

6/16 AUTO LOAD OPTION SUPPORT PROGRAM

Consists of:

Program Description	B06-194M95R01A15
Program Listing	06-194F01M96R01A13
Program Listing	06-194F02M96R01A13
Test Tape	06-194F01M17R01
Test Tape	06-194F02M17R01

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SERIES 16 AUTO LOAD OPTION
SUPPORT PROGRAM DESCRIPTION

1. SERIES 16 ALO SUPPORT PROGRAM

1.1 Related Documents

Test Program Listing	06-194F01M96R01
	06-194F02M96R01
Test Program Tape	06-194F01M17R01
	06-194F02M17R01
Auto Load Option User's Manual	29-522
Model 6/16 Maintenance Manual	29-470
16-Bit Loader Description Manual	29-231

1.2 Test Programs to be run prior to loading this test

Memory Test	06-003
Processor Test	06-106
Common Teletype Basic Confidence Test	06-004
Common CRT Test	06-146
Common Current Loop Interface Test	06-184
Common Carousel 300 Test	06-183
8/16 Processor Test Part 1	06-209
8/16 Processor Test Part 2	06-210
8/16E Processor Test Part 1	06-211
8/16E Processor Test Part 2	06-212

2. PURPOSE OF TEST

The Model 6/16 ALO Support Program:

- Accepts CAL object as source information.
- Generates Data Tapes from CAL object for the (Signetics or Spectrum Dynamics) ROM Programmer to create the ROM chips.
- Checks the Data Tapes against CAL object.
- Tests the ROM chips blown by the (Signetics or Spectrum Dynamics) ROM Programmer against the Data Tapes.
- Tests the switch positions and data paths of the ALO.

3. MINIMUM HARDWARE REQUIRED

3.1 Processor

Model 6/16, 8/16 or 8/16E with ALO option
8KB of Memory
Test ROMS 19-186R00F10 and 19-186R00F11 (Test Phase - TESTS
1, 2 and 3)

3.2 Console Input Device

Teletype, CRT on PASLA, CAROUSEL 15, 30, or 300

3.3 List Device

Teletype, CRT on PASLA, Line Printer or Carousel 15, 30, 300.

3.4 Paper Tape Reader/Punch

Teletype, or High Speed Paper Tape Reader/Punch

4. REQUIREMENTS OF MACHINE UNDER TEST

This program assumes that the programs indicated in the "Test Programs to be run prior to loading this Test" section, have been run without detecting an error.

4.1 Device Addresses

See Appendix 1.

5. LOADING PROCEDURE

5.1 Test Tape Format

Absolute, non-zoned object tape (M17) with front end boot loader. The test program occupies approximately 8KB of memory.

5.2 Normal Loading Procedure

Manually enter the X'50' sequence shown below, into memory:

<u>LOCATION</u>	<u>CONTENTS</u>
X'30'	X'0000'
X'32'	X'0000'
X'34'	X'0000'
X'36'	X'0050'
X'50'	X'D500'
X'52'	X'00CF'
X'54'	X'4300'
X'56'	X'0080'

(See TABLE 1 for desired configuration)

TABLE 1. DEVICE DEFINITION TABLE

	X'78'	X'7A'	X'7C'	X'7E'
	LOAD	PUNCH	-	-
TTY	X'0294'	X'0298'	-	-
HSPTR/P	X'1399'	X'139A'	-	-
PTR	X'0399'	-	-	-

Place the program tape in the paper tape reader.

Execute at address X'30'.

When the processor halts, observe the CHKSUM byte, displayed on console display register D1. If it is zero, loading is complete; otherwise, repeat the loading procedure.

5.3 Multi-Media Diagnostic Loading Procedure

To load this program from the INTERDATA Multi-Media Diagnostic System, refer to publication 06-176A15.

6. PROGRAM EXECUTION

Refer to Appendix 1 and set up the addresses for console input device and the list device.

Address memory location X'A00'. Execute and observe the following title output to the list device:

ALO SUPPORT PROGRAM 06-194F01R01

or

ALO SUPPORT PROGRAM 06-194F02R01

7. OPERATING PROCEDURES

The program is divided into two parts, each having the same loading procedures. Part 1 (06-194F01) contains the SPECIFY and VERIFY phase needed to generate and verify the Data Tapes. Part 2 (06-194F02) contains the TEST Phase. This phase is divided into four tests, testing the ALO switch positions, data paths and Customer ROMs.

7.1 Specification Phase (06-194F01)

The Specification Phase converts CAL object into 512 x 8 ROM tape (see Note) format. Use the following procedures to operate the program in the Specification Phase:

<u>STEP</u>	<u>OPERATION</u>	<u>PROCESSOR RESPONSE</u>
1	Start the program execution at X'A00'	ALO SUPPORT PROGRAM 06-194R01 SIGNETICS OR DYNAMICS FORMAT?
2	Type 'S' for Signetics, 'D' for Spectrum Dynamics	* SPECIFY OR VERIFY?
3	Type 'S'	PLACE OBJECT TAPE IN READER HIT RUN

NOTE

CAL object tape must be assembled Target 16

<u>STEP</u>	<u>OPERATION</u>	<u>PROCESSOR RESPONSE</u>
4	Place the object tape in the reader and press Run on display panel (X'78' specifies the Binary Input Device)	The object tape is read. TAPE OR LISTING OR BOTH? *
5	Type "T" if only data tape is desired. Type "L" if only listing is desired. Type "B" if both tape and listing are desired.	PART NUMBER *
6	Type a part number in the following format: 97-XXXRXXF00. After the first part number is typed in, the program requires only the functional variation number (F00) to be typed.	Tape and/or Listing for a ROM chip is generated. Device is specified by I0+1, and the Binary Output Device used for punching a data tape is specified by X'7A'. Output commands for these devices are specified in the contents of X'7B'. Program asks for another part number until all data is punched. END OF SPECIFY SPECIFY OR VERIFY? *

NOTE

PART NUMBERS ARE ASSIGNED BY INTERDATA WHERE:

97-XXX - IS THE PARENT NUMBER
RXX - IS THE REVISION LEVEL
FXX - IS THE FUNCTIONAL VARIATION

7.2 Verification Phase (06-194F01)

The Verification Phase compares the Data Tapes produced by the Specify Phase with the CAL object data.

Use the following procedures to operate the program in the Verification Phase.

<u>STEP</u>	<u>OPERATION</u>	<u>PROCESSOR RESPONSE</u>
1	Start execution at X'A00'	ALO SUPPORT PROGRAM 06-194R01 SIGNETICS OR DYNAMICS FORMAT? *
2	Type 'S' for Signetics, 'D' for Spectrum Dynamics	SPECIFY OR VERIFY? *
3	Type 'V'	IS OBJECT PROGRAM IN BUFFER? *
4	Type "Y" if this verification phase is immediately following the Specification Phase (i.e., object program is already in buffer). Proceed to Step 6. If the object program is not in the buffer, type "N" and pro- ceed to Step 5.	PLACE OBJECT TAPE IN READER HIT RUN
5	Place the object tape in the reader and press RUN (Location X'78' specifies the Binary Input Device; loca- tion X'79' contains the read command for the device).	NUMBER OF DATA SEGMENTS? *
6	Type a hexadecimal number representing the number of data segments (one segment for each ROM of the ALO.	PLACE DATA TAPE IN READER HIT RUN
7	Place the data tape into the reader and HIT RUN. When program asks for next data tape if all records are on one contiguous tape, just hit RUN. Otherwise place the next tape in the reader and hit RUN.	Program verifies data tape and returns to Step 6 until all tapes are verified. END OF VERIFY SPECIFY OR VERIFY? *

7.3 Test Phase (06-194F02)

The ALO TEST Program Tape tests, the DISABLE, ENABLE, and TEST Switch positions, ALO data paths, and the data on Customer ROMs against Customer Data Tapes produced by the SPECIFY Phase. TESTs 1, 2, and 3 require the TEST ROMs 19-186R00F10 and 19-186R00F11 to be in place before test execution. (See Appendix 6 for position.) TEST 4 requires the Customer ROMs to be in place before test execution.

The Test Phase (06-194F02) contains four tests:

- TEST 1 - checks the DISABLE switch position.
- TEST 2 - checks the TEST switch position and data paths using the two Test ROMs.
- TEST 3 - checks the ENABLE switch position.
- TEST 4 - checks the Customer's ROMs against the Customer's Data Tapes.

Proceed in the following manner to operate in the TEST Phase:

<u>STEP</u>	<u>OPERATION</u>	<u>PROCESSOR RESPONSE</u>
1	Start program execution at X'A00'.	ALO SUPPORT PROGRAM 06-194R01 TEST 1, 2, 3 or 4?
2	Type TEST number desired.	Processor responds with specific instructions which must be followed precisely. (Refer to Appendix 3 for expected results.) If any errors occur, refer to Appendix 4 for error explanation.

NOTE

If Processor does not have Power Fail/Auto Restart, RUN must be depressed after any Initialize with ALO in Disable Mode.

8. ERROR PROCEDURES

All error message numbers are explained in Appendix 4.

When any load errors occur when loading (CAL) Loader object take corrective action specified in Appendix 4.

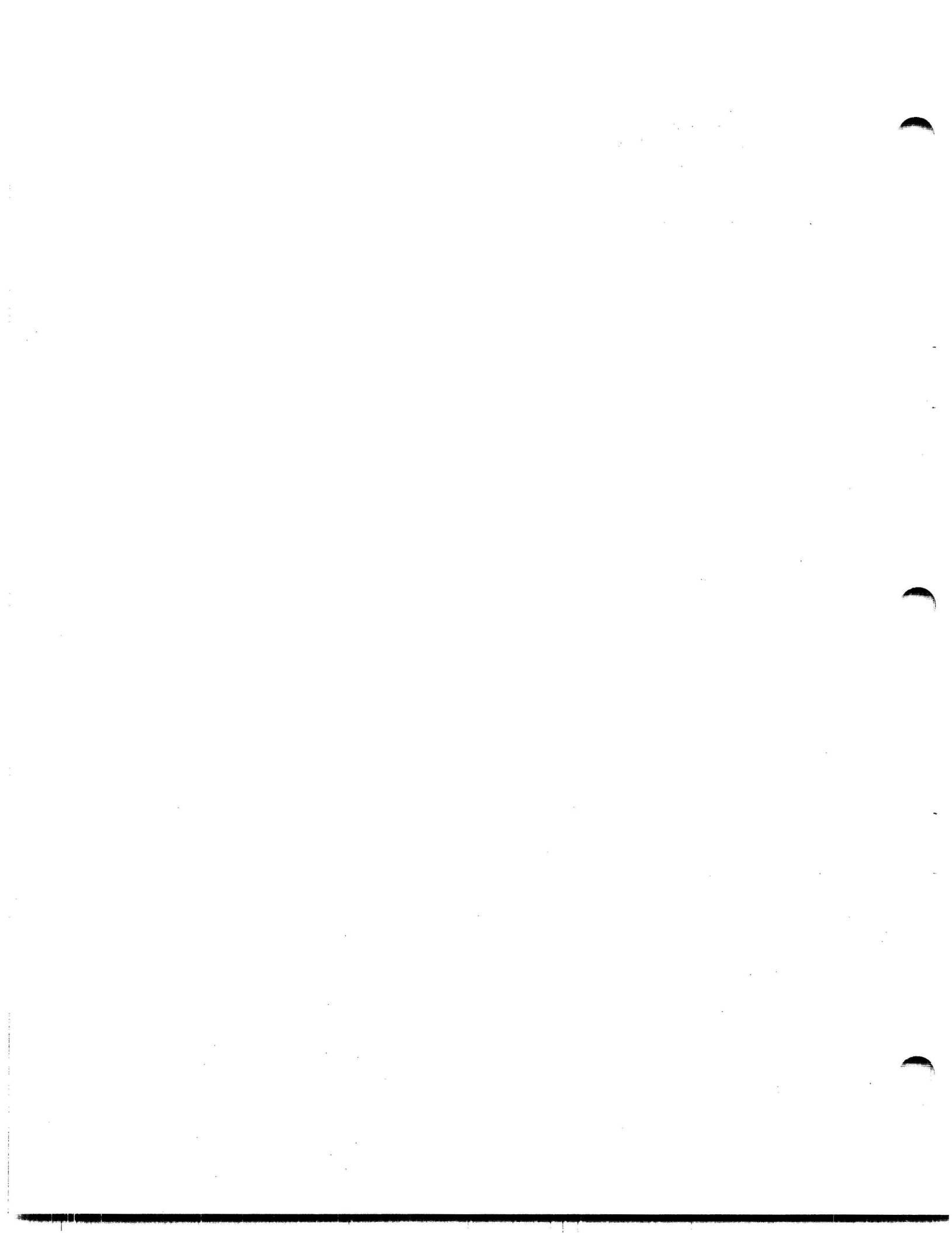
On any Compare Fail error, re-execute that portion of test.

9. PROGRAMMING NOTES

To generate the desired ROM chips the following steps must be followed: (see 6/16 Auto Load Option User's Manual, 29-522, for specific details).

1. Request Part Number from INTERDATA for ROM chips.
2. Code Loader for ALO (see Appendix 5).
3. Do Cal assembly of Loader, and obtain Loader object.
4. Using SPECIFY Phase of Test Program (06-194F01), generate Data Tapes, and Listing from the Loader object.

5. Using VERIFY Phase of Test Program (06-194F01), verify Data Tapes against (CAL) Loader object.
6. After Tapes are verified, send Purchase Order, Tapes and Listing to INTERDATA.
7. When ROM chips are received, check them using Test 4 of the Test Program (06-194F02).
8. After chips are verified, they are ready for use.



APPENDIX 1

USER DEVICE DEFINITION

The halfword labeled I0 (see the listing) has the default value for Teletype as an Input/Output console device. If the setup is different, it must be changed as follows:

	0	7 8	15
I0	Console Device Identifier	List Device Identifier	

Console Device Identifier	Explanation
X'01'	GDT/CRT on PASLA/PALM Interface, strapped for FDX and the highest baud rate.
X'02'	TTY on TTY Interface. GDT/CRT on Current Loop Interface. Carousel 15, 30 on Current Loop Interface.
X'04'	Carousel 300 on PASLA/PALM, FDX, highest baud.
0,X'05'-X'FF'	Reserved. The program defaults it to 2.

List Device Identifier	Explanation
X'01'	GDT/CRT as stated previously.
X'02'	TTY as stated previously.
X'03'	Line Printer. LP Interface.
X'04'	Carousel 300 as stated previously.
0,X'05'-x'FF'	Reserved. The program defaults it to 2.

The GDT or CRT; if used on PASLA/PALM Interface, should be strapped for the device address of X'10' and X'11' for receiving and transmitting side respectively. If it is different, the halfword labeled PASLADR (see the listing) must be changed accordingly. The Carousel 300 follows this rule also, if different the halfword labeled PASLADR (see the listing) must be changed accordingly.

APPENDIX 1 (Continued)

The Teletype or Carousel on Current Loop Interface, if used, should be strapped for the device address of X'02'. If it is different, the halfword labeled CLIFADR (see the listing) must be changed accordingly.

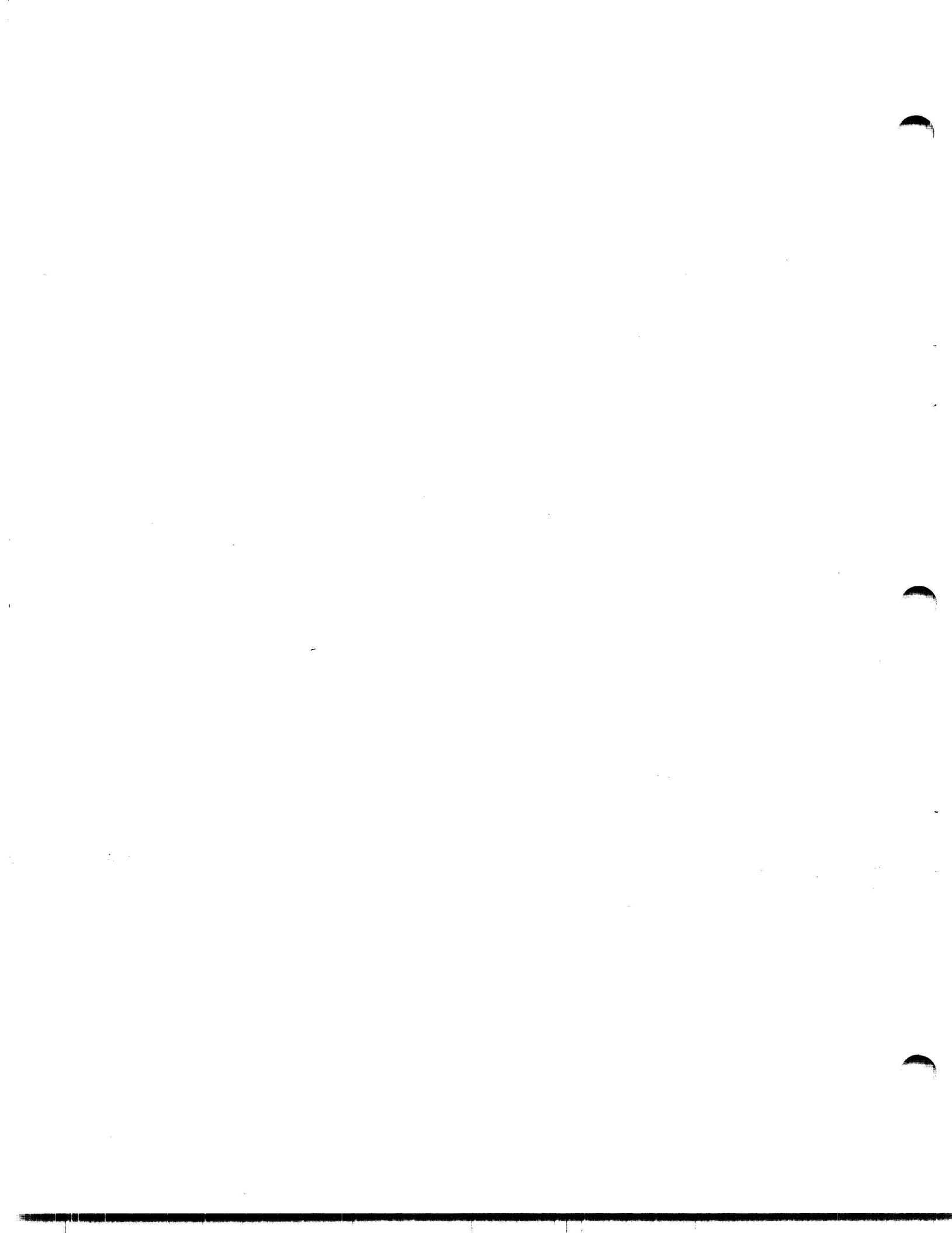
The Line Printer, if used, should be strapped for the device address of X'62'. If it is different, the halfword labeled LPADR (see the listing) must be changed accordingly.

APPENDIX 2

COMMAND INPUT STRUCTURE

An asterisk (*) is output to the list device to indicate that the program is waiting for user input. The user then types his input followed by a carriage return. An invalid input causes a (?) followed by a carriage return (CR) line feed (LF), and an asterisk (*) to occur.

All other commands require a specific physical action followed by the depressing of RUN or INITIALIZE on the display panel or the BRK key on the Console device.



APPENDIX 3

EXPECTED RESULTS TABLE

Sample printout during the specify Phase:

ALO SUPPORT PROGRAM 06-194F01R01
SIGNETICS OR DYNAMICS FORMAT?
*S
SPECIFY OR VERIFY?
*S
PLACE OBJECT TAPE IN READER
HIT RUN
TAPE OR LISTING OR BOTH?
*T
PART NUMBER?
*19-123R01F00 F00 Tape is punched at this time
PART NUMBER?
*F01 F01 tape is punched at this time
END OF SPECIFY
SPECIFY OR VERIFY?
*

Sample printout during Verify Phase (object program in buffer):

SIGNETICS OR DYNAMICS FORMAT?
*S
SPECIFY OR VERIFY?
*V
IS OBJECT PROGRAM IN BUFFER?
*Y
NUMBER OF DATA TAPES?
*2
PLACE DATA TAPE IN READER
HIT RUN
PLACE DATA TAPE IN READER
HIT RUN
END OF VERIFY
NO ERROR

Sample printout during Test Phase:

ALO SUPPORT PROGRAM 06-194F02R01
TEST 1, 2, 3 or 4
*1
PLACE ALO IN DISABLE MODE
DEPRESS INITIALIZE
DISABLE SWITCH OK
NO ERROR

APPENDIX 3 (Continued)

TEST 1, 2, 3 or 4

*2

PLACE ALO IN DISABLE MODE
DEPRESS INITIALIZE
PLACE ALO IN TEST MODE
PRESS BRK
TEST SWITCH OK
PLACE ALO IN DISABLE MODE
DEPRESS INITIALIZE
PLACE ALO IN TEST MODE
PRESS BRK
PLACE ALO IN DISABLE MODE
PRESS BRK
NO ERROR

TEST 1, 2, 3 or 4

*3

PLACE ALO IN ENABLE MODE
DEPRESS INITIALIZE
ENABLE SWITCH OK
PLACE ALO IN DISABLE MODE
PRESS BRK
NO ERROR

TEST 1, 2, 3 or 4

*4

NUMBERS OF ROMS TO VERIFY

*2

SIGNETIC OR DYNAMICS?

*5

PLACE ALO IN DISABLE MODE
DEPRESS INITIALIZE
PLACE ALO IN TEST MODE
PRESS BRK
PLACE ALO IN DISABLE MODE
PLACE DATA TAPE IN READER
PRESS BRK
PLACE DATA TAPE IN READER
PRESS BRK
NO ERROR

APPENDIX 4

All error messages in 06-194F02R00 (TEST PHASE) are in the following format:

ERROR ABCD

where

AB = Test number
CD = Error number

ERROR #	TYPE OR ERROR	COMMENT
01	Checksum error	Reposition the tape to the beginning of the record and depress RUN to reread the record.
02	Sequence Number error	Reposition the tape to the proper record and depress EXECUTE to try again. The error usually occurs when the tape is improperly positioned following a checksum error.
03	Attempt to load beyond the buffer end	The object program is too large (the ALO can accept a program of a maximum 4k bytes.)
04	REF LOOP error	This message results when an endless forward reference chain is encountered. It indicates that input tape was generated incorrectly.
05	Compare fail error	This error occurs when there is any data mismatch. (See NOTE)
06	TEST switch not operational	Test TEST switch logic.
07	DISABLE switch not operational	Test DISABLE switch logic.
08	ENABLE switch not operational	Test ENABLE switch logic.
FN	Load error	This message results if an illegal control item is detected during load. Depress EXEC (RUN) to ignore the control item and continue N = specific control item (see 29-231 for further detail).

APPENDIX 4 (Continued)

NOTE

On any compare fail in addition to the error number the byte that failed is printed in the following manner:

ERROR 0205
IS AB SHOULD BE CD

where

AB = the byte being tested
CD = the expected byte
XX = Hexadecimal address of bad byte
YY = Chip position (See Appendix 6)

On any compare fail, rerun that portion of the test to check for validity. Once validity is established consult TABLE A4-1.

ERROR 05 OCCURS IN	PROBABLE FAULT
VERIFY PHASE	Data Tape bad
TEST 2	Bad ALO data path
TEST 3	ALO loaded specified data wrong
TEST 4	Either ROM chip contains bad data or ALO data path error.

TABLE A4-1. COMPARE FAIL ACTION

A total of 23 compare fails are queued in Test 4 and printed at the end of the test. If more than 23 errors occur the test is aborted and the errors printed in the following format.

DATA ACT DATA EXP CHIP AD.H AD.D
VV WW X YYYY ZZZZ

where

VV = Actual Data
WW = Expected Data
X = Chip which error occurred
YYYY = Address of bad data in Hexidecimal
ZZZZ = Address of bad data in Decimal.

APPENDIX 5

CODING PROCEDURE FOR ALO LOADER

1. Generate Program to do desired task.
2. Debug Program.
3. For maximum usage of ROM space, the size of your program plus four halfwords should come as close as possible to 1K, 2K, 3K or 4K.
4. After minimized or enhanced, debug once more.
5. Set up prefix to program as follows.

```

ORIGIN EQU *
        DC 70F0           --starting PSW
        DC A (START)     --starting LOC
        DC A (ORIGIN1)   --start of Loader CODE
        DC A (END)       - end of Loader CODE
ORIGIN1 EQU *           - start of Loader CODE
-
-
-
START EQU *             --start of Loader program
-
-
-
-
-
-
-
END EQU *-1             --Last statement of Loader CODE
    
```

NOTE

1. Memory Size between ORIGIN and END should be as close to 1K, 2K, 3K or 4K as possible for maximum usage of ROM space.
2. Only one ORG statement should be used.
3. No Define Storage (DS) statements are allowed in the Loader Code.
All storage areas should lie outside loader programs.

APPENDIX 5 (Continued)

Loader Formats

Signetics

Leader
Part number (ascii)
10 bytes of FF
X'12' Tape on
2 bytes of ascii data
X'27'
2 bytes of ascii data
X'27'
'
' 32 bytes of ascii data
' (16 hex characters)
X'27'
X'0D' Carriage Return
X'0A' Line Feed
'
'
'
' 1024 bytes of ascii data
' (512 hex characters)
X'14' Tape off
leader

Spectrum Dynamics

Leader
Part number (ascii)
10 bytes of FF
X'0D'
X'0A'
Decimal address in ascii
X'20' Space
8 bits in ascii
X'0D'
X'0A'
Decimal address in ascii
X'20'
8 bits in ascii
'
'
' 512 decimal addresses
' and 8-bit bytes
'
0D
0A
leader

PROG= *NONE* ASSEMBLED BY CAL 03-066R05-00 (32-BIT)

	1	SCRAT		AL100000
	2	CROSS		AL100010
	3	TARGT 16		AL100020
	4	PROG SERIES 16 ALO SUPPORT PROGRAM 06-194F01R01		AL100030
	5	*****		AL100040
	6	*		AL100050
	7	* COPYRIGHT INTERDATA INC.		AL100060
	8	*		AL100070
	9	* SERIES 16 ALO SUPPORT PROGRAM 06-194F01R01		AL100080
	10	*		AL100090
	11	* THIS PROGRAM IS USED TO VERIFY DATA TAPES PRODUCED BY THIS		AL100100
	12	* PROGRAM FROM CAL OBJECT INPUT		AL100110
	13	*		AL100120
	14	* THIS PROGRAM REQUIRES A 6/16,8/16,8/16E WITH AN ALO		AL100130
	15	* AND AT LEAST 8KB OF MEMORY		AL100140
	16	*		AL100150
	17	* THIS PROGRAM IS BROKEN UP INTO 2 SECTIONS:		AL100160
	18	*		AL100170
	19	* SPECIFICATION PHASE:	*	AL100180
	20	* ROM CHIP LISTINGS AND/OR ROM DATA TAPES ARE GENERATED FROM	*	AL100190
	21	* THE INPUT OBJECT TAPE	*	AL100200
	22	* VERIFICATION PHASE:	*	AL100210
	23	* ROM DATA TAPES ARE VERIFIED	*	AL100220
	24	*****		AL100230
	25	*		AL100240
0000 0000	26	R0 EQU 0		AL100250
0000 0000	27	ZERO EQU 0		AL100260
0000 0001	28	R1 EQU 1		AL100270
0000 0002	29	R2 EQU 2		AL100280
0000 0002	30	LINK4 EQU 2		AL100290
0000 0003	31	R3 EQU 3		AL100300
0000 0003	32	DAT EQU 3		AL100310
0000 0004	33	R4 EQU 4		AL100320
0000 0004	34	DEV EQU 4		AL100330
0000 0005	35	R5 EQU 5		AL100340
0000 0005	36	PNT EQU 5		AL100350
0000 0006	37	R6 EQU 6		AL100360
0000 0007	38	R7 EQU 7		AL100370
0000 0007	39	LINK2 EQU 7		AL100380
0000 0008	40	R8 EQU 8		AL100390
0000 0008	41	LINK3 EQU 8		AL100400
0000 0009	42	R9 EQU 9		AL100410
0000 0009	43	COUNT EQU 9		AL100420
0000 000A	44	R10 EQU 10		AL100430
0000 000B	45	R11 EQU 11		AL100440
0000 000C	46	R12 EQU 12		AL100450
0000 000D	47	R13 EQU 13		AL100460
0000 000E	48	R14 EQU 14		AL100470
0000 000F	49	R15 EQU 15		AL100480
0000 000F	50	LINK EQU 15		AL100490
	51	*		AL100500
	52	*		AL100510
	53	* BOOTLOADER WITH CHKSUM		AL100520

00C8		83	ORG	X'100'		AL100820
		84	*****			AL100830
		85	*			AL100840
		86	*	TEST CONSTANTS		AL100850
		87	*			AL100860
0100	0202	88	IG	DC	X'0202'	I/O DEVICE(S) IDENTIFIER
0102	1011	89	PASLADR	DC	X'1011'	PASLA/PALM IDENTIFIER
0104	0202	90	CLIFADR	DC	X'0202'	CURRENT LOOP INT R/W ADDRESS
0106	6262	91	LPADR	DC	X'6262'	LINE PRINTER ADDRESS
		92	*			AL100900
		93	*****			AL100910
		94	*****			AL100920
		95	*	START PHASE		AL100930
		96	*			AL100940
0108	0711	97	START1	XHR	R1,R1	AL100950
010A	C830 1EC8	98		LHI	R3,RSAVE	AL100960
010E	4030 0022	99		STH	R3,X'22'	AL100970
0112	C820 00F0	100		LHI	R2,X'F0'	AL100980
0116	4010 0030	101		STH	R1,X'30'	AL100990
011A	4020 0032	102		STH	R2,X'32'	AL101000
011E	C820 012C	103	ST	LHI	R2,START	AL101010
0122	4010 0034	104		STH	R1,X'34'	AL101020
0126	4020 0036	105		STH	R2,X'36'	AL101030
012A	0000	106		DC	0	AL101040
		107	*	START		AL101050
012C	41F0 09AE	108	START	BAL	LINK,SETKB	AL101060
0130	2701	109		SIS	R0,1	AL101070
0132	233D	110		BZS	CRT	AL101080
0134	2703	111		SIS	R0,3	AL101090
0136	4230 016A	112		BNZ	TTY	AL101100
013A	4000 0930	113	C300	STH	R0,PAUSE	AL101110
013E	4810 0C6A	114		LH	R1,CARRD	AL101120
0142	D320 0CAE	115		LB	R2,CAR2ND	AL101130
0146	D340 0CAC	116		LB	R4,CARRQ2S	AL101140
014A	2307	117		BS	CRT2	AL101150
014C	4810 0C68	118	CRT	LH	R1,CRTRD	AL101160
0150	D320 0CAD	119		LB	R2,CRT2ND	AL101170
0154	D340 0CAB	120		LB	R4,CRTRQ2S	AL101180
0158	4800 0102	121	CRT2	LH	R0,PASLADR	AL101190
015C	4000 0C70	122		STH	R0,PASFLG	AL101200
0160	9330	123		LBR	R3,R0	AL101210
0162	9E32	124		OCR	R3,R2	AL101220
0164	D240 0CB6	125		STB	R4,CONRQ2S	AL101230
0168	2309	126		BS	GOTIT	AL101240
016A	2400	127	TTY	LIS	R0,0	AL101250
016C	4000 0C70	128		STH	R0,PASFLG	AL101260
0170	4800 0104	129		LH	R0,CLIFADR	AL101270
0174	4810 0C6C	130		LH	R1,CLIFRD	AL101280
0178	9421	131		EXBR	R2,R1	AL101290
017A	4000 0C76	132	GOTIT	STH	R0,CONADR	AL101300
017E	4010 0C6E	133		STH	R1,CONRD	AL101310
0182	D220 0CB4	134		STB	R2,CON2ND	AL101320
0186	41F0 095E	135		BAL	LINK,CRLF	AL101330
018A	C850 0C98	136		LHI	R5,TITLE	AL101340
018E	41F0 08A2	137		BAL	R15,PRINT	AL101350
						AL101360

0192	41F0	095E	138	BAL	LINK,CRLF		AL101370
0196	C850	0CE4	139	LHI	R5,SORDFORM	SIGNETICS OR DYNAMICS?	AL101380
019A	41F0	08A2	140	BAL	R15,PRINT	PRINT IT	AL101390
019E	41E0	098C	141	BAL	R14,ASTSK	PRINT *	AL101400
01A2	41F0	0932	142	GOTIT2	BAL LINK,GETCHR	GET INPUT	AL101410
01A6	C540	0053	143	CLHI	R4,C'S'	IS IT S FOR SIGNETICS	AL101420
01AA	2339		144	BES	GOTIT4	YES GO FILL FLAG	AL101430
01AC	C540	0044	145	CLHI	R4,C'D'	IS IT D FOR DYNAMICS	AL101440
01B0	2133		146	BNES	GOTIT3	NO VALID INPUT	AL101450
01B2	24F0		147	LIS	R15,0	SORDFLG = 0 FOR DYNAMICS (SPECTRUM)	AL101460
01B4	2305		148	BS	GOTIT5	FILL IN FLAG	AL101470
01B6	41E0	0972	149	GOTIT3	BAL R14,QUESTN	?	AL101480
01BA	220C		150	BS	GOTIT2	RETURN	AL101490
01BC	24F1		151	GOTIT4	LIS R15,1		AL101500
01BE	40F0	0C80	152	GOTIT5	STH R15,SORDFLG	SIGNETICS OR DYNAMICS FLAG	AL101510
	0000	01C2	153	STTTST	EQU *		AL101520
01C2	0700		154	XHR	R0,R0		AL101530
01C4	0755		155	XHR	PNT,PNT		AL101540
01C6	4050	0C98	156	STH	PNT,DECADRS	ZERO OUT DECIMAL ADDRESS	AL101550
01CA	4050	0C1C	157	STH	PNT,BIAS		AL101560
01CE	4050	0C96	158	STH	PNT,NOCLRF	RESET CR LF FLAG	AL101570
			159	*****			AL101580
			160	* SELECT SPECIFY OR VERIFY PHASE			AL101590
			161	*			AL101600
	0000	01D2	162	PHASE	EQU *		AL101610
01D2	C850	0D1C	163	LHI	R5,MSG1	SPECIFY OR VERIFY OR TEST?	AL101620
01D6	41F0	08A2	164	BAL	LINK,PRINT	PRINT IT	AL101630
01DA	41E0	098C	165	BAL	R14,ASTSK	ASTERISK	AL101640
01DE	41F0	0932	166	PHASE1	BAL LINK,GETCHR	READ ONE CHARACTER FROM CONSOLE	AL101650
01E2	C540	0053	167	CLHI	R4,X'53'	IS IT S FOR SPECIFY?	AL101660
01E6	4330	01FA	168	BE	SPCFY	YES, GO TO SPECIFY PHASE	AL101670
01EA	C540	0056	169	CLHI	R4,X'56'	IS IT V FOR VERIFY?	AL101680
01EE	4330	040E	170	BE	VERFY	YES, GO TO VERIFY PHASE	AL101690
01F2	41E0	0972	171	BAL	R14,QUESTN	INVALID INPUT, QUFSTION AND	AL101700
01F6	4300	01DE	172	B	PHASE1	GO AGAIN	AL101710
			173	* SPECIFY			AL101720
			174	*****			AL101730
			175	*			AL101740
			176	* SPECIFY PHASE			AL101750
			177	*			AL101760
			178	* PURPOSE:			AL101770
			179	* TO CREATE A DATA TAPE FROM A GIVEN CAL OBJECT TAPE			AL101780
			180	*			AL101790
			181	* DESIGN SPECIFICATION:			AL101800
			182	* THIS PHASE IS DESIGNED TO READ ANY CAL OBJECT TAPE			AL101810
			183	* AND GENERATE A DATA TAPE AND/OR LISTING			AL101820
			184	*			AL101830
			185	* HOW TO RUN TEST:			AL101840
			186	*			AL101850
			187	* FOLLOW OPERATING PROCEDURES IN 06-194A15			AL101860
			188	*			AL101870
	0000	01FA	189	SPCFY	EQU *		AL101880
01FA	41F0	0882	190	BAL	LINK,ZERRBF	ZERO OUT ROM DATA BUFFER	AL101890
01FE	4120	04F8	191	BAL	LINK4,LDOBJ		AL101900
0202	4810	0E48	192	LH	R1,ROMBFR+4		AL101910

0206	4820	0E4A	193	LH	R2,ROMBFR+6		AL101920
020A	0B21		194	SHR	R2,R1	FIGURE # OF BYTES	AL101930
020C	902A		195	SRLS	R2,10	SHIFT OVER	AL101940
020E	2621		196	AIS	R2,1	INCREMENT	AL101950
0210	0A22		197	AHR	R2,R2	DOUBLE	AL101960
0212	C520	0009	198	CLHI	R2,9		AL101970
0216	4380	08C8	199	BNL	PNG		AL101980
021A	4020	0C92	200	STH	R2,NTAPES	STORE IN NUMBER OF TAPES	AL101990
021E	2411		201	CONT1	LIS	R1,1	AL102000
0220	4010	0C9A	202	STH	R1,TAPFLG	SET TAPE FLAG	AL102010
0224	4010	0C94	203	STH	R1,LSTFLG	SET LIST FLAG	AL102020
0228	C850	0D4E	204	LHI	R5,MSG4	TAPE OR LISTING OR BOTH?	AL102030
022C	41F0	08A2	205	BAL	LINK,PRINT	PRINT IT	AL102040
0230	41E0	098C	206	BAL	R14,ASTSK		AL102050
0234	41F0	0932	207	TAPLST	BAL	LINK,GETCHR	AL102060
0238	0700		208	XHR	R0,R0	READ ONE CHARACTER FROM CONSOLE	AL102070
023A	C540	0054	209	CLHI	R4,X'54'	JUST TAPE	AL102080
023E	233A		210	BES	TAPE		AL102090
0240	C540	004C	211	CLHI	R4,X'4C'	JUST LISTING	AL102100
0244	233A		212	BES	LIST		AL102110
0246	C540	0042	213	CLHI	R4,X'42'	OR BOTH TAPE AND LISTING	AL102120
024A	2339		214	BES	BOTH		AL102130
024C	41E0	0972	215	BAL	R14,QUESTN	INVALID INPUT QUESTION AND	AL102140
0250	220E		216	BS	TAPLST		AL102150
0252	4000	0C94	217	TAPE	STH	R0,LSTFLG	AL102160
0256	2303		218	BS	BOTH	RESET LIST FLAG	AL102170
0258	4000	0C9A	219	LIST	STH	R0,TAPFLG	AL102180
	0000	025C	220	BOTH	EQU	*	AL102190
025C	07AA		221	XHR	R10,R10		AL102200
025E	07BB		222	XHR	R11,R11	ZERO OUT R11	AL102210
	0000	0260	223	RPARTN	EQU	*	AL102220
0260	4810	0C92	224	LH	R1,NTAPES	SET UP FOR CHECK	AL102230
0264	C410	0001	225	NHI	R1,1	MASK OFF EVEN ODD BIT	AL102240
0268	0AA1		226	AHR	R10,R1	ADD OFFSET VALUE	AL102250
026A	41F0	09AE	227	BAL	LINK,SETKB		AL102260
026E	41F0	095E	228	BAL	LINK,CRLF		AL102270
0272	C850	0D68	229	LHI	R5,MSG5	PART NUMBER	AL102280
0276	41F0	08A2	230	BAL	LINK,PRINT	PRINT IT	AL102290
027A	4800	0100	231	LH	R0,I0		AL102300
027E	4000	1EC4	232	STH	R0,IOSAVE		AL102310
0282	41E0	098C	233	BAL	R14,ASTSK		AL102320
0286	2451		234	LIS	PNT,1	LOAD 1	AL102330
0288	4050	0C96	235	STH	PNT,NOCRLF	SET CR LF FLAG	AL102340
028C	0755		236	XHR	PNT,PNT	ZERO POINTER	AL102350
028E	41F0	0932	237	CMD0	BAL	LINK,GETCHR	AL102360
0292	0824		238	LHR	R2,R4	READ A CHARACTER FROM CONSOLE	AL102370
0294	C520	0030	239	CLHI	R2,X'30'	LOAD ASCII CHARACTER INTO WORK	AL102380
0298	2185		240	BLS	CMD1	TEST CHARACTER	AL102390
029A	C520	003A	241	CLHI	R2,X'3A'	IF NOT 0-9 CHECK FOR SPECIAL CHAR	AL102400
029E	4280	02C0	242	BL	CMD4	TEST CHARACTER	AL102410
02A2	C520	002D	243	CMD1	CLHI	R2,C'-'	AL102420
02A6	2133		244	BNES	CMD2	BRANCH AND STORE WITH TAB VALUE	AL102430
02A8	2452		245	LIS	PNT,2	TEST CHARACTER	AL102440
02AA	230B		246	BS	CMD4	NOT - SE IF R OR F	AL102450
02AC	C520	0052	247	CMD2	CLHI	R2,C'R'	AL102460

0280	2133	248		BNES	CMD3	NOT R SEE IF F	AL102470
0282	2456	249		LIS	PNT,6	LOAD TAB VALUE 6	AL102480
0284	2306	250		BS	CMD4	BRANCH AND STORE WITH TAB VALUE	AL102490
0286	C520 0046	251	CMD3	CLHI	R2,C*F*	TEST CHARACTRE	AL102500
028A	4230 0260	252		BNE	RPARTN		AL102510
028E	2459	253		LIS	PNT,9	LOAD TAB VALUE OF 9	AL102520
02C0	D225 0C1E	254	CMD4	STB	R2,PARTNO(PNT)	STORE INTO PART NUMBER BUFFER	AL102530
02C4	2651	255		AIS	PNT,1	INCREMENT TAB	AL102540
02C6	C550 000C	256		CLHI	PNT,12	LIMIT YET	AL102550
02CA	4280 028E	257		BL	CM00	NO READ NEXT CHARACTER	AL102560
02CE	0755	258		XHR	PNT,PNT		AL102570
02D0	4050 0C96	259		STH	PNT,NOCRLF	RESET CRLF FLAG	AL102580
		260	*			IN ROM BUFFER	AL102590
02D4	41F0 095E	261		BAL	LINK,CRLF	CAR RETURN LINE FEED	AL102600
	0000 02D8	262	PUNLST	EQU	*		AL102610
02D8	4810 0C9A	263	PUN0	LH	R1,TAPFLG	TAPE ?	AL102620
02DC	4330 0312	264		BZ	LST0	NO	AL102630
02E0	4180 0A18	265		BAL	LINK3,SETUP2	SET UP PUNCH DEVICE	AL102640
02E4	4170 0A22	266		BAL	LINK2,PLEADER	PUNCH LEADER TAPE	AL102650
02E8	C850 0C1E	267		LHI	R5,PARTNO	LOAD PART NUMBER	AL102660
02EC	41F0 CA32	268		BAL	LINK,PUNCH	PUNCH IT	AL102670
02F0	4810 0C80	269		LH	R1,SORDFLG		AL102680
02F4	4230 0312	270		BZ	LST0		AL102690
02F8	245A	271		LIS	R5,10		AL102700
02FA	4830 0CB0	272		LH	R3,NULL	LOAD NULL FF CHAR	AL102710
02FE	4180 0A10	273	PUN3	BAL	LINK3,OUT1	OUTPUT 1	AL102720
0302	2751	274		SIS	R5,1	DECREMENT	AL102730
0304	2033	275		BNZS	PUN3	FINISHED YET	AL102740
0306	243D	276		LIS	R3,13		AL102750
0308	4180 0A10	277		BAL	LINK3,OUT1	OUTPUT	AL102760
030C	243A	278		LIS	R3,10		AL102770
030E	4180 0A10	279		BAL	LINK3,OUT1	OUTPUT	AL102780
0312	4810 0C9A	280	LST0	LH	R1,LSTFLG	LIST?	AL102790
0316	2337	281		BZS	PUN1		AL102800
0318	4110 09BC	282		BAL	R1,SETUP	SET UP LST DEVICE TO PRINT	AL102810
031C	C850 0C1E	283		LHI	R5,PARTNO	LOAD PART NUMBER	AL102820
0320	41F0 08A2	284		BAL	LINK,PRINT	PRINT IT	AL102830
	0000 0324	285	PUN1	EQU	*		AL102840
0324	4870 0C80	286		LH	R7,SORDFLG	TEST SIGNETICS OR DYNAMICS FLAG	AL102850
0328	4330 0A44	287		BZ	DYNPNLST	SPECIAL SPECTRUM DYNAMICS	AL102860
032C	2404	288		LIS	R0,4	4 DIGITS TO CONVERT	AL102870
032E	4810 0C98	289		LH	R1,DECADRS		AL102880
0332	C820 0C2E	290		LHI	R2,LNTOADR	WHERE TO PUT IT	AL102890
0336	41F0 0818	291		BAL	R15,HEXASC	CONVERT IT	AL102900
033A	0777	292		XHR	R7,R7	ZERO OUT R7	AL102910
033C	D35A 0E44	293	CAL0	LB	R5,ROMBER(R10)	LOAD UP BYTE TO BF PROSS	AL102920
0340	41F0 07F8	294		BAL	R15,INCADRS	INCREMENT DECIMAL ADDRESS	AL102930
0344	26A2	295		AIS	R10,2	INCREMENT	AL102940
0346	0835	296		LHR	R3,R5		AL102950
0348	9034	297		SRLS	R3,4		AL102960
034A	D333 0BF8	298		LB	R3,ASC(R3)	CONVERT TO ASCII	AL102970
034E	D237 0C34	299		STB	R3,LNTOBPR7(R7)		AL102980
0352	2671	300		AIS	R7,1		AL102990
0354	0835	301		LHR	R3,R5		AL103000
0356	C430 000F	302		NHI	R3,X*F*		AL103010

035A	D333	0BFE	303	LB	R3,ASC(R3)	CONVERT TO ASCII	AL103020
035E	D237	0C34	304	STB	R3,LNTOBPRT(R7)		AL103030
0362	2671		305	AIS	R7,1		AL103040
0364	C830	0027	306	LHI	R3,X*27'		AL103050
0368	D237	0C34	307	STB	R3,LNTOBPRT(R7)		AL103060
036C	2671		308	AIS	R7,1		AL103070
036E	C570	0030	309	CLHI	R7,48		AL103080
0372	4280	033C	310	BL	CALO	GO AGAIN	AL103090
	0000	0376	311	CAL1 EQU	*		AL103100
0376	C630	000A	312	LHI	R3,X*000A'		AL103110
037A	4037	0C34	313	STH	R3,LNTOBPRT(R7)		AL103120
037E	2672		314	AIS	R7,2		AL103130
0380	4810	0C9A	315	LH	R1,TAPFLG	TAPE?	AL103140
0384	2337		316	BZS	LST1		AL103150
0386	4180	0A18	317	BAL	LINK3,SETUP2	SET UP PUNCH DEVICE	AL103160
038A	C850	0C34	318	LHI	R5,LNTOBPRT	SET UP TO PUNCH	AL103170
038E	41F0	0A32	319	BAL	LINK,PUNCH	PUNCH IT	AL103180
0392	4810	0C9A	320	LST1 LH	R1,LSTFLG		AL103190
0396	2337		321	BZS	INCBOTH		AL103200
0398	4110	098C	322	BAL	R1,SETUP	SET UP LIST DEVICE	AL103210
039C	C850	0C2E	323	LHI	R5,LNTOADR	SET LINE ADDRESS TO PRINT	AL103220
03A0	41F0	08A2	324	BAL	LINK,PRINT	PRINT IT	AL103230
	0000	03A4	325	INCBOTH EQU	*		AL103240
03A4	C3A0	03FE	326	THI	R10,X*3FE'	FINISHED ONE TAPE YET	AL103250
03A8	4230	0324	327	BNZ	PUN1	NO GO AGAIN	AL103260
	0000	03AC	328	PUN2 EQU	*		AL103270
03AC	4810	0C9A	329	LH	R1,TAPFLG	TAPE?	AL103280
03B0	2330		330	BZS	LST2		AL103290
03B2	4180	0A18	331	BAL	LINK3,SETUP2	SET UP PUNCH DEVICE	AL103300
03B6	4810	0C80	332	LH	R1,SORDFLG		AL103310
03BA	4330	03C6	333	BZ	PUN4		AL103320
03BE	C850	0BF4	334	LHI	R5,TAPOFF	SET UP TAPE OFF CHARACTER	AL103330
03C2	41F0	0A32	335	BAL	LINK,PUNCH	PUNCH X*14' TAPE OFF	AL103340
	0000	03C6	336	PUN4 EQU	*		AL103350
03C6	4170	0A22	337	BAL	LINK2,PLEADER	PUNCH TRAILER	AL103360
03CA	4810	0C9A	338	LST2 LH	R1,LSTFLG	LIST?	AL103370
03CE	2335		339	BZS	INC1		AL103380
03D0	41F0	095E	340	BAL	LINK,CRLF		AL103390
03D4	41F0	095E	341	BAL	LINK,CRLF		AL103400
	0000	03D8	342	INC1 EQU	*		AL103410
03D8	4810	0C92	343	LH	R1,NTAPES		AL103420
03DC	C310	0001	344	THI	R1,1	IS IT EVEN OR ODD	AL103430
03E0	2332		345	BZS	INC2		AL103440
03E2	2684		346	AIS	R11,4		AL103450
03E4	94AB		347	INC2 EXBR	R10,R11		AL103460
03E6	2420		348	LIS	R2,0	ZERO OUT	AL103470
03E8	4020	0C98	349	STH	R2,DECADRS	DECIMAL ADDRESS	AL103480
03EC	2711		350	SIS	R1,1	DECREMENT	AL103490
03EE	4010	0C92	351	STH	R1,NTAPES	UPDATE # OF TAPES LEFT	AL103500
03F2	4230	0260	352	BNZ	RPARTN	NEXT	AL103510
03F6	41F0	09AE	353	BAL	LINK,SETKB		AL103520
03FA	C850	0DF4	354	LHI	R5,MSG15	END OF SPECIFY	AL103530
03FE	41F0	08A2	355	BAL	LINK,PRINT	PRINT IT	AL103540
0402	41F0	095E	356	BAL	LINK,CRLF	CAR RETURN LINE FEED	AL103550
0406	41F0	095E	357	BAL	LINK,CRLF	CAR RETURN LINE FEED	AL103560

040A	4300	01C2	358	B	STTST		AL103570
			359	*****			AL103580
			360	*			AL103590
			361	*	VERIFY PHASE		AL103600
			362	*			AL103610
			363	*	PURPOSE:		AL103620
			364	*	TO VERIFY THE DATA TAPE GENERATED FROM CAL OBJECT BY THE SPECIFY		AL103630
			365	*	PHASE.		AL103640
			366	*			AL103650
			367	*	DESIGN SPECIFICATION:		AL103660
			368	*	THIS PHASE IS DESIGNED TO CHECK THE DATA TAPES. THE PROGRAM		AL103670
			369	*	MAKES SURE THE CAL OBJECT IS READ AND THEN READS THE DATA		AL103680
			370	*	TAPE AND EFFECTIVELY REGENERATES THE DATA TAPE FROM		AL103690
			371	*	CAL OBJECT AND CHECKS IT AGAINST THE PUNCHED DATA TAPE.		AL103700
			372	*			AL103710
			373	*	HOW TO RUN TEST:		AL103720
			374	*	FOLLOW OPERATING PROCEDURES IN 06-194A15.		AL103730
			375	*			AL103740
040E	C850	0076	376	VERFY	LHI R5,MSG8	IS OBJECT PROGRAM IN BUFFER?	AL103750
0412	41F0	08A2	377		BAL LINK,PRINT	PRINT IT	AL103760
0416	41E0	098C	378		BAL R14,ASTSK		AL103770
041A	41F0	0932	379		BAL LINK,GETCHR	READ ONE CHARACTER FROM CONSOLE	AL103780
041E	C540	0059	380		CLHI R4,X'59'	Y?	AL103790
0422	2338		381		BES CONT5		AL103800
0424	C540	004E	382		CLHI R4,X'4E'	N?	AL103810
0428	203D		383		BNES VERFY		AL103820
042A	41F0	0882	384		BAL LINK,ZERRBF	ZERO OUT ROM BUFFER	AL103830
042E	4120	04F8	385		BAL LINK4,LDOBJ	LOAS CAL OBJECT	AL103840
	0000	0432	386	CONT5	EQU *		AL103850
0432	C850	0DB2	387	RSEGN0	LHI R5,MSG10	NUMBER OF DATA SEGMENTS?	AL103860
0436	41F0	08A2	388		BAL LINK,PRINT	PRINT IT	AL103870
043A	41E0	098C	389		BAL R14,ASTSK		AL103880
043E	41F0	0932	390		BAL LINK,GETCHR	GET INPUT FROM CONSOLE	AL103890
0442	0834		391		LHR R3,R4		AL103900
0444	C830	0030	392		SHI R3,X'30'		AL103910
0448	4030	0C92	393		STH R3,NTAPES		AL103920
044C	2732		394		SIS R3,2		AL103930
044E	C330	FFF9	395		THI R3,-1-6		AL103940
0452	4230	0432	396		BNZ RSEGN0	IF NOT 0 2 4 OR 6 THEN TRY AGAIN	AL103950
0456	07AA		397	RDCOMP	XHR R10,R10	ZERO OUT R10	AL103960
0458	07BB		398		XHR R11,R11	ZERO OUT R9	AL103970
045A	C850	0DC8	399	VER0	LHI R5,MSG11	PLACE DATA TAPE IN READER	AL103980
045E	41F0	08A2	400		BAL LINK,PRINT	PRINT IT	AL103990
0462	4170	0892	401		BAL LINK2,EXEC	HIT EXEC AND HALT	AL104000
0466	C830	0200	402		LHI R3,512	LOAD ONE LIMIT	AL104010
046A	4030	0C72	403		STH R3,SPECOUNT	STORE INTO COUNT	AL104020
046E	4830	0C92	404		LH R3,NTAPES		AL104030
0472	C430	0001	405		NHI R3,1	MASK OFF FOR EVEN OR ODD	AL104040
0476	0AA3		406		AHR R10,R3	ADD OFFSET VALUE	AL104050
0478	D3CA	0E44	407	VER1	LB R12,ROMBFR(R10)		AL104060
047C	41F0	082A	408	VER4	BAL LINK,RD BYTE	READ NEXT BYTE AND COMPARE EXIT	AL104070
			409	*		ON ERROR	AL104080
	0000	0480	410	VER5	EQU *		AL104090
0480	C590	0027	411		CLHI R9,X'27'	ARE TWO PREVIOUS DIGITS GOOD BYTE	AL104100
0484	2136		412		BNES VER3	NO TRY OTHER SPECIAL CHARACTER	AL104110

	0000 0486	413	VER6	EQU *		AL104120
0486	05C6	414		CLHR R12,R6	COMPARE OBJECT BYTE WITH DATABYTE	AL104130
	0000 0488	415	TOE5	EQU *		AL104140
0488	4230 0B64	416		BNE ER05	COMPARE FAIL	AL104150
048C	4300 04C6	417		B RETURN3		AL104160
0490	C590 0014	418	VER3	CLHI R9,X'14'	IS IT END OF TAPE?	AL104170
0494	203C	419		BNES VER4		AL104180
0496	9031	420	RETURN1	SRLS R3,1	TEST FOR EVEN OR ODD TAPE IN PAIR	AL104190
0498	2382	421		BNCS VER2	IF EVEN THEN SKIP DOWN AND DECREMENT	AL104200
049A	26B4	422		AIS R11,4	INCREMENT	AL104210
049C	94AB	423	VER2	EXBR R10,R11	INTO CORRECT POSITION	AL104220
049E	4830 0C92	424		LH R3,NTAPES		AL104230
04A2	2731	425		SIS R3,1	DECREMENT	AL104240
04A4	4030 0C92	426		STH R3,NTAPES		AL104250
04A8	4230 045A	427		BNZ VERO		AL104260
04AC	41F0 095E	428		BAL LINK,CRLF	CAR RETURN LINE FEED	AL104270
04B0	41F0 095E	429		BAL LINK,CRLF	CAR RETURN LINE FEED	AL104280
04B4	C850 0DE4	430		LHI R5,MSG14	END OF VRIFY	AL104290
04B8	41F0 08A2	431		BAL LINK,PRINT	PRINT IT	AL104300
04BC	4300 04DC	432		B TSTEND	FINISH	AL104310
04C0	26A2	433	RETURN2	AIS R10,2	INCREMENT	AL104320
04C2	4300 0478	434		B VER1	GO AGAIN	AL104330
	0000 04C6	435	RETURN3	EQU *		AL104340
04C6	4810 0C80	436		LH R1,SORDFLG	LOOK AT SIGN OR DYN FLAG	AL104350
04CA	2035	437		BNZS RETURN2		AL104360
04CC	4810 0C72	438		LH R1,SPECOUNT		AL104370
04D0	2711	439		SIS R1,1	DECREMENT	AL104380
04D2	4010 0C72	440		STH R1,SPECOUNT	UPDATE COUNT	AL104390
04D6	203B	441		BNZS RETURN2		AL104400
04D8	4300 0496	442		B RETURN1		AL104410
		443	*****			AL104420
		444	*			AL104430
		445	* TEST MODULE END ROUTINE			AL104440
		446	*			AL104450
	0000 04DC	447	TSTEND	EQU *		AL104460
04DC	C810 00F0	448		LHI R1,X'F0'		AL104470
04E0	9501	449		EPSR R0,R1	DISABLE INT @ PROCESSOR LEVEL	AL104480
04E2	4800 0C9E	450	KEEP7	LH R0,NOERR	LOOK @ ERROR FLAG	AL104490
04E6	2137	451		BNZS TSTEND1		AL104500
04E8	C850 0D10	452		LHI R5,NOERMSG		AL104510
04EC	41F0 08A2	453		BAL LINK,PRINT	PRINT "NO ERROR"	AL104520
04F0	41F0 095E	454		BAL LINK,CRLF		AL104530
04F4	4300 01C2	455	TSTEND1	B STTTST		AL104540
		456	* THIS SUBROUTINE READS THE OBJECT PROGRAM FROM INPUT TAPE.			AL104550
		457	* RELOCATES IT, AND STORES THE RELOCATED PROGRAM INTO ROM BUFFER			AL104560
	0000 04F8	458	LD0BJ	EQU *		AL104570
04F8	C850 0D30	459		LHI R5,MSG3	PLACE OBJECT TAPE IN READER	AL104580
04FC	41F0 08A2	460		BAL LINK,PRINT	PRINT IT	AL104590
0500	4170 0892	461		BAL LINK2,EXEC		AL104600
0504	4170 050A	462		BAL LINK2,RD0BJ	READ THE OBJECT TAPE AND STORE THE	AL104610
		463	*			AL104620
		464	*			AL104630
0508	0302	465		BR LINK4	ROM BUFFER	AL104640
		466	*****			AL104650
		467	* BASIC REL-LOADER			AL104660

		468	*	THIS LOADER OPERATES STAND-ALONE. IT ACCEPTS STANDARD	AL104670
		469	*	LOADER-FORMAT, INTERDATA TYPE M08/09 OR M16/17 FORMATS	AL104680
		470	*	PROGRAM-RELOCATION AND FORWARD-REFERENCE CHAINING IS	AL104690
		471	*	ALLOWED FOR.	AL104700
		472	*	LABEL AND ENTRY ITEMS ARE IGNORED	AL104710
		473	*	EXTRN ITEMS HALT, BUT ARE IGNORED ON RESTART	AL104720
		474	*	COMMON ITEMS HALT, WITH NO RESTART AVAILABLE	AL104730
		475	*		AL104740
		476	*	ERROR-STOP DISPLAYS:	AL104750
		477	*	01 CHECKSUM ERROR	AL104760
		478	*	02 SEQUENCE-ERROR	AL104770
		479	*	03 ATTEMPT TO LOAD OUTSIDE THE BUFFER	AL104780
		480	*	04 REF-CHAIN LOOP	AL104790
		481	*	FX X-CONTROL-ITEM ENCOUNTERED	AL104800
		482	*		AL104810
		483	*		AL104820
		484	*		AL104830
		485	*		AL104840
		486	BYTE	EQU 4	AL104850
		487	PICK	EQU 5	AL104860
		488	SEQNJH	EQU 6	AL104870
		489	ONE	EQU 7	AL104880
		490	TWO	EQU 8	AL104890
		491	FOUR	EQU 9	AL104900
		492	A	EQU 10	AL104910
		493	B	EQU 11	AL104920
		494	C	EQU 12	AL104930
		495	D	EQU 13	AL104940
		496	E	EQU 14	AL104950
		497	ABSF	EQU 15	AL104960
		498	BINDV	EQU X'78'	AL104970
		499	*		AL104980
050A	D000 1EC8	500	RDOBJ	STM R0,RSAVE	AL104990
050E	48A0 0C1C	501	LH	A,BIAS	AL105000
0512	40A0 0BF6	502	STH	A,LOC	LOAD BIAS VALUE
0516	C8A0 0E44	503	LHI	A,ROMBFR	LOC=BIAS
051A	40A0 0C84	504	STH	A,PTOP	AL105010
051E	0B66	505	CONT	SHR SEQNUM,SEQNUM	AL105020
0520	0BFF	506	SHR	ABSF,ABSF	AL105030
0522	C870 0001	507	LHI	ONE,1	CLEAR SEQNUM
0526	C880 0002	508	LHI	TWO,2	SET REL MODE
052A	C890 0004	509	LHI	FOUR,4	AL105050
052E	0B67	510	NEXT	SHR SEQNUM,ONE	SET CONSTANTS 1,2,4
0530	4120 0740	511	BAL	R2,INPUT	AL105060
0534	C8A0 006A	512	LHI	A,106	AL105070
0538	07CC	513	XHR	C,C	AL105080
053A	47CA 1E44	514	CKIT	XH C,BUFF(A)	DECR SEQ COUNT
053E	0BA8	515	SHR	A,TWO	INPUT ONE RECORD
0540	2213	516	BNMS	CKIT	AL105100
0542	C7C0 FFFF	517	XHI	C,-1	AL105110
	0000 0546	518	TOE1	EQU *	CLEAR REGISTER C
0546	4230 05C6	519	BNZ	CERR	AL105120
054A	4560 1E44	520	CLH	SEQNUM,BUFF	BY XH OF EVERY HW OF BUFR
	0000 054E	521	TOE2	EQU *	AND WHEN DONE,
054E	4230 05D2	522	BNE	SERR	AL105130
					AL105140
					AL105150
					AL105160
					AL105170
					AL105180
					AL105190
					AL105200
					AL105210

0552	C850	1E48	523		LHI	PICK,BUFF+4	ADJUST PICK,BYTE	AL105220
0556	C840	000C	524		LHI	BYTE,12		AL105230
			525	*				AL105240
055A	C550	1E80	526	LOOP	CLHI	PICK,BUFF+108	TEST IF RECORD DONE	AL105250
055E	4380	052E	527		BNL	NEXT		AL105260
0562	48A5	0000	528		LH	A,0(PICK)	EXTRACT NEXT COMMAND	AL105270
0566	4110	072A	529		BAL	R1,EXTR		AL105280
056A	08EA		530		LHR	E,A	SAVE ITEM FOR ERR STOP	AL105290
056C	0AAA		531		AHR	A,A		AL105300
056E	48BA	0574	532		LH	B,JUMP(A)	GO TO COMMAND ROUTINE	AL105310
0572	0308		533		BR	B		AL105320
			534	*				AL105330
0574	052E		535	JUMP	DC	NEXT,END,CHAIN,FLIP		AL105340
0576	0608							
0578	06E6							
057A	060E							
057C	0626		536		DC	LDx,LDL,RFIN,DFIN		AL105350
057E	0632							
0580	06B4							
0582	06C0							
0584	0666		537		DC	UNAB,UNRL,DUAB,DURL		AL105360
0586	066E							
0588	068C							
058A	06AC							
058C	06D2		538		DC	RBCD,DBCD,EITM,LABEL		AL105370
058E	06CC							
0590	0594							
0592	06CC							
			539	*				AL105380
0594	48A5	0000	540	EITM	LH	A,0(PICK)	FETCH SECOND DIGIT	AL105390
0598	4110	072A	541		BAL	R1,EXTR	OF EX CONTROL ITEMS	AL105400
059C	05A9		542		CLHR	A,FOUR	IF IT'S E4. ZERO SEQ	AL105410
059E	2134		543		BNES	LERR		AL105420
05A0	0766		544		XHR	SEQNUM,SEQNUM		AL105430
05A2	4300	055A	545		B	LOOP		AL105440
05A6	C8BE	00F0	546	LERR	LHI	B,x'F0'(E)	FETCH ERROR DISPLAY	AL105450
05AA	9A78		547		WDR	ONE,B	SHOW ERROR AND STP	AL105460
05AC	D280	000B	548		STB	B,ETESTNO	STORE FOR ERROR PRINT	AL105470
05B0	C850	0004	549		LHI	R5,ERRMSG	LOAD ERROR MSG FOR PRINT	AL105480
05B4	41F0	08A2	550		BAL	LINK,PRINT	PRINT IT	AL105490
05B8	2471		551		LIS	ONE,1	RESTORE CONSTANTS 1,2,4	AL105500
05BA	2482		552		LIS	TWO,2		AL105510
05BC	2494		553		LIS	FOUR,4		AL105520
05BE	C200	05C2	554		LPSW	***		AL105530
05C2	8000		555		DC	X'8000',LOOP		AL105540
05C4	055A							
			556	*				AL105550
	0000	05C6	557	CERR	EQU	*		AL105560
05C6	C8A0	3031	558		LHI	A,C'01'		AL105570
05CA	40A0	000C	559		STH	A,ERRNO	SET UP FOR PRINT	AL105580
05CE	4300	05F0	560		B	ERROR		AL105590
	0000	05D2	561	SERR	EQU	*		AL105600
05D2	C8A0	3032	562		LHI	A,C'02'		AL105610
05D6	40A0	000C	563		STH	A,ERRNO	SET UP FOR PRINT	AL105620
05DA	4300	05F0	564		B	ERROR		AL105630

05DE	0000	05DE	565	ADER	EQU	*		AL105640
05E2	C8A0	3033	566		LHI	A,C'03'		AL105650
05E6	40A0	000C	567		STH	A,ERRNO	SET UP FOR PRINT	AL105660
	2305		568		BS	ERROR		AL105670
05E8	0000	05E8	569	RELP	EQU	*		AL105680
05EC	C8A0	3034	570		LHI	A,C'04'		AL105690
05F0	40A0	0D0C	571		STH	A,ERRNO	SET UP FOR PRINT	AL105700
05F2	9A7A		572	ERROR	WDR	ONE,A	SHOW ERROR STOP	AL105710
05F6	C850	0C04	573		LHI	R5,ERRMSG		AL105720
05FA	41F0	08A2	574		BAL	LINK,PRINT	PRINT IT	AL105730
05FC	2471		575		LIS	ONE,1	RESTORE CONSTANTS 1,2,4	AL105740
05FE	2482		576		LIS	TWO,2		AL105750
0600	2494		577		LIS	FOUR,4		AL105760
0604	C200	0604	578		LPSW	**4		AL105770
0606	8000		579		DC	X'8000',A(NEXT+2)		AL105780
0608	0530							
060C	D100	1EC8	580	END	LM	R0,RSAVE		AL105790
	0307		581		BR	LINK2	RETURN	AL105800
			582	*				AL105810
060E	C7F0	FFFF	583	FLIP	XHI	ABSF,X'FFFF'	FLIP THE ABS FLAG	AL105820
0612	48A0	08F6	584		LH	A,LOC	FLIP LOC COUNTERS	AL105830
0616	48B0	06F8	585		LH	B,LOC+2		AL105840
061A	40A0	08F8	586		STH	A,LOC+2		AL105850
061E	40B0	09F6	587		STH	B,LOC		AL105860
0622	4300	055A	588		B	LOOP		AL105870
			589	*				AL105880
0626	4130	0704	590	LDX	BAL	R3,GETT	SET EXECUTION ADRS	AL105890
062A	40D0	0C8A	591		STH	D,LOCX		AL105900
062E	4300	055A	592		B	LOOP		AL105910
			593	*				AL105920
0632	4130	0704	594	LDL	BAL	R3,GETT	SET LOAD LOCATION	AL105930
0636	40D0	0C1C	595		STH	D,BIAS		AL105940
063A	40D0	08F6	596	LDL0	STH	D,LOC	STORE LOCATION COUNTER VALUE	AL105950
063E	48D0	0C1C	597	LDL1	SH	D,BIAS		AL105960
0642	CAD0	0E44	598	LDL2	AHI	D,ROMBFR		AL105970
0646	C5D0	0E44	599		CLHI	D,ROMBFR	COMPARE AGAINST ROMBFR ADDRESS	AL105980
	0000	064A	600	TOE3	EQU	*		AL105990
064A	4280	05DE	601		BL	ADER		AL106000
064E	C5D0	1E43	602		CLHI	D,RMBED		AL106010
0652	4380	05DE	603		BNL	ADER	OUTSIDE ROM BUFFER	AL106020
0656	45D0	0C84	604		CLH	D,PTOP		AL106030
065A	4280	055A	605		BL	LOOP		AL106040
065E	40D0	0C84	606		STH	D,PTOP		AL106050
0662	4300	055A	607		B	LOOP		AL106060
			608	*				AL106070
0666	4120	0714	609	UNAB	BAL	R2,WORD	LOAD 2 BYTES ABS	AL106080
066A	4300	0676	610		B	UNRX		AL106090
066E	4120	0714	611	UNRL	BAL	R2,WORD	LOAD 2 BYTES REL	AL106100
0672	4AD0	0C1C	612		AH	D,BIAS		AL106110
0676	48C0	08F6	613	UNRX	LH	C,LOC		AL106120
067A	48C0	0C1C	614		SH	C,BIAS		AL106130
067E	40DC	0E44	615		STH	D,ROMBFR(C)	STORE	AL106140
0682	48D0	08F6	616		LH	D,LOC	LOC VALUE	AL106150
0686	0AD8		617		AHR	D,TWO	INCR. LOC	AL106160
0688	4300	063A	618		B	LDL0		AL106170

068C	C8E0	0666	619	*					AL106180
0690	4120	0714	620	DUAB	LHI	E,UNAB	LOAD 4 BYTES ABS		AL106190
0694	48C0	0BF6	621	DU	BAL	R2,WORD			AL106200
0698	4BC0	0C1C	622		LH	C,LOC			AL106210
069C	40DC	0E44	623		SH	C,BIAS			AL106220
06A0	48C0	0BF6	624		STH	D,ROMBFR(C)			AL106230
06A4	0AC8		625		LH	C,LOC			AL106240
06A6	40C0	0BF6	626		AHR	C,TWO			AL106250
06AA	030E		627		STH	C,LOC			AL106260
			628		BR	E			AL106270
			629	*					AL106280
06AC	C8E0	066E	630	DURL	LHI	E,UNRL	LOAD 4 BYTES REL		AL106290
06B0	4300	0690	631		B	DU			AL106300
			632	*					AL106310
06B4	4130	0704	633	RFIN	BAL	R3,GETT	GET REF VALUE		AL106320
06B8	4000	0C86	634		STH	D,REF			AL106330
06BC	4300	055A	635		B	LOOP			AL106340
			636	*					AL106350
06C0	4130	0704	637	DFIN	BAL	R3,GETT	GET DEF VALUE		AL106360
06C4	40D0	0C88	638		STH	D,DEF			AL106370
06C8	4300	055A	639		B	LOOP			AL106380
			640	*					AL106390
06CC	C8B0	055A	641	DBCD	LHI	B,LOOP			AL106400
06D0	2304		642		BS	SKIPD			AL106410
06D2	C8B0	05A6	643	RBCD	LHI	B,LERR			AL106420
06D6	2301		644		BS	SKIPD			AL106430
	0000	06CC	645	LABEL	EQU	DBCD			AL106440
06D8	4120	0714	646	SKIPD	BAL	R2,WORD	SKIP DATA-ITEMS		AL106450
06DC	4120	0714	647		BAL	R2,WORD			AL106460
06E0	4120	0714	648		BAL	R2,WORD			AL106470
06E4	030B		649		BR	B			AL106480
			650	*					AL106490
06E6	48D0	0C88	651	CHAIN	LH	D,DEF	DEFINE CHAIN:		AL106500
06EA	48E0	0C86	652		LH	E,REF			AL106510
06EE	48CE	0000	653	CH1	LH	C,0(E)	FOLLOW THE THREAD		AL106520
06F2	40DE	0000	654		STH	D,0(E)	AND DEF EACH REF		AL106530
06F6	05CD		655		CLHR	C,D	BUT IF A REF=A DEF.		AL106540
	0000	06F8	656	TOE4	EQU	*			AL106550
06F8	4330	05E8	657		BE	REL	THEN WE'VE BEEN HERE BEFORE		AL106560
06FC	08EC		658		LHR	E,C	AND THIS IS A REF-LOOP.		AL106570
06FE	2038		659		BNZS	CH1			AL106580
0700	4300	055A	660		B	LOOP	SO FETCH ANOTHER ITEM...		AL106590
			661	*					AL106600
0704	4120	0714	662	GETT	BAL	R2,WORD	GET 2 BYTES OF DATA		AL106610
0708	08FF		663		LHR	ABSF,ABSF	AND ADD BIAS TO IT		AL106620
070A	4233	0000	664		BNZ	0(R3)	IF IN REL MODE		AL106630
070E	4AD0	0C1C	665		AH	D,BIAS			AL106640
0712	0303		666		BR	R3			AL106650
			667	*					AL106660
0714	08C9		668	WORD	LHR	C,FOUR	ASSEMBLE 1 WORD OR		AL106670
0716	48A5	0000	669	WORD1	LH	A,0(PICK)	TWO BYTES OF DATA		AL106680
071A	4110	072A	670		BAL	R1,EXTR	INTO REG D.		AL106690
071E	CDD0	0004	671		SLHL	D,4			AL106700
0722	06DA		672		OHR	D,A			AL106710
0724	0BC7		673		SHR	C,ONE			AL106720

0726	2038	674		BNZS	WORD1		AL106730
0728	0302	675		BR	R2		AL106740
		676	*				AL106750
072A	CCA4 0000	677	EXTR	SRHL	A,0(BYTE)	EXTRACT ONE FOUR BIT	AL106760
072E	C4A0 000F	678		NHI	A,X'F'	BYTE FROM THE DATA	AL106770
0732	0B49	679		SHR	BYTE,FOUR	IN REG A.	AL106780
0734	4311 0000	680		BNM	0(R1)		AL106790
0738	C840 000C	681		LHI	BYTE,12	UPDATE PICK AND BYTE	AL106800
073C	0A58	682		AHR	PICK,TWO		AL106810
073E	0301	683		BR	R1		AL106820
		684	*****				AL106830
		685	*				AL106840
		686	*				AL106850
		687	* INPUT ROUTINE				AL106860
		688	*				AL106870
		689	* READS EITHER M16/17 OR M08/09, 108-BYTE RECORD				AL106880
		690	* REDEFINE SOME REGISTERS				AL106890
	0000 0002	691	RTN	EGU	R2	LINK REGISTER	AL106900
	0000 000A	692	AC1	EQU	A		AL106910
	0000 000E	693	CBA	EQU	E	CUR BYTE ADRS POINTER	AL106920
	0000 000B	694	CRB	EQU	B	TEMP STOR FOR BYTE ASMB	AL106930
		695	*				AL106940
		696	* CALL	BAL	RTN,INPUT		AL106950
0740	D340 0078	697	INPUT	LB	DEV,BINDV	FETCH INPUT DEV ADRS	AL106960
0744	0548	698		CLHR	DEV,TWO	IF TTY, SELECT WRITE	AL106970
0746	4230 0760	699		BNE	IN1		AL106980
074A	DE40 0BFC	700		OC	DEV,TWRT	AND OUTPUT X-ON	AL106990
074E	4240 074A	701		BTC	4,*-4	REPEAT IF FSYN	AL107000
0752	9D43	702		SSR	DEV,DAT	AS SOON AS IT ISN'T	AL107010
0754	42F0 0752	703		BTC	15,*-2	BUSY	AL107020
0758	0A40 0BFA	704		WD	DEV,XON		AL107030
075C	4240 0758	705		BTC	4,*-4	REPEAT WRT IF FSYN.	AL107040
0760	DE40 0079	706	IN1	OC	DEV,BINDV+1	START DEVICE IN READ-	AL107050
0764	4240 0760	707		BTC	4,*-4	MODE (LOOP IF FSYN)	AL107060
0768	07EE	708		XHR	CBA,CBA	INITIALIZE FLAGS	AL107070
076A	40E0 0C8C	709		STH	CBA,CFLG	AND BUFFER-INDEX	AL107080
076E	40E0 0C8E	710		STH	CBA,BFLG		AL107090
0772	080E	711		LHR	ZERO,CBA		AL107100
		712	*				AL107110
0774	9D43	713	READIT	SSR	DEV,DAT	LOOP ON BUSY	AL107120
0776	42F0 0774	714		BTC	15,READIT	STATUS	AL107130
077A	9B43	715		RDR	DEV,DAT	READ A BYTE	AL107140
077C	4240 077A	716		BTC	4,*-2	REPEAT IF FSYN	AL107150
0780	9A73	717		WOR	ONE,DAT	SHOW DATA READ	AL107160
0782	48A0 0C8C	718		LH	AC1,CFLG	TEST C FLAG	AL107170
0786	4220 07CE	719		BP	STORE	IF + ITS M16/17 FORMAT	AL107180
078A	2118	720		RMS	TESTB		AL107190
078C	C530 00F0	721		CLHI	DAT,X'FG'	ELSE, WAIT & SEE	AL107200
0790	2135	722		BNES	TESTB		AL107210
0792	4070 0C8C	723		STH	ONE,CFLG		AL107220
0796	4300 0774	724		B	READIT	AND READ IN BUFFER	AL107230
079A	08A3	725	TESTB	LHR	AC1,DAT	OTHERWISE SEE IF	AL107240
079C	C4A0 000F	726		NHI	AC1,15	LEGAL M08/09 CHAR	AL107250
07A0	D3AA 0BE2	727		LB	AC1,ZTAB(AC1)	FETCH TABLED-ENTRY	AL107260
07A4	053A	728		CLHR	DAT,AC1	AND IS IT = DATA?	AL107270

07A6	4230	0774	729	BNE	READIT	IF NOT, IGNORE	AL107280
07AA	48A0	0C8E	730	LH	AC1,BFLG	IF SO, TEST B FLAG	AL107290
07AE	4230	07C4	731	BNZ	ASMB	IF SET, THIS IS AN ODD	AL107300
07B2	4070	0C8E	732	STH	ONE,BFLG	HALF-BYTE SO ASSEMBLE	AL107310
07B6	08B3		733	LHR	CRB,DAT	IF RESET, SAVE EVEN-	AL107320
07B8	CD60	0004	734	SLHL	CRB,4	HALF-BYTE AND SET B	AL107330
07BC	4060	0C6C	735	STH	SEQNUM,CFLG	IF LEGAL ZONES, SET C -	AL107340
07C0	4300	0774	736	B	READIT		AL107350
07C4	4000	0C8E	737	ASMB	STH ZERO,BFLG	ON ODD-ITEMS, RESET B	AL107360
07C8	C430	000F	738	NHI	DAT,15	AND ASSEMBLE A WHOLE	AL107370
07CC	063B		739	OHR	DAT,CRB	BYTE	AL107380
07CE	D23E	1E44	740	STORE	STB DAT,BUFF(CBA)	PUT IT IN BUFFER	AL107390
07D2	0AE7		741	AHR	CBA,ONE	BUMP THE POINTER	AL107400
07D4	C5E0	006C	742	CLHI	CBA,108	THRU YET???	AL107410
07D8	4280	0774	743	BL	READIT	NO. GET SOME MORE	AL107420
07DC	0548		744	CLHR	DEV,TWO	ELSE RETURN UNLESS	AL107430
07DE	0232		745	BNER	RTN	ITS A TELETYPE.	AL107440
07E0	DE40	0BFC	746	OC	DEV,TWRT	THEN	AL107450
07E4	4240	07E0	747	BTC	4, *-4	WAIT FOR A CHANCE	AL107460
07E8	9D43		748	SSR	DEV,DAT	AND SEND X-OFF	AL107470
07EA	42F0	07E8	749	BTC	15, *-2		AL107480
07EE	DA40	0BFB	750	WD	DEV,XOFF		AL107490
07F2	4240	07EE	751	BTC	4, *-4		AL107500
07F6	0302		752	BR	RTN		AL107510
			753	*****			AL107520
			754	*	THIS SUBROUTINE INCREMENTS A DECIMAL COUNTER		AL107530
			755	*			AL107540
	0000	07F8	756	INCADRS	EQU *		AL107550
07F8	2411		757	LIS	R1,1		AL107560
07FA	6110	0C98	758	AHM	R1,DECADRS	ADD ONE TO DECIMAL COUNT	AL107570
07FE	4810	0C98	759	LH	R1,DECADRS	LOAD UPDATED ADDRESS	AL107580
0802	C410	000F	760	NHI	R1,X'F'	MASK	AL107590
0806	C510	000A	761	CLHI	R1,X'A'	EXCEED 10?	AL107600
080A	023F		762	BNER	R15		AL107610
080C	2416		763	LIS	R1,6	ADD DECIMAL FACTOR	AL107620
080E	6110	0C98	764	AHM	R1,DECADRS	ADD 6 TO MAKE DECIMAL	AL107630
0812	4810	0C98	765	LH	R1,DECADRS	LOAD UPDATED ADDRESS	AL107640
0816	C410	00F0	766	NHI	R1,X'F0'	MASK OFF	AL107650
081A	C510	00A0	767	CLHI	R1,X'A0'	EXCEED 100	AL107660
081E	023F		768	BNER	R15	NO RETURN	AL107670
0820	C610	0060	769	LHI	R1,X'60'	ADD DECIMAL FACTOR	AL107680
0824	6110	0C98	770	AHM	R1,DECADRS	ADD 60 TO MAKE DECIMAL	AL107690
0828	030F		771	BR	R15	RETURN	AL107700
			772	* *****			AL107710
			773	*	THIS SUBROUTINE READS ONE BYTE FROM DATA TAPE AND		AL107720
			774	*	PUT IT IN R6		AL107730
	0000	082A	775	R0BYTE	EQU *		AL107740
082A	0766		776	R0ANSTUF	XHR R6,R6	ZERO OUT R6	AL107750
082C	D370	0078	777	LB	R7,X'78'	LOAD ADDRESS OF TAPE READER	AL107760
0830	DE70	0079	778	OC	R7,X'79'	LOAD COMMAND BYTE OF READER	AL107770
0834	9D78		779	R0ASF	SSR R7,R8	SENSE STATUS ON READER	AL107780
0836	42F0	0834	780	BTC	15,R0ASF	IS IT CLEAR TO READ	AL107790
083A	9879		781	RDR	R7,R9	READ DATA	AL107800
083C	C590	0020	782	CLHI	R9,X'20'		AL107810
0840	4330	0868	783	BE	SPECREAD		AL107820

0844	4810 0C80	784	LH	R1,SORDFLG		AL107830
0848	2133	785	BNZS	RDASF2		AL107840
084A	4300 0834	786	B	RDASF		AL107850
	0000 084E	787	RDASF2	EQU *		AL107860
084E	C590 0030	788	CLHI	R9,X*30'	IS IT VALID ASCII	AL107870
0852	028F	789	BLR	LINK	RETURN	AL107880
0854	C590 003A	790	CLHI	R9,X*3A'	IS IT GREATER THAN 9	AL107890
0858	2182	791	BLS	RDASF1		AL107900
085A	2797	792	SIS	R9,7	ADJUST CHARACTER	AL107910
085C	C490 000F	793	RDASF1	NHI R9,X*F'	MASK OFF LOWER ORDER DIGIT	AL107920
0860	9164	794	SLLS	R6,4	SHIFT OVER FOR COMBINATION WITH NEXT	AL107930
0862	0669	795	OHR	R6,R9	OR IN NEXT CHARACTER	AL107940
0864	4300 0834	796	B	RDASF		AL107950
	0000 0868	797	SPECREAD	EQU *		AL107960
0868	2448	798	LIS	R4,8		AL107970
086A	0722	799	XHR	R2,R2		AL107980
086C	9D78	800	SPEC11	SSR R7,R8		AL107990
086E	20F1	801	BTBS	15,1		AL108000
0870	9673	802	RDR	R7,R3		AL108010
0872	913F	803	SLLS	R3,15		AL108020
0874	ED20 0001	804	SLL	R2,1		AL108030
0878	2741	805	SIS	R4,1		AL108040
087A	2037	806	BNZS	SPEC11		AL108050
087C	0862	807	LHR	R6,R2		AL108060
087E	4300 0486	808	B	VER6		AL108070
		809	*****			AL108080
		810	*	THIS SUBROUTINE PUTS ZERO INTO ROM BUFFER		AL108090
		811	*			AL108100
	0000 0882	812	ZERRBF	EQU *		AL108110
0882	2440	813	LIS	R4,0	INIT R4	AL108120
0884	C850 0FFE	814	LHI	R5,X*FFE'	LIMIT	AL108130
0888	4045 0E44	815	RBZER	STH R4,ROMBFR(R5)	ZERO INTO BUFFER	AL108140
088C	2752	816	SIS	R5,2	DECREMENT	AL108150
088E	2213	817	BNMS	RBZER	IF NOT DONE DO AGAIN	AL108160
0890	030F	818	BR	LINK	RETURN	AL108170
		819	*****			AL108180
		820	*	THIS SUBROUTINE PUTS TOGETHER SOME COMMONLY USED PRINT		AL108190
		821	*	SEQUENCES		AL108200
		822	*			AL108210
0892	C850 0E0C	823	EXEC	LHI R5,MSG52	HIT EXEC RUN	AL108220
0896	41F0 08A2	824	BAL	LINK,PRINT	PRINT IT	AL108230
089A	C810 8000	825	LHI	R1,X*8000'	HALT PROCESSOR	AL108240
089E	9501	826	EPSR	R0,R1	ACTIVATE	AL108250
08A0	0307	827	BR	LINK2	RETURN	AL108260
		828	-----			AL108270
		829	*	THIS SUBROUTINE IS USED		AL108280
		830	*	TO PRINT THE ASCII MESSAGE		AL108290
		831	*			AL108300
08A2	D000 1EC8	832	PRINT	STM R0,RSVAVE	STORE REGISTERS	AL108310
08A6	D345 0000	833	PRINT2	LB R4,0(R5)	GET A MESSAGE BYTF	AL108320
08AA	41F0 08D4	834	BAL	LINK,OUTCHR		AL108330
08AE	274D	835	SIS	R4,13		AL108340
08B0	2333	836	BZS	PRINT3		AL108350
08B2	2651	837	AIS	R5,1		AL108360
08B4	2207	838	BS	PRINT2	LOOP FOR NEXT CHAR	AL108370

08B6	244A	839	PRINT3	LIS	R4,10		AL108380	
08B8	D310 1EC5	840		LB	R1,IOSAVE+1		AL108390	
08BC	2713	841		SIS	R1,3		AL108400	
08BE	2335	842		BZS	PRINT3A	BRANCH IF YES	AL108410	
08C0	41F0 08D4	843		BAL	LINK,OUTCHR		AL108420	
08C4	2541	844		LCS	R4,1		AL108430	
08C6	2302	845		BS	PRINT3B		AL108440	
08C8	2441	846	PRINT3A	LIS	R4,1	YES OUTPUT X*01'	AL108450	
08CA	41F0 08D4	847	PRINT3B	BAL	LINK,OUTCHR	TERMINAL CHARACTER	AL108460	
08CE	D100 1EC8	848	PRINT5	LM	R0,RSAVE		AL108470	
08D2	030F	849		BR	LINK		AL108480	
		850	*-----*					AL108490
		851	*					AL108500
08D4	40F0 092E	852	OUTCHR	STH	R15,OUT12+2	SAVE RETURN ADDRESS	AL108510	
08D8	D300 1EC5	853		LB	R0,IOSAVE+1		AL108520	
08DC	2704	854		SIS	R0,4		AL108530	
08DE	4230 0918	855		BNZ	OUTCHR2	BRANCH IF NO	AL108540	
08E2	4000 0930	856		STH	R0,PAUSE	RESET FLAG	AL108550	
	0000 08E6	857	OTC.0	EQU	*		AL108560	
08E6	D300 0C76	858		LB	R0,CONADR		AL108570	
08EA	9D01	859		SSR	R0,R1	CHAR TO READ?	AL108580	
08EC	2386	860		BFFS	8,OTC.2	BRANCH IF YES	AL108590	
08EE	4810 0930	861	OTC.1	LH	R1,PAUSE	PAUSED?	AL108600	
08F2	2036	862		BNZS	OTC.0	BRANCH YES WAIT FOR DC2	AL108610	
08F4	4300 0918	863		B	OUTCHR2		AL108620	
08F8	9B01	864	OTC.2	RDR	R0,R1	DC1,DC4(FDX ONLY)	AL108630	
08FA	C410 007F	865		NHI	R1,X*7F'		AL108640	
08FE	CB10 0012	866		SHI	R1,X*12'	DC 2	AL108650	
0902	2134	867		BNZS	OTC.3		AL108660	
0904	4010 0930	868		STH	R1,PAUSE	RESET FLAG	AL108670	
0908	2308	869		BS	OUTCHR2		AL108680	
090A	2712	870	OTC.3	SIS	R1,2	DC 4?	AL108690	
090C	4230 08E6	871		BNZ	OTC.0	NO	AL108700	
0910	40F0 0930	872		STH	LINK,PAUSE	RESET FLAG	AL108710	
0914	4300 08E6	873		B	OTC.0	AND WAIT FOR DC 2	AL108720	
	0000 0918	874	OUTCHR2	EQU	*		AL108730	
0918	4110 09BC	875		BAL	R1,SETUP	SET UP FOR PUTPUT	AL108740	
091C	9D01	876		SSR	R0,R1	WAIT FOR NOT BUSY	AL108750	
091E	2137	877		BTFS	3,OUT0	B	AL108760	
0920	2082	878		BTBS	8,2		AL108770	
0922	9A04	879		WDR	R0,R4	OUT PUT DATA BYTE	AL108780	
0924	DD00 0CB3	880	OTC.4	SS	R0,SINK		AL108790	
0928	2132	881		BTFS	3,OUT0		AL108800	
092A	2083	882		BTBS	8,OTC.4		AL108810	
	0000 092C	883	OUT0	EQU	*		AL108820	
092C	4300 092C	884	OUT12	B	*		AL108830	
0930	0000	885	PAUSE	DCX	0		AL108840	
		886	*****					AL108850
		887	* THIS SUBROUTINE IS USED					AL108860
		888	* TO GET A CHAR FROM KEYBOARD (IN REG R4)					AL108870
		889	*					AL108880
0932	4140 0996	890	GETCHR	BAL	R4,KBREAD	PUT KB DEV INTO READ MODE	AL108890	
0936	9004	891		SSR	R0,R4		AL108900	
0938	021F	892		BTCR	1,LINK	IF DU RETURN	AL108910	
093A	2082	893		BTBS	8,2	IF BUSY LOOP	AL108920	

093C	9B04	894	RDR	R0,R4	READ CHARACTER IN R4	AL108930
093E	D390 0C6E	895	ECHO	LB R9,CONRD		AL108940
0942	C590 00A9	896		CLHI R9,X'A9'	CAROUSEL?	AL108950
0946	2137	897		BNES ECHR TN	NO DO NOT ECHO	AL108960
0948	D390 0C77	898		LB R9,CONADR+1		AL108970
094C	DD90 0CB3	899		SS R9,SINK		AL108980
0950	2082	900		BTBS 8,2		AL108990
0952	9A94	901		WDR R9,R4	ECHO RECEIVED BYTF	AL109000
0954	C440 007F	902	ECHR TN	NHI R4,X'7F'	REMOVE PARITY	AL109010
0958	4800 0C96	903		LH R0,NOCLRF	TEST NOCLRF FLAG	AL109020
095C	023F	904		BNZR LINK	IF NOT ZERO RETURN	AL109030
095E	D000 1EC8	905	CRLF	STM R0,RSAVE	STORE REGISTERS	AL109040
0962	2440	906		LIS R4,13		AL109050
0964	41F0 08D4	907		BAL LINK,OUTCHR	OUTPUT CR	AL109060
0968	2440	908		LIS R4,13	CARRIAGE RETURN	AL109070
096A	41F0 08D4	909		BAL LINK,OUTCHR	OUTPUT IT	AL109080
096E	4300 088E	910		B PRINT3		AL109090
		911		-----		AL109100
		912		* THIS SUBROUTINE IS USED		AL109110
		913		* TO OUTPUT '?' TO CONSOLE		AL109120
		914		*		AL109130
0972	41F0 095E	915	QUESTN	BAL LINK,CRLF		AL109140
0976	40F0 0C9C	916		STH R15,ISITERR		AL109150
097A	C850 0D1A	917		LHI R5,QMSG		AL109160
097E	41F0 08A2	918		BAL LINK,PRINT	PRINT '?'	AL109170
0982	0700	919		XHR R0,R0		AL109180
0984	4000 0C9C	920		STH R0,ISITERR		AL109190
0988	41F0 095E	921		BAL LINK,CRLF	SPACE	AL109200
	0000 098C	922	ASTSK	EQJ *		AL109210
098C	C840 002A	923		LHI R4,X'2A'	ASTERISK	AL109220
0990	41F0 08D4	924		BAL LINK,OUTCHR	OUTPUT A CHARACTER	AL109230
0994	030E	925		BR R14	RETURN	AL109240
		926		-----		AL109250
		927		* THIS SUBROUTINE IS USED		AL109260
		928		* TO PUT KEYBOARD DEVICE IN READ MODE		AL109270
		929		*		AL109280
0996	D300 0C76	930	KBREAD	LB R0,CONADR		AL109290
099A	DE00 0C6E	931		OC R0,CONRD		AL109300
099E	4890 0C70	932		LH R9,PASFLG	PASLA?	AL109310
09A2	0334	933	TTYGET	BZR R4	RETURN	AL109320
09A4	DB00 0CB3	934	CRTGET	RD R0,SINK	DUMMY READ	AL109330
09A8	DE00 0CB6	935		OC R0,CONRQ2S		AL109340
09AC	0304	936		BR R4	RETURN	AL109350
		937		*****		AL109360
		938		* THIS SUBROUTINE IS USED TO DIRECT I/O TO CONSOLE		AL109370
		939		*		AL109380
09AE	D300 0100	940	SETKB	LB R0,IO		AL109390
09B2	9410	941		EXBR R1,R0		AL109400
09B4	0610	942		OHR R1,R0		AL109410
09B6	4010 1EC4	943		STH R1,IOSAVE	KB=LIST	AL109420
09BA	030F	944		BR LINK	RETURN	AL109430
		945		-----		AL109440
		946		* THIS SUBROUTINE IS USED		AL109450
		947		* LIST DEVICE SET UP ROUTINE		AL109460
		948		*		AL109470

09BC	D300	1EC5	949	SETUP	LB	R0,IOSAVE+1	GET LIST DEVICE IDENTIFIER	AL109480
09C0	2701		950		SIS	R0,1		AL109490
09C2	4330	09DE	951		BZ	CRTDRV	YES GO TO CRT DRIVER	AL109500
09C6	2701		952		SIS	R0,1		AL109510
09C8	2336		953		BZS	TTYDRV	YES GO TO TTY DRIVER	AL109520
09CA	2701		954		SIS	R0,1		AL109530
09CC	233E		955		BZS	LPDRV		AL109540
09CE	2701		956		SIS	R0,1		AL109550
09D0	4330	09F2	957		BZ	CARDRV	YES GO TO CAROUSEL DRIVER	AL109560
09D4	D300	0105	958	TTYDRV	LB	R0,CLIFADR+1		AL109570
09D8	DE00	0C6D	959		OC	R0,CLIFWRT		AL109580
09DC	0301		960		BR	R1		AL109590
09DE	D300	0103	961	CRTDRV	LB	R0,PASLADR+1		AL109600
09E2	DE00	0C69	962		OC	R0,CRTWRT		AL109610
09E6	0301		963		BR	R1		AL109620
09E8	D300	0106	964	LPDRV	LB	R0,LPADR		AL109630
09EC	DE00	0CA8	965		OC	R0,LPWRT		AL109640
09F0	0301		966		BR	R1		AL109650
09F2	D300	0103	967	CARDRV	LB	R0,PASLADR+1		AL109660
09F6	DE00	0C6B	968		OC	R0,CARWRT		AL109670
09FA	0301		969		BR	R1		AL109680
			970	*				AL109690
09FC			971		ORG	X'A00'		AL109700
			972	*****				AL109710
			973	* THIS MUST RESIDE AT X'A00'-X'A10' FOR PURPOSE OF				AL109720
			974	* COMPATABILITY OF STARTING ADDRESSES				AL109730
			975	*				AL109740
0A00	4300	0108	976	ORIGIN1	B	START1		AL109750
0A04	4300	0108	977	ORIGIN2	B	START1		AL109760
0A08	4300	0108	978	ORIGIN3	B	START1		AL109770
0A0C	4300	0108	979	ORIGIN4	B	START1		AL109780
			980	*****				AL109790
			981	* THIS SUBROUTINE OUTPUTS A CHARACTER				AL109800
			982	* TO THE PUNCH DEVICE				AL109810
			983	*				AL109820
0A10	9D4C		984	OUT1	SSR	DEV,R12		AL109830
0A12	20F1		985		BTBS	15.1		AL109840
0A14	9A43		986		WDR	DEV,R3		AL109850
0A16	0308		987		BR	LINK3		AL109860
			988	*****				AL109870
			989	* THIS SUBROUTINE SETS UP THE PUNCH DEVICE				AL109880
			990	*				AL109890
	0000	0A16	991	SETUP2	EQU	*		AL109900
0A18	D340	007A	992		LB	R4,X'7A'	LOAD ADDRESS OF PUNCH	AL109910
0A1C	DE40	007B	993		OC	R4,X'7B'	OUTPUT COMMAND FOR PUNCH	AL109920
0A20	0308		994		BR	LINK3		AL109930
			995	* *****				AL109940
			996	* THIS SUBROUTINE PUNCHES 200 FRAMES OF ZERO				AL109950
			997	*				AL109960
	0000	0A22	998	PLEADER	EQU	*		AL109970
0A22	C810	00C8	999		LHI	R1,200	200 COUNT FOR # OF ZEROES IN LEADFR	AL109980
0A26	0733		1000		XHR	R3,R3		AL109990
0A28	4180	0A10	1001	LEADER1	BAL	LINK3,OUT1		AL110000
0A2C	2711		1002		SIS	R1,1		AL110010
0A2E	2213		1003		BNMS	LEADER1		AL110020

0A30	0307	1004	BR	LINK2		AL110030
		1005	* *****			AL110040
		1006	* THIS SUBROUTINE PUNCHES A LINE OF DATA UNTIL AN X'FF' IS ENCOUNTERED			AL110050
		1007	*			AL110060
	0000 0A32	1008	PUNCH	EQU *		AL110070
0A32	0335 0000	1009	LDANTHER	LB R3,0(R5)		AL110080
0A36	C530 00FF	1010	CLHI	R3,X'FF'	END CHARACTER YET	AL110090
0A3A	033F	1011	BER	LINK		AL110100
0A3C	4180 0A10	1012	BAL	LINK3.OUT1		AL110110
0A40	2651	1013	AIS	R5,1		AL110120
0A42	2208	1014	BS	LDANTHER		AL110130
		1015	* THIS ROUTINE LISTS AND PUNCHES THE SPECTRUM DYNAMICS FORMAT			AL110140
		1016	*			AL110150
	0000 0A44	1017	DYNPNLST	EQU *		AL110160
0A44	07EE	1018	XHR	R14,R14	ZERO OUT COUNT	AL110170
0A46	40E0 0C72	1019	STH	R14,SPECOUNT		AL110180
0A4A	C880 0010	1020	LHI	R8,16		AL110190
0A4E	4080 0C74	1021	STH	R8,SPECNT		AL110200
0A52	0777	1022	SPEC1	XHR R7,R7	ZERO OUT INDEX	AL110210
0A54	2404	1023	LIS	R0,4	4 DIGITS TO CONVERT	AL110220
0A56	4810 0C98	1024	LH	R1,DECADRS	DATA TO CONVERT	AL110230
0A5A	C827 0C34	1025	LHI	R2,LNTOBPRT(R7)	DESTINATION	AL110240
0A5E	41FC 0B18	1026	BAL	R15,HEXASC	DO CONVERT	AL110250
0A62	2674	1027	AIS	R7,4	INCREMENT	AL110260
0A64	C840 2020	1028	LHI	R4,X'2020'	LOAD SPACE	AL110270
0A68	D247 0C34	1029	STB	R4,LNTOBPRT(R7)	STORE IN MESSAGE	AL110280
0A6C	2671	1030	AIS	R7,1	INCREMENT	AL110290
0A6E	D30A 0E44	1031	LB	R0,ROMBFR(R10)	LOAD DATA BYTE	AL110300
0A72	26A2	1032	AIS	R10,2	INCREMENT	AL110310
0A74	C817 0C34	1033	LHI	R1,LNTOBPRT(R7)	DESTINATION	AL110320
0A78	41FD 0B40	1034	BAL	R15,BYCON	EXPAND AND PLACE	AL110330
0A7C	2678	1035	AIS	R7,8	INCREMENT	AL110340
0A7E	41F0 07F8	1036	BAL	R15,INCADRS	INCREMENT DECIMAL ADDRESS	AL110350
0A82	4810 0C94	1037	LH	R1,LSTFLG	DO WE LIST	AL110360
0A86	4330 0ADC	1038	BZ	SPEC3	NO SKIP	AL110370
0A8A	070D	1039	XHR	R13,R13	ZERO OUT COUNTER	AL110380
0A8C	034D 0C34	1040	SPEC2	LB R4,LNTOBPRT(R13)	LOAD BYTE	AL110390
0A90	D24E 1E44	1041	STB	R4,BUFF(R14)	STORE BYTE	AL110400
0A94	26E1	1042	AIS	R14,1	INCREMENT	AL110410
0A96	26D1	1043	AIS	R13,1	INCREMENT	AL110420
0A98	C500 0000	1044	CLHI	R13,13	ARE WE FINISHED	AL110430
0A9C	4230 0A8C	1045	BNE	SPEC2	NO GO AGAIN	AL110440
0AA0	C840 2020	1046	LHI	R4,X'2020'	LOAD SPACE	AL110450
0AA4	D24E 1E44	1047	STB	R4,BUFF(R14)	STUFF INTO OUTPUT BUFFER	AL110460
0AA8	26E1	1048	AIS	R14,1	INCREMENT	AL110470
0AAA	4840 0C72	1049	LH	R4,SPECOUNT		AL110480
0AAE	2641	1050	AIS	R4,1		AL110490
0AB0	4040 0C72	1051	STH	R4,SPECOUNT		AL110500
0AB4	C540 0004	1052	CLHI	R4,4		AL110510
0AB8	4230 0ADC	1053	BNE	SPEC3	NO GO AGAIN	AL110520
0ABC	244D	1054	LIS	R4,13		AL110530
0ABE	D24E 1E44	1055	STB	R4,BUFF(R14)	STUFF INTO BUFFER	AL110540
0AC2	26E1	1056	AIS	R14,1		AL110550
0AC4	244A	1057	LIS	R4,10		AL110560
0AC6	D24E 1E44	1058	STB	R4,BUFF(R14)		AL110570

0ACA	07EE	1059	XHR	R14,R14	ZERO OUT COUNTER	AL110580
0ACC	40E0 0C72	1060	STH	R14,SPECOUNT		AL110590
0ADD	4110 09BC	1061	BAL	R1,SETUP	SET UP LIST	AL110600
0AD4	C850 1E44	1062	LHI	R5,BUFF	START ADDRESS	AL110610
0AD8	41F0 08A2	1063	BAL	R15,PRINT	PRINT IT	AL110620
0ADC	244D	1064	SPEC3	LIS	R4,13	AL110630
0ADE	D247 0C34	1065	STB	R4,LNTOBPRT(R7)		AL110640
0AE2	2671	1066	AIS	R7,1		AL110650
0AE4	244A	1067	LIS	R4,10		AL110660
0AE6	D247 0C34	1068	STB	R4,LNTOBPRT(R7)		AL110670
0AEA	2671	1069	AIS	R7,1		AL110680
0AEC	2541	1070	LCS	R4,1	LOAD END CHARACTER	AL110690
0AEE	D247 0C34	1071	STB	R4,LNTOBPRT(R7)	STORE INTO LINE BUFFER	AL110700
0AF2	4810 0C9A	1072	LH	R1,TAPFLG	DO WE PUNCH TAPE	AL110710
0AF6	4330 0B06	1073	BZ	SPEC4	NO SKIP	AL110720
0AFA	4180 0A18	1074	BAL	LINK3,SETUP2	SET UP PUNCH	AL110730
0AFE	C850 0C34	1075	LHI	R5,LNTOBPRT	START ADDRESS OF RUFFER	AL110740
0B02	41F0 0A32	1076	BAL	R15,PUNCH	PUNCH IT	AL110750
0B06	4880 0C74	1077	SPEC4	LH	R8,SPECNT	AL110760
0B0A	2781	1078	SIS	R8,1		AL110770
0B0C	4080 0C74	1079	STH	R8,SPECNT		AL110780
0B10	4230 0A52	1080	BNZ	SPEC1		AL110790
0B14	4300 03A4	1081	B	INCBOTH	YES INCREMENT BOTH	AL110800
		1082	*	THIS SUBROUTINE CONVERTS HEX DATA TO ASCII		AL110810
		1083	*	R0 = NUMBER OF DIGITS TO CONVERT		AL110820
		1084	*	R1 = DATA TO BE CONVERTED		AL110830
		1085	*	R2 = ADDRESS OF DESTINATION		AL110840
		1086	*			AL110850
		1087	HEXASC	EQU	*	AL110860
0B18	0000 0B18	1088	STM	R0,RSAVE	SAVE REGISTERS	AL110870
0B1C	0830	1089	LDAR	R3,R0	LOAD NUMBER OF DIGITS TO BE CONVERTED	AL110880
0B1E	9132	1090	SLLS	R3,2	ADJUST	AL110890
0B20	2734	1091	SIS	R3,4	DECREMENT	AL110900
0B22	0841	1092	HEXASC1	LDAR	R4,R1	LOAD DATA TO BE CONVERTED
0B24	CC43 0000	1093	SRAL	R4,0(R3)	ADJUST DATA	AL110920
0B28	C440 000F	1094	NHI	R4,15	MASK OFF LAST DIGIT	AL110930
0B2C	D344 0BFE	1095	LB	R4,ASC(R4)	CONVERT TO ASCII	AL110940
0B30	D242 0000	1096	STB	R4,0(R2)	STORE TO DESTINATION	AL110950
0B34	2621	1097	AIS	R2,1	INCREMENT	AL110960
0B36	2734	1098	SIS	R3,4	DECREMENT	AL110970
0B38	2218	1099	BNMS	HEXASC1	GO AGAIN	AL110980
0B3A	D100 1EC8	1100	LM	R0,RSAVE	RESTORE REGISTERS	AL110990
0B3E	030F	1101	BR	LINK	RETURN	AL111000
		1102	*	THIS SUBROUTINE EXPANDS A BYTE INTO 8 BITS		AL111010
		1103	*	WITH EACH BIT REPRESENTED IN ASCII DATA		AL111020
		1104	*	R0 = DATA TO BE CONVERTED		AL111030
		1105	*	R1 = DESTINATION ADDRESS		AL111040
		1106	*			AL111050
		1107	BYCON	EQU	*	AL111060
0B40	0000 1EC8	1108	STM	R0,RSAVE	SAVE REGISTERS	AL111070
0B44	2457	1109	LIS	R5,7	LOAD UP COUNTER	AL111080
0B46	0830	1110	LHR	R3,R0	LOAD DATA BYTE	AL111090
0B48	9138	1111	SLLS	R3,8	ADJUST DATA BYTE TO TOP OF R3	AL111100
0B4A	0722	1112	BYCON1	XHR	R2,R2	ZERO OUT R2
0B4C	ED20 0001	1113	SLL	R2,1	SHIFT TOP BIT OF R3 INTO R2	AL111120

0850	D322	0BFE	1114	LB	R2,ASC(R2)	CONVERT TO ASCII	AL111130
0854	D221	0000	1115	STB	R2,0(R1)	STORE INTO MESSAGE	AL111140
0858	2611		1116	AIS	R1,1	INCREMENT	AL111150
085A	2751		1117	SIS	R5,1	DECREMENT	AL111160
085C	2219		1118	BNMS	BYCON1	GO AGAIN	AL111170
085E	D100	1EC8	1119	LM	R0,RSAVE	RESTORE REGISTERS	AL111180
0862	030F		1120	BR	LINK	RETURN	AL111190
			1121	*****			AL111200
			1122	* ERROR ROUTINES			AL111210
			1123	*			AL111220
	0000	0864	1124	ER05	EQU *		AL111230
0864	C810	3035	1125	LHI	R1,C'05'	LOAD 5	AL111240
0868	4010	0D0C	1126	STH	R1,ERRNO	STORE FOR ERROR PRINT	AL111250
086C	0856		1127	LHR	R5,R6	LOAD INTO WORK	AL111260
086E	9054		1128	SRLS	R5,4	FIRST DIGIT	AL111270
0870	D355	0BFE	1129	LB	R5,ASC(R5)	CONVERT TO ASCII	AL111280
0874	D250	0E2E	1130	STB	R5,MSG58	SET UP MESSAGE	AL111290
0878	0856		1131	LHR	R5,R6	LOAD INTO WORK	AL111300
087A	C450	000F	1132	NHI	R5,15		AL111310
087E	D355	0BFE	1133	LB	R5,ASC(R5)	CONVERT TO ASCII	AL111320
0882	D250	0E2F	1134	STB	R5,MSG58+1	SET UP MESSAGE	AL111330
0886	085C		1135	LHR	R5,R12		AL111340
0888	9054		1136	SRLS	R5,4		AL111350
088A	D355	0BFE	1137	LB	R5,ASC(R5)		AL111360
088E	D250	0E40	1138	STB	R5,MSG58.1		AL111370
0892	085C		1139	LHR	R5,R12		AL111380
0894	C450	000F	1140	NHI	R5,15		AL111390
0898	D355	0BFE	1141	LB	R5,ASC(R5)		AL111400
089C	D250	0E41	1142	STB	R5,MSG58.1+1		AL111410
08A0	2421		1143	LIS	R2,1	SET UP	AL111420
08A2	C810	00F0	1144	ERRCOM	LHI R1,X'F0'		AL111430
08A6	9501		1145	EPSK	R0,R1	DISABLE INT. @ PROCESSOR LEVEL	AL111440
08A8	4020	0C9C	1146	STH	R2,ISITERR	SET ERROR FLAG	AL111450
08AC	4020	0C9E	1147	STH	R2,NOERR		AL111460
08B0	C850	0D04	1148	ERR1	LHI R5,ERRMSG		AL111470
08B4	41F0	08A2	1149	BAL	LINK,PRINT	PRINT 'ERROR TTNN'	AL111480
			1150	*		TT = TEST #, NN = ERROR #	AL111490
08B8	C850	0E2A	1151	LHI	R5,MSG57	WAS SHOULD BE	AL111500
08BC	41F0	08A2	1152	BAL	LINK,PRINT	PRINT IT	AL111510
08C0	41F0	095E	1153	BAL	LINK,CRLF	CARRIAGE RETURN LINE LEED	AL111520
08C4	4300	04DC	1154	B	TSTEND		AL111530
08C8	C850	0D94	1155	PNG	LHI R5,MSG9		AL111540
08CC	41F0	08A2	1156	BAL	LINK,PRINT		AL111550
08D0	41F0	095E	1157	BAL	LINK,CRLF		AL111560
08D4	4300	01C2	1158	B	STTTST		AL111570
			1159	* DATA CONSTANTS			AL111580
08D8			1160	ALIGN	8		AL111590
			1161	-----			AL111600
08D8	30B1		1162	ZTAB2	DC X'30B1',X'B233',X'R435',X'36B7',X'B839'		AL111610
08DA	B233						
08DC	B435						
08DE	36B7						
08E0	B839						
08E2	9081		1163	ZTAB	DC X'9081'		AL111620
08E4	8283		1164	DC	X'8283'		AL111630

0BE6	8495		1165	DC	X'8495'	AL111640	
0BE8	9697		1166	DC	X'9697'	AL111650	
0BEA	9899		1167	DC	X'9899'	AL111660	
0BEC	9A9B		1168	DC	X'9A9B'	AL111670	
0BEE	9C9D		1169	DC	X'9C9D'	AL111680	
0BF0	9E9F		1170	DC	X'9E9F'	AL111690	
0BF2	A0A9		1171	FEED	DC	X'A0A9'	AL111700
	0000	0BF3	1172	TSTP	EQU	FEED+1	AL111710
0BF4	14FF		1173	TAPOFF	DC	X'14FF'	AL111720
0BF6	0080		1174	LOC	DC	X'80'	AL111730
0BF8	0000		1175		DC	0	AL111740
0BFA	9193		1176	XON	DC	X'9193'	AL111750
	0000	0BFB	1177	XOFF	EQU	XON+1	AL111760
0BFC	98A4		1178	TWRT	DC	X'98A4'	AL111770
	0000	0BFD	1179	TREAD	EQU	TWRT+1	AL111780
0BFE	3031	3233 3435 3637	1180	ASC	DC	C'0123456789ABCDEF'	AL111790
0C06	3839	4142 4344 4546					
0C0E	0CA0		1181	FFCR	DC	X'0CA0',X'A0A0',X'A0A0',X'A0A0',X'8D0A'	AL111800
0C10	A0A0						
0C12	A0A0						
0C14	A0A0						
0C16	8D0A						
0C18	8D0A		1182	CRLF2	DC	X'8D0A'	AL111810
0C1A	20A0		1183	BLANK2	DC	X'20A0'	AL111820
0C1C	0080		1184	BIAS	DC	X'80'	AL111830
0C1E			1185	PARTNO	DS	12	AL111840
0C2A	0D0A		1186		DC	X'0D0A'	AL111850
0C2C	12FF		1187		DC	X'12FF'	AL111860
0C2E	2020	2020 2020	1188	LNTOADR	DC	C'	AL111870
0C34			1189	LNTOBPR	DS	50	AL111880
0C66	FFFF		1190		DC	X'FFFF'	AL111890
0C68	B9AB		1191	CRTRD	DCX	B9AB	AL111900
	0000	0C69	1192	CRTWRT	EQU	CRTRD+1	AL111910
0C6A	A9AB		1193	CARRD	DCX	A9AB	AL111920
	0000	0C6B	1194	CARWRT	EQU	CARRD+1	AL111930
0C6C	A4D8		1195	CLIFRD	DCX	A4D8	AL111940
	0000	0C6D	1196	CLIFWRT	EQU	CLIFRD+1	AL111950
0C6E	0000		1197	CONRD	DC	0	AL111960
0C70	0000		1198	PASFLG	DC	0	AL111970
0C72	0000		1199	SPECOUNT	DCX	0	AL111980
0C74	0000		1200	SPECNT	DCX	0	AL111990
0C76	0000		1201	CONADR	DC	0	AL112000
0C78	0000		1202	CONBYT	DC	0	AL112010
0C7A	0000		1203	STRTOFLN	DC	0	AL112020
0C7C	0000		1204	ROMCOUNT	DC	0	AL112030
0C7E	0000		1205	XITFLG	DC	X'0'	AL112040
0C80	0000		1206	SORDFLG	DC	0	AL112050
0C82	0000		1207	SPECFLG	DC	0	AL112060
0C84	0000		1208	PTOP	DC	0	AL112070
0C86	0000		1209	REF	DC	0	AL112080
0C88	0000		1210	DEF	DC	0	AL112090
0C8A	0000		1211	LOCX	DC	0	AL112100
0C8C	0000		1212	CFLG	DC	0	AL112110
0C8E	0000		1213	BFLG	DC	0	AL112120
0C90	0000		1214	STPFLG	DC	0	AL112130

0C92	0000		1215	NTAPES	DC	0		AL112140
0C94	0000		1216	LSTFLG	DC	0		AL112150
0C96	0000		1217	NOCRLF	DC	0		AL112160
0C98	0000		1218	DECADRS	DC	0		AL112170
0C9A	0000		1219	TAPFLG	DC	0		AL112180
0C9C	0000		1220	ISITERR	DC	0		AL112190
0C9E	0000		1221	NOERR	DC	0		AL112200
0CA0	0000		1222	OPSW	DC	0		AL112210
0CA2	0000		1223	OLOC	DC	0		AL112220
0CA4	02		1224	KBADR	DB	2	KEYBOARD DEV ADR	AL112230
JCA5	79		1225	CRTENRD	DB	X'79'		AL112240
0CA6	3B		1226	RQ2S	DB	X'3B'		AL112250
0CA7	78		1227	SECOND	DB	X'78'		AL112260
0CA8	80		1228	LPWRT	DB	X'80'		AL112270
0CA9	08		1229	TTYWRT	DB	X'08'		AL112280
0CAA	A4		1230	TTYRD	DB	X'A4'		AL112290
0CAB	3B		1231	CRTRQ2S	DB	X'3B'		AL112300
0CAC	23		1232	CARRQ2S	DB	X'23'		AL112310
0CAD	F8		1233	CRT2ND	DB	X'F8'		AL112320
0CAE	F0		1234	CAR2ND	DB	X'F0'		AL112330
0CAF	64		1235	TTYENRD	DB	X'64'		AL112340
0CB0	FFFF		1236	NULL	DC	X'FFFF'		AL112350
0CB2	00		1237		DB	0		AL112360
0CB3	00		1238	SINK	DB	0		AL112370
0CB4	00		1239	CON2ND	DB	0		AL112380
0CB5	00		1240	CONENRD	DB	0		AL112390
0CB6	00		1241	CONRQ2S	DB	0		AL112400
0CB8	5345 5249 4553 2031		1242	TITLE	DC	C'SERIES 16 ALO SUPPORT PROGRAM 06-194F01R01'		AL112410
0CC0	3620 414C 4F20 5355							
0CC8	5050 4F52 5420 5052							
0CD0	4F47 5241 4D20 3036							
0CD8	2031 3934 4630 3152							
0CE0	3031							
0CE2	0000		1243		DC	X'00'		AL112420
0CE4	5349 474E 4554 4943		1244	SORDFORM	DC	C'SIGNETICS OR DYNAMICS FORMAT?'		AL112430
0CEC	5320 4F52 2044 594E							
0CF4	414D 4943 5320 464F							
0CFC	524D 4154 3F20							
0D02	0D00		1245		DC	X'0D00'		AL112440
0D04	4552 524F 5220 3030		1246	ERRMSG	DC	C'ERROR 0000',X'0D00'		AL112450
0D0C	3030							
0D0E	0D00							
	0000 0D0B		1247	ETESTNO	EQU	*-5		AL112460
	0000 0D0C		1248	ERRNO	EQU	*-4	STORE ERRNO AS CHAR CONSTANT	AL112470
0D10	4E4F 2045 5252 4F52		1249	NOERMSG	DC	C'NO ERROR',X'0D00'		AL112480
0D18	0D00							
0D1A	3F0D		1250	QMSG	DC	X'3F0D'		AL112490
0D1C	5350 4543 4946 5920		1251	MSG1	DC	C'SPECIFY OR VERIFY?'		AL112500
0D24	4F52 2056 4552 4946							
0D2C	593F							
0D2E	0000		1252		DC	X'00'		AL112510
0D30	504C 4143 4520 4F42		1253	MSG3	LC	C'PLACE OBJECT TAPE IN READER'		AL112520
0D38	4A45 4354 2054 4150							
0D40	4520 494E 2052 4541							
0D48	4445 5220							

004C	0000		1254	DC	X'00'	AL112530
004E	5441 5045 204F 5220	1255	MSG4	DC	C'TAPE OR LISTING OR BOTH?'	AL112540
0056	4C49 5354 494E 4720					
005E	4F52 2042 4F54 483F					
0066	0000	1256		DC	X'00'	AL112550
0068	5041 5254 204E 554D	1257	MSG5	DC	C'PART NUMBER?'	AL112560
0070	4245 523F					
0074	0000	1258		DC	X'00'	AL112570
0076	4953 204F 424A 4543	1259	MSG8	DC	C'IS OBJECT PROGRAM IN BUFFER?'	AL112580
007E	5420 5052 4F47 5241					
0086	4020 494E 2042 5546					
008E	4645 523F					
0092	0000	1260		DC	X'00'	AL112590
0094	414C 4F20 4255 4646	1261	MSG9	DC	C'ALO BUFFER EXCEEDS 4K LIMIT'	AL112600
009C	4552 2045 5843 4545					
0DA4	4453 2034 4820 4C49					
0DAC	4049 5420					
0DB0	0000	1262		DC	X'00'	AL112610
0DB2	4E55 4042 4552 204F	1263	MSG10	DC	C'NUMBER OF DATA TAPES'	AL112620
0DBA	4620 4441 5441 2054					
0DC2	4150 4553					
0DC6	0000	1264		DC	X'00'	AL112630
0DC8	504C 4143 4520 4441	1265	MSG11	DC	C'PLACE DATA TAPE IN READER'	AL112640
0DD0	5441 2054 4150 4520					
0DD8	494E 2052 4541 4445					
0DE0	5220					
0DE2	0000	1266		DC	X'00'	AL112650
0DE4	454E 4420 4F46 2056	1267	MSG14	DC	C'END OF VERIFY'	AL112660
0DEC	4552 4946 5920					
0DF2	000A	1268		DC	X'000A'	AL112670
0DF4	454E 4420 4F46 2053	1269	MSG15	DC	C'END OF SPECIFY'	AL112680
0DFC	5045 4349 4659					
0E02	000A	1270		DC	X'000A'	AL112690
0E04	4552 524F 5220	1271	MSG24	DC	C'ERROR'	AL112700
0E0A	0000	1272		DC	X'00'	AL112710
0E0C	4649 5420 5255 4E20	1273	MSG52	DC	C'HIT RUN'	AL112720
0E14	0000	1274		DC	X'00'	AL112730
0E16	4445 5052 4553 5320	1275	MSG56	DC	C'DEPRESS INITIALIZE'	AL112740
0E1E	494E 4954 4941 4C49					
0E26	5A45					
0E28	0000	1276		DC	X'00'	AL112750
0E2A	4953 2020	1277	MSG57	DC	C'IS	AL112760
0E2E	0000	1278	MSG58	DC	X'00'	AL112770
0E30	2020 2020	1279		DC	C'	AL112780
0E34	5348 4F55 4C44 2042	1280		DC	C'SHOULD BE	AL112790
0E3C	4520 2020					
0E40	0000	1281	MSG58.1	DC	X'00'	AL112800
0E42	000A	1282		DC	X'000A'	AL112810
	0000 0E43	1283	LNZB	EQU	*-1	AL112820
0E44		1284	ROMBFR	DS	X'1000'	AL112830
	0000 1E43	1285	RMBED	EQU	*-1	AL112840
1E44		1286	BUFF	DS	128	AL112850
1EC4		1287	IOSAVE	DS	2	AL112860
1EC8		1288		ALIGN	8	AL112870
1EC8		1289	RSAVE	DS	32	AL112880

CHKSUM/M17 PUNCHER

1EE8	2400	1292	*					AL112910
1EEA	9510	1293	\$CHKSUM	LIS	R0,0	PUNCH M17 TAPE WITH CHECKSUM		AL112920
		1294		EPSR	R1,R0	SELECT REG. SET 0		AL112930
		1295	*					AL112940
1EEC	C810 0100	1296		LDAI	R1,X'100'	START		AL112950
1EF0	2421	1297		LIS	R2,1	INCREMENT		AL112960
1EF2	C830 0E43	1298		LDAI	R3,LNZB	FINAL		AL112970
1EF6	2440	1299		LIS	R4,0	CHECKSUM BYTE		AL112980
1EF8	D351 0000	1300	\$GEN	LB	R5,0(R1)			AL112990
1EFC	0745	1301		XAR	R4,R5			AL113000
1EFE	C110 1EF8	1302		EXLE	R1,\$GEN			AL113010
1F02	D240 0091	1303		STB	R4,MN+3	CHECKSUM BYTE TO BOOT LOADER		AL113020
		1304	*					AL113030
1F06	C810 0080	1305	\$TAPE	LHI	R1,X'0080'			AL113040
1F0A	9E21	1306		JCR	R2,R1	DISPLAY : NORMAL MODE		AL113050
1F0C	9444	1307		EXBR	R4,R4			AL113060
1F0E	9824	1308		WHR	R2,R4	CHECKSUM BYTE TO D1		AL113070
1F10	9411	1309		EXBR	R1,R1			AL113080
1F12	9501	1310		EPSR	R0,R1	HALT PROCESSOR.		AL113090
1F14	D360 007A	1312	\$PUNCH	LB	R6,X'7A'	GET BOUTDV (PUNCH) ADDRESS.		AL113110
1F18	DE60 007B	1313		OC	R6,X'7B'	START TAPE PUNCH		AL113120
1F1C	9D60	1314		SSR	R6,R0			AL113130
1F1E	2081	1315		BTBS	8,1			AL113140
1F20	41F0 1F62	1316		BAL	R15,\$TAPL	PUNCH LEADER		AL113150
1F24	9411	1317		EXBR	R1,R1	(R1) = X'0080'		AL113160
1F26	C830 00CF	1318		LHI	R3,X'CF'			AL113170
1F2A	DA61 0000	1319	\$PNCH1	WD	R6,0(R1)	PUNCH BOOT LOADER		AL113180
1F2E	9060	1320		SSR	R6,R0			AL113190
1F30	2081	1321		BTBS	8,1			AL113200
1F32	C110 1F2A	1322		BXLE	R1,\$PNCH1			AL113210
1F36	41F0 1F68	1323		BAL	R15,\$TAPL1	PUNCH ONE-FOLD GAP.		AL113220
		1324	*					AL113230
1F3A	D340 0091	1325		LB	R4,MN+3	GET CHECKSUM BYTE		AL113240
1F3E	C810 0100	1326		LDAI	R1,X'100'	START		AL113250
1F42	C830 0E43	1327		LDAI	R3,LNZB			AL113260
1F46	D351 0000	1328	\$PNCH2	LB	R5,0(R1)	PUNCH PROGRAM		AL113270
1F4A	0745	1329		XAR	R4,R5			AL113280
1F4C	9A65	1330		WDR	R6,R5			AL113290
1F4E	9401	1331		EXBR	R0,R1			AL113300
1F50	9820	1332		WHR	R2,R0	DATA ADDRESS TO DISPLAY.		AL113310
1F52	9D60	1333		SSR	R6,R0			AL113320
1F54	2081	1334		BTBS	8,1			AL113330
1F56	C110 1F46	1335		BXLE	R1,\$PNCH2			AL113340
1F5A	41F0 1F62	1336		BAL	R15,\$TAPL	PUNCH TRAILER.		AL113350
1F5E	4300 1F06	1337		B	\$TAPE	DISPLAY CHECKSUM, HALT PROCESSOR.		AL113360
1F62	C800 0100	1339	\$TAPL	LHI	R0,256	TO PUNCH BLANK LEADER		AL113380
1F66	2303	1340		BS	\$TAPLP			AL113390
1F68	C800 0055	1341	\$TAPL1	LHI	R0,85	TO PUNCH 1-FOLD GAP		AL113400
1F6C	2701	1342	\$TAPLP	SIS	R0,1			AL113410

CHKSUM/M17 PUNCHER

1F6E 032F
1F70 2430
1F72 9A63
1F74 9D68
1F76 2081
1F78 2206

1343
1344
1345
1346
1347
1348
1349 *
1350

BNPR R15
LIS R3.0
WDR R6,R3
SSR R6,R8
BTBS 8,1
BS \$TAPLP
END

RETURN
PUNCH BLANK FRAME
CONTINUE.

AL113420
AL113430
AL113440
AL113450
AL113460
AL113470
AL113480
AL113490



PROG= *NONE* ASSEMBLED BY CAL 03-066R05-00 (32-BIT)

	1	**061940200		AL200000
	2	CROSS		AL200010
	3	SCRAT		AL200020
	4	ERLST		AL200030
	5	TARGT 16		AL200040
	6	PROG SERIES 16 ALO SUPPORT PROGRAM 06-194F02R01		AL200050
	7	*****		AL200060
	8	* COPYRIGHT INTERDATA INC.		AL200070
	9	*		AL200080
	10	*SERIES 16 ALO SUPPORT PROGRAM 06-194F02R01		AL200090
	11	*		AL200100
	12	* THIS PROGRAM TESTS THE ALO SWITCH POSITIONS, DATA PATHS		AL200110
	13	* AND CUSTOMER ROMS		AL200120
	14	*		AL200130
	15	* THE PROGRAM REQUIRES A 6/16,8/16,8/16E WITH AN ALO AND AT LEAST		AL200140
	16	* 8KB OF MEMORY		AL200150
	17	*		AL200160
	18	* THE PROGRAM IS DIVIDED INTO 4 TESTS:		AL200170
	19	*		AL200180
	20	* TEST1		AL200190
	21	* DISABLE SWITCH TEST		AL200200
	22	*		AL200210
	23	* TEST2		AL200220
	24	* TEST SWITCH AND DATA PATHS TEST		AL200230
	25	*		AL200240
	26	* TEST3		AL200250
	27	* ENABLE SWITCH TEST		AL200260
	28	*		AL200270
	29	* TEST4		AL200280
	30	* CUSTOMER ROM TEST		AL200290
	31	*		AL200300
	32	* TEST 1,2,AND 3 REQUIRE TEST ROMS IN PLACE BEFORE START OF PROGRAM		AL200310
	33	* TEST 4 REQUIRES CUSTOMER ROMS IN PLACE BEFORE START OF PROGRAM		AL200320
	34	*		AL200330
	35	*****		AL200340
	36	*		AL200350
0000 0000	37	R0 EQU 0		AL200360
0000 0001	38	R1 EQU 1		AL200370
0000 0002	39	R2 EQU 2		AL200380
0000 0003	40	R3 EQU 3		AL200390
0000 0003	41	DAT EQU 3		AL200400
0000 0004	42	R4 EQU 4		AL200410
0000 0004	43	DEV EQU 4		AL200420
0000 0005	44	R5 EQU 5		AL200430
0000 0005	45	PNT EQU 5		AL200440
0000 0006	46	R6 EQU 6		AL200450
0000 0006	47	LINK1 EQU 6		AL200460
0000 0007	48	R7 EQU 7		AL200470
0000 0007	49	LINK2 EQU 7		AL200480
0000 0008	50	R8 EQU 8		AL200490
0000 0008	51	LINK3 EQU 8		AL200500
0000 0009	52	R9 EQU 9		AL200510
0000 000A	53	R10 EQU 10		AL200520

0000 000B	54	R11	EQU	11		AL200530
0000 000C	55	R12	EQU	12		AL200540
0000 000D	56	R13	EQU	13		AL200550
0000 000E	57	R14	EQU	14		AL200560
0000 000F	58	R15	EQU	15		AL200570
0000 000F	59	LINK	EQU	15		AL200580
	60	*				AL200590
	61	*				AL200600
	62	*	BOOTLOADER WITH CHKSUM			AL200610
	63	*				AL200620
0000R	64		ORG	X'80'		AL200630
0080 2421	65		LIS	R2,1		AL200640
0082 4020 0022	66	BOOT	STH	R2,X'22'	REGISTER SAVE POINTER(16-BIT M/C)	AL200650
0086 C810 0500	67		LHI	R1,X'500'		AL200660
008A C830 0E73	68		LHI	R3,LN2B	R3 = ADR(LAST NON-ZERO BYTE)	AL200670
008E C860 0000	69	MN	LHI	R6,0	R6 = CHKSUM BYTE = X'MN'	AL200680
0092 0340 0078	70		LB	R4,X'78'	INPUT DEV ADR	AL200690
0096 DE40 0079	71		OC	R4,X'79'		AL200700
009A 9D45	72	LEADER	SSR	R4,R5		AL200710
009C 2091	73		BTBS	9,1	DU,BSY	AL200720
009E 9845	74		RDR	R4,R5		AL200730
00A0 0855	75		LHR	R5,R5		AL200740
00A2 2234	76		BZS	LEADER	IGNORE LEADER	AL200750
00A4 0251 0000	77	LOAD	STB	R5,0(R1)	STORE 1ST NON-ZERO & SUBSEQUENT BYTE	AL200760
00A8 0351 0000	78		LB	R5,0(R1)	RELOAD DATA BYTE	AL200770
00AC 0765	79		XHR	R6,R5	GENERATE CHKSUM	AL200780
00AE 9481	80		EXBR	R8,R1		AL200790
00B0 9A28	81		WDR	R2,R8		AL200800
00B2 9D45	82		SSR	R4,R5		AL200810
00B4 2091	83		BTBS	9,1	DU,BSY	AL200820
00B6 9845	84		RDR	R4,R5		AL200830
00B8 C110 00A4	85		BXLE	R1,LOAD	LOAD TILL LAST BYTE	AL200840
00BC 9486	86		EXBR	R8,R6		AL200850
00BE 9828	87		WHR	R2,R8	DISPLAY FINAL CHKSUM	AL200860
00C0 C870 8000	88	LDWT	LHI	R7,X'8000'		AL200870
00C4 9557	89		EPSP	R5,R7	HALT PROCESSOR	AL200880
00C6 2203	90		BS	LDWT		AL200890

		92	*****		AL200910
		93	*		AL200920
		94	* THIS AREA IS RESERVER FOR TEST ROM LOAD AREA		AL200930
		95	*		AL200940
		96	* WHEN ALO IS ENABLED AND TEST ROMS ARE IN PLACE, ALO LOAD DATA		AL200950
		97	* ON CHIPS INTO THIS AREA (SPECIFIED BY 3RD AND 4TH HALFWORD OF CHIPS)		AL200960
		98	*		AL200970
00C8		99	ORG X'100'		AL200980
	0000 0100	100	ALOBUFST EQU *		AL200990
0100		101	ORG X'4FE'		AL201000
	0000 04FE	102	ALOBUFED EQU *		AL201010
04FE		103	ORG X'500'		AL201020
		104	*****		AL201030
		105	*		AL201040
		106	* TEST CONSTANTS		AL201050
		107	*		AL201060
0500	0202	108	IO DCX 0202	I/O IDENTIFIERS	AL201070
0502	1011	109	PASLADR DCX 1011	PASLA/PALM READ/WRITE ADDRESSES	AL201080
0504	0202	110	CLIFADR DCX 0202	CURRENT LOOP INTERFACE R/W ADDRESSES	AL201090
0506	6262	111	LPAADR DCX 6262	LINE PRINTER ADDRESS	AL201100
		112	*		AL201110
		113	*****		AL201120
		114	*		AL201130
		115	* START		AL201140
		116	*		AL201150
0508	0711	117	START1 XHR R1,R1		AL201160
050A	C830 1FD8	118	LHI R3,RSAVE		AL201170
050E	4030 0022	119	STH R3,X'22'		AL201180
0512	C820 00F0	120	LHI R2,X'F0'		AL201190
0516	4010 0030	121	STH R1,X'30'	DISABLE INT AT PROCESSOR LEVEL	AL201200
051A	4020 0032	122	STH R2,X'32'	SELECT REG SET 15	AL201210
051E	C820 052C	123	ST LHI R2,START		AL201220
0522	4010 0034	124	STH R1,X'34'		AL201230
0526	4020 0036	125	STH R2,X'36'	II INT NEW PSW LOC	AL201240
052A	0000	126	DC 0	TAKE AN ILLEGAL INSTRUCTION INT	AL201250
		127	*		AL201260
052C	41F0 0A96	128	START BAL LINK,SETKB	ESTABLISH KEYBOARD DEVICE	AL201270
0530	2701	129	SIS R0,1	CRT ON PASLS	AL201280
0532	4330 054E	130	BZ CRT	BRANCH IF YES	AL201290
0536	2703	131	SIS R0,3	CAROUSEL ON PALS A ?	AL201300
0538	4230 056C	132	BNZ TTY	BRANCH IF NO	AL201310
053C	4000 095E	133	C300 STH R0,PAUSE	REASET TRANS PAUSF FLAG	AL201320
0540	4810 0C78	134	LH R1,CARRD	CAROUSEL COMMANDS	AL201330
0544	D320 0C9D	135	LB R2,CAR2ND	PASLA/PALM FORMAT COMMAND	AL201340
0548	D340 0C9B	136	LB R4,CARRQ2S		AL201350
054C	2307	137	BS CRT2		AL201360
054E	4810 0C76	138	CRT LH R1,CRTD		AL201370
0552	D320 0C9C	139	LB R2,CRT2ND	AND FORMAT COMMANDS	AL201380
0556	D340 0C9A	140	LB R4,CRTQ2S		AL201390
055A	4800 0502	141	CRT2 LH R0,PASLADR	PASLA/PALM ADDRESSES	AL201400
055E	4000 0C7C	142	STH R0,PASFLG	SET PASLA/PALM FORMAT	AL201410
0562	9330	143	LBR R3,R0		AL201420
0564	9E32	144	OCR R3,R2		AL201430
0566	D240 0CAA	145	STB R4,CONRQ2S		AL201440
056A	2309	146	BS 60TIT		AL201450

056C	2400	147	TTY	LIS	R0,0		AL201460
056E	4000 0C7C	148		STH	R0,PASFLG	RESET THIS FLAG	AL201470
0572	4800 0504	149		LH	R0,CLIFADR		AL201480
0576	4810 0C7A	150		LH	R1,CLIFRD		AL201490
057A	9421	151		EXBR	R2,R1		AL201500
057C	4000 0C7E	152	GOTIT	STH	R0,CONADR	CONSOLE DEVICE ADDRESSES	AL201510
0580	4010 0C64	153		STH	R1,CONRD	CONSOLE READ/WRITE COMMANDS	AL201520
0584	0220 0CA8	154		STB	R2,CON2ND	AND FORMAT COMMANDS	AL201530
0588	41F0 0986	155		BAL	LINK,CRLF		AL201540
058C	C850 0CAC	156		LHI	R5,TITLE		AL201550
0590	41F0 08D0	157		BAL	R15,PRINT	PRINT TEST PROGRAM TITLE	AL201560
0594	41F0 0986	158		BAL	LINK,CRLF		AL201570
	0000 0598	159	STTTST	EQU	*		AL201580
0598	0700	160		XHR	R0,R0		AL201590
059A	0755	161		XHR	PNT,PNT		AL201600
059C	4050 0C58	162		STH	PNT,BIAS		AL201610
05A0	4050 0C98	163		STH	PNT,NOERR		AL201620
05A4	4050 0C92	164		STH	PNT,ISITERR		AL201630
05A8	4050 0C94	165		STH	PNT,ERRCOUNT	ZERO OUT ERRCOUNT	AL201640
05AC	4050 0C96	166		STH	PNT,ERLCOUNT	ZERO OUT ERROR LINECOUNT	AL201650
05B0	41F0 0A6A	167		BAL	LINK,ZERRBF	ZERO OUT ROM DATA BUFFER	AL201660
		168	*****				AL201670
		169	* TEST SELECT PHASE				AL201680
		170	*				AL201690
	0000 0584	171	TEST	EQU	*		AL201700
0584	4800 0500	172		LH	R0,IO		AL201710
0588	4000 1FD4	173		STH	R0,IOSAVE	RESTORE USER I/O CHOICE	AL201720
058C	C850 0D0C	174		LHI	R5,MSG12	TEST 1,2,3 OR 4	AL201730
05C0	41F0 08D0	175		BAL	LINK,PRINT	PRINT IT	AL201740
05C4	41E0 09B4	176		BAL	R14,ASTSK	ASTERISK	AL201750
05C8	41F0 0960	177	TAGN	BAL	LINK,GETCHR	READ ONE CHARACTER FROM CONSOLE	AL201760
05CC	D240 0CDF	178		STB	R4,ETESTNO	SET UP FOR POSSIBLE PRINT	AL201770
05D0	C540 0031	179		CLHI	R4,X'31'	1?	AL201780
05D4	4330 05F8	180		BE	TEST1		AL201790
05D8	C540 0032	181		CLHI	R4,X'32'	2?	AL201800
05DC	4330 0616	182		BE	TEST2		AL201810
05E0	C540 0033	183		CLHI	R4,X'33'	3?	AL201820
05E4	4330 0680	184		BE	TEST3		AL201830
05E8	C540 0034	185		CLHI	R4,X'34'	4?	AL201840
05EC	4330 071A	186		BE	TEST4		AL201850
05F0	41E0 099A	187		BAL	R14,QUESTN	QUESTION MARK	AL201860
05F4	4300 05C8	188		B	TAGN	INVALID INPUT GO AGAIN	AL201870
		189	*****				AL201880
		190	*				AL201890
		191	* TEST1 DISABLE SWITCH TEST				AL201900
		192	*				AL201910
		193	* PURPOSE:				AL201920
		194	* ENSURES THE OPERATION OF THE DISABLE SWITCH				AL201930
		195	*				AL201940
		196	* DESIGN SPECIFICATION:				AL201950
		197	* THIS TEST SETS UP A FLAG IN THE SPECIAL RETURN ROUTINE TO GO TO AN				AL201960
		198	* ERROR				AL201970
		199	* IF ALO RESPONDS TO INITIALIZE				AL201980
		200	* THE PROGRAM EXPECTS NO RESPONSE AS A GOOD END				AL201990
		201	*				AL202000

		202	* POSSIBLE ERRORS		AL202010
		203	* 07- DISABLE SWITCH ERROR		AL202020
		204	*		AL202030
		205	*****		AL202040
		206	TEST1 EQU *		AL202050
05F8	0000 05F8	207	LCS R1,1	LOAD NEGATIVE ONE	AL202060
05FA	4010 0C8C	208	STH R1,SPECFLG	SET UP SPECIAL FLAG	AL202070
05FE	C850 0D52	209	LHI R5,MSG54	PLACE ALO IN DISABLE MODE	AL202080
0602	41F0 08D0	210	BAL LINK,PRINT	PRINT IT	AL202090
0606	4170 08AA	211	BAL LINK2,DPINIT	DEPRESS INIT AND HALT PROCESSOR	AL202100
060A	C850 0DEA	212	CNTEST LHI R5,MSG80	DISABLE SWITCH OK	AL202110
060E	41F0 08D0	213	BAL LINK,PRINT	PRINT IT	AL202120
0612	4300 0860	214	B TSTEND		AL202130
		215	*****		AL202140
		216	*		AL202150
		217	* TEST2 TEST SWITCH AND DATA PATH TEST		AL202160
		218	*		AL202170
		219	* PURPOSE:		AL202180
		220	* ENSURES OPERATION OF TEST SWITCH AND TESTS ALO DATA PATHS		AL202190
		221	*		AL202200
		222	* DESIGN SPECIFICATION:		AL202210
		223	* THIS TEST READS TWICE FROM DEVICE 0 WHILE IN TEST MODE AND EXPECTS		AL202220
		224	* TO SEE THE FIRST HALFWORDS ON THE ROM		AL202230
		225	* THEN RESETS THE COUNTER AND READS THE ENTIRE CONTENTS OF THE TEST		AL202240
		226	* ROMS AND COMPARES IT WITH KNOWN DATA		AL202250
		227	*		AL202260
		228	* POSSIBLE ERRORS		AL202270
		229	* 05- COMPARE FAIL		AL202280
		230	* 06- TEST SWITCH ERROR		AL202290
		231	*		AL202300
		232	*****		AL202310
		233	TEST2 EQU *		AL202320
		234	TEST12 EQU *		AL202330
		235	LHI R5,MSG54	PUT ALO IN DISABLE MODE	AL202340
0616	C850 0D52	236	BAL LINK,PRINT		AL202350
061A	41F0 08D0	237	BAL LINK2,DPINIT	DEPRESS INIT AND HALT PROCESSOR	AL202360
061E	4170 08AA	238	LHI R5,MSG51	PLACE ALO IN TSET MODE	AL202370
0622	C850 0D1E	239	BAL LINK,PRINT	PRINT IT	AL202380
0626	41F0 08D0	240	BAL LINK2,EXEC	HIT EXEC AND HALT	AL202390
062A	4170 08BA	241	LIS R1,0	LOAD DEVICE NUMBER ZERO	AL202400
062E	2410	242	RDR R1,R0	READ 1ST HALFWORD ON ROM	AL202410
0630	9B10	243	CLHI R0,X'0'	COMPARE TO EXPECTED DATA ON TEST ROM	AL202420
0632	C500 0000	244	BNE ER06	TEST SWITCH BAD ERROR	AL202430
0636	4230 0B90	245	RDR R1,R0	READ 2ND HALFWORD FORM ROM	AL202440
063A	9B10	246	CLHI R0,X'A10'	IS SECOND CHARACTER CORRECT	AL202450
063C	C500 0A10	247	BNE ER06	TES SWITCH BAD ERROR	AL202460
0640	4230 0B90	248	LHI R5,MSG53	TEST SWITCH OK	AL202470
0644	C850 0D42	249	BAL LINK,PRINT	PRINT IT	AL202480
0648	41F0 08D0	250	LHI R5,MSG54	PUT ALO IN DISABLE MODE	AL202490
064C	C850 0D52	251	BAL LINK,PRINT	PRINT IT	AL202500
0650	41F0 08D0	252	BAL LINK2,DPINIT	DEPRESS INIT AND HALT PROCESSOR	AL202510
0654	4170 08AA	253	LHI R5,MSG51	PUT ALO IN TEST MODE	AL202520
0658	C850 0D1E	254	BAL LINK,PRINT	PRINT IT	AL202530
065C	41F0 08D0	255	BAL LINK2,EXEC	HIT EXEC (RUN) AND HALT PROCESSOR	AL202540
0660	4170 08BA	256	LHI R1,X'3FC'	SET UP FOR ROM READ	AL202550
0664	C810 03FC				

0668	4010	0C8A	257	STH	R1,ENCONT		AL202560
066C	41F0	087C	258	BAL	LINK,ROMREAD	READ 4K OF ROM	AL202570
0670	0733		259	XHR	R3,R3	INITIALIZE R3 TO ZERO	AL202580
0672	0722		260	XHR	R2,R2	INITIALIZE R2 TO ZERO	AL202590
0674	4812	0C38	261	RDAG1	LH R1,RDATBUF(R2)	LOAD SPECIAL DATA	AL202600
	0000	0678	262	RDAG12	EQU *		AL202610
0678	0861		263	LHR	R6,R1	LOAD FOR PRINT	AL202620
067A	48C2	0E74	264	LH	R12,ROMBFR(R2)	LOAD FOR PRINT	AL202630
067E	05C6		265	CLHR	R12,R6	IS DATA BYTE CORRE T	AL202640
0680	4230	0AF8	266	BNE	ER05	COMPARE FAIL ERROR	AL202650
0684	2622		267	AIS	R2,2	INCREMENT	AL202660
0686	C520	0010	268	CLHI	R2,16	FIRST LINE YET	AL202670
068A	2088		269	BLS	RDAG1	NO GO AGAIN	AL202680
068C	C520	03FC	270	CLHI	R2,X'3FC'	LIMIT YET	AL202690
0690	2338		271	BES	DIS		AL202700
0692	C430	000F	272	NHI	R3,X'F'	KEEP INCREMENT BETWEEN 0 AND F	AL202710
0696	4813	0C48	273	LH	R1,RDATBUF1(R3)		AL202720
069A	2632		274	AIS	R3,2		AL202730
069C	4300	0678	275	B	RDAG12	GO AGAIN	AL202740
06A0	C850	0D52	276	DIS	LHI R5,MSG54	PUT ALO IN DISABLE MODE	AL202750
06A4	41F0	08D0	277	BAL	LINK,PRINT	PRINT IT	AL202760
06A8	4170	08A0	278	BAL	LINK2,EXEC1	HIT EXEC (RUN) AND HALT PROCESSOR	AL202770
06AC	4300	0860	279	B	TSTEND		AL202780
			280	*****			AL202790
			281	*			AL202800
			282	* TEST3 ENABLE SWITCH TEST			AL202810
			283	*			AL202820
			284	* PURPOSE:			AL202830
			285	* ENSURE OPERATION OF THE ENABLE SWITCH AND ALO LOAD PROCEDURE			AL202840
			286	*			AL202850
			287	* DESIGN SPECIFICATION:			AL202860
			288	* THIS TEST SETS UP A FLAG IN A SPECIAL RETURN ROUTINE AND TAKES			AL202870
			289	* THE CORRECT RETURN			AL202880
			290	*			AL202890
			291	* POSSIBLE ERRORS			AL202900
			292	* 08- ENABLE SWITCH BAD			AL202910
			293	* 05 COMPARE FAIL			AL202920
			294	*			AL202930
			295	*****			AL202940
	0000	06B0	296	TEST3	EQU *		AL202950
06B0	0733		297	XHR	R3,R3	ZERO OUT R3	AL202960
06B2	C820	03F8	298	LHI	R2,X'3F8'	LOAD LIMIT	AL202970
	0000	06B6	299	TST3Z	EQU *		AL202980
06B6	4032	0100	300	STH	R3,AL0BUFST(R2)	ZERO OUT LOC	AL202990
06BA	2722		301	SIS	R2,2	DECREMENT	AL203000
06BC	2033		302	BNZS	TST3Z		AL203010
06BE	2451		303	LIS	R5,1		AL203020
06C0	4050	0C8C	304	STH	R5,SPECFLG	SET UP SPECIAL FLAG	AL203030
06C4	C850	0D6E	305	LHI	R5,MSG55	PLACE ALO IN ENABLE MODE	AL203040
06C8	41F0	08D0	306	BAL	LINK,PRINT	PRINT IT	AL203050
06CC	4170	08AA	307	BAL	LINK2,DPINIT	DEPRESS INIT AND HALT PROCESSOR	AL203060
06D0	4300	08A0	308	B	ER08	ENABLE SWICH BAD	AL203070
	0000	06D4	309	ENTSTOK	EQU *		AL203080
06D4	C850	0D9C	310	LHI	R5,MSG57	ENABLE SWITCH OK	AL203090
06D8	41F0	08D0	311	BAL	LINK,PRINT	PRINT IT	AL203100

06DC	C850	0D52	312	LHI	R5,MSG54	PIT ALO IN DISABLE MODE	AL203110
06E0	41F0	08D0	313	BAL	LINK,PRINT	PRINT IT	AL203120
06E4	4170	08BA	314	BAL	LINK2,EXEC	HIT EXEC (RUN) AND HALT PROCESSOR	AL203130
06E8	0733		315	XHR	R3,R3	ZERO OUT R3	AL203140
06EA	2428		316	LIS	R2,8	LOAD INIT VALUE	AL203150
	0000	06EC	317	TST31	EQU *		AL203160
06EC	D362	0C38	318	LB	R6,RDATBUF(R2)	LOAD FROM FIRST SET	AL203170
	0000	06F0	319	TST32	EQU *		AL203180
06F0	D3C2	0100	320	LB	R12,ALOBUFST(R2)	GET DATA FROM ALO LOAD	AL203190
06F4	05C6		321	CLHR	R12,R6	IS IT CORRECT	AL203200
06F6	4230	0AF8	322	BNE	ER05	COMPARE FAIL	AL203210
06FA	2621		323	AIS	R2,1	INCREMENT	AL203220
06FC	C520	0010	324	CLHI	R2,16	END OF LINE YET	AL203230
0700	208A		325	BLS	TST31		AL203240
0702	C520	03FE	326	CLHI	R2,X'3FE'	LIMIT YET	AL203250
0706	2338		327	BES	TST33		AL203260
0708	C430	000F	328	NHI	R3,15	MASK OFF LOWER BITS	AL203270
070C	D363	0C48	329	LB	R6,RDATBUF1(R3)	LOAD FROM 2ND SET OF DATA	AL203280
0710	2631		330	AIS	R3,1	INCREMENT	AL203290
0712	4300	06F0	331	B	TST32	GO AGAIN	AL203300
	0000	0716	332	TST33	EQU *		AL203310
0716	4300	0860	333	B	TSTEND		AL203320
			334	*			AL203330
			335	*****			AL203340
			336	*			AL203350
			337	* TEST4			AL203360
			338	*			AL203370
			339	* PURPOSE:			AL203380
			340	* ENSURE THE CUSTOMER ROMS CONTAIN THE SAME DATA AS THE APPROPRIATE			AL203390
			341	* DATA TAPES			AL203400
			342	* DESIGN SPECIFICATIONS:			AL203410
			343	*			AL203420
			344	* THIS TEST READS THE CONTENTS OF THE ROMS AND COMPARES IT TO THE			AL203430
			345	* DATA READ FROM THE DATA TAPES			AL203440
			346	*			AL203450
			347	*			AL203460
			348	* POSSIBLE ERRORS			AL203470
			349	* 05-COMPARE FAIL			AL203480
			350	*			AL203490
			351	*****			AL203500
	0000	071A	352	TEST4	EQU *		AL203510
071A	2421		353	LIS	R2,1	SET UP FOR	AL203520
071C	4020	0C86	354	STH	R2,ROMCNT	CHIP PRINT	AL203530
0720	C850	00FE	355	LHI	R5,MSG82	NUMBER OF ROMS TO VERIFY	AL203540
0724	41F0	08D0	356	BAL	LINK,PRINT	PRINT IT	AL203550
0728	41E0	09B4	357	BAL	R14,ASTSK		AL203560
072C	41F0	0960	358	BAL	LINK,GETCHR	READ INPUT	AL203570
0730	C840	0030	359	SHI	R4,X'30'	STRIP OFF ASCII	AL203580
0734	4040	0C88	360	STH	R4,NTAPES	UPDATE ROM NUMBER	AL203590
0738	2742		361	SIS	R4,2	DECREMENT	AL203600
073A	C340	FFF9	362	THI	R4,-1-6	TEST FOR 2 4 6	AL203610
073E	4230	071A	363	BNZ	TEST4		AL203620
0742	C850	0D52	364	LHI	R5,MSG54	PUT ALO IN DISABLE MODE	AL203630
0746	41F0	08D0	365	BAL	LINK,PRINT	PRINT IT	AL203640
074A	4170	08AA	366	BAL	LINK2,DPINIT	DEPRESS INIT AND HALT PROCESSOR	AL203650

074E	C850	001E	367	LHI	R5,MSG51	PLACE ALO IN TEST MODE	AL203660
0752	41F0	08D0	368	BAL	LINK,PRINT	PRINT IT	AL203670
0756	4170	088A	369	BAL	LINK2,EXEC	HIT EXEC AND HALT	AL203680
075A	4810	0C88	370	LH	R1,NTAPES	LOAD CURRENT ROM TAPE COUNT	AL203690
075E	0821		371	LHR	R2,R1	LOAD INTO WORK REGISTER	AL203700
0760	9129		372	SLLS	R2,9	ADJUST COUNT	AL203710
0762	2724		373	SIS	R2,4	TO DESIRED AMONUT	AL203720
0764	4020	0C8A	374	STH	R2,ENCONT	SET COUNT	AL203730
	0000	0768	375	RRAG	EQU *		AL203740
0768	41F0	087C	376	BAL	LINK,ROMREAD	ROM ENTIRE CONTENTS OF ROM	AL203750
076C	C850	0052	377	LHI	R5,MSG54		AL203760
0770	41F0	08D0	378	BAL	LINK,PRINT		AL203770
0774	C850	00C8	379	LHI	R5,SORDFORM	SIGN OR DYMAMICS	AL203780
0778	41F0	08D0	380	BAL	R15,PRINT		AL203790
077C	41E0	09B4	381	BAL	R14,ASTSK	PRINT AN ASTERISK	AL203800
0780	41F0	0960	382	GOT1	BAL R15,GETCHR	READ A CHARACTER	AL203810
0784	C540	0053	383	CLHI	R4,C'S'	IS IT SIGNETICS	AL203820
0788	2339		384	BES	GOT3		AL203830
078A	C540	0044	385	CLHI	R4,C'D'	IS IT SPECTRUM DYNAMICS	AL203840
078E	2133		386	BNES	GOT2		AL203850
0790	24F0		387	LIS	R15,0		AL203860
0792	2305		388	BS	GOT4		AL203870
0794	41F0	099A	389	GOT2	BAL R15,QUESTN		AL203880
0798	220C		390	BS	GOT1		AL203890
079A	24F1		391	GOT3	LIS R15,1		AL203900
079C	40F0	0C80	392	GOT4	STH R15,SORDFLG		AL203910
07A0	07AA		393	XHR	R10,R10		AL203920
07A2	07BB		394	XHR	R11,R11	ZERO OUT R11	AL203930
07A4	C850	0CF0	395	REDAG	LHI R5,MSG11	PLACE DATA TAPE IN READER	AL203940
07A8	41F0	08D0	396	BAL	LINK,PRINT	PRINT IT	AL203950
07AC	4170	08A0	397	BAL	LINK2,EXEC1		AL203960
07B0	C830	0200	398	LHI	R3,512		AL203970
07B4	4030	0C82	399	STH	R3,SPECOUNT		AL203980
07B8	4830	0C88	400	LH	R3,NTAPES	LOAD PRESENT VALUF OF NTAPES	AL203990
07BC	C430	0001	401	NHI	R3,1	IS IT ODD OR EVEN	AL204000
07C0	0AA3		402	AHR	R10,R3	ADD ADJUST VALUE	AL204010
	0000	07C2	403	REDAG1	EQU *		AL204020
07C2	D3CA	0E74	404	LB	R12,ROMBFR(R10)	LOAD BYTE	AL204030
07C6	41F0	0A14	405	BAL	LINK,RD BYTE		AL204040
07CA	C590	0027	406	SPECHAR	CLHI R9,X'27'	IS IT A DELIMETER CHARACTER	AL204050
07CE	4230	082C	407	BNE	RDASF2	NO WHAT IS IT	AL204060
	0000	07D2	408	SPECTRUM	EQU *		AL204070
07D2	4820	0C86	409	LH	R2,ROMCNT	LOAD CHIP NUMBER	AL204080
07D6	CA20	2030	410	AHI	R2,X'2030'	CONVERT TO ASCII PLUS A SPACE	AL204090
07DA	4020	0E54	411	STH	R2,MSGA.3	STORE AWAY IN MESSAGE	AL204100
07DE	082A		412	LHR	R2,R10	LOAD HALFWORD COUNT	AL204110
07E0	9021		413	SRLS	R2,1	ADJUST FOR BYTE ADDRESS	AL204120
07E2	2443		414	LIS	R4,3		AL204130
07E4	C420	01FF	415	NHI	R2,X'1FF'		AL204140
07E8	0852		416	LHR	R5,R2	LOAD INTO WORK	AL204150
	0000	07EA	417	LASMG	EQU *		AL204160
07EA	0832		418	LHR	R3,R2	LOAD INTO WORK	AL204170
07EC	C430	000F	419	NHI	R3,X'F'	MASK OFF BOTTOM	AL204180
07F0	D333	0C66	420	LB	R3,ASC(R3)	CONVERT TO ASCII	AL204190
07F4	D234	0E58	421	STB	R3,MSGA.4(R4)		AL204200

07F8	9024	422	SRLS	R2,4		AL204210
07FA	2741	423	SIS	R4,1	DECREMENT	AL204220
07FC	2289	424	BNLS	LASHG	GO AGAIN	AL204230
07FE	2404	425	LIS	R0,4	4DECIMAL DIGITS	AL204240
0800	0815	426	LHR	R1,R5		AL204250
0802	C820 DESE	427	LHI	R2,MSGA,5	LOAD START OF MESSAGE TO CONTAIN DEC	AL204260
0806	41F0 CAA4	428	BAL	R15,DECASC	CONVERT TO DECIMAL	AL204270
080A	05C6	429	CLHR	R12,R6	IS BYTE GOOD	AL204280
080C	4230 OAF8	430	BNE	ER05	COMPARE FAIL ERROR	AL204290
0810	4810 OC80	431	LH	R1,SORDFLG		AL204300
0814	2139	432	BNZS	T4E5R		AL204310
	0000 0816	433	T4E5R1	EQU *		AL204320
0816	4810 OC82	434	LH	R1,SPECOUNT		AL204330
081A	2711	435	SIS	R1,1		AL204340
081C	4010 OC82	436	STH	R1,SPECOUNT		AL204350
0820	2133	437	BNZS	T4E5R		AL204360
0822	4300 0834	438	B	RAG31		AL204370
	0000 0826	439	T4E5R	EQU *		AL204380
0826	26A2	440	AIS	R10,2	INCREMENT	AL204390
0828	4300 07C2	441	B	REDAG1		AL204400
082C	C590 0014	442	RDASF2	CLHI R9,X'14'	IS IT TAPE OFF	AL204410
0830	4230 07C2	443	BNE	REDAG1		AL204420
	0000 0834	444	RAG31	EQU *		AL204430
0834	4830 OC88	445	LH	R3,NTAPES	LOAD CURRENT NUMBER	AL204440
0838	9031	446	SRLS	R3,1	ADJUST	AL204450
083A	2382	447	BNCS	RAG3	IF ODD SKIP	AL204460
083C	26B4	448	AIS	R11,4	INCREMENT	AL204470
	0000 083E	449	RAG3	EQU *		AL204480
083E	94AB	450	EXBR	R10,R11		AL204490
0840	2421	451	LIS	R2,1	SET UP R2, FOR PRINT	AL204500
0842	6120 OC86	452	AHM	R2,ROMCNT	UPDATE ROMCOUNT	AL204510
0846	4830 OC88	453	LH	R3,NTAPES	LOAD PRESENT VALUE OF NTAPES	AL204520
084A	2731	454	SIS	R3,1	DECREMENT	AL204530
084C	4030 OC88	455	STH	R3,NTAPES		AL204540
0850	4230 07A4	456	BNZ	REDAG	GO AGAIN	AL204550
0854	4830 OC94	457	LH	R3,ERRCOUNT	ANY ERRORS	AL204560
0858	4230 0B0A	458	BNZ	LOGERPR	YES PRINT	AL204570
085C	4300 0860	459	B	TSTEND		AL204580
		460	*****			AL204590
		461	*			AL204600
		462	* TEST MODULE END ROUTINE			AL204610
		463	*			AL204620
	0000 0860	464	TSTEND	EQU *		AL204630
0860	C810 00F0	465	LHI	R1,X'F0'		AL204640
0864	9501	466	EPSR	R0,R1	DISABLE INT @ PROCESSOR LEVEL	AL204650
0866	4800 OC98	467	KEEP7	LH R0,NOERR	LOOK @ ERROR FLAG	AL204660
086A	2137	468	BNZS	TSTEND1	EVEN AFTER ERROR START TEST AGAIN	AL204670
086C	C850 OCE4	469	LHI	R5,NOERMSG		AL204680
0870	41F0 08D0	470	BAL	LINK,PRINT	PRINT "NO ERROR"	AL204690
0874	41F0 0986	471	BAL	LINK,CRLF		AL204700
0878	4300 0598	472	TSTEND1	B STTST	START TEST AGAIN	AL204710
		473	*****			AL204720
		474	* THIS SUBROUTINE READS THE CONTENTS OF THE ROM			AL204730
		475	* INTO THE BUFFER RMBFR0			AL204740
		476	*			AL204750

087C	0000 087C	477	ROMREAD EQU *		AL204760
087E	0766	478	XHR R6,R6	ZERO OUT R6	AL204770
0882	4870 0C8A	479	LH R7,ENCONT	LOAD DESIRED COUNT	AL204780
0884	2450	480	LIS R5,0	LOAD DEVICE NUMBER OF ZERO	AL204790
0888	D956 0E74	481	ROMREAD2 RH R5,ROMBFR(R6)		AL204800
088A	2662	482	AIS R6,2	INCREMENT	AL204810
088C	0567	483	CLHR R6,R7	LIMIT YET	AL204820
088E	2034	484	BNES ROMREAD2	NO GO AGAIN	AL204830
	030F	485	BR LINK	RETURN	AL204840
		486	*****		AL204850
		487	* THIS SUBROUTINE INSPECTS THE RETURN FLAGS AND BRANCHES ACCORDINGLY		AL204860
		488	*		AL204870
0890	48F0 0C8C	489	SPECRET LH R15,SPECFLG		AL204880
	0000 0894	490	T1E7 EQU *		AL204890
0894	4210 0898	491	BM ER07	DISABLE SWITCH BAD	AL204900
0898	4330 0508	492	BZ START1		AL204910
089C	4300 06D4	493	B ENTSTOK	ENABLE SWITCH OK	AL204920
		494	*****		AL204930
		495	* THIS SUBROUTINE PUTS TOGETHER SOME COMMONLY USED PRINT		AL204940
		496	* SEQUENCES		AL204950
		497	*		AL204960
08A0	C850 0DE0	498	EXEC1 LHI R5,MSG60	HIT RUN	AL204970
08A4	41F0 08D0	499	BAL LINK,PRINT	PRINT IT	AL204980
08A8	2305	500	BS EXEC2		AL204990
08AA	C850 0D88	501	OPINIT LHI R5,MSG56	DEPRESS INITIALIZE	AL205000
08AE	41F0 08D0	502	BAL LINK,PRINT	PRINT IT	AL205010
	0000 08B2	503	EXEC2 EQU *		AL205020
08B2	C810 8000	504	LHI R1,X'8000'	HALT PROCESSOR	AL205030
08B6	9501	505	EPSR R0,R1	ACTIVATE	AL205040
08B8	0307	506	BR LINK2	RETURN	AL205050
08BA	C850 0D36	507	EXEC LHI R5,MSG52	HIT EXEC RUN	AL205060
08BE	41F0 08D0	508	BAL LINK,PRINT	PRINT I	AL205070
08C2	D350 0C7E	509	LB R5,CONADR		AL205080
	0000 08C6	510	PRESBRK1 EQU *		AL205090
08C6	9D56	511	SSR R5,R6	SENSE STATUS	AL205100
08C8	C360 0020	512	THI R6,X'20'	TEST BREAK	AL205110
08CC	2233	513	BZS PRESBRK1		AL205120
08CE	0307	514	BR LINK2	RETURN	AL205130
		515	*****		AL205140
		516	* THIS SUBROUTINE IS USED		AL205150
		517	* TO PRINT THE ASCII MESSAGE		AL205160
		518	*		AL205170
08D0	0000 1FD8	519	PRINT STM R0,RSAVE	STORE REGISTERS	AL205180
08D4	D345 0000	520	PRINT2 LB R4,0(R5)	GET A MESSAGE BYTE	AL205190
08D8	41F0 0902	521	BAL LINK,OUTCHR		AL205200
08DC	274D	522	SIS R4,13		AL205210
08DE	2333	523	BZS PRINT3		AL205220
08E0	2651	524	AIS R5,1		AL205230
08E2	2207	525	BS PRINT2	LOP FOR NEXT CHAR	AL205240
08E4	244A	526	PRINT3 LIS R4,10		AL205250
08E6	D310 1FD5	527	LB R1,IOSAVE+1		AL205260
08EA	2713	528	SIS R1,3		AL205270
08EC	2335	529	BZS PRINT3A	BRANCH IF YES	AL205280
08EE	41F0 0902	530	BAL LINK,OUTCHR		AL205290
08F2	2541	531	LCS R4,1		AL205300

08F4	2302	532	BS	PRINT3B		AL205310
08F6	2441	533	PRINT3A	LIS	R4,1	AL205320
08F8	41F0 0902	534	PRINT3B	BAL	LINK,OUTCHR	AL205330
08FC	D100 1FD8	535	PRINT5	LM	R0,RSAVE	AL205340
0900	030F	536		BR	LINK	AL205350
		537	*-----*			AL205360
		538	* THIS SUBROUTINE OUTPUTS A CHARACTER TO A LIST DEVICE			AL205370
		539	*			AL205380
0902	40F0 095C	540	OUTCHR	STH	R15,OUT12+2	AL205390
0906	0300 1FD5	541		LB	R0,IOSAVE+1	AL205400
090A	2704	542		SIS	R0,4	AL205410
090C	4230 0946	543		BNZ	OUTCHR2	AL205420
0910	4000 095E	544		STH	R0,PAUSE	AL205430
	0000 0914	545	OTC.0	EQU	*	AL205440
0914	0300 0C7E	546		LB	R0,CONADR	AL205450
0918	9D01	547		SSR	R0,R1	AL205460
091A	2386	548		BFFS	8,OTC.2	AL205470
091C	4810 095E	549	OTC.1	LH	R1,PAUSE	AL205480
0920	0306	550		BNZS	OTC.0	AL205490
0922	4300 0946	551		B	OUTCHR2	AL205500
0926	9801	552	OTC.2	RDR	R0,R1	AL205510
0928	C410 007F	553		NHI	R1,X*7F'	AL205520
092C	CB10 0012	554		SHI	R1,X*12'	AL205530
0930	2134	555		BNZS	OTC.3	AL205540
0932	4010 095E	556		STH	R1,PAUSE	AL205550
0936	2308	557		BS	OUTCHR2	AL205560
0938	2712	558	OTC.3	SIS	R1,2	AL205570
093A	4230 0914	559		BNZ	OTC.0	AL205580
093E	40F0 095E	560		STH	LINK,PAUSE	AL205590
0942	4300 0914	561		B	OTC.0	AL205600
	0000 0946	562	OUTCHR2	EQU	*	AL205610
0946	4110 098E	563		BAL	R1,SETUP	AL205620
094A	9D01	564		SSR	R0,R1	AL205630
094C	2137	565		BTFS	3,OUT0	AL205640
094E	2182	566		BTFS	8,2	AL205650
0950	9A04	567		WDR	R0,R4	AL205660
0952	D000 0CA7	568	OTC.4	SS	R0,SINK	AL205670
0956	2132	569		BTFS	3,OUT0	AL205680
0958	2083	570		BTBS	8,OTC.4	AL205690
	0000 095A	571	OUT0	EQU	*	AL205700
095A	4300 095A	572	OUT12	B	*	AL205710
095E	0000	573	PAUSE	DCX	0	AL205720
		574	*-----*			AL205730
		575	* THIS SUBROUTINE IS USED			AL205740
		576	* TO GET A CHAR FROM KEYBOARD (IN REG R4)			AL205750
		577	*			AL205760
0960	4140 0A7A	578	GETCHR	BAL	R4,KBREAD	AL205770
0964	9D04	579		SSR	R0,R4	AL205780
0966	021F	580		BTBR	1,LINK	AL205790
0968	2082	581		BTBS	8,2	AL205800
096A	9B04	582		RDR	R0,R4	AL205810
096C	D390 0C84	583	ECHO	LB	R9,CONRD	AL205820
0970	C590 00A9	584		CLHI	R9,X'A9'	AL205830
0974	2137	585		BNES	ECHRTN	AL205840
0976	D390 0C7F	586		LB	R9,CONADR+1	AL205850

097A	DD90	0CA7	587	SS	R9,SINK		AL205860
097E	2082		588	BTBS	8,2		AL205870
0980	9A94		589	WDR	R9,R4	ECHO RECEIVED BYTE	AL205880
0982	C440	007F	590	ECHR TN	NHI R4,X'7F'	MASK OFF PARITY BIT	AL205890
0986	D000	1FD8	591	CRLF	STM R0,RSAVE	STORE REGISTERS	AL205900
098A	244D		592	LIS	R4,13		AL205910
098C	41F0	0902	593	BAL	LINK,OUTCHR	OUTPUT CR	AL205920
0990	244D		594	LIS	R4,13	CARRAIGE RETURN	AL205930
0992	41F0	0902	595	BAL	LINK,OUTCHR	OUTPUT IT	AL205940
0996	4300	08E4	596	B	PRINT3		AL205950
			597	*-----*			AL205960
			598	* THIS SUBROUTINE IS USED			AL205970
			599	* TO OUTPUT '?' TO CONSOLE			AL205980
			600	*			AL205990
099A	41F0	0986	601	QUESTN	BAL LINK,CRLF		AL206000
099E	40F0	0C92	602	STH	R15,ISITERR		AL206010
09A2	C650	0CEE	603	LHI	R5,QMSG		AL206020
09A6	41F0	08D0	604	BAL	LINK,PRINT	PRINT '?'	AL206030
09AA	0700		605	XHR	R0,R0		AL206040
09AC	4000	0C92	606	STH	R0,ISITERR		AL206050
09B0	41F0	0986	607	BAL	LINK,CRLF	SPACE	AL206060
	0000	0984	608	ASTSK	EQU *		AL206070
09B4	C840	002A	609	LHI	R4,X'2A'	ASTERISK	AL206080
09B8	41F0	0902	610	BAL	LINK,OUTCHR	OUTPUT A CHARACTER	AL206090
09BC	030E		611	BR	R14	RETURN	AL206100
			612	*-----*			AL206110
			613	* THIS SUBROUTINE IS USED AS A			AL206120
			614	* LIST DEVICE SET UP ROUTINE			AL206130
			615	*			AL206140
09BE	D300	1FD5	616	SETUP	LB R0,IOSAVE+1	GET LIST DEVICE IDENTIFIER	AL206150
09C2	2701		617	SIS	R0,1		AL206160
09C4	4330	09E2	618	BZ	CRTDRV	YES GO TO CRT DRIVER	AL206170
09C8	2701		619	SIS	R0,1		AL206180
09CA	2337		620	BZS	TTYDRV	YES GO TO TTY DRIVER	AL206190
09CC	2701		621	SIS	R0,1		AL206200
09CE	4330	09EC	622	BZ	LPDRV	YES GO TO LP DRIVER	AL206210
09D2	2701		623	SIS	R0,1		AL206220
09D4	4330	09F6	624	BZ	CARDRV	YES GO TO CAROUSEL DRIVER	AL206230
09D8	D300	0505	625	TTYDRV	LB R0,CLIFADR+1		AL206240
09DC	DE00	0C7B	626	OC	R0,CLIFWRT		AL206250
09E0	0301		627	BR	R1		AL206260
09E2	D300	0503	628	CRTDRV	LB R0,PASLADR+1		AL206270
09E6	DE00	0C77	629	OC	R0,CRTWRT		AL206280
09EA	0301		630	BR	R1		AL206290
09EC	D300	0506	631	LPDRV	LB R0,LPADR		AL206300
09F0	DE00	0C9E	632	OC	R0,LPWRT		AL206310
09F4	0301		633	BR	R1		AL206320
09F6	D300	0503	634	CARDRV	LB R0,PASLADR+1		AL206330
09FA	DE00	0C79	635	OC	R0,CARWRT		AL206340
09FE	0301		636	BR	R1		AL206350
			637	*****			AL206360
			638	* THIS PHASE MUST RESIDE AT X'A00'-X'A14'			AL206370
			639	* TEST ROM RETURN ADDRESS AT X'A10'			AL206380
			640	*			AL206390
0A00			641	ORG	X'A00'		AL206400

0A00	4300	0508	642	ORIGIN1	B	START1		AL206410
0A04	4300	0508	643	ORIGIN2	B	START1		AL206420
0A08	4300	0508	644	ORIGIN3	B	START1		AL206430
0A0C	4300	0508	645	ORIGIN4	B	START1		AL206440
0A10	4300	0890	646	ROMRTN	B	SPECTET		AL206450
			647	* THIS SUBROUTINE READS ONE BYTE FROM DATA TAPE AND				AL206460
			648	* PUT IT IN R6				AL206470
	0000	0A14	649	RDBYTE	EQU	*		AL206480
0A14	0766		650	RDANSTUF	XHR	R6,R6	ZERO OUT R6	AL206490
0A16	D370	0078	651		LB	R7,X'78'	LOAD ADDRESS OF TAPE READER	AL206500
0A1A	DE79	0079	652		OC	R7,X'79'	LOAD COMMAND BYTE OF REA	AL206510
0A1E	9D78		653	RDASF	SSR	R7,R8	SENSE STATUS ON READER	AL206520
0A20	20F1		654		BTBS	15,1		AL206530
0A22	9B79		655		RDR	R7,R9	READ DATA	AL206540
0A24	C590	0020	656		CLHI	R9,X'20'	CHECK FOR SPECTRUM TAPE FORMAT	AL206550
0A28	4330	0A50	657		BE	READSPEC	YES SPECIAL READ ROUTINE	AL206560
0A2C	4810	0C80	658		LH	R1,SORDFLG		AL206570
0A30	2133		659		BNZS	RDASF21		AL206580
0A32	4300	0A1E	660		B	RDASF		AL206590
	0000	0A36	661	RDASF21	EQU	*		AL206600
0A36	C590	0030	662		CLHI	R9,X'30'	IS IT VALID ASCII	AL206610
0A3A	028F		663		BLR	LINK	RETURN	AL206620
0A3C	C590	003A	664		CLHI	R9,X'3A'	IS IT GREATER THAN 9	AL206630
0A40	2182		665		BLS	RDASF1		AL206640
0A42	2797		666		SIS	R9,7	ADJUST CHARACTER	AL206650
0A44	C490	000F	667	RDASF1	NHI	R9,X'F'	MASK OFF LOWER ORDER DIGIT	AL206660
0A48	9164		668		SLLS	R6,4	SHIFT OVER FOR COMBINATION WITH NEXT	AL206670
0A4A	0669		669		OHR	R6,R9	OR IN NEXT CHARACTEWR	AL206680
0A4C	4300	0A1E	670		B	RDASF		AL206690
	0000	0A50	671	READSPEC	EQU	*		AL206700
0A50	2448		672		LIS	R4,8	LOAD 8 BYTE COUNT	AL206710
0A52	0722		673		XHR	R2,R2		AL206720
0A54	9D78		674	RDSPEC1	SSR	R7,R8	SENSE STATUS ON TAPE READER	AL206730
0A56	20F1		675		BTBS	15,1		AL206740
0A58	9B73		676		RDR	R7,R3	READ A BYTE	AL206750
0A5A	913F		677		SLLS	R3,15	PLACE SIGNIFICANT BIT IN DBL RRG	AL206760
0A5C	ED20	0001	678		SLL	R2,1	SHIFT BIT 0 OF REG 3 INTO REG 2	AL206770
0A60	2741		679		SIS	R4,1	DECREMENT COUNT	AL206780
0A62	2037		680		BNZS	RDSPEC1		AL206790
0A64	0862		681		LHR	R6,R2	SET IT UP	AL206800
0A66	4300	0702	682		B	SPECTRUM		AL206810
			683	*****				AL206820
			684	*				AL206830
			685	* THIS SUBROUTINE PUTS ZERO INTO ROM BUFFER				AL206840
			686	*				AL206850
	0000	0A6A	687	ZERR3F	EQU	*		AL206860
0A6A	2440		688		LIS	R4,0	INIT R4	AL206870
0A6C	C850	0FFE	689		LHI	R5,X'FFE'	LOAD LIMIT	AL206880
0A70	4045	0E74	690	RBZER	STH	R4,ROMBFR(R5)	STORE ZERO INTO BUFFER	AL206890
0A74	2752		691		SIS	R5,2		AL206900
0A76	2213		692		BNMS	RBZER	IF NOT DONE STORE AGAIN	AL206910
0A78	030F		693		BR	LINK	RETURN	AL206920
			694	*****				AL206930
			695	* THIS SUBROUTINE IS USED				AL206940
			696	* TO PUT KEYBOARD DEVICE IN READ MODE				AL206950

0A7A	D300	0C7E	697	*				AL206960
0A7E	DEG0	0C84	698	KBREAD	LB	R0,CONADR		AL206970
0A82	4890	0C7C	699		OC	R0,CONRD		AL206980
0A66	4200	0A86	700		LH	R9,PASFLG	PASLA?	AL206990
0A8A	0334		701		NOP	*		AL207000
0A8C	DB00	0CA7	702	TTYGET	BZR	R4	RETURN	AL207010
0A90	DEG0	0CAA	703	CRTGET	RD	R0,SINK	DUMMY READ	AL207020
0A94	0304		704		OC	R0,CONRQ2S		AL207030
			705		BR	R4	RETURN	AL207040
			706	*****				AL207050
			707	* THIS SUBROUTINE IS USED TO DIRECT I/O TO CONSOLE				AL207060
			708	*				AL207070
0A96	D300	0500	709	SETKB	LB	R0,IO		AL207080
0A9A	9410		710		EXBR	R1,R0		AL207090
0A9C	0610		711		OMR	R1,R0		AL207100
0A9E	4010	1FD4	712		STH	R1,IOSAVE	KB=LIST	AL207110
0AA2	030F		713		BR	LINK	RETURN	AL207120
			714	*****				AL207130
			715	* THIS SUBROUTINE CONVERTS A HEXIDECIMAL NUMBER TO DECIMAL				AL207140
			716	*				AL207150
0AA4	D000	1FD8	717	DECASC	STM	R0,RSVAE	STORE REGISTERS	AL207160
0AA8	C830	3030	718		LHI	R3,C'00'	LOAD ASCII ZERO	AL207170
0AAC	4030	0E64	719		STH	R3,DECI	STORE INTO CONVERT TAB	AL207180
0AB0	4030	0E66	720		STH	R3,DECI+2	STORE INTO CONVERT TAB	AL207190
0AB4	4030	0E68	721		STH	R3,DECI+4	STORE INTO CONVERT TAB	AL207200
0AB8	0744		722		XHR	R4,R4		AL207210
0ABA	0755		723		XHR	R5,R5	ZERO OUT R5	AL207220
0ABC	4514	0E6A	724	DEC1	CLH	R1,DECITAB(R4)	COMPARE	AL207230
0AC0	2187		725		BLS	DEC2	IFLESS SKIP	AL207240
0AC2	2631		726		AIS	R3,1	INCREMENT	AL207250
0AC4	D235	0E64	727		STB	R3,DECI(R5)	STORE IN CONVERT TAB	AL207260
0AC8	4814	0E6A	728		SH	R1,DECITAB(R4)	SUBTRACT DECIMAL COUNT	AL207270
0ACC	2208		729		BS	DEC1	GO AGAIN	AL207280
0ACE	C830	0030	730	DEC2	LHI	R3,C'0'		AL207290
0AD2	2642		731		AIS	R4,2	INCREMENT	AL207300
0AD4	2651		732		AIS	R5,1	INCREMENT	AL207310
0AD6	C550	0005	733		CLHI	R5,5	LIMIT	AL207320
0ADA	208F		734		BLS	DEC1	LESS THAN GO AGAIN	AL207330
0ADC	0B50		735		SHR	R5,R0		AL207340
0ADE	211A		736		BMS	DEC4		AL207350
0AE0	D345	0E64	737	DEC3	LB	R4,DECI(R5)	LOAD UP	AL207360
0AE4	D242	0000	738		STB	R4,0(R2)	STORE AWAY	AL207370
0AE8	2621		739		AIS	R2,1	INCREMENT	AL207380
0AEA	2651		740		AIS	R5,1	INCREMENT	AL207390
0AEC	C550	0005	741		CLHI	R5,5	FINISHED	AL207400
0AF0	2088		742		BLS	DEC3	NO GO ANOTHER	AL207410
0AF2	D100	1FD8	743	DEC4	LM	R0,RSVAE	RESTORE REGISTERS	AL207420
0AF6	030F		744		BR	R15	RETURN	AL207430
			745	*****				AL207440
			746	* ERROR ROUTINES				AL207450
			747	*				AL207460
			748	* COMPARE FAIL				AL207470
	0000	0AF8	749	ER05	EQV	*		AL207480
0AF8	085C		750		LHR	R5,R12	LOAD INTO WORK	AL207490
0AFA	9054		751		SRLS	R5,4	SHIFT OVER	AL207500

0AFC	D355	0C66	752	LB	R5,ASC(R5)	CONVERT TO ASCII	AL207510
0B00	D250	0DB2	753	STB	R5,MSG58		AL207520
0B04	085C		754	LHR	R5,R12	LOAD INTO WORK	AL207530
0B06	C450	000F	755	NHI	R5,15	MASK OFF LEAST BITS	AL207540
0B0A	D355	0C66	756	LB	R5,ASC(R5)	CONVERT TO ASCII	AL207550
0B0E	D250	0DB3	757	STB	R5,MSG58+1	SET UP MSG	AL207560
0B12	0856		758	LHR	R5,R6	LOAD INTO WORK	AL207570
0B14	9054		759	SRLS	R5,4	SHIFT OVER	AL207580
0B16	D355	0C66	760	LB	R5,ASC(R5)	CONVERT TO ASCII	AL207590
0B1A	D250	0DC4	761	STB	R5,MSG58.1	SET UP MSG	AL207600
0B1E	0856		762	LHR	R5,R6	LOAD INTO WORK	AL207610
0B20	C450	000F	763	NHI	R5,15	MASK OFF LOWER BITS	AL207620
0B24	D355	0C66	764	LB	R5,ASC(R5)	CONVERT TO ASCII	AL207630
0B28	D250	0DC5	765	STB	R5,MSG58.1+1	SET UP MSG	AL207640
0B2C	C810	3035	766	LHI	R1,C'05'	LOAD 5	AL207650
0B30	D350	0CDF	767	LB	R5,ETESTNO	LOAD TEST NUMBER	AL207660
0B34	C550	0034	768	CLHI	R5,X'34'	IS IT TEST 4	AL207670
0B38	4230	0BA4	769	BNE	ERST	NO SKIP	AL207680
0B3C	4820	0C94	770	LH	R2,ERRCOUNT	LOAD ERRCOUNT	AL207690
0B40	C520	0150	771	CLHI	R2,336	LIMIT 21 ERRORS	AL207700
0B44	4380	0BDA	772	BNL	LOGERPR	PRINT THEM	AL207710
0B48	C832	1E74	773	LHI	R3,ERRFLD(R2)	LOAD QUEUE POINTER	AL207720
0B4C	4810	0DB2	774	LH	R1,MSG58	LOAD DATA	AL207730
0B50	4013	0000	775	STH	R1,0(R3)	STORE IN QUEUE	AL207740
0B54	4810	0DC4	776	LH	R1,MSG58.1	LOAD DATA	AL207750
0B58	4013	0002	777	STH	R1,2(R3)	STORE IN QUEUE	AL207760
0B5C	4810	0E54	778	LH	R1,MSGA.3	LOAD DATA	AL207770
0B60	4013	0004	779	STH	R1,4(R3)	STORE IN QUEUE	AL207780
0B64	4810	0E58	780	LH	R1,MSGA.4	LOAD DATA	AL207790
0B68	4013	0006	781	STH	R1,6(R3)	STORE IN QUEUE	AL207800
0B6C	4810	0E5A	782	LH	R1,MSGA.4+2	LOAD DATA	AL207810
0B70	4013	0008	783	STH	R1,8(R3)	STORE IN QUEUE	AL207820
0B74	4810	0E5E	784	LH	R1,MSGA.5	LOAD DATA	AL207830
0B78	4013	000A	785	STH	R1,10(R3)	STORE IN QUEUE	AL207840
0B7C	4810	0E60	786	LH	R1,MSGA.5+2	LOAD DATA	AL207850
0B80	4013	000C	787	STH	R1,12(R3)	STORE IN QUEUE	AL207860
0B84	CA20	0010	788	AHI	R2,16	INCREMENT ERRCOUNT	AL207870
0B88	4020	0C94	789	STH	R2,ERRCOUNT		AL207880
0B8C	4300	0816	790	B	T4E5R1		AL207890
			791		* TEST SWITCH BAD		AL207900
	0000	0B90	792	ER06	EQU *		AL207910
0B90	C810	3036	793	LHI	R1,C'06'	LOAD 6	AL207920
0B94	4300	0BA4	794	B	ERST		AL207930
			795		* DISABLE SWITCH BAD		AL207940
	0000	0B98	796	ER07	EQU *		AL207950
0B98	C810	3037	797	LHI	R1,C'07'	LOAD 7	AL207960
0B9C	4300	0BA4	798	B	ERST		AL207970
			799		* ENABLE SWITCH BAD		AL207980
	0000	0BA0	800	ER08	EQU *		AL207990
0BA0	C810	3038	801	LHI	R1,C'08'	LOAD 8	AL208000
0BA4	4010	0CE0	802	ERST	STH R1,ERRNO	STORE IN ERROR MSG	AL208010
0BA8	2421		803	LIS	R2,1		AL208020
0BAA	C810	00F0	804	ERRCOM	LHI R1,X'F0'		AL208030
0BAE	9501		805	EPSR	R0,R1	DISABLE INT. @ PROCESSOR LEVEL	AL208040
0BB0	4020	0C92	806	STH	R2,ISITERR	SET ERROR FLAG	AL208050

0BB4	4020	0C98	807	STH	R2,NOERR		AL208060
0BB8	C850	0C08	808	ERR1	LHI	R5,ERRMSG	AL208070
0BBC	41F0	08D0	809		BAL	LINK,PRINT	AL208080
0BC0	4810	0CE0	810		LH	R1,ERRNO	AL208090
0BC4	C510	3035	811		CLHI	R1,X'3035'	AL208100
0BC8	2135		812		BNES	ERR2	AL208110
0BCA	C850	0DAE	813		LHI	R5,MSG57.1	AL208120
0BCE	41F0	08D0	814		BAL	LINK,PRINT	AL208130
	0000	08D2	815	ERR2	EQU	*	AL208140
0BD2	41F0	0986	816		BAL	LINK,CRLF	AL208150
0BD6	4300	0860	817		B	TSTEND	AL208160
	0000	08DA	818		LOGERPR	EQU	AL208170
	08DA	4810	819		LH	R1,ERRCOUNT	AL208180
0BDE	4010	0C92	820		STH	R1,ISITERR	AL208190
0BE2	4010	0C98	821		STH	R1,NOERR	AL208200
0BE6	9014		822		SRLS	R1.4	AL208210
0BE8	4010	0C96	823		STH	R1,ERLCOUNT	AL208220
0BEC	C850	0E16	824		LHI	R5,MSG9	AL208230
0BF0	41F0	08D0	825		BAL	R15,PRINT	AL208240
0BF4	2430		826		LIS	R3.0	AL208250
0BF6	2420		827		LIS	R2.0	AL208260
0BF8	C812	1E74	828	LOGER1	LHI	R1,ERRFLD(R2)	AL208270
0BFC	D191	0000	829		LM	R9.0(R1)	AL208280
0C00	4090	0E44	830		STH	R9,MSGA.1	AL208290
0C04	40A0	0E4E	831		STH	R10,MSGA.2	AL208300
0C08	4080	0E54	832		STH	R11,MSGA.3	AL208310
0C0C	40C0	0E58	833		STH	R12,MSGA.4	AL208320
0C10	40D0	0E5A	834		STH	R13,MSGA.4+2	AL208330
0C14	40E0	0E5E	835		STH	R14,MSGA.5	AL208340
0C18	40F0	0E60	836		STH	R15,MSGA.5+2	AL208350
0C1C	C850	0E3E	837		LHI	R5,MSGA	AL208360
0C20	41F0	08D0	838		BAL	R15,PRINT	AL208370
0C24	CA20	0010	839		AHI	R2.16	AL208380
0C28	2631		840		AIS	R3.1	AL208390
0C2A	4530	0C96	841		CLH	R3,ERLCOUNT	AL208400
0C2E	4230	0BF8	842		BNE	LOGER1	AL208410
0C32	4300	0860	843		B	TSTEND	AL208420
0C38			844		ALIGN	B	AL208430
			845		*****		AL208440
			846		* RDATBUF CONTAINS THE KNOWN DATA WHICH		AL208450
			847		* CORRESPONDS TO THE DATA ON THE TWO		AL208460
			848		* TEST ROMS TOTAL BUFFER = 1K OF DATA		AL208470
			849		* BUFFER IS FILLED BY A SOFTWARE ROUTINE IN THE START SEQUENCE		AL208480
			850		RDATBUF DCX 0,A10.108.4FE.123.4567.89AB.CDEF		AL208490
0C38	0000						
0C3A	0A10						
0C3C	0108						
0C3E	04FE						
0C40	0123						
0C42	4567						
0C44	89AB						
0C46	CDEF						
0C48	0123		851	RDATBUF1	DCX	123.4567.89AB.CDEF.FEDC.BA98.7654.3210	AL208500
0C4A	4567						
0C4C	89AB						
0C4E	CDEF						

0C50 FEDC
 0C52 BA98
 0C54 7654
 0C56 3210

0C58 0080
 0C5A 20A0
 0C5C 98A4
 0000 0C5D
 0C5E 9193
 0000 0C5F
 0C60 0080
 0C62 0000
 0C64 A0A9
 0000 0C65
 0C66 3031 3233 3435 3637
 0C6E 3839 4142 4344 4546
 0C76 B9AB
 0000 0C77
 0C78 A9AB
 0000 0C79
 0C7A A4D8
 0000 0C7B
 0C7C 0000
 0C7E 0000
 0C80 0000
 0C82 0000
 0C84 0000
 0C86 0000
 0C88 0000
 0C8A 0000
 0C8C 0000
 0C8E 0000
 0C90 0000
 0C92 0000
 0C94 0000
 0C96 0000
 0C98 0000
 0C9A 38
 0C9B 23
 0C9C F8
 0C9D F0
 0C9E 80
 0C9F 02
 0CA0 79
 0CA1 38
 0CA2 78
 0CA3 08
 0CA4 A4
 0CA5 64
 0CA6 00
 0CA7 00

852 *
 853 *****
 854 * DATA CONSTANTS
 855 *
 856 BIAS DC X'80'
 857 BLANK2 DC X'20A0'
 858 TWRT DC X'98A4'
 859 TREAD EQU TWRT+1
 860 XON DC X'9193'
 861 XOFF EQU XON+1
 862 LOC DC X'80'
 863 DC 0
 864 FEED DC X'A0A9'
 865 TSTP EQU FEED+1
 866 ASC DC C'0123456789ABCDEF'
 867 CRTRD DCX B9AB
 868 CRTWRT EQU CRTRD+1
 869 CARRD DCX A9AB
 870 CARWRT EQU CARRD+1
 871 CLIFRD DCX A4D8
 872 CLIFWRT EQU CLIFRD+1
 873 PASFLG DC 0
 874 CONADR DC 0
 875 SORDFLG DCX 0
 876 SPECOUNT DCX 0
 877 CONRD DC 0
 878 ROMCNT DC 0
 879 NTAPES DC 0
 880 ENCONT DC 0
 881 SPECFLG DC 0
 882 PTOP DC 0
 883 LOCK DC 0
 884 ISITERR DC 0
 885 ERRCOUNT DCX 0
 886 ERLCOUNT DCX 0
 887 NOERR DC 0
 888 CRTRQ2S DB X'38'
 889 CARRQ2S DB X'23'
 890 CRT2ND DB X'F8'
 891 CAR2ND DB X'F0'
 892 LPWRT DB X'80'
 893 KBADR DB 2
 894 CRTENRD DB X'79'
 895 RQ2S DB X'38'
 896 SECOND DB X'78'
 897 TTYWRT DB X'D8'
 898 TTYRD DB X'A4'
 899 TTYENRD DB X'64'
 900 DB 0
 901 SINK DB 0

AL208510
 AL208520
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 AL208930
 AL208940
 AL208950
 AL208960
 AL208970
 AL208980
 AL208990
 AL209000

KEYBOARD DEV ADR

0CA8	00				902	CON2ND	DB	0		AL209010
0CA9	00				903	CONENRD	DB	0		AL209020
0CAA	00				904	CONRQ2S	DB	0		AL209030
					905	*				AL209040
					906	-----				AL209050
					907	* MESSAGES				AL209060
					908	*				AL209070
					909	TITLE	DC		C'SERIES 16 ALO SUPPORT PROGRAM 06-194F02R01'	AL209080
0CAC	5345	5249	4553	2031						
0CB4	3620	414C	4F20	5355						
0CBC	5050	4F52	5420	5052						
0CC4	4F47	5241	4020	3036						
0CCC	2031	3934	4630	3252						
0CD4	3031									
0CD6	0000				910		DC		X'0D'	AL209090
0CD8	4552	524F	5220	3030	911	ERRMSG	DC		C'ERROR 0000',X'0D00'	AL209100
0CE0	3030									
0CE2	0000									
	0000	0CDF			912	ETESTNO	EQU		*-5	AL209110
	0000	0CE0			913	ERRNO	EQU		*-4	AL209120
									STORE ERRNO AS CHAR CONSTANT	AL209130
0CE4	4E4F	2045	5252	4F52	914	NOERMSG	DC		C'NO ERROR',X'0D00'	AL209140
0CEC	0D00									AL209150
0CEE	3F00				915	QMSG	DC		X'3F00'	AL209160
0CF0	504C	4143	4520	4441	916	MSG11	CC		C'PLACE DATA TAPE IN READER'	AL209170
0CF8	5441	2054	4150	4520						
0D00	494E	2052	4541	4445						
0D08	5220									
0D0A	0000				917		DC		X'0D'	AL209180
0D0C	5445	5354	2031	2C32	918	MSG12	DC		C'TEST 1,2,3 OR 4?'	AL209190
0D14	2C33	204F	5220	343F						
0D1C	0000				919		DC		X'0D'	AL209180
0D1E	504C	4143	4520	414C	920	MSG51	DC		C'PLACE ALO IN TEST MODE'	AL209190
0D26	4F20	494E	2054	4553						
0D2E	5420	404F	4445							
0D34	0000				921		DC		X'0D'	AL209200
0D36	5052	4553	5320	4252	922	MSG52	DC		C'PRESS BRK'	AL209210
0D3E	4B20									
0D40	0000				923		DC		X'0D'	AL209220
0D42	5445	5354	2053	5749	924	MSG53	DC		C'TEST SWITCH OK'	AL209230
0D4A	5443	4820	4F48							
0D50	0000				925		DC		X'0D'	AL209240
0D52	504C	4143	4520	414C	926	MSG54	DC		C'PLACE ALO IN DISABLE MODE'	AL209250
0D5A	4F20	494E	2044	4953						
0D62	4142	4C45	204D	4F44						
0D6A	4520									
0D6C	0000				927		DC		X'0D'	AL209260
0D6E	504C	4143	4520	414C	928	MSG55	DC		C'PLACE ALO IN ENABLE MODE'	AL209270
0D76	4F20	494E	2045	4E41						
0D7E	424C	4520	404F	4445						
0D86	0000				929		DC		X'0D'	AL209280
0D88	4445	5052	4553	5320	930	MSG56	DC		C'DEPRESS INITIALIZE'	AL209290
0D90	494E	4954	4941	4C49						
0D98	5A45									
0D9A	0000				931		DC		X'0D'	AL209300
0D9C	454E	4142	4C45	2053	932	MSG57	DC		C'ENABLE SWITCH OK'	AL209310
0DA4	5749	5443	4820	4F48						

0DAC	0000		933	DC	X'0D'		AL209320		
0DAE	4953	2020	934	MSG57.1	DC	C'IS'	AL209330		
0DB2	0000		935	MSG58	DC	X'0'	AL209340		
0DB4	2020	2020	936		DC	C'	AL209350		
0DB8	5348	4F55	4C44	2042	937	DC	C'SHOULD BE'	AL209360	
0DC0	4520	2020							
0DC4	0000		938	MSG58.1	DC	X'0'	AL209370		
0DC6	0000		939		DC	X'0D'	AL209380		
0DC8	5349	474E	4554	4943	940	SORDFORM	DC	C'SIGNETICS OR DYNAMICS'	AL209390
0DD0	5320	4F52	2044	594E					
0DD8	4E41	4049	4353						
0DDE	0000		941		DCX	0D	AL209400		
0DE0	4849	5420	5255	4E20	942	MSG60	DC	C'HIT RUN'	AL209410
0DE8	0000		943		DC	X'0D'	AL209420		
0DEA	4449	5341	424C	4520	944	MSG80	DC	C'DISABLE SWITCH OK'	AL209430
0DF2	5357	4954	4348	204F					
0DFA	4B20								
0DFC	0000		945		DC	X'0D'	AL209440		
0DFE	4E55	4042	4552	204F	946	MSG82	DC	C'NUMBER OF ROMS TO VERIFY'	AL209450
0E06	4620	524F	4053	2054					
0E0E	4F20	5645	5249	4659					
0E16	0000		947		DC	X'0D'	AL209460		
0E18	4441	5441	2041	4354	948	MSG9	DC	C'DATA ACT DATA EXP CHIP AD.H AD.D'	AL209470
0E20	2020	4441	5441	2045					
0E28	5850	2020	4348	4950					
0E30	2020	4144	2E48	2020					
0E38	4144	2E44							
0E3C	0D00		949		DC	X'0D00'	AL209480		
0E3E	2020	2020	2020	2020	950	MSGA	DC	C' *X'0D00'	AL209490
0E46	2020	2020	2020	2020					
0E4E	2020	2020	2020	2020					
0E56	2020	2020	2020	2020					
0E5E	2020	2020							
0E62	0D00								
	0000	0E44	951	MSGA.1	EQU	MSGA+6	DATA ACTUAL	AL209500	
	0000	0E4E	952	MSGA.2	EQU	MSGA+16	DATA EXPECTED	AL209510	
	0000	0E54	953	MSGA.3	EQU	MSGA+22	CHIP	AL209520	
	0000	0E58	954	MSGA.4	EQU	MSGA+26	ADDRESS IN HEX	AL209530	
	0000	0E5E	955	MSGA.5	EQU	MSGA+32	ADDRESS IN DECIMAL	AL209540	
0E64	3030		956	DECI	DC	C'00',C'00',C'00'		AL209550	
0E66	3030								
0E68	3030								
0E6A	2710		957	DECITAB	DC	10000,1000,100,10,1	AL209560		
0E6C	03E8								
0E6E	0064								
0E70	000A								
0E72	0001								
	0000	0E73	958	LNZB	EQU	*-1	AL209570		
0E74			959	ROMBFR	DS	X'1000'	AL209580		
	0000	1E73	960	RMED	EQU	*-1	AL209590		
1E74			961	ERRFLD	DS	352	AL209600		
1FD4			962	IOSAVE	DS	2	AL209610		
1FD8			963		ALIGN	8	AL209620		
			964	RSAVE	DS	32	AL209630		

CHKSUM/M17 PUNCHER

1FF8	2400	967	*				AL209660
1FFA	9510	968	\$CHKSUM	LIS	R0,0	PUNCH M17 TAPE WITH CHECKSUM	AL209670
		969		EPSR	R1,R0	SELECT REG. SET 0	AL209680
		970	*				AL209690
1FFC	C810 0500	971		LDAI	R1,X'500'	START	AL209700
2000	2421	972		LIS	R2,1	INCREMENT	AL209710
2002	C830 0E73	973		LDAI	R3,LNZB	FINAL	AL209720
2006	2440	974		LIS	R4,0	CHECKSUM BYTE	AL209730
2008	D351 0000	975	\$GEN	LB	R5,0(R1)		AL209740
200C	0745	976		XAR	R4,R5		AL209750
200E	C110 2008	977		BXLE	R1,\$GEN		AL209760
2012	D240 0091	978		STB	R4,MN+3	CHECKSUM BYTE TO BOOT LOADER	AL209770
		979	*				AL209780
2016	C810 0080	980	\$TAPE	LHI	R1,X'0080'		AL209790
201A	9E21	981		OCR	R2,R1	DISPLAY : NORMAL MODE	AL209800
201C	9444	982		EXBR	R4,R4		AL209810
201E	9824	983		WHR	R2,R4	CHECKSUM BYTE TO D1	AL209820
2020	9411	984		EXBR	R1,R1		AL209830
2022	9501	985		EPSR	R0,R1	HALT PROCESSOR.	AL209840
2024	D360 007A	987	\$PUNCH	LB	R6,X'7A'	GET BOUTDV (PUNCH) ADDRESS.	AL209860
2028	DE60 007B	988		OC	R6,X'7B'	START TAPE PUNCH	AL209870
202C	9D60	989		SSR	R6,R0		AL209880
202E	2081	990		BTBS	8,1		AL209890
2030	41F0 2072	991		BAL	R15,\$TAPL	PUNCH LEADER	AL209900
2034	9411	992		EXBR	R1,R1	(R1) = X'0080'	AL209910
2036	C830 00CF	993		LHI	R3,X'CF'		AL209920
203A	DA61 0000	994	\$PNCH1	WD	R6,0(R1)	PUNCH BOOT LOADER	AL209930
203E	9D60	995		SSR	R6,R0		AL209940
2040	2081	996		BTBS	8,1		AL209950
2042	C110 203A	997		BXLE	R1,\$PNCH1		AL209960
2046	41F0 2078	998		BAL	R15,\$TAPL1	PUNCH ONE-FOLD GAP.	AL209970
		999	*				AL209980
204A	D340 0091	1000		LB	R4,MN+3	GET CHECKSUM BYTE	AL209990
204E	C810 0500	1001		LDAI	R1,X'500'	START	AL210000
2052	C830 0E73	1002		LDAI	R3,LNZB		AL210010
2056	D351 0000	1003	\$PNCH2	LB	R5,0(R1)	PUNCH PROGRAM	AL210020
205A	0745	1004		XAR	R4,R5		AL210030
205C	9A65	1005		WDR	R6,R5		AL210040
205E	9401	1006		EXBR	R0,R1		AL210050
2060	9820	1007		WHR	R2,R0	DATA ADDRESS TO DISPLAY.	AL210060
2062	9D60	1008		SSR	R6,R0		AL210070
2064	2081	1009		BTBS	8,1		AL210080
2066	C110 2056	1010		BXLE	R1,\$PNCH2		AL210090
206A	41F0 2072	1011		BAL	R15,\$TAPL	PUNCH TRAILER.	AL210100
206E	4300 2016	1012		B	\$TAPE	DISPLAY CHECKSUM. HALT PROCESSOR.	AL210110
2072	C800 0100	1014	\$TAPL	LHI	R0,256	TO PUNCH BLANK LEADER	AL210130
2076	2303	1015		BS	\$TAPLP		AL210140
2078	C800 0055	1016	\$TAPL1	LHI	R0,85	TO PUNCH 1-FOLD GAP	AL210150
207C	2701	1017	\$TAPLP	SIS	R0,1		AL210160

CHKSUM/M17 PUNCHER

207E	032F	1018	BNPR	R15
2080	2430	1019	LIS	R3.0
2082	9A63	1020	WDR	R6,R3
2084	9D63	1021	SSR	R6,R8
2086	2081	1022	BTBS	8.1
2088	2206	1023	BS	\$TAPLP
		1024 *		
208A		1025	END	

RETURN
PUNCH BLANK FRAME
CONTINUE.

AL210170
AL210180
AL210190
AL210200
AL210210
AL210220
AL210230
AL210240

CHKSUM/M17 PUNCHER

ASSEMBLED BY CAL 03-066R05-00 (32-BIT)

START OPTIONS: T=16.SCR.CRO

NO CAL ERRORS
NO CAL WARNINGS
2 PASSES

\$CHKSUM	0000	1FF8	966*						
\$GEN	0000	2008	975*	977					
\$PNCH1	0000	203A	994*	997					
\$PNCH2	0000	2056	1003*	1010					
\$PUNCH	0000	2024	987*						
\$TAPE	0000	2016	980*	1012					
\$TAPL	0000	2072	991	1011	1014*				
\$TAPL1	0000	2078	998	1016*					
\$TAPLP	0000	207C	1015	1017*	1023				
ABSTOP	0000	206A							
ADC	0000	0002							
ALOBUFED	0000	04FE	102*						
ALOBUFST	0000	0100	100*	300	320				
ASC	0000	0C66	420	752	756	760	764	866*	
ASTSK	0000	09B4	176	357	381	608*			
BIAS	0000	0C58	162	856*					
BLANK2	0000	0C5A	857*						
BOOT	0000	0082	66*						
C300	0000	053C	133*						
CAR2ND	0000	0C9D	135	891*					
CARDRV	0000	09F6	624	634*					
CARRD	0000	0C78	134	869*	870				
CARRQ2S	0000	0C98	136	889*					
CARWRT	0000	0C79	635	870*					
CLIFADR	0000	0504	110*	149	625				
CLIFRD	0000	0C7A	150	871*	872				
CLIFWRT	0000	0C78	626	872*					
CNTEST	0000	060A	212*						
CON2ND	0000	0CA8	154	902*					
CONADR	0000	0C7E	152	509	546	586	698	874*	
CONENRD	0000	0CA9	903*						
CONRD	0000	0C84	153	583	699	877*			
CONRQ2S	0000	0CAA	145	704	904*				
CRLF	0000	0986	155	158	471	591*	601	607	816
CRT	0000	054E	130	138*					
CRT2	0000	055A	137	141*					
CRT2ND	0000	0C9C	139	890*					
CRTDRV	0000	09E2	618	628*					
CRTENRD	0000	0CA9	894*						
CRTGET	0000	0A8C	703*						
CRTRD	0000	0C76	138	867*	868				
CRTRQ2S	0000	0C9A	140	888*					
CRTWRT	0000	0C77	629	868*					
DAT	0000	0003	41*						
DEC1	0000	0ABC	724*	729	734				

CHKSUM/M17 PUNCHER

PAUSE	0000 095E	133	544	549	556	560	573*											
PNT	0000 0005	45*	161	161	162	163	164	165	166									
PRESBRK1	0000 08C6	510*	513															
PRINT	0000 08D0	157	175	210	213	236	239	249	251	254	277	306	311	313				
		356	365	368	378	380	396	470	499	502	508	519*	604	809				
		814	825	838														
PRINT2	0000 08D4	520*	525															
PRINT3	0000 08E4	523	526*	596														
PRINT3A	0000 08F6	529	533*															
PRINT3B	0000 08F8	532	534*															
PRINT5	0000 08FC	535*																
PTOP	0000 0C8E	882*																
PURETOP	0000 0000R																	
QMSG	0000 0CEE	603	915*															
QUESTN	0000 099A	187	389	601*														
RO	0000 0000	37*	129	131	133	141	142	143	147	148	149	152	160	160				
		172	173	242	243	245	246	425	466	467	505	519	535	541				
		542	544	546	547	552	564	567	568	579	582	591	605	605				
		606	616	617	619	621	623	625	626	628	629	631	632	634				
		635	698	699	703	704	709	710	711	717	735	743	805	968				
		969	985	989	995	1006	1007	1008	1014	1016	1017							
R1	0000 0001	38*	67	77	78	80	85	117	117	121	124	134	138	150				
		151	153	207	208	241	242	245	256	257	261	263	273	370				
		371	426	431	434	435	436	465	466	504	505	527	528	547				
		549	552	553	554	556	558	563	564	627	630	633	636	658				
		710	711	712	724	728	766	774	775	776	777	778	779	780				
		781	782	783	784	785	786	787	793	797	801	802	804	805				
		810	811	819	820	821	822	823	828	829	829	969	971	975	977			
		980	981	984	984	985	992	992	994	997	1001	1003	1006	1010				
R10	0000 000A	53*	393	393	402	404	412	440	450	831								
R11	0000 000B	54*	394	394	448	450	832											
R12	0000 000C	55*	264	265	320	321	404	429	750	754	833							
R13	0000 000D	56*	834															
R14	0000 000E	57*	176	187	357	381	611	835										
R15	0000 000F	58*	157	380	382	387	389	391	392	428	489	540	602	744				
		825	836	838	991	998	1011	1018										
R2	0000 0002	39*	65	66	81	87	120	122	123	125	135	139	144	151				
		154	260	260	261	264	267	268	270	298	300	301	316	318				
		320	323	324	326	353	371	372	373	374	409	409	410	411				
		412	413	415	416	418	422	427	451	452	673	673	678	681				
		736	739	770	771	773	788	789	803	806	807	827	828	839				
		972	981	983	1007													
R3	0000 0003	40*	68	118	119	143	144	259	259	272	273	274	297	297				
		300	315	315	328	329	330	398	399	400	401	402	418	419				
		420	420	421	445	446	453	454	455	457	676	677	718	719				
		720	721	726	727	730	773	775	777	779	781	783	785	787				
		826	840	841	973	993	1002	1019	1020									
R4	0000 0004	42*	70	71	72	74	82	84	136	140	145	178	179	181				
		183	185	359	360	361	362	383	385	414	421	423	520	522				
		526	531	533	567	578	579	582	589	590	592	594	609	672				
		679	688	690	702	705	722	722	724	728	731	737	738	974				
		976	978	982	982	983	1000	1004										
R5	0000 0005	44*	72	74	75	75	77	78	79	82	84	89	156	174				

CHKSUM/M17 PUNCHER

		209	212	235	238	248	250	253	276	303	304	305	310	312
		355	364	367	377	379	395	416	426	469	480	481	498	501
		507	509	511	520	524	603	689	690	691	723	723	727	732
		733	735	737	740	741	750	751	752	752	753	754	755	756
		756	757	758	759	760	760	761	762	763	764	764	765	767
		768	808	813	824	837	975	976	1003	1004	1005			
R6	0000 0006	46*	69	79	86	263	265	318	321	329	429	478	478	481
		482	483	511	512	650	650	668	669	681	758	762	987	988
		989	994	995	1005	1008	1020	1021						
R7	0000 0007	48*	88	89	479	483	651	652	653	655	674	676		
R8	0000 0008	50*	80	81	86	87	653	674	1021					
R9	0000 0009	52*	406	442	583	584	586	587	589	655	656	662	664	666
		667	669	700	829	830								
RAG3	0000 083E	447	449*											
RAG31	0000 0834	438	444*											
RBZER	0000 0A70	690*	692											
RDAG1	0000 0674	261*	269											
RDAG12	0000 0678	262*	275											
RDANSTUF	0000 0A14	650*												
RDASF	0000 0A1E	653*	660	670										
RDASF1	0000 0A44	665	667*											
RDASF2	0000 082C	407	442*											
RDASF21	0000 0A36	659	661*											
RDATBUF	0000 0C38	261	318	850*										
RDATBUF1	0000 0C48	273	329	851*										
RDBYTE	0000 0A14	405	649*											
RDSPEC1	0000 0A54	674*	680											
READSPEC	0000 0A50	657	671*											
REDAG	0000 07A4	395*	456											
REDAG1	0000 07C2	403*	441	443										
RMBED	0000 1E73	960*												
ROMBFR	0000 0E74	264	404	481	690	959*								
ROMCNT	0000 0C86	354	409	452	878*									
ROMREAD	0000 087C	258	376	477*										
ROMREAD2	0000 0864	481*	484											
ROMRTN	0000 0A10	646*												
RQ2S	0000 0CA1	895*												
RRAG	0000 0768	375*												
RSAVE	0000 1F08	118	519	535	591	717	743	964*						
SECOND	0000 0CA2	896*												
SETKB	0000 0A96	128	709*											
SETUP	0000 098E	563	616*											
SINK	0000 0CA7	566	587	703	901*									
SORDFLG	0000 0C80	392	431	658	875*									
SORDFORM	0000 0DC8	379	940*											
SPECFLG	0000 0C8C	208	304	489	881*									
SPECHAR	0000 07CA	406*												
SPECOUNT	0000 0C82	399	434	436	878*									
SPECRET	0000 0890	489*	646											
SPECTRUM	0000 0702	408*	682											
ST	0000 051E	123*												
START	0000 052C	123	128*											
START1	0000 0508	117*	492	642	643	644	645							

CHKSUM/M17 PUNCHER

STTTST	0000	0598	159*	472					
T1E7	0000	0894	490*						
T4E5R	0000	0826	432	437	439*				
T4E5R1	0000	0816	433*	790					
TAGN	0000	05C8	177*	188					
TEST	0000	05B4	171*						
TEST1	0000	05F8	180	206*					
TEST12	0000	0616	234*						
TEST2	0000	0616	182	233*					
TEST3	0000	06B0	184	296*					
TEST4	0000	071A	186	352*	363				
TITLE	0000	0CAC	156	909*					
TREAD	0000	0C5D	859*						
TST31	0000	06EC	317*	325					
TST32	0000	06F0	319*	331					
TST33	0000	0716	327	332*					
TST3Z	0000	06B6	299*	302					
TSTEND	0000	0860	214	279	333	459	464*	817	843
TSTEND1	0000	0878	468	472*					
TSTP	0000	0C65	865*						
TTY	0000	066C	132	147*					
TTYDRV	0000	0908	620	625*					
TTYENRD	0000	0CA5	899*						
TTYGET	0000	0A8A	702*						
TTYRD	0000	0CA4	898*						
TTYWRT	0000	0CA3	897*						
TWRT	0000	0C5C	858*	859					
XOFF	0000	0C5F	861*						
XON	0000	0C5E	860*	861					
ZERRBF	0000	0A6A	167	687*					

