PROGRAM.

1. SET SWITCHES TO 408B.
2. PRESS INTERRUPT REQUEST KEY.
3. SET SWITCHES TO 0080.
4. PRESS INTERRUPT REQUEST KEY.

NOTE

DEPENDING ON HOW THE PROGRAM WAS TERMINATED, THE
LAST TWO STEPS MAY NOT BE REQUIRED.

4. PRINTOUTS

ALL PRINTOUTS ARE IN THE STANDARD FORMAT.

APPNN OORR (MESSAGE)
OR
EPPNN CORR (MESSAGE)

WHERE A IDENTIFIES STATUS MESSAGES
E IDENTIFIES ERROR MESSAGES
PP IS THE PID OF THE PROGRAM CAUSING THE MESSAGE
NN IS THE MESSAGE SEQUENCE NUMBER
RR IS THE ROUTINE NUMBER
MESSAGE IS ANY VARIABLE INFORMATION

4.1 STATUS MESSAGES

A0B02 0004 RDR ERROR

DSW ERROR WAS DETECTED AFTER A READ COMMAND. OPERATOR MUST DETERMINE IF TAPE WAS READ PROPERLY BY COMPARING TAPE COLUMN JUST PAST READ STATION WITH MODIFIER WORD OF ERROR-PRINTOUT E0B16 (SEE 4.2). AFTER MAKING ANY TAPE ADJUSTMENTS NECESSARY, SELECT PROGRAM CONTROL OPTIONS PER STEPS A AND B OF PARAGRAPH 3.3 AND TABLE 1.

A0B03 000X TAPE ALIGNED

THE PAPER TAPE TEST RECORD IS ASSUMED TO BE PROPERLY ALIGNED IN THE READER AT THIS TIME.

4.2 ERROR PRINTOUTS

	(ROUTINE)	(DSW WAS)	(DSW SHOULD HAVE BEEN)
E0B01	000X	XXXX	0X00

DSW ERROR AFTER READER-CONTROL COMMAND
THE READER SHOULD BE BUSY AND NOT READY.

	(ROUTINE)	(DSW WAS)	(DSW SHOULD HAVE BEEN)
E0B02	000X	XXXX	0X00

DSW ERROR AFTER PUNCH COMMAND
THE PUNCH SHOULD BE BUSY AND NOT READY.

	(ROUTINE)	(DSW WAS)	(DSW SHOULD HAVE BEEN)
E0B03	000X	XXXX	0F00

DSW ERROR AFTER READER-CONTROL AND PUNCH COMMANDS
BOTH THE READER AND PUNCH SHOULD BE BUSY AND NOT READY.

	(ROUTINE)	(DSW WAS)	(DSW SHOULD HAVE BEEN)
E0B04	000X	XXXX	0X00 RDR NRDY

DSW ERROR WHEN CHECKING FOR READER-READY
THE READER WAS READ AFTER INTERRUPT AND NOW SHOULD BE READY FOR ANOTHER CONTROL COMMAND.

	(ROUTINE)	(DSW WAS)	(DSW SHOULD HAVE BEEN)
E0B05	000X	XXXX	0X00 PCH NRDY

DSW ERROR WHEN CHECKING FOR PUNCH-READY
THE PUNCH INTERRUPT HAS BEEN SERVICED AND THE PUNCH SHOULD NOW BE READY FOR ANOTHER WRITE COMMAND.

	(ROUTINE)	(DSW WAS)	(DSW SHOULD HAVE BEEN)
E0B06	000X	XXXX	4000

READER SERVICE-REQUEST DSW ERROR
ERROR IN DSW DURING INTERRUPT.

	(ROUTINE)	(DSW WAS)	(DSW SHOULD HAVE BEEN)
E0B07	000X	XXXX	1000

PUNCH SERVICE-REQUEST DSW ERROR
ERROR IN DSW DURING INTERRUPT.

	(ROUTINE)	(DSW WAS)	(DSW SHOULD HAVE BEEN)
E0B08	000X	XXXX	5000

DSW ERROR WHEN PUNCH AND READER INTERRUPTS RECEIVED AT SAME TIME
ERROR IN DSW DURING INTERRUPT.

	(ROUTINE)	(DSW WAS)	(DSW SHOULD HAVE BEEN)
E0B09	000X	XXXX	X000

DSW ERROR WHEN FIRST INTERRUPT WAS RECEIVED
AT THIS TIME THE READER AND THE PUNCH ARE BEING RUN UNDER RACE CONDITION. THE DSW FOR THE DEVICE THAT INTERRUPTS FIRST IS ANALIZED FIRST. ANY ERROR WILL BE PRINTED AS AN E0B09. SIMILARLY FOR THE SECOND INTERRUPT, ANY ERROR WILL BE PRINTED AS E0B10.

	(ROUTINE)	(DSW WAS)	(DSW SHOULD HAVE BEEN)
E0B10	000X	XXXX	X000

DSW ERROR WHEN SECOND INTERRUPT WAS RECEIVED
AT THIS TIME THE READER AND THE PUNCH ARE BEING RUN UNDER RACE CONDITION. THE DSW FOR THE DEVICE THAT INTERRUPTS FIRST IS ANALIZED FIRST. ANY ERROR WILL BE PRINTED AS AN E0B09. SIMILARLY FOR THE SECOND INTERRUPT, ANY ERROR WILL BE PRINTED AS E0B10.

	(ROUTINE)	(DSW WAS)	(DSW SHOULD HAVE BEEN)
E0B11	000X	XXXX	0X00

NO READER INTERRUPT RECEIVED. (DSW SENSED AFTER READER-CONTROL COMMAND)

	(ROUTINE)	(DSW WAS)	(DSW SHOULD HAVE BEEN)
E0B12	000X	XXXX	0X00

NO PUNCH INTERRUTP RECEIVED (DSW SENSED AFTER PUNCH COMMAND)

	(ROUTINE)	(DSW WAS)	(DSW SHOULD HAVE BEEN)
E0B13	000X	XXXX	0F00

NO PUNCH OR READER INTERRUPT (DSW SENSED AFTER READER-CONTROL AND PUNCH COMMANDS)

```
      (ROUTINE)          (WAS) (DATA SHOULD HAVE BEEN)
E0814 000X                XXCO XXCO WAS S/B
```

READ/CCMPARE ERROR RDR BUFFER CHANGED
DATA (XX00) PRINTED AS ENTERED IN CORE-CHANNELS 8-1 RESPECTIVELY.

```
      (ROUTINE)          (WAS) (DATA SHOULD HAVE BEEN)
E0815 000X                XX00 XXCO WAS S/B
```

READ/CCMPARE ERROR (RDR BUFFER UNCHANGED)
DATA (XXOC) PRINTED AS ENTERED IN CORE-CHANNELS 8-1 RESPECTIVELY.

```
      (RCUTINE)     (DSW WAS)  DSW DATA
E0816 0004                    XXXX 0000 XX00 RDR ERRCR
```

READER-DSW READ ERROR WHEN REPRODUCING TAPES. IF TAPE STOPPED, THE FIRST CHARACTER BEYOND THE READ STATION WAS PERHAPS IMPROPERLY READ. THIS CHARACTER HAS NOT AS YET BEEN PUNCHED. BACK THE READER UP ONE CHARACTER AND PRESS START ON THE P-C.
DATA (XX00) PRINTED AS ENTERED IN CORE-CHANNELS 8-0 RESPECTIVELY.

```
      (ROUTINE)          OPEN  SHORT
E0819 000X                XX00  YY00
```

THE PROGRAM COULD NOT ALIGN THE TAPE IN THE READER IN THE LAST 500 CHARACTERS.

THE PROBLEM IS,

A. OPEN DATA CHANNEL(S). XX00 SHOULD BE FF00, WHICH IS THE CHARACTER THAT WOULD BE PLACED IN CORE BY READING AN ALL-BITS CHARACTER. ANY MISSING BIT(S) INDICATE THE OPEN DATA CHANNEL(S).

B. SHORTED DATA CHANNEL(S). YYCO SHOULD BE 0000, WHICH IS THE CHARACTER THAT WOULD BE PLACED IN CORE BY READING A NO-BITS CHARACTER. ANY BIT(S) PRESENT INDICATE THE SHORTED CHANNEL(S).

C. IF BOTH XX00 AND YY00 ARE CORRECT,

1. THE TAPE IS NOT IN THE READER CORRECTLY, OR
2. THE READER CAN NOT READ THE FIRST 8 CHARACTERS PROPERLY. IF SO,

A. TRY REPRODUCING TAPE BY ENTERING SWITCH SETTINGS IN FOLLOWING SEQUENCE,

1. 4C08 STOP THE PROGRAM
2. 4804 LOOP ROUTINE 4
3. 408B RESTART PROGRAM

OR

B. FOR READER-ONLY SYSTEMS

1. ENTER SWITCHES - 400B
2. POSITION TAPE IN READER SO THAT FIRST CHARACTER TO BE READ IS THE FIRST CHARACTER OF THE TEST PATTERN.
3. ENTER SWITCHES - 4B80
4. ENTER SWITCHES - 408B

ALL DATA READ WHICH DOES NOT COMPARE WITH THAT IN THE PROGRAM WILL CAUSE ERROR PRINTOUTS.

5. COMMENTS

THE FUNCTION TEST CONSISTS OF A MAINLINE PROGRAM THAT COMBINES MANY ROUTINES TO PERFORM THREE MAIN TESTS AND ONE OPTIONAL TEST. THESE ROUTINES ARE DESCRIBED IN PARAGRAPHS 5.1 THROUGH 5.4.

THE FUNCTION TEST,

A. CHECKS DSW FOR PROPER BITS BEFORE ISSUING WRITE (PUNCH) OR CONTROL (READER) COMMANDS.

B. CHECKS DSW FOR CORRECTNESS AFTER XIO INSTRUCTION.

C. CHECKS FOR INTERRUPT FROM DEVICE WITHIN SPECIFIED TIME LIMIT.

D. CHECKS DSW AFTER INTERRUPT IS RECEIVED.

5.1 ROUTINE NO. 1 (PUNCH TEST)

TEST NO. 1 CHECKS THE OPERATION OF THE PAPER-TAPE PUNCH WHILE PUNCHING TWO TEST RECORDS. THE RECORD INCLUDES A RIPPLE PATTERN AND AN ALL-CHARACTER PATTERN. (REFER FIGURE 1).

5.2 ROUTINE NO. 2 (READER TEST)

CHECKS THE OPERATION OF THE PAPER TAPE READER WHILE READING ONE RECORD PRODUCED BY THE PUNCH TEST. THE TAPE SHOULD BE INITIALLY PLACED IN THE READER AT SOME POINT PRECEEDING THE RIPPLE PATTERN. THE PROGRAM WILL ALIGN THE TAPE PROPERLY IN THE READER. THE TAPE IS ASSUMED TO BE PROPERLY ALIGNED AS SOON AS FOUR CHARACTERS HAVE BEEN CORRECTLY READ.

EACH CHARACTER READ IS COMPARED WITH A WORD IN STORAGE. AN UNEQUAL COMPARE WILL CAUSE AN ERROR TYPEOUT. SEE 4.2.4 THERE WILL BE ONE ERROR TYPEOUT FOR EACH READ/COMPARE ERROR. TAPE MAY BE RE-ALIGNED IN READER BY SETTING SWS. (TABLE 1) AND DEPRESSING INT REQ KEY.

5.3 ROUTINE NO. 3 (PUNCH/READ/COMPARE TEST)

THIS TEST CHECKS THE FUNCTION AND RELIABILITY OF THE PAPER TAPE READER AND PUNCH WHEN OPERATED TOGETHER. THE DATA READ IS COMPARED WITH THE DATA PUNCHED IN A NEW TAPE. THIS TEST ALSO HAS THE TAPE ALIGNMENT FEATURE OF TEST NO. 2. THE TEST IS COMPLETE AFTER ONE RECORD HAS BEEN PROCESSED.

5.4 ROUTINE NO. 4 (REPRODUCE-TAPES TEST)

THE OPERATOR HAS THE OPTION OF REPRODUCING ANY TAPE. AGAIN, ALL DEVICE STATUS CHECKING DONE IS TESTS NOS. 1 AND 2 IS INCLUDED IN THIS TEST. ALSO, A DSW ERROR WHEN READING THE TAPE WILL CAUSE A DELAY OF THE PROGRAM UNTIL THE OPERATOR CAN INTERVENE TO VERIFY THAT THE TAPE DID READ PROPERLY.

5.5 ROUTINE NO. 5 (PUNCH FROM BIT SWITCHES)

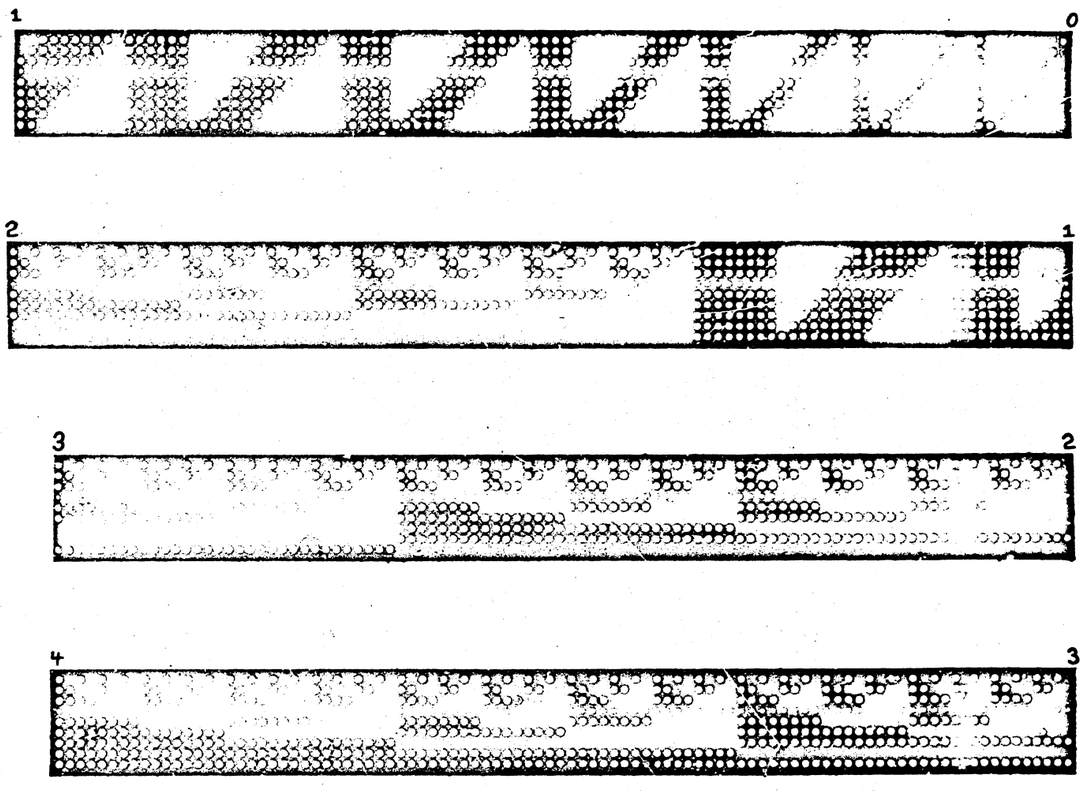
ROUTINE 5 WILL PUNCH CONTINUOUSLY ANY PATTERN SPECIFIED BY THE BIT SWITCHES. TO SET UP FROM BIT SWITCHES-

TO ENTER PATTERN,
1. SET BIT SWITCHES TO CBXX, WHERE XX EQUALS THE DESIRED PATTERN.
2. PRESS INTERRUPT REQUEST KEY.

6. APPENDIX

6.1 SAMPLE TAPE

FIGURE 1 SHOWS AN EXAMPLE OF A PAPER TAPE RECORD.



PAPER TAPE READER/PUNCH FUNCTION TEST

```
                      *                                                      30B00000
                      *                         PROG TRANSFER VECTOR         30B00010
                      *                                                      30B00020
0010                  BEGIN EQU    16                                        30B00030
0011                  START EQU    BEGIN+1                                   30B00040
0012                  ERROR EQU    START+1                                   30B00050
0013                  LOG   EQU    ERROR+1                                   30B00060
0014                  HALT  EQU    LOG+1                                     30B00070
0015                  END   EQU    HALT+1                                    30B00080
                      *                                                      30B00090
0016                  LOGBY EQU    END+1                                     30B00100
0017                  RSTKB EQU    LOGBY+1                                   30B00110
0018                  ETRAP EQU    RSTKB+1                                   30B00120
0019                  AQ5A  EQU    ETRAP+1                                   30B00130
                      *                                                      30B00140
0028                  IL0   EQU    40                                        30B00150
0029                  IL1   EQU    IL0+1                                     30B00160
002A                  IL2   EQU    IL1+1                                     30B00170
002B                  IL3   EQU    IL2+1                                     30B00180
002C                  IL4   EQU    IL3+1                                     30B00190
0030                  ILCRP EQU    IL4+4                                     30B00200
0032                  ILPAT EQU    ILCRP+2                                   30B00210
0033                  RQTY  EQU    ILPAT+1                                   30B00220
0034                  RQKB  EQU    RQTY+1                                    30B00230
0035                  SVKB  EQU    RQKB+1                                    30B00240
0036                  ILIR  EQU    SVKB+1                                    30B00250
                      *                                                      30B00260
0037                  AEND  EQU    ILIR+1                                    30B00270
003B                  AIVD  EQU    AEND+4      INVLD                         30B00280
003E                  ALD   EQU    AIVD+3      LD                            30B00290
0041                  ANINT EQU    ALD+3       NO INTRPT                     30B00300
0044                  AINT  EQU    ANINT+3     INTRPT                        30B00310
004B                  ANRDY EQU    AINT+7      NRDY                          30B00320
004C                  ARDY  EQU    ANRDY+1     RDY                           30B00330
0050                  ASWS  EQU    ARDY+4      SWS                           30B00340
0054                  ASB   EQU    ASWS+4      S/B                           30B00350
0058                  ADSCT EQU    ASB+4                                     30B00360
005A                  ASCT  EQU    ADSCT+2     SELCT                         30B00370
0060                  AWAS  EQU    ASCT+6      WAS                           30B00380
                      *                                                      30B00390
                      **************************************************     30B00400
                      *                     DIAGNOSTIC MONITOR           *   30B00410
                      *                         CONTROLLED               *   30B00420
                      *                     1130 PAPER TAPE TEST         *   30B00430
                      **************************************************     30B00440
0000                        ORG    *+1500                                    30B00450
                      *                                                      30B00460
                      *                          PROGRAM STATUS TABLE        30B00470
                      *                                                      30B00480
05DC 0  0B00          PID   DC     /0B00       PROGRAM I.D. NO               30B00490
05DD 0  0000          RID   DC     /0000       TEST NUMBER                   30B00500
05DE 0  0000          SW0   DC     /0000       FCN 0 - CONTROL               30B00510
05DF 0  0000          SW1   DC     /0000       FCN 1 - LOOP ROUTINE          30B00520
05E0 0  0000          SW2   DC                 NOT USED                      30B00530
05E1 0  0000          SW3   DC     /0000       FCN 3 -  PUNCH FROM SWS       30B00540
05E2 1  0625                DC     PTILZ       INITIALIZATION ADDR           30B00550
05E3 1  0631                DC     MGR         LOOP PROGRAM ADDR             30B00560
05E4 0  0000          MLSCF DC     /0000       MAIN LINE SEQ CNTL            30B00570
05E5 0  0000                DC     /0000       COUNTER ENTRY                 30B00580
05E6 0  FFFF                DC     /FFFF       TERMINATOR                    30B00590
                      *                                                      30B00600
                      *                                                      30B00610
                      *                                                      30B00620
                      *                          INTERRUPT ROUTINE           30B00630
                      *                                                      30B00640
05E7 0  0000          POINT DC     /0000                             IE      30B00650
05E8 01 0C000744            XIO  L XIOSD       SENSE DSW                     30B00660
05EA 0  D072                STO    DSWIT                                     30B00670
```


PAPER TAPE READER/PUNCH FUNCTION TEST

```
05EB 01 65800667            LDX  I1 INTEX                                    30B00680
05ED 01 4D80065E            BSC  I1 HANDL-1                                  30B00690
05EF 01 F5000664      SINT  EOR  L1 INTEX-3                                  30B00700
05F1 01 E5800667            AND  I1 INTEX                                    30B00710
05F3 01 4C180615            BSC  L  PINT3,+-   BR IF DSW OK                  30B00720
05F5 01 66000756            LDX  L2 NIPES      SVC REQ ERROR                 30B00730
05F7 0  701F                MDX     PINT1                                    30B00740
                      *                                                      30B00750
05F8 0  F06D          DINT  EOR     INTED      CK DSW FOR 2 SVC REQ          30B00760
05F9 00 4C000000            BSC  L  /0000      BR IF 2ND DOUBLE INT          30B00770
05FB 0  D066          DINT1 STO     DSWDI                                    30B00780
05FC 0  E067                AND     INTED                                    30B00790
05FD 0  D065                STO     DSWID                                    30B00800
05FE 01 4C20060E            BSC  L  DINT4,Z    EXIT IF ONLY ONE REC          30B00810
0600 0  C061                LD      DSWDI                                    30B00820
0601 01 4C180615            BSC  L  PINT3,+-   BR IF DSW OK                  30B00830
0603 01 66000760            LDX  L2 DINE1                                    30B00840
0605 0  7011                MDX     PINT1                                    30B00850
                      *                                                      30B00860
0606 0  E85C          DINT2 OR      DSWID                                    30B00870
0607 0  D055                STO     DSWIT                                    30B00880
0608 0  F05B                EOR     INTED                                    30B00890
                      *                                                      30B00900
0609 01 4C180615            BSC  L  PINT3,+-   BR IF DSW OK                  30B00910
060B 01 66000765            LDX  L2 DINE2                                    30B00920
060D 0  7009                MDX     PINT1                                    30B00930
                      *                                                      30B00940
                      *                                                      30B00950
060E 0  1140          DINT4 SLCA  1 0                                        30B00960
060F 0  1001                SLA     1                                        30B00970
0610 0  D04D                STO     BUMRQ      ZERO IF NO IEQ BIT            30B00980
0611 01 65000606            LDX  L1 DINT2      SET SECOND INT SW             30B00990
0613 0  69E6                STX   1 DINT1-1                                  30B01000
0614 0  700B                MDX     XIT                                      30B01010
                      *                                                      30B01020
0615 01 66000775      PINT3 LDX  L2 DINE6                                    30B01030
0617 01 6700077D      PINT1 LDX  L3 BSYES      CHECK BUSY DSW NEXT           30B01040
0619 0  68CA                STX   3 MLSCF                                    30B01050
061A 01 6E000792            STX  L2 XBSYX+1                         PR01     30B01060
                      *                                                      30B01070
061C 00 C4000018            LD   L  ETRAP      RESTORE INTERRUPT             30B01080
061E 00 D4000032            STO  L  ILPAT      * TRAP ADDRESS                30B01090
                      *                                                      30B01100
0620 01 4C8005E7      XIT   BSC  I  POINT      EXIT INTERRUPT RT    IX       30B01110
                      **************************************************     30B01120
                      *                                                      30B01130
                      **************************************************     30B01140
0622 00 44800010      PTBGN BSI  I  BEGIN      CALL MONITOR      * SC        30B01150
0624 1  05DC                DC      PID        ADDR OF PID NO    *           30B01160
                      **************************************************     30B01170
                      *                                                      30B01180
                      **************************************************     30B01190
                      *                                                      30B01200
                      *                        INITIALIZATION ROUTINE        30B01210
                      *                                                      30B01220
0625 0  0000          PTILZ DC      /0000      ENTRY POINT          SE       30B01230
                      *                                                      30B01240
0626 0  C0B7                LD      SW0        CK ALIGN TAPE SW              30B01241
0627 0  1008                SLA     8                                        30B01242
0628 0  4810                BSC     -          REALIGN IF SET                30B01244
0629 0  1010                SLA     16                                       30B01250
062A 01 D40007CD            STO  L  N1ST       SET ALIGN TAPE SW             30B01260
062C 01 66000631            LDX  L2 MGR        SET MAIN LINE SEQ             30B01270
062E 0  6AB5                STX   2 MLSCF      * CONTROL FIELD               30B01280
062F 01 4C800625            BSC  I  PTILZ                       SX           30B01290
                      **************************************************     30B01300
                      *                                                      30B01310
                      *                                                      30B01320
```

```
0631 0  1810        MGR   SRA     16                          30B01330
0632 0  D0AA              STO     RID                         30B01340
                    *                                         30B01350
0633 01 660005DC    MGR1  LDX  L2 PID                         30B01360
0635 0  C203              LD     2 SW1-PID    ASSURE PROPER ENTRY 30B01370
0636 0  D025              STO    SWCMP                       30B01380
0637 0  100D              SLA    13                          30B01390
0638 0  180D              SRA    13                          30B01400
                    *                                         30B01410
0639 0  4820              BSC    Z            SET ROUTINE ID 30B01420
063A 0  D201              STO    2 RID-PID                   30B01430
                    *                                         30B01440
063B 01 658005DD          LDX  I1 RID          UPDATE THE RID 30B01450
063D 0  4818              BSC    +-                          30B01460
063E 0  7101              MDX    1 1          INDEX THE ROUTINE NO 30B01470
                    *                                         30B01480
063F 0  699D              STX    1 RID        SET RTN NO AND ADDR 30B01490
0640 01 C5000654          LD   L1 RTCON-1                    30B01500
                    *                                         30B01510
0642 0  6300              LDX    3 0          RESTORE CHAR RTN 30B01520
0643 01 6F00083D          STX  L3 DULP+1                     30B01530
0645 0  6301              LDX    3 1                         30B01540
0646 01 6F00083B          STX  L3 DULP-1                     30B01550
                    *                                         30B01560
0648 00 67000187          LDX  L3 391          SET RECORD LENGTH 30B01570
064A 01 6F0006D5          STX  L3 WRECK                      30B01580
064C 0  62F8              LDX    2 -8         RESET CORRECT SW 30B01590
064D 01 6E00J7CC          STX  L2 CORCT                      30B01600
064F 00 660001F4          LDX  L2 500                        30B01610
0651 01 6E0007D1          STX  L2 TRIAL                      30B01620
                    *                                         30B01630
0653 01 4D800654          BSC  I1 RTCON-1      BR TO USER ROUTINE 30B01640
                    *                                         30B01650
                    *                                         30B01660
                    *                                         30B01670
0655 1  066A        RTCON DC      RTN1I        PUNCH ROUTINE  30B01680
0656 1  0674              DC      RTN2I        READER RTN     30B01690
0657 1  067D              DC      RTN3I        PCH + RDR CHECK 30B01700
0658 1  0687              DC      RTN4I        REPRODUCE TAPE 30B01710
0659 1  068B              DC      RTN5I        PCH BIT SW DATA RTN 30B01720
065A 1  089D              DC      TEND         END ROUTINE    30B01730
065B 1  089D              DC      TEND         END ROUTINE    30B01740
                    *                                         30B01750
065C 0  0000        SWCMP DC      /0000        SW1 COMPARE WORD 30B01760
                    ********************************************30B01770
                    *                                         30B01780
065D 0  0000        DSWIT DC      /0000        LAST INTERRUPT DSW 30B01790
065E 0  0000        BUMRQ DC      /0000                     30B01800
065F 1  05EF        HANDL DC      SINT         INTERRUPT BR ADDS 30B01810
0660 1  05EF              DC      SINT                       30B01820
0661 1  05F8              DC      DINT                       30B01830
0662 0  0000        DSWDI DC      /0000                      30B01840
0663 0  0000        DSWID DC      /0000        IDENTIFY INT YET EXP 30B01850
                    *                                         30B01860
0664 0  5000        INTED DC      /5000        RDR-PCH SVC REQ EXP 30B01870
0665 0  4000              DC      /4000        RDR SVC REQ    30B01880
0666 0  1000              DC      /1000        PCH SVC REQ    30B01890
0667 0  0000        INTEX DC      /0000        INTERRUPT EXPECTED 30B01900
                    *                          * 1 = READER   30B01910
                    *                          * 2 = PUNCH    30B01920
                    *                          * 3 = BOTH     30B01930
0668 1  074A              DC      RMASK        READER         30B01940
0669 1  074B              DC      XMASK        PUNCH          30B01950
                    ********************************************30B01960
                    *                                         30B01970
                    *                                         30B01980
                    *                                         30B01990
                    *              MAINLINE TESTS             30B02000
```



```
                    *                                         30B02010
                    *                                         30B02020
                    *              TEST 1 - PUNCH TEST        30B02030
                    *                                         30B02040
066A 00 6500030E    RTN1I LDX  L1 782          SET FOR 2 RECORDS 30B02050
066C 0  6968              STX    1 WRECK                    30B02060
066D 01 44000835    RTN1  BSI  L  MARK         BUILD NEXT CHARACTER SC 30B02070
066F 0  4066              BSI     XKRDY        PUNCH READY    SC 30B02080
0670 01 4C000731          BSC  L  PUNH         PUNCH ONE CHARACTER 30B02090
0672 0  405A        RTN1A BSI     CRASH                      SC 30B02100
0673 0  70F9              MDX     RTN1                       30B02110
                    *                                         30B02120
                    *              TEST 2 - READER TEST       30B02130
                    *                                         30B02140
0674 01 44000835    RTN2I BSI  L  MARK         BUILD NEXT CHARACTER SC 30B02150
0676 0  4079              BSI     RRDY         READER READY   SC 30B02160
0677 01 4C00070A          BSC  L  FEED         CONTROL READER 30B02170
0679 01 44000793    RTN2A BSI  L  RDIT         READ AND COMPARE SC 30B02180
067B 0  4051              BSI     CRASH                      SC 30B02190
067C 0  70F7              MDX     RTN2I                      30B02200
                    *                                         30B02210
                    *                                         30B02220
                    *              TEST 3 - PCH-RD + COMPARE  30B02230
                    *                                         30B02240
067D 01 44000835    RTN3I BSI  L  MARK         BUILD NEXT CHARACTER SC 30B02250
067F 0  4056              BSI     XKRDY        PUNCH READY    SC 30B02260
0680 0  406F              BSI     RRDY         READER READY   SC 30B02270
0681 01 4C00071B          BSC  L  XFEED        PUNCH + CONTROL RDR 30B02280
0683 01 44000793    RTN3A BSI  L  RDIT         READ AND COMPARE SC 30B02290
0685 0  4047              BSI     CRASH                      SC 30B02300
0686 0  70F6              MDX     RTN3I                      30B02310
                    *                                         30B02320
                    *                                         30B02330
                    *              TEST 4 - REPRO PAPER TAPE  30B02340
                    *                                         30B02350
0687 01 C40005DF    RTN4I LD   L  SW1                        30B02360
0689 01 4C180633          BSC  L  MGR1,+-      BR IF NO EXECUTE RTN 30B02370
068B 0  1010              SLA     16                         30B02380
068C 01 D40007CB          STO  L  ERRET                      30B02390
068E 01 D400080B          STO  L  XCHAR        PUNCH FEED HOLE 1ST 30B02400
0690 01 C40005DF    RTN4  LD   L  SW1                        30B02410
0692 0  F0C9              EOR     SWCMP                      30B02420
0693 01 4C200633          BSC  L  MGR1,Z       BR IF END ROUTINE 30B02430
0695 0  4040              BSI     XKRDY        PUNCH READY    30B02440
0696 0  4059              BSI     RRDY         READER READY   SC 30B02450
0697 01 4C00071B          BSC  L  XFEED        PUNCH + CONTROL RDR 30B02460
0699 01 0C000748    RTN4A XIO  L  XIORR        READ RDR BUFFER 30B02470
069B 01 C400080A          LD   L  CARED        PLACE CHAR READ IN 30B02480
069D 01 D400080B          STO  L  XCHAR      * OUTPUT AREA    30B02490
069F 0  10A0              SLT     32                         30B02500
06A0 01 0C000744          XIO  L  XIOSD        SENSE DSW      30B02510
06A2 01 4C100690          BSC  L  RTN4,-       BR IF NO DSW ERRORS 30B02520
06A4 0  6116              LDX    1 /0016       PRINT RDR ERROR 30B02530
06A5 01 66000880          LDX  L2 RDR                        30B02540
06A7 01 74010803          MDX  L  EMESG,1                    30B02550
06A9 01 440007EC          BSI  L  PRDSW                   MC 30B02560
06AB 01 74FF0803          MDX  L  EMESG,-1                   30B02570
06AD 01 740105DE          MDX  L  SWO,1                      30B02580
06AF 0  6102        REQST LDX    1 2           REQUEST OPER ACTION 30B02590
06B0 01 CC000880          LDD  L  RDR                        30B02600
06B2 01 44000810          BSI  L  PTLOG                   MC 30B02610
06B4 01 44000826          BSI  L  TIME         PAUSE FOR OPERATOR 30B02620
06B6 01 C40005DE          LD   L  SWO                        30B02630
06B8 01 4C0406AF          BSC  L  REQST,E                    30B02640
06BA 0  70D5              MDX     RTN4                       30B02650
                    *                                         30B02660
                    *              TEST 5 - PUNCH FROM BIT SWS 30B02670
                    *                                         30B02680
```

```
068B 01 C40005DF   RTN5I LD   L  SW1                                  30B02690
068D 01 4C180633         BSC  L  MGR1,+-    BR IF NO EXECUTE RTN      30B02700
068F 01 C40005DF   RTN5  LD   L  SW1                                  30B02710
06C1 0  F09A             EOR     SWCMP                                30B02720
06C2 01 4C200633         BSC  L  MGR1,Z     BR IF END ROUTINE         30B02730
06C4 01 C40005E1         LD   L  SW3                                  30B02740
06C6 0  1008             SLA     8                                    30B02750
06C7 01 D400080B         STO  L  XCHAR                                30B02760
06C9 0  400C             BSI     XKRDY                                30B02770
06CA 01 4C000731         BSC  L  PUNH       PUNCH ONE CHARACTER       30B02780
06CC 0  70F2       RTN5A MDX     RTN5                                 30B02790
                   ********************************************       30B02800
                   *                                                  30B02810
                   *                COUNT CHARACTERS ROUTINE          30B02820
                   *                                                  30B02830
06CD 0  0000       CRASH DC      /0000                          SE    30B02840
06CE 01 74FF06D5         MDX  L  WRECK,-1                             30B02850
06D0 0  7002             MDX     RASH                                 30B02860
                   *                                                  30B02870
06D1 01 4C0C0633         BSC  L  MGR1       BR IF END OF RECORD       30B02880
                   *                                                  30B02890
06D3 01 4C8006CD   RASH  BSC  I  CRASH      RET IF RCD NOT CMPLT SX   30B02900
                   *                                                  30B02910
06D5 0  0000       WRECK DC      /0000                                30B02920
                   ********************************************       30B02930
                   *                                                  30B02940
06D6 0  0000       XKRDY DC      /0000                          SE    30B02950
06D7 01 C40C05DE         LD   L  SWO                                  30B02960
06D9 01 650006D7         LDX  L1 XKRDY+1                              30B02970
06DB 01 4C0407FD         BSC  L  PDSWX,E    BR IF HALT PROGRAM        30B02980
                   *                                                  30B02990
06DD 0  0866             XIO     XIOSD      SENSE AND SAVE DSW        30B03000
06DE 0  D076             STO     DSWAS                                30B03010
                   *                                                  30B03020
06DF 0  E06B             AND     XMASK      REMOVE RDR NRDY BIT       30B03030
                   *                                                  30B03040
06E0 01 4C9806D6         BSC  I  XKRDY,+-   BR IF DSW OKAY       SX   30B03050
                   *                                                  30B03060
06E2 0  1007             SLA     7          PRINT DSW ERROR           30B03070
06E3 01 6600087E         LDX  L2 PNRDY                                30B03080
06E5 0  4810             BSC     -          BR IF PCH NRDY            30B03090
06E6 0  6200             LDX     2 0                                  30B03100
06E7 0  6105             LDX     1 5                                  30B03110
06E8 0  C86C             LDD     DSWAS                                30B03120
06E9 0  E067             AND     PDFF                                 30B03130
06EA 0  18D0             RTE     16                                   30B03140
06EB 01 440007EC         BSI  L  PRDSW                          MC    30B03150
                   *                                                  30B03160
06ED 01 44000826         BSI  L  TIME       PAUSE BEFORE RECHECK SC   30B03170
06EF 0  70E7             MDX     XKRDY+1                              30B03180
                   ********************************************       30B03190
                   *                                                  30B03200
                   *                                                  30B03210
                   *              READER READY ROUTINE                30B03220
                   *                                                  30B03230
06F0 0  0000       RRDY  DC      /0000                          SE    30B03240
06F1 01 C40005DE         LD   L  SWO                                  30B03250
06F3 01 650006F1         LDX  L1 RRDY+1                               30B03260
06F5 01 4C0407FD         BSC  L  PDSWX,E    BR IF HALT PROGRAM        30B03270
                   *                                                  30B03280
06F7 0  084C             XIO     XIOSD      SENSE AND SAVE DSW        30B03290
06F8 0  D05C             STO     DSWAS                                30B03300
                   *                                                  30B03310
06F9 0  E050             AND     RMASK      REMOVE PCH NRDY BIT       30B03320
                   *                                                  30B03330
06FA 01 4C9806F0         BSC  I  RRDY,+-    BR IF DSW OKAY         SX 30B03340
                   *                                                  30B03350
06FC 0  1005             SLA     5          PRINT DSW ERROR           30B03360
```



```
06FD 01 6600087C         LDX  L2 RNRDY                                30B03370
06FF 0  4810             BSC     -          BR IF RDR NRDY            30B03380
0700 0  6200             LDX     2 0                                  30B03390
0701 0  6104             LDX     1 4                                  30B03400
0702 0  C852             LDD     DSWAS                                30B03410
0703 0  E04C             AND     ROFF                                 30B03420
0704 0  18D0             RTE     16                                   30B03430
0705 01 440007EC         BSI  L  PRDSW                          MC    30B03440
                   *                                                  30B03450
0707 01 44000826         BSI  L  TIME       PAUSE BEFORE RECHECK SC   30B03460
0709 0  70E7             MDX     RRDY+1                               30B03470
                   ********************************************       30B03480
                   *                                                  30B03490
                   *              CONTROL READER ROUTINE              30B03500
                   *                                                  30B03510
070A 0  6101       FEED  LDX     1 1          SET READER INTRPT       30B03520
070B 01 6D000667         STX  L1 INTEX      * EXPECTED                30B03530
                   *                                                  30B03540
070D 01 C4000621         LD   L  XIT+1      SET INTERRUPT LEVEL       30B03550
070F 00 D4000032         STO  L  ILPAT      * TRAP ADDRESS            30B03560
0711 0  0834             XIO     XIOFD      FEED READER               30B03570
                   *                                                  30B03580
0712 0  0831             XIO     XIOSD      SAVE BUSY DSW             30B03590
0713 0  D03F             STO     DSWBY                                30B03600
                   *                                                  30B03610
0714 01 44000826         BSI  L  TIME       PAUSE FOR INTRPT      SC  30B03620
                   *                                                  30B03630
0716 0  6111             LDX     1 /0011    PRINT NO INTRPT ERR       30B03640
0717 0  C83B             LDD     DSWBY                                30B03650
0718 0  E037             AND     ROFF                                 30B03660
0719 0  E833             OR      DSWR2                                30B03670
071A 0  7056             MDX     DINE5                                30B03680
                   ********************************************       30B03690
                   *                                                  30B03700
                   *          PUNCH AND CONTROL READER                30B03710
                   *                ROUTINE                           30B03720
                   *                                                  30B03730
071B 01 650005FB   XFEED LDX  L1 DINT1      RESTORE DOUBLE INT        30B03740
071D 01 6D0005FA         STX  L1 DINT1-1    * SWITCH                  30B03750
                   *                                                  30B03760
071F 0  6103             LDX     1 3        SET DOUBLE INTRPT         30B03770
0720 01 6D000667         STX  L1 INTEX      * EXPECTED                30B03780
                   *                                                  30B03790
0722 01 C4000621         LD   L  XIT+1      SET INTERRUPT LEVEL       30B03800
0724 00 D4000032         STO  L  ILPAT      * TRAP ADDRESS            30B03810
                   *                                                  30B03820
0726 0  081B             XIO     XIOXX      FEED AND PUNCH            30B03830
0727 0  081E             XIO     XIOFD                                30B03840
                   *                                                  30B03850
0728 0  081B             XIO     XIOSD      SAVE BUSY DSW             30B03860
0729 0  D029             STO     DSWBY                                30B03870
                   *                                                  30B03880
072A 01 44000826         BSI  L  TIME       PAUSE FOR INTERRUPT   SC  30B03890
                   *                                                  30B03900
072C 0  6113             LDX     1 /0013    PRINT NO INTRPT ERR       30B03910
072D 0  C025             LD      DSWBY                                30B03920
072E 0  18D0             RTE     16                                   30B03930
072F 0  C01F             LD      DSWRX                                30B03940
0730 0  7040             MDX     DINE5                                30B03950
                   ********************************************       30B03960
                   *                                                  30B03970
                   *              PUNCH ROUTINE                       30B03980
                   *                                                  30B03990
0731 0  6302       PUNH  LDX     3 2          SET PUNCH INTRPT        30B04000
0732 01 6F000667         STX  L3 INTEX      * EXPECTED                30B04010
                   *                                                  30B04020
0734 01 C4000621         LD   L  XIT+1      SET INTERRUPT LEVEL       30B04030
0736 00 D4000032         STO  L  ILPAT      * TRAP ADDRESS            30B04040
```

PAPER TAPE READER/PUNCH FUNCTION TEST

```
                      *                                             30B04050
0738 0  0809                XIO    XIOXX       PUNCH CHARACTER      30B04060
                      *                                             30B04070
0739 0  080A                XIO    XIOSD       SAVE BUSY DSW        30B04080
073A 0  D018                STO    DSWBY                            30B04090
                      *                                             30B04100
073B 01 44000826            BSI  L TIME        PAUSE FOR INTERRUPT  SC  30B04110
                      *                                             30B04120
073D 0  6112                LDX  1 /0012       PRINT NO INTRPT ERR  30B04130
073E 0  C814                LDD    DSWBY                            30B04140
073F 0  E011                AND    POFF                             30B04150
0740 0  E80D                OR     DSWX2                            30B04160
0741 0  702F                MDX    DINE5                            30B04170
                      ********************************************* 30B04180
                      *                                             30B04190
                      *                                             30B04200
0742    0000                BSS  E                                  30B04210
0742 1  080B          XIOXX DC     XCHAR       PUNCH IOCC           30B04220
0743 0  1900                DC     /1900                            30B04230
0744 0  0000          XIOSD DC     /0000       SENSE DSW IOCC       30B04240
0745 0  1F01                DC     /1F01                            30B04250
0746 0  0000          XIOFD DC     /0000       FEED IOCC            30B04260
0747 0  1C10                DC     /1C10                            30B04270
0748 1  080A          XIORR DC     CARED       READ IOCC            30B04280
0749 0  1A00                DC     /1A00                            30B04290
074A 0  FEFF          RMASK DC     /FEFF       READER MASK          30B04300
074B 0  FBFF          XMASK DC     /FBFF       PUNCH MASK           30B04310
074C 0  FFFF                DC     /FFFF                            30B04320
074D 0  0C00          DSWR2 DC     /0C00       RDR BUSY EXP DSW     30B04330
074E 0  0300          DSWX2 DC     /0300       PCH BUSY EXP DSW     30B04340
074F 0  0F00          DSWRX DC     /0F00       DOUBLE BUSY DSW EXP  30B04350
0750 0  0100          ROFF  DC     /0100                            30B04360
0751 0  0400          POFF  DC     /0400                            30B04370
0752 0  0000                DC     /0000                            30B04380
0753 0  0000          DSWBY DC     /0000       LAST BUSY DSW        30B04390
0754 0  0000                DC     /0000       NOT USED             30B04400
0755 0  0000          DSWAS DC     /0000       LAST DSWER PRINTED   30B04410
                      ********************************************* 30B04420
                      *                                             30B04430
                      *               PRINT DSW ERRORS DETECTED     30B04440
                      *                          DURING INTERRUPT   30B04450
                      *                                             30B04460
0756 01 65800667      NIPES LDX  I1 INTEX      PRINT DSW ERROR      30B04470
0758 01 C000065D            LDD  L  DSWIT      * DETECTED WHILE     30B04480
075A 01 E500074F            AND  L1 ROFF-1     * RUNNING RTN 1 OR   30B04490
075C 01 ED000664            OR   L1 INTEX-3    * RTN 2              30B04500
075E 0  7105                MDX  1 5                                30B04510
075F 0  7011                MDX    DINE5                            30B04520
                      *                                             30B04530
                      *                                             30B04540
0760 01 C400065D      DINE1 LD   L  DSWIT      PRINT DSW ERROR      30B04550
0762 0  18D0                RTE    16          * DETECTED WHILE     30B04560
0763 0  6108                LDX  1 8           * RUNNING RTN 3 OR   30B04570
0764 0  700A                MDX    DINE4       * RTN 4              30B04580
                      *                                             30B04590
0765 01 C4000650      DINE2 LD   L  DSWIT      SEQ SVC REQ ERROR    30B04600
0767 0  18D0                RTE    16                               30B04610
0768 01 C400065E            LD   L  BUMRQ                           30B04620
076A 01 4C20076E            BSC  L  DINE3,Z    BR IF 1ST SVC REQ OK 30B04630
076C 0  6109                LDX  1 9                                30B04640
076D 0  7001                MDX    DINE4                            30B04650
                      *                                             30B04660
076E 0  6110          DINE3 LDX  1 /0010                            30B04670
076F 01 C4000664      DINE4 LD   L  INTED                           30B04680
0771 0  18D0          DINE5 RTE    16                               30B04690
0772 0  6200                LDX  2 0                                30B04700
0773 01 440007EC            BSI  L  PRDSW                       MC  30B04710
                      *                                             30B04720
```


PAPER TAPE READER/PUNCH FUNCTION TEST

```
0775 01 658005DD      DINE6 LDX  I1 RID        RET TO MAINLINE RTN      30B04730
0777 0  C053                LD     ERRET                                30B04740
0778 01 4D980874            BSC  I1 SORTS-1,+- BR IF NO ERROR LAST      30B04750
                      *                                                 30B04760
077A 0  1810                SRA    16          RETURN TO FINISH         30B04770
077B 0  D04F                STO    ERRET       * ALIGNING TAPE          30B04780
077C 0  7019                MDX    READ        * IN READER              30B04790
                      *********************************************     30B04800
                      *                                                 30B04810
                      *               CHECK BUSY DSW                    30B04820
                      *                                                 30B04830
077D 01 65800667      BSYES LDX  I1 INTEX                               30B04840
077F 0  C0D3                LD     DSWBY                                30B04850
0780 01 E5000749            AND  L1 RMASK-1                             30B04860
0782 01 F500074C            EOR  L1 DSWR2-1                             30B04870
0784 01 4C18078E            BSC  L  XBSE,+-    BR IF DSW OK             30B04880
                      *                                                 30B04890
0786 0  C8CC                LDD    DSWBY       PRINT DSW ERROR          30B04900
0787 01 E500074F            AND  L1 ROFF-1                              30B04910
0789 01 ED00074C            OR   L1 DSWR2-1                             30B04920
078B 0  18D0                RTE    16                                   30B04930
078C 0  6200                LDX  2 0                                    30B04940
078D 0  405E                BSI    PRDSW                           MC   30B04950
                      *                                                 30B04960
078E 0  6100          XBSE  LDX  1 0           BLOCK PAUSE FOR INT      30B04970
078F 01 6D0005E5            STX  L1 MLSCF+1    * ROUTINE REENTRY        30B04980
                      *                                                 30B04990
0791 0C 4C000000      XBSYX BSC  L  /0000      BRANCH TO SOMEWHERE PM01 30B05000
                      *********************************************     30B05010
                      *                                                 30B05020
                      *                                                 30B05030
                      *               COMPARE ROUTINE                   30B05040
0793 0  0000          RDIT  DC     /0000                                30B05050
0794 0  C075                LD     CARED                                30B05060
0795 0  D077                STO    LREAD       SAVE LAST CHAR READ      30B05070
                      *                                                 30B05080
0796 0  0881          READ  XIO    XIORR       READ                     30B05090
                      *                                                 30B05100
0797 0  C073                LD     XCHAR       DO CHARACTERS            30B05110
0798 0  F071                EOR    CARED       * COMPARE                30B05120
0799 0  1808                SRA    8                                    30B05130
079A 01 4C2007B1            BSC  L  RDIT2,Z    BR IF NON COMPARE        30B05140
079C 01 740107CC            MDX  L  CORCT,1    CK IF ALIGNED            30B05150
079E 0  704B                MDX    RDITE       EXIT                     30B05160
079F 0  682D                STX  0 N1ST        8 SEQ CHRS CORCT         30B05170
07A0 0  6103                LDX  1 3           PRINT TAPE ALIGNED       30B05180
07A1 0  C86C                LDD    TPEAL                                30B05190
07A2 0  406D                BSI    PTLOG                                30B05200
07A3 01 C40005DE            LD   L  SWO        CLEAR REALIGNMENT SW     30B05210
07A5 0  100A                SLA    10                                   30B05220
07A6 0  180A                SRA    10                                   30B05230
07A7 01 D40005DE            STO  L  SWO                                 30B05240
                      *                                                 30B05250
07A9 0  1810          RDITD SRA    16          RESET BIT LINE CHECK     30B05260
07AA 0  D025                STO    BTLNE                                30B05270
07AB 0  C022                LD     KFF00                                30B05280
07AC 0  D022                STO    NOLNE                                30B05290
07AD 00 650001F4            LDX  L1 500                                 30B05300
07AF 0  6921                STX  1 TRIAL                                30B05310
07B0 0  7039                MDX    RDITE       EXIT                     30B05320
                      *                                                 30B05330
07B1 0  C01B          RDIT2 LD     N1ST                                 30B05340
07B2 01 4C2007D2            BSC  L  RDIT4,Z    BR IF NOT FIRST ERR      30B05350
07B4 0  62F8                LDX  2 -8          RESET CORRECT SW         30B05360
07B5 0  6A16                STX  2 CORCT                                30B05370
07B6 0  C019                LD     BTLNE       BIT LINE OPEN CK         30B05380
07B7 0  E852                OR     CARED                                30B05390
07B8 0  D017                STO    BTLNE                                30B05400
```

```
                        *                                                       30B05410
07B9 0  C015            LD      NOLNE       BIT LINE SHORT CK                   30B05420
07BA 0  E04F            AND     CARED                                           30B05430
07BB 0  D013            STO     NOLNE                                           30B05440
                        *                                                       30B05450
07BC 01 74FF07D1        MDX  L  TRIAL,-1    COUNT DOWN 100 MAX                  30B05460
07BE 0  7007            MDX     RDIT3                                           30B05470
                        *                                                       30B05480
07BF 0  6119            LDX  1  /19                                             30B05490
07C0 0  6200            LDX  2  0                                               30B05500
07C1 0  C00D            LD      NOLNE                                           30B05510
07C2 0  18D0            RTE     16                                              30B05520
07C3 0  C00C            LD      BTLNE                                           30B05530
07C4 0  4027            BSI     PRDSW       PRINT NO ALIGN ERROR                30B05540
07C5 0  70E3            MDX     RDITD                                           30B05550
                        *                                                       30B05560
07C6 01 440006F0  RDIT3 BSI  L  RRDY        READER READY                        30B05570
07C8 0  6802            STX     0 ERRET                                         30B05580
07C9 01 4C00070A        BSC  L  FEED        CONTROL READER                      30B05590
                        *                                                       30B05600
                        *                                                       30B05610
07CB 0  0000      ERRET DC      /0000       RET TO READ  IF SET                 30B05620
07CC 0  0000      CORCT DC      /0000       TAPE ALIGNMENT                      30B05630
07CD 0  0000      N1ST  DC      /0000     * WORK AREAS                          30B05640
07CE 0  FF00      KFF00 DC      /FF00                                           30B05650
07CF 0  FF00      NOLNE DC      /FF00       SHORT CHAN CHECK WD                 30B05660
07D0 0  0000      BTLNE DC      /0000       OPEN  CHAN CHECK WD                 30B05670
07D1 0  01F4      TRIAL DC      500         ERROR COUNTER                       30B05680
                        *                                                       30B05690
07D2 01 C40005DE  RDIT4 LD   L  SWO                                             30B05700
07D4 0  1009            SLA     9                                               30B05710
07D5 01 4C1007DA        BSC  L  RDIT6,-     BR IF NO REALIGN                    30B05720
07D7 0  1007            SLA     7                                               30B05730
07D8 0  D0F4            STO     N1ST                                            30B05740
07D9 0  70D7            MDX     RDIT2                                           30B05750
                        *                                                       30B05760
                        *                                                       30B05770
07DA 0  6114      RDIT6 LDX  1  /0014       PRINT DATA READ ERR                 30B05780
07DB 0  C030            LD      LCHAR                                           30B05790
07DC 0  F02E            EOR     XCHAR                                           30B05800
07DD 01 4C1807E3        BSC  L  RDIT5,+-    BR IF BUF S/NB CNGD                 30B05810
07DF 0  C02A            LD      CARED                                           30B05820
07E0 0  F02C            EOR     LREAD                                           30B05830
07E1 0  4818            BSC     +-          BR IF RDR BUF CNGED                 30B05840
07E2 0  6115            LDX  1  /0015                                           30B05850
07E3 01 6600087A  RDIT5 LDX  L2 WASSB                                           30B05860
07E5 0  C025            LD      XCHAR                                           30B05870
07E6 0  1898            SRT     24                                              30B05880
07E7 0  1088            SLT     8                                               30B05890
07E8 0  C021            LD      CARED                                           30B05900
07E9 0  4002            BSI     PRDSW                              MC           30B05910
                        *                                                       30B05920
07EA 01 4C800793  RDITE BSC  I  RDIT                               SX           30B05930
                        ********************************************************30B05940
                        *                                                       30B05950
                        *                                                       30B05960
                        *                PRINT ERROR ROUTINE                    30B05970
                        *                                                       30B05980
07EC 0  0000      PRDSW DC      /0000       PRINT ERROR RTN        ME           30B05990
07ED 0  6917            STX  1  EMESG+2     SAVE MESSAGE NUMBER                 30B06000
                        *                                                       30B06010
07EE 0  D819            STD     EMESG+5     SAVE DATA WAS + S/B                 30B06020
                        *                                                       30B06030
07EF 0  10A0            SLT     32          SAVE ALPHA ADRS                     30B06040
07F0 0  7200            MDX  2  0                                               30B06050
07F1 0  CA00            LDD  2  0                                               30B06060
07F2 0  D813            STD     EMESG+3                                         30B06070
                        ********************************************************30B06080
```



```
07F3 00 44800012  ERDSW BSI  I  ERROR                          * SC     30B06090
07F5 1  0803            DC      EMESG       MESSAGE ADDR        *        30B06100
07F6 1  07FB            DC      CKDSX       BUSY RETURN ADDR    *        30B06110
07F7 1  07F8            DC      ERLOP       LOOP ON ERR ADDR    *        30B06120
                        ********************************************       30B06130
07F8 01 658007EC  ERLOP LDX  I1 PRDSW       NORMAL + LOOP RETS              30B06140
07FA 0  7002            MDX     PDSWX                                       30B06150
                        *                                                   30B06160
07FB 01 650007F3  CKDSX LDX  L1 ERDSW       BUSY RETURN TO CALL             30B06170
07FD 01 6D0005E4  PDSWX STX  L1 MLSCF                                       30B06180
07FF 00 4C800011        BSC  I  START                              MX       30B06190
                        *                                                   30B06200
0802    0000            BSS  E                                              30B06210
0802 0  1000      TIMEX DC      /1000       COUNTER                         30B06220
0803 0  0002      EMESG DC      /0002       WORD COUNT                      30B06230
0804 0  0000            DC      /0000       HEX     OUTPUT                  30B06240
0805 0  0000            DC      /0000       MSG ID                          30B06250
0806 0  0000            DC      /0000       ALPHA ADDR                      30B06260
0807 0  0000            DC      /0000       ALPHA ADDR                      30B06270
0808 0  0000            DC      /0000       DSWAS                           30B06280
0809 0  0000            DC      /0000       DSW S/B                         30B06290
                        *                                                   30B06300
                        *                                                   30B06310
080A 0  0000      CARED DC      /0000       CHARACTER READ                  30B06320
080B 0  0000      XCHAR DC      /0000       PUNCH OUTPUT CHAR               30B06330
080C 0  0000      LCHAR DC      /0000       PREVIOUS OUTPUT CHAR            30B06340
080D 0  0000      LREAD DC      /0000       PREVIOUS CHAR READ              30B06350
080E 0  0000      TPEAL DC      /0000                                       30B06360
080F 1  0890            DC      ATAPE                                       30B06370
                        ********************************************       30B06380
                        *                                                   30B06390
                        *                LOG MESSAGE ROUTINE                30B06400
                        *                                                   30B06410
                        *                                                   30B06420
0810 0  0000      PTLOG DC      /0000                              ME       30B06430
0811 0  6911            STX  1  LGMS+2      SAVE MESSAGE ID                 30B06440
                        *                                                   30B06450
0812 0  D811            STD     LGMS+3      SAVE ALPHA MESSAGE              30B06460
                        ********************************************       30B06470
0813 00 44800013  PTLO6 BSI  I  LOG                                * SC     30B06480
0815 1  0821            DC      LGMS        ADDR OF MESSAGE     *        30B06490
0816 1  081A            DC      PTLO2       BUSY RETURN ADDR    *        30B06500
0817 0  0000            DC      /0000       RUN                 *        30B06510
                        ********************************************       30B06520
                        *                                                   30B05530
0818 0  C0F7            LD      PTLOG       NORMAL RETURN                   30B06540
0819 0  7001            MDX     PTLO1                                       30B06550
081A 0  C005      PTLO2 LD      LGMS1       BUSY RETURN                     30B06560
081B 01 D40005E4  PTLO1 STO  L  MLSCF                                       30B06570
081D 00 4C800011        BSC  I  START                              MX       30B06580
                        *                                                   30B06590
0820    0000            BSS  E                                              30B06600
0820 1  0813      LGMS1 DC      PTLO6                                       30B06610
0821 0  0000      LGMS  DC      /0000       WORD COUNT                      30B06620
0822 0  0000            DC      /0000                                       30B06630
0823 0  0000            DC      /0000       MESSAGE ID NUMBER               30B06640
0824 0  0000            DC      /0000       ALPHA ADDR                      30B06650
0825 0  0000            DC      /0000       ALPHA ADDR                      30B06660
                        ********************************************       30B06670
                        *                                                   30B06680
                        *                TIMED DELAY ROUTINE                30B06690
                        *                                                   30B06700
0826 0  0000      TIME  DC      /0000                              SE       30B06710
0827 00 65001000        LDX  L1 /1000       SET UP COUNTER                  30B06720
0829 0  69D8            STX  1  TIMEX                                       30B06730
082A 01 74FF0802        MDX  L  TIMEX,-1                                    30B06740
082C 0  7002            MDX     TIME1                                       30B06750
082D 01 4C800826        BSC  I  TIME        EXIT TIME UP            SX      30B06760
```

PAPER TAPE READER/PUNCH FUNCTION TEST

```
082F 01 6600082A     TIME1 LDX  L2 TIME+4      SET FOR REENTRY            30B06770
0831 01 6E0005E5           STX  L2 MLSCF+1                                30B06780
0833 00 4C800011           BSC  I  START                                  30B06790
                     ******************************************           30B06800
                     *                                                    30B06810
                     *                    BUILD NEXT CHARACTER            30B06820
                     *                           ROUTINE                  30B06830
                     *                                                    30B06840
0835 0  0000         MARK  DC      /0000                          SE      30B06850
0836 0  C0D4               LD      XCHAR       SAVE LAST CHARACTER        30B06860
0837 0  1808               SRA     8                                      30B06870
0838 0  1008               SLA     8                                      30B06880
0839 0  D0D2               STO     LCHAR                                  30B06890
                     *                                                    30B06900
083A 00 65000001           LDX  L1 1           INIT TEST XR1              30B06910
083C 00 66000000     DULP  LDX  L2 0                     XR2              30B06920
083E 01 4E800866           BSC  I2 WHAT        GO BUILD CHARACTER         30B06930
                     *                                                    30B06940
0840 01 C500086A     NRIPX LD   L1 BITSX       START NEW RIPPLE           30B06950
0842 0  D0C8               STO     XCHAR     * PATTERN                    30B06960
0843 0  6201               LDX   2 1                                      30B06970
0844 0  701D               MDX     EXITX                                  30B06980
                     *                                                    30B06990
0845 0  C0C5         SRIPX LD      XCHAR       SHIFT RIPPLE PATTERN       30B07000
0846 0  1001               SLA     1                                      30B07010
0847 0  D0C3               STO     XCHAR                                  30B07020
0848 0  4820               BSC     Z           SKIP NEXT CH NO BITS       30B07030
0849 0  7018               MDX     EXITX                                  30B07040
084A 0  6202               LDX   2 2                                      30B07050
084B 0  C01E               LD      BITSX       PLACE ALL BIT CHAR         30B07060
084C 0  D0BE               STO     XCHAR                                  30B07070
084D 0  6925               STX   1 COUNX                                  30B07080
                     *                                                    30B07090
084E 01 74FF0873     BARX  MDX  L  COUNX,-1    SKIP WHEN COUNX GO 0       30B07100
0850 0  7011               MDX     EXITX                                  30B07110
0851 0  6200               LDX   2 0                                      30B07120
0852 0  7101               MDX   1 1                                      30B07130
0853 0  6920               STX   1 KOUNX                                  30B07140
0854 01 74F80874           MDX  L  KOUNX,-8    SKIP EXCEPT END RIPPE      30B07150
0856 0  7001               MDX     ENRIX       BR TO END RIPPLE ROUT      30B07160
0857 0  700A               MDX     EXITX       BR TO EXIT                 30B07170
                     *                                                    30B07180
0858 0  6203         ENRIX LDX   2 3           END RIPPLE PATTERN         30B07190
0859 0  7008               MDX     EXITX                                  30B07200
                     *                                                    30B07210
085A 0  C018         ALLBX LD      COUNX       ALL CHARS PATTERN          30B07220
085B 0  D0AF               STO     XCHAR                                  30B07230
085C 0  800E               A       ONEEX       ADD ONE I. E. 0100         30B07240
085D 0  D015               STO     COUNX                                  30B07250
085E 01 4C200862           BSC  L  EXITX,Z                                30B07260
                     *                                                    30B07270
                     *                                                    30B07280
0860 0  6101               LDX   1 1           REINITIALIZE               30B07290
0861 0  6200               LDX   2 0                                      30B07300
0862 0  69D8         EXITX STX   1 DUIP-1                                 30B07310
0863 0  6AD9               STX   2 DULP+1                                 30B07320
0864 01 4C800835           BSC  I  MARK        EXIT               SX      30B07330
                     *                                                    30B07340
                     *                                                    30B07350
0866 1  0840         WHAT  DC      NRIPX       RECORD CONTROL ADRS        30B07360
0867 1  0845               DC      SRIPX                                  30B07370
0869 1  084E               DC      BARX                                   30B07380
0869 1  085A               DC      ALLBX                                  30B07390
                     *                                                    30B07400
                     *                                                    30B07410
086A 0  FF00         BITSX DC      /FF00       CHARACTER PATTERN          30B07420
086B 0  0100         ONEEX DC      /0100     * CONSTANTS                  30B07430
086C 0  00C0               DC      /00C0                                  30B07440
```


PAPER TAPE READER/PUNCH FUNCTION TEST

```
086D 0  00E0               DC      /00E0                                  30B07450
086E 0  00F0               DC      /00F0                                  30B07460
086F 0  00F8               DC      /00F8                                  30B07470
0870 0  00FC               DC      /00FC                                  30B07480
0871 0  00FE               DC      /00FE                                  30B07490
0872 0  00FF               DC      /00FF                                  30B07500
                     *                                                    30B07510
0873 0  0000         COUNX DC      /0000       WORK AREAS                 30B07520
0874 0  0000         KOUNX DC      /0000                                  30B07530
                     ******************************************           30B07540
                     *                                                    30B07550
                     *                                                    30B07560
                     *              ADDRESSES FOR RETURN TO               30B07570
                     *               MAINLINE AFTER INTRPT                30B07580
0875 1  0672         SORTS DC      RTN1A       ROUTINE 1                  30B07590
0876 1  0679               DC      RTN2A       ROUTINE 2                  30B07600
0877 1  0683               DC      RTN3A       ROUTINE 3                  30B07610
0878 1  0699               DC      RTN4A       ROUTINE 4                  30B07620
0879 1  06CC               DC      RTN5A      ROUTINE 5                   30B07630
                     *                                                    30B07640
                     *              ALPHABETIC MESSAGE                    30B07650
                     *               STORAGE AREAS                        30B07660
                     *                                                    30B07670
087A    0000               BSS  E                                         30B07680
087A 0  0060         WASSB DC      AWAS                                   30B07690
087B 0  0054               DC      ASB                                    30B07700
087C 1  0882         RNRDY DC      ARDR                                   30B07710
087D 0  004B               DC      ANRDY                                  30B07720
087E 1  088C         PNRDY DC      APCH                                   30B07730
087F 0  004B               DC      ANRDY                                  30B07740
0880 1  0882         RDR   DC      ARDR                                   30B07750
0881 1  0886               DC      AERR                                   30B07760
                     *                                                    30B07770
0882 0  6200         ARDR  DC      /6200       RDR ERROR                  30B07780
0883 0  3200               DC      /3200                                  30B07790
0884 0  6200               DC      /6200                                  30B07800
0885 0  FFFF               DC      /FFFF                                  30B07810
                     *                                                    30B07820
0886 0  36C0         AERR  DC      /3600                                  30B07830
0887 0  6200               DC      /6200                                  30B07840
0888 0  6200               DC      /6200                                  30B07850
0889 0  5200               DC      /5200                                  30B07860
088A 0  6200               DC      /6200                                  30B07870
088B 0  FFFF               DC      /FFFF                                  30B07880
                     *                                                    30B07890
088C 0  5600         APCH  DC      /5600       PCH                        30B07900
088D 0  1E00               DC      /1E00                                  30B07910
088E 0  2600               DC      /2600                                  30B07920
088F 0  FFFF               DC      /FFFF                                  30B07930
                     *                                                    30B07940
0890 0  9C00         ATAPE DC      /9C00       TAPE ALIGNED               30B07950
0891 0  3C00               DC      /3C00                                  30B07960
0892 0  5400               DC      /5400                                  30B07970
0893 0  3400               DC      /3400                                  30B07980
0894 0  2100               DC      /2100                                  30B07990
0895 0  3C00               DC      /3C00                                  30B08000
0896 0  5C00               DC      /5C00                                  30B08010
0897 0  2000               DC      /2000                                  30B08020
0898 0  1400               DC      /1400                                  30B08030
0899 0  7400               DC      /7400                                  30B08040
089A 0  3400               DC      /3400                                  30B08050
089B 0  3000               DC      /3000                                  30B08060
089C 0  FFFF               DC      /FFFF                                  30B08070
                     *                                                    30B08080
                     ******************************************           30B08090
089D 00 44800015     TEND  BSI  I  END         END PROGRAM      * SC      30B08100
089F 1  05DC               DC      PID                          *         30B08110
                     ******************************************           30B08120
```

08A0 0622 END PTBGN 30808130

CROSS REFERENCE LISTING

SYMBOL	VALUE	REFERENCES
ADSCT	0058	0000
AEND	0037	0000
AERR	0886	0881
AINT	0044	0000
AIVD	003B	0000
ALD	003E	0000
ALLBX	085A	0869
ANINT	0041	0000
ANRDY	004B	0000,087D,087F
APCH	088C	087E
AQ5A	0019	
ARDR	0882	087C,0880
ARDY	004C	0000
ASB	0054	0000,087B
ASCT	005A	0000
ASWS	0050	0000
ATAPE	0890	090F
AWAS	0060	087A
BARX	084E	0868
BEGIN	001D	0000,0622
BITSX	086A	0840,084B
BSYES	077D	0617
BTLNE	07D0	07AA,0786,07B8,07C3
BUMRQ	065E	0610,0768
CARED	080A	0698,0748,C7S4,0798,07B7,07BA,07DF,07E8
CKDSX	07F8	07F6
CORCT	07CC	C64D,079C,C7B5
COUNX	0873	084D,084E,C85A,085D
CRASH	06CD	0672,067B,C685,06D3
DINE1	0760	0603
DINE2	0765	060B
DINE3	076E	076A
DINE4	076F	0764,076D
DINE5	0771	071A,0730,0741,075F
DINE6	0775	0615
DINT	05F8	0661
DINT1	05FB	0613,071B,C71D
DINT2	0606	0611
DINT4	060E	05FE
DSWAS	0755	C6DE,06E8,C6F8,0702
DSWBY	0753	0713,0717,C729,072D,073A,073E,077F,0786
DSWD1	0662	05FB,0600
DSWID	0663	05FD,0606
DSWIT	065D	05EA,0607,0758,0760,0765
DSWRX	074F	072F
DSWR2	074D	0719,0782,0789
DSWX2	074E	0740
DULP	083C	0643,0646,0862,0863
EMESG	0803	05A7,06AB,C7ED,07EE,07F2,07F5
END	0015	0000,C89D
ENRIX	0858	0856
ERDSW	07F3	07FB
ERLOP	07F8	07F7
ERRET	07C8	068C,0777,C77B,07C8
ERROR	0012	0000,07F3
ETRAP	0018	0000,061C
EXITX	0862	0844,0849,0850,0857,0859,085E
FEED	070A	0677,07C9
HALT	0014	0000
HANDL	065F	05ED
ILCRP	0030	0C00
ILIR	0036	0000
ILPAT	0032	0000,061E,070F,0724,0736
IL0	0028	0000
IL1	0029	0000

IL2	002A	0000
IL3	002B	0000
IL4	002C	0000
INTED	0664	05F8,05FC,C608,076F
INTEX	0667	05EB,05EF,05F1,0708,0720,0732,0756,075C,077D
KFF00	07CE	07AB
KOUNX	0874	0853,0854
LCHAR	080C	07DB,0839
LGMS	0821	0811,0812,0815
LGMS1	0820	081A
LOG	0013	0000,0813
LOGBY	0016	0000
LREAD	080D	0795,C7E0
MARK	0835	066D,0674,067D,0864
MGR	0631	05E3,062C
MGR1	0633	C689,C693,06BD,06C2,06D1
MLSCF	05E4	0619,062E,078F,07FD,081B,0831
NIPES	0756	05F5
NOLNE	07CF	07AC,07B9,C7BB,07C1
NRIPX	0840	0866
NIST	07CD	C62A,079F,C7B1,07D8
ONEEX	086B	085C
POSWX	07FD	C6DB,06F5,C7FA
PID	05DC	0624,0633,0635,063A,089F
PINT1	0617	05F7,0605,C60D
PINT3	0615	05F3,0601,0609
PNRDY	087E	C6E3
POFF	0751	06E9,073F
POINT	05E7	0620
PRDSW	07EC	06A9,06EB,C705,0773,078D,07C4,07E9,C7F8
PTBGN	0622	08A0
PTILZ	0625	05E2,062F
PTLOG	0810	0682,07A2,0818
PTLO1	081B	C819
PTLO2	081A	0816
PTLO6	0813	0820
PUNH	0731	0670,06CA
RASH	06D3	06D0
RDIT	0793	0679,0683,C7EA
RDITD	C7A9	07C5
RDITE	07EA	C79E,07B0
RDIT2	07B1	C79A,07D9
RDIT3	07C6	078E
RDIT4	07D2	07B2
RDIT5	07E3	07DD
RDIT6	07DA	07D5
RDR	0880	C6A5,06B0
READ	0796	C77C
REQST	06AF	06B8
RID	05DD	C632,063A,063B,063F,0775
RMASK	074A	0668,06F9,0780
RNRDY	087C	06FD
ROFF	0750	C703,C718,075A,0787
RQKB	0034	0000
RQTY	0033	0000
RRDY	06F0	0676,0680,0696,06F3,06FA,0709,07C6
RSTKB	0017	0000
RTCON	0655	0640,0653
RTN1	066D	0673
RTN1A	0672	0875
RTN1I	066A	0655
RTN2A	0679	C876
RTN2I	0674	0656,067C
RTN3A	0683	0877
RTN3I	067D	C657,0686
RTN4	0690	06A2,068A
RTN4A	0699	C878
RTN4I	0687	0658

RTN5	06BF	06CC
RTN5A	06CC	C879
RTN5I	06BB	0659
SINT	05EF	065F,0660
SORTS	0875	0778
SRIPX	0845	0867
START	0011	0000,07FF,C81D,0833
SVKB	0035	0000
SWCMP	065C	0636,C692,06C1
SW0	05DE	0626,06AD,06B6,06D7,06F1,07A3,07A7,07D2
SW1	05DF	0635,0687,C690,06BB,06BF
SW2	05E0	
SW3	05E1	06C4
TEND	089D	065A,065B
TIME	0826	06B4,06ED,C707,0714,072A,073B,082D,C82F
TIMEX	0802	0829,082A
TIME1	082F	082C
TPEAL	080E	07A1
TRIAL	07D1	0651,07AF,C7BC
WASSB	087A	07E3
WHAT	0866	083E
WRECK	06D5	064A,066C,06CE
XBSE	078E	0784
XBSYX	0791	061A
XCHAR	080B	068E,069D,06C7,0742,0797,07DC,07E5,0836,0842,0845, 0847,084C,C85B
XFEED	071B	0681,0697
XIOFD	0746	0711,0727
XIORR	0748	0699,C796
XIOSD	0744	05E8,06A0,06DD,06F7,0712,0728,0739
XIOXX	0742	0726,C738
XIT	0620	0614,C70D,C722,0734
XKRDY	06D6	066F,067F,0695,06C9,06D9,06E0,06EF
XMASK	0748	0669,06DF

1132 PRINTER FUNCTION TEST

TABLE OF CONTENTS

1132 PRINTER FUNCTION TEST

1. PURPOSE

TO PROVIDE A CHECKOUT OF ALL PRINTER FUNCTIONS. ALL TESTS ARE CONDUCTED UNDER CONTROL OF THE DIAGNOSTIC MONITOR. HENCE, THE PRINTER FUNCTIONS CAN BE PERFORMED EITHER ALONE OR WHILE OTHER I/O DEVICES ARE OPERATING. (OVERLAP)

2. PREREQUISITES

2.1 PROGRAM

THIS PROGRAM LOADS AND IS RUN UNDER CONTROL OF THE 1130 DIAGNOSTIC MONITOR.

AN 1132 CARRIAGE TAPE IS NEEDED IN ORDER TO RUN ROUTINE 4. ORDER PART NO 2191276, OR IF DESIRED, TO MAKE THE TAPE-

1. CUT TAPE TO LENGTH OF 66 LINES.
2. PUNCH CHANNEL. 1 IN LINE 1
   2 IN LINE 9
   3 IN LINE 17
   4 IN LINE 25
   5 IN LINE 33
   6 IN LINE 41
   9 IN LINE 49
   12 IN LINE 57

3. USE PROCEDURE

3.1 LOADING

THIS PROGRAM FOLLOWS THE LOADING PROCEDURES ESTABLISHED BY THE 1130 DIAGNOSTIC MONITOR. REFER TO D. M. DOCUMENTATION.

3.2 OPERATION

3.2.1 PROGRAM EXECUTION

A. LOAD AND GO MODE

ALL ROUTINES WILL BE EXECUTED WITH NO OPTIONS
ALL DETECTED ERRORS WILL BE IDENTIFIED BY AN ERROR TYPEOUT.

B. SINGLE PROGRAM AND OVERLAP MODE

AFTER PROGRAM IS LOADED, THE MONITOR WILL WAIT TO ALLOW OPTIONS TO BE SPECIFIED.

1. SPECIFY DESIRED OPTIONS AS INSTRUCTED IN SECTION 3.2.2. IF NO OPTIONS ARE DESIRED, NO ENTRY IS REQUIRED.

2. TO START EXECUTION - EXECUTE MODE MUST BE SPECIFIED

SET BIT SWITCHES FOR DESIRED MODE

SW. SETTING	CONTROL
0080	EXECUTE WITH NO OPTIONS
0082	HALT ON ANY ERROR
0084	BYPASS ALL ERROR PRINTOUTS
0088	LOOP ON ERROR
008C	LOOP ON ERROR AND BYPASS ALL ERROR PRINTOUTS
0090	LOOP ALL PROGRAMS
0092	LOOP ALL PROGRAMS AND HALT ON ERRORS

PRESS INTERRUPT REQUEST KEY

3.2.2 PROGRAM OPTIONS

THE OPERATOR MAY MODIFY THE EXECUTION OF THE PROGRAM ANY TIME BEFORE OR AFTER IT HAS STARTED EXECUTION BY ENTERING PROGRAM CONTROL OPTIONS OR ROUTINE SELECTION OPTIONS.

A. PROGRAM CONTROL OPTIONS
1. TO SELECT PROGRAM OPTIONS SET BIT SWITCHES AS INDICATED

SW. SETTING	CONTROL
0C00	RESET ALL CONTROL OPTIONS
0C01	HALT 1132 PROGRAM (TO START AFTER HALT, SET SWS TO DESIRED CONTROL OPTION OR 0C00, THEN PRESS INTERRUPT REQUEST KEY.)
0C20	LOOP AN 1132 ROUTINE

2. PRESS INTERRUPT REQUEST KEY.

B. SPECIAL OPTIONS

2. LOCK ON PATTERN

IN ROUTINES 5 AND 6, THE OPERATOR CAN LOCK ON ANY PATTERN IN THAT ROUTINE BY SPECIFYING THE START CHARACTER FOR THE LINE. FOR ROUTINE 5, THIS WILL RESULT IN A RIPPLE PATTERN THAT DOES NOT ROTATE.

TO SPECIFY CHARACTER, SET SWITCHES TO 8CXX WHERE XX IDENTIFIES THE CHARACTER AS FOLLOWS - THEN PRESS INTERRUPT REQUEST.

XX	CHARACTER
01	1
02	2
03	3
04	4
05	5
06	6
07	7
08	8
09	9
0A	0
0B	=
0C	$
0D	.
0E	'
0F	,
10	)
11	-
12	(
13	+
14	/
15	*
16	+
17	J
18	K
19	L
1A	M
1B	N
1C	O

XX	CHARACTER
1D	P
1E	Q
1F	R
20	E
21	G
22	W
23	X
24	Y
25	Z
26	A
27	B
28	C
29	D
2A	F
2B	H
2C	I
2D	S
2E	T
2F	U
30	V

3. MODIFY SPACE TIMING

IN ROUTINES 5,6 AND 7, THE PROGRAM WILL NORMALLY WAIT 36 IDLES BEFORE GIVING A SPACE COMMAND. THIS CAN BE INCREASED OR DECREASED BY SETTING THE SWITCHES TO CCXX, WHERE XX IS A HEX NUMBER EQUAL TO THE DESIRED NUMBER OF IDLES.

C. ROUTINE SELECTION

EXECUTION WILL START WITH THE SELECTED ROUTINE.

1. TO SELECT ROUTINE OPTIONS SET BIT SWITCHES AS INDICATED

SW. SETTING	ROUTINE
4C01	EMIT SEQUENCE AND DSW TEST
4C02	PRINT SCAN INCOMPLETE TEST
4C03	SPACE TEST
4C04	SKIP TEST
4C05	ROTATE PATTERN
4C06	PRINT ALL CHARACTERS
4C07	FAST PRINT

2. PRESS INTERRUPT REQUEST KEY.

3.3 TERMINATION

IF THERE ARE NO 'LOOP' CONTROL OPTIONS SELECTED, THE PROGRAM WILL TERMINATE AFTER ONE PASS. IF OPTIONS TO LOOP HAVE BEEN SELECTED, THE PROGRAM MAY BE TERMINATED BY.

1. REMOVE LOOP OPTIONS AND ALLOW NORMAL TERMINATION.
OR
2. SET ENTRY SWITCHES TO 400C AND PRESS THE INTER. REQ. KEY.

1132 PRINTER FUNCTION TEST

3.4 RESTART

TO RESTART THE PROGRAM.

1. SET SWITCHES TO 408C.
2. PRESS INTERRUPT REQUEST KEY.
3. SET SWITCHES TO 0080.
4. PRESS INTERRUPT REQUEST KEY.

NOTE

DEPENDING ON HOW THE PROGRAM WAS TERMINATED, THE LAST TWO STEPS MAY NOT BE REQUIRED.

4. PRINTOUTS

ALL PRINTOUTS ARE IN THE STANDARD FORMAT.

APPNN 00RR (MESSAGE)
OR
EPPNN 00RR (MESSAGE)

WHERE A IDENTIFIES STATUS MESSAGES
E IDENTIFIES ERROR MESSAGES
PP IS THE PID OF THE PROGRAM CAUSING THE MESSAGE
NN IS THE MESSAGE SEQUENCE NUMBER
RR IS THE ROUTINE NUMBER
MESSAGE IS ANY VARIABLE INFORMATION

4.1 NORMAL PRINTOUTS

DSW
A00C01 00RR XXXX NRDY

BIT 5 ON IN DSW. NORMALLY TURNED ON BY FORM CHECK OR PRINTER NOT READY.

A00FF 00RR END

THE PROGRAM HAS TERMINATED.
TO RESTART, SEE SEC. 3.4.

4.2 ERROR PRINTOUTS

DSW
E00C04 00RR XXXX NO INTRPT
THE FIRST READ EMITTER INTERRUPT AFTER A 'START PRINTER' COMMAND DID NOT OCCUR.

DSW
E00C05 00RR XXXX NO INTRPT
SKIP RESPONSE INTERRUPT DID NOT OCCUR.

DSW
E00C06 00RR XXXX NO INTRPT
SPACE RESPONSE INTERRUPT DID NOT OCCUR.

DSW EMIT EMIT
WAS S/B
E00C07 00RR XXXX XXXX XXXX INVLD EMIT WAS S/B
INCORRECT CHARACTERS EMITTED. SEE NOTE UNDER E00C09 FOR RECOMMENDED ACTION.

DSW
E00C08 00RR XXXX NO INTRPT
THE FIRST READ EMITTER INTERRUPT OCCURED AFTER A 'START PRINTER' COMMAND, BUT ONE OF THE LATER READ EMITTER INTERRUPTS WAS LOST.

1132 PRINTER FUNCTION TEST

DSW EMIT
E00C09 00RR XXXX XXXX INVLD EMIT
PRINTER STARTED. FIRST EMIT CHARACTER WAS NOT VALID.

NOTE. IF THIS ERROR PERSISTS, ENTER 0084 IN SWITCHES. THIS WILL BYPASS ERROR TYPEOUT. THE PRINTER WILL THEN PRINT, AND IN ROUTINES 4 AND 5, ANY LINE BEGINNING WITH AN INVALID CHARACTER WILL BE SKIPPED.

DSW CHAN
E00C10 00RR XXXX XXXX CHANNEL
EXPECTED CARRIAGE CHANNEL BIT DID NOT APPEAR IN DSW. MUST USE CORRECT CARRIAGE TAPE TO AVOID THIS ERROR ON A GOOD MACHINE.

DSW
E00C11 00RR XXXX INVLD DSW
INCORRECT DSW. PRINTER SHOULD BE OFF WHEN THIS DSW IS SENSED. THE CORRECT DSW SHOULD BE 00XX, WHERE XX IS CHANNEL CONTROL BITS.

DSW DSW
WAS S/B
E00C12 00RR XXXX XXXX INVLD DSW
ERROR IN DSW FOLLOWING INTERRUPT. THIS DSW IS SENSED IN THE INTERRUPT ROUTINE, AND AT LEAST ONE RESPONSE BIT SHOULD BE ON.

A B
E00C13 00RR XX00 XX00 EMIT ERROR
THIS ERROR WILL OCUR IF ANY EMIT BIT IS MISSING OR ALWAYS ON. MODIFIERS A AND B IDENTIFY THE BIT OR BITS IN ERROR. MODIFIER A SHOULD BE FF00 IF NO EMIT BITS ARE MISSING. A MISSING BIT WILL BE IDENTIFIED BY A 0 IN BIT POSITION OF MISSING BIT. MODIFIER B SHOULD BE 0000. ANY EMIT BIT WHICH IS ALWAYS ON WILL BE IDENTIFIED BY A 1 IN THE BIT POSITION OF THE EMIT BIT IN ERROR.

5. COMMENTS

5.1 THE FOLLOWING IS A MORE DETAILED DESCRIPTION OF EACH ROUTINE.

ROUTINE 01 IDLE THE PRINTER FOR 100 READ EMITTER INTERRUPTS.
ERROR DETECTION-

1. LOSS OF AN INTERRUPT
2. EMITS OUT OF SEQUENCE
3. INVALID CHARACTER FOR FIRST EMIT
4. DSW INCORRECT AFTER AN INTERRUPT

ROUTINE 02 IDLE THE PRINTER FOR 100 READ EMITTER INTERRUPTS. SET BIT 15 TO ZERO IN STORAGE LOCATION 0027 WHICH WILL FORCE A 'PRINT SCAN CHECK'.
ERROR DETECTION -

1. LOSS OF AN INTERRUPT
2. EMITS OUT OF SEQUENCE
3. INVALID CHARACTER FOR FIRST EMIT
4. DSW INCORRECT AFTER AN INTERRUPT

1132 PRINTER FUNCTION TEST

ROUTINE 03 SPACE THE CARRIAGE 50 TIMES. THE PRINTER WILL NOT BE STARTED.
ERROR DETECTION -

1. LOSS IF INTERRUPT AFTER EACH SPACE.

2. DSW INCORRECT

ROUTINE 04 START THE CARRIAGE AND CHECK THAT EACH CARRIAGE CHANNEL CAN BE DETECTED IN THE DSW. THE CARRIAGE IS STARTED AND STOPPED FOR EACH CHANNEL.
ERROR DETECTION -

1. LOSS OF AN INTERRUPT

2. DSW INCORRECT

ROUTINE 05 PRINT 49 LINES IN A ROTATING PATTERN. CHECK THAT ALL OF THE CHARACTERS ARE EMITTED IN THE PROPER SEQUENCE

THIS ROUTINE COMPARES THE EMITTER CHARACTER WITH THE DESIRED CHARACTER ONLY FOR THE FIRST CHARACTER IN EACH LINE. WHEN A COMPARISON IS FOUND, A ONE IS FLOATED ACROSS THE PRINT BUFFER - SHIFTING RIGHT ONE WITH EACH INTERRUPT RECEIVED. THE RIPPLE IS THUS PRINTED IN EMIT SEQUENCE, 120 EMITS REQUIRED TO PRINT A FULL LINE.

ERROR DETECTION -

1. LOSS OF AN INTERRUPT

2. EMITS OUT OF SEQUENCE

3. INVALID CHARACTER FOR FIRST EMIT

ROUTINE 06 PRINT ONE LINE OF EACH CHARACTER. CONTINUE UNTIL ALL CHARACTERS HAVE BEEN PRINTED ONCE.
ERROR DETECTION-

1. LOSS OF AN INTERRUPT

2. EMITS OUT OF SEQUENCE

3. INVALID CHARACTER FOR FIRST EMIT

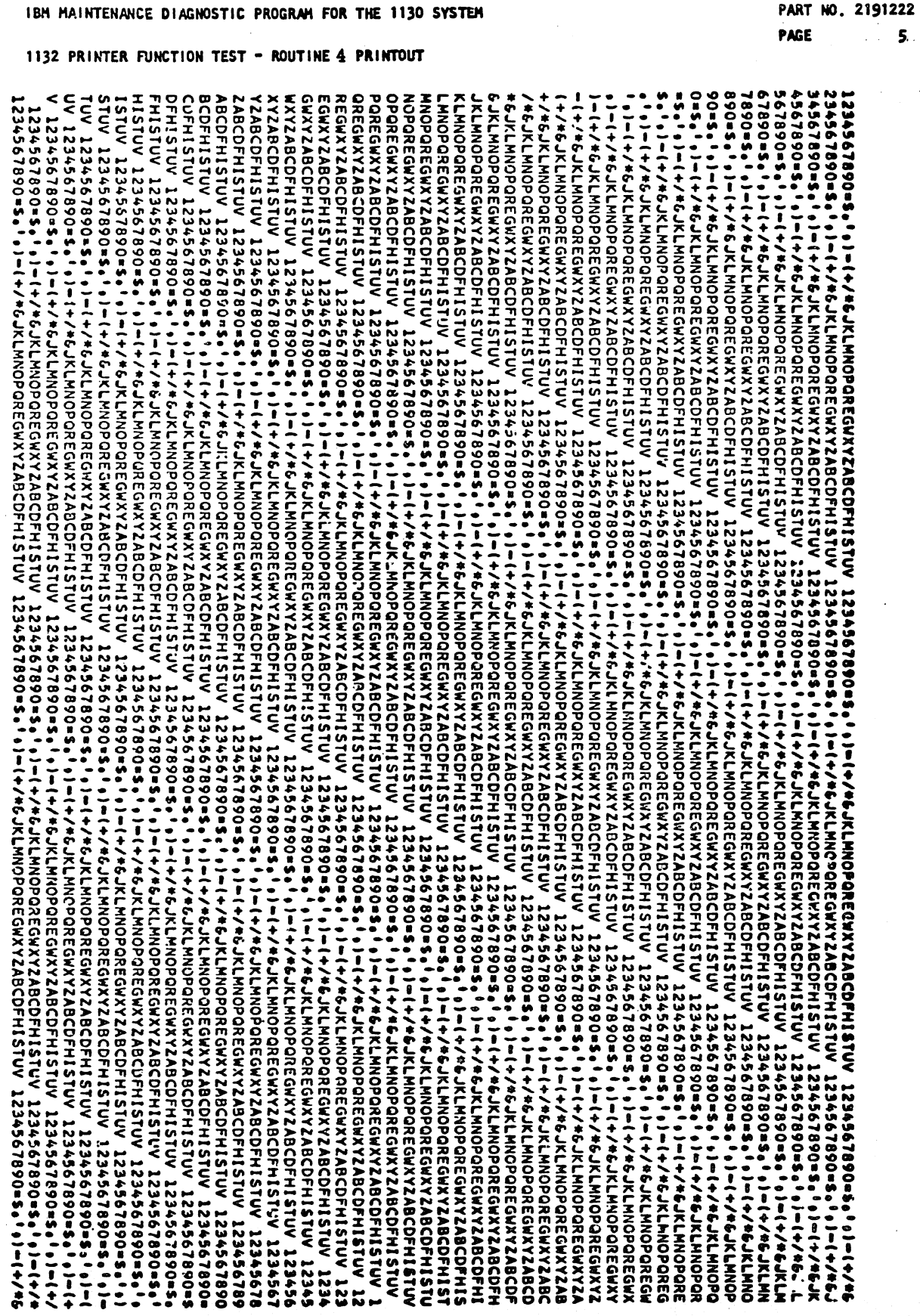
ROUTINE 07 FAST PRINT ROUTINE. (APPROXIMATELY 140 LINES PER MINUTE). PRINTS 100 LINES. THE ROUTINE IS USED TO EXPOSE MARGINAL ELECTRO/MECHANICAL PROBLEMS IN THE PRINTER.
ERROR DETECTION-

1. LOSS OF AN INTERRUPT

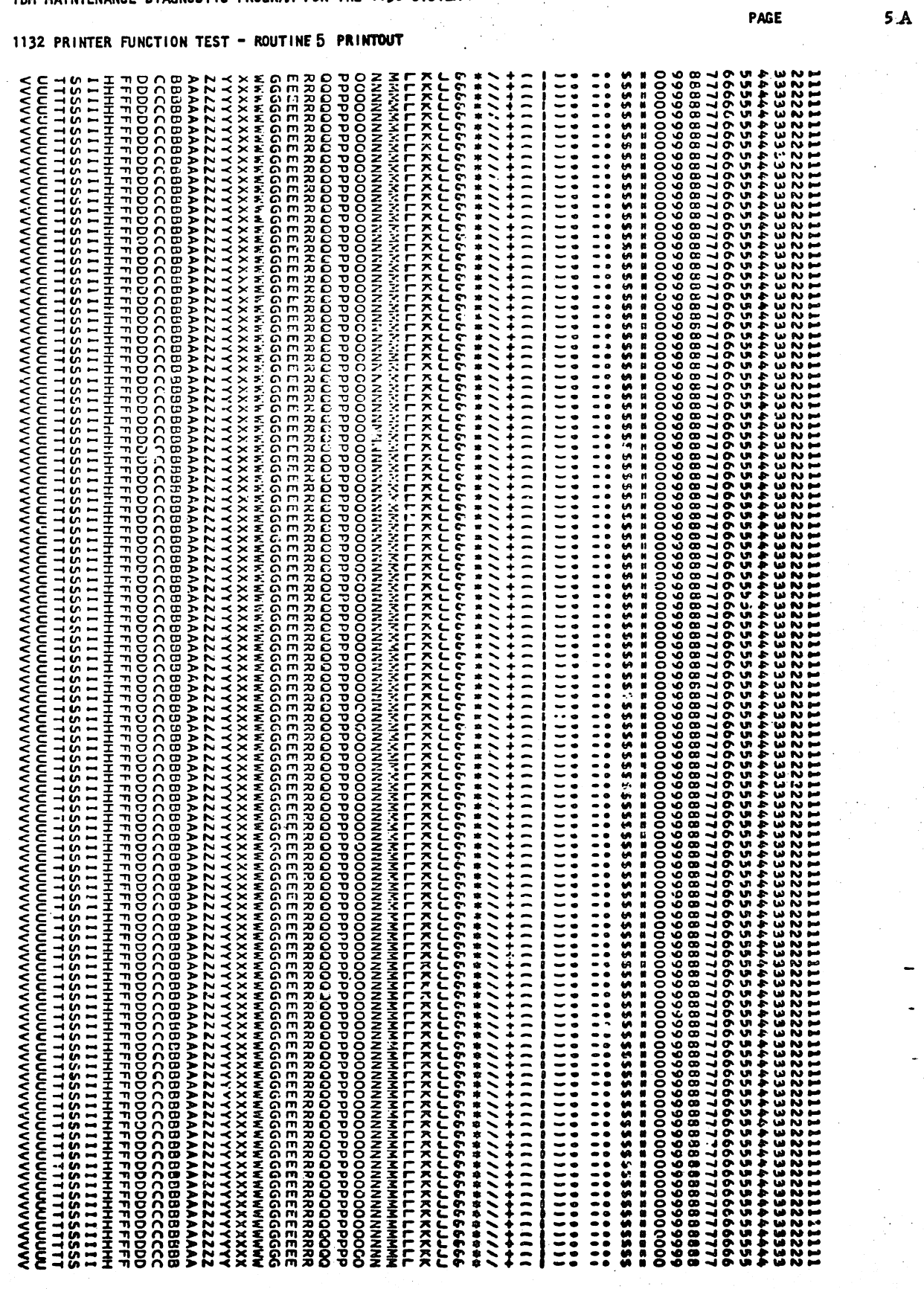
2. EMITS OUT OF SEQUENCE

3. INVALID CHARACTER FOR FIRST EMIT

1132 PRINTER FUNCTION TEST - ROUTINE 4 PRINTOUT



1132 PRINTER FUNCTION TEST - ROUTINE 5 PRINTOUT



1132 PRINTER FUNCTION TEST

```
0000                    ORG     *+1500                          30C10000
                        *                                       30C00010
                        *                       PROG TRANSFER VECTOR  30C00020
                        *                                       30C00030
0010                    BEGIN EQU   16                          30C00040
0011                    START EQU   BEGIN+1                     30C00050
0012                    ERROR EQU   START+1                     30C00060
0013                    LOG   EQU   ERROR+1                     30C00070
0014                    HALT  EQU   LOG+1                       30C00080
0015                    END   EQU   HALT+1                      30C00090
                        *                                       30C00100
0016                    LOGBY EQU   END+1                       30C00110
0017                    RSTKB EQU   LOGBY+1                     30C00120
0018                    ETRAP EQU   RSTKB+1                     30C00130
0019                    AQSA  EQU   ETRAP+1                     30C00140
                        *                                       30C00150
0028                    IL0   EQU   40                          30C00160
0029                    IL1   EQU   IL0+1                       30C00170
002A                    IL2   EQU   IL1+1                       30C00180
002B                    IL3   EQU   IL2+1                       30C00190
002C                    IL4   EQU   IL3+1                       30C00200
0030                    ILCRP EQU   IL4+4                       30C00210
0032                    ILPAT EQU   ILCRP+2                     30C00220
0033                    RQTY  EQU   ILPAT+1                     30C00230
0034                    RQKB  EQU   RQTY+1                      30C00240
0035                    SVKB  EQU   RQKB+1                      30C00250
0036                    ILIR  EQU   SVKB+1                      30C00260
                        *                                       30C00270
0037                    AEND  EQU   ILIR+1                      30C00280
003B                    AIVD  EQU   AEND+4    INVLD             30C00290
003E                    ALD   EQU   AIVD+3    LD                30C00300
0041                    ANINT EQU   ALD+3     NO INTRPT         30C00310
0044                    AINT  EQU   ANINT+3   INTRPT           30C00320
0048                    ANRDY EQU   AINT+7    NRDY              30C00330
004C                    ARDY  EQU   ANRDY+1   RDY               30C00340
0050                    ASWS  EQU   ARDY+4    SWS               30C00350
0054                    ASB   EQU   ASWS+4    S/B               30C00360
0058                    ADSCT EQU   ASB+4                       30C00370
005A                    ASCT  EQU   ADSCT+2   SELCT            30C00380
0060                    AWAS  EQU   ASCT+6    WAS               30C00390
                        *                                       30C00400
                        *                                       30C00410
                        *                                       30C00420
                        *                       PRINTER DIAGNOSTIC  30C00430
                        *                                       30C00440
                        *                                       30C00450
                        *                                       30C00460
05DC 0  0C00            PRPST DC    /0C00     PID               30C00470
05DD 0  0000            PRRTU DC    0         ROUTINE           30C00480
05DE 0  0000            BSW0  DC    0          PROGRAM CONTROL  30C00490
05DF 0  0006            BSW1  DC    0          ROUTINE SELECTION  30C00500
05E0 0  0000            BSW2  DC    0          SCAN START CHARACTER  30C00510
05E1 0  0012            BSW3  DC    18         SPACE AFTER PRINT DLY  30C00520
05E2 1  05E8                  DC    PRSET     INIT ADDRESS      30C00530
05E3 1  05E8                  DC    PRDIA     LOOP ADDRESS      30C00540
05E4 0  0000            PST32 DC    0         ENTRY SET IN MAINLINE  30C00550
05E5 0  0000            PSTIN DC    0                   IN INTERRUPT  30C00560
05E6 0  0000            PSTDE DC    0                   IN IDLE ROUTINE  30C00570
05E7 0  FFFF                  DC    /FFFF                       30C00580
05E8 00 44800010        STRT  BSI I BEGIN                       30C00590
05EA 1  05DC                  DC    PRPST     PST TABLE         30C00600
                        *                                       30C00610
                        * INITIALIZATION ROUTINE                30C00620
                        *                                       30C00630
05EB 0  0001            PRSET DC    1                           30C00640
05EC 01 0C0006DC              XIO L STPPT     STOP PRINTER      30C00650
05EE 01 650005F8              LDX L1 PRDIA                      30C00660
05F0 01 6D0005E4              STX L1 PST32                      30C00670
```


1132 PRINTER FUNCTION TEST

```
05F2 01 65000632              LDX L1 PIRT                       30C00680
05F4 00 6D000029              STX L1 IL1      SET INTERRUPT ADRS  30C00690
05F6 01 4C8005EB              BSC I  PRSET                      30C00700
                        *                                       30C00710
                        *  START OF TEST                        30C00720
                        *                                       30C00730
05F8 00 65000001        PRDIA LDX L1 1        SET TO START      30C00740
05FA 0  691B                  STX  1 CN12+1     AT 1ST ROUTINE  30C00750
05FB 0  6164                  LDX  1 100                        30C00760
05FC 01 6D0007AB              STX L1 EMTCT    SET EMIT CHECK CNT  30C00770
05FE 01 CC0007AE              LDD L  ANDOR                      30C00780
0600 01 DC0007AC              STD L  ANDEM    SET EMIT CK CONSTANT  30C00790
0602 0  6100                  LDX  1 0                          30C00800
0603 0  69DC                  STX  1 BSW2     RESET CHAR SELECT   30C00820
0604 01 6D0007A9              STX L1 CKESW                      30C00821
0606 0  6124                  LDX  1 36                         30C00830
0607 0  69D9                  STX  1 BSW3     RESET SPACE DELAY   30C00840
0608 0  4001                  BSI    CNTRL    GO TO CONTROL RTN   30C00850
0609 0  700B                  MDX    CN12                       30C00860
                        *                                       30C00870
                        * THIS ROUTINE CHECKS SWITCHES AND CONTROLS  30C00880
                        * SEQUENCE IN WHICH TEST ROUTINES ARE RUN.  30C00890
                        *                                       30C00900
060A 0  0000            CNTRL DC    0                           30C00910
060B 0  C0D2                  LD    BSW0      LD CONTROL SWS    30C00920
060C 01 440407E7              BSI L STOP,E    CK FOR PROG STOP  30C00930
                        *                                       30C00940
060E 01 7400050F        CN10  MDX L BSW1,0    SKIP IF NO RTN    30C00950
0610 0  700A                  MDX   CN14        SELECTED          30C00960
0611 0  C0CC                  LD    BSW0      LD CONTROL SWS    30C00970
0612 0  100A                  SLA   10        CK FOR LOOP ON RTN  30C00980
0613 01 4C480060A             BSC I CNTRL,Z+  RETURN IF LOOP    30C00990
                        *                                       30C01000
0615 00 65000001        CN12  LDX L1 1        RTN NO. SET HERE  30C01010
0617 01 74010616        CN13  MDX L CN12+1,1  ADV RTN NO        30C01020
0619 01 4D800629              BSC I1 RTTBL-1  GO TO RTN          30C01030
                        *                                       30C01040
0618 0  C0C3            CN14  LD      BSW1    LD RNT SLCT SWS   30C01050
061C 0  100D                  SLA     13      STRIP OUT INVALID 30C01060
061D 0  180D                  SRA     13      SWITCHES          30C01070
061E 0  D0DA                  STO     PRDIA+1                   30C01080
061F 0  D0F6                  STO     CN12+1                    30C01090
0620 0  1810                  SRA     16                        30C01100
0621 0  D0BD                  STO     BSW1    RESET ROUTINE SWITCH  30C01110
0622 0  70F2                  MDX     CN12                      30C01120
                        *                                       30C01130
                        * END OF TEST                           30C01140
                        *                                       30C01150
0623 0  C0BA            PREND LD      BSW0    LD CONTROL SWS    30C01160
0624 0  100B                  SLA     11      CHECK FOR LOOP PROGRAM  30C01170
0625 01 4C2805F8              BSC L   PRDIA,+Z                  30C01180
0627 00 44800015              BSI I   END                       30C01190
0629 1  05DC                  DC      PRPST                     30C01200
                        *                                       30C01210
                        * ROUTINE ADDRESS TABLE                 30C01220
                        *                                       30C01230
062A 1  07F3            RTTBL DC      CE10    RTN1  EMIT SEQUENCE  30C01240
062B 1  080F                  DC      CS10    RTN2  SCAN CHECK  30C01250
062C 1  082E                  DC      SP10    RTN3  SPACE       30C01260
062D 1  0840                  DC      SC10    RTN4  SKIP        30C01270
062E 1  0889                  DC      RR01    RTN5  ROTATING PAT  30C01280
062F 1  08E3                  DC      AC10    RTN6  ALL CHARACTERS  30C01290
0630 1  091E                  DC      AD10    RTN7  FAST PRINT  30C01300
0631 1  0623                  DC      PREND   END ROUTINE       30C01310
                        *                                       30C01320
                        * CONSTANTS AND STORAGE                 30C01330
                        *                                       30C01340
                        *                                       30C01350
```

```
                        * INTERRUPT ROUTINE                                  30C01360
                        *                                                    30C01370
0632 0  0000    PIRT    DC      G                                            30C01380
0633 00 650005DC        LDX   L1 1500       RESET INTERRUPT                  30C01390
0635 01 60000747        STX   L1 ICT          WAIT COUNTER                   30C01400
0637 01 0C0006E0        XIO   L  DSW32      CHECK DSW                        30C01410
0639 01 740007A9        MDX   L  CKESW,0                                     30C01411
0638 C  7012            MDX      PIA                                         30C01412
063C 01 D40009E0        STO   L  ERM4       SAVE DSW                         30C01420
063E 01 E40006D7        AND   L  MSK1       MASK BITS 7-15                   30C01430
0640 01 F40006D8        EOR   L  MSK2       CK FOR GOOD DSW                  30C01440
0642 01 4C18064E        BSC   L  PIA,+-     BR IF DSW OK                     30C01450
0644 01 C40009E0    PIE LD    L  ERM4                                        30C01460
0646 01 E4000607        AND   L  MSK1       MASK BITS 7-15                   30C01470
0648 01 D40009E0        STO   L  ERM4       STORE DSW IN MESS                30C01480
064A 01 65000944        LDX   L1 ERR12      SET TO TYPE ERROR                30C01490
064C 01 6D00079A        STX   L1 CKESW                                       30C01500
064E 01 C40009E0    PIA LD    L  ERM4                                        30C01510
0650 01 4C280659        BSC   L  PINT,+Z    BR IF PRINT RES                  30C01520
0652 0  1001            SLA      1                                           30C01530
0653 01 4C2806AD        BSC   L  SKINT,+Z   BR IF SKIP RES                   30C01540
0655 0  1001            SLA      1                                           30C01550
0656 01 4C2806CF        BSC   L  SPINT,+Z   BR IF SPACE RES                  30C01560
0658 0  700E            MDX      PIS        GO STOP PRINTER                  30C01570
                        *                                                    30C01580
0659 01 0C0006E4    PINT XIO  L  RDEM1                                       30C01590
065B 01 740006DA        MDX   L  STPRT      CK FOR 1ST EMIT                  30C01600
065D 0  704C            MDX      PI8        BR IF 1ST EMIT                   30C01610
065E 01 44000786        BSI   L  CKEMT      CK EMIT SEQUENCE                 30C01620
                        *                                                    30C01630
0660 0  C074            LD       IDLE       CHECK FOR PRINT                  30C01640
0661 0  D074            STO      IDLSW      SET IDLE SW                      30C01650
0662 01 4C280676        BSC   L  PI2,+Z     BR IF PRINT                      30C01660
0664 01 74FF06D5        MDX   L  IDLE,-1    DEC IDLE CNT                     30C01670
0666 0  7018            MDX      PI3        BR IF IDLE                       30C01680
                        *                                                    30C01690
0667 0  1810    PIS     SRA      16                                          30C01695
0668 01 D40008DD        STO   L  EMIT       SET EMIT TO ZERO                 30C01700
066A 0  0811            XIO      STPPT      STOP PRINTER                     30C01710
066B 01 65000708        LDX   L1 SP2        SET FOR SPACE RETURN             30C01720
066D 01 740006E2        MDX   L  SENSE,0                                     30C01730
066F 0  7002            MDX      PI1                                         30C01740
                        *                                                    30C01750
0670 01 65000700        LDX   L1 PRTN                                        30C01760
0672 01 6D0005E5    PI1 STX   L1 PSTIN      SET MLSCF                        30C01770
0674 01 4C800632        BSC   I  PIRT                                        30C01780
                        *                                                    30C01790
0676 01 74FF06D4    PI2 MDX   L  SCNCT,-1   ADV SCAN CNT                     30C01800
0678 0  700D            MDX      PI4        GO SHIFT BUFFER                  30C01810
0679 01 44000723        BSI   L  CLEAR      SET BUFFER TO ZERO               30C01820
067B 00 65008200        LDX   L1 /8200      SET MASK FOR                     30C01830
067D 01 6D0006D8        STX   L1 MSK2         NORMAL PRINT DSW               30C01840
067F 01 C40005E1        LD    L  BSW3                                        30C01850
0681 0  D053            STO      IDLE       SET IDLE COUNT                   30C01860
                        *                                                    30C01870
0682 01 740006E2    PI3 MDX   L  SENSE,0    SKIP IF RTRN TO PRINT            30C01880
0684 0  70EF            MDX      PI1+2                                       30C01890
0685 0  70EA            MDX      PI1-2                                       30C01900
                        *                                                    30C01910
0686 00 C4000027    PI4 LD    L  39         SAVE SCAN COMP                   30C01920
0688 0  E057            AND      DSW32                                       30C01930
0689 0  D054            STO      STSPA                                       30C01940
068A 0  10A0            SLT      32                                          30C01950
068B 00 6500FFF0    PI5 LDX   L1 -16                                        30C01960
068D 00 6600FFF8    PI6 LDX   L2 -8                                         30C01970
068F 00 C6000028        LD    L2 40         LD WORD TO SHIFT                 30C01980
0691 0  18C1            RTE      1          SHIFT BIT                        30C01990
0692 00 D6000028        STO   L2 40                                          30C02000
```



```
0694 0  7101            MDX   1 1        DECREMENT WORD CNT               30C02010
0695 0  7007            MDX      PI7                                         30C02020
0696 0  7201            MDX   2 1        ADV TO NEXT WORD                 30C02030
0697 0  7001            MDX      *+1                                         30C02040
0698 0  70E0            MDX      PI2+3                                       30C02050
0699 0  61F0            LDX   1 -16      RESET SHIFT CNT                  30C02060
069A 0  1090            SLT      16                                          30C02070
069B 00 D6000028        STO   L2 40       SET NEXT WORD                    30C02080
                        *                                                    30C02090
069D 0  C040    PI7     LD       STSPA                                       30C02100
069E 00 EC000027        OR    L  39       RESTORE SCAN COMP BIT            30C02110
06A0 00 D4000027        STO   L  39                                          30C02120
06A2 0  69E9            STX   1  PI5+1    SAVE XR1                         30C02130
06A3 0  6AEA            STX   2  PI6+1    SAVE XR2                         30C02140
06A4 01 740106DC        MDX   L  STPPT,1                                     30C02150
06A6 0  70CD            MDX      PI1+2                                       30C02160
06A7 0  61CF            LDX   1 -49      PUT SPACE                        30C02170
06A8 0  6933            STX   1  STPPT      IN PATTERN                    30C02180
06A9 0  70DC            MDX      PI4                                         30C02190
                        *                                                    30C02200
06AA 01 44200748    PI8 BSI   L  FFE,Z      IDENTIFY 1ST EMIT CHAR           30C02210
06AC 0  70D5            MDX      PI3                                         30C02220
                        *                                                    30C02230
                        * THIS IS THE SKIP INTERRUPT ROUTINE                 30C02240
                        *                                                    30C02250
06AD 01 0C0006E8    SKINT XIO  L  STPCA                                      30C02260
06AF 0  1810            SRA      16                                          30C02270
06B0 0  D021            STO      CCF                                         30C02280
06B1 01 6580087E        LDX   I1 SCTM       GET CHANNEL NUMBER               30C02290
06B3 01 C5000888        LD    L1 SKPT+8     AND PLACE IN XR1                 30C02300
06B5 00 D4000001        STO   L  1                                           30C02310
06B7 01 C40009E0        LD    L  ERM4        LD DSW                          30C02311
06B9 0  E019            AND      SKM        MASK OUT FIRST 8 BITS            30C02320
06BA 01 F50006C2        EOR   L1 SKCH       IF AC = 0, MATCH FOUND           30C02330
06BC 01 4C2006BF        BSC   L  SK10,Z     NO MATCH, RETURN                 30C02340
06BE 0  6913            STX   1  CCF                                         30C02350
06BF 01 65000868    SK10 LDX  L1 SC30       SET MLSCF                        30C02360
06C1 0  7080            MDX      PI1                                         30C02370
                        *                                                    30C02380
06C2 0  0000    SKCH    DC       0          INVALID CHANNEL                  30C02390
06C3 0  0080            DC       /0080      CHANNEL 1                        30C02400
06C4 0  0040            DC       /0040      CHANNEL 2                        30C02410
06C5 0  0020            DC       /0020      CHANNEL 3                        30C02420
06C6 0  0010            DC       /0010      CHANNEL 4                        30C02430
06C7 0  0008            DC       /0008      CHANNEL 5                        30C02440
06C8 0  0004            DC       /0004      CHANNEL 6                        30C02450
06C9 0  0000            DC       0          INVALID   7                      30C02460
06CA 0  0000            DC       0          CHANNELS  8                      30C02470
06CB 0  0002            DC       /0002      CHANNEL 9                        30C02480
06CC 0  0000            DC       0          INVALID                          30C02490
06CD 0  0000            DC       0          CHANNELS                         30C02500
06CE 0  0001            DC       /0001      CHANNEL 12                       30C02510
                        *                                                    30C02520
                        * THIS IS THE SPACE INTERRUPT ROUTINE                30C02530
                        *                                                    30C02540
06CF 01 65000718    SPINT LDX  L1 SPRTN     RETURN TO SPACE RTN              30C02550
06D1 0  70A0            MDX      PI1                                         30C02560
                        *                                                    30C02570
                        * CONSTANTS AND STORAGE                              30C02580
                        *                                                    30C02590
06D2 0  0000    CCF     DC       0                                           30C02600
06D3 0  00FF    SKM     DC       /00FF                                       30C02610
06D4 0  0000    SCNCT   DC       0          SCAN COUNT                       30C02620
06D5 0  0000    IDLE    DC       0          IDLE COUNT                       30C02630
06D6 0  0000    IDLSW   DC       0          IDLE SW                          30C02640
06D7 0  FE00    MSK1    DC       /FE00                                       30C02650
06D8 0  2000    MSK2    DC       /2000                                       30C02660
                        *                                                    30C02670
```

```
                        * IOCC TABLE AND EVEN ADDRESS CONSTANTS                 30C02680
                        *                                                       30C02690
06DA    0000                BSS  E                                              30C02700
06DA 0  0000            STPRT DC     /0000     START                           30C02710
06DB 0  3480                  DC     /3480     PRINTER                         30C02720
06DC 0  0000            STPPT DC     /0000     STOP                            30C02730
06DD 0  3440                  DC     /3440     PRINTER                         30C02740
06DE 0  0000            STSPA DC     /0000     START                           30C02750
06DF 0  3401                  DC     /3401     SPACE                           30C02760
06E0 0  0001            DSW32 DC     /0001     CHECK                           30C02770
06E1 0  3701                  DC     /3701     DSW                             30C02780
06E2 0  0000            SENSE DC     /0000      SENSE WITHOUT                  30C02790
06E3 0  3700                  DC     /3700        RESET                        30C02800
06E4 1  0800            RDEMT DC     EMIT      READ CHARACTER                  30C02810
06E5 0  3200                  DC     /3200     SCANNED                         30C02820
06E6 0  0000            STCAR DC     /0000     START                           30C02830
06E7 0  3404                  DC     /3404     CARRIAGE                        30C02840
06E8 0  0000            STPCA DC     /0000     STOP                            30C02850
06E9 0  3402                  DC     /3402     CARRIAGE                        30C02860
06EA 0  FFFF            ONES  DC     /FFFF                                     30C02870
06EB 0  FFFF                  DC     /FFFF                                     30C02880
                        *                                                       30C02890
                        * THIS IS THE PRINT ROUTINE                            30C02900
                        *                                                       30C02910
06EC 0  0000            PRINT DC     0                                         30C02920
06ED 0  69E6                  STX    1 SCNCT     STO SCAN CNT                  30C02930
06EE 0  69F3                  STX    1 SENSE     SET PRINT RTRN SW             30C02940
06EF 0  C0FC                  LD       PRINT                                   30C02950
06F0 0  D016                  STO      SPACE     SET RETURN FROM SPACE         30C02960
06F1 0  61FF                  LDX    1 -1                                      30C02970
06F2 0  69E2                  STX    1 IDLE      SET FOR PRINT                 30C02980
06F3 0  1010                  SLA      16                                      30C02990
06F4 01 D40005E5              STO    L PSTIN     RESET MLSCF                   30C03000
06F6 0  08E8                  XIO      SENSE                                   30C03010
06F7 0  1006                  SLA      6         CK IF BUSY                    30C03020
06F8 01 4C2806FC              BSC    L PRN1,+Z   BR IF BUSY                    30C03030
06FA 0  68DF                  STX      STPRT     SET 1ST SCAN SW               30C03040
06FB 0  08DE                  XIO      STPRT     START THE PRINTER             30C03050
                        *                                                       30C03060
06FC 01 44000738        PRN1  BSI    L ICTR      WAIT FOR INTERRUPT            30C03070
06FE 01 4400096D              BSI    L ERR4      NO INTERRUPT                  30C03080
                        *                                                       30C03090
0700 01 C40007A9        PRTN  LD     L CKESW                                   30C03100
0702 0  D001                  STO      *+1                                     30C03110
0703 00 44200000              BSI    L *-*,Z     BR IF EMIT ERR                30C03120
0705 01 4C8006EC              BSC    I PRINT                                   30C03130
                        *                                                       30C03140
                        * SPACE SUBROUTINE                                     30C03150
                        *                                                       30C03160
0707 0  0000            SPACE DC     0                                         30C03170
                        *                                                       30C03180
0708 01 C40007A9        SP2   LD     L CKESW     CHECK IF SEQUENCE ERROR       30C03190
070A 01 4420097C              BSI    L ERR7,Z    BR IF EMIT ERR                30C03200
070C 01 C400050E              LD     L BSW0      LD CONTROL SWS                30C03210
070E 0  100F                  SLA      15        CK FOR PROG HALT              30C03220
070F 01 442807E7              BSI    L STOP,+Z                                 30C03230
0711 00 65002000              LDX    L1 /2000                                  30C03240
0713 01 6D000608              STX    L1 MSK2     SET MASK FOR SPACE            30C03250
0715 01 0C00060E              XIO    L STSPA     START SPACE                   30C03260
0717 01 44000738              BSI    L ICTR      WAIT FOR INTERRUPT            30C03270
0719 01 44000977              BSI    L ERR6                                    30C03280
                        *                                                       30C03290
071B 01 440007B0        SPRTN BSI    L FORMS     CK DSW                        30C03300
071D 01 C40005DF              LD     L BSW1      CHECK FOR NEW                 30C03310
071F 01 4C30061B              BSC    L CN14,Z-     ROUTINE NUMBER              30C03320
0721 01 4C800707              BSC    I SPACE     RETURN                        30C03330
                        *                                                       30C03340
                        *  THIS SUBROUTINE CLEARS 32-39 AND                     30C03350
```



```
                        *  SETS BIT 15, LOC 39.                                 30C03360
                        *                                                       30C03370
0723 0  0000            CLEAR DC     0                                          30C03380
0724 0  61F8                  LDX    1 -8        PRINT AREA                    30C03390
0725 0  10A0                  SLT      32                                      30C03400
0726 00 DD000028        CL10  STD    L1 40                                     30C03410
0728 0  7102                  MDX    1 2                                       30C03420
0729 0  70FC                  MDX      CL10                                    30C03430
072A 0  6101                  LDX    1 1         SET B15 L 39 TO ONE           30C03440
072B 00 6D000027              STX    L1 39                                     30C03450
072D 01 4C800723              BSC    I CLEAR                                   30C03460
                        *                                                       30C03470
                        * SUBROUTINE TO SET PRINT AREA TO ONES                  30C03480
                        *                                                       30C03490
072F 0  0000            A1    DC     0                                         30C03500
0730 0  63F8                  LDX    3 -8                                      30C03510
0731 0  C888                  LDD      ONES      SET PRINT                     30C03520
0732 00 DF000028        A110  STD    L3 40       AREA TO ALL ONES              30C03530
0734 0  7302                  MDX    3 2                                       30C03540
0735 0  70FC                  MDX      A110                                    30C03550
0736 01 4C80072F              BSC    I A1        LEAVE                         30C03560
                        *                                                       30C03570
                        * THIS SUBROUTINE WAITS FOR INTERRUPT                  30C03580
                        *                                                       30C03590
0738 0  0000            ICTR  DC     0                                         30C03600
0739 00 650005DC              LDX    L1 1500      SET                          30C03610
073B 0  690B                  STX    1 ICT        COUNT                        30C03620
073C 01 65000742        ICTR1 LDX    L1 ICTR2                                  30C03630
073E 01 6D00005E6             STX    L1 PSTDE                                  30C03640
0740 00 4C800011              BSC    I START                                   30C03650
0742 01 74FF0747        ICTR2 MDX    L ICT,-1                                  30C03660
0744 0  70F7                  MDX      ICTR1                                   30C03670
0745 01 4C800738              BSC    I ICTR                                    30C03680
0747 0  0000            ICT   DC     0                                         30C03690
                        *                                                       30C03700
                        * THIS SUBROUTINE FINDS THE FIRST CHARACTER             30C03710
                        * EMITTED IN THE TABLE                                  30C03720
                        *                                                       30C03730
0748 0  0000            FFE   DC     0                                         30C03740
0749 01 C40008DD              LD     L EMIT                                    30C03750
074B 0  E861                  OR       OREM      CK FOR MISSING EMIT BITS      30C03760
074C 0  D060                  STO      OREM      FF00 IF OK                    30C03770
074D 01 C40008DD              LD     L EMIT                                    30C03780
074F 0  E05C                  AND      ANDEM     CK FOR SHORTED EMIT BITS      30C03790
0750 0  D05B                  STO      ANDEM     0000 IF OK                    30C03800
0751 0  F05B                  EOR      OREM      CK FOR EMIT BITS OK           30C03810
0752 0  F057                  EOR      KFF00                                   30C03820
0753 01 4C200771              BSC    L ST20,Z    CONT IF ALL EMIT BITS OK      30C03830
0755 0  1010                  SLA      16                                      30C03840
0756 01 D40006DA              STO    L STPRT     RESET 1ST SCAN SW             30C03850
0758 0  63D0                  LDX    3 -48       FIND 1ST CHAR                 30C03860
0759 01 C700096C        ST05  LD     L3 CHAR+48  EMITTED IN                    30C03870
075B 01 940008DD              S      L EMIT      SEQUENCE TABLE                30C03880
075D 01 4C18076A              BSC    L ST10,+-   FOUND IF BR                   30C03890
075F 0  7301                  MDX    3 1         GO TO NEXT TABLE ENTRY        30C03900
0760 0  70F8                  MDX      ST05                                    30C03910
0761 01 6700098D              LDX    L3 ERR9                                   30C03920
0763 0  6845                  STX    3 CKESW                                   30C03930
0764 01 C40008DD              LD     L EMIT                                    30C03940
0766 01 D40009E1              STO    L ERM5      STO EMIT IN ERR MESS          30C03950
0768 01 4C800748              BSC    I FFE                                     30C03960
076A 0  7301            ST10  MDX    3 1         DECREMENT XR FOR NEXT CHAR    30C03970
076B 0  7001                  MDX      ST15      AND SAVE                      30C03980
076C 0  63D0                  LDX    3 -48       IF XR3 = 0, RESET             30C03990
076D 01 6F0008E0        ST15  STX    L3 CHARC                                  30C04000
076F 01 4C800748              BSC    I FFE                                     30C04010
                        *                                                       30C04020
0771 01 74FF07AB        ST20  MDX    L EMTCT,-1  CNT 100 EMITS                 30C04030
```

1132 PRINTER FUNCTION TEST

```
0773 0  7010          MDX     ST25        THEN SKIP                    30C04040
0774 01 67C009AE      LDX  L3 ERR13                                    30C04050
0776 0  6B32          STX   3 CKESW       SET ER SW FOR ER 13          30C04060
0777 01 0C0006DC      XIO  L  STPPT       STOP THE PRINTER             30C04061
0779 0  C832          LDD     ANDEM       LD ERROR CODE                30C04062
077A 01 DC9009E0      STD  L  ERM4        SET IN MESSAGE               30C04063
077C 0  C831          LDD     ANDOR       REINITIALIZE EMIT            30C04064
077D 0  D82E          STD     ANDEM        CHECK WORD                  30C04065
077E 0  6164          LDX   1 100                                      30C04066
077F 0  6928          STX   1 EMTCT       RESET EMIT CK CNT            30C04067
0780 01 65000700      LDX  L1 PRTN        SET TO RETURN TO             30C04070
0782 01 6D0005E5      STX  L1 PSTIN        PRINT ROUTINE               30C04080
0784 01 4C800632  ST25 BSC  I  PIRT                                    30C04090
                      *                                                30C04100
                      * THIS SUBROUTINE CHECKS THE CHARACTER EMITTED   30C04110
                      * WITH THE TABLE OF CHARACTERS IN THE PROPER SEQ 30C04120
                      *                                                30C04130
0786 0  0000          CKEMT DC    0                                    30C04140
0787 01 C40007A9            LD   L  CKESW                              30C04150
0789 01 4CA00786            BSC  I  CKEMT,Z     RETURN IF ERROR        30C04160
078B 01 678C08E0            LDX  I3 CHARC      RESET XR3 AND  CHECK IF 30C04170
078D 01 C700096C            LD   L3 CHAR+48    CHAR EMITTED            30C04180
078F 01 940008DD            S    L  EMIT       IS IN THE PROPER SEQUENCE 30C04190
0791 01 4C18C7A2            BSC  L  CKEMi,+-    YES, IF BRANCH         30C04200
0793 01 C40008DD            LD   L  EMIT                               30C04210
0795 01 D40009E1            STO  L  ERM5        STO EMIT IN ERR MESS   30C04220
0797 01 678C08E0            LDX  I3 CHARC                              30C04230
0799 01 C700096C            LD   L3 CHAR+48                            30C04240
079B 01 D40009E2            STO  L  ERM6        STO EMIT S/B           30C04250
079D 01 6700097C            LDX  L3 ERR7                               30C04260
079F 0  6B09                STX   3 CKESW       SET ERROR SW           30C04270
07A0 01 4C800786            BSC  I  CKEMT                              30C04280
07A2 0  7301          CKEM1 MDX   3 1                                  30C04290
07A3 0  7001                MDX     R1153       AND SAVE               30C04300
07A4 0  63D0                LDX   3 -48         RESET XR3, IF = 0      30C04310
07A5 01 6FC008E0      R1153 STX  L3 CHARC       SAVE XR3               30C04320
07A7 01 4C800786            BSC  I  CKEMT                              30C04330
07A9 0  0000          CKESW DC    0             ERROR SWITCH           30C04340
07AA 0  FF00          KFF00 DC    /FF00                                30C04350
07AB 0  0000          EMTCT DC    0                                    30C04360
07AC    0000                  BSS  E                                   30C04361
07AC 0  0000          ANDEM DC    0                                    30C04362
07AD 0  0000          OREM  DC    0                                    30C04363
07AE 0  BF00          ANDOR DC    /BF00         EMIT CK CONSTANT       30C04364
07AF 0  0000                DC    /0000                                30C04365
                      *                                                30C04370
                      * THIS SUBROUTINE CHECKS THE DSW FOR             30C04380
                      * READY CONDITIONS                               30C04390
                      *                                                30C04400
0780 0  0000          FORMS DC    0                                    30C04410
0781 0  1810                SRA     16                                 30C04420
0782 01 D40005E6            STO  L  PSTDE                              30C04430
0784 01 0C0006E2            XIO  L  SENSE       DSW TO AC              30C04440
0786 0  E01A                AND     FOMSK       CCK BITS 0-7           30C04450
0787 0  D01F                STO     STM1                               30C04460
0788 01 4C9807B0            BSC  I  FORMS,+-    READY IF BRANCH        30C04470
078A 0  1005                SLA     5                                  30C04480
078B 01 4C2807C4            BSC  L  ULOG1,Z+    BR IF NRDY             30C04490
078D 0  C019                LD      STM1                               30C04500
078E 01 D40009E0            STO  L  ERM4                               30C04510
07C0 01 4400099D            BSI  L  ERR11                              30C04520
07C2 01 4C8007B0            BSC  I  FORMS                              30C04530
07C4 00 44800013      ULOG1 BSI  I  LOG         TYPE                   30C04540
07C4 1  07D2                DC      STM         MESSAGE                30C04550
07C7 1  07CB                DC      ULOG2       BUSY                   30C04560
07C8 0  0000                DC      0           HOLD SW                30C04570
07C9 0  400E                BSI     DLY          GO DELAY              30C04580
07CA 0  70E6                MDX     FORMS+1      TRY AGAIN             30C04590
```


1132 PRINTER FUNCTION TEST

```
07C8 01 650007C4      ULOG2 LDX  L1 ULOG1       BUSY                   30C04600
07CD 01 6D0005E4      ULOG3 STX  L1 PST32       SET MLCSF              30C04610
07CF 00 4C800011            BSC  I  START       RETURN TO MONITOR      30C04620
07D1 0  FE00          FOMSK DC    /FE00                                30C04630
                      *                                                30C04640
07D2 0  0001          STM   DC    1             WORD COUNT             30C04650
07D3 0  0000                DC    0                                    30C04660
07D4 0  0001                DC    1             MESSAGE ID             30C04670
07D5 0  0048                DC    ANRDY                                30C04680
07D6 0  0000                DC    0                                    30C04690
07D7 0  0000          STM1  DC    0             DSW                    30C04700
                      *                                                30C04710
                      * THIS ROUTINE DELAYS FOR 10 SECONDS             30C04720
                      *                                                30C04730
07D8 0  0000          DLY   DC    0                                    30C04740
07D9 0  1810                SRA     16                                 30C04750
07DA 0  D00B                STO     DLYCT                              30C04760
07DB 01 740307E6      DLY1  MDX  L  DLYCT,3                            30C04770
07DD 0  7002                MDX     *+2                                30C04780
07DE 01 4C8007D8            BSC  I  DLY                                30C04790
07E0 01 650007DB            LDX  L1 DLY1                               30C04800
07E2 01 6D0005E6            STX  L1 PSTDE                              30C04810
07E4 00 4C800011            BSC  I  START                              30C04820
07E6 0  0000          DLYCT DC    0             DELAY COUNTER          30C04830
                      *                                                30C04840
                      * THE PROGRAM WILL LOOP IN THIS ROUTINE          30C04850
                      * IF SW 15 FUNC CO IS TURNED ON.                 30C04860
                      *                                                30C04870
07E7 0  0000          STOP  DC    0                                    30C04880
07E8 01 C40005DE            LD   L  BSW0        LD CONTROL SWS         30C04890
07EA 0  100F                SLA     15          CK FOR PROG HALT       30C04900
07EB 01 4C9007E7            BSC  I  STOP,-      BR IF HALT OFF         30C04910
                      *                                                30C04920
07ED 01 650007E8            LDX  L1 STOP+1      IF ON SET MLSCF        30C04930
07EF 01 6D0005E4            STX  L1 PST32        FOR RETURN            30C04940
07F1 00 4C800011            BSC  I  START                              30C04950
                      *                                                30C04960
                      *             TEST ROUTINE 1                     30C04970
                      *                                                30C04980
                      * CHECK EMIT SEQUENCE AND NORMAL PRINT DSW       30C04990
                      *                                                30C05000
07F3 0  6101          CE10  LDX   1 1                                  30C05010
07F4 01 6D0005DD            STX  L1 PRROU       STORE RTN NO           30C05020
07F6 01 6C0009CD            STX  L  UERR9       SET LOOP ADDRS         30C05030
07F8 01 44000723            BSI  L  CLEAR       SET BUFFER TO ZERO     30C05040
07FA 01 44000780            BSI  L  FORMS       CK FOR READY           30C05050
                      *                                                30C05060
07FC 0  6164          CE11  LDX   1 100                                30C05070
07FD 01 6D0008DF            STX  L1 LPCNT       SET LOOP COUNT         30C05080
                      *                                                30C05090
07FF 00 65C08200      CE12  LDX  L1 /8200                              30C05100
0801 01 6D0006D8            STX  L1 MSK2        SET MASK FOR PRINT     30C05110
0803 00 65000000            LDX  L1 0           SET SCAN CNT           30C05120
0805 01 440006EC            BSI  L  PRINT                              30C05130
0807 01 74FF08DF            MDX  L  LPCNT,-1    ADV LOOP CNT           30C05140
0809 0  70F5                MDX     CE12                               30C05150
080A 01 0C0006DC            XIO  L  STPPT       STOP PRINTER           30C05160
080C 01 4400060A            BSI  L  CNTRL       GO TO CONTROL RTN      30C05170
080E 0  70ED                MDX     CE11                               30C05180
                      *                                                30C05190
                      *             TEST ROUTINE 2                     30C05200
                      *                                                30C05210
                      * CHECK PRINT SCAN CHECK INDICATOR               30C05220
                      *                                                30C05230
080F 0  6102          CS10  LDX   1 2                                  30C05240
0810 01 6D0005DD            STX  L1 PRROU       STORE RTN NO           30C05250
0812 01 6C0009CD            STX  L  UERR9       SET LOOP ADDRS         30C05260
0814 01 44000723            BSI  L  CLEAR       SET BUFFER TO ZERO     30C05270
```

1132 PRINTER FUNCTION TEST

```
0816 01 44000780            BSI  L  FORMS       CK FOR READY                 30C05280
                       *                                                     30C05290
0818 0  6164           CS11  LDX   1 100                                     30C05300
0819 01 6D0008DF             STX  L1 LPCNT      SET LOOP COUNT               30C05310
                       *                                                     30C05320
081B 0  1810           CS12  SRA     16                                      30C05330
081C 00 D4000027             STO  L  39        CLEAR BIT 15 LOC 39           30C05340
081E 00 65008A00             LDX  L1 /8A00      SET MASK TO                  30C05350
0820 01 6D0006D8             STX  L1 MSK2         CK FOR SCAN CHECK          30C05360
0822 00 65000000             LDX  L1 0          SET SCAN CNT                 30C05370
0824 01 440006EC             BSI  L  PRINT                                   30C05380
0826 01 74FF08DF             MDX  L  LPCNT,-1   ADV LOOP CNT                 30C05390
0828 0  70F2                 MDX     CS12                                    30C05400
0829 01 0C0006DC             XIO  L  STPPT      STOP PRINTER                 30C05410
082B 01 4400060A             BSI  L  CNTRL      GO TO CONTROL RTN            30C05420
082D 0  70EA                 MDX     CS11                                    30C05430
                       *                                                     30C05440
                       *                                                     30C05450
                       *             TEST ROUTINE 3                          30C05460
                       *                                                     30C05470
                       *                                                     30C05480
                       * THIS ROUTINE CHECKS FOR SPACE RESPONSES             30C05490
                       * AND CHECKS THE DSW                                  30C05500
                       *                                                     30C05510
082E 0  6103           SP10  LDX   1 3                                       30C05520
082F 01 6D0005DD             STX  L1 PRROU      STORE RTN NO                 30C05530
0831 01 6C0009CD             STX  L  UERR9      SET LOOP ADDRS               30C05540
0833 01 44000780             BSI  L  FORMS      CK FOR READY                 30C05550
                       *                                                     30C05560
0835 0  61CE           SP15  LDX   1 -50                                     30C05570
0836 0  6903           SP16  STX   1 SP30+1                                  30C05580
0837 01 44000707             BSI  L  SPACE                                   30C05590
                       *                                                     30C05600
0839 00 65000000       SP30  LDX  L1 0                                       30C05610
083B 0  7101                 MDX   1 1                                       30C05620
083C 0  70F9                 MDX     SP16                                    30C05630
083D 01 4400060A             BSI  L  CNTRL      GO TO CONTROL RTN            30C05640
083F 0  70F5                 MDX     SP15                                    30C05650
                       *                                                     30C05660
                       *                                                     30C05670
                       *             TEST ROUTINE 4                          30C05680
                       *                                                     30C05690
                       * THIS ROUTINE CHECKS SKIP CONTROL                    30C05700
                       *                                                     30C05710
0840 0  6104           SC10  LDX   1 4                                       30C05720
0841 01 6D0005DD             STX  L1 PRROU      STORE RTN NO                 30C05730
0843 01 6C0009CD             STX  L  UERR9      SET LOOP ADDRS               30C05740
0845 01 44000780             BSI  L  FORMS      CK FOR READY                 30C05750
                       *                                                     30C05760
0847 0  61F8           SC15  LDX   1 -8                                      30C05770
0848 0  6936                 STX   1 SCTM1                                   30C05780
0849 0  6934           SC16  STX   1 SCTM                                    30C05790
                       *                                                     30C05800
084A 01 C400050E       SC17  LD   L  BSW0       LD CONTROL SWS               30C05810
084C 0  100F                 SLA     15         CK FOR PROG HALT             30C05820
084D 01 442807E7             BSI  L  STOP,+Z                                 30C05830
084F 01 C40005DF             LD   L  BSW1       CHECK FOR NEW                30C05840
0851 01 4C30061B             BSC  L  CN14,Z-      ROUTINE NUMBER             30C05850
                       *                                                     30C05860
0853 00 65005000             LDX  L1 /5000      SET MASK TO                  30C05870
0855 01 6D0006D8             STX  L1 MSK2         CK SKIP DSW                30C05880
0857 01 0C0006E6             XIO  L  STCAR     START CARRIAGE                30C05890
0859 01 44000738             BSI  L  ICTR      IDLE FOR INTERRUPT            30C05900
085B 01 0C0006E8             XIO  L  STPCA     ERROR. CHECK IF NO INT        30C05910
085D 01 44000972             BSI  L  ERR5      TYPE MESSAGE                  30C05920
085F 0  7008                 MDX     SC30                                    30C05930
0860 01 6580087E       SC18  LDX  I1 SCTM                                    30C05940
0862 01 C5000888             LD   L1 SKPT+8    DID NOT OCCUR FOR CHANNEL     30C05950
```


1132 PRINTER FUNCTION TEST

```
0864 01 D40009E1             STO  L  ERM5       SPECIFIED                    30C05960
0866 01 44000994             BSI  L  ERR10      TYPE ERROR MESSAGE           30C05970
                       *                                                     30C05980
0868 01 44000738       SC30  BSI  L  ICTR       IDLE UNTIL CARR HAS STOPPED  30C05990
086A 01 C40006D2             LD   L  CCF                                     30C06000
086C 01 4C200875             BSC  L  SC31,Z                                  30C06010
086E 01 6680087F             LDX  I2 SCTM1                                   30C06020
0870 0  7201                 MDX   2 1                                       30C06030
0871 0  7001                 MDX     SC305                                   30C06040
0872 0  70ED                 MDX     SC18                                    30C06050
0873 0  6A08           SC305 STX   2 SCTM1                                   30C06060
0874 0  70D5                 MDX     SC17                                    30C06070
0875 0  62F8           SC31  LDX   2 -8                                      30C06080
0876 0  6A08                 STX   2 SCTM1                                   30C06090
0877 01 6580087E             LDX  I1 SCTM                                    30C06100
0879 0  7101                 MDX   1 1          INTERRUPT OCCURD FOR         30C06110
087A 0  70CE                 MDX     SC16       CHANNEL, GO TO NEXT          30C06120
                       *                                                     30C06130
087B 01 4400060A             BSI  L  CNTRL      NONE LEFT, END OF ROUTINE    30C06140
087D 0  70C9                 MDX     SC15                                    30C06150
                       *                                                     30C06160
                       * CONSTANTS AND STORAGE                               30C06170
                       *                                                     30C06180
087E 0  0000           SCTM  DC      0          TEMPORARY STORAGE FOR XR     30C06190
087F 0  0000           SCTM1 DC      0                                       30C06200
0880 0  0001           SKPT  DC      1          VALID                        30C06210
0881 0  0002                 DC      2          CHANNELS                     30C06220
0882 0  0003                 DC      3                                       30C06230
0883 0  0004                 DC      4                                       30C06240
0884 0  0005                 DC      5                                       30C06250
0885 0  0006                 DC      6                                       30C06260
0886 0  0009                 DC      9                                       30C06270
0887 0  000C                 DC      12                                      30C06280
0888 1  06AD           SCA2  DC      SKINT                                   30C06290
                       *                                                     30C06300
                       *                                                     30C06310
                       *             TEST ROUTINE 5                          30C06320
                       *                                                     30C06330
                       * THIS IS THE PART OF THE PROGRAM WHICH               30C06340
                       * PRINTS LINES OF ROTATION PATTERNS                   30C06350
                       *                                                     30C06360
0889 00 65000005       RR01  LDX  L1 5                                       30C06370
088B 01 6D0005DD             STX  L1 PRROU       STORE RTN NO                30C06380
088D 01 6C0009CD             STX  L  UERR9       SET LOOP ADDRS              30C06390
088F 01 440007B0             BSI  L  FORMS       CK FOR READY                30C06400
0891 01 44000723             BSI  L  CLEAR                                   30C06410
0893 01 44000707             BSI  L  SPACE                                   30C06420
0895 01 44000707             BSI  L  SPACE                                   30C06430
0897 0  61CF                 LDX   1 -49                                     30C06440
0898 01 6D0008AE             STX  L1 R104+1      SET EMIT CHAR CNT           30C06450
                       *                                                     30C06460
089A 0  6132           R101  LDX   1 50          SET LINE COUNT              30C06470
089B 0  6942                 STX   1 LINES                                   30C06480
                       *                                                     30C06490
089C 0  6132           R102  LDX   1 50          SET EMIT LOOP CNT           30C06500
089D 0  6941                 STX   1 LPCNT                                   30C06510
089E 01 C40005E0             LD   L  BSW2        CHECK FOR LOOP ON           30C06520
08A0 0  100A                 SLA     10                                      30C06530
08A1 0  180A                 SRA     10          CLEAR INVALID BITS          30C06540
08A2 01 4C0808A6             BSC  L  R103,+        START CHARACTER           30C06550
08A4 0  903D                 S       N050                                    30C06560
08A5 0  D008                 STO     R104+1      SET START SCAN EMIT         30C06570
                       *                                                     30C06580
08A6 00 65008200       R103  LDX  L1 /8200                                   30C06590
08A8 01 6D0006D8             STX  L1 MSK2        SET MASK FOR PRINT          30C06600
08AA 0  6100                 LDX   1 0           SET SCAN COUNT              30C06610
08AB 01 440006EC             BSI  L  PRINT       GO PRINT                    30C06620
                       *                                                     30C06630
```

```
08AD 00 67000000    R104  LDX  L3 0           COMPARE START SCAN          30C06640
08AF 01 C700096D          LD   L3 CHAR+49      CHAR WITH LAST              30C06650
08B1 0  9028              S    EMIT            EMIT CHAR                   30C06660
08B2 01 4C18098C          BSC  L  R107,+-      LOOP IF NOT EQUAL           30C06670
08B4 01 74010606          MDX  L  IDLSW,1      SKIP IF SCAN CNT -1         30C06680
08B6 0  70E5              MDX     R102                                     30C06690
                          *                                                30C06700
08B7 01 74FF08DF          MDX  L  LPCNT,-1     IF AFTER 50 CONSECUTIVE     30C06710
08B9 0  70EC              MDX     R103           EMITS A MATCH IS NOT      30C06720
08BA 0  1810              SRA     16             FOUND, LEAVE SPACE        30C06730
08BB 0  7001              MDX     R107+1         THEN CONTINUE             30C06740
                          *                                                30C06750
08BC 0  C01F        R107  LD      SET          SET BUFFER WITH FIRST BIT   30C06760
08BD 0  61F0              LDX   1 -16          SET SHIFT REGISTER          30C06770
08BE 0  62F8              LDX   2 -8           SET STORAGE REGISTER        30C06780
08BF 0  7301              MDX   3 1                                        30C06790
08C0 0  7005              MDX     R1041                                    30C06800
08C1 0  63CE              LDX   3 -50                                      30C06810
08C2 0  6BEB              STX   3 R104+1       RESET EMIT CHAR CNT         30C06820
08C3 0  1801              SPA     1            SHIFT LAST LINE             30C06830
08C4 0  7101              MDX   1 1              IN PATTERN                30C06840
08C5 0  7302              MDX   3 2                                        30C06850
                          *                                                30C06860
08C6 01 6F00069C    R1041 STX   L3 STPPT       SET FOR PATTERN SPACE       30C06870
08C8 01 6D00068C          STX   L1 PI5+1                                   30C06880
08CA 01 6E00068E          STX   L2 PI6+1                                   30C06890
08CC 0  6176              LDX   1 118          SET SCAN COUNT              30C06900
08CD 01 6D0006D4          STX   L1 SCNCT                                   30C06910
08CF 00 D4000020          STO   L  32          SET 1ST BUFR WORD           30C06920
08D1 01 440006EC          BSI   L  PRINT       GO PRINT                    30C06930
                          *                                                30C06940
08D3 01 740108AE    R105  MDX   L  R104+1,1    ADV CHAR FOR NXT SCAN       30C06950
08D5 0  1000              NOP                  SAFETY NOP                  30C06960
08D6 01 74FF08DE          MDX   L  LINES,-1    ADV LINE CNT                30C06970
08D8 0  70C3              MDX     R102                                     30C06980
                          *                                                30C06990
08D9 01 4400060A          BSI   L  CNTRL       GO TO CONTROL RTN           30C07000
08DB 0  708E              MDX     R101         LOOP ROUTINE RETURN         30C07010
                          *                                                30C07020
                          * CONSTANTS AND STORAGE                          30C07030
                          *                                                30C07040
08DC 0  8000        SET   DC      /8000                                    30C07050
08DD 0  0000        EMIT  DC      0            EMITTED CHARACTER           30C07060
08DE 0  0000        LINES DC      0            LINE COUNT                  30C07070
08DF 0  0000        LPCNT DC      0             LOOP COUNT                 30C07080
08E0 0  0000        CHARC DC      0            TEMPORARY STORAGE           30C07090
08E1 0  0031        N049  DC      49                                       30C07100
08E2 0  0032        N050  DC      50                                       30C07110
                          *                                                30C07120
                          *                                                30C07130
                          *            TEST ROUTINE 6                      30C07140
                          *                                                30C07150
                          * THIS ROUTINE PRINTS LINES OF ONE CHAR          30C07160
                          * UNTIL ALL 48 CHARACTERS HAVE BEEN PRINTED      30C07170
                          *                                                30C07180
08E3 0  6106        AC10  LDX   1 6                                        30C07190
08E4 01 6D0005DD          STX   L1 PRROU       STORE RTN NO                30C07200
08E6 01 6C0009CD          STX   L  UERR9       SET LOOP ADDRS              30C07210
08E8 01 44000780          BSI   L  FORMS       CK FOR READY                30C07220
08EA 01 44000723          BSI   L  CLEAR                                   30C07230
08EC 01 44000707          BSI   L  SPACE                                   30C07240
08EE 01 44000707          BSI   L  SPACE                                   30C07250
                          *                                                30C07260
08F0 0  61D0        AC14  LDX   1 -48                                      30C07270
08F1 0  6912              STX   1 AC30+1       SET CHAR CNT                30C07280
                          *                                                30C07290
08F2 0  6132        AC15  LDX   1 50           SET EMIT LOOP CNT           30C07300
08F3 0  69EB              STX   1 LPCNT                                    30C07310
```



```
08F4 01 C40005E0          LD    L  BSW2        CHECK FOR LOOP ON           30C07320
08F6 0  100A              SLA     10                                       30C07330
08F7 0  180A              SRA     10           CLEAR INVALID BITS          30C07340
08F8 01 4C0808FC          BSC   L  AC20,+        START CHARACTER           30C07350
08FA 0  90E6              S       N049                                     30C07360
08FB 0  D008              STO     AC30+1       SET START SCAN EMIT         30C07370
                          *                                                30C07380
08FC 00 65008200    AC20  LDX   L1 /8200                                   30C07390
08FE 01 6D0006D8          STX   L1 MSK2        SET MASK FOR PRINT          30C07400
0900 0  6100              LDX   1 0                                        30C07410
0901 01 440006EC          BSI   L  PRINT                                   30C07420
                          *                                                30C07430
0903 00 65000000    AC30  LDX   L1 0                                       30C07440
0905 0  C0D7              LD      EMIT         CHECK IF CHARACTER IS       30C07450
0906 01 9500096C          S     L1 CHAR+48     TO BE PRINTED               30C07460
0908 01 4C180911          BSC   L  AC35,+-     YES IF BRANCH               30C07470
                          *                                                30C07480
090A 01 74010606          MDX   L  IDLSW,1     SKIP IF SCAN CNT -1         30C07490
090C 0  70E5              MDX      AC15                                    30C07500
090D 01 74FF08DF          MDX   L  LPCNT,-1    AFTER 50 CONSECUTIVE        30C07510
090F 0  70EC              MDX      AC20          EMITS - SPACE             30C07520
0910 0  7002              MDX      AC35+2        THEN CONTINUE             30C07530
                          *                                                30C07540
0911 01 4400072F    AC35  BSI   L  A1          SET PRINT BUFR TO ONES      30C07550
0913 0  6101              LDX   1 1            SET SCAN CNT                30C07560
0914 01 6D0006D4          STX   L1 SCNCT                                   30C07570
0916 01 440006EC          BSI   L  PRINT                                   30C07580
                          *                                                30C07590
0918 01 74010904    AC40  MDX   L  AC30+1,1    ADV TO NXT CHAR             30C07600
091A 0  70D7              MDX      AC15                                    30C07610
091B 01 4400C60A          BSI   L  CNTRL       GO TO CONTROL RTN           30C07620
091D 0  70D2              MDX      AC14        LOOP ROUTINE RETURN         30C07630
                          *                                                30C07640
                          *                                                30C07650
                          *                                                30C07660
                          *            TEST ROUTINE 7                      30C07670
                          *                                                30C07680
                          * THIS ROUTINE PRINTS LINES OF ALL ONE CHARACTER 30C07690
                          *                                                30C07700
091E 0  6107        A010  LDX   1 7                                        30C07710
091F 01 6D0005DD          STX   L1 PRROU       STORE RTN NO                30C07720
0921 01 6C0009CD          STX   L  UERR9       SET LOOP ADDRS              30C07730
0923 01 44000780          BSI   L  FORMS       CK FOR READY                30C07740
0925 01 44000723          BSI   L  CLEAR                                   30C07750
0927 01 44000707          BSI   L  SPACE                                   30C07760
0929 01 44000707          BSI   L  SPACE                                   30C07770
                          *                                                30C07780
092B 0  6164        A0105 LDX   1 100          SET LINE COUNT              30C07790
092C 0  6981              STX   1 LINES                                    30C07800
                          *                                                30C07810
092D 01 4400072F    A011  BSI   L  A1          SET PRINT AREA TO ONES      30C07820
092F 00 65008200          LDX   L1 /8200                                   30C07830
0931 01 6D0006D8          STX   L1 MSK2        SET MASK FOR PRINT          30C07840
0933 0  6101              LDX   1 1            SET SCAN CNT                30C07850
0934 01 440006EC          BSI   L  PRINT       GO PRINT                    30C07860
                          *                                                30C07870
0936 01 74FF08DE    A012  MDX   L  LINES,-1    UPDATE LINE COUNT           30C07880
0938 0  70F4              MDX      A011                                    30C07890
0939 01 4400060A          BSI   L  CNTRL       GO TO CONTROL RTN           30C07900
093B 0  70E2              MDX      A010        LOOP ROUTINE RETURN         30C07910
                          *                                                30C07920
                          * THIS IS THE TABLE OF CHARACTERS IN THE         30C07930
                          * PROPER SCAN EMIT SEQUENCE                      30C07940
                          *                                                30C07950
093C 0  F100        CHAR  DC      /F100        1                           30C07960
093D 0  F200              DC      /F200        2                           30C07970
093E 0  F300              DC      /F300        3                           30C07980
093F 0  F400              DC      /F400        4                           30C07990
```

```
0940 0  F500            DC      /F500   5                30C08000
0941 0  F600            DC      /F600   6                30C08010
0942 0  F700            DC      /F700   7                30C08020
0943 0  F800            DC      /F800   8                30C08030
0944 0  F900            DC      /F900   9                30C08040
0945 0  F000            DC      /F000   0                30C08050
0946 0  7E00            DC      /7E00   =                30C08060
0947 0  5B00            DC      /5B00   $                30C08070
0948 0  4B00            DC      /4B00   .                30C08080
0949 0  7D00            DC      /7D00   =                30C08090
094A 0  6B00            DC      /6B00   ,                30C08100
094B 0  5D00            DC      /5D00   )                30C08110
094C 0  6000            DC      /6000   -                30C08120
094D 0  4D00            DC      /4D00   (                30C08130
094E 0  4E00            DC      /4E00   +                30C08140
094F 0  6100            DC      /6100   /                30C08150
0950 0  5C00            DC      /5C00   *                30C08160
0951 0  5000            DC      /5000   &                30C08170
0952 0  D100            DC      /D100   J                30C08180
0953 0  D200            DC      /D200   K                30C08190
0954 0  D300            DC      /D300   L                30C08200
0955 0  D400            DC      /D400   M                30C08210
0956 0  D500            DC      /D500   N                30C08220
0957 0  D600            DC      /D600   O                30C08230
0958 0  D700            DC      /D700   P                30C08240
0959 0  D800            DC      /D800   Q                30C08250
095A 0  D900            DC      /D900   R                30C08260
095B 0  C500            DC      /C500   E                30C08270
095C 0  C700            DC      /C700   G                30C08280
095D 0  E600            DC      /E600   W                30C08290
095E 0  E700            DC      /E700   X                30C08300
095F 0  E800            DC      /E800   Y                30C08310
0960 0  E900            DC      /E900   Z                30C08320
0961 0  C100            DC      /C100   A                30C08330
0962 0  C200            DC      /C200   B                30C08340
0963 0  C300            DC      /C300   C                30C08350
0964 0  C400            DC      /C400   D                30C08360
0965 0  C600            DC      /C600   F                30C08370
0966 0  C800            DC      /C800   H                30C08380
0967 0  C900            DC      /C900   I                30C08390
0968 0  E200            DC      /E200   S                30C08400
0969 0  E300            DC      /E300   T                30C08410
096A 0  E400            DC      /E400   U                30C08420
096B 0  E500            DC      /E500   V                30C08430
096C 0  F100            DC      /F100   1                30C08440
                *                                        30C08450
                * THIS SET OF SHORT ROUTINES SETS UP TO TYPE 30C08460
                * DIFFERENT ERROR MESSAGES.              30C08470
                *                                        30C08480
096D 0  0000    ERR4    DC      0       ERROR 4 MESSAGE  30C08490
096E 0  6104            LDX   1 4                        30C08500
096F 0  4013            BSI     ERRX                     30C08510
0970 01 4C80096D        BSC   I ERR4                     30C08520
                *                                        30C08530
0972 0  0000    ERR5    DC      0                        30C08540
0973 0  6105            LDX   1 5                        30C08550
0974 0  400E            BSI     ERRX                     30C08560
0975 01 4C800972        BSC   I ERR5                     30C08570
                *                                        30C08580
0977 0  0000    ERR6    DC      0       ERROR 6 MESSAGE  30C08590
0978 0  6106            LDX   1 6                        30C08600
0979 0  4009            BSI     ERRX                     30C08610
097A 01 4C800977        BSC   I ERR6                     30C08620
                *                                        30C08630
097C 0  0000    ERR7    DC      0       ERROR 7 MESSAGE  30C08640
097D 0  6107            LDX   1 7                        30C08650
097E 0  C837            LDD     MES7     LD ALPHA MESS   30C08680
097F 0  6203            LDX   2 3        SET WORD CNT    30C08690
```



```
0980 0  4041            BSI     UERR     GO TYPE MESS    30C08700
0981 01 4C80097C        BSC   I ERR7                     30C08710
                *                                        30C08720
0983 0  0000    ERRX    DC      0        COMMON ROUTINE  30C08730
0984 01 0C0006E2        XIO   L SENSE    SENSE DSW       30C08740
0986 01 D40009E0        STO   L ERM5     STO DSW IN MESS 30C08750
0988 0  C82F            LDD     MES8     LD ALPHA MESS   30C08760
0989 0  6201            LDX   2 1        SET WORD CNT    30C08770
098A 0  4037            BSI     UERR     GO TYPE MESS    30C08780
098B 01 4C800983        BSC   I ERRX                     30C08790
                *                                        30C08800
098D 0  0000    ERR9    DC      0        ERROR 9 MESSAGE 30C08810
098E 0  6109            LDX   1 9                        30C08820
098F 0  C82A            LDD     MES9     LD ALPHA MESS   30C08850
0990 0  6202            LDX   2 2        SET WORD CNT    30C08860
0991 0  4030            BSI     UERR     GO TYPE MESS    30C08870
0992 01 4C80098D        BSC   I ERR9                     30C08880
                *                                        30C08890
0994 0  0000    ERR10   DC      0        ERROR 10 MESSAGE 30C08900
0995 0  6110            LDX   1 /0010                    30C08910
0996 0  C825            LDD     MES10    LD ALPHA MESS   30C08920
0997 0  6202            LDX   2 2        SET WORD CNT    30C08930
0998 0  4029            BSI     UERR     GO TYPE MESS    30C08940
0999 01 4400060A        BSI   L CNTRL                    30C08950
099B 01 4C000847        BSC   L SC15                     30C08960
                *                                        30C08970
099D 0  0000    ERR11   DC      0        ERR 11 MESSAGE  30C08980
099E 0  6111            LDX   1 /0011                    30C08990
099F 0  C81E            LDD     MES11    LD ALPHA MESS   30C09000
09A0 0  6201            LDX   2 1        SET WORD CNT    30C09010
09A1 0  4020            BSI     UERR     GO TYPE MESS    30C09020
09A2 01 4C800990        BSC   I ERR11                    30C09030
                *                                        30C09040
09A4 0  0000    ERR12   DC      0        ERROR 12 MESSAGE 30C09050
09A5 0  6112            LDX   1 /0012                    30C09060
09A6 01 C40006D8        LD    L MSK2     SET S/B         30C09070
09A8 0  D038            STO     ERM5       IN MESSAGE    30C09080
09A9 0  C816            LDD     MES12    LD ALPHA MESS   30C09090
09AA 0  6202            LDX   2 2        SET WORD CNT    30C09100
09AB 0  4016            BSI     UERR     GO TYPE MESS    30C09110
09AC 01 4C8009A4        BSC   I ERR12                    30C09120
                *                                        30C09130
09AE 0  0000    ERR13   DC      0        ERROR 13 MESSAGE 30C09140
09AF 0  6113            LDX   1 /0013                    30C09150
09B0 0  C809            LDD     MES9     LD ALPHA MSG    30C09160
09B1 0  6202            LDX   2 2        SET WORD CNT    30C09170
09B2 0  400F            BSI     UERR     GO TYPE MSG     30C09180
09B3 01 4C8009AE        BSC   I ERR13                    30C09190
                *                                        30C09200
09B6    0000            BSS   E 0                        30C09210
09B6 1  09E3    MES7    DC      IVCLM    INVLD EMIT      30C09220
09B7 1  09EE            DC      WSB      WAS S/B         30C09230
09B8 0  0041    MES8    DC      ANINT    NO INTRPT       30C09240
09B9 0  0000            DC      0                        30C09250
09BA 1  09E3    MES9    DC      IVCLM    INVLD EMIT      30C09260
09BB 0  0000            DC      0                        30C09270
09BC 1  09F8    MES10   DC      CH1      CHANNEL         30C09280
09BD 0  0000            DC      0                        30C09290
09BE 1  0A00    MES11   DC      IVDSW    INVLD DSW       30C09300
09BF 0  0000            DC      0                        30C09310
09C0 1  0A00    MES12   DC      IVDSW    INVLD DSW       30C09320
09C1 1  09EE            DC      WSB      WAS S/B         30C09330
                *                                        30C09340
                * THIS ROUTINE TYPES THE ERROR MESSAGE   30C09350
                *                                        30C09360
09C2 0  0000    UERR    DC      0                        30C09370
09C3 0  6919            STX     1 ERM1     SET ID IN MESSAGE BUFFER 30C09380
09C4 0  6A16            STX     2 ERM      SET WD CNT IN MESS 30C09390
```

```
09C5 0  D818          STD     ERM2                            30C09400
09C6 0  1810          SRA     16          RESET ERROR         30C09405
09C7 01 D40007A9      STO  L  CKESW       SWITCH              30C09406
                      *                                       30C09410
09C9 00 44800012 UERR2 BSI  I  ERROR                          30C09420
09CB 1  09DB          DC      ERM                             30C09430
09CC 1  09D3          DC      UERR6       BUSY                30C09440
09CD 0  0000     UERR9 DC     0           LOOP ON ERROR       30C09450
                      *                                       30C09460
09CE 0  C0F3          LD      UERR                            30C09470
09CF 01 D40005E4      STO  L  PST32                           30C09480
09D1 00 4C800011      BSC  I  START                           30C09490
09D3 01 650009C9 UERR6 LDX L1 UERR2       BUSY, SET MLCSF     30C09500
09D5 01 600005E4      STX  L1 PST32                           30C09510
09D7 00 4C800011      BSC  I  START                           30C09520
                      *                                       30C09530
                      *                                       30C09540
                      * ERROR MESSAGE TABLE, USED BY SUBROUTINE ERROR  30C09550
                      *                                       30C09560
09DA    0001          BSS  E  1                               30C09570
09DB 0  0000     ERM   DC     0           WORD COUNT          30C09580
09DC 0  0000           DC     0           HEX                 30C09590
09DD 0  0000     ERM1  DC     0           ID                  30C09600
09DE 0  0000     ERM2  DC     0           1ST ALPHA MESSAGE ADDRESS  30C09610
09DF 0  0000     ERM3  DC     0           2ND ALPHA MESSAGE ADDRESS  30C09620
09E0 0  0000     ERM4  DC     0           MODIFIERS           30C09630
09E1 0  0000     ERM5  DC     0                               30C09640
09E2 0  0000     ERM6  DC     0                               30C09650
                      *                                       30C09660
                      * ALPHA MESSAGES                       30C09670
                      *                                       30C09680
09E3 0  2200     IVCLM DC     /2200       I                   30C09690
09E4 0  7600           DC     /7600       N                   30C09700
09E5 0  B600           DC     /B600       V                   30C09710
09E6 0  5E00           DC     /5E00       L                   30C09720
09E7 0  3200           DC     /3200       D                   30C09730
09E8 0  2100           DC     /2100                           30C09740
09E9 0  3600           DC     /3600       E                   30C09750
09EA 0  7200           DC     /7200       R                   30C09760
09EB 0  2200           DC     /2200       I                   30C09770
09EC 0  9E00           DC     /9E00       T                   30C09780
09ED 0  FFFF           DC     /FFFF                           30C09790
                      *                                       30C09800
09EE 0  8000     WSB   DC     /8000       .                   30C09810
09EF 0  2100           DC     /2100                           30C09820
09F0 0  9200           DC     /9200       W                   30C09830
09F1 0  3E00           DC     /3E00       A                   30C09840
09F2 0  9A00           DC     /9A00       S                   30C09850
09F3 0  2100           DC     /2100                           30C09860
09F4 0  9A00           DC     /9A00       S                   30C09870
09F5 0  BC00           DC     /BC00       /                   30C09880
09F6 0  1A00           DC     /1A00       B                   30C09890
09F7 0  FFFF           DC     /FFFF                           30C09900
                      *                                       30C09910
09F8 0  1E00     CH1   DC     /1E00       C                   30C09920
09F9 0  2600           DC     /2600       H                   30C09930
09FA 0  3E00           DC     /3E00       A                   30C09940
09FB 0  7600           DC     /7600       N                   30C09950
09FC 0  7600           DC     /7600       N                   30C09960
09FD 0  3600           DC     /3600       E                   30C09970
09FE 0  5E00           DC     /5E00       L                   30C09980
09FF 0  FFFF           DC     /FFFF                           30C09990
                      *                                       30C10000
0A00 0  2200     IVDSW DC     /2200       I                   30C10010
0A01 0  7600           DC     /7600       N                   30C10020
0A02 0  B600           DC     /B600       V                   30C10030
0A03 0  5E00           DC     /5E00       L                   30C10040
0A04 0  3200           DC     /3200       D                   30C10050
```



```
0A05 0  2100          DC      /2100                           30C10060
0A06 0  3200     DSW1 DC      /3200       D                   30C10070
0A07 0  9A00          DC      /9A00       S                   30C10080
0A08 0  9200          DC      /9200       W                   30C10090
0A09 0  FFFF          DC      /FFFF                           30C10100
                      *                                       30C10110
0A0A    05E8          END     STRT                            30C10120
```

1132 PRINTER FUNCTION TEST

CROSS REFERENCE LISTING

SYMBOL	VALUE	REFERENCES
AC10	08E3	062F
AC14	08F0	091D
AC15	08F2	090C,091A
AC20	08FC	08F8,090F
AC30	0903	08F1,08FB,0918
AC35	0911	0908,0910
AC40	0918	
ADSCT	0058	05DC
AEND	0037	05DC
AINT	0044	05DC
AIVD	0038	05DC
ALD	003E	05DC
ANDEM	07AC	0600,074F,0750,0779,077D
ANDOR	07AE	05FE,077C
ANINT	0041	05DC,0988
ANRDY	0048	05DC,07D5
AO10	091E	0630,0938
AO105	0928	
AO11	092D	0938
AO12	0936	
AQ5A	0019	
ARDY	004C	05DC
ASB	0054	05DC
ASCT	005A	05DC
ASWS	0050	05DC
AWAS	0060	
A1	072F	0736,0911,092D
A110	0732	0735
BEGIN	0010	05DC,05E8
BSW0	05DE	0608,0611,0623,070C,07E8,084A
BSW1	05DF	060E,0618,0621,071D,084F
BSW2	05E0	0603,089E,08F4
BSW3	05E1	0607,067F
CCF	06D2	0680,068E,086A
CE10	07F3	062A
CE11	07FC	080E
CE12	07FF	0809
CHAR	093C	0759,078D,0799,08AF,0906
CHARC	08E0	076D,0788,0797,07A5
CH1	09F8	09BC
CKEMT	0786	065E,0789,07A0,07A7
CKEM1	07A2	0791
CKESW	07A9	0604,0639,064C,0700,0708,0763,0776,0787,079F,09C7
CLEAR	0723	0679,072D,07F8,0814,0891,08EA,0925
CL10	0726	0729
CNTRL	060A	0608,0613,080C,0828,083D,087B,08D9,091B,0939,0999
CN10	060E	
CN12	0615	05FA,0609,0617,061F,0622
CN13	0617	
CN14	061B	0610,071F,0851
CS10	080F	062B
CS11	0818	082D
CS12	0818	0828
DLY	07D8	07C9,07DE
DLYCT	07E6	07DA,07DB
DLY1	07DB	07E0
DSW1	0A06	
DSW32	06E0	0637,0688
EMIT	08DD	0668,06E4,0749,074D,075B,0764,078F,0793,0881,0905
EMTCT	07AB	05FC,0771,077F
END	0015	05DC,0627
ERM	09DB	09C4,09CB
ERM1	09DD	09C3
ERM2	09DE	09C5
ERM3	09DF	

1132 PRINTER FUNCTION TEST

ERM4	09E0	063C,0644,0648,064E,06B7,077A,078E,0986
ERM5	09E1	0766,0795,0864,09A8
ERM6	09E2	0798
ERROR	0012	05DC,09C9
ERRX	0983	096F,0974,0979,0988
ERR10	0994	0866
ERR11	099D	07C0,09A2
ERR12	09A4	064A,09AC
ERR13	09AE	0774,09B3
ERR4	096D	06FE,0970
ERR5	0972	085D,0975
ERR6	0977	0719,097A
ERR7	097C	070A,079D,0981
ERR9	098D	0761,0992
ETRAP	0018	05DC
FFE	0748	06AA,0768,076F
FOMSK	07D1	0786
FORMS	0780	0718,0788,07C2,07CA,07FA,0816,0833,0845,088F,08E8, 0923
HALT	0014	05DC
ICT	0747	0635,073B,0742
ICTR	0738	06FC,0717,0745,0859,0868
ICTR1	073C	0744
ICTR2	0742	073C
IDLE	06D5	0660,0664,0681,06F2
IDLSW	06D6	0661,08B4,090A
ILCRP	0030	05DC
ILIR	0036	05DC
ILPAT	0032	05DC
ILO	0028	05DC
IL1	0029	05DC,05F4
IL2	002A	05DC
IL3	002B	05DC
IL4	002C	05DC
IVCLM	09E3	09B6,09BA
IVDSW	0A00	09BE,09C0
KFF00	07AA	0752
LINES	08DE	089B,08D6,092C,0936
LOG	0013	05DC,07C4
LOGBY	0016	05DC
LPCNT	08DF	07FD,0E07,0819,0826,089D,08B7,08F3,090D
MES10	09BC	0996
MES11	09BE	099F
MES12	09C0	09A9
MES7	09B6	097E
MES8	09B8	0988
MES9	09BA	098F,09B0
MSK1	06D7	063E,0646
MSK2	06D8	0640,067D,0713,0801,0820,0855,08A8,08FE,0931,09A6
NO49	08E1	08FA
NO50	08E2	08A4
ONES	06EA	0731
OREM	07AD	074B,074C,0751
PIA	064E	063B,0642
PIE	0644	
PINT	0659	0650
PIRT	0632	05F2,0674,0784
PIS	0667	0658
PI1	0672	066F,0684,0685,06A6,06C1,06D1
PI2	0676	0662,0698
PI3	0682	0666,06AC
PI4	0686	0678,06A9
PI5	068B	06A2,08C8
PI6	068D	06A3,08CA
PI7	069D	0695
PI8	06AA	065D
PRDIA	05F8	05E3,05EE,061E,0625
PREND	0623	0631

PRINT	06EC	06EF,0705,0805,0824,08AB,08D1,0901,0916,0934
PRN1	06FC	06F8
PRPST	05DC	05EA,0629
PRROU	05DD	07F4,0810,082F,0841,088B,08E4,091F
PRSET	05EB	05E2,05F6
PRTN	0700	0670,0780
PSTDE	05E6	073E,07B2,07E2
PSTIN	05E5	0672,06F4,0782
PST32	05E4	05F0,07CD,07EF,09CF,09D5
RDEMT	06E4	0659
RQKB	0034	05DC
RQTY	0033	05DC
RR01	0889	062E
RSTKB	0017	05DC
RTTBL	062A	0619
R101	089A	08DB
R102	089C	08B6,08D8
R103	08A6	08A2,08B9
R104	08AD	0898,08A5,08C2,08D3
R1041	08C6	08C0
R105	08D3	
R107	08BC	08B2,08BB
R1153	07A5	07A3
SCA2	0888	
SCNCT	06D4	0676,06ED,08CD,0914
SCTM	087E	0681,0849,0860,0877
SCTM1	087F	0848,086E,0873,0876
SC10	0840	062D
SC15	0847	087D,0898
SC16	0849	087A
SC17	084A	0874
SC18	0860	0872
SC30	0868	068F,085F
SC305	0873	0871
SC31	0875	086C
SENSE	06E2	066D,0682,06EE,06F6,0784,0984
SET	08DC	08BC
SKCH	06C2	068A
SKINT	06AD	0653,0688
SKM	06D3	0689
SKPT	0880	0683,0862
SK10	06BF	068C
SPACE	0707	06F0,0721,0837,0893,0895,08EC,08EE,0927,0929
SPINT	06CF	0656
SPRTN	071B	06CF
SP10	082E	062C
SP15	0835	083F
SP16	0836	083C
SP2	0708	0668
SP30	0839	0836
START	0011	05DC,0740,07CF,07E4,07F1,09D1,09D7
STCAR	06E6	0857
STM	07D2	07C6
STM1	07D7	07B7,07BD
STOP	07E7	06CC,070F,07EB,07ED,084D
STPCA	06E8	06AD,085B
STPPT	06DC	05EC,066A,06A4,06A8,0777,080A,0829,08C6
STPRT	06DA	065B,06FA,06F3,0756
STRT	05E8	0A0A
STSPA	06DE	0689,069D,0715
ST05	0759	0760
ST10	076A	075D
ST15	076D	076B
ST20	0771	0753
ST25	0784	0773
SVKB	0035	05DC
UERR	09C2	0980,098A,0991,0998,09A1,09AB,09B2,09CE
UERR2	09C9	09D3

UERR6	09D3	09CC
UERR9	09CD	07F6,0812,0831,0843,088D,08E6,0921
ULOG1	07C4	07B8,07CB
ULOG2	07CB	07C7
ULOG3	07CD	
WSB	09EE	0987,09C1

1442 READER/PUNCH FUNCTION TEST

TABLE OF CONTENTS

1442 READER/PUNCH FUNCTION TEST

1. PURPOSE

THE 1442 CARD READ/PUNCH DIAGNOSTIC PROGRAM CHECKS THE OPERATING PERFORMANCE OF THE 1442 CARD READ/PUNCH.

2. PREREQUISITES

2.1 PROGRAM PREREQUISITES

THE 1442 CARD READ/PUNCH DIAGNOSTIC PROGRAM MUST RUN UNDER CONTROL OF THE DIAGNOSTIC MONITOR.

2.2 EQUIPMENT PREREQUISITES

THE FOLLOWING EQUIPMENT IS REQUIRED.

A. 1131 CENTRAL PROCESSING UNIT (CPU).
B. 1442 CARD READ/PUNCH.

3. USE PROCEDURE

3.1 LOADING

THIS PROGRAM FOLLOWS THE LOADING PROCEDURES ESTABLISHED BY THE 1130 DIAGNOSTIC MONITOR. REFER TO D. M. DOCUMENTATION.

THE FOLLOWING REQUIREMENTS MUST BE MET.

1. NO OTHER PROGRAM DECK SHOULD FOLLOW THE 1442 FUNCTION TEST DECK.
2. PROGRAM DECK SHOULD BE FOLLOWED BY A DECK OF BLANK CARDS ABOUT 5 INCHES THICK.

3.2 OPERATION

3.2.1 PROGRAM EXECUTION

A. LOAD AND GO MODE

ALL ROUTINES WILL BE EXECUTED WITH NO OPTIONS
ALL DETECTED ERRORS WILL BE IDENTIFIED BY AN ERROR TYPEOUT.

B. SINGLE PROGRAM AND OVERLAP MODE

AFTER PROGRAM IS LOADED, THE MONITOR WILL WAIT TO ALLOW OPTIONS TO BE SPECIFIED.

1. SPECIFY DESIRED OPTIONS AS INSTRUCTED IN SECTION 3.2.2. IF NO OPTIONS ARE DESIRED, NO ENTRY IS REQUIRED.

2. TO START EXECUTION - EXECUTE MODE MUST BE SPECIFIED SET BIT SWITCHES FOR DESIRED MODE

SW: SETTING	CONTROL
0080	EXECUTE WITH NO OPTIONS
0088	LOOP ON ERROR
0084	BYPASS ALL ERROR PRINTOUTS
0082	HALT ON ANY ERROR
008C	LOOP ON ERROR AND BYPASS ALL ERROR PRINTOUTS
0090	LOOP ALL PROGRAMS
0092	LOOP ALL PROGRAMS AND HALT ON ERRORS

PRESS INTERRUPT REQUEST KEY.

3.2.2 PROGRAM OPTIONS

THE OPERATOR MAY MODIFY THE EXECUTION OF THE PROGRAM ANY TIME BEFORE OR AFTER IT HAS STARTED EXECUTION BY ENTERING PROGRAM CONTROL OPTIONS OR ROUTINE SELECTION OPTIONS.

A. PROGRAM CONTROL OPTIONS

1. TO SELECT PROGRAM OPTIONS SET BIT SWITCHES AS INDICATED

SW. SETTING	CONTROL
0F00	RESET ALL CONTROL OPTIONS
0F04	BYPASS ALL 1442 LOGS
0F08	BYPASS ALL 1442 ERROR PRINTOUTS
0F20	LOOP A 1442 ROUTINE
0F40	LOG ALL 1442 ERRORS
0F24	LOOP ROUTINE AND BYPASS 1442 LOGS.
0F28	LOOP ROUTINE AND BYPASS 1442 ERROR PRINTOUTS.
0F60	LOOP ROUTINE AND LOG ALL 1442 ERRORS.

2. PRESS INTERRUPT REQUEST KEY.

B. ROUTINE SELECTION

EXECUTION WILL START WITH THE SELECTED ROUTINE.

1. TO SELECT ROUTINE OPTIONS SET BIT SWITCHES AS INDICATED

SW. SETTING	ROUTINE
4F00	ALL ROUTINES
4F80	1. CHECK DSW
4F40	2. FEED-READ-PUNCH
4F20	3. READ ONLY
4F10	4. PUNCH ONLY
4F08	5. READ, THEN PUNCH WHAT WAS READ
4F04	6. SELECTED DATA

2. PRESS INTERRUPT REQUEST KEY.

3.3 TERMINATION

IF THERE ARE NO 'LOOP' CONTROL OPTIONS SELECTED, THE PROGRAM WILL TERMINATE AFTER ONE PASS. IF OPTIONS TO LOOP HAVE BEEN SELECTED, THE PROGRAM MAY BE TERMINATED BY-

1. REMOVE LOOP OPTIONS AND ALLOW NORMAL TERMINATION.
   OR
2. SET ENTRY SWITCHES TO 400F AND PRESS THE INTRPT REQ. KEY.

3.4 RESTART

TO RESTART THE PROGRAM.

1. SET SWITCHES TO 408F.
2. PRESS INTERRUPT REQUEST KEY.
3. SET SWITCHES TO 0080.
4. PRESS INTERRUPT REQUEST KEY.

NOTE

DEPENDING ON HOW THE PROGRAM WAS TERMINATED, THE LAST TWO STEPS MAY NOT BE REQUIRED.

4. PRINTOUTS

ALL PRINTOUTS ARE IN THE STANDARD FORMAT.

APPNN CORR (MESSAGE)
OR
EPPNN OORR (MESSAGE)

WHERE A IDENTIFIES STATUS MESSAGES
E IDENTIFIES ERROR MESSAGES
PP IS THE PID OF THE PROGRAM CAUSING THE MESSAGE
NN IS THE MESSAGE SEQUENCE NUMBER
RR IS THE ROUTINE NUMBER
MESSAGE IS ANY VARIABLE INFORMATION

4.1 STATUS MESSAGES (A0FXX) RR= ROUTINE NO. XX = MESSAGE NO.

A0F01 0006 ANY PATTERN PLUS BLANKS MAKE READY

COMMANDS OPERATOR TO LOAD ANY PREPUNCHED CARD FOLLOWED BY BLANK CARDS.

A0F02 OORR BUSY

THE 1442 WAS BUSY WHEN ITS DSW WAS SENSED. PROGRAM WILL CONTINUE.

A0F03 OORR LAST CARD

LAST CARD INDICATOR WAS ON WHEN 1442'S DSW WAS SENSED.

A0F04 OORR LOAD FROM STK 2 MAKE READY

NPRO AND PLACE CARDS IN STACKER NO. 2 IN THE READ HOPPER AND PRESS START.

A0F05 OORR LOAD BLANKS MAKE READY

LOAD PUNCH HOPPER WITH BLANK CARDS AND PRESS START.

A0F06 OORR NRDY

1442 WAS NOT READY WHEN ITS DSW WAS SENSED. (TRY PUSHING 1442 START BUTTON).

A0F07 OORR PROG HALT

INDICATES PROGRAM HAS BEEN HALTED BY BIT SWITCH 15 (ON).

A0F08 0001 LOAD BLANKS MAKE READY

THIS PRINTOUT WILL OCCUR IF A NON BLANK CARD IS ENCOUNTERED WHILE RUNNING RTN. 2 (PUNCH ONLY). NOTHING WILL BE PUNCHED IN THE NON BLANK CARD. THE PRINTOUT INSTRUCTS THE OPERATOR TO LOAD BLANK CARDS BEFORE CONTINUING THE 1442 TEST. AFTER THE 1442 IS MADE READY, THE OPERATOR MUST SET 0F00 IN THE BIT SWITCHES THEN PRESS THE INTERRUPT REQUEST KEY.

4.2 ERROR MESSAGES

EOF09 OORR XXXX XXXX XXXX
WAS S/B COL

READ ERROR - MODIFIERS SHOW INCORRECT DATA READ, WHAT DATA SHOULD HAVE BEEN, AND CARD COLUMN IN WHICH ERROR OCCURED.

EOF0A OORR XXXX XXXX
WAS S/B

DSW ERROR - MODIFIERS SHOW INCORRECT DSW FOLLOWED BY CORRECT DSW.

EOF0B OORR NO INTRPT

NO INTERRUPT WAS RECEIVED AFTER A READ, FEED, OR PUNCH COMMAND WAS INITIATED.

PROGRAM CONTINUES AFTER PRINTOUT.

5. COMMENTS

5.1 ROUTINE 1 (CONSOLE ENTRY SWITCH NO. 8 ON)

ROUTINE 1 CHECKS THE STATUS OF THE 1442. BY LOOPING THIS ROUTINE, THE PROGRAM OPERATOR CAN USE AN OSCILLOSCOPE TO CHECK ANY DSW INDICATOR.

5.2 ROUTINE 2 (CONSOLE ENTRY SWITCH NO. 9 ON)

ROUTINE 2 CHECKS THE FEEDING AND PUNCHING FUNCTIONS. THE CARDS PUNCHED BY THIS ROUTINE ARE STACKED IN STACKER NO. 2 OF THE 1442. THESE CARDS WILL BE USED IN ROUTINE 3.

5.3 ROUTINE 3 (CONSOLE ENTRY SWITCH NO. 10 ON)

ROUTINE 3 READS IN STANDARD MODE (I.E., ONE COLUMN PER WORD). DIGITS 12 THROUGH 9 OF THE CARD ARE PLACED IN STORAGE BITS 0 THROUGH 11. BITS 12 THROUGH 15 ARE LEFT BLANK. ALL DATA ARE CHECKED AGAINST THE DATA FROM WHICH THEY WERE PUNCHED. IF AN ERROR IS FOUND, A PRINTOUT OCCURS. THE ERROR PRINTOUT CONTAINS THE PID, ROUTINE NUMBER, BITS IN ERROR, THE CORRECT BITS (BOTH IN HEXADECIMAL NOTATION) AND THE COLUMN IN WHICH THE ERROR OCCURRED (ALSO IN HEXADECIMAL NOTATION).

5.4 ROUTINE 4 (CONSOLE ENTRY SWITCH NO. 11 ON)

ROUTINE 4 PUNCHES THE FIRST 40 COLUMNS OF A CARD AND PLACES THEM IN STACKER NO. 2. THE CARDS PUNCHED BY ROUTINE 4 ARE USED BY ROUTINE 5.

5.5 ROUTINE 5 (CONSOLE ENTRY SWITCH NO. 12 ON)

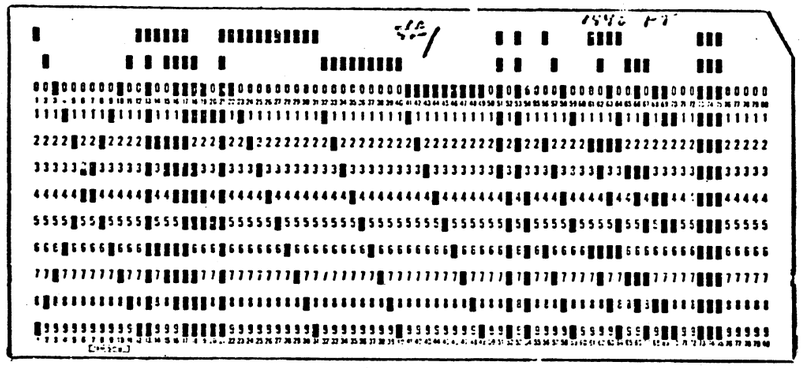
ROUTINE 5 READS THE CARDS THAT WERE PUNCHED BY ROUTINE 4 AND CHECKS THE DATA READ AGAINST DATA PUNCHED. AFTER THE DATA IS CHECKED, THE FIELD IS REVERSED (I.E., COLUMN 1 IS PLACED IN COLUMN 80, COLUMN 2 IS PLACED IN COLUMN 79, ETC.). AFTER THE FIELD-REVERSING OPERATION THE READ AREA IS CLEARED. A PUNCH COMMAND IS INITIATED THAT WILL CAUSE THE LAST 40 COLUMNS TO BE PUNCHED. THIS ROUTINE DOES NOT AUTOMATICALLY CHECK THE PUNCHING OPERATION. HOWEVER, BY FOLDING EACH CARD PUNCHED BY THIS ROUTINE IN HALF (FOLDED BETWEEN COLUMNS 40 AND 41), THE HOLES MAY BE ALIGNED. PERFECT CORRESPONDENCE OF HOLES INDICATES SATISFACTORY RESULTS.

5.6 ROUTINE 6 (CONSOLE ENTRY SWITCH NO. 13 ON)

ROUTINE 6 READS A CARD THAT IS PUNCHED BY THE PROGRAM OPERATOR AND PUNCHES THE DATA READ INTO A NUMBER OF BLANK CARDS. SATISFACTORY RESULTS ARE INDICATED BY A DIRECT CORRESPONDENCE BETWEEN THE HOLES IN THE PREPUNCHED CARD AND THE HOLES IN THE CARDS PUNCHED BY THE ROUTINE. THE COMPARISON MUST BE MADE BY THE PROGRAM OPERATOR.

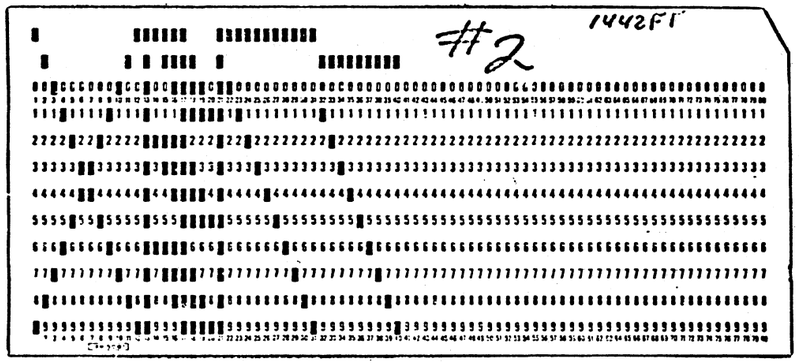
6. APPENDIX

6.1 SAMPLE OUTPUT



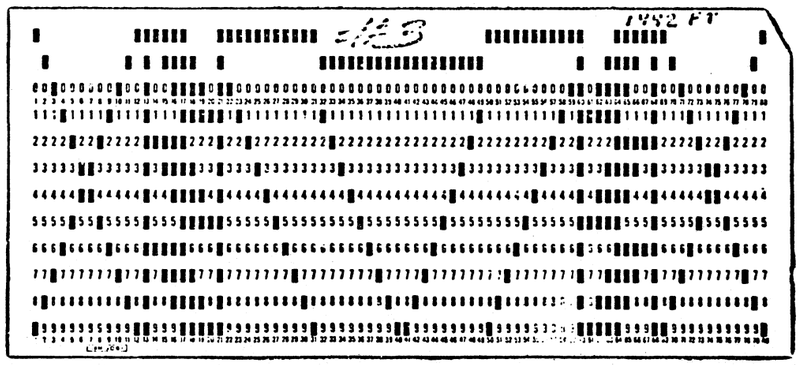
SAMPLE OUTPUT FOR

ROUTINE # 1



SAMPLE OUTPUT FOR

ROUTINE # 2



SAMPLE OUTPUT FOR

ROUTINE # 3

1442 READER/PUNCH FUNCTION TEST

```
0000                    ORG     *+1500                                  30F10000
                        *                                               30F00010
                        *                       PROG TRANSFER VECTOR    30F00020
                        *                                               30F00030
0010                    BEGIN   EQU     16                              30F00040
0011                    START   EQU     BEGIN+1                         30F00050
0012                    ERROR   EQU     START+1                         30F00060
0013                    LOG     EQU     ERROR+1                         30F00070
0014                    HALT    EQU     LOG+1                           30F00080
0015                    END     EQU     HALT+1                          30F00090
                        *                                               30F00100
0016                    LOGBY   EQU     END+1                           30F00110
0017                    RSTKB   EQU     LOGBY+1                         30F00120
0018                    ETRAP   EQU     RSTKB+1                         30F00130
0019                    AQ5A    EQU     ETRAP+1                         30F00140
                        *                                               30F00150
0028                    ILO     EQU     40                              30F00160
0029                    IL1     EQU     ILO+1                           30F00170
002A                    IL2     EQU     IL1+1                           30F00180
002B                    IL3     EQU     IL2+1                           30F00190
002C                    IL4     EQU     IL3+1                           30F00200
0030                    ILCRP   EQU     IL4+4                           30F00210
0032                    ILPAT   EQU     ILCRP+2                         30F00220
0033                    RQTY    EQU     ILPAT+1                         30F00230
0034                    RQKB    EQU     RQTY+1                          30F00240
0035                    SVKB    EQU     RQKB+1                          30F00250
0036                    ILIR    EQU     SVKB+1                          30F00260
                        *                                               30F00270
0037                    AEND    EQU     ILIR+1                          30F00280
003B                    AIVD    EQU     AEND+4          INVLD           30F00290
003E                    ALD     EQU     AIVD+3          LD              30F00300
0041                    ANINT   EQU     ALD+3           NO INTRPT       30F00310
0044                    AINT    EQU     ANINT+3         INTRPT          30F00320
0048                    ANRDY   EQU     AINT+7          NRDY            30F00330
004C                    ARDY    EQU     ANRDY+1         RDY             30F00340
0050                    ASWS    EQU     ARDY+4          SWS             30F00350
0054                    ASB     EQU     ASWS+4          S/B             30F00360
0058                    ADSCT   EQU     ASB+4                           30F00370
005A                    ASCT    EQU     ADSCT+2         SELCT           30F00380
0060                    AWAS    EQU     ASCT+6          WAS             30F00390
                        *                                               30F00400
                        *                                               30F00410
                        ********************************************      30F00420
                        *                                               30F00430
                        *****           BIT SWITCH SETTINGS     *****   30F00440
                        *                                               30F00450
                        *BIT SW  FUNCTION 00        FUNCTION 01         30F00460
                        *                                               30F00470
                        *  00-   FUNC CONTROL       FUNC CONTROL        30F00480
                        *  01-   FUNC CONTROL       FUNC CONTROL        30F00490
                        *  02-   PROG IDENT         PROG IDENT          30F00500
                        *  03-   PROG IDENT         PROG IDENT          30F00510
                        *  04-   PROG IDENT         PROG IDENT          30F00520
                        *  05-   PROG IDENT         PROG IDENT          30F00530
                        *  06-   PROG IDENT         PROG IDENT          30F00540
                        *  07-   PROG IDENT         PROG IDENT          30F00550
                        *  08-   START PROGRAM      SELECT ROUTINE 1    30F00560
                        *  09-   TYPE ALL ERRORS    SELECT ROUTINE 2    30F00570
                        *  10-   LOOP ROUTINE       SELECT ROUTINE 3    30F00580
                        *  11-   LOOP PROGRAM       SELECT ROUTINE 4    30F00590
                        *  12-   BYPASS ERR TYPE    SELECT ROUTINE 5    30F00600
                        *  13-   BYPASS LOG TYPE    SELECT ROUTINE 6    30F00610
                        *  14-   UNASSIGNED         UNASSIGNED          30F00620
                        *  15    HALT PROGRAM       SELECT ROUTINE END  30F00630
                        *                                               30F00640
                        *                                               30F00650
                        ***** PST     PROGRAM STARTER TABLES*********   30F00660
                        *                                               30F00670
```


1442 READER/PUNCH FUNCTION TEST

```
05DC 0  0F00    PST     DC      /0F00   PID                             30F00680
05DD 0  0000            DC      /0000   ROUTINE NUMBER                  30F00690
05DE 0  0000    TELL    DC      /0000   BIT SW FUNC 0                   30F00700
05DF 0  0000            DC      /0000           1                       30F00710
05E0 0  0000            DC      /0000           2                       30F00720
05E1 0  0000            DC      /0000           3                       30F00730
05E2 1  061B            DC      INILZ   INITIALIZATION ADDR             30F00740
05E3 1  0622            DC      RTO     REPEAT                          30F00750
05E4 0  0000    MLSCF   DC      /0000   1ST MLSCF NORMAL                30F00760
05E5 0  0000            DC      /0000   2ND MLSCF BUSY                  30F00770
05E6 0  0000            DC      /0000   3RD MLSCF TEST INTR             30F00780
05E7 0  FFFF            DC      /FFFF   TERMINATOR                      30F00790
                        *                                               30F00800
                        ********************************************      30F00810
                        *                                               30F00820
                        *****           DSW CHECK FOR LEVEL 0 *********  30F00830
                        *                                               30F00840
                        *                                               30F00850
05E8 0  0000    DSW1A   DC      /0000                                E  30F00860
05E9 01 0C0008CA        XIO   L SENSE   SENSE DSW                       30F00870
05EB 0  1000    KEEP3   SLA     0       USE FOR TRAP                    30F00880
05EC 01 4C2805FC        BSC   L CKRDR,+Z CK RDR IF BO -                  30F00890
05EE 01 F4000768        EOR   L CNTL1   4003                            30F00900
05F0 01 D40007D4        STO   L WAS     SAVE DSW                        30F00910
05F2 01 0C0008C4        XIO   L PUNCH   PCH A COLUMN                    30F00970
05F4 01 740108C4        MDX   L PUNCH,1 INCREASE PCH ADDR               30F00930
                        *                                               30F00940
05F6 01 C40007D4    LOOK LD     L WAS                                   30F00950
05F8 01 EC000774        OR    L XERR    ACCUMULATED ERRORS              30F00960
05FA 01 4C8005E8        BSC   I DSW1A                                 X  30F00970
                        *                                               30F00980
05FC 01 F4000767    CKRDR EOR   L CNTL0   8003                          30F00990
05FE 01 D40007D4        STO   L WAS     SAVE DSW                        30F01000
0600 01 0C0008C8        XIO   L READ    READ COMMAND                    30F01010
0602 01 740108C8        MDX   L READ,1  INCREASE RD ADDR                30F01020
0604 0  70F1            MDX     LOOK                                    30F01030
                        *                                               30F01040
                        *                                               30F01050
                        *****           DSW CHECK FOR LEVEL 4 *********  30F01060
                        *                                               30F01070
                        *                                               30F01080
0605 0  0000    DSW4A   DC      /0000   ADDR OF RETURN                E  30F01090
0606 01 0C0008CA        XIO   L SENSE   SENSE DSW                       30F01100
0608 0  1000    KEEP4   SLA     0       USE FOR TRAP                    30F01110
0609 01 F4000769        EOR   L CNTL4   CK FOR OP COMPLETE               30F01120
060B 01 EC000774        OR    L XERR    ACCUMULATED ERRORS              30F01130
060D 01 D40007D4        STO   L WAS     SAVE DSW BITS                   30F01140
060F 0  1011            SLA     17      CLEAR ACC                       30F01150
0610 01 D4000774        STO   L XERR    ZERO OUT XERR                   30F01160
0612 01 C4000770        LD    L SWA                                     30F01170
0614 01 D400085C        STO   L SW1     SET SWITCH IN RTL           PRO1 30F01180
0616 01 4C800605        BSC   I DSW4A                                 X  30F01190
                        *                                               30F01200
                        *****           STARTER ROUTINE **************  30F01210
                        *                                               30F01220
                        *                                               30F01230
0618 00 44800010    GO  BSI   I BEGIN   CALL MONITOR                SC  30F01240
061A 1  05DC            DC      PST     ADDR OF PST                     30F01250
                        *                                               30F01260
061B 0  0000    INILZ   DC      0                                       30F01270
061C 01 65000622        LDX   L1 RTO                                    30F01280
061E 01 6D0005E4        STX   L1 MLSCF                                  30F01281
0620 01 4C800618        BSC   I INILZ                                   30F01290
                        *                                               30F01320
                        ********************************************      30F01330
                        *                                               30F01340
                        *****           RTO INITIALIZATION ***********  30F01350
                        *                                               30F01360
```

1442 READER/PUNCH FUNCTION TEST

```
                  *                                                       30F01370
0622 01 650005E8  RT0   LDX  L1 DSW1A                               E     30F01390
0624 00 6D000028        STX  L1 ILO         STORE INTR ZERO               30F01400
0626 01 65000605        LDX  L1 DSW4A                                     30F01410
0628 00 6D000030        STX  L1 ILCRP                                     30F01420
                  *                                                       30F01430
062A 01 65000631  SET1  LDX  L1 RT1         RT ADDR                       30F01440
062C 0  6301            LDX   3 1           RT NUMBER                     30F01450
062D 01 44000893        BSI  L  RTU         USE UPDATE RT            SC   30F01460
062F 00 4C800011        BSC  I  START                                X    30F01470
                  *                                                       30F01480
                  ********************************************            30F01490
                  *                                                       30F01500
                  *****         ROUTINE 1-  CHECK STATUS ******           30F01510
                  *                                                       30F01520
0631 01 4400089C  RT1   BSI  L  SENSB       CHECK 1442 STATUS             30F01530
0633 01 440007DC        BSI  L  KNOW        CHECK BIT SWITCHES       SC   30F01540
                  *                                                       30F01550
0635 01 6500063D  SET2  LDX  L1 RT2         RT ADDR                       30F01560
0637 0  6302            LDX   3 2           RT NUMBER                     30F01570
0638 01 44000893        BSI  L  RTU         USE UPDATE RT            SC   30F01580
063A 00 4C800011        BSC  I  START       RETURN TO MONITOR        X    30F01590
                  *                                                       30F01600
063C 0  0001      ONE   DC      1                                         30F01610
                  *                                                       30F01620
                  ********************************************            30F01630
                  *                                                       30F01640
                  *****         ROUTINE 2- FD A CARD OR PUNCH *           30F01650
                  *                                                       30F01660
                  *                                                       30F01670
063D 01 C4000940  RT2   LD   L  WA40                                 E    30F01680
063F 01 D400096A        STO  L  WAREA+39    REMOVE TERMINATOR             30F01690
                  *                                                       30F01700
0641 01 65000993  RT2A  LDX  L1 RAREA                                     30F01710
0643 01 6D0008C8        STX  L1 READ        RESTORE READ ADDR             30F01720
0645 01 0C0008C6        XIO  L  RDRST       START READER                  30F01730
0647 01 4400084F        BSI  L  RTL         USE TIMING LOOP          SC   30F01740
0649 0  7001            MDX     HOP1                                      30F01750
064A 0  7018            MDX     SKIP        LAST CARD RETURN              30F01760
                  *                                                       30F01770
064B 0  6280      HOP1  LDX   2 -80         LOAD XR 2                     30F01780
064C 01 C60009E3        LD   L2 RAREA+80    DATA READ                     30F01790
064E 01 4C20066E        BSC  L  NTBLK,Z     BRANCH NOT BLANK              30F01800
0650 0  7201            MDX   2 1           ADJ COL COUNT                 30F01810
0651 0  70FA            MDX     HOP1+1                                    30F01820
                  *                                                       30F01830
0652 01 0C0008CC        XIO  L  STACK       SELECT STACKER 2              30F01840
0654 01 65000943        LDX  L1 WAREA       WRITE AREA ADDR               30F01850
0656 01 6D0008C4        STX  L1 PUNCH       PUNCH INSTRUCTION             30F01860
0658 01 0C0008C2        XIO  L  PCHST       START 1130 PUNCH              30F01870
065A 01 4400084F        BSI  L  RTL         USE TIMING LOOP          SC   30F01880
065C 0  7001            MDX     HOP2                                      30F01890
065D 0  7005            MDX     SKIP        LAST CARD RETURN              30F01900
                  *                                                       30F01910
065E 01 0C0008C0  HOP2  XIO  L  FDACD       FEED COMMAND                  30F01920
0660 01 4400084F        BSI  L  RTL         USE TIMING LOOP          SC   30F01930
0662 0  70DE            MDX     RT2A        REPEAT CYCLE                  30F01940
                  *                                                       30F01950
0663 01 440007D7  SKIP  BSI  L  FDLCD       USE FEED LAST CARD       SC   30F01960
0665 01 440007DC        BSI  L  KNOW        CHECK BIT SWITCHES       SC   30F01970
                  *                                                       30F01980
0667 01 6500067B  SET3  LDX  L1 RT3         RT ADDR                       30F01990
0669 0  6303            LDX   3 3           RT NUMBER                     30F02000
066A 01 44C00893        BSI  L  RTU         USE UPDATE RT            SC   30F02010
066C 00 4C800011        BSC  I  START       RETURN TO MONITOR        X    30F02020
                  *                                                       30F02030
066E 0  C0CD      NTBLK LD      ONE                                       30F02040
066F 01 EC0005DE        OR   L  TELL        SET HALT SWITCH               30F02050
```


1442 READER/PUNCH FUNCTION TEST

```
0671 01 D40005DE        STO  L  TELL                                      30F02060
0673 0  6308            LDX   3 8           MESSAGE NUMBER           E    30F02070
0674 01 650008FF        LDX  L1 ALDBK       LOAD BLANKS                   30F02080
0676 01 44000830        BSI  L  TYPE        USE TYPE ROUTINE         SC   30F02090
0678 01 440007DC        BSI  L  KNOW        CHECK BIT SWITCHES            30F02100
067A 0  70C2            MDX     RT2                                       30F02110
                  *                                                       30F02120
                  ********************************************            30F02130
                  *                                                       30F02140
                  *****         ROUTINE 3- READ 12 BITS/COL ***           30F02150
                  *                                                       30F02160
                  *                                                       30F02170
067B 01 6500090B  RT3   LDX  L1 AMRDY       MAKE READY               E    30F02180
067D 01 6D00084E        STX  L1 MSG+1       UPDATE MESSAGE                30F02190
067F 01 650008EE        LDX  L1 ASTOH       STK TO HOPPER                 30F02200
0681 0  6304            LDX   3 4           MESSAGE NUMBER                30F02210
0682 01 4400077D        BSI  L  CKSTS       CHECK 1442 STATUS        SC   30F02220
0684 01 C4000940        LD   L  WA40                                      30F02221
0686 01 D400096A        STO  L  WAREA+39    REMOVE TERMINATOR             30F02222
                  *                                                       30F02230
0688 01 65000993  RT3A  LDX  L1 RAREA                                     30F02240
068A 01 6D0008C8        STX  L1 READ        RESTORE READ ADDR             30F02250
068C 01 0C0008C6        XIO  L  RDRST       START READER                  30F02260
068E 01 4400084F        BSI  L  RTL         DELAY LOOP               SC   30F02270
0690 0  700B            MDX     CHECK-1                                   30F02280
0691 01 440007D7        BSI  L  FDLCD       FEED LAST CARD           SC   30F02290
0693 01 440007DC        BSI  L  KNOW        CHECK BIT SWITCHES       SC   30F02300
                  *                                                       30F02310
0695 01 650006B9  SET4  LDX  L1 RT4         RT ADDR                       30F02320
0697 0  6304            LDX   3 4           RT NUMBER                     30F02330
0698 01 44000893        BSI  L  RTU         USE UPDATE RT            SC   30F02340
069A 00 4C800011        BSC  I  START       RETURN TO MONITOR        X    30F02350
                  *                                                       30F02360
069C 0  6280            LDX   2 -80         LOAD XR 2                     30F02370
069D 01 C6000993  CHECK LD   L2 WAREA+80    DATA PUNCHED                  30F02380
069F 0  1803            SRA     3           REMOVE 3 BITS                 30F02390
06A0 01 4C0406AC        BSC  L  TERMR,E     CK FOR TERMINATOR             30F02400
06A2 0  1003            SLA     3           ADJ BACK                      30F02410
06A3 01 D40007D5        STO  L  OUBE        STO IN OUGHT TO BE            30F02420
06A5 01 F60009E3        EOR  L2 RAREA+80    DATA READ                     30F02430
06A7 01 44200784        BSI  L  ERRFD,Z     BCH ON BITS                   30F02440
06A9 0  7201            MDX   2 1           ADJ COL COUNT                 30F02450
06AA 0  70F2            MDX     CHECK       CK NEXT COLUMN                30F02460
06AB 0  70DC            MDX     RT3A                                      30F02470
                  *                                                       30F02480
                  *                                                       30F02490
                  *****         TERMINATOR FOUND ROUTINE ******           30F02500
                  *                                                       30F02510
                  *                                                       30F02520
06AC 0  1801      TERMR SRA     1           REMOVE TERMINATOR             30F02530
06AD 0  1004            SLA     4           ADJ BACK                      30F02540
06AE 0  7001            MDX     XXX+1                                     30F02550
                  *                                                       30F02560
06AF 0  1011      XXX   SLA     17          CLEAR ACC TO ZERO             30F02570
06B0 01 D40007D5        STO  L  OUBE        STO IN OUGHT TO BE            30F02580
06B2 01 F60009E3        EOR  L2 RAREA+80    DATA READ                     30F02590
06B4 01 44200784        BSI  L  ERRFD,Z     BCH ON BITS              SC   30F02600
06B6 0  7201            MDX   2 1           ADJ COL COUNT                 30F02610
06B7 0  70F7            MDX     XXX                                       30F02620
06B8 0  70CF            MDX     RT3A                                      30F02630
                  *                                                       30F02640
                  ********************************************            30F02650
                  *                                                       30F02660
                  *****         ROUTINE 4- PUNCH 40 COLUMNS ***           30F02670
                  *                                                       30F02680
                  *                                                       30F02690
06B9 01 C4000941  RT4   LD   L  WA40A                                E    30F02700
06BB 01 D400096A        STO  L  WAREA+39    CHANGE PCH DATA               30F02710
```

```
06BD 01 650008FF        LDX  L1 ALDBK     LOAD BLANKS                    30F02720
06BF 0  6305            LDX   3 5         MESSAGE NUMBER                 30F02730
06C0 01 4400077D        BSI  L  CKSTS     CHECK 1442 STATUS      SC      30F02740
                        *                                                30F02750
06C2 01 65000943 DUP    LDX  L1 WAREA                                    30F02760
06C4 01 6D0008C4        STX  L1 PUNCH     RESTORE PCH ADDR               30F02770
06C6 01 0C0008CC        XIO  L  STACK     SELECT STACKER 2               30F02780
06C8 01 0C0008C2        XIO  L  PCHST     START PUNCH                    30F02790
06CA 01 4400084F        BSI  L  RTL       USE TIMING LOOP        SC      30F02800
06CC 0  70F5            MDX     DUP                                      30F02810
06CD 01 0C0008CC        XIO  L  STACK     SELECT STACKER 2               30F02820
06CF 01 440007D7        BSI  L  FDLCD     FEED LAST CARD         SC      30F02830
06D1 01 440007DC        BSI  L  KNOW      CHECK BIT SWITCHES     SC      30F02840
                        *                                                30F02850
06D3 01 650006DA SET5   LDX  L1 RT5       RT ADDR                        30F02860
06D5 0  6305            LDX   3 5         RT NUMBER                      30F02870
06D6 01 44000893        BSI  L  RTU       UPDATE ROUTINE         SC      30F02880
06D8 00 4C800011        BSC  I  START     RETURN TO MONITOR      X       30F02890
                        *                                                30F02900
                        ************************************             30F02910
                        *                                                30F02920
                        *****       ROUTINE 5- RD AND PCH *********      30F02930
                        *                                                30F02940
                        *                                                30F02950
06DA 01 65000908 RT5    LDX  L1 AMRDY     MAKE READY             E       30F02960
06DC 01 6D00084E        STX  L1 MSG+1     UPDATE MESSAGE                 30F02970
06DE 01 650008EE        LDX  L1 ASTOH     STK TO HOPPER                  30F02980
06E0 0  6304            LDX   3 4         MESSAGE NUMBER                 30F02990
06E1 01 4400077D        BSI  L  CKSTS     CHECK 1442 STATUS      SC      30F03000
                        *                                                30F03010
06E3 01 65000993 RT5A   LDX  L1 RAREA                                    30F03020
06E5 01 6D0008C8        STX  L1 READ      RESTORE READ ADDR              30F03030
06E7 01 0C0008C6        XIO  L  RDRST     START RDR                      30F03040
06E9 01 4400084F        BSI  L  RTL       USE TIMING LOOP        SC      30F03050
06EB 0  7008            MDX     NEXT                                     30F03060
06EC 01 440007D7        BSI  L  FDLCD     FEED LAST CARD         SC      30F03070
06EE 01 440007DC        BSI  L  KNOW      CK BIT SW SETTINGS     SC      30F03080
                        *                                                30F03090
06F0 01 6500072F SET6   LDX  L1 RT6       RT ADDR                        30F03100
06F2 0  6306            LDX   3 6         RT NUMBER                      30F03110
06F3 01 44000893        BSI  L  RTU       USE UPDATE RT          SC      30F03120
06F5 00 4C800011        BSC  I  START     RETURN TO MONITOR      X       30F03130
                        *                                                30F03140
06F7 0  62D8    NEXT    LDX   2 -40       LOAD XR 2                      30F03150
06F8 01 C600096B COMP   LD   L2 WAREA+40  DATA PUNCHED                   30F03160
06FA 0  1803            SRA     3         REMOVE 3 BITS                  30F03170
06FB 01 4C040707        BSC  L  CHIP,E    CK FOR TERMINATOR              30F03180
06FD 0  1003            SLA     3         ADJ BACK                       30F03190
06FE 01 D40007D5        STO  L  02BE      STO IN OUGHT TO BE             30F03200
0700 01 F600098B        EOR  L2 RAREA+40  DATA READ                     30F03210
0702 01 44200784        BSI  L  ERRFD,Z   BCH ON BITS            SC      30F03220
0704 0  7201            MDX   2 1         ADJ COL COUNT                  30F03230
0705 0  70F2            MDX     COMP                                     30F03240
0706 0  7018            MDX     NOW                                      30F03250
                        *                                                30F03260
0707 0  1801    CHIP    SRA     1         REMOVE TERMINATOR              30F03270
0708 0  1004            SLA     4         ADJ BACK                       30F03280
0709 0  7001            MDX     XXXX+1                                   30F03290
                        *                                                30F03300
070A 0  1011    XXXX    SLA     17        CLEAR ACC TO ZERO              30F03310
070B 01 D40007D5        STO  L  02BE      STO IN OUGHT TO BE             30F03320
070D 01 F600098B        EOR  L2 RAREA+40  DATA READ                     30F03330
070F 01 44200784        BSI  L  ERRFD,Z   BCH ON BITS            SC      30F03340
0711 0  7201            MDX   2 1         ADJ COL COUNT                  30F03350
0712 0  70F7            MDX     XXXX                                     30F03360
0713 0  63FE            LDX   3 -2        LOAD XR 3                      30F03370
0714 0  62D8            LDX   2 -40       LOAD XR 2                      30F03380
                        *                                                30F03390
```



```
0715 01 C60009BB FLIP   LD   L2 RAREA+40  DATA READ                      30F03400
0717 01 D70009E4        STO  L3 RAREA+81  NEW LOCATION                   30F03410
0719 0  73FF            MDX   3 -1       ADJ XR 3                       30F03420
071A 0  7201            MDX   2 1        ADJ XR 2                       30F03430
071B 0  70F9            MDX     FLIP                                     30F03440
                        *                                                30F03450
071C 0  62D8            LDX   2 -40       LOAD XR 2                      30F03460
071D 0  1011            SLA     17        CLEAR ACC                      30F03470
071E 01 D60009BB CLEAR  STO  L2 RAREA+40  CLEAR COL 1 TO 40              30F03480
0720 0  7201            MDX   2 1                                        30F03490
0721 0  70FC            MDX     CLEAR                                    30F03500
                        *                                                30F03510
0722 01 C4000942 NOW    LD   L  WA79                                     30F03520
0724 01 D40009E2        STO  L  RAREA+79  SET TERM FOR PCH                30F03530
0726 01 65000993        LDX  L1 RAREA                                    30F03540
0728 01 6D0008C4        STX  L1 PUNCH     SET PCH ADDR                   30F03550
072A 01 0C0008C2        XIO  L  PCHST     START PUNCH                    30F03560
072C 01 4400084F        BSI  L  RTL       USE TIMING LOOP        SC      30F03570
072E 0  70B4            MDX     RT5A                                     30F03580
                        *                                                30F03590
                        ************************************************ 30F03600
                        *                                                30F03610
                        *****       ROUTINE 6- PUNCH 80 COLUMNS ***      30F03620
                        *                                                30F03630
                        *                                                30F03640
072F 01 65000904 RT6    LDX  L1 ABLK      BLANKS MAKE READY      E       30F03650
0731 01 6D00084E        STX  L1 MSG+1                                    30F03660
0733 01 650008CE        LDX  L1 ANYP      ANY PATTERN PLUS               30F03670
0735 0  6301            LDX   3 1         MESSAGE NUMBER                 30F03680
0736 0  4046            BSI     CKSTS     CHECK 1442 STATUS      SC      30F03690
0737 01 65000993        LDX  L1 RAREA                                    30F03700
0739 01 6D0008C8        STX  L1 READ      RESTORE RD ADDR                30F03710
073B 01 0C0008C6        XIO  L  RDRST     START READER                   30F03720
073D 01 4400084F        BSI  L  RTL       USE TIMING LOOP        SC      30F03730
073F 01 C40009E2        LD   L  RAREA+79  LAST COL DATA                  30F03740
0741 01 EC000766        OR   L  BIT12     SET TERMINATOR                 30F03750
0743 01 D40009E2        STO  L  RAREA+79  REPLACE DATA                   30F03760
0745 01 440007D7        BSI  L  FDLCD     FEED LAST CARD         SC      30F03770
                        *                                                30F03780
0747 01 65000993 RECK   LDX  L1 RAREA                                    30F03790
0749 01 6D0008C4        STX  L1 PUNCH     RESTORE PCH ADDR               30F03800
074B 01 0C0008CC        XIO  L  STACK     SELECT STACKER 2               30F03810
074D 01 0C0008C2        XIO  L  PCHST     START PUNCH                    30F03820
074F 01 4400084F        BSI  L  RTL       USE TIMING LOOP        SC      30F03830
0751 0  70F5            MDX     RECK      REPEAT NO LAST CARD            30F03840
0752 01 0C0008CC        XIO  L  STACK     SELECT STACKER 2               30F03850
0754 01 440007D7        BSI  L  FDLCD     FEED DATA CARD         SC      30F03860
                        *                                                30F03870
0756 01 440007DC RTEND  BSI  L  KNOW      CHECK BIT SWITCHES     SC      30F03880
0758 01 0C0008CA        XIO  L  SENSE     SENSE DSW                      30F03890
075A 0  1003            SLA     3         CHECK FOR LAST CARD            30F03900
075B 01 4C100763        BSC  L  RTED,-    BR IF NOT LAST CARD            30F03905
075D 01 67000756        LDX  L3 RTEND     LOOP THRU MONITOR              30F03910
075F 01 6F0005E4        STX  L3 MLSCF      UNTIL LAST CARD               30F03915
0761 00 4C800011        BSC  I  START      GOES OFF                      30F03920
                        *                                                30F03925
0763 00 44800015 RTED   BSI  I  END       TERMINATE PROG                 30F03930
0765 1  05DC            DC      PST                                      30F03940
                        *                                                30F03950
                        *                                                30F03970
                        ************************************************ 30F03980
                        *                                                30F03990
                        *****       STORAGE AREA *****************       30F04000
                        *                                                30F04010
                        *                                                30F04020
0766 0  0008    BIT12   DC      /0008     BIT 12                         30F04030
0767 0  8003    CNTL0   DC      /8003     RDR COL REQ                    30F04040
0768 0  4003    CNTL1   DC      /4003     PCH COL REQ                    30F04050
```

```
0769 0  0800        CNTL4 DC      /0800       OP COMPLETE                    30F04060
076A 0  0000        CONST DC      /0000       TIMING COUNT                   30F04070
076B 0  0000        COUNT DC      /0000       SHIFT COUNT                    30F04080
076C 0  0000        EXTRA DC      /0000       ROUTINE STORAGE                30F04090
076D 0  0000        SAVE  DC      /0000       ERROR BITS                     30F04100
076E 0  8000              DC      /8000       BIT 0                          30F04110
076F 0  0000        STG   DC      /0000       ROUTINE ADDR STG               30F04120
0770 0  7007        SWA   MDX   X IRECD-SW1-1      VALUE OF BCH    PR01 30F04130
0771 0  1000        SWB   DC      /1000       NO OP                   PR02 30F04140
0772 0  7006        SWJ   MDX   X IRECD-SW-1 EQUAL VALUE OF BCH      PR02 30F04150
0773 0  70F7        SWL   MDX   X RTLA-SW1-1 EQUAL VALUE OF BCH      PR01 30F04160
0774 0  0000        XERR  DC      /0000       EXTRA ERROR                    30F04170
                    *                                                        30F04180
                    ********************************************           30F04190
                    *                                                        30F04200
                    *****         COMMON USE ROUTINES ***********            30F04210
                    *                                                        30F04220
                    *                                                        30F04230
                    *****         BUSY ROUTINE ******************            30F04240
                    *                                                        30F04250
                    *                                                        30F04260
0775 0  0000        BUSY  DC      0                                  SE    30F04270
0776 01 650008DF          LDX   L1 ABUSY      BUSY                           30F04280
0778 0  6302              LDX    3 2          MESSAGE NUMBER                 30F04290
0779 01 44000830          BSI   L  TYPE       USE TYPE RT            SC    30F04300
077B 01 4C800775          BSC   I  BUSY       RETURN TO PROG         SX    30F04310
                    *                                                        30F04320
                    *                                                        30F04330
                    *****         CHECK STATUS ROUTINE **********            30F04340
                    *                                                        30F04350
                    *                                                        30F04360
077D 0  0000        CKSTS DC      /0000                              SE    30F04370
077E 01 44000830          BSI   L  TYPE       USE TYPE RT            SC    30F04380
0780 01 4400089C          BSI   L  SENSB      USE SENSE RT           SC    30F04390
0782 01 4C80077D          BSC   I  CKSTS      RETURN TO PROGRAM      SX    30F04400
                    *                                                        30F04410
                    *                                                        30F04420
                    *****         ERROR FOUND ROUTINE ***********            30F04430
                    *                                                        30F04440
                    *                                                        30F04450
0784 0  0000        ERRFD DC      /0000       ADDR STG               SE    30F04460
0785 0  F04F              EOR     02BE        ERROR AS FOUND                 30F04470
0786 0  D04D              STO     WAS         STORE FOR TYPING               30F04480
                    *                                                        30F04490
0787 0  7251              MDX     2 +81                                      30F04500
0788 0  1000        KEEP1 SLA       0         MDX WILL SKIP THIS             30F04510
0789 0  6A4C              STX     2 COL       STO COL COUNT                  30F04520
078A 0  72AF              MDX     2 -81       CORRECT XR2                    30F04530
078B 0  1000        KEEP2 SLA       0         MDX WILL SKIP THIS             30F04540
                    *                                                        30F04550
078C 01 6E0008CA          STX   L2 SENSE      SAVE XR2                       30F04560
078E 01 6F0008CC          STX   L3 STACK      SAVE XR3                       30F04570
0790 01 67000929          LDX   L3 ACOL       MSG- COLUMN                    30F04580
0792 0  6B40              STX    3 AMSG+1                                    30F04590
0793 0  6103              LDX    1 3          NUMBER OF MODIFIERS            30F04600
0794 0  6209              LDX    2 9          MESSAGE NUMBER                 30F04610
0795 01 6700091E          LDX   L3 AWASB      ALPHA MESSAGE                  30F04620
0797 0  401B              BSI     ETYPE       ERROR TYPE OUT         SC    30F04630
0798 01 678008CC          LDX   I3 STACK      RESTORE XR3                    30F04640
079A 01 668008CA          LDX   I2 SENSE      RESTORE XR2                    30F04650
079C 01 74020784          MDX   L  ERRFD,2    ADD 2 TO RETURN ADDR           30F04660
079E 01 0C0008CC          XIO   L  STACK      SELECT ERROR CARD              30F04670
07A0 01 C40005DE          LD    L  TELL        BIT SWITCH STG                30F04680
07A2 0  1009              SLA     9         CK BIT 9 TYPE ALL ER           30F04690
07A3 01 4C900784          BSC   I  ERRFD,-    BCH PLUS OR ZERO       SX    30F04700
07A5 01 74FE0784          MDX   L  ERRFD,-2   SUB 2 RETURN ADDR             30F04710
07A7 01 4C800784          BSC   I  ERRFD      RETURN TO ROUTINE      SX    30F04720
                    *                                                        30F04730
```



```
                    *                                                        30F04740
                    *****         ROUTINE ERR1 ********************          30F04750
                    *                                                        30F04760
                    *                                                        30F04770
07A9 0  0000        ERR1  DC      /0000       RETURN ADDR            SE    30F04780
07AA 0  6102              LDX     1 2         NUMBER OF MODIFIERS            30F04790
07AB 0  620A              LDX     2 10        MESSAGE NUMBER                 30F04800
07AC 01 6700091E          LDX   L3 AWASB      MSG- WAS  SHOULD BE            30F04810
07AE 0  1010              SLA     16                                         30F04820
07AF 0  D025              STO     02BE        CORRECT DSW                    30F04830
07B0 0  4002              BSI     ETYPE       USE ERROR TYPE OUT     SC    30F04840
07B1 01 4C8007A9          BSC   I  ERR1       RETURN TO PROG         SX    30F04850
                    *                                                        30F04860
                    *                                                        30F04870
                    *****         ROUTINE ERROR TYPE OUT ********            30F04880
                    *                                                        30F04890
                    *                                                        30F04900
07B3 0  0000        ETYPE DC      /0000                              SE    30F04910
07B4 01 C40005DE          LD    L  TELL       BIT SWITCH STORAGE             30F04920
07B6 0  100C              SLA     12          CK BIT 12 BYPASS ERR           30F04930
07B7 01 4CA807B3          BSC   I  ETYPE,+Z   BCH ON MINUS           SX    30F04940
                    *                                                        30F04950
07B9 0  6915              STX     1 INSTE     NUMBER OF MODIFIERS            30F04960
07BA 0  6A16              STX     2 MSGN      MESSAGE NUMBER                 30F04970
07BB 0  6B16              STX     3 AMSG      ALPHA MESSAGE                  30F04980
                    *                                                        30F04990
07BC 00 44800012    REPT  BSI   I  ERROR      CALL ON ERR RT- MON    SC    30F05000
07BE 1  07CF              DC      INSTE       ADDR OF ERROR MSG              30F05010
07BF 1  07C9              DC      REPT1       ADDR OF BUSY                   30F05020
07C0 0  0000              DC      /0000                                      30F05030
                    *                                                        30F05040
07C1 0  1010              SLA     16          CLEAR ACC                      30F05050
07C2 0  D010              STO     MSGN+2                                     30F05060
07C3 01 65800783          LDX   I1 ETYPE                                     30F05070
07C5 01 6D0005E4          STX   L1 MLSCF      SET MLSCF                      30F05080
07C7 00 4C800011          BSC   I  START      RETURN TO MONITOR      SX    30F05090
                    *                                                        30F05100
07C9 01 650007BC    REPT1 LDX   L1 REPT       BUSY ROUTINE                   30F05110
07CB 01 6D0005E5          STX   L1 MLSCF+1    SET MLSCF                      30F05120
07CD 00 4C800011          BSC   I  START      RETURN TO MONITOR      SX    30F05130
                    *                                                        30F05140
                    *                                                        30F05150
                    *****         EOF-- 00 0000 0000 0000 WAS S/B COL        30F05160
                    *                                                        30F05170
                    *                                                        30F05180
07CF 0  0000        INSTE DC      /0000       WORD COUNT                     30F05190
07D0 0  0000              DC      /0000       HEX CONTROL                    30F05200
07D1 0  0000        MSGN  DC      /0000       MESSAGE NUMBER                 30F05210
07D2 0  0000        AMSG  DC      /0000       ALPHA CONRTOL 1                30F05220
07D3 0  0000              DC      /0000       ALPHA CNTROL 2                 30F05230
07D4 0  0000        WAS   DC      /0000       ERROR BITS IN HEX              30F05240
07D5 0  0000        02BE  DC      /0000       WHAT BITS OUGHT TO BE          30F05250
07D6 0  0000        COL   DC      /0000       COL IN HEX                     30F05260
                    *                                                        30F05270
                    *                                                        30F05280
                    *****         FEED LAST CARD ****************            30F05290
                    *                                                        30F05300
                    *                                                        30F05310
07D7 0  0000        FDLCD DC      /0000       RETURN ADDR            SE    30F05320
07D8 01 0C0008C0          XIO   L  FDACD      FEED COMMAND                   30F05330
07DA 01 4C8007D7          BSC   I  FDLCD      RETURN TO PROG         SX    30F05350
                    *                                                        30F05360
                    *                                                        30F05370
                    *****         KNOW *** BIT SETTINGS *********            30F05380
                    *                                                        30F05390
                    *                                                        30F05400
07DC 0  0000        KNOW  DC      /0000                              SE    30F05410
07DD 01 C40005DE          LD    L  TELL       BIT SWITCH STORAGE             30F05420
```

```
07DF 01 4C04080E        BSC  L  STOP,E     CK FOR PROG HALT          30F05430
07E1 01 740005DF  GONE  MDX  L  TELL+1,0   CHECK FOR BEING 0          30F05440
07E3 0  7003            MDX     GET                                   30F05450
07E4 0  100A            SLA     10                                    30F05460
07E5 01 4C280808        BSC  L  FIND,+Z    BCH ON MINUS              30F05470
                *                                                     30F05480
07E7 01 C40005DF  GET   LD   L  TELL+1     BIT SW STG FOR ROUT       30F05490
07E9 0  630F            LDX  3  15         LOAD XR 3                 30F05500
07EA 01 4C2007F2        BSC  L  STEP,Z     BCH ON BITS               30F05510
07EC 01 C400076C        LD   L  EXTRA      STG FOR RT NUMBER         30F05520
07EE 01 4C9807DC        BSC  I  KNOW,+-    BCH ON ZERO           SX  30F05530
07F0 01 6780076B        LDX  I3 COUNT      LOAD SHIFT COUNT          30F05540
                *                                                     30F05550
07F2 0  1340      STEP  SLCA 3  0          LOOKING FOR BITS          30F05560
07F3 01 4C9807DC        BSC  I  KNOW,+-    BCH ON ZERO           SX  30F05570
07F5 01 F400076E        EOR  L  SAVE+1     REMOVE BIT FOUND          30F05580
07F7 01 D400076C        STO  L  EXTRA      SAVE REST OF BITS         30F05590
07F9 01 6F00076B        STX  L3 COUNT      SAVE REST OF SHIFT        30F05600
07FB 0  1010            SLA     16                                    30F05610
07FC 01 D40005DF        STO  L  TELL+1     CLEAR ROUTINE STORA       30F05620
07FE 01 4F800800        BSC  I3 SETUP      TO NEW ROUTINE        SX  30F05630
                *                                                     30F05640
0800 1  0756      SETUP DC     RTEND       ROUTINE END               30F05650
0801 1  06F0            DC      SET6       ROUTINE 6                 30F05660
0802 1  06F0            DC      SET6       ROUTINE 6                 30F05670
0803 1  06D3            DC      SET5       ROUTINE 5                 30F05680
0804 1  0695            DC      SET4       ROUTINE 4                 30F05690
0805 1  0667            DC      SET3       ROUTINE 3                 30F05700
0806 1  0635            DC      SET2       ROUTINE 2                 30F05710
0807 1  062A            DC      SET1       ROUTINE 1                 30F05720
                *                                                     30F05730
0808 01 C400076F  FIND  LD   L  STG        OLD ROUTINE ADDR          30F05740
080A 01 D40005E4        STO  L  MLSCF                                30F05750
080C 00 4C800011        BSC  I  START      RETURN TO MONITOR     SX  30F05760
                *                                                     30F05770
080E 01 65000914  STOP  LDX  L1 AHALT      MSG- PROG HALT            30F05780
0810 0  6307            LDX  3  7          MESSAGE NUMBER            30F05790
0811 01 44000830        BSI  L  TYPE       USE TYPE ROUTINE      SC  30F05800
                *                                                     30F05810
0813 01 65000819  SPOT  LDX  L1 OVER       GET MLSCF                 30F05820
0815 01 6D0005E4        STX  L1 MLSCF      SET MLSCF                 30F05830
0817 00 4C800011        BSC  I  START      RETURN TO MONITOR     SX  30F05840
                *                                                     30F05850
0819 01 C40005DE  OVER  LD   L  TELL        BIT SWITCH STORAGE    SE  30F05860
0818 01 4C040813        BSC  L  SPOT,E     BCH ON BIT 15             30F05870
081D 0  70C3            MDX     GONE                                  30F05880
                *                                                     30F05890
                *                                                     30F05900
                *****           LAST CARD DEVISE **************       30F05910
                *                                                     30F05920
                *                                                     30F05930
081E 0  0000      LCD   DC     0                                 SE  30F05940
081F 01 650008E4        LDX  L1 ALCD       LAST CARD                 30F05950
0821 0  6303            LDX  3  3          MESSAGE NUMBER            30F05960
0822 0  400D            BSI     TYPE       USE TYPE RT           SC  30F05970
0823 0  1010            SLA     16                                    30F05980
0824 0  D0AF            STO     WAS                                   30F05990
0825 01 7401084F        MDX  L  RTL,1      CHANGE RETURN ADDR        30F06000
0827 01 4C80084F        BSC  I  RTL        USE TIMING LOOP       SX  30F06010
                *                                                     30F06020
                *                                                     30F06030
                *****           NOT READY **********************      30F06040
                *                                                     30F06050
                *                                                     30F06060
0829 0  0000      NRDY  DC     /0000                             SE  30F06070
082A 00 6500004B        LDX  L1 ANRDY      NOT READY                 30F06080
082C 0  6306            LDX  3  6          MESSAGE NUMBER            30F06090
082D 0  4002            BSI     TYPE       USE TYPE RT           SC  30F06100
```



```
082E 01 4C800829        BSC  I  NRDY       RETURN TO PROG        SX  30F06110
                *                                                     30F06120
                *                                                     30F06130
                *****           PRINT ROUTINE *****************       30F06140
                *                                                     30F06150
                *                                                     30F06160
0830 0  0000      TYPE  DC     /0000                             SE  30F06170
0831 01 C40005DE        LD   L  TELL       BIT SWITCH STORAGE        30F06180
0833 0  100D            SLA     13                                    30F06190
0834 01 4CA80830        BSC  I  TYPE,+Z    BCH ON MINUS          SX  30F06200
0836 0  6916            STX  1  MSG        UPDATE MESSAGE            30F06210
0837 0  6814            STX  3  MSG-1      NEW MSG NUMBER            30F06220
                *                                                     30F06230
0838 00 44800013  TYPEA BSI  I  LOG        CALL ON LOG           SC  30F06240
083A 1  084A            DC      INSTL      ADDR OF MSG               30F06250
083B 1  0844            DC      TYPEB      BUSY ADDR                 30F06260
083C 0  0000            DC      /0000      RUN WAIT                  30F06270
083D 0  1010            SLA     16         CLEAR ACC                 30F06280
083E 0  D00F            STO     MSG+1      CLEAR 2 ND MSG AREA       30F06290
                *                                                     30F06300
083F 0  C0F0            LD      TYPE       RETURN ADDR               30F06310
0840 01 D40005E4        STO  L  MLSCF      UPDATE RETURN             30F06320
0842 00 4C800011        BSC  I  START      RETURN TO MONITOR     SX  30F06330
                *                                                     30F06340
0844 01 65000838  TYPEB LDX  L1 TYPEA      BUSY ROUTINE              30F06350
0846 01 6D0005E5        STX  L1 MLSCF+1    SET MLSCF                 30F06360
0848 00 4C800011        BSC  I  START      RETURN TO MONITOR     SX  30F06370
                *                                                     30F06380
                *                                                     30F06390
                *****           AOF-- 00  ALPHA MESSAGE               30F06400
                *                                                     30F06410
                *                                                     30F06420
084A 0  0000      INSTL DC     /0000      WORD COUNT                30F06430
084B 0  0000            DC      /0000      HEX CONTROL               30F06440
084C 0  0000            DC      /0000      MESSAGE NUMBER            30F06450
084D 0  0000      MSG   DC     /0000      ALPHA CNTL                30F06460
084E 0  0000            DC      /0000      ALPHA CNTROL 2            30F06470
                *                                                     30F06480
                *                                                     30F06490
                *****           ROUTINE LOOP ******************       30F06500
                *                                                     30F06510
                *                                                     30F06520
084F 0  0000      RTL   DC     0                                 SE  30F06530
0850 00 6700F000        LDX  L3 /F000      TIMING CONSTANT           30F06540
0852 01 6F00076A        STX  L3 CONST                                30F06550
                *                                                     30F06560
0854 01 6500085A  RTLA  LDX  L1 RTM                                  30F06570
0856 01 6D0005E6        STX  L1 MLSCF+2    SET MLSCF                 30F06580
0858 00 4C800011        BSC  I  START      RETURN TO MONITOR     SX  30F06590
                *                                                     30F06600
085A 01 7401076A  RTM   MDX  L  CONST,1    ADD ONE TO CONSTANT   SE  30F06610
085C 0  70F7      SW1   MDX     RTLA       MDX RTLA OR MDX IRECD PM01 30F06620
085D 0  1000      SW    SLA     0          SLA 0  OR  MDX IRECD  PM02 30F06630
085E 0  6100            LDX  1  0          NUMBER OF MODIFIERS       30F06640
085F 0  620B            LDX  2  11         MESSAGE NUMBER            30F06650
0860 00 67000041        LDX  L3 ANINT      MSG- NO INTERRUPT         30F06660
0862 01 440007B3        BSI  L  ETYPE      USE ERROR TYPE OUT    SC  30F06670
                *                                                     30F06680
0864 01 C40007D4  IRECD LD   L  WAS        BITS ON DURING INTR   SE  30F06690
0866 01 4C18088B        BSC  L  ZIP,+-     BCH ON NO BITS            30F06700
0868 0  630F            LDX  3  15         LOAD XR 3                 30F06710
                *                                                     30F06720
0869 0  1340      INERR SLCA 3  0          LOOK FOR BITS             30F06730
086A 01 F400076E        EOR  L  SAVE+1     REMOVE BIT FOUND          30F06740
086C 01 D400076D        STO  L  SAVE       SAVE REST OF BITS         30F06750
086E 0  1010            SLA     16                                    30F06760
086F 01 D40007D5        STO  L  02BE                                 30F06770
                *                                                     30F06780
```

```
0871 01 6E0008CA        STX  L2 SENSE      SAVE XR2                      30F06790
0873 01 6F0008CC        STX  L3 STACK      SAVE XR3                      30F06800
0875 01 478008AF        BSI  I3 DSWBT      IDENTIFY BIT FOUND            30F06810
0877 01 668008CA        LDX  I2 SENSE      RESTORE XR2                   30F06820
0879 01 678008CC        LDX  I3 STACK      RESTORE XR3                   30F06830
087B 01 C400076D        LD   L  SAVE       REMAINING BITS                30F06840
087D 01 4C200869        BSC  L  INERR,Z    BCH ON BITS                   30F06850
087F 01 C4000772        LD   L  SWJ                                      30F06860
0881 0  D0DB            STO     SW         SET SWITCH IN RTL     PR02    30F06870
0882 0  0847      BOX   XIO     SENSE      SENSE DSW             SE      30F06880
0883 01 4C18088B        BSC  L  ZIP,+-     BCH ON NO BITS                30F06890
0885 01 65000882        LDX  L1 BOX        GET MLSCF                     30F06900
0887 01 6D0005E5        STX  L1 MLSCF+1    SET MLSCF                     30F06910
0889 00 4C800011        BSC  I  START      RETURN TO MONITOR     SX      30F06920
                  *                                                      30F06930
088B 01 C4000773  ZIP   LD   L  SWL                                      30F06940
088D 0  D0CE            STO     SW1        RESTORE SWITCH        PR01    30F06950
088E 01 C4000771        LD   L  SWB                                      30F06960
0890 0  D0CC            STO     SW         RESTORE SWITCH        PR02    30F06970
0891 01 4C80084F        BSC  I  RTL        RETURN TO PROG        SX      30F06980
                  *                                                      30F06990
                  *                                                      30F07000
                  *****         ROUTINE UPDATE ***************           30F07010
                  *                                                      30F07020
                  *                                                      30F07030
0893 0  0000      RTU   DC      /0000                            SE      30F07040
0894 01 6D0005E4        STX  L1 MLSCF      RT ADDR                       30F07050
0896 01 6D00076F        STX  L1 STG        ROUTINE ADDR                  30F07060
0898 01 6F0005DD        STX  L3 PST+1      RT NUMBER                     30F07070
089A 01 4C800893        BSC  I  RTU        RETURN TO ROUTINE     SX      30F07080
                  *                                                      30F07090
                  *                                                      30F07100
                  *****         SENSE DSW BITS ***************           30F07110
                  *                                                      30F07120
                  *                                                      30F07130
089C 0  0000      SENSB DC      0          PROGAM HANDLED SENSE  SE      30F07140
089D 01 0C0008CA        XIO  L  SENSE      SENSE DSW                     30F07150
089F 01 D40007D4        STO  L  WAS        STORE DSW                     30F07160
08A1 01 4C98089C        BSC  I  SENSB,+-   NO BITS FOUND                 30F07170
08A3 01 C4000772        LD   L  SWJ                                      30F07180
08A5 01 D400085D        STO  L  SW         SET SWITCH IN RTL     PR02    30F07190
08A7 01 650008AD        LDX  L1 THIS                                     30F07200
08A9 01 6D00084F        STX  L1 RTL        LOAD RETURN ADDR              30F07210
08AB 01 4C000864        BSC  L  IRECD      TO TYPE CONDITIONS    SX      30F07220
08AD 01 4C80089C  THIS  BSC  I  SENSB      RETURN TO PROG        SESX    30F07230
                  *                                                      30F07240
                  *                                                      30F07250
                  *****         IDENTIFY DSW ERROR ************          30F07260
                  *                                                      30F07270
                  *                                                      30F07280
08AF 1  0829      DSWBT DC      NRDY       15                            30F07290
08B0 1  0775            DC      BUSY       14                            30F07300
08B1 1  07A9            DC      ERR1       13                            30F07310
08B2 1  07A9            DC      ERR1       12                            30F07320
08B3 1  07A9            DC      ERR1       11                            30F07330
08B4 1  07A9            DC      ERR1       10                            30F07340
08B5 1  07A9            DC      ERR1       9                             30F07350
08B6 1  07A9            DC      ERR1       8                             30F07360
08B7 1  07A9            DC      ERR1       7                             30F07370
08B8 1  07A9            DC      ERR1       6                             30F07380
08B9 1  07A9            DC      ERR1       5                             30F07390
08BA 1  07A9            DC      ERR1       4 OP COMPLETE                 30F07400
08BB 1  081E            DC      LCD        3                             30F07410
08BC 1  07A9            DC      ERR1       2                             30F07420
08BD 1  07A9            DC      ERR1       1                             30F07430
08BE 1  07A9            DC      ERR1       0                             30F07440
                  *                                                      30F07450
                  **********************************************         30F07460
```



```
                  *                                                      30F07470
                  *                                                      30F07480
                  *****         MESSAGE AREA ******************          30F07490
                  *                                                      30F07500
                  *                                                      30F07510
08C0    0000            BSS  E  0                                      30F07520
08C0 0  0000      FDACD DC      /0000      FEED A CARD                   30F07530
08C1 0  1402            DC      /1402                                    30F07540
08C2 0  0000      PCHST DC      /0000      START PUNCH                   30F07550
08C3 0  1401            DC      /1401                                    30F07560
08C4 1  0943      PUNCH DC      WAREA      PUNCH                         30F07570
08C5 0  1100            DC      /1100                                    30F07580
08C6 0  0000      RDRST DC      /0000      START READER                  30F07590
08C7 0  1404            DC      /1404                                    30F07600
08C8 1  0993      READ  DC      RAREA      READ                          30F07610
08C9 0  1200            DC      /1200                                    30F07620
08CA 0  0000      SENSE DC      /0000      SENSE DSW                     30F07630
08CB 0  1703            DC      /1703                                    30F07640
08CC 0  0000      STACK DC      /0000      SELECT =2 STACKER             30F07650
08CD 0  1480            DC      /1480                                    30F07660
                  **********************************************         30F07670
                  *                                                      30F07680
08CE 0  3E00      ANYP  DC      /3E00      ANY PATTERN PLUS              30F07690
08CF 0  7600            DC      /7600                                    30F07700
08D0 0  A600            DC      /A600                                    30F07710
08D1 0  2100            DC      /2100                                    30F07720
08D2 0  5600            DC      /5600                                    30F07730
08D3 0  3E00            DC      /3E00                                    30F07740
08D4 0  9E00            DC      /9E00                                    30F07750
08D5 0  9E00            DC      /9E00                                    30F07760
08D6 0  3600            DC      /3600                                    30F07770
08D7 0  6200            DC      /6200                                    30F07780
08D8 0  7600            DC      /7600                                    30F07790
08D9 0  2100            DC      /2100                                    30F07800
08DA 0  5600            DC      /5600                                    30F07810
08DB 0  5E00            DC      /5E00                                    30F07820
08DC 0  B200            DC      /B200                                    30F07830
08DD 0  9A00            DC      /9A00                                    30F07840
08DE 0  FFFF            DC      /FFFF                                    30F07850
                  *                                                      30F07860
08DF 0  1A00      ABUSY DC      /1A00      BUSY                          30F07870
08E0 0  B200            DC      /B200                                    30F07880
08E1 0  9A00            DC      /9A00                                    30F07890
08E2 0  A600            DC      /A600                                    30F07900
08E3 0  FFFF            DC      /FFFF                                    30F07910
                  *                                                      30F07920
08E4 0  5E00      ALCD  DC      /5E00      LAST CARD                     30F07930
08E5 0  3E00            DC      /3E00                                    30F07940
08E6 0  9A00            DC      /9A00                                    30F07950
08E7 0  9E00            DC      /9E00                                    30F07960
08E8 0  2100            DC      /2100                                    30F07970
08E9 0  1E00            DC      /1E00                                    30F07980
08EA 0  3E00            DC      /3E00                                    30F07990
08EB 0  6200            DC      /6200                                    30F08000
08EC 0  3200            DC      /3200                                    30F08010
08ED 0  FFFF            DC      /FFFF                                    30F08020
                  *                                                      30F08030
08EE 0  5E00      ASTOH DC      /5E00      LOAD FROM STK 2               30F08040
08EF 0  5200            DC      /5200                                    30F08050
08F0 0  3E00            DC      /3E00                                    30F08060
08F1 0  3200            DC      /3200                                    30F08070
08F2 0  2100            DC      /2100                                    30F08080
08F3 0  1200            DC      /1200                                    30F08090
08F4 0  6200            DC      /6200                                    30F08100
08F5 0  5200            DC      /5200                                    30F08110
08F6 0  7200            DC      /7200                                    30F08120
08F7 0  2100            DC      /2100                                    30F08130
08F8 0  9A00            DC      /9A00                                    30F08140
```

```
08F9 0 9E00          DC    /9E00                        30F08150
08FA 0 5A00          DC    /5A00                        30F08160
08FB 0 2100          DC    /2100                        30F08170
08FC 0 D800          DC    /D800                        30F08180
08FD 0 2100          DC    /2100                        30F08190
08FE 0 FFFF          DC    /FFFF                        30F08200
                     *                                  30F08210
08FF 0 5E00    ALCBK DC    /5E00    LOAD BLANKS         30F08220
0900 0 5200          DC    /5200                        30F08230
0901 0 3E00          DC    /3E00                        30F08240
0902 0 3200          DC    /3200                        30F08250
0903 0 2100          DC    /2100                        30F08260
                     *                                  30F08270
0904 0 1A00    ABLK  DC    /1A00                        30F08280
0905 0 5E00          DC    /5E00                        30F08290
0906 0 3E00          DC    /3E00                        30F08300
0907 0 7600          DC    /7600                        30F08310
0908 0 5A00          DC    /5A00                        30F08320
0909 0 9A00          DC    /9A00                        30F08330
090A 0 2100          DC    /2100                        30F08340
                     *                                  30F08350
090B 0 7200    AMRDY DC    /7200    MAKE RDY            30F08360
090C 0 3E00          DC    /3E00                        30F08370
090D 0 5A00          DC    /5A00                        30F08380
090E 0 3600          DC    /3600                        30F08390
090F 0 2100          DC    /2100                        30F08400
0910 0 6200          DC    /6200                        30F08410
0911 0 3200          DC    /3200                        30F08420
0912 0 A600          DC    /A600                        30F08430
0913 0 FFFF          DC    /FFFF                        30F08440
                     *                                  30F08450
0914 0 5600    AHALT DC    /5600    PROG HALT           30F08460
0915 0 6200          DC    /6200                        30F08470
0916 0 5200          DC    /5200                        30F08480
0917 0 1600          DC    /1600                        30F08490
0918 0 2100          DC    /2100                        30F08500
0919 0 2600          DC    /2600                        30F08510
091A 0 3E00          DC    /3E00                        30F08520
091B 0 5E00          DC    /5E00                        30F08530
091C 0 9E00          DC    /9E00                        30F08540
091D 0 FFFF          DC    /FFFF                        30F08550
                     *                                  30F08560
091E 0 9200    AWASB DC    /9200    WAS S/B             30F08690
091F 0 3E00          DC    /3E00                        30F08700
0920 0 9A00          DC    /9A00                        30F08710
0921 0 2100          DC    /2100                        30F08720
0922 0 2100          DC    /2100                        30F08730
0923 0 9A00          DC    /9A00                        30F08740
0924 0 BC00          DC    /BC00                        30F08750
0925 0 1A00          DC    /1A00                        30F08760
0926 0 2100          DC    /2100                        30F08770
0927 0 2100          DC    /2100                        30F08780
0928 0 FFFF          DC    /FFFF                        30F08790
                     *                                  30F08800
0929 0 1E00    ACOL  DC    /1E00    COLUMN              30F08810
092A 0 5200          DC    /5200                        30F08820
092B 0 5E00          DC    /5E00                        30F08830
092C 0 8100          DC    /8100                        30F08840
092D 0 FFFF          DC    /FFFF                        30F08850
                     *                                  30F08860
092E 0 9A00    ASET  DC    /9A00    SET BIT 8 FUNC 00   30F08870
092F 0 3600          DC    /3600                        30F08880
0930 0 9E00          DC    /9E00                        30F08890
0931 0 2100          DC    /2100                        30F08900
0932 0 1A00          DC    /1A00                        30F08910
0933 0 2200          DC    /220C                        30F08920
0934 0 9E00          DC    /9E00                        30F08930
0935 0 2100          DC    /2100                        30F08940
```



```
0936 0 E400          DC    /E400                        30F08950
0937 0 2100          DC    /2100                        30F08960
0938 0 1200          DC    /1200                        30F08970
0939 0 B200          DC    /B200                        30F08980
093A 0 7600          DC    /7600                        30F08990
093B 0 1E00          DC    /1E00                        30F09000
093C 0 2100          DC    /2100                        30F09010
093D 0 C400          DC    /C400                        30F09020
093E 0 C400          DC    /C400                        30F09030
093F 0 FFFF          DC    /FFFF    END OF MESSAGE      30F09040
                     *                                  30F09050
                     *****          WRITE AREA FOR PUNCH 30F09060
                     *                                  30F09070
0940 0 4010    WA40  DC    /4010                        30F09080
0941 0 4018    WA40A DC    /4018                        30F09090
0942 0 8018    WA79  DC    /8018                        30F09100
0943 0 8010    WAREA DC    /8010    COLUMN 1            30F09110
0944 0 4020          DC    /4020                        30F09120
0945 0 2040          DC    /2040                        30F09130
0946 0 1080          DC    /1080                        30F09140
0947 0 0900          DC    /0900                        30F09150
0948 0 0600          DC    /0600                        30F09160
0949 0 0600          DC    /0600                        30F09170
094A 0 0900          DC    /0900                        30F09180
094B 0 1080          DC    /1080                        30F09190
094C 0 2040          DC    /2040                        30F09200
094D 0 4020          DC    /4020                        30F09210
094E 0 8010          DC    /8010                        30F09220
094F 0 FFF7          DC    /FFF7                        30F09230
0950 0 8880          DC    /8880                        30F09240
0951 0 CCC0          DC    /CCC0                        30F09250
0952 0 EEE0          DC    /EEE0                        30F09260
0953 0 FFF0          DC    /FFF0                        30F09270
0954 0 7777          DC    /7777                        30F09280
0955 0 3333          DC    /3333                        30F09290
0956 0 1111          DC    /1111                        30F09300
0957 0 FFF7          DC    /FFF7    COL 21              30F09310
0958 0 A000          DC    /A000                        30F09320
0959 0 9000          DC    /9000    ALPHA RIPPLE        30F09330
095A 0 8800          DC    /8800                        30F09340
095B 0 8400          DC    /8400                        30F09350
095C 0 8200          DC    /8200    COL 26              30F09360
095D 0 8100          DC    /8100                        30F09370
095E 0 8080          DC    /8080                        30F09380
095F 0 8040          DC    /8040                        30F09390
0960 0 8020          DC    /8020                        30F09400
0961 0 8010          DC    /8010                        30F09410
0962 0 5000          DC    /5000                        30F09420
0963 0 4800          DC    /4800                        30F09430
0964 0 4400          DC    /4400                        30F09440
0965 0 4200          DC    /4200                        30F09450
0966 0 4100          DC    /4100                        30F09460
0967 0 4080          DC    /4080                        30F09470
0968 0 4040          DC    /4040                        30F09480
0969 0 4020          DC    /4020                        30F09490
096A 0 4010          DC    /4010    COL 40 WAREA+39     30F09500
096B 0 3000          DC    /3000                        30F09510
096C 0 2800          DC    /2800                        30F09520
096D 0 2400          DC    /2400                        30F09530
096E 0 2200          DC    /2200                        30F09540
096F 0 2100          DC    /2100                        30F09550
0970 0 2080          DC    /2080                        30F09560
0971 0 2040          DC    /2040                        30F09570
0972 0 2020          DC    /2020                        30F09580
0973 0 2010          DC    /2010                        30F09590
0974 0 0000          DC    /0000                        30F09600
0975 0 FC00          DC    /FC00                        30F09610
0976 0 03F0          DC    /03F0                        30F09620
```

```
0977 0  FC00            DC      /FC00                           30F09630
0978 0  03F0            DC      /03F0                           30F09640
0979 0  0000            DC      /0000                           30F09650
097A 0  8887            DC      /8887                           30F09660
097B 0  4444            DC      /4444                           30F09670
097C 0  2222            DC      /2222                           30F09680
097D 0  1111            DC      /1111                           30F09690
097E 0  0007            DC      /0007                           30F09700
097F 0  8880            DC      /8880                           30F09710
0980 0  CCC4            DC      /CCC4                           30F09720
0981 0  AAA2            DC      /AAA2                           30F09730
0982 0  9991            DC      /9991                           30F09740
0983 0  4444            DC      /4444                           30F09750
0984 0  6666            DC      /6666                           30F09760
0985 0  5555            DC      /5555                           30F09770
0986 0  2222            DC      /2222                           30F09780
0987 0  3333            DC      /3333                           30F09790
0988 0  1111            DC      /1111                           30F09800
0989 0  0005            DC      /0005     CHECK PCH TERM        30F09810
098A 0  0006            DC      /0006                           30F09820
098B 0  FFF7            DC      /FFF7                           30F09830
098C 0  FFF7            DC      /FFF7                           30F09840
098D 0  FFF7            DC      /FFF7                           30F09850
098E 0  0008            DC      /0008     COLUMN 76             30F09860
098F 0  FFF0            DC      /FFF0                           30F09870
0990 0  FFF0            DC      /FFF0                           30F09880
0991 0  FFF0            DC      /FFF0                           30F09890
0992 0  FFF0            DC      /FFF0                           30F09900
                *                                               30F09910
0993    0050    RAREA BSS       80        AREA FOR READ         30F09920
                *                                               30F09930
09E4    0618            END     GO                              30F09940
```


CROSS REFERENCE LISTING

1442 TIMING TEST

TABLE OF CONTENTS

1442 TIMING TEST

1. PURPOSE

THE 1442 TIMING TEST IS DESIGNED TO CHECK THE FOLLOWING CONDITIONS.

A. READ AND PUNCH COLUMN TIMING TOLERANCES.
B. PUNCH COLUMN DELAY TOLERANCE.
C. PROPER DSW RESPONSES.
D. READ REGISTRATION OR COMPARE ERRORS.
E. PUNCH ECHO CHECK ERRORS.
F. CORRECT COLUMN INTERRUPT COUNTS.

THE PROGRAM WILL NOT CHECK THE FOLLOWING ITEMS WHICH MUST BE CHECKED BY SCOPING WHILE PROGRAM IS RUNNING.

A. READ CELL DURATION
B. EMITTER TIMING
C. READ OR PUNCH SINGLE SHOT TIMING (LOGIC PAGE XR301)

2. PREREQUISITES

2.1 PROGRAM PREREQUISITES

THE 1442 TIMING TEST MUST RUN UNDER CONTROL OF THE 1130 DIAGNOSTIC MONITOR. THE TEST MAY NOT BE RUN IN OVERLAP WITH ANY OTHER PROGRAM.

2.2 DECK CUSTOMIZATION

1442 MODEL NUMBER INFORMATION MAY BE MADE A PERMANENT PART OF THE 1442 TIMING TEST OBJECT DECK BY INSERTING AN EDIT CARD IN FRONT OF THE LAST CARD OF THE DECK.

THE EDIT CARD SHOULD BE PUNCHED AS FOLLOWS,

FOR MODEL 6	FOR MODEL 7
COLS 1-10, +05E0 0006	COLS 1-10, +05E0 0007
COLS 11-19, BLANK	COLS 11-19, BLANK
COLS 20-29, 1442 MOD 6	COLS 20-29, 1442 MOD 7

IF THE PROGRAM DOES NOT FIND MODEL INFORMATION, IT WILL GENERATE A PRINTOUT REQUIRING OPERATOR TO ENTER THE INFORMATION. THE PROCEDURE TO ENTER THE INFORMATION IS DESCRIBED IN PARAGRAPH 3.2 PROGRAM OPERATION.

2.3 EQUIPMENT PREREQUISITES

THE FOLLOWING EQUIPMENT IS REQUIRED,

1. 1131 CENTRAL PROCESSING UNIT.
2. 1442 CARD READ/PUNCH MODEL 6 OR 7.

3. USE PROCEDURE

3.1 LOADING

THIS PROGRAM FOLLOWS THE LOADING PROCEDURES ESTABLISHED BY THE 1130 DIAGNOSTIC MONITOR. REFER TO D. M. DOCUMENTATION.

THE FOLLOWING REQUIREMENTS MUST BE MET.

1. NO OTHER PROGRAM DECK SHOULD FOLLOW THE 1442 TIMING TEST DECK.
2. PROGRAM DECK SHOULD BE FOLLOWED BY A DECK OF BLANK CARDS ABOUT 5 INCHES THICK.
3. IF THE MODIFY DATA OPTION IS DESIRED, PLACE THE CARD WITH THE DESIRED DATA AFTER THE LAST CARD OF THE PROGRAM DECK.

3.2 OPERATION

3.2.1 PROGRAM EXECUTION

A. LOAD AND GO MODE

ALL ROUTINES WILL BE EXECUTED WITH NO OPTIONS
ALL DETECTED ERRORS WILL BE IDENTIFIED BY AN ERROR TYPEOUT.

B. SINGLE PROGRAM MODE.

AFTER PROGRAM IS LOADED,THE MONITOR WILL WAIT
TO ALLOW OPTIONS TO BE SPECIFIED.

1. SPECIFY DESIRED OPTIONS AS INSTRUCTED IN SECTION 3.2.2.
   IF NO OPTIONS ARE DESIRED, NO ENTRY IS REQUIRED.

2. TO START EXECUTION - SET BIT SWITCHES TO 0080, THEN
   PRESS INTERRUPT REQUEST KEY.

C. IF THE MODEL NUMBER EDIT CARD IS NOT PART OF THE PROGRAM DECK,
ENTER THE INFORMATION AS FOLLOWS,

1. FOR MODEL 6 SET CONSOLE ENTRY SWITCHES TO AF06.
   FOR MODEL 7 SET CONSOLE ENTRY SWITCHES TO AF07.
2. PRESS THE INTERRUPT REQUEST KEY. AN ACKNOWLEDGE PRINTOUT WILL
   OCCUR, AND THE INFORMATION WILL BE ENTERED.

3.2.2 PROGRAM OPTIONS

THE OPERATOR MAY MODIFY THE EXECUTION OF THE PROGRAM ANY TIME BEFORE
OR AFTER IT HAS STARTED EXECUTION BY ENTERING PROGRAM CONTROL OPTIONS
OR ROUTINE SELECTION OPTIONS.

A. PROGRAM CONTROL OPTIONS

1. TO SELECT PROGRAM OPTIONS SET BIT SWITCHES AS INDICATED

SW. SETTING	CONTROL
2F00	RESET ALL CONTROL OPTIONS
2F04	BYPASS ERROR MESSAGE PRINTOUTS
2F08	SINGLE CARD WAIT
2F80	MODIFY DATA TABLE (RTN 4)
2F84	BYPASS ERROR MESSAGES WITH DATA MODIFIED

2. PRESS INTERRUPT REQUEST KEY.

B. ROUTINE SELECTION

EXECUTION WILL START WITH THE SELECTED ROUTINE.

1. TO SELECT ROUTINE OPTIONS SET BIT SWITCHES AS INDICATED

SW. SETTING	ROUTINE
6F04	1 PUNCH ONLY
6F02	2 READ ONLY
6F01	3 FEED ONLY
6F06	RUN ROUTINE 1 THEN ROUTINE 2

2. PRESS INTERRUPT REQUEST KEY.

3.3 NORMAL OPERATION

NORMAL PROGRAM OPERATION CONSISTS OF RUNNING THE PROGRAM IN LOAD AND GO MODE WITHOUT ANY OPTIONS SELECTED. NORMAL PROGRAM OPERATION PROCEEDS AS FOLLOWS,

PROGRAM WILL CHECK THAT FIRST CARD IS BLANK AND WILL THEN BEGIN THE PUNCH ROUTINE.

BLANK DECK WILL BE PUNCHED WITH DATA FROM DATA TABLE. WHEN THE HOPPER BECOMES EMPTY, PRINTOUT A2F02 WILL OCCUR AND PROGRAM WILL STOP AT WAIT 1. AT THIS POINT PROCEED AS FOLLOWS,

A. DEPRESS 1442 START KEY.
B. DEPRESS PROG. START KEY AT CPU.

PROGRAM WILL PUNCH THE LAST CARD, PRINTOUT A2F03 WILL OCCUR, AND PROGRAM WILL STOP AT WAIT 1. AT THIS POINT PROCEED AS FOLLOWS,

A. REMOVE PUNCHED CARDS FROM STACKER NO. 2 AND PLACE IN HOPPER.
B. DEPRESS 1442 START KEY.
C. AT CPU DEPRESS PROG. START KEY.

PROGRAM WILL READ THE PUNCHED CARDS UNTIL THE HOPPER BECOMES EMPTY. AT THAT TIME PRINTOUT A2F02 WILL AGAIN OCCUR, AND PROGRAM WILL STOP AT WAIT 1.

IF NO ERROR PRINTOUTS OCCURRED, THE 1442 TIMING IS CORRECT AND THE TEST MAY BE CONSIDERED COMPLETE. DEPRESS NPRO TO CLEAR FEED.

REFER TO PARAGRAPH 4, PRINTOUTS, FOR A DESCRIPTION OF THE POSSIBLE PRINTOUTS THAT MAY OCCUR, AND FOR THE ACTION TO BE TAKEN IN EACH CASE.

3.4 PROGRAM TERMINATION

THERE IS NO NORMAL PROGRAM TERMINATION. THE PROGRAM WILL STOP WHEN THE 1442 HOPPER BECOMES EMPTY, OR THE 1442 STOP KEY IS DEPRESSED.

NOTE

DO NOT USE THE CPU'S PROG. STOP KEY TO STOP THE PROGRAM. THIS WILL CAUSE A TIMING ERROR TO OCCUR AND WILL NOT SERVICE THE LEVEL 5 INTERRUPT.

3.5 PROGRAM WAITS.

3000 AT LOCATION 0600 WAIT FOR OPERATOR TO ENTER MODEL NUMBER, SEE SECTION 3.2.1.C.
3001 AT LOCATION 07D6 WAIT AT END OF CARD. PROGRAM WILL STOP AT WAIT 1 AFTER ANY PRINTOUT, OR AFTER EACH CARD IF SINGLE CARD WAIT OPTION IS SELECTED.

3.6 RESTART

TO RESTART THE PROGRAM.

1. SET SWITCHES TO 40AF.
2. PRESS INTERRUPT REQUEST KEY.

4. PRINTOUTS

ALL PRINTOUTS ARE IN THE STANDARD FORMAT.

APPNN 00RR (MESSAGE)
OR
EPPNN 00RR (MESSAGE)

WHERE A IDENTIFIES STATUS MESSAGES
E IDENTIFIES ERROR MESSAGES
PP IS THE PID OF THE PROGRAM CAUSING THE MESSAGE
NN IS THE MESSAGE SEQUENCE NUMBER
RR IS THE ROUTINE NUMBER
MESSAGE IS ANY VARIABLE INFORMATION

4.1 STATUS MESSAGES

A2F01 0000 ENTER MOD NUMBER.

THIS PRINTOUT OCCURS WHEN THE PROGRAM FINDS THE MODEL NUMBER AREA BLANK. THE MODEL NUMBER MAY BE ENTERED BY MEANS OF AN EDIT CARD, SEE PARAGRAPH 2.1 PROGRAM PREREQUISITES) OR BY MEANS OF THE CONSOLE ENTRY SWITCHES (SEE PARAGRAPH 3.2 PROGRAM OPERATION).

A2F02 000X RDR DSW NOT READY- PRESS START

THIS PRINTOUT INDICATES THAT THE 1442 WAS NOT READY WHEN ITS DSW WAS SENSED. WHEN THE PRINTOUT OCCURS,

A. MAKE 1442 READY (IF NO FEED CHECK JUST PRESS 1442 START).
B. DEPRESS PROG START. PROGRAM WILL CONTINUE.

A2F03 0001 LAST CARD. LOAD PCHED CARDS + START

THIS PRINTOUT OCCURS AFTER THE LAST CARD HAS BEEN PUNCHED. WHEN THIS PRINTOUT OCCURS,

A. REMOVE PUNCHED CARDS FROM STACKER NO. 2 AND PLACE IN HOPPER.
B. DEPRESS 1442 START KEY. READY LIGHT SHOULD GO ON.
C. AT CPU DEPRESS PROG. START KEY. READ ROUTINE WILL BEGIN.

4.2 ERROR MESSAGES.

ALL NUMERICAL PRINTOUTS ARE IN HEXADECIMAL FORMAT.

E2F01 0005 CARD NOT BLANK

THIS PRINTOUT INDICATES THAT A PREPUNCHED CARD WAS FED INTO THE PUNCH STATION AT BEGINNING OF PUNCH ROUTINE. WHEN THIS PRINTOUT OCCURS,

A. DEPRESS NPRO TO CLEAR FEED.
B. REMOVE PREPUNCHED CARD AND INSURE THAT NO OTHER PUNCHED CARDS ARE IN DECK OF BLANK CARDS TO BE PUNCHED.
C. DEPRESS 1442 START KEY.
D. AT CPU, ENTER 40AF IN CONSOLE ENTRY SWITCHES TO REINITIALIZE PROGRAM. PROGRAM WILL CONTINUE.

E2F02 0000 INVLD SWS

THIS PRINTOUT INDICATES THAT NO ENTRY WAS FOUND IN PROGRAM TEST OPTION BIT SWITCH AREA. ENTER 6F0X IN CONSOLE ENTRY SWITCHES TO CONTINUE. SEE SECTION 3.2.2.B.

E2F03 000X NO INTRPT

ROUTINE NUMBER MAY BE 1, 2, OR 3. TIMER OVERFLOW. NO INTERRUPT WAS RECEIVED 4 SECONDS AFTER A COMMAND WAS GIVEN. IF THIS PRINTOUT OCCURS, CHECK,

A. FEED CLUTCH LATCH (LOGIC PAGE XR211)
B. MOTOR DELAY (LOGIC PAGE XR211)

E2F04 000R XXXX XXXX XXXX WAS, S/B, COL- COLUMN ERROR

A. THIS PRINTOUT OCCURS FOLLOWING ANY 1442 ERROR WHICH SETS THE 1442 ERROR BIT (BIT 2) IN THE 1442 DSW. THIS ERROR BIT INDICATES THAT ONE OF SEVEN ERROR CONDITIONS EXISTS IN THE 1442.

1. READ REGISTRATION CHECK
2. PUNCH CHECK
3. HOPPER CHECK
4. TRANSPORT CHECK
5. FEED CHECK - READ STATION
6. FEED CHECK - PUNCH STATION
7. FEED CLUTCH CHECK

B. IF THE ERROR IS OTHER THAN A READ REGISTRATION OR PUNCH CHECK, CLEAR THE 1442 - REPLACE THE CARDS IN THE HOPPER, THEN PRESS 1442 START AND 1131 START TO CONTINUE. NOTE -- WAS AND S/B WILL NOT AGREE IF ERROR WAS IN ROUTINE 1.

C. IF THE ERROR BIT WAS SET BY A READ REGISTRATION CHECK THE PRINTOUT SHOULD BE INTERPRETTED AS FOLLOWS. READING FROM LEFT TO RIGHT---

1. WORD THREE IS THE DATA THAT WAS READ.
2. WORD FOUR IS THE DATA THAT SHOULD BE IN THE COLUMN JUST READ.
3. WORD FIVE IDENTIFIES THE CARD COLUMN IN WHICH THE ERROR WAS DETECTED.

ONLY ONE ERROR WILL BE DETECTED PER CARD AS READING TERMINATES WHEN THE ERROR IS DETECTED.

D. IF THE ERROR BIT WAS SET BY A PUNCH CHECK THE PRINTOUT SHOULD BE INTERPRETTED AS FOLLOWS -- READING FROM LEFT TO RIGHT --

1. WORD THREE CONTAINS THE CONTENTS OF THE 1442 BUFFER REGISTER FOLLOWING THE PUNCH ECHO CHECK. ANY BIT ON IN THIS WORD IDENTIFIES THE DESCREPANCY BETWEEN THE PUNCH DIE ECHO AND THE DATA WHICH WAS TO BE PUNCHED IN THE COLUMN.
2. WORD FOUR CONTAINS THE DATA THAT SHOULD HAVE BEEN PUNCHED IN THE COLUMN.
3. WORD FIVE IDENTIFIES THE CARD COLUMN IN WHICH THE ERROR WAS DETECTED. THERE WILL ONLY BE ONE ERROR PER CARD AS PUNCHING IS TERMINATED WHEN THE ERROR IS DETECTED.
FOLLOWING A PUNCH RESPONSE INTERRUPT THIS ROUTINE DELAYS 300 USEC (MAXIMUN ALLOWABLE PUNCH DELAY) BEFORE EXECUTING A PUNCH COMMAND.

WHEN THIS ERROR PRINTOUT OCCURS, CHECK THE BUFFER REGISTER, COMPL GATE, COMPL SPD. (LOGIC PAGES XR341, 351, 361, 321, 331, 311).

1442 TIMING TEST

E2F05 0002 XXXX XXXX 00XX WAS, S/B, COL- READ COMPARE

THIS PRINTOUT INDICATES AN INCORRECT COMPARISON BETWEEN DATA READ AND DATA IN DATA TABLE. READING FROM LEFT TO RIGHT,

A. WORD THREE REPRESENTS THE INCORRECT DATA (WAS).
B. WORD FOUR IS THE CORRECT DATA (S/B).
C. WORD FIVE IS THE COLUMN WHERE ERROR OCCURRED (COL). IF THERE IS MORE THAN ONE ERROR ON THE CARD ONLY THE ERROR IN THE HIGHEST NUMBERED COLUMN WILL BE IDENTIFIED BY THIS PRINTOUT (CARD IS CHECKED STARTING WITH COLUMN 80).
D. WORDS NINE AND TEN DESCRIBE THE TYPE OF ERROR.

WHEN THIS PRINTOUT OCCURS CHECK THE PUNCHED CARD TO SEE IF IT IS PUNCHED CORRECTLY. IF THE CARD IS CORRECTLY PUNCHED, CHECK THE DATA BUFFER REGISTER.

E2F06 000X XXXX 4003 WAS, S/B- COL DSW

THIS PRINTOUT INDICATES A LEVEL 0 (COLUMN) DSW ERROR. WORD THREE IS THE ERROR DSW. CHECK THE DSW CIRCUITS (LOGIC PAGES XR371, 381). ROUTINE NUMBER MAY BE 1 OR 2.

E2F07 000X XXXX 0800 WAS, S/B- END DSW

LEVEL 4 (END-OP) DSW ERROR. WORD THREE IS THE ERROR DSW. CHECK DSW CIRCUITS. ROUTINE NUMBER MAY BE 1, 2, 3, 4, OR 5.

E2F08 000X NO COLUMN INTRPT

END OP WAS RECEIVED, BUT NO COLUMN INTERRUPTS ON READ OR PUNCH. CHECK READ OR PUNCH RESPONSE (LOGIC PAGE XR 291). ROUTINE NUMBER MAY BE 1, 2, OR 4.

E2F09 000X XXXX XXXX 00XX WAS, S/B, COL- COL TIME LONG

ROUTINE NUMBER MAY BE 1 OR 2.
THIS PRINTOUT INDICATES THAT EITHER READ OR PUNCH COLUMN TIME EXCEEDED MAXIMUM LIMITS. TIME FIGURES ARE GIVEN IN MICROSECONDS. FROM LEFT TO RIGHT,

A. WORD THREE IS ACTUAL TIME FOR READ OR PUNCH COLUMN (WAS).
B. WORD FOUR REPRESENTS THE MAXIMUM TIME LIMIT FOR A READ OR PUNCH COLUMN (S/B).
C. WORD FIVE REPRESENTS THE COLUMN THAT EXCEEDED THE MAXIMUM TIME LIMIT (COL).
D. WORDS NINE, TEN, AND ELEVEN IDENTIFY THE ERROR.

WHEN THIS PRINTOUT OCCURS,

A. CHECK ADJUSTMENT AND LUBRICATION OF FEED AND READ CLUTCH.
B. CHECK PUNCH INCREMENTAL DRIVE.

1442 TIMING TEST

E2F10 000X XXXX XXXX 00XX WAS, S/B, COL- COL TIME SHORT

ROUTINE NUMBER MAY BE 1 OR 2.
THIS PRINTOUT INDICATES THAT EITHER READ OR PUNCH COLUMN TIME WAS SHORTER THAN THE MINIMUM TIME LIMIT. TIME FIGURES ARE GIVEN IN MICROSECONDS. FROM LEFT TO RIGHT,

A. WORD THREE IS ACTUAL TIME FOR READ OR PUNCH COLUMN (WAS).
B. WORD FOUR REPRESENTS THE MINIMUM TIME LIMIT FOR A READ OR PUNCH COLUMN (S/B).
C. WORD FIVE REPRESENTS COLUMN THAT WAS UNDER THE MINIMUM TIME LIMIT (COL).
D. WORDS NINE, TEN, AND ELEVEN IDENTIFY THE ERROR.

WHEN THIS PRINTOUT OCCURS,

A. CHECK ADJUSTMENT AND LUBRICATION OF FEED AND READ CLUTCH.
B. CHECK PUNCH INCREMENTAL DRIVE.

E2F11 000X 00XX 0050 WAS, S/B- COL COUNT

ROUTINE NUMBER MAY BE 1, 2, OR 4.
THIS PRINTOUT INDICATES THAT THE NUMBER OF COLUMN INTERRUPTS WAS NOT 80. WHEN IT OCCURS CHECK TAPE ON EMITTER DISK(AND PUNCH OR READ RESPONSE (LOGIC PAGE XR 291).

A. WORD THREE REPRESENTS THE NUMBER OF COLUMN INTERRUPTS RECEIVED (WAS).
B. WORD FOUR REPRESENTS THE NUMBER OF COLUMN INTERRUPTS THAT SHOULD HAVE BEEN RECEIVED (S/B).
C. WORDS SEVEN AND EIGHT IDENTIFY THE ERROR.

4.3 SAMPLE PRINTOUTS

THE FOLLOWING ARE SAMPLE PRINTOUTS FOR SPECIFIC ERRORS.

E2F04 0002 8010 8000 0C01 WAS, S/B, COL- COLUMN ERROR
E2F06 0002 A801 8003 WAS, S/B- COL DSW
E2F07 0002 2801 0800 WAS, S/B- END DSW
E2F11 0002 0001 0050 WAS, S/B- COL COUNT

READ REGISTRATION ERROR. THESE PRINTOUTS TELL THE OPERATOR THAT A READ REGISTRATION ERROR HAS OCCURRED IN COLUMN 1, AND THAT THE ERROR WAS AN EXTRA BIT 11 (9 PUNCH). ALSO PRESENTED ARE THE HIGHEST COLUMN DSW, THE END OP DSW, AND THE TOTAL COLUMN COUNT FOR THAT CARD.

E2F05 0002 C200 C000 0011 WAS, S/B, COL- READ COMPARE

READ COMPARE ERROR. THIS PRINTOUT TELLS THE OPERATOR THAT THE DATA READ IN COLUMN 17 (HEX 11) DOES NOT MATCH THE DATA TABLE (I.E., CONTAINED AN EXTRA BIT 6).

E2F04 0001 0200 0000 003F WAS, S/B, COL- COLUMN ERROR
E2F06 0001 6003 4003 WAS, S/B- COL DSW
E2F07 0001 2801 0800 WAS, S/B- END DSW
E2F11 0001 003F 0050 WAS, S/B- COL COUNT

PUNCH ECHO CHECK ERROR. THESE PRINTOUTS TELL THE OPERATOR THAT A PUNCH ECHO CHECK HAS OCCURRED IN COL 63 (HEX 3F), AND THAT THE BIT THAT CAUSED THE FAILURE IS BIT 6 (4 PUNCH). OPERATOR SHOULD COMPARE CARD COLUMN 63 AGAINST S/B TO DETERMINE IF ERROR IS DUE TO PUNCH FAILURE, OR FALSE ECHO CHECK. ALSO PRESENTED ARE THE HIGHEST COLUMN DSW, THE END OP DSW, AND THE TOTAL COLUMN COUNT FOR THAT CARD.

E2F10 0002 0301 036B 000C WAS, S/B, COL- COL TIME SHORT

READ TIMING ERROR. THIS PRINTOUT TELLS THE OPERATOR THAT TIME BETWEEN COLUMN 11 AND COLUMN 12 (HEX OC) WAS 769 USEC, SHOULD HAVE BEEN 875 USEC. MINIMUM. THE 1442 FEED CLUTCH MAY NEED SERVICING.

5. COMMENTS

5.1 PROGRAM DESCRIPTION

THE 1442 TIMING TEST CONSISTS OF A CONTROL ROUTINE, FIVE MAIN ROUTINES, AND AN ERROR LOGGING ROUTINE.

THE CONTROL ROUTINE ACCOMPLISHES THE PROGRAM OPTIONS SPECIFIED BY THE OPERATOR.

ROUTINE 1, PUNCH ROUTINE, PUNCHES CARDS FROM DATA IN THE DATA TABLE, CHECKS DSW'S, DELAYS PUNCH RESPONSE BY 300 USEC. THE ROUTINE ALSO READS BUFFER ON PUNCH ECHO CHECKS, CHECKS PUNCH COLUMN TIMING, AND CHECKS FOR CORRECT CCLUMN COUNT.

ROUTINE 2, READ ROUTINE, READS CARDS PUNCHED BY ROUTINE 1, AND COMPARES THEM AGAINST DATA IN THE DATA TABLE. IT ALSO CHECKS DSW'S, CHECKS READ COLUMN TIMING, AND CHECKS FOR CORRECT COLUMN COUNT.

ROUTINE 3, FEED ROUTINE, FEEDS CARDS AND CHECKS END OP DSW ONLY.

ROUTINE 4, MODIFY DATA TABLE ROUTINE, REPLACES DATA IN DATA TABLE WITH DATA IN CARD FOLLOWING THE LAST CARD OF THE PROGRAM DECK. THE DATA TABLE WILL BE MODIFIED ONLY IF THE MODIFY DATA TABLE OPTION HAS BEEN SELECTED.

ROUTINE 5 CHECKS THAT THE FIRST CARD FOLLOWING THE PROGRAM DECK IS A BLANK. THE ROUTINE IS USED TO PREVENT THE ACCIDENTAL PUNCHING OF ANOTHER PROGRAM S CARDS.

IN THE NORMAL MODE OF OPERATION, ROUTINES 5, 1, AND 2 ARE EXECUTED SEQUENTIALLY.

5.2 PROGRAM CONTROL OPTIONS DESCRIPTION

5.2.1 BYPASS ERROR MESSAGE OPTION

THIS OPTION WILL BYPASS THE ERROR PRINTOUT ROUTINE, EXCEPT FOR PRINTOUTS E2F01, AND E2F02. THIS OPTION IS USED MAINLY FOR SCOPING, WHEN IT IS DESIRED TO RUN PROGRAM WITHOUT STOPPING AFTER AN ERROR (PROGRAM WILL NORMALLY STOP AT WAIT 1 AFTER ANY PRINTOUT).

5.2.2 SINGLE CARD WAIT OPTION

THIS OPTION WILL CAUSE PROGRAM TO STOP AFTER EACH CARD IS EITHER PUNCHED, READ, OR FED. TO CONTINUE, DEPRESS PROG START KEY.

5.2.3 MODIFY DATA TABLE OPTION

WHEN THIS OPTION IS SELECTED, THE DATA IN THE DATA TABLE IS REPLACED BY DATA IN CARD FOLLOWING LAST CARD OF PROGRAM DECK. THIS OPTION IS USED WHEN IT IS DESIRED TO PUNCH OR READ A SPECIFIC DATA PATTERN, SUCH AS ONE THAT HAS CAUSED FAILURES BEFORE.

5.3 PROGRAM TEST OPTIONS DESCRIPTION

5.3.1 FEED ONLY OPTION

WHEN THIS OPTION IS SELECTED, THE PROGRAM WILL FEED CARDS AND CHECK THE END OP DSW ONLY. THE OPTION IS USED FOR SCOPING READ CELL DURATION, EMITTER TIMING, ETC.

5.3.2 READ ONLY OPTION

THIS OPTION IS USED WHEN IT IS DESIRED TO READ CARDS ONLY. WHEN HOPPER BECOMES EMPTY, IT CAN BE REFILLED WITH PUNCHED CARDS AND READER MADE READY. DEPRESSING PROG. START KEY WILL CAUSE PROGRAM TO CONTINUE. THE PUNCHED CARDS TO BE READ MUST MATCH THE DATA TABLE DATA OR ERRORS WILL BE INDICATED.

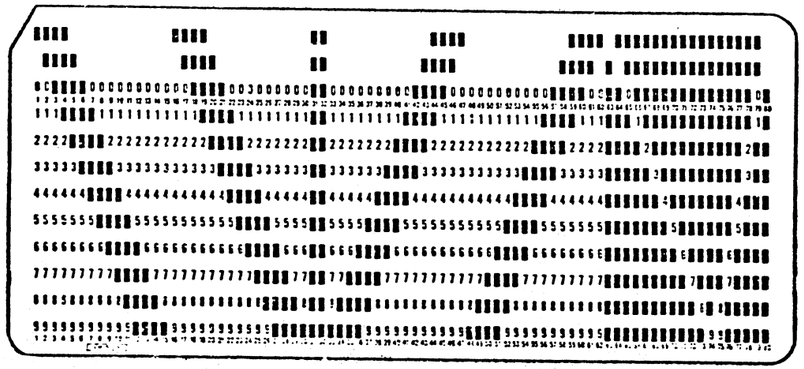
5.3.3 PUNCH ONLY OPTION

USED WHEN ONLY PUNCHING IS DESIRED.

6. APPENDIX

6.1 SAMPLE OUTPUT

THE FIGURE BELOW SHOWS CARD PUNCHED FROM PROGRAM'S INTERNAL DATA TABLE.



```
*****         1442/1130  TIMING  DIAGNOSTIC  *****   32F10000
* * * * *  *  * * * * * * * * * * * * * * * * *     32F00010
*                                                    32F00020
*     LOAD -  MONITOR  +  1442 TEST  +  BLANK CDS *  32F00030
*                                                    32F00040
*                                                    32F00050
***** ****     BIT  SWITCH  SETTINGS     **** *****  32F00060
* * * * *  *  * * * * * * * * * * * * * * * * *     32F00070
*                                                    32F00080
* 1   00A0     LOAD  AND  GO  MODE - PUNCH  DELAYED  32F00090
*              UNTIL  LAST  CARD , THEN  READ        32F00100
*              PUNCHED  CARDS.                       32F00110
* * * * *  *  * * * * * * * * * * * * * * * * *     32F00120
*                                                    32F00130
* 1   0020     SELECT  TEST  OPTION  MODE            32F00140
*                                                    32F00150
* 2   AFCX     SPECIFY MOD NUMBER, PRESS INT REQ     32F00160
*                                                    32F00170
*       6           MOD 6                            32F00180
*                                                    32F00190
*       7           MOD 7                            32F00200
*                                                    32F00210
* 3   2FXX     SELCT CONTROL OPTION, PRESS INT REQ   32F00220
*                                                    32F00230
*       80          MODIFY  DATA  TABLE (ONE CARD)   32F00240
*                                                    32F00250
*       40          BYPASS PUNCH DELAY               32F00260
*                                                    32F00270
*       08          SINGLE  CARD  WAIT               32F00280
*                                                    32F00290
*       04          BYPASS  ERROR  PRINT   ROUTINE   32F00300
*                                                    32F00310
*                                                    32F00320
* 4   6F0X     SELECT TEST OPTION, PRESS INT REQ     32F00330
*                                                    32F00340
*       C6          PUNCH  THEN  READ                32F00350
*                                                    32F00360
*       04          PUNCH  ONLY                      32F00370
*                                                    32F00380
*       02          READ  ONLY                       32F00390
*                                                    32F00400
*       01          FEED  ONLY                       32F00410
*                                                    32F00420
*                                                    32F00430
* 5   C080     EXECUTE , PRESS  INT                  32F00440
*                                                    32F00450
* * * * *  *  * * * * * * * * * * * * * * * * *     32F00460
*                                                    32F00470
* 6   40AF     PROGRAM  RESELECT  AND  RESTART       32F00480
*                                                    32F00490
* * * * *  *  * * * * * * * * * * * * * * * * *     32F00500
*                                                    32F00510
0000               ORG     *+1500                    32F00520
*                                                    32F00530
*                          PROG TRANSFER VECTOR      32F00540
*                                                    32F00550
0010               BEGIN EQU    16                   32F00560
0011               START EQU    BEGIN+1              32F00570
0012               ERROR EQU    START+1              32F00580
0013               LOG   EQU    ERROR+1              32F00590
0014               HALT  EQU    LOG+1                32F00600
0015               END   EQU    HALT+1               32F00610
*                                                    32F00620
0016               LOGBY EQU    END+1                32F00630
0017               RSTKB EQU    LOGBY+1              32F00640
0018               ETRAP EQU    RSTKB+1              32F00650
0019               AQ5A  EQU    ETRAP+1              32F00660
*                                                    32F00670
```



```
0028               ILO   EQU    40                   32F00680
0029               IL1   EQU    ILO+1                32F00690
002A               IL2   EQU    IL1+1                32F00700
002B               IL3   EQU    IL2+1                32F00710
002C               IL4   EQU    IL3+1                32F00720
0030               ILCRP EQU    IL4+4                32F00730
0032               ILPAT EQU    ILCRP+2              32F00740
0033               RQTY  EQU    ILPAT+1              32F00750
0034               RQKB  EQU    RQTY+1               32F00760
0035               SVKB  EQU    RQKB+1               32F00770
0036               ILIR  EQU    SVKB+1               32F00780
                   *                                 32F00790
0037               AEND  EQU    ILIR+1               32F00800
003B               AIVD  EQU    AEND+4    INVLD      32F00810
003E               ALD   EQU    AIVD+3    LD         32F00820
0041               ANINT EQU    ALD+3     NO INTRPT  32F00830
0044               AINT  EQU    ANINT+3   INTRPT     32F00840
004B               ANRDY EQU    AINT+7    NRDY       32F00850
004C               ARDY  EQU    ANRDY+1   RDY        32F00860
0050               ASWS  EQU    ARDY+4    SWS        32F00870
0054               ASB   EQU    ASWS+4    S/B        32F00880
0058               ADSCT EQU    ASB+4                32F00890
005A               ASCT  EQU    ADSCT+2   SELCT      32F00900
0060               AWAS  EQU    ASCT+6    WAS        32F00910
006A               EAQO  EQU    AWAS+10              32F00920
                   * * * * *  *  * * * * * * * * * * * * * * * * *  32F00930
                   *****         PROGRAM  CONTROL  TABLE        ***** 32F00940
                   *                                 32F00950
05DC 0  2F00       PID   DC     /2F00     PROGRAM  IDENTIFICATION  32F00960
05DD 0  0000             DC     /0000     ROUTINE                  32F00970
05DE 0  0000       BSW0  DC     /0000     BIT  SW 0 - CONTROL  OPT 32F00980
05DF 0  0006       BSW1  DC     /0006     BIT  SW 1 - TEST  SEL    32F00990
05E0 0  0000       BSW2  DC     /0000     BIT  SW 2 - MODEL 6/7    32F01000
05E1 0  0000       BSW3  DC     /0000     BIT  SW 3                32F01010
05E2 1  05EC             DC     INITL     INITIAL  ADDRESS         32F01020
05E3 1  05E9             DC     GO        LOOP  ADDRESS            32F01030
05E4 0  0000       MLSCF DC     /0000     MLSCF 1  TEST  BIT  SW    32F01040
05E5 0  0000       MLSC2 DC     /0000     MLSCF 2  MODIFY  DATA    32F01050
05E6 0  0000       MLSC3 DC     /0000     MLSCF 3  BLANK  CARD  CHK 32F01060
05E7 0  0000       MLSC4 DC     /0000     MLSCF 4  MAIN  ROUTINE   32F01070
05E8 0  FFFF             DC     /FFFF     TERM                     32F01080
                   * * * * *  *  * * * * * * * * * * * * * * * * *  32F01090
                   *                                 32F01100
05E9 00 44800010   GO    BSI  I BEGIN     MONITOR  BEGIN  CALL     32F01110
05EB 1  05DC             DC     PID                                 32F01120
                   *                                 32F01130
                   *                                 32F01140
                   * * * * *  *  * * * * * * * * * * * * * * * * *  32F01150
                   *****         INITIALIZATION  RTN          ***** 32F01160
                   * * * * *  *  * * * * * * * * * * * * * * * * *  32F01170
                   *                                 32F01180
05EC 0  0000       INITL DC     /0000     ICTR                     32F01190
05ED 01 670005F8         LDX  L3 TEST      STORE  TEST  ADDR       32F01200
05EF 0  6BF4             STX   3 MLSCF     IN  MLSCF 1              32F01210
                   *                                 32F01220
05F0 01 670006AF         LDX  L3 BLANK     STORE  BLANK  CARD  CHK  32F01230
05F2 0  6BF3             STX   3 MLSC3     IN  MLSCF 3              32F01240
05F3 00 67000000         LDX  L3 /0000     CLEAR  BLANK  FLAG       32F01250
05F5 0  6B50             STX   3 BLFLG                              32F01260
                   *                                 32F01270
05F6 01 4C8005EC         BSC  I INITL      RETURN  TO  MONITOR      32F01280
                   *                                 32F01290
                   *                                 32F01300
                   *****         TEST  BIT  SWITCH  ROUTINE   ***** 32F01310
                   * * * * *  *  * * * * * * * * * * * * * * * * *  32F01320
                   *                                 32F01330
05F8 0  C0E7       TEST  LD     BSW2      LD FUNC 2 SWS            32F01340
05F9 01 4C200606         BSC  L TEST2,Z   BR IF SW 2 ENTRY          32F01350
```

1442 TIMING TEST

```
                   *                                                 32F01360
05FB 00 44800013         BSI  I  LOG        LOG ENTER MOD            32F01370
05FD 1  088F             DC      MSGM       NUMBER MESSAGE           32F01380
05FE 1  0601             DC      TEST1                               32F01390
05FF 0  0000             DC      0000                                32F01400
0600 0  3000             WAIT               WAIT FOR SW ENTRY        32F01410
                   *                                                 32F01420
0601 01 670005F8   TEST1 LDX  L3 TEST       SET TO CHECK AGAIN       32F01430
0603 0  6BE0             STX   3 MLSCF      FOR SW 2 ENTRY           32F01440
0604 00 4C800011         BSC  I  START                               32F01450
                   *                                                 32F01460
0606 01 4C040618   TEST2 BSC  L  TEST3,E    BR IF MOD 7              32F01470
0608 00 67002968         LDX  L3 /2968      SET  PUNCH  MIN          32F01480
060A 01 6F000659         STX  L3 PMIN+1     FOR 10,600 MICRO SEC     32F01490
060C 00 67003818         LDX  L3 /3818      SET  PUNCH  MAX          32F01500
060E 01 6F00065D         STX  L3 PMAX+1     FOR 14,360 MICRO SEC     32F01510
0610 00 6700036B         LDX  L3 /036B      SET  READ  MIN           32F01520
0612 01 6F000675         STX  L3 RMIN+1     FOR  875 MICRO SEC       32F01530
0614 00 67000822         LDX  L3 /0822      SET  READ  MAX           32F01540
0616 01 6F000679         STX  L3 RMAX+1     FOR 2850 MICRO SEC       32F01550
                   *                                                 32F01560
0618 00 65000000   TEST3 LDX  L1 /0000      RESET  ERROR  FLAG       32F01570
061A 00 67000000         LDX  L3 /0000      RESET  INDEX  REG 3      32F01580
                   *                                                 32F01590
061C 0  C0C1             LD      BSW0       LD FUNC 0 SWS            32F01600
061D 0  1802             SRA     2          SHIFT TO BYPASS BIT      32F01610
061E 0  4804             BSC     E          SKIP  IF  NO  BYPASS  BIT 32F01620
061F 0  7101             MDX   1 1          ADD  BIT  IN  ERROR  FLAG 32F01630
0620 01 6D0007B5         STX  L1 ERFLG      STORE BYPASS BIT OR CLEAR 32F01640
                   *                                                 32F01650
0622 0  1801             SRA     1          SHIFT  TO  SINGLE  CARD  32F01660
0623 0  4804             BSC     E          SKIP  IF  NOT  SINGLE  CD 32F01670
0624 0  7301             MDX   3 1          ADD  BIT  TO  INDEX 3    32F01680
0625 01 6F0007D5         STX  L3 LGFLG      STORE  1/0  IN  LOG  FLAG 32F01690
                   *                                                 32F01700
0627 00 67000000         LDX  L3 /0000      LOAD  PUNCH  DELAY  CONST 32F01710
0629 0  1803             SRA     3          SHIFT  TO  DELAY  PCH    32F01720
062A 0  4804             BSC     E          SKIP  IF  NO  DELAY      32F01730
062B 0  6300             LDX   3 0          CLEAR  DELAY             32F01740
062C 0  6B18             STX   3 DELAY      STORE  CONST/0  IN  DELAY 32F01750
                   *                                                 32F01760
062D 01 6700069B         LDX  L3 NDRD       LOAD  MODIFY  DATA  ADDR 32F01770
062F 0  1901             SRA     1          SHIFT  TO  MODIFY  DATA  32F01780
0630 0  4804             BSC     E          SKIP  IF  NO  MODIFY     32F01790
0631 0  6BB3             STX   3 MLSC2      STORE  ADDR/ZERO         32F01800
                   *                                                 32F01810
0632 0  C0AC             LD      BSW1       LD FUNC 1 SWS            32F01820
0633 01 4C0807E1         BSC  L  ERR2,+     BRANCH IF NO TEST SW SET 32F01830
                   *                                                 32F01840
0635 01 6700068F         LDX  L3 FEED       LOAD  FEED  ADDR         32F01850
0637 0  4804             BSC     E          SKIP  IF  NO  FEED       32F01860
0638 0  6BAE             STX   3 MLSC4      STORE  FEED  ADDR        32F01870
                   *                                                 32F01880
0639 01 67000673         LDX  L3 READ       LOAD  READ  ADDR         32F01890
063B 0  1801             SRA     1          SHIFT  TO  READ          32F01900
063C 0  4804             BSC     E          SKIP  IF  NO  READ       32F01910
063D 0  6BA9             STX   3 MLSC4      STORE  READ  ADDR        32F01920
                   *                                                 32F01930
063E 01 67000654         LDX  L3 PUNCH      LOAD  PUNCH  ADDR        32F01940
0640 0  1801             SRA     1          SHIFT  TO  PUNCH         32F01950
0641 0  4804             BSC     E          SKIP  IF  NO  PUNCH      32F01960
0642 0  6BA4             STX   3 MLSC4      STORE  PUNCH  ADDR       32F01970
                   *                                                 32F01980
0643 00 4C800011         BSC  I  START      RETURN  TO  MONITOR      32F01990
                   *                                                 32F02000
0645 0  0000       DELAY DC      /0000                               32F02010
                   *                                                 32F02020
0646 0  0000       BLFLG DC      /0000      CARD  NOT  BLANK  FLAG   32F02030
```


1442 TIMING TEST

```
                   *                                                      32F02040
                   *****        1442  DSW  READY  RTN          *****      32F02050
                   * * * * *  *  * * * * * * * * * * * * * * * * *        32F02060
                   *                                                      32F02070
0647 0  0000       READY DC      /0000      ICTR                          32F02080
0648 01 0C000780         XIO  L  SNSRY      SENSE  DSW                    32F02090
064A 01 4C20064E         BSC  L  NOTRY,Z    BRANCH  IF  DSW  NOT  ZERO    32F02100
064C 01 4C800647         BSC  I  READY                                    32F02110
064E 00 67002000   NOTRY LDX  L3 /2000                                    32F02120
0650 01 6F0007D5         STX  L3 LGFLG      SET BIT 2 IN LOG FLAG         32F02130
0652 01 4C0007B6         BSC  L  LGSCN                                    32F02140
                   *                                                      32F02150
                   *****        START PUNCH - RTN 1            *****      32F02160
                   * * * * *  *  * * * * * * * * * * * * * * * * *        32F02170
                   *                                                      32F02180
0654 0  40F2       PUNCH BSI     READY      GO  TO  DSW  READY            32F02190
                   *                                                      32F02200
0655 0  C0F0             LD      BLFLG      LOAD  BLANK  CARD  FLAG       32F02210
0656 01 4C2007DD         BSC  L  ERR1,Z     BRANCH  IF  NOT  ZERO         32F02220
                   *                                                      32F02230
0658 00 670014B4   PMIN  LDX  L3 /14B4      MOD 7  PUNCH  COL  MIN        32F02240
065A 01 6F000885         STX  L3 CLMIN           5300 US                  32F02250
                   *                                                      32F02260
065C 00 67001C0C   PMAX  LDX  L3 /1C0C      MOD 7  PUNCH  COL  MAX        32F02270
065E 01 6F00087D         STX  L3 CLMAX           7180 US                  32F02280
                   *                                                      32F02290
0660 00 67004003         LDX  L3 /4003      STORE  PCH  RESP  DSW  S/B    32F02300
0662 01 6F000865         STX  L3 DSWC+1                                   32F02310
                   *                                                      32F02320
0664 01 670006D0         LDX  L3 PCCOL      INT  LVL 0                    32F02330
0666 00 6F000028         STX  L3 ILO        ENTRY                         32F02340
                   *                                                      32F02350
0668 01 67000728         LDX  L3 OPEND      INT  LVL 4                    32F02360
066A 00 6F000030         STX  L3 ILCRP           ENTRY                    32F02370
                   *                                                      32F02380
066C 00 67000001         LDX  L3 /0001      STORE  RTN  NO 1              32F02390
066E 01 6F0005DD         STX  L3 PID+1                                    32F02400
                   *                                                      32F02410
0670 01 0C000784         XIO  L  STPCH      START  PUNCH                  32F02420
0672 0  704C             MDX     CLEAR      GO  TO  CLEAR                 32F02430
                   *                                                      32F02440
                   *****        START READ - RTN 2             *****      32F02450
                   * * * * *  *  * * * * * * * * * * * * * * * * *        32F02460
                   *                                                      32F02470
0673 0  40D3       READ  BSI     READY      GO  TO  DSW  READY            32F02480
                   *                                                      32F02490
0674 00 670002BC   RMIN  LDX  L3 /02BC      MOD 7  READ  COL  MIN         32F02500
0676 01 6F000885         STX  L3 CLMIN           700 USEC                 32F02510
                   *                                                      32F02520
0678 00 670009C4   RMAX  LDX  L3 /09C4      MOD 7  READ  COL  MAX         32F02530
067A 01 6F00087D         STX  L3 CLMAX           2500 USEC                32F02540
                   *                                                      32F02550
067C 00 67008003         LDX  L3 /8003      STORE  COL  DSW  S/B          32F02560
067E 01 6F000865         STX  L3 DSWC+1                                   32F02570
                   *                                                      32F02580
0680 01 670006DE         LDX  L3 RDCOL      INTERRUPT  LVL 0              32F02590
0682 00 6F000028         STX  L3 ILO        ENTRY                         32F02600
                   *                                                      32F02610
0684 01 67000728         LDX  L3 OPEND      INT  LVL  4                   32F02620
0686 00 6F000030         STX  L3 ILCRP           ENTRY                    32F02630
                   *                                                      32F02640
0688 00 67000002         LDX  L3 /0002      STORE  RTN  NO 2              32F02650
068A 01 6F0005DD         STX  L3 PID+1                                    32F02660
                   *                                                      32F02670
068C 01 0C000782         XIO  L  STRD       START  READ                   32F02680
068E 0  7030             MDX     CLEAR      GO  TO  CLEAR                 32F02690
                   *                                                      32F02700
                   *****        START FEED - RTN 3             *****      32F02710
```

```
                     * * * * *  * * * * * * * * * * * * * * * * * *    32F02720
                     *                                                 32F02730
068F 0  4087         FEED  BSI     READY      GO  TO  DSW  READY       32F02740
0690 01 67000715           LDX  L3 FDEND      INT  LVL 4                32F02750
0692 00 6F000030           STX  L3 ILCRP           ENTRY                32F02760
                     *                                                 32F02770
0694 00 67000003           LDX  L3 /0003      STORE  RTN  NO 3          32F02780
0696 01 6F0005DD           STX  L3 PID+1                                32F02790
                     *                                                 32F02800
0698 01 0C000786           XIO  L  STFD       START  FEED               32F02810
069A 0  7024               MDX     CLEAR      GO  TO  CLEAR             32F02820
                     *                                                 32F02830
                     *****          START NEW DATA READ - RTN 4    *****32F02840
                     * * * * *  * * * * * * * * * * * * * * * * * *    32F02850
                     *                                                 32F02860
0698 0  40AB         NDRD  BSI     READY      GO  TO  DSW  READY       32F02870
069C 00 67008003           LDX  L3 /8003      STORE  RD  RESP  DSW  S/B 32F02880
069E 01 6F000865           STX  L3 DSWC+1                               32F02890
                     *                                                 32F02900
06A0 01 670006ED           LDX  L3 NDCOL      STORE  INTERRUPT  LVL 0   32F02910
06A2 00 6F000028           STX  L3 ILO        ENTRY  IN  MONITOR        32F02920
                     *                                                 32F02930
06A4 01 6700071D           LDX  L3 NDEND      STORE  INTERRUPT  LVL 4   32F02940
06A6 00 6F000030           STX  L3 ILCRP           ENTRY                32F02950
                     *                                                 32F02960
06A8 00 67000004           LDX  L3 /0004      STORE  RTN  NO 4          32F02970
06AA 01 6F0005DD           STX  L3 PID+1                                32F02980
                     *                                                 32F02990
06AC 01 0C000782           XIO  L  STRD       START  READ               32F03000
06AE 0  7010               MDX     CLEAR      GO  TO  CLEAR             32F03010
                     *                                                 32F03020
                     *****          START CHECK FOR BLANK CARD - RTN 5 **32F03030
                     * * * * *  * * * * * * * * * * * * * * * * * *    32F03040
                     *                                                 32F03050
06AF 0  4097         BLANK BSI     READY      GO  TO  DSW  READY       32F03060
                     *                                                 32F03070
0680 01 670006F5           LDX  L3 BLCOL      INT  LVL 0                32F03080
0682 00 6F000028           STX  L3 ILO        ENTRY                     32F03090
                     *                                                 32F03100
0684 01 67000718           LDX  L3 BLEND      INT  LVL 4                32F03110
0686 00 6F000030           STX  L3 ILCRP           ENTRY                32F03120
                     *                                                 32F03130
0688 00 67000005           LDX  L3 /0005      STORE  RTN 5              32F03140
068A 01 6F0005DD           STX  L3 PID+1                                32F03150
                     *                                                 32F03160
068C 01 0C000782           XIO  L  STRD       START READ                32F03170
068E 0  7000               MDX     CLEAR      GO  TO  CLEAR             32F03180
                     *                                                 32F03190
                     *****          TIMING  LOOP                  *****32F03200
                     * * * * *  * * * * * * * * * * * * * * * * * *    32F03210
                     *                                                 32F03220
068F 00 65000000     CLEAR LDX  L1 /0000      CLEAR  ERROR  FLAG        32F03230
06C1 00 66000000           LDX  L2 /0000      CLEAR  COLUMN  COUNT      32F03240
06C3 0  2000         TIMER LDS     0          CLEAR  CARRY              32F03250
06C4 0  C807               LDD     CONST      LOAD  TIME  CONSTANT      32F03260
06C5 0  8808         ADD   AD      CONST+2    INCREMENT  UNTIL  INTRPT  32F03270
06C6 0  100A               SLA     10         TEST  4 SEC  LIMIT        32F03280
06C7 01 4C0207E5           BSC  L  ERR3,C     BRANCH  ON  CARRY         32F03290
06C9 0  180A               SRA     10                                   32F03300
06CA 0  70FA               MDX     ADD                                  32F03310
                     *                                                 32F03320
06CC    0000               BSS  E  0                                    32F03330
06CC 0  0000         CONST DC      /0000                                32F03340
06CD 0  012C               DC      /012C      TIMING CONST 300 US       32F03350
06CE 0  0000               DC      /0000                                32F03360
06CF 0  0022               DC      /0022      TIMING  CONST  34 US      32F03370
                     *                                                 32F03380
                     *                                                 32F03390
```



```
                     * * * * *  * * * * * * * * * * * * * * * * * *    32F03400
                     *****          COLUMN  INTERRUPT - PUNCH      *****32F03410
                     * * * * *  * * * * * * * * * * * * * * * * * *    32F03420
                     *                                                 32F03430
06D0 0  0000         PCCOL DC      /0000      ICTR  FROM  MON          32F03440
06D1 0  402D               BSI     CMCOL      GO  TO  COMMON  RTN     32F03450
                     *                                                 32F03460
06D2 01 4C2807E9           BSC  L  ERR4,+Z    BRANCH  IF  DSW  ERROR    32F03470
                     *                                                 32F03480
06D4 01 67800645           LDX  I3 DELAY      LOAD  PUNCH  DELAY  AND   32F03490
06D6 0  73FF         DLPCH MDX   3 -1         DECREMENT  UNTIL  ZERO   32F03500
06D7 0  70FE               MDX     DLPCH      THEN  SKIP                32F03510
                     *                                                 32F03520
06D8 01 7401078C           MDX  L  COLPC,1    INCR  PUNCH  ADDR         32F03530
06DA 01 0C00078C           XIO  L  COLPC      PUNCH  COLUMN  FROM  DATA 32F03540
06DC 01 4C4006C3           BOSC L  TIMER      BRANCH  OUT  OF  INT      32F03550
                     *                                                 32F03560
                     *****          COLUMN  INTERRUPT - READ       *****32F03570
                     * * * * *  * * * * * * * * * * * * * * * * * *    32F03580
                     *                                                 32F03590
06DE 0  0000         RDCOL DC      /0000      ICTR  FROM  MON          32F03600
06DF 0  401F               BSI     CMCOL      GO  TO  COMMON  RTN     32F03610
                     *                                                 32F03620
06E0 01 4C2807EA           BSC  L  ERR4+1,+Z  BRANCH  IF  DSW  ERROR    32F03630
06E2 01 0C00078A           XIO  L  COLRD      READ  COLUMN              32F03640
06E4 01 C4000985           LD   L  RDATA                                32F03650
06E6 01 F6000985           EOR  L2 RDATA      COMPARE  WITH  DATA  TBL  32F03660
06E8 0  1804               SRA     4          SHIFT  OUT  LAST  PUNCH  BIT 32F03670
06E9 01 4C2007FB           BSC  L  ERR5,Z     BRANCH  IF  COMPARE  NG   32F03680
06EB 01 4C4006C3           BOSC L  TIMER      BRANCH  OUT  OF  INT      32F03690
                     *                                                 32F03700
                     *****          COLUMN  INTERRUPT - MODIFY  DATA  ** 32F03710
                     * * * * *  * * * * * * * * * * * * * * * * * *    32F03720
                     *                                                 32F03730
06ED 0  0000         NDCOL DC      /0000      ICTR  FROM  MON          32F03740
06EE 0  4010               BSI     CMCOL      GO  TO  COMMON  RTN     32F03750
06EF 01 7401078A           MDX  L  COLRD,1    INCR  COLUMN  READ  ADDR  32F03760
06F1 01 0C00078A           XIO  L  COLRD      READ  COLUMN  INTO  DATA  32F03770
06F3 01 4C4006C3           BOSC L  TIMER      BRANCH  OUT  OF  INT      32F03780
                     *                                                 32F03790
                     *****          COLUMN  INTERRUPT - READ BLANK    ** 32F03800
                     * * * * *  * * * * * * * * * * * * * * * * * *    32F03810
                     *                                                 32F03820
06F5 0  0000         BLCOL DC      /0000                                32F03830
06F6 01 0C000788           XIO  L  SNCOL      SENSE  DSW  -  RESET      32F03840
06F8 01 0C00078A           XIO  L  COLRD      READ  COLUMN              32F03850
06FA 01 74000985           MDX  L  RDATA      SKIP  IF  COLUMN  BLANK   32F03860
06FC 0  7201               MDX   2 1          SET  NOT  BLANK  SW       32F03870
06FD 01 4C4006C3           BOSC L  TIMER      BRANCH  OUT  OF  INT      32F03880
                     *                                                 32F03890
                     *****          COMMON  COLUMN  INTERRUPT  RTN  **** 32F03900
                     * * * * *  * * * * * * * * * * * * * * * * * *    32F03910
                     *                                                 32F03920
06FF 0  0000         CMCOL DC      /0000      ICTR                      32F03930
0700 0  7201               MDX   2 1          INCR  COLUMN  CTR         32F03940
0701 00 CC80006A           LDD   I EAQO       LOAD  TIME                32F03950
0703 0  1090               SLT     16                                   32F03960
0704 01 D6000907           STO  L2 TIME       STORE  TIMER  COUNT       32F03970
                     *                                                 32F03980
0706 01 0C000788           XIO  L  SNCOL      SENSE  DSW  -  RESET  RESP 32F03990
0708 01 D4000864           STO  L  DSWC       STORE  DSW  WAS           32F04000
070A 01 F4000865           EOR  L  DSWC+1     COMPARE                   32F04010
070C 01 E4000766           AND  L  MASK+1     MASK  OUT  LAST  CARD     32F04020
070E 01 4C20080D           BSC  L  ERR6,Z     BRANCH  IF  NG            32F04030
                     *                                                 32F04040
                     *                                                 32F04050
0710 01 C4000864     TSTER LD   L  DSWC       LOAD  DSW                 32F04060
0712 0  1002               SLA     2          SHIFT  ERROR  BIT         32F04070
```

```
0713 01 4C8006FF          BSC  I  CMCOL      RETURN  TO  COL  RTN          32F04080
                          *                                               32F04090
                          * * * * *  *  * * * * * * * * * * * * * * * *   32F04100
                          *****          END  OP  INT - FEED          *****32F04110
                          * * * * *  *  * * * * * * * * * * * * * * * *   32F04120
                          *                                               32F04130
0715 0  0000              FDEND DC       /0000       ICTR  FROM  MON      32F04140
0716 0  4029                    BSI      CMEND       GO  TO  COMMON  RTN  32F04150
                          *                                               32F04160
0717 0  7020                    MDX      BREND       GO  TO  BRANCH  END  32F04170
                          *                                               32F04180
                          *****          END  OP  INT - BLANK CARD    *****32F04190
                          * * * * *  *  * * * * * * * * * * * * * * * *   32F04200
                          *                                               32F04210
0718 0  0000              BLEND DC       /0000                            32F04220
0719 01 6E000646                STX  L2  BLFLG       STORE  BLANK  FLAG   32F04230
071B 0  4024                    BSI      CMEND       GO TO COMMON RTN     32F04240
                          *                                               32F04250
071C 0  7018                    MDX      BREND                            32F04260
                          *                                               32F04270
                          *****          END  OP  INT - MODIFY  DATA  *****32F04280
                          * * * * *  *  * * * * * * * * * * * * * * * *   32F04290
                          *                                               32F04300
071D 0  0000              NDEND DC       /0000       ICTR  FROM  MONITOR  32F04310
071E 01 740809D5                MDX  L   RDATA+80,8 ADD  LAST  PUNCH  BIT 32F04320
                          *                                               32F04330
0720 01 C400058E                LD   L   BSWO        MASK  OUT  MODIFY  BIT 32F04340
0722 01 E4000765                AND  L   MASK                             32F04350
0724 01 D400058E                STO  L   BSWO                             32F04360
                          *                                               32F04370
0726 0  4019                    BSI      CMEND       GO  TO  COMMON  RTN  32F04380
                          *                                               32F04390
0727 0  7008                    MDX      LDCOL       GO  TO  COL  COUNT  CHK 32F04400
                          *                                               32F04410
                          *****          END  OP  INT - READ  AND  PUNCH  *** 32F04420
                          * * * * *  *  * * * * * * * * * * * * * * * *   32F04430
                          *                                               32F04440
0728 0  0000              OPEND DC       /0000       ICTR  FROM  MONITOR  32F04450
0729 0  4016                    BSI      CMEND       GO  TO  COMMON  RTN  32F04460
                          *                                               32F04470
072A 0  72FF              MAXCK MDX   2  -1          DECREMENT  COLUMN  COUNT 32F04480
072B 0  7028                    MDX      CHK1              SKIP  WHEN  ZERO 32F04490
                          *                                               32F04500
072C 01 6680088C          MINCK LDX   I2 COLCT       RESTORE  COL  COUNT  32F04510
                          *                                               32F04520
072E 0  72FF              CLCHK MDX   2  -1          DECR  COL  COUNT - SKIP 32F04530
                          *                          WHEN  COUNT = 1/0    32F04540
072F 0  702E                    MDX      CHKTM       GO  TO  COL  TIME  CHECK 32F04550
                          *                                               32F04560
0730 01 C400088C          LDCOL LD   L   COLCT       LOAD  COLUMN  COUNT   32F04570
0732 01 4C080819                BSC  L   ERR8,+      BRANCH  IF  COUNT = ZERO 32F04580
0734 01 9400088D                S    L   BIN80       SUB  80              32F04590
0736 01 4C200833                BSC  L   ERR11,Z     BRANCH  IF  CNT  NOT  80 32F04600
                          *                                               32F04610
0738 01 67000985          BREND LDX  L3  RDATA       RESET  READ 8 PUNCH  ADDR 32F04620
073A 01 6F00078A                STX  L3  COLRD                            32F04630
073C 01 6F00078C                STX  L3  COLPC                            32F04640
                          *                                               32F04650
073E 01 4C400792                BOSC L   ERSCN       BRANCH  OUT  OF  INT 32F04660
                          *                                               32F04670
                          *****          COMMON  END  OP  RTN         *****32F04680
                          * * * * *  *  * * * * * * * * * * * * * * * *   32F04690
                          *                                               32F04700
0740 0  0000              CMEND DC       /0000       ICTR                 32F04710
0741 01 6E00088C                STX  L2  COLCT       SAVE  COLUMN  COUNT  32F04720
                          *                                               32F04730
0743 01 0C000790                XIO  L   SNEND       SENSE  DSW - RESET  RESP 32F04740
0745 01 D400086C                STO  L   DSWE        STORE  DSW  WAS      32F04750
```



```
                          *                                               32F04760
0747 0  F020              CHK  EOR     NRDSW       CHK  READER  NOT  READY 32F04770
0748 01 4C180769                BSC  L   NRDY,+-     BRANCH  IF  NOT  READY 32F04780
                          *                                               32F04790
074A 01 C400086C                LD   L   DSWE        LOAD  DSW  WAS       32F04800
074C 0  1003                    SLA      3           SHIFT  TO  LAST  CARD 32F04810
074D 01 4C280771                BSC  L   LSTCD,+Z    BRANCH  TO  LAST  CARD 32F04820
                          *                                               32F04830
074F 01 C400086C                LD   L   DSWE        LOAD  DSW  WAS       32F04840
0751 01 F400086D                EOR  L   DSWE+1      COMPARE              32F04850
0753 01 4C200815                BSC  L   ERR7,Z      BRANCH  IF  NG       32F04860
                          *                                               32F04870
0755 01 4C800740                BSC  I   CMEND       RETURN  TO  END  OP  RTN 32F04880
                          *                                               32F04890
                          *****          COLUMN  TIME  CHECK          *****32F04900
                          * * * * *  *  * * * * * * * * * * * * * * * *   32F04910
                          *                                               32F04920
0757 01 C400087D          CHK1 LD   L   CLMAX       CHECK  HIGHEST  COL  TIME 32F04930
0759 01 960009D8                S    L2  TIME+1                            32F04940
075B 01 4C08081D                BSC  L   ERR9,+      BRANCH  IF  TOO  LONG 32F04950
075D 0  70CC                    MDX      MAXCK       REPEAT  FOR  NEXT  COL 32F04960
                          *                                               32F04970
075E 01 C60009D8          CHKTM LD   L2  TIME+1      CHECK  HIGHEST  COL  TIME 32F04980
0760 01 94000885                S    L   CLMIN                             32F04990
0762 01 4C080828                BSC  L   ERR10,+     BRANCH  IF  COL  TIME 32F05000
                          *                          TOO  SHORT           32F05010
0764 0  70C9                    MDX      CLCHK       REPEAT  FOR  NEXT  COL 32F05020
                          *                                               32F05030
0765 0  FF7F              MASK DC        /FF7F       MASK  BIT  8         32F05040
0766 0  EFFF                   DC        /EFFF       MASK  LAST  CARD  BIT 32F05050
0767 0  FFFB                   DC        /FFFB       MASK  BIT  13        32F05060
0768 0  0801              NRDSW DC       /0801       NOT  READY  DSW  MASK 32F05070
                          *                                               32F05080
                          *****          NOT  READY  ROUTINE          *****32F05090
                          * * * * *  *  * * * * * * * * * * * * * * * *   32F05100
                          *                                               32F05110
0769 01 678007D5          NRDY LDX   I3  LGFLG                            32F05120
076B 00 77002000                MDX  L3  /2000                            32F05130
076D 01 6F0007D5                STX  L3  LGFLG       SET  BIT  2  IN  LOG  FLAG 32F05140
076F 01 4C800740                BSC  I   CMEND       RETURN  TO  END  OP  RTN 32F05150
                          *                                               32F05160
                          *****          LAST  CARD  ROUTINE          *****32F05170
                          * * * * *  *  * * * * * * * * * * * * * * * *   32F05180
                          *                                               32F05190
0771 01 C40005DF          LSTCD LD   L   BSW1                             32F05200
0773 0  E0F3                    AND      MASK+2      MASK  OUT  PUNCH  RTN 32F05210
0774 01 D40005DF                STO  L   BSW1                             32F05220
                          *                                               32F05230
0776 01 0C000786                XIO  L   STFD        FEED  OUT  LAST  CARD 32F05240
                          *                                               32F05250
0778 01 678007D5                LDX  I3  LGFLG       ADD  BIT  1  TO  LOG  FLAG 32F05260
077A 00 77004000                MDX  L3  /4000                            32F05270
077C 01 6F0007D5                STX  L3  LGFLG                            32F05280
                          *                                               32F05290
077E 01 4C800740                BSC  I   CMEND       RETURN  TO  END  OP  RTN 32F05300
                          *                                               32F05310
                          *****          IOCC  TABLE                  *****32F05320
                          * * * * *  *  * * * * * * * * * * * * * * * *   32F05330
                          *                                               32F05340
0780    0000              SNSRY BSS  E   0                               32F05350
0780 0  0000                    DC       /0000                            32F05360
0781 0  1700                    DC       /1700                            32F05370
                          *                                               32F05380
0782 0  0000              STRD  DC       /0000                            32F05390
0783 0  1404                    DC       /1404                            32F05400
                          *                                               32F05410
0784 0  0000              STPCH DC       /0000                            32F05420
0785 0  1481                    DC       /1481                            32F05430
```

```
                *                                                       32F05440
0786 0  0000    STFD  DC      /0000                                     32F05450
0787 0  1402          DC      /1402                                     32F05460
                *                                                       32F05470
0788 0  0000    SNCOL DC      /0000                                     32F05480
0789 0  1701          DC      /1701                                     32F05490
                *                                                       32F05500
078A 1  0985    COLRD DC      RDATA                                     32F05510
078B 0  1200          DC      /1200                                     32F05520
                *                                                       32F05530
078C 1  0985    COLPC DC      RDATA                                     32F05540
078D 0  1100          DC      /1100                                     32F05550
                *                                                       32F05560
078E 1  0854    COLER DC      MSG4+5                                    32F05570
078F 0  1200          DC      /1200                                     32F05580
                *                                                       32F05590
0790 0  0000    SNEND DC      /0000                                     32F05600
0791 0  1702          DC      /1702                                     32F05610
                *                                                       32F05620
                *                                                       32F05630
                *****         ERROR  LOG  RTN                 *****     32F05640
                * * * * *  *  * * * * * * * * * * * * * * * * *        32F05650
                *                                                       32F05660
0792 00 C4000001 ERSCN LD   L 1         LOAD  INDEX  REG 1              32F05670
0794 0  E820          OR    ERFLG     COMBINE  ERROR  FLAGS            32F05680
0795 0  001F          STO   ERFLG                                       32F05690
0796 0  C01E    ERTST LD      ERFLG                                     32F05700
0797 01 4C040786      BSC   L LGSCN,E   BRANCH  IF  BYPASS  ERROR       32F05710
                *                                                       32F05720
0799 01 4C180786      BSC   L LGSCN,+-  BRANCH IF ERROR FLAG            32F05730
                *               IS  ZERO                                32F05740
079B 01 740107D5      MDX   L LGFLG,1   ADD  BIT  TO  LOG  FLAG         32F05750
079D 0  1001          SLA     1         TEST  FOR  ERROR  BIT           32F05760
079E 0  D016          STO     ERFLG                                     32F05770
079F 01 4C2807A9      BSC   L ERCAL,+Z  BRANCH  IF  ERROR               32F05780
                *                                                       32F05790
07A1 01 740807AB ERRET MDX  L MSGAD,8   INCR  MESSAGE  ADDRESS          32F05800
07A3 01 67000796      LDX   L3 ERTST    STORE RETURN ADDR               32F05810
07A5 01 6F0005E4      STX   L3 MLSCF                                    32F05820
07A7 00 4C800011      BSC   I  START     GO TO MONITOR                  32F05830
                *                                                       32F05840
07A9 00 44800012 ERCAL BSI  I  ERROR     MONITOR  ERROR  CALL           32F05850
07AB 1  0837    MSGAD DC      MSG1      MESSAGE  ADDRESS               32F05860
07AC 1  07AF          DC      BUSY      BUSY  RETURN                  32F05870
07AD 0  0000          DC      /0000                                     32F05880
07AE 0  70F2          MDX     ERRET     NORMAL  RETURN                  32F05890
                *                                                       32F05900
07AF 01 670007A9 BUSY LDX   L3 ERCAL     STORE  BUSY  RETURN  ADDR      32F05910
07B1 01 6F0005E4      STX   L3 MLSCF                                    32F05920
07B3 00 4C800011      BSC   I  START     RETURN  TO  MONITOR            32F05930
                *                                                       32F05940
07B5 0  0000    ERFLG DC      /0000     ERROR  FLAG                     32F05950
                *                                                       32F05960
                *****         END  CARD  LOG  RTN             *****     32F05970
                * * * * *  *  * * * * * * * * * * * * * * * * *        32F05980
                *                                                       32F05990
07B6 01 67000837 LGSCN LDX  L3 MSG1      RESET  CALL  ADDRESS           32F06000
07B8 0  6BF2          STX    3 MSGAD                                    32F06010
                *                                                       32F06020
07B9 0  C018          LD      LGFLG     TEST  LOG  FLAG  BIT 1         32F06030
07BA 01 67000899      LDX   L3 MSGLG    SET LAST CD MESS                32F06040
07BC 0  1001          SLA     1                                         32F06050
07BD 01 4C2807C8      BSC   L LGCAL,+Z  BRANCH  IF  LOG  BIT            32F06060
                *                                                       32F06070
07BF 01 67000894      LDX   L3 MSGNR    SET NRDY MESS                   32F06080
07C1 0  1001          SLA     1                                         32F06090
07C2 01 4C2807C8      BSC   L LGCAL,+Z  BR IF NRDY MESS                 32F06100
                *                                                       32F06110
```



```
07C4 0  1001          SLA     1         BRANCH  IF  ERRORS  OR        32F06120
07C5 01 4C2007D6      BSC   L WTRET,Z        SINGLE  CARD  BIT         32F06130
                *                                                       32F06140
07C7 0  700F          MDX     NEXT      GO  TO  NEXT                    32F06150
                *                                                       32F06160
07C8 0  6802    LGCAL STX    3 LGMSG    SET LOG MESS                    32F06170
07C9 00 44800013      BSI   I LOG       MONITOR  LOG  CALL             32F06180
07CB 1  0899    LGMSG DC      MSGLG     MESSAGE  ADDR                  32F06190
07CC 1  07CF          DC      LGBSY     BUSY  RETURN                   32F06200
07CD 0  8000          DC      /8000     RUN  SW                         32F06210
07CE 0  7007          MDX     WTRET     NORMAL  RETURN                  32F06220
                *                                                       32F06230
07CF 01 670007C8 LGBSY LDX  L3 LGCAL     STORE  BUSY  RETURN  ADDR      32F06240
07D1 01 6F0005E4      STX   L3 MLSCF                                    32F06250
07D3 00 4C800011      BSC   I  START     RETURN  TO  MONITOR            32F06260
                *                                                       32F06270
07D5 0  0000    LGFLG DC      /0000     LOG  FLAG                       32F06280
                *                                                       32F06290
                * * * * *  *  * * * * * * * * * * * * * * * * *        32F06300
                *                                                       32F06310
07D6 0  3001    WTRET WAIT    1         WAIT  FOR  OPERATOR  TO        32F06320
                *                             READY  1442               32F06330
                *                             PRESS  PROG  START        32F06340
07D7 01 67000618 NEXT LDX   L3 TEST3     END OF ROUTINE                  32F06350
07D9 01 6F0005E4      STX   L3 MLSCF        GO TO MONITOR               32F06360
07DB 00 4C800011      BSC   I  START        TO TEST FOR NEXT            32F06370
                *                           CARD                        32F06380
                * * * * *  *  * * * * * * * * * * * * * * * * *        32F06390
                *                                                       32F06400
                *****         ERROR  ROUTINES                 *****     32F06410
                * * * * *  *  * * * * * * * * * * * * * * * * *        32F06420
                *                                                       32F06430
07DD 00 65004000 ERR1 LDX   L1 /4000     PLACE  BIT 1  IN  ERROR        32F06440
07DF 01 4C000792      BSC   L ERSCN                                     32F06450
                *                                                       32F06460
07E1 00 65002000 ERR2 LDX   L1 /2000     PLACE  BIT 2  IN  ERROR        32F06470
07E3 01 4C000792      BSC   L ERSCN                                     32F06480
                *                                                       32F06490
07E5 00 75001000 ERR3 MDX   L1 /1000     ADD  BIT 3  TO ERROR           32F06500
07E7 01 4C000792      BSC   L ERSCN                                     32F06510
                *                                                       32F06520
07E9 0  72FF    ERR4  MDX    2 -1        DECR  COL  CTR                 32F06530
07EA 0  1000          NOP               NO  OP                          32F06540
                *                                                       32F06550
07EB 01 0C00078E      XIO   L COLER      READ  COLUMN  WAS              32F06560
07ED 01 C4000785      LD    L ERFLG                                     32F06570
07EF 0  E80A          OR      BIT4      ADD  BIT 4  TO  ERROR           32F06580
07F0 01 D4000785      STO   L ERFLG                                     32F06590
07F2 01 C6000985      LD    L2 RDATA    STORE  DATA  S/B               32F06600
07F4 01 D4000855      STO   L MSG4+6                                    32F06610
07F6 01 6E000856      STX   L2 MSG4+7   STORE  COL  COUNT               32F06620
07F8 01 4C4006C3      BOSC  L TIMER     BRANCH  OUT                     32F06630
07FA 0  0800    BIT4  DC      /0800                                     32F06640
                *                                                       32F06650
07FB 01 C4000785 ERR5 LD    L ERFLG     ADD  NIT 5  TO  ERROR           32F06660
07FD 0  E80E          OR      BIT5                                      32F06670
07FE 01 D4000785      STO   L ERFLG                                     32F06680
0800 01 67800985      LDX   I3 RDATA    STORE  DATA  WAS               32F06690
0802 01 6F00085C      STX   L3 MSG5+5                                   32F06700
0804 01 C6000985      LD    L2 RDATA    STORE  DATA  S/B               32F06710
0806 01 D400085D      STO   L MSG5+6                                    32F06720
0808 01 6E00085E      STX   L2 MSG5+7   STORE  COL  COUNT               32F06730
080A 01 4C4006C3      BOSC  L TIMER     BRANCH  OUT                     32F06740
080C 0  0400    BIT5  DC      /0400                                     32F06750
                *                                                       32F06760
080D 01 C4000785 ERR6 LD    L ERFLG     ADD  BIT 6  TO  ERROR           32F06770
080F 0  E804          OR      BIT6                                      32F06780
0810 01 D4000785      STO   L ERFLG                                     32F06790
```

```
0812 01 4C000710          BSC  L  TSTER     RETURN TO COLUMN RTN     32F06800
0814 0  0200      BIT6    DC       /0200                              32F06810
                  *                                                   32F06820
0815 00 75000100  ERR7    MDX  L1 /0100     ADD BIT 7 TO ERROR       32F06830
0817 01 4C800740          BSC  I  CMEND     RETURN TO END OP RTN     32F06840
                  *                                                   32F06850
0819 00 75000080  ERR8    MDX  L1 /0080     ADD BIT 8 TO ERROR       32F06860
081B 01 4C000738          BSC  L  BREND     RETURN TO END            32F06870
                  *                                                   32F06880
081D 00 75000040  ERR9    MDX  L1 /0040     ADD BIT 9 TO ERROR       32F06890
081F 01 C60009D8          LD   L2 TIME+1    STORE COL TIME WAS       32F06900
0821 01 D400087C          STO  L  MSG9+5                             32F06910
0823 0  7201              MDX   2 1                                  32F06920
0824 01 6E00087E          STX  L2 MSG9+7    STORE COL COUNT          32F06930
0826 01 4C00072C          BSC  L  MINCK     RETURN TO END OP         32F06940
                  *                                                   32F06950
0828 00 75000020  ERR10   MDX  L1 /0020     ADD BIT 10 TO ERROR      32F06960
082A 01 C60009D8          LD   L2 TIME+1    STORE COL TIME WAS       32F06970
082C 01 D4000884          STO  L  MSG10+5                            32F06980
082E 0  7201              MDX   2 1                                  32F06990
082F 01 6E000886          STX  L2 MSG10+7   STORE COL COUNT          32F07000
0831 01 4C000730          BSC  L  LDCOL     RETURN TO END OP RTN     32F07010
                  *                                                   32F07020
0833 00 75000010  ERR11   MDX  L1 /0010     ADD BIT 11 TO ERROR      32F07030
0835 01 4C000738          BSC  L  BREND     RETURN TO END            32F07040
                  *                                                   32F07050
                  *****          ERROR MESSAGES              *****    32F07060
                  * * * * *  *  * * * * * * * * * * * * * * * *      32F07070
                  *                                                   32F07080
0837 0  0000      MSG1    DC       /0000    WORD COUNT               32F07090
0838 0  0000              DC       /0000                             32F07100
0839 0  0001              DC       /0001    MSG ID                   32F07110
083A 1  088A              DC       ALPH1    CARD NOT BLANK           32F07120
083B 0  0000              DC       /0000                             32F07130
083C 0  0000              DC       /0000                             32F07140
083D 0  0000              DC       /0000                             32F07150
083E 0  0000              DC       /0000                             32F07160
                  *                                                   32F07170
083F 0  0000      MSG2    DC       /0000                             32F07180
0840 0  0000              DC       /0000                             32F07190
0841 0  0002              DC       /0002                             32F07200
0842 0  003B              DC       AIVD     ALPHA MSG 1 - INVLD      32F07210
0843 0  0050              DC       ASWS     ALPHA MSG - SWS          32F07220
0844 0  0000              DC       /0000                             32F07230
0845 0  0000              DC       /0000                             32F07240
0846 0  0000              DC       /0000                             32F07250
                  *                                                   32F07260
0847 0  0000      MSG3    DC       /0000                             32F07270
0848 0  0000              DC       /0000                             32F07280
0849 0  0003              DC       /0003                             32F07290
084A 0  0041              DC       ANINT    NO INTRPT                32F07300
084B 0  0000              DC       /0000                             32F07310
084C 0  0000              DC       /0000                             32F07320
084D 0  0000              DC       /0000                             32F07330
084E 0  0000              DC       /0000                             32F07340
                  *                                                   32F07350
084F 0  0003      MSG4    DC       /0003                             32F07360
0850 0  0000              DC       /0000                             32F07370
0851 0  0004              DC       /0004                             32F07380
0852 1  08AA              DC       WSBCL    -WAS,S/B,COL             32F07390
0853 1  08CA              DC       ALPH4    COLUMN ERROR             32F07400
0854 0  0000              DC       /0000    WAS                      32F07410
0855 0  0000              DC       /0000    S/B                      32F07420
0856 0  0000              DC       /0000    COL COUNT                32F07430
                  *                                                   32F07440
0857 0  0003      MSG5    DC       /0003                             32F07450
0858 0  0000              DC       /0000                             32F07460
0859 0  0005              DC       /0005                             32F07470
```



```
085A 1  08AA              DC       WSBCL    -WAS,S/B,COL             32F07480
085B 1  08D8              DC       ALPH5    READ COMPARE             32F07490
085C 0  0000              DC       /0000    WAS                      32F07500
085D 0  0000              DC       /0000    S/B                      32F07510
085E 0  0000              DC       /0000    COL COUNT                32F07520
                  *                                                   32F07530
085F 0  0002      MSG6    DC       /0002                             32F07540
0860 0  0000              DC       /0000                             32F07550
0861 0  0006              DC       /0006                             32F07560
0862 1  089E              DC       WASSB    WAS - S/B                32F07570
0863 1  08E6              DC       ALPH6    COL DSW                  32F07580
0864 0  0000      DSWC    DC       /0000    COL DSW WAS              32F07590
0865 0  0000              DC       /0000    S/B                      32F07600
0866 0  0000              DC       /0000                             32F07610
                  *                                                   32F07620
0867 0  0002      MSG7    DC       /0002                             32F07630
0868 0  0000              DC       /0000                             32F07640
0869 0  0007              DC       /0007                             32F07650
086A 1  089E              DC       WASSB    WAS - S/B                32F07660
086B 1  08EF              DC       ALPH7    END DSW                  32F07670
086C 0  0000      DSWE    DC       /0000    END OP DSW WAS           32F07680
086D 0  0800              DC       /0800    S/B                      32F07690
086E 0  0000              DC       /0000                             32F07700
                  *                                                   32F07710
086F 0  0000      MSG8    DC       /0000                             32F07720
0870 0  0000              DC       /0000                             32F07730
0871 0  0008              DC       /0008                             32F07740
0872 1  08F8              DC       ALPH8    NO COLUMN                32F07750
0873 0  0044              DC       AINT     INTRPT                   32F07760
0874 0  0000              DC       /0000                             32F07770
0875 0  0000              DC       /0000                             32F07780
0876 0  0000              DC       /0000                             32F07790
                  *                                                   32F07800
0877 0  0003      MSG9    DC       /0003                             32F07810
0878 0  0000              DC       /000C                             32F07820
0879 0  0009              DC       /0009                             32F07830
087A 1  08AA              DC       WSBCL    -WAS,S/B,COL             32F07840
0878 1  0902              DC       ALPH9    COL TIME LONG            32F07850
087C 0  0000              DC       /0000    COL TIME WAS             32F07860
087D 0  0000      CLMAX   DC       /0000    COL TIME MAX             32F07870
087E 0  0000              DC       /0000    COL COUNT                32F07880
                  *                                                   32F07890
087F 0  0003      MSG10   DC       /0003                             32F07900
0880 0  0000              DC       /0000                             32F07910
0881 0  0010              DC       /0010                             32F07920
0882 1  08AA              DC       WSBCL    -WAS,S/B,COL             32F07930
0883 1  0911              DC       ALP10    COL TIME SHORT           32F07940
0884 0  0000              DC       /0000    COL TIME WAS             32F07950
0885 0  0000      CLMIN   DC       /0000    COL TIME MIN             32F07960
0886 0  0000              DC       /0000    COL COUNT                32F07970
                  *                                                   32F07980
0887 0  0002      MSG11   DC       /0002                             32F07990
0888 0  0000              DC       /0000                             32F08000
0889 0  0011              DC       /0011                             32F08010
088A 1  089E              DC       WASSB    WAS - S/B                32F08020
088B 1  0921              DC       ALP11    COL CNT                  32F08030
088C 0  0000      COLCT   DC       /0000    COLUMN COUNT WAS         32F08040
088D 0  0050      BIN80   DC       /0050    S/B                      32F08050
088E 0  0000              DC       /0000                             32F08060
                  *                                                   32F08070
088F 0  0000      MSGM    DC       /0000                             32F08080
0890 0  0000              DC       /0000                             32F08090
0891 0  0001              DC       /0001                             32F08100
0892 1  094D              DC       ALPHM    ENTER MOD NUMBER 6/7     32F08110
0893 0  0000              DC       /0000                             32F08120
                  *                                                   32F08130
0894 0  0000      MSGNR   DC       /0000                             32F08140
0895 0  0000              DC       /0000                             32F08150
```

1442 TIMING TEST

```
0896 0  0002            DC      /0002                           32F08160
0897 1  092C            DC      ALPHN       NOT  READY - PRESS  START  32F08170
0898 0  0000            DC      /0000                           32F08180
                *                                               32F08190
0899 0  0000    MSGLG   DC      /0000                           32F08200
089A 0  0000            DC      /0000                           32F08210
089B 0  0003            DC      /0003                           32F08220
089C 1  095F            DC      ALPLG       LAST  CARD , LOAD  PCHED  32F08230
                *                               CARDS + START   32F08240
089D 0  0000            DC      /0000                           32F08250
                *                                               32F08260
                *****           ALPHA MESSAGES                  *****  32F08270
                * * * * * *  * * * * * * * * * * * * * * * * *  32F08280
                *                                               32F08290
089E 0  8400    WASSB   DC      /8400       -                   32F08300
089F 0  2100            DC      /2100                           32F08310
08A0 0  9200            DC      /9200       W                   32F08320
08A1 0  3E00            DC      /3E00       A                   32F08330
08A2 0  9A00            DC      /9A00       S                   32F08340
08A3 0  8000            DC      /8000       ,                   32F08350
08A4 0  9A00            DC      /9A00       S                   32F08360
08A5 0  BC00            DC      /BC00       /                   32F08370
08A6 0  1A00            DC      /1A00       B                   32F08380
08A7 0  2100            DC      /2100                           32F08390
08A8 0  8400            DC      /8400       -                   32F08400
08A9 0  FFFF            DC      /FFFF                           32F08410
                *                                               32F08420
08AA 0  8400    WSBCL   DC      /8400       -                   32F08430
08AB 0  2100            DC      /2100                           32F08440
08AC 0  9200            DC      /9200       W                   32F08450
08AD 0  3E00            DC      /3E00       A                   32F08460
08AE 0  9A00            DC      /9A00       S                   32F08470
08AF 0  8000            DC      /8000       ,                   32F08480
08B0 0  9A00            DC      /9A00       S                   32F08490
08B1 0  BC00            DC      /BC00       /                   32F08500
08B2 0  1A00            DC      /1A00       B                   32F08510
08B3 0  8000            DC      /8000       ,                   32F08520
08B4 0  1E00            DC      /1E00       C                   32F08530
08B5 0  5200            DC      /5200       O                   32F08540
08B6 0  5E00            DC      /5E00       L                   32F08550
08B7 0  2100            DC      /2100                           32F08560
08B8 0  8400            DC      /8400       -                   32F08570
08B9 0  FFFF            DC      /FFFF                           32F08580
                *                                               32F08590
08BA 0  1E00    ALPH1   DC      /1E00       C                   32F08600
08BB 0  3E00            DC      /3E00       A                   32F08610
08BC 0  6200            DC      /6200       R                   32F08620
08BD 0  3200            DC      /3200       D                   32F08630
08BE 0  2100            DC      /2100                           32F08640
08BF 0  7600            DC      /7600       N                   32F08650
08C0 0  5200            DC      /5200       O                   32F08660
08C1 0  9E00            DC      /9E00       T                   32F08670
08C2 0  2100            DC      /2100                           32F08680
08C3 0  1A00            DC      /1A00       B                   32F08690
08C4 0  5E00            DC      /5E00       L                   32F08700
08C5 0  3E00            DC      /3E00       A                   32F08710
08C6 0  7600            DC      /7600       N                   32F08720
08C7 0  5A00            DC      /5A00       K                   32F08730
08C8 0  0300            DC      /0300       LINE  FEED          32F08740
08C9 0  FFFF            DC      /FFFF                           32F08750
                *                                               32F08760
08CA 0  1E00    ALPH4   DC      /1E00       C                   32F08770
08CB 0  5200            DC      /5200       O                   32F08780
08CC 0  5E00            DC      /5E00       L                   32F08790
08CD 0  B200            DC      /B200       U                   32F08800
08CE 0  7200            DC      /7200       M                   32F08810
08CF 0  7600            DC      /7600       N                   32F08820
08D0 0  2100            DC      /2100                           32F08830
```


1442 TIMING TEST

```
08D1 0  3600            DC      /3600       E                   32F08840
08D2 0  6200            DC      /6200       R                   32F08850
08D3 0  6200            DC      /6200       R                   32F08860
08D4 0  5200            DC      /5200       O                   32F08870
08D5 0  6200            DC      /6200       R                   32F08880
08D6 0  0300            DC      /0300       LINE  FEED          32F08890
08D7 0  FFFF            DC      /FFFF                           32F08900
                *                                               32F08910
08D8 0  6200    ALPH5   DC      /6200       R                   32F08920
08D9 0  3600            DC      /3600       E                   32F08930
08DA 0  3E00            DC      /3E00       A                   32F08940
08DB 0  3200            DC      /3200       D                   32F08950
08DC 0  2100            DC      /2100                           32F08960
08DD 0  1E00            DC      /1E00       C                   32F08970
08DE 0  5200            DC      /5200       O                   32F08980
08DF 0  7200            DC      /7200       M                   32F08990
08E0 0  5600            DC      /5600       P                   32F09000
08E1 0  3E00            DC      /3E00       A                   32F09010
08E2 0  6200            DC      /6200       R                   32F09020
08E3 0  3600            DC      /3600       E                   32F09030
08E4 0  0300            DC      /0300       LINE  FEED          32F09040
08E5 0  FFFF            DC      /FFFF                           32F09050
                *                                               32F09060
08E6 0  1E00    ALPH6   DC      /1E00       C                   32F09070
08E7 0  5200            DC      /5200       O                   32F09080
08E8 0  5E00            DC      /5E00       L                   32F09090
08E9 0  2100            DC      /2100                           32F09100
08EA 0  3200            DC      /3200       D                   32F09110
08EB 0  9A00            DC      /9A00       S                   32F09120
08EC 0  9200            DC      /9200       W                   32F09130
08ED 0  0300            DC      /0300       LINE  FEED          32F09140
08EE 0  FFFF            DC      /FFFF                           32F09150
                *                                               32F09160
08EF 0  3600    ALPH7   DC      /3600       E                   32F09170
08F0 0  7600            DC      /7600       N                   32F09180
08F1 0  3200            DC      /3200       D                   32F09190
08F2 0  2100            DC      /2100                           32F09200
08F3 0  3200            DC      /3200       D                   32F09210
08F4 0  9A00            DC      /9A00       S                   32F09220
08F5 0  9200            DC      /9200       W                   32F09230
08F6 0  0300            DC      /0300       LINE  FEED          32F09240
08F7 0  FFFF            DC      /FFFF                           32F09250
                *                                               32F09260
08F8 0  7600    ALPH8   DC      /7600       N                   32F09270
08F9 0  5200            DC      /5200       O                   32F09280
08FA 0  2100            DC      /2100                           32F09290
08FB 0  1E00            DC      /1E00       C                   32F09300
08FC 0  5200            DC      /5200       O                   32F09310
08FD 0  5E00            DC      /5E00       L                   32F09320
08FE 0  B200            DC      /B200       U                   32F09330
08FF 0  7200            DC      /7200       M                   32F09340
0900 0  7600            DC      /7600       N                   32F09350
0901 0  FFFF            DC      /FFFF                           32F09360
                *                                               32F09370
0902 0  1E00    ALPH9   DC      /1E00       C                   32F09380
0903 0  5200            DC      /5200       O                   32F09390
0904 0  5E00            DC      /5E00       L                   32F09400
0905 0  2100            DC      /2100                           32F09410
0906 0  9E00            DC      /9E00       T                   32F09420
0907 0  2200            DC      /2200       I                   32F09430
0908 0  7200            DC      /7200       M                   32F09440
0909 0  3600            DC      /3600       E                   32F09450
090A 0  2100            DC      /2100                           32F09460
090B 0  5E00            DC      /5E00       L                   32F09470
090C 0  5200            DC      /5200       O                   32F09480
090D 0  7600            DC      /7600       N                   32F09490
090E 0  1600            DC      /1600       G                   32F09500
090F 0  0300            DC      /0300       LINE  FEED          32F09510
```

1442 TIMING TEST

```
0910 0  FFFF            DC      /FFFF                           32F09520
                        *                                       32F09530
0911 0  1E00    ALP10   DC      /1E00       C                   32F09540
0912 0  5200            DC      /5200       O                   32F09550
0913 0  5E00            DC      /5E00       L                   32F09560
0914 0  2100            DC      /2100                           32F09570
0915 0  9E00            DC      /9E00       T                   32F09580
0916 0  2200            DC      /2200       I                   32F09590
0917 0  7200            DC      /7200       M                   32F09600
0918 0  3600            DC      /3600       E                   32F09610
0919 0  2100            DC      /2100                           32F09620
091A 0  9A00            DC      /9A00       S                   32F09630
0918 0  2600            DC      /2600       H                   32F09640
091C 0  5200            DC      /5200       U                   32F09650
091D 0  6200            DC      /6200       R                   32F09660
091E 0  9E00            DC      /9E00       T                   32F09670
091F 0  0300            DC      /0300       LINE  FEED          32F09680
0920 0  FFFF            DC      /FFFF                           32F09690
                        *                                       32F09700
0921 0  1E00    ALP11   DC      /1E00       C                   32F09710
0922 0  5200            DC      /5200       O                   32F09720
0923 0  5E00            DC      /5E00       L                   32F09730
0924 0  2100            DC      /2100                           32F09740
0925 0  1E00            DC      /1E00       C                   32F09750
0926 0  5200            DC      /5200       O                   32F09760
0927 0  8200            DC      /8200       U                   32F09770
0928 0  7600            DC      /7600       N                   32F09780
0929 0  9E00            DC      /9E00       T                   32F09790
092A 0  0300            DC      /0300       LINE  FEED          32F09800
092B 0  FFFF            DC      /FFFF                           32F09810
                        *                                       32F09820
                        *                                       32F09830
092C 0  6200    ALPHN   DC      /6200       R                   32F09840
092D 0  3200            DC      /3200       D                   32F09850
092E 0  6200            DC      /6200       R                   32F09860
092F 0  2100            DC      /2100                           32F09870
0930 0  3200            DC      /3200       D                   32F09880
0931 0  9A00            DC      /9A00       S                   32F09890
0932 0  9200            DC      /9200       W                   32F09900
0933 0  2100            DC      /2100                           32F09910
0934 0  7600            DC      /7600       N                   32F09920
0935 0  5200            DC      /5200       O                   32F09930
0936 0  9E00            DC      /9E00       T                   32F09940
0937 0  2100            DC      /2100                           32F09950
0938 0  6200            DC      /6200       R                   32F09960
0939 0  3600            DC      /3600       E                   32F09970
093A 0  3E00            DC      /3E00       A                   32F09980
093B 0  3200            DC      /3200       D                   32F09990
093C 0  A600            DC      /A600       Y                   32F10000
093D 0  2100            DC      /2100                           32F10010
093E 0  8400            DC      /8400       -                   32F10020
093F 0  2100            DC      /2100                           32F10030
0940 0  5600            DC      /5600       P                   32F10040
0941 0  6200            DC      /6200       R                   32F10050
0942 0  3600            DC      /3600       E                   32F10060
0943 0  9A00            DC      /9A00       S                   32F10070
0944 0  9A00            DC      /9A00       S                   32F10080
0945 0  2100            DC      /2100                           32F10090
0946 0  9A00            DC      /9A00       S                   32F10100
0947 0  9E00            DC      /9E00       T                   32F10110
0948 0  3E00            DC      /3E00       A                   32F10120
0949 0  6200            DC      /6200       R                   32F10130
094A 0  9E00            DC      /9E00       T                   32F10140
094B 0  0300            DC      /0300       LINE  FEED          32F10150
094C 0  FFFF            DC      /FFFF                           32F10160
                        *                                       32F10170
094D 0  3600    ALPHM   DC      /3600       E                   32F10180
094E 0  7600            DC      /7600       N                   32F10190
```


1442 TIMING TEST

```
094F 0  9E00            DC      /9E00       T                   32F10200
0950 0  3600            DC      /3600       E                   32F10210
0951 0  6200            DC      /6200       R                   32F10220
0952 0  2100            DC      /2100                           32F10230
0953 0  7200            DC      /7200       M                   32F10240
0954 0  5200            DC      /5200       O                   32F10250
0955 0  3200            DC      /3200       D                   32F10260
0956 0  2100            DC      /2100                           32F10270
0957 0  7600            DC      /7600       N                   32F10280
0958 0  8200            DC      /8200       U                   32F10290
0959 0  7200            DC      /7200       M                   32F10300
095A 0  1A00            DC      /1A00       B                   32F10310
095B 0  3600            DC      /3600       E                   32F10320
095C 0  6200            DC      /6200       R                   32F10330
095D 0  0300            DC      /0300       LINE  FEED          32F10340
095E 0  FFFF            DC      /FFFF                           32F10350
                        *                                       32F10360
095F 0  5E00    ALPLG   DC      /5E00       L                   32F10370
0960 0  3E00            DC      /3E00       A                   32F10380
0961 0  9A00            DC      /9A00       S                   32F10390
0962 0  9E00            DC      /9E00       T                   32F10400
0963 0  2100            DC      /2100                           32F10410
0964 0  1E00            DC      /1E00       C                   32F10420
0965 0  3E00            DC      /3E00       A                   32F10430
0966 0  6200            DC      /6200       R                   32F10440
0967 0  3200            DC      /3200       D                   32F10450
0968 0  2100            DC      /2100                           32F10460
0969 0  8200            DC      /8200       .                   32F10470
096A 0  2100            DC      /2100                           32F10480
096B 0  5E00            DC      /5E00       L                   32F10490
096C 0  5200            DC      /5200       O                   32F10500
096D 0  3E00            DC      /3E00       A                   32F10510
096E 0  3200            DC      /3200       D                   32F10520
096F 0  2100            DC      /2100                           32F10530
0970 0  5600            DC      /5600       P                   32F10540
0971 0  1E00            DC      /1E00       C                   32F10550
0972 0  2600            DC      /2600       H                   32F10560
0973 0  3600            DC      /3600       E                   32F10570
0974 0  3200            DC      /3200       D                   32F10580
0975 0  2100            DC      /2100                           32F10590
0976 0  1E00            DC      /1E00       C                   32F10600
0977 0  3E00            DC      /3E00       A                   32F10610
0978 0  6200            DC      /6200       R                   32F10620
0979 0  3200            DC      /3200       D                   32F10630
097A 0  9A00            DC      /9A00       S                   32F10640
097B 0  2100            DC      /2100                           32F10650
097C 0  4400            DC      /4400       +                   32F10660
097D 0  2100            DC      /2100                           32F10670
097E 0  9A00            DC      /9A00       S                   32F10680
097F 0  9E00            DC      /9E00       T                   32F10690
0980 0  3E00            DC      /3E00       A                   32F10700
0981 0  6200            DC      /6200       R                   32F10710
0982 0  9E00            DC      /9E00       T                   32F10720
0983 0  0300            DC      /0300       LINE  FEED          32F10730
0984 0  FFFF            DC      /FFFF                           32F10740
                        *                                       32F10750
                        *                                       32F10760
                        *****   DATA TABLES             *****   32F10770
                        *                                       32F10780
0985 0  0000    RDATA   DC      /0000       CURRENT  DATA  READ 32F10790
                        *                                       37F10800
0986 0  8000            DC      /8000       DATA  TBL  COLUMN 1 32F10810
0987 0  C000            DC      /C000                           32F10820
0988 0  E000            DC      /E000                           32F10830
0989 0  F000            DC      /F000                           32F10840
098A 0  7800            DC      /7800                           32F10850
098B 0  3C00            DC      /3C00                           32F10860
098C 0  1E00            DC      /1E00                           32F10870
```

```
098D 0 0F00          DC    /0F00                    32F10880
098E 0 0780          DC    /0780                    32F10890
098F 0 03C0          DC    /03C0      COL 10        32F10900
0990 0 01E0          DC    /01E0                    32F10910
0991 0 00F0          DC    /00F0                    32F10920
0992 0 0070          DC    /0070                    32F10930
0993 0 0030          DC    /0030                    32F10940
0994 0 0010          DC    /0010                    32F10950
0995 0 8000          DC    /8000                    32F10960
0996 0 C000          DC    /C000                    32F10970
0997 0 E000          DC    /E000                    32F10980
0998 0 F000          DC    /F000                    32F10990
0999 0 7800          DC    /7800      COL 20        32F11000
099A 0 3C00          DC    /3C00                    32F11010
099B 0 1E00          DC    /1E00                    32F11020
099C 0 0F00          DC    /0F00                    32F11030
099D 0 0780          DC    /0780                    32F11040
099E 0 03C0          DC    /03C0                    32F11050
099F 0 01E0          DC    /01E0                    32F11060
09A0 0 00F0          DC    /00F0                    32F11070
09A1 0 0070          DC    /0070                    32F11080
09A2 0 0030          DC    /0030                    32F11090
09A3 0 0010          DC    /0010      COL 30        32F11100
09A4 0 FFF0          DC    /FFF0                    32F11110
09A5 0 FFF0          DC    /FFF0                    32F11120
09A6 0 0010          DC    /0010                    32F11130
09A7 0 0030          DC    /0030                    32F11140
09A8 0 0070          DC    /0070                    32F11150
09A9 0 00F0          DC    /00F0                    32F11160
09AA 0 01E0          DC    /01E0                    32F11170
09AB 0 03C0          DC    /03C0                    32F11180
09AC 0 0780          DC    /0780                    32F11190
09AD 0 0F00          DC    /0F00      COL 40        32F11200
09AE 0 1E00          DC    /1E00                    32F11210
09AF 0 3C00          DC    /3C00                    32F11220
09B0 0 7800          DC    /7800                    32F11230
09B1 0 F000          DC    /F000                    32F11240
09B2 0 E000          DC    /E000                    32F11250
09B3 0 C000          DC    /C000                    32F11260
09B4 0 8000          DC    /8000                    32F11270
09B5 0 0010          DC    /0010                    32F11280
09B6 0 0030          DC    /0030                    32F11290
09B7 0 0070          DC    /0070      COL 50        32F11300
09B8 0 00F0          DC    /00F0                    32F11310
09B9 0 01E0          DC    /01E0                    32F11320
09BA 0 03C0          DC    /03C0                    32F11330
09BB 0 0780          DC    /0780                    32F11340
09BC 0 0F00          DC    /0F00                    32F11350
09BD 0 1E00          DC    /1E00                    32F11360
09BE 0 3C00          DC    /3C00                    32F11370
09BF 0 7800          DC    /7800                    32F11380
09C0 0 F000          DC    /F000                    32F11390
09C1 0 E000          DC    /E000      COL 60        32F11400
09C2 0 C000          DC    /C000                    32F11410
09C3 0 8000          DC    /8000                    32F11420
09C4 0 7FF0          DC    /7FF0                    32F11430
09C5 0 BFF0          DC    /BFF0                    32F11440
09C6 0 DFF0          DC    /DFF0                    32F11450
09C7 0 EFF0          DC    /EFF0                    32F11460
09C8 0 F7F0          DC    /F7F0                    32F11470
09C9 0 FBF0          DC    /FBF0                    32F11480
09CA 0 FDF0          DC    /FDF0                    32F11490
09CB 0 FEF0          DC    /FEF0      COL 70        32F11500
09CC 0 FF70          DC    /FF70                    32F11510
09CD 0 FFB0          DC    /FFB0                    32F11520
09CE 0 FFD0          DC    /FFD0                    32F11530
09CF 0 FFE0          DC    /FFE0                    32F1154u
09D0 0 FFC0          DC    /FFC0                    32F11550
```



```
09D1 0 FF30          DC    /FF30                    32F11560
09D2 0 FCF0          DC    /FCF0                    32F11570
09D3 0 F3F0          DC    /F3F0                    32F11580
09D4 0 CFF0          DC    /CFF0                    32F11590
09D5 0 3FF8          DC    /3FF8      COL 80        32F11600
09D6 0 FFFF          DC    /FFFF                    32F11610
09D7 0 000A    TIME  DC    /000A      START OF TIME TABLE  32F11620
09D8   0051          BSS   81                       32F11630
                     *                              32F11640
0A2A   05E9          END   GO                       32F11650
```

1442 TIMING TEST

CROSS REFERENCE LISTING

SYMBOL	VALUE	REFERENCES
ADD	06C5	06CA
ADSCT	0058	05DC
AEND	0037	05DC
AINT	0044	05DC,0873
AIVD	003B	05DC,0842
ALD	003E	05DC
ALPHM	094D	0892
ALPHN	092C	C897
ALPH1	088A	083A
ALPH4	08CA	0853
ALPH5	08D8	085B
ALPH6	08E6	0863
ALPH7	08EF	086B
ALPH8	08F8	0872
ALPH9	0902	087B
ALPLG	095F	089C
ALP10	0911	0883
ALP11	0921	088B
ANINT	0041	05DC,C84A
ANRDY	004B	05DC
AQ5A	0019	
ARDY	004C	05DC
ASB	0054	05DC
ASCT	005A	05DC
ASWS	0050	05DC,0843
AWAS	0060	05DC
BEGIN	0010	05DC,05E9
BIN80	088D	0734
BIT4	07FA	07EF
BIT5	080C	07FD
BIT6	0814	080F
BLANK	06AF	05F0
BLCOL	06F5	06B0
BLEND	0718	06B4
BLFLG	0646	05F5,C655,0719
BREND	0738	0717,C71C,C81B,0835
BSW0	05DE	061C,0720,0724
BSW1	05DF	0632,0771,0774
BSW2	05E0	05F8
BSW3	05E1	
BUSY	07AF	07AC
CHKTM	075E	072F
CHK1	0757	072B
CLCHK	072E	0764
CLEAR	06BF	0672,068E,069A,06AE,06BE
CLMAX	087D	065E,067A,0757
CLMIN	0885	C65A,C676,C760
CMCOL	06FF	06D1,06DF,06EE,0713
CMEND	0740	0716,C718,0726,0729,0755,076F,077E,0817
COLCT	088C	072C,0730,0741
COLER	078E	07EB
COLPC	078C	06D8,06DA,C73C
COLRD	078A	06E2,06EF,06F1,06F8,073A
CONST	06CC	06C4,06C5
DELAY	0645	062C,06D4
DLPCH	06D6	06D7
DSWC	0864	0662,067E,069E,0708,070A,0710
DSWE	086C	0745,C74A,C74F,0751
EAQ0	006A	0701
END	0015	05DC
ERCAL	07A9	079F,07AF
ERFLG	0785	0620,0794,C795,0796-079E,07ED,07F0,07FB,07FE,080D, 0810
ERRET	07A1	07AE
ERROR	0012	05DC,07A9

1442 TIMING TEST

ERR1	07DD	0656
ERR10	0828	0762
ERR11	0833	0736
ERR2	07E1	0633
ERR3	07E5	06C7
ERR4	07E9	06D2,06E0
ERR5	07FB	06E9
ERR6	080D	C70E
ERR7	0815	0753
ERR8	0819	0732
ERR9	081D	075B
ERSCN	0792	073E,07DF,C7E3,07E7
ERTST	0796	07A3
ETRAP	0018	05DC
FDEND	071E	0690
FEED	068F	0635
GO	05E9	05E3,0A29
HALT	0014	05DC
ILCRP	0030	05DC,066A,0686,0692,06A6,06B6
ILIR	0036	05DC
ILPAT	0032	05DC
IL0	0028	05DC,0666,0682,06A2,06B2
IL1	0029	05DC
IL2	002A	C5DC
IL3	002B	05DC
IL4	002C	05DC
INITL	05EC	05E2,05F6
LDCOL	0730	0727,0831
LGBSY	07CF	07CC
LGCAL	07C8	078D,07C2,07CF
LGFLG	07D5	0625,0650,0769,076D,0778,077C,0798,0789
LGMSG	07C8	07C8
LGSCN	0786	0652,0797,C799
LOG	0013	05DC,05FB,07C9
LOGBY	0016	05DC
LSTCD	0771	074D
MASK	0765	070C,0722,0773
MAXCK	072A	075D
MINCK	072C	0826
MLSCF	05E4	05EF,0603,07A5,07B1,07D1,07D9
MLSC2	05E5	0631
MLSC3	05E6	05F2
MLSC4	05E7	0638,063D,0642
MSGAD	07AB	C7A1,07B8
MSGLG	0899	078A,07CB
MSGM	088F	05FD
MSGNR	0894	078F
MSG1	0837	07AB,07B6
MSG10	087F	C82C,082F
MSG11	0887	
MSG2	083F	
MSG3	0847	
MSG4	084F	078E,07F4,07F6
MSG5	0857	0802,0806,0808
MSG6	085F	
MSG7	0867	
MSG8	086F	
MSG9	0877	0821,0824
NDCOL	06ED	06A0
NDEND	071D	06A4
NDRD	069B	062D
NEXT	07D7	07C7
NOTRY	064E	C64A
NRDSW	0768	0747
NRDY	0769	0748
OPEND	0728	0663,0684
PCCOL	06D0	0664
PID	05DC	05EB,066E,068A,0696,06AA,06BA

1442 TIMING TEST

PMAX	065C	060E
PMIN	0658	060A
PUNCH	0654	063E
RDATA	0985	06E4,06E6,C6FA,071E,0738,078A,078C,07F2,0800,0804
RDCOL	06DE	0680
READ	0673	0639
READY	0647	064C,0654,0673,068F,069B,06AF
RMAX	0678	0616
RMIN	0674	0612
RQKB	0034	05DC
RQTY	0033	C5DC
RSTKB	0017	05DC
SNCOL	0788	06F6,0706
SNEND	0790	0743
SNSRY	0780	0648
START	0011	05DC,0604,0643,07A7,07B3,0703,07DB
STFD	0786	0698,0776
STPCH	0784	0670
STRD	0782	068C,06AC,06BC
SVKB	0035	05DC
TEST	05F8	05ED,0601
TEST1	0601	05FE
TEST2	0606	05F9
TEST3	0618	0606,07D7
TIME	09D7	0704,0759,C75E,081F,082A
TIMER	06C3	06DC,06EB,C6F3,06FD,07F8,080A
TSTER	0710	0812
WASSB	089E	0862,086A,088A
WSBCL	08AA	0852,085A,C87A,0882
WTRET	0706	07C5,C7CE

1442 TIMING TEST

PMAX	065C	060E
PMIN	0658	060A
PUNCH	0654	063E
RDATA	0985	06E4,06E6,C6FA,071E,0738,078A,078C,07F2,0800,0804
RDCOL	06DE	0680
READ	0673	0639
READY	0647	064C,0654,0673,068F,069B,06AF
RMAX	0678	0616
RMIN	0674	0612
RQKB	0034	05DC
RQTY	0033	C5DC
RSTKB	0017	05DC
SNCOL	0788	06F6,0706
SNEND	0790	0743
SNSRY	0780	0648
START	0011	05DC,0604,0643,07A7,07B3,07D3,07D8
STFD	0786	0698,0776
STPCH	0784	0670
STRD	0782	068C,06AC,06BC
SVKB	0035	05DC
TEST	05F8	05ED,0601
TEST1	0601	05FE
TEST2	0606	05F9
TEST3	0618	0606,07D7
TIME	09D7	0704,0759,C75E,081F,082A
TIMER	06C3	06DC,06EB,C6F3,06FD,07F8,080A
TSTER	0710	0812
WASSB	089E	0862,086A,088A
WSBCL	08AA	0852,085A,C87A,0882
WTRET	0706	07C5,07CE