```
  LOC   OBJECT CODE     ADDR1 ADDR2  STMT    SOURCE STATEMENT                                             F01MAY72    9/04/73
000000                                  2           START                                                             00000030
```

```
  6 ********************************************************************* 00000070
  7 *                                                                   * 00000080
  8 *       3803-2 MICROPROGRAM LISTING  ROS1 (ALU1)                    * 00000090
  9 *                                                                   * 00000100
 10 *       ROS2 AND DATAFLOW CONTROL                                   * 00000110
 11 *                                                                   * 00000120
 12 *       P/N 1846377   SYSTEM EC 734110                              * 00000130
 13 *       CARD ASSEMBLY 88236252 MODULE EC 734087                     * 00000140
 14 *                                                                   * 00000150
 15 *     © COPYRIGHT INTERNATIONAL BUSINESS MACHINES CORP. 1973        * 00000160
 16 *                                                                   * 00000170
 17 ********************************************************************* 00000180
```

```
 22 ********************************************************************* 00000230
 23 ************************** BRANCH CONDITIONS ************************ 00000240
 24 ********************************************************************* 00000250
 25 *                                                                   * 00000260
 26 *       DBUS   - ACTIVE ANYTIME THE RESULT OF AN ALU OP EQUALS      * 00000270
 27 *                ALL ZERO.                                          * 00000280
 28 *       NALCO  - NO ALU CARRY OUT IS ACTIVE AFTER ADD OPS RESULTING * 00000290
 29 *                IN NO CARRY OUT.                                   * 00000300
 30 *       ALUR   - ALU ERROR IS ACTIVE WHEN ALU2 HAS HAD ANY ERROR    * 00000310
 31 *                CONDITION DESCRIBED IN SENSE BYTE 12. WHEN THE     * 00000320
 32 *                ERROR OCCURS, ALU2 WILL BE TRAPPED AT LOC 0,STAT D * 00000330
 33 *                WILL BE SET,AND THIS BRANCH WILL BE MADE ACTIVE.   * 00000340
 34 *       MIFTR  - MULTIPLE INTERFACE FEATURE WILL BE ACTIVE IF THE   * 00000350
 35 *                MIS OR SEVEN TRK FEATURES ARE INSTALLED. THIS BRANCH* 00000360
 36 *                DIFFERS FROM OTHER BOC'S SINCE HARDWARE WILL ALWAYS * 00000370
 37 *                FORCE PAGE 4 INTO THE HI-ORDER IC   LO ORDER IC    * 00000380
 38 *                WILL BE REPLACED FROM THE BOC MICROWORD AS IS DONE * 00000390
 39 *                NORMALLY.                                          * 00000400
 40 *       BOPE   - BUS OUT PARITY ERROR WILL BE ACTIVE ANYTIME THE    * 00000410
 41 *                CHANNEL BUS OUT REG CONTAINS BAD PARITY.           * 00000420
```

```
 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                                F01MAY72   9/04/73
                                    42 *         NCUEA  - NOT CONTROL UNIT END ON A INTERFACE WILL BE ACTIVE  * 00000430
                                    43 *                  WHEN HARDWARE IS NOT HOLDING A CUE FOR INTERFACE    * 00000440
                                    44 *                  A.                                                  * 00000450
                                    45 *         SELO   - SELECT OUT WILL BE ACTIVE ANYTIME THE SELECT OUT    * 00000460
                                    46 *                  CHANNEL TAG IS ACTIVE.                              * 00000470
                                    47 *         DFLER  - DATA FLOW ERROR WILL BE ACTIVE WHEN DATA FLOW CIRCUI* 00000480
                                    48 *                  HAVE FOUND AN ERROR CONDITION(E.G.ENVELOPE CHECK).  * 00000490
                                    49 *         CLOCKB - ALTERNATES WHEN WRITE LOGIC IS WRITING A SUBGROUP IN  00000500
                                    50 *                  GCR OR EVERY OTHER DATA BYTE IN PE OR NRZI          * 00000510
                                    51 *         ADROUT - ACTIVE ANYTIME ADDRESS OUT FROM THE CHANNEL IS UP   * 00000520
                                    52 *                  AND THE INTERFACE IS ENABLED.                       * 00000530
                                    53 *         CMDOUT - ACTIVE ANYTIME COMMAND OUT FROM THE CHANNEL IS UP.  * 00000540
                                    54 *                  AND THE INTERFACE IS ENABLED.                       * 00000550
                                    55 *         STATA  - ACTIVE WHEN ALU1'S BIT 4 IN THE STAT REGISTER       * 00000560
                                    56 *                  (NOT LSR) IS ON.                                    * 00000570
                                    57 *         STATB  - ACTIVE WHEN ALU2'S BIT 5 IN THE STAT REGISTER       * 00000580
                                    58 *                  (NOT LSR) IS ON.                                    * 00000590
                                    59 *         SELRST - SELECTIVE RESET IS ACTIVE WHEN THE CHANNEL ISSUES   * 00000600
                                    60 *                  A SELECTIVE RESET(OP-IN UP,OP-OUT DOWN, SUPPRESS    * 00000610
                                    61 *                  OUT UP). IN ADDITION, IF ALU1 FORCES A HARD ERROR   * 00000620
                                    62 *                  (XFR TO HDWERR), HARDWARE WILL FORCE ALU1 IC TO      * 00000630
                                    63 *                  0 AND ENABLE THIS BOC(360 ONLY)                     * 00000640
                                    64 *         SVCOUT - ACTIVE ANYTIME SERVICE OUT FROM THE CHANNEL IS UP   * 00000650
                                    65 *                  AND THE INTERFACE IS ENABLED.                       * 00000660
                                    66 *         SCB    - SWITCHED TO CHANNEL B(MIS ONLY) IS ACTIVE ONLY      * 00000670
                                    67 *                  WHEN THE CONTROL UNIT INTERFACE IS SWITCHED TO      * 00000680
                                    68 *                  CHANNEL B.                                          * 00000690
                                    69 *         PWRRST - POWER ON RESET IS ACTIVE ON INITIAL POWER UP AND    * 00000700
                                    70 *                  WHEN A RESET IS INITIATED VIA THE CE PANEL          * 00000710
                                    71 *                  MACHINE RESET PUSHBUTTON                            * 00000720
                                    72 *         DREG0  - ACTIVE IF D BUS BIT 0 IS PRESENT                    * 00000730
                                    73 *         DREG1  - ACTIVE IF D BUS BIT 1 IS PRESENT                    * 00000740
                                    74 *         DREG2  - ACTIVE IF D BUS BIT 2 IS PRESENT                    * 00000750
                                    75 *         DREG3  - ACTIVE IF D BUS BIT 3                               * 00000760
                                    76 *         DREG4  - ACTIVE IF D BUS BIT 4                               * 00000770
                                    77 *         DREG5  - ACTIVE IF D BUS BIT 5                               * 00000780
                                    78 *         DREG6  - ACTIVE IF D BUS BIT 6                               * 00000790
                                    79 *         DREG7  - ACTIVE IF D BUS BIT 7                               * 00000800
                                    80 *         OPRIN  - ACTIVE WHEN OP-IN TO CHANNEL IS UP  NOT TO BE       * 00000810
                                    81 *                  CONFUSED WITH CTI BIT 7(MICRO-PGM OP-IN)            * 00000820
                                    82 *         SUPO   - ACTIVE WHEN SUPPRESS OUT FROM CHANNEL IS UP         * 00000830
                                    83 *         STATC  - ACTIVE WHEN ALU2'S BIT 6 IN STAT REG IS SET         * 00000840
                                    84 *         STATD  - ACTIVE WHEN ALU2'S BIT 7 IN STAT REG IS SET         * 00000850
                                    85 *         NGENR  - ACTIVE WHEN A GENERAL RESET FOR EITHER INTERFACE    * 00000860
                                    86 *                  IS NOT PRESENT                                      * 00000870
                                    87 *         ISEL   - ACTIVE WHEN CHANNEL HAS INITIATED AN INITIAL        * 00000880
                                    88 *                  SELECTION SEQUENCE OR WHEN A POLL IS RECEIVED       * 00000890
                                    89 *                  IN RESPONSE TO REQUEST IN                           * 00000900
                                    90 *         NCUEB  - NOT CONTROL UNIT END ON B INTERFACE WILL BE ACTIVE  * 00000910
                                    91 *                  WHEN HARDWARE IS NOT HOLDING A CUE FOR INTF B.      * 00000920
                                    92 *         OVERRUN- WILL BE ACTIVE ON READ AND WRITE OP WHEN DATA       * 00000930
                                    93 *                  FLOW HAS DETECTED AN OVERRUN CONDITION              * 00000940
                                    94 *         ALLONES- DATA FLOW IS WRITING ENDING ONES IN GCR ORPE        * 00000950
                                    95 *                  OR HAS WRITTEN LAST DATA BYTE IN NRZI                 00000960
```

```
 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                          F01MAY72   9/04/73
                                    96 ********************************************************************** 00000970

                                    98 ********************************************************************** 00000990
                                    99 ************************** TRANSFER DECODES ************************* 00001000
                                   100 ********************************************************************** 00001010
                                   101 *                                                                    * 00001020
                                   102 *       RSTCOMTD- RESET COMMITTED WILL RESET THE DEVICE COMMITTED    * 00001030
                                   103 *                 LATCH IN THE DEVICE SWITCH                         * 00001040
                                   104 *       LSR     - SELECT LSR'S DEPENDING ON XFRH OR XFR              * 00001050
                                   105 *       HDWERR  - HARDWARE ERROR WILL FORCE A CATASTROPHIC           * 00001060
                                   106 *       CLEAR   - CLEAR WILL RESET ALL DATA FLOW SENSE DATA AND      * 00001070
                                   107 *                 CATASTROPHIC ERROR IN BOTH ALU'S                   * 00001080
                                   108 *       TUADR   - TAPE UNIT ADDRESS WILL TRANSFER THE SPECIFIED      * 00001090
                                   109 *                 LSR TO THE TU ADDRESS REG                          * 00001100
                                   110 *       AR      - THE AR TRANSFER WILL MOVE THE SPECIFIED LSR TO     * 00001110
                                   111 *                 THE ALU A REG INPUT. THE A REG IS RESET AT THE     * 00001120
                                   112 *                 END OF ALL LOGICAL AND ADD OPS.                    * 00001130
                                   113 *       CBI     - CBI WILL XFER THE SPECIFIED LSR TO THE CHANNEL     * 00001140
                                   114 *                 BUS IN REG                                         * 00001150
                                   115 *       CTI     - CTI WILL XFER THE SPECIFIED LSR TO THE CHANNEL     * 00001160
                                   116 *                 TAGS IN REG. CTI REG CONTINS TAGS IE SERV IN,      * 00001170
                                   117 *                 STATUS IN, ETC.                                    * 00001180
                                   118 *       IC      - IC WILL XFER THE SPECIFIED LSR TO THE LO-ORDER     * 00001190
                                   119 *                 8 BITS OF THE INSTRUCTION COUNTER.                 * 00001200
                                   120 *       INHP    - INHIBIT PARITY WILL BLOCK PARITY GENERATION ON     * 00001210
                                   121 *                 THE B BUS.                                         * 00001220
                                   122 *       HDWR    - HARDWARE ERRORS WILL XFR THE ALU1 CATASTROPHIC     * 00001230
                                   123 *                 ERROR REC TO THE SPECIFIED LSR                     * 00001240
                                   124 *       CBO     - CHANNEL BUS OUT WILL XFR THE CHANNEL BUS OUT REG   * 00001250
                                   125 *                 TO THE SPECIFIED LSR                               * 00001260
                                   126 *       XINA    - XINA WILL XFR ALU2'S CROSSOVER REG A TO THE        * 00001270
                                   127 *                 SPECIFIED LSR.                                     * 00001280
                                   128 *       XINB    - XINB WILL XFR ALU2'S CROSSOVER REG B TO THE        * 00001290
                                   129 *                 SPECIFIED LSR.                                     * 00001300
                                   130 *       XOUTA   - XOUTA WILL XFR THE SPECIFIED LSR TO ALU1'S         * 00001310
                                   131 *                 CROSSOVER REG A.                                   * 00001320
                                   132 *       XOUTB   - XOUTB WILL XFR THE SPECIFIED LSR TO ALU1'S         * 00001330
                                   133 *                 CROSSOVER REG B.                                   * 00001340
                                   134 *       STAT    - STAT WILL XFR THE SPECIFIED LSR TO ALU1'S          * 00001350
                                   135 *                 STAT REGISTER.                                     * 00001360
                                   136 *       MIST    - MIST WILL XFR THE SPECIFIED LSR TO THE             * 00001370
                                   137 *                 MLTIIPLE INTERFACE SWITCH TAGS REG. THE MIST       * 00001380
                                   138 *                 REG CONTAINS THE REQ-IN TAGS FOR BOTH INTERFACES.  * 00001390
                                   139 *       PING    - PING IS PECULIAR TO MIS AND IS USED TO RESET THE   * 00001400
                                   140 *                 INTERFACE PING-PONG HOLD LATCH IN HARDWARE.        * 00001410
                                   141 *       TIP     - TIP WILL NOTIFY HARDWARE TO GATE THE ALU1 XOUTA    * 00001420
                                   142 *                 REG TO THE DEAD TRACK REG.                         * 00001430
                                   143 *       CUREA   - CONTROL UNIT END RESET ON A WILL RESET THE CONTROL * 00001440
                                   144 *                 UNIT END OR GENERAL RESET LATCH ON A INTERFACE     * 00001450
                                   145 *       CUREB   - CONTROL UNIT END RESET ON B WILL RESET THE CONTROL * 00001460
                                   146 *                 UNIT END OR GENERAL RESET LATCH ON B INTERFACE     * 00001470
                                   147 *       EXT     - EXTERNAL XFR'S ALU2'S CATASTROPHIC ERROR REG INTO  * 00001480
                                   148 *                 THE SPECIFIED LSR.                                 * 00001490
                                   149 *                                                                    * 00001500
```

LOC OBJECT CODE ADDR1 ADDR2 STMT SOURCE STATEMENT F01MAY72 9/04/73

```
************************************************************************
************************************************************************
******************** LOCAL STORE REGISTER(LSR) ************************
********************       LAYOUT              ************************
************************************************************************
************* LSR0 ************************* LSR16 *********************
************************************************************************
* DESC: CONTAINS CURRENT COMMAND  * DESC: USED AS LINK REGISTER FOR   *
*       RELATIVE TO SIO/TIO       *       SUBROUTINE RETURNS          *
*       X'3F' FOR IDLESCAN        *       USUALLY SERV OUT RESPONSE   *
*                                 *       RETURN FOR STATUS AND       *
*                                 *       SERVICE SUBROUTINES         *
*                                 *                                   *
* SYMBOLIC=CURCOMM                * SYMBOLIC=LINK1                    *
*                                 *                                   *
* BIT 0*                          * BIT 0*                            *
*  THRU*** COMMAND CODE           *  THRU*** LO-IC LINK ADDRESS       *
* BIT 7*                          * BIT 7*                            *
*                                 *                                   *
************************************************************************
************* LSR1 ************************* LSR17 *********************
************************************************************************
* DESC: USED TO CONTAIN AN IMAGE  * DESC: USED AS A LINK REGISTER     *
*       OF THE HARDWARE CHANNEL   *       FOR SUBROUTINE RETURNS      *
*       TAG REG. THE ALU MODIFIES *       USUALLY CMD OUT RESPONSE    *
*       THIS LSR AND XFR'S IT     *       FOR STATUS AND SERVICE      *
*       TO THE HARDWARE REG TO    *       SUBROUTINES                 *
*       CHANGE CHANNEL INBOUND TAG*                                   *
*       STATES.                   *                                   *
*                                 *                                   *
* SYMBOLIC=CTIMAGE                * SYMBOLIC=LINK2                    *
*                                 *                                   *
* BIT0=HOLDA                      * BIT 0*                            *
*      THE CHAINING/HOLD INTFCE A *  THRU*** LO-IC LINK ADDRESS       *
*       BIT IS USED TO PREVENT    * BIT 7*                            *
*       METER AND INTERFACE DISABL*                                   *
* BIT1=HOLDB                      *                                   *
*      SAME FUNCTION AS BIT 0 EX- *                                   *
*       CEPT FOR B INTERFACE      *                                   *
* BIT2=HOLDINT                    *                                   *
*      IF ACTIVE,HARDWARE WILL    *                                   *
*       HOLD THE CURRENT INTERFACE*                                   *
*       SWITCH POSITION AND WILL  *                                   *
*       ENABLE SHORT BUSY TO THE  *                                   *
*       OPPOSITE INTERFACE.       *                                   *
* BIT3=CUBUSY                     *                                   *
*      NOTIFIES HARDWARE TO MAIN- *                                   *
*       TAIN THE INTERFACE SWITCH *                                   *
*       CONNECTION AND PRESENT A  *                                   *
*       SHORT BUSY SEQUENCE IF    *                                   *
*       SELECTED BY CHANNEL. ALU1 *                                   *
*       IS NOT SUBJECT TO INIT SEL*                                   *
*       TRAP WHILE THIS BIT IS    *                                   *
*       ACTIVE.                   *                                   *
```

```
  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                                     F01MAY72   9/04/73
                                    204 * BIT4=SVCIN                        *                                      * 00002050
                                    205 *      USED TO RAISE OR DROP SERV-*                                        * 00002060
                                    206 *       IN TO THE CHANNEL           *                                      * 00002070
                                    207 * BITS5=STSIN                       *                                      * 00002080
                                    208 *      USED TO RAISE OR DROP        *                                      * 00002090
                                    209 *       STATUS-IN TO THE CHANNEL.   *                                      * 00002100
                                    210 * BIT6=ADDIN                        *                                      * 00002110
                                    211 *      USED TO RAISE OR DROP        *                                      * 00002120
                                    212 *       ADDRESS-IN TO THE CAHNNEL.*                                        * 00002130
                                    213 * BIT7=OPIN                         *                                      * 00002140
                                    214 *      USED TO RAISE OR DROP OP-IN*                                        * 00002150
                                    215 *       TO THE CHANNEL. THE ACTUAL*                                        * 00002160
                                    216 *       OP-IN LINE IS INTERLOCKED *                                        * 00002170
                                    217 *       WITH THE SELECT SIGNAL SO *                                        * 00002180
                                    218 *       THAT OP-IN CAN ONLY BE      *                                      * 00002190
                                    219 *       RAISED IF THE CONTROLLER    *                                      * 00002200
                                    220 *       IS SELECTED.                *                                      * 00002210
                                    221 *                                   *                                      * 00002220
                                    222 ********************************************************************* 00002230
                                    223 ************** LSR2 ************************ LSR18 ***************** 00002240
                                    224 ********************************************************************* 00002250
                                    225 * DESC: USED TO CONTAIN AN IMAGE   * DESC: USED AS A LINK REGISTER         * 00002260
                                    226 *       OF THE HARDWARE ALU1'A'     *       FOR SUBROUTINE RETURNS          * 00002270
                                    227 *       CROSSOVER REG. THE CROSS-  *       USUALLY A HALT I/O DURING       * 00002280
                                    228 *       OVER REG IS USED BY HARD-  *       STATUS AND SERVICE              * 00002290
                                    229 *       WARE FOR DATA FLOW CONTROL*       SUBROUTINES.                     * 00002300
                                    230 *                                   *                                      * 00002310
                                    231 * SYMBOLIC=XOUTA                    * SYMBOLIC=LINK3                       * 00002320
                                    232 *                                   *                                      * 00002330
                                    233 * BIT0=CONTROL                      * BIT 0*                               * 00002340
                                    234 *      INDICATES CONTROL COMMAND    *  THRU*** LO-IC LINK ADDRESS          * 00002350
                                    235 *       TO DATA FLOW                * BIT 7*                               * 00002360
                                    236 * BIT1=FOUR BITS OF                 *                                      * 00002370
                                    237 *  T   MODE 1 SET                    *                                       00002380
                                    238 * BIT=FROM  CHANNEL                  *                                       00002390
                                    239 * BIT5=WRITE                        *                                      * 00002400
                                    240 * BIT6=MODE6250                     *                                      * 00002410
                                    241 *      INDICATES 6250BPI TO ROS2    *                                      * 00002420
                                    242 * BIT7=NRZMODE                      *                                      * 00002430
                                    243 *      INDICATES NRZI WAS LAST      *                                      * 00002440
                                    244 *       MODE SET TO ROS2            *                                      * 00002450
                                    245 *                                   *                                      * 00002460
                                    246 ********************************************************************* 00002470
                                    247 ************** LSR3 ************************** LSR19 **************** 00002480
                                    248 ********************************************************************* 00002490
                                    249 * DESC: CONTAINS CURRENT DEVICE     * DESC: USED AS A LINK REGISTER        * 00002500
                                    250 *       ADDRESS RELATIVE TO THE     *       FOR DIAGNOSTIC AND SENSE       * 00002510
                                    251 *       LAST COMMAND RECEIVED.      *       SUBROUTINE RETURNS.            * 00002520
                                    252 *                                   *                                      * 00002530
                                    253 * SYMBOLIC=CURADDR                  * SYMBOLIC=LINK4                       * 00002540
                                    254 * BIT 0*                            * BIT 0*                               * 00002550
                                    255 *  THRU*** CONTROLLER-DEVICE        *  THRU*** LO-IC LINK ADDRESS          * 00002560
                                    256 * BIT 7*    ADDRESS                 * BIT 7*                               * 00002570
                                    257 ********************************************************************* 00002580
```

```
 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   9/04/73
                                   258 ************** LSR4 ****************************** LSR20 ************** 00002590
                                   259 ************************************************************************ 00002600
                                   260 * DESC: SCRATCH REGISTER USED BY  * DESC: USED TO CONTAIN AN IMAGE     * 00002610
                                   261 *       VARIOUS ROUTINES.        *       OF THE HARDWARE ALU1 'B'     * 00002620
                                   262 *                                *       CROSSOVER REG. THE 'B'       * 00002630
                                   263 *                                *       CROSSOVER IS USED TO KICKOFF* 00002640
                                   264 *                                *       ALU2 AND CONTAINS THE INDEX  * 00002650
                                   265 *                                *       VALUE FOR SELECTING ALU2     * 00002660
                                   266 *                                *       ROUTINES.                    * 00002670
                                   267 *                                *                                    * 00002680
                                   268 * SYMBOLIC=WORK1                 * SYMBOLIC=XOUTBIM                   * 00002690
                                   269 *                                *                                    * 00002700
                                   270 * BIT 0*                         * BIT 0*                             * 00002710
                                   271 *  THRU*** SCRATCH DATA          *  THRU*** ALU2 ROUTINE INDEX        * 00002720
                                   272 * BIT 7*                         * BIT 7*                             * 00002730
                                   273 *                                *                                    * 00002740
                                   274 ************************************************************************ 00002750
                                   275 ************** LSR5 ****************************** LSR21 ************** 00002760
                                   276 ************************************************************************ 00002770
                                   277 * DESC: USED HOLD ANY STATUS THAT * DESC: HOLDS ALU1 CASTASTROPHIC    * 00002780
                                   278 *       IS PENDING TO BE PRESENTED*       ERROR DATA UNTIL A SENSE     * 00002790
                                   279 *       TO CHANNEL               *       OP IS PERFORMED              * 00002800
                                   280 *                                *                                    * 00002810
                                   281 * SYMBOLIC=PNDSTS                * SYMBOLIC=ALU1ERR                   * 00002820
                                   282 *                                *                                    * 00002830
                                   283 * BIT 0=NOT USED                 * BIT 0=B BUS PARITY OR LSR ADDRESS * 00002840
                                   284 *                                *       ERROR                        * 00002850
                                   285 * BIT 1=STATUS MODIFIER          * BIT 1=SPARE                        * 00002860
                                   286 *                                *                                    * 00002870
                                   287 * BIT 2=CUE                      * BIT 2=XFR-LOIC ERROR               * 00002880
                                   288 *       CONTROL UNIT END         *                                    * 00002890
                                   289 * BIT 3=BUSY                     * BIT 3=INST DECODE HI IC-BOC ERROR * 00002900
                                   290 *                                *                                    * 00002910
                                   291 * BIT 4=CHANEND                  * BIT 4=MICROPROGRAM DETECTED ERROR * 00002920
                                   292 *       CHANNEL END              *                                    * 00002930
                                   293 * BIT 5=DEVEND                   * BIT 5=D BUSY PARITY ERROR          * 00002940
                                   294 *       DEVICE END               *                                    * 00002950
                                   295 * BIT 6=UNITCHK                  * BIT 6=SPARE                        * 00002960
                                   296 *       UNIT CHECK               *                                    * 00002970
                                   297 * BIT 7=UNITEXC                  * BIT 7=BOC ERROR                    * 00002980
                                   298 *       UNITEXCEPTION            *                                    * 00002990
                                   299 *                                *                                    * 00003000
                                   300 ************************************************************************ 00003010
                                   301 ************** LSR6 ****************************** LSR22 ************** 00003020
                                   302 ************************************************************************ 00003030
                                   303 *                                *                                    * 00003040
                                   304 * DESC: CONTAINS DEVICE ADDRESS   * DESC: HOLDS ALU2 CATASTROPHIC     * 00003050
                                   305 *       FOR WHICH ALU1 IS HOLDING *       ERROR DATA UNTIL A SENSE     * 00003060
                                   306 *       PENDING STATUS.          *       OP IS PERFORMED.             * 00003070
                                   307 *                                *                                    * 00003080
                                   308 * SYMBOLIC=PNDADDR               * SYMBOLIC=ALU2ERR                   * 00003090
                                   309 *                                *                                    * 00003100
                                   310 * BIT 0*                         * BIT 0*                             * 00003110
                                   311 *  THRU***DEVICE ADDRESS         *  THRU***SAME AS ALU1ERR(LSR21)     * 00003120
```

```
 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                        F01MAY72   9/04/73
                                   312 * BIT 7*                        * BIT 7* EXCEPT DATA IS FOR ALU2.   * 00003130
                                   313 *                               *                                   * 00003140
                                   314 ************************************************************************ 00003150
                                   315 ************** LSR7 ********************************** LSR23 ************** 00003160
                                   316 ************************************************************************ 00003170
                                   317 * DESC: CONTAINS ALU1'S SENSE     * DESC: SCRATCH REGISTER USED BY    * 00003180
                                   318 *       DATA FOR SENSE BYTE 0     *       VARIOUS ROUTINES            * 00003190
                                   319 *                                 *                                   * 00003200
                                   320 * SYMBOLIC=SNSSTS2                * SYMBOLIC=WORK2                    * 00003210
                                   321 *                                 *                                   * 00003220
                                   322 * BIT 0=CMDREJ                    * BIT 0*                            * 00003230
                                   323 *       COMMAND REJECT            *  THRU*** SCRATCH DATA             * 00003240
                                   324 * BIT 1=INTREQ                    * BIT 7*                            * 00003250
                                   325 *       INTERVENTION REQUIRED     *                                   * 00003260
                                   326 * BIT 2=BUSOC                     *                                   * 00003270
                                   327 *       BUS OUT CHECK             *                                   * 00003280
                                   328 * BIT 3=EQUIPCK                   *                                   * 00003290
                                   329 *       EQUIPMENT CHECK           *                                   * 00003300
                                   330 * BIT 4=DATACK                    *                                   * 00003310
                                   331 *       DATA CHECK                *                                   * 00003320
                                   332 * BIT 5=OVERUN                    *                                   * 00003330
                                   333 *       OVERRUN                   *                                   * 00003340
                                   334 * BIT 6=WDCNT0                    *                                   * 00003350
                                   335 *       WORK COUNT 0              *                                   * 00003360
                                   336 * BIT 7=RDNOISE                   *                                   * 00003370
                                   337 *       READ NOISE(PE OR RLC)     *                                   * 00003380
                                   338 *                                 *                                   * 00003390
                                   339 ************************************************************************ 00003400
                                   340 ************** LSR8 ********************************** LSR24 ************** 00003410
                                   341 ************************************************************************ 00003420
                                   342 * DESC: USED AS IMAGE LSR FOR     * DESC: USED AS A LINK REGISTER     * 00003430
                                   343 *       HARDWARE ALU1 STAT REG    *       FOR SUBROUTINE RETURN       * 00003440
                                   344 *                                 *       IN THE DIAGNOSTIC DMR       * 00003450
                                   345 *                                 *       ROUTINE.                    * 00003460
                                   346 *                                 *                                   * 00003470
                                   347 * SYMBOLIC=STATIMG                * SYMBOLIC=LINKS                    * 00003480
                                   348 *                                 *                                   * 00003490
                                   349 * BIT 0=STOP                      * BIT 0*                            * 00003500
                                   350 *       INDICATES CMD OUT RESPONSE*  THRU*** LO-IC LINK ADDRESS       * 00003510
                                   351 *       TO SERVICE IN.            * BIT 7*                            * 00003520
                                   352 * BIT 1=SENSE                     *                                   * 00003530
                                   353 *       NOTIFIES DATA FLOW TO GATE*                                   * 00003540
                                   354 *       OUT THEIR SENSE DATA      *                                   * 00003550
                                   355 * BIT 2=NOT USED                  *                                   * 00003560
                                   356 *                                 *                                   * 00003570
                                   357 * BIT 3=DIAGMODE                  *                                   * 00003580
                                   358 *       INDICATES TO DATA FLOW    *                                   * 00003590
                                   359 *       THAT DIAGNOSTIC MODE IS   *                                   * 00003600
                                   360 *       IN EFFECT.                *                                   * 00003610
                                   361 * BIT4 =STATA                     *                                   * 00003620
                                   362 *       USED BY ALU1 AS A DIRECT  *                                   * 00003630
                                   363 *       BRANCH CONDITION          *                                   * 00003640
                                   364 * BIT 5=STATB                     *                                   * 00003650
                                   365 *       USED BY ALU2 AS A DIRECT  *                                   * 00003660
```

```
 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72  9/04/73
                                   366 *       BRANCH CONDITION          *                                * 00003670
                                   367 * BIT 6=USED BY ALU2 AS A DIRECT  *                                * 00003680
                                   368 *       BRANCH CONDITION          *                                * 00003690
                                   369 * BIT 7=STATD                     *                                * 00003700
                                   370 *       USED BY ALU2 AS A DIRECT  *                                * 00003710
                                   371 *       BRANCH CONDITION          *                                * 00003720
                                   372 ************************************************************************ 00003730
                                   373 ************** LSR9 ************************************ LSR25 ************** 00003740
                                   374 ************************************************************************ 00003750
                                   375 * DESC: USED TO HOLD FLAGS        * DESC: USED AS A LINK REGISTER FOR * 00003760
                                   376 *       PERTAINING TO THE CHANNEL *       SUBROUTINE RETURN IN THE    * 00003770
                                   377 *       INTERFACE AND ETC.        *       DIAGNOSTIC DMR ROUTINE.     * 00003780
                                   378 *                                 *                                   * 00003790
                                   379 * SYMBOLIC=FLAGS                  * SYMBOLIC=LINK6                    * 00003800
                                   380 *                                 *                                   * 00003810
                                   381 * BIT 0=CONCON                   * BIT 0*                            * 00003820
                                   382 *       SET IF CONTINGENT CONN-   *  THRU*** LO-IC LINK ADDRESS      * 00003830
                                   383 *     ECTION IS BEING MAINTAINED.* BIT 7*                            * 00003840
                                   384 * BIT 1=CUEA                      *                                   * 00003850
                                   385 *       SET IF CONTROL UNIT END   *                                   * 00003860
                                   386 *       CONDITION WAS FOUND FOR   *                                   * 00003870
                                   387 *       INTERFACE A.              *                                   * 00003880
                                   388 * BIT 2=INTFB                     *                                   * 00003890
                                   389 *       SET IF INTERFACE B IS     *                                   * 00003900
                                   390 *       SELECTING.                *                                   * 00003910
                                   391 * BIT 3=CUEB                      *                                   * 00003920
                                   392 *       SET IF CONTROL UNIT END   *                                   * 00003930
                                   393 *       CONDITION WAS FOUND FOR   *                                   * 00003940
                                   394 *       INTERFACE B.              *                                   * 00003950
                                   395 * BIT 4=RESETOK                   *                                   * 00003960
                                   396 *       SET IF A GENERAL RESET TO *                                   * 00003970
                                   397 *       ALL DEVICES HAS BEEN PER- *                                   * 00003980
                                   398 *       FORMED. PREVENTS RESETTING*                                   * 00003990
                                   399 *       ALL DEVICES TWICE WHEN A  *                                   * 00004000
                                   400 *       GENERAL RESET IS ISSUED TO*                                   * 00004010
                                   401 *       AN MIS MACHINE ON A SINGLE*                                   * 00004020
                                   402 *       CPU.                     *                                    * 00004030
                                   403 * BIT 5=STATPNDG                 *                                   * 00004040
                                   404 *       SET IF CONTROLLER IS      *                                   * 00004050
                                   405 *       PRESENTING PENDING STATUS *                                   * 00004060
                                   406 *       WHEN PENDING STATUS IS    *                                   * 00004070
                                   407 *       BEING HELD. CHANNEL MUST  *                                   * 00004080
                                   408 *       ACCEPT PENDING STATUS     *                                   * 00004090
                                   409 *       BEFORE CONTROLLER IS FREE.*                                   * 00004100
                                   410 *       FOR OTHER OPS.            *                                   * 00004110
                                   411 * BIT 6=STACK                     *                                   * 00004120
                                   412 *       SET IF CHANNEL RESPONDS TO*                                   * 00004130
                                   413 *       STATUS IN WITH CMD OUT.   *                                   * 00004140
                                   414 *       DEPENDING ON THE STATUS   *                                   * 00004150
                                   415 *       THIS FLAG MAY OR MAY NOT  *                                   * 00004160
                                   416 *       BE SET.                   *                                   * 00004170
                                   417 * BIT 7=CHAIN                     *                                   * 00004180
                                   418 *       SET IF CHANNEL RESPONDS   *                                   * 00004190
                                   419 *       TO STATUS IN WITH SERV OUT*                                   * 00004200
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                                F01MAY72   9/04/73
                                    420 *       AND SUPPRESS OUT IS UP    *                                          * 00004210
                                    421 *                                 *                                          * 00004220
                                    422 ************************************************************************** 00004230
                                    423 ************** LSR10 ***************************** LSR26 ************** 00004240
                                    424 ************************************************************************** 00004250
                                    425 * DESC: UPPER FOUR BITS ARE USED  * DESC: USED AS 7 TK MODE REG          * 00004260
                                    426 *       AS FLAGS  LOWER FOUR BITS *       FOR A INTERFACE.               * 00004270
                                    427 *       ARE IMAGE FOR THE REQUEST *                                      * 00004280
                                    428 *       IN TAGS REG IN HARDWARE   *                                      * 00004290
                                    429 *       (MIST)                    *                                      * 00004300
                                    430 *                                 *                                      * 00004310
                                    431 * SYMBOLIC=FLAGS1 AND REQTAGS     * SYMBOLIC=SEVMODA                   * 00004320
                                    432 *                                 *                                      * 00004330
                                    433 * BIT 0=BNRZI                     * BIT 0=FIVE                         * 00004340
                                    434 *       USED TO INDICATE A NRZI   *                                      * 00004350
                                    435 *       MODE SET(X'CB') WAS THE   * BIT 1= BITS                        * 00004360
                                    436 *       LAST RECIEVED ON B INTF   *                                      * 00004370
                                    437 *                                   BIT 2=  FROM                       * 00004380
                                    438 * BIT 1=ANRZI                     *                                      * 00004390
                                    439 *       USED TO INDICATE A NRZI   * BIT 3=   MODE                      * 00004400
                                    440 *       MODE SET(X'CB')S AS THE   *                                      * 00004410
                                    441 *       LAST RECIEVED ON A INTF   *                                      * 00004420
                                    442 * BIT 2=CURFLAG                    * BIT 4=   SET                       * 00004430
                                    443 *       INDICATES CONTROL UNIT IS *                                      * 00004440
                                    444 *       RESERVED TO THE CURRENT   * BIT 5=WRITE                        * 00004450
                                    445 *       INTERFACE.                *                                      * 00004460
                                    446 * BIT 3=ALLOWDSE                  * BIT 6=DEN6250                      * 00004470
                                    447 *       INDICATES DATA SECURITY   *                                      * 00004480
                                    448 *       ERASE CAN BE EXECUTED SINC* BIT 7=DEN800                       * 00004490
                                    449 *       AN ERASE HAS JUST BEEN    *                                      * 00004500
                                    450 *       PERFORMED.                *                                      * 00004510
                                    451 * BIT 4=SUPREQA                   *                                      * 00004520
                                    452 *       IMAGE BIT FOR SUPPRESSIBLE*                                      * 00004530
                                    453 *       REQUEST-IN FOR INTF A.    *                                      * 00004540
                                    454 * BIT 5=IMAGE BIT FOR NON-SUPPRESS-*                                      * 00004550
                                    455 *       SIBLE REQUEST-IN FOR A.   *                                      * 00004560
                                    456 * BIT 6=SUPREQB                   *                                      * 00004570
                                    457 *       IMAGE BIT FOR SUPPRESSIBLE*                                      * 00004580
                                    458 *       REQUEST-IN FOR INTF B.    *                                      * 00004590
                                    459 * BIT 7=REQINB                    *                                      * 00004600
                                    460 *       IMAGE BIT FOR NON-SUPP-   *                                      * 00004610
                                    461 *       RESSIBLE REQUEST-IN FOR B.*                                      * 00004620
                                    462 *                                 *                                      * 00004630
                                    463 ************************************************************************** 00004640
                                    464 ************** LSR11 ***************************** LSR27 ************** 00004650
                                    465 ************************************************************************** 00004660
                                    466 * DESC: USED AS THE ALU1 FRU REG  * DESC: USED AS 7 TK MODE REG          * 00004670
                                    467 *       AN HOLDS THE ALU FAILURE  *       FOR B INTERFACE                * 00004680
                                    468 *       FLAGS.                    *                                      * 00004690
                                    469 *                                 *                                      * 00004700
                                    470 * SYMBOLIC=FLAGS2                 * SYMBOLIC=SEVMODB                   * 00004710
                                    471 *                                 *                                      * 00004720
                                    472 * BIT 0=FORCEUC                   * BIT 0*                             * 00004730
                                    473 *       SET ON AN INITIAL ALU     *  THRU*** SAME AS SEVMODA(LSR26)    * 00004740
```

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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   9/04/73
                                    474 *       FAILURE. WILL BE RESET    * BIT 7*                          * 00004750
                                    475 *       ONCE THE UNIT CHECK HAS   *                                 * 00004760
                                    476 *       BEEN PRESENTED TO CHANNEL.*                                 * 00004770
                                    477 * BIT 1=ALUFAIL                    *                                 * 00004780
                                    478 *       SET WHEN AN ALU FAILURE   *                                 * 00004790
                                    479 *       OCCUR. ONLY RESET ON SENSE*                                 * 00004800
                                    480 *       OPS.                      *                                 * 00004810
                                    481 * BIT 2=A64 INTFA=6250             *                                 * 00004820
                                    482 * BIT3 =B64 INTFB=6250                                               00004830
                                    483 ************************************************************************ 00004840
                                    484 ************** LSR12 ***************************** LSR28 ************** 00004850
                                    485 ************************************************************************ 00004860
                                    486 * DESC: CONTAINS DIAGNOSTIC FLAGS * DESC: USED AS SCRATCH REG BY      * 00004870
                                    487 *       RECEIVED ON SET DIAGNOSE  *       SEVEN TRK MODE ROUTINE      * 00004880
                                    488 *       COMMAND.                  *                                   * 00004890
                                    489 *                                 *                                   * 00004900
                                    490 * SYMBOLIC=SETDIA1                * SYMBOLIC=WORK4                    * 00004910
                                    491 *                                 *                                   * 00004920
                                    492 * BIT 0=DIAWRT - READ CH BUFFER   * BIT 0*                           * 00004930
                                    493 *       SET DIAGNOSTIC MODE FOR   *  THRU*** SCRATCH DATA             * 00004940
                                    494 *       WRITE OR READ OP          * BIT 7*                            * 00004950
                                    495 * BIT 1=IBGMSR                    *                                   * 00004960
                                    496 *       READ OP- DO IBG MEASURE   *                                   * 00004970
                                    497 * BIT 2=INHPOST OR RDACC          *                                   * 00004980
                                    498 *       READ OP- DO READ ACCESS   *                                   * 00004990
                                    499 *                MEASUREMENT      *                                   * 00005000
                                    500 *       WRITE OP-INHIBIT PE POST- *                                   * 00005010
                                    501 *                AMBLE ON NEXT    *                                   * 00005020
                                    502 *                WRITE OP.        *                                   * 00005030
                                    503 * BIT 3=GDT                       *                                   * 00005040
                                    504 *       DO GO-DOWN-TIMING USING   *                                   * 00005050
                                    505 *       COUNT IN SETCNT1 AND      *                                   * 00005060
                                    506 *       SET CNT2 REGS.            *                                   * 00005070
                                    507 * BIT 4=INHPRE OR RDSTOP          *                                   * 00005080
                                    508 *       WRITE OP-INHIBIT PE PRE-  *                                   * 00005090
                                    509 *       NEXT WRITAMBLE ON NEXT    *                                   * 00005100
                                    510 *                WRITE OP         *                                   * 00005110
                                    511 *       READ OP-DO READ STOP      *                                   * 00005120
                                    512 *              MEASUREMENT        *                                   * 00005130
                                    513 * BIT 5=DMR OR LWROP              *                                   * 00005140
                                    514 *       WRITE OP- DO WRITE IN LWR *                                   * 00005150
                                    515 *                  MODE.          *                                   * 00005160
                                    516 *       READ OP- DO DIAGNOSTIC    *                                   * 00005170
                                    517 *                  READ AND MEASURE*                                  * 00005180
                                    518 * BIT 6=TUBOMSK                   *                                   * 00005190
                                    519 *       WRITE OP-MASK TUBO IN ALU2*                                   * 00005200
                                    520 *                WITH SETCNT1 BYTE*                                   * 00005210
                                    521 *                DURING NXT WRITE *                                   * 00005220
                                    522 * BIT 7=CHGSTS                     *                                   * 00005230
                                    523 *       EXECUTE NEXT COMMAND UP TO*                                   * 00005240
                                    524 *       THE POINT OF RAISING MOVE *                                   * 00005250
                                    525 *       TO DEVICE. ALLOWS CHANG-  *                                   * 00005260
                                    526 *       ING DEV STS WITHOUT MOVING*                                   * 00005270
                                    527 *       TAPE.                     *                                   * 00005280
```

```
*                                 *                                 *
*********************************************************************
************** LSR13 ***************************** LSR29 *************
*********************************************************************
* DESC: CONTAINS DIAGNOSTIC FLAGS * DESC: CONTAINS ALU1 FRU IDENTIFIER*
*       RECEIVED ON SET DIAGNOSE  *       FOR ALU CATASTROPHIC ERROR  *
*       COMMAND                   *       DURING IDLE                 *
*                                 *                                   *
* SYMBOLIC=SETDIA2                * SYMBOLIC=FRUREG                   *
*                                 *                                   *
* BIT 0=BLKDC                     * BIT 4*                            *
*       THIS FLAG WILL BE USED TO *  THRU*** SEQUENCE INDICATOR       *
*       BLOCK A UNIT CHECK DUE TO * BIT 7*                            *
*       DATA CHECK FROM HARDWARE. *                                   *
*       USEFUL TO CHAIN DIAG WRITE*                                   *
*       OP.                       *                                   *
* BIT 1=DEVBSY                                                        *
*       THIS FLAG WILL GIVE IMME- *                                   *
*       DIATE DEV END DURING CHAIN-                                   *
*       ED REWIND/DSE OPS.        *                                   *
* BIT 2=BLKINTS                                                       *
*       THIS FLAG WILL BLOCK THE  *                                   *
*       RAISING OF SUPPRESSIBLE   *                                   *
*       REQUEST-IN.               *                                   *
* BIT 3=SETCUB                    *                                   *
*       WILL FORCE A SHORT BUSY   *                                   *
*       SEQUENCE IN A CHAIN OF    *                                   *
*       COMMANDS.                 *                                   *
* BIT 4=SPARE                     *                                   *
* BIT 5=SPARE                     *                                   *
* BIT 6=TEST DISCONNECT IN        *                                   *
* BIT 7=LOOP FORMAT               *                                   *
*********************************************************************
************** LSR14 ***************************** LSR30 *************
*********************************************************************
* DESC: HOLDS HI ORDER COUNT FOR  * DESC: FRUSAV                      *
*       GO-DOWN-TIMING OR GO-UP   *                                   *
*       COUNT IN TACHS FOR DMR OR *                                   *
*       MASK FOR TUBO             *                                   *
* SYMBOLIC=SETCNT1                *                                   *
*                                 *                                   *
* BIT 0*                          *                                   *
*  THRU*** GO OR GUP COUNT        *                                   *
* BIT 7*                          *                                   *
*                                 *                                   *
*********************************************************************
************** LSR15 ***************************** LSR31 *************
*********************************************************************
* DESC:HOLD LO-ORDER COUNT FOR    * DESC: FORMAT                      *
*      GO DOWN-TIME OR GO-DOWN-   *                                   *
*      COUNT FOR DMR.             *                                   *
*                                 *                                   *
* SYMBOLIC=SETCNT2                *                                   *
*                                 *                                   *
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                              F01MAY72   9/04/73
                                    582 * BIT 0*                      *                                       * 00005830
                                    583 *  THRU*                      *                                       * 00005840
                                    584 * BIT 7*** GDT COUNT          *                                       * 00005850
                                    585 *      *                      *                                       * 00005860
                                    586 *                             *                                       * 00005870
                                    587 ********************************************************************* 00005880
                                    588 *  BRANCH ON CONDITIONS FOR ***BOC***                                   00005890
000000                              589 #DBUS     EQU   X'00'             D BUS EQUAL ZERO                      00005900
000001                              590 #NALCO    EQU   X'01'             NOT ALU CARRY OUT                     00005910
000002                              591 #ALUR     EQU   X'02' SET ON ANY ALU ERRORS                             00005920
000003                              592 #MIFTR    EQU   X'03'             MIS FEATURE                           00005930
000004                              593 #BOPE     EQU   X'04'             BUS OUT PARITY EVEN                   00005940
000005                              594 #NCUEA    EQU   X'05'             NOT CU END CHAN A                     00005950
000006                              595 #SELO     EQU   X'06' SELECTLOUT A OR B                                 00005960
000007                              596 #DFLER    EQU   X'07'             DATA FLOW ERROR                       00005970
000007                              597 #CLOCKB   EQU   X'07'             CLOCK                                 00005980
000008                              598 #ADROUT   EQU   X'08'             ADDRESS OUT A OR B                    00005990
000009                              599 #CMDOUT   EQU   X'09'             COMMAND OUT A OR B                    00006000
00000A                              600 #STATA    EQU   X'0A'             STAT A ALU 1                          00006010
00000B                              601 #STATB    EQU   X'0B'             STAT B ALU 2                          00006020
00000C                              602 #SELRST   EQU   X'0C'             SELECTIVE RESET                       00006030
00000D                              603 #SVCOUT   EQU   X'0D'             SERVICE OUT                           00006040
00000E                              604 #SCB      EQU   X'0E'             SWITCHED TO CHAN B (MIS)              00006050
00000F                              605 #PWRRST   EQU   X'0F'             POWER ON RESET                        00006060
                                    606 ***************************************************************        00006070
000010                              607 #DREG0    EQU   X'10'             D REG 0                               00006080
000011                              608 #DREG1    EQU   X'11'             D REG 1                               00006090
000012                              609 #DREG2    EQU   X'12'             D REG 2                               00006100
000013                              610 #DREG3    EQU   X'13'             D REG 3                               00006110
000014                              611 #DREG4    EQU   X'14'             D REG 4                               00006120
000015                              612 #DREG5    EQU   X'15'             D REG 5                               00006130
000016                              613 #DREG6    EQU   X'16'             D REG 6                               00006140
000017                              614 #DREG7    EQU   X'17'             D REG 7                               00006150
000018                              615 #OPRIN    EQU   X'18'             OPERATIONAL IN                        00006160
000019                              616 #SUPO     EQU   X'19'             SUPPRESS OUT                          00006170
00001A                              617 #STATC    EQU   X'1A'             ALU 2 STAT C                          00006180
00001B                              618 #STATD    EQU   X'1B'             ALU 2 STATD                           00006190
00001C                              619 #NGENR    EQU   X'1C'             NOT GENERAL RESET FOR CH A OR B       00006200
00001D                              620 #ISEL     EQU   X'1D'             INITIAL SELECTION                     00006210
00001E                              621 #NCUEB    EQU   X'1E'             NOT CU END FOR CHAN B (MIS)           00006220
00001F                              622 #OVERRUN  EQU   X'1F'             DATA FLOW DETECTED OVERRUN            00006230
00001F                              623 #ALLONES  EQU   X'1F'             END OF DATA BEING WRITTEN             00006240
                                    624 ******************EQUATE STATEMENTS ***************                    00006250
                                    625 *                 ALU 1 TRANSFER ADDRESSES                              00006260
000005                              626 RSTCOMTD EQU    X'05'             RESET DEV COMMITTED LATCH             00006270
000006                              627 LSR       EQU   X'06'             SELECT HI LSRS                        00006280
000011                              628 HDWERR    EQU   X'11' FORCE ALU ERRORS                                  00006290
000012                              629 CLEAR     EQU   X'12'     RESET SENSE DATA TO DATA FLOW                 00006300
000024                              630 TUADR     EQU   X'24'             TAPE UNIT ADR SELECTION               00006310
000021                              631 AR        EQU   X'21'             ALU INPUT REGISTER                    00006320
000060                              632 CBI       EQU   X'60'             CHANNEL BUS IN                        00006330
000050                              633 CTI       EQU   X'50'             CHANNEL TAGS IN                       00006340
000022                              634 IC        EQU   X'22'             INSTRUCTION COUNTER                   00006350
000082                              635 INHP      EQU   X'82'             INHIBIT B BUS PARITY                  00006360
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  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   9/04/73
000084                              636 HDWR     EQU   X'84'              HARDWARE ERRORS ALU 1                 00006370
0000A0                              637 CBO      EQU   X'A0'              CHANNEL BUS OUT                       00006380
000090                              638 XINA     EQU   X'90'              CROSSOVER REGISTER INPUT A            00006390
000088                              639 XINB     EQU   X'88'              CROSSOVER REGISTER INPUT B            00006400
000042                              640 XOUTA    EQU   X'42'               CROSSOVER REGISTER OUTPUTA           00006410
000041                              641 XOUTB    EQU   X'41'              CROSSOVER REGISTER OUTPUT B           00006420
000028                              642 STAT     EQU   X'28'              GLITCHLESS CTRL REG                   00006430
000048                              643 MIST     EQU   X'48'              MIS INTERFACE TAGS                    00006440
000044                              644 PING     EQU   X'44'              HARDWARE ERROR RESET                  00006450
000014                              645 TIP      EQU   X'14'              TRANSFER TRACK IN ERROR               00006460
000009                              646 CUREA    EQU   X'09'              RESET CU END IN CHANNEL A             00006470
00000A                              647 CUREB    EQU   X'0A'              RESET CU END IN CHANNEL B             00006480
000081                              648 EXT      EQU   X'81'              MOVE ERRORS OF ALU2 TO ALU1           00006490
                                    649 *  USE EXCLUSIVE OR OF STAT C AND D TO DECODE CU IDENT OR ALU ERRORS.  00006500
                                    651 *                          **** ALU1 ****                           00006520
                                    653 * REGISTER DEFINITIONS                                               00006540
000000                              654 R0       EQU   X'00'              LSR 0                                 00006550
000001                              655 R1       EQU   X'01'              LSR 1                                 00006560
000002                              656 R2       EQU   X'02'              LSR 2                                 00006570
000003                              657 R3       EQU   X'03'              LSR 3                                 00006580
000004                              658 R4       EQU   X'04'              LSR 4                                 00006590
000005                              659 R5       EQU   X'05'              LSR 5                                 00006600
000006                              660 R6       EQU   X'06'              LSR 6                                 00006610
000007                              661 R7       EQU   X'07'              LSR 7                                 00006620
000008                              662 R8       EQU   X'08'              LSR 8                                 00006630
000009                              663 R9       EQU   X'09'              LSR 9                                 00006640
00000A                              664 R10      EQU   X'0A'              LSR 10                                00006650
00000B                              665 R11      EQU   X'0B'              LSR 11                                00006660
00000C                              666 R12      EQU   X'0C'              LSR 12                                00006670
00000D                              667 R13      EQU   X'0D'              LSR 13                                00006680
00000E                              668 R14      EQU   X'0E'              LSR 14                                00006690
00000F                              669 R15      EQU   X'0F'              LSR 15                                00006700
000010                              670 R16      EQU   X'10'              LSR 16                                00006710
000011                              671 R17      EQU   X'11'              LSR 17                                00006720
000012                              672 R18      EQU   X'12'              LSR 18                                00006730
000013                              673 R19      EQU   X'13'              LSR 19                                00006740
000014                              674 R20      EQU   X'14'              LSR 20                                00006750
000015                              675 R21      EQU   X'15'              LSR 21                                00006760
000016                              676 R22      EQU   X'16'              LSR 22                                00006770
000017                              677 R23      EQU   X'17'              LSR 23                                00006780
000018                              678 R24      EQU   X'18'              LSR 24                                00006790
000019                              679 R25      EQU   X'19'              LSR 25                                00006800
00001A                              680 R26      EQU   X'1A'              LSR 26                                00006810
00001B                              681 R27      EQU   X'1B'              LSR 27                                00006820
00001C                              682 R28      EQU   X'1C'              LSR 28                                00006830
00001D                              683 R29      EQU   X'1D'              LSR 29                                00006840
00001E                              684 R30      EQU   X'1E'              LSR 30                                00006850
00001F                              685 R31      EQU   X'1F'              LSR 31                                00006860
000000                              686 CURCOMM  EQU   X'00'  CURRENT COMMAND RELATIVE TO LAST SIO/TIO          00006870
000001                              687 CTIMAGE  EQU   X'01'  CHANNEL TAG IMAGE REGISTER                       00006880
000002                              688 XOUTAIM  EQU   X'02'  CROSSOVER REGISTER A OUTPUT IMAGE REG            00006890
000003                              689 CURADDR  EQU   X'03'  CURRENT DEVICE ADDRESS RELATIVE TO LAST COMMAND  00006900
000004                              690 WORK1    EQU   X'04'  SCRATCH REGISTER1                               00006910
000005                              691 PNDSTS   EQU   X'05'  PENDING STATUS REGISTER                         00006920
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  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                        F01MAY72   9/04/73
000006                             692 PNDADDR  EQU   X'06' PENDING STATUS DEVICE ADDRESS REG                 00006930
000007                             693 SNSSTS2  EQU   X'07' SENSE STATUS REG 2                               00006940
000008                             694 STATIMG  EQU   X'08' STAT REGISTER IMAGE REG                          00006950
000009                             695 FLAGS    EQU   X'09' FLAGS REGISTER FOR ALU1                        00006960
00000A                             696 FLAGS1   EQU   X'0A'   UPPER FOUR BITS ARE FLAGS                    00006970
00000A                             697 REQTAGS  EQU   X'0A' REQUEST IN TAGS REG FOR A AND B INTFCES        00006980
00000B                             698 FLAGS2   EQU   X'0B'   THIRD FLAGS REG                              00006990
00000C                             699 SETDIA1  EQU   X'0C'   SET DIAGNOSE REG 1                           00007000
00000D                             700 SETDIA2  EQU   X'0D'   SET DIAGNOSE REG 2                           00007010
00000E                             701 SETCNT1  EQU   X'0E'   SET COUNT REG 1                              00007020
00000F                             702 SETCNT2  EQU   X'0F'   SET COUNT REG 2                              00007030
000010                             703 LINK1    EQU   X'10' LINK REGISTER 1                               00007040
000011                             704 LINK2    EQU   X'11' LINK REGISTER 2                               00007050
000012                             705 LINK3    EQU   X'12' LINK REGISTER 3                               00007060
000013                             706 LINK4    EQU   X'13'      LINK REGISTER 4                          00007070
000014                             707 XOUTBIM  EQU   X'14' CROSSOVER REGISTER B OUTPUT IMAGE REG          00007080
000015                             708 ALU1ERR  EQU   X'15'   ALU1 HARDWARE DETECTED ERRORS                00007090
000016                             709 ALU2ERR  EQU   X'16'   ALU2 HARDWARE DETECTED ERRORS                00007100
000017                             710 WORK2    EQU   X'17' WORK REGISTER 2                               00007110
000018                             711 LINK5    EQU   X'18' WORK REGISTER 2                               00007120
000019                             712 LINK6    EQU   X'19' WORK REGISTER 2                               00007130
00001A                             713 SEVMODA  EQU   X'1A' SEVEN TRACK MODE REG A                        00007140
00001B                             714 SEVMODB  EQU   X'1B' SEVEN TRACK MODE REG B                        00007150
00001C                             715 WORK4    EQU   X'1C'               WORK REGISTER                 00007160
00001D                             716 FRUREG   EQU   X'1D'               ALU1 FRU REG                  00007170
00001E                             717 FRUSAV   EQU   X'1E'               FRU SAVE LSR                  00007180
00001F                             718 FORMAT   EQU   X'1F'               USED FOR FORMAT CONTROL       00007190
                                   719 ****** THESE LSR EQUATES ARE USED BY LOGICAL MACROS ONLY**********  00007200
                                   720 ****** AND SHOULD NOT BE CODED ***************************************  00007210
000000                             721 #R0      EQU   X'00'               LSR 0                         00007220
000001                             722 #R1      EQU   X'01'               LSR 1                         00007230
000002                             723 #R2      EQU   X'02'               LSR 2                         00007240
000003                             724 #R3      EQU   X'03'               LSR 3                         00007250
000004                             725 #R4      EQU   X'04'               LSR 4                         00007260
000005                             726 #R5      EQU   X'05'               LSR 5                         00007270
000006                             727 #R6      EQU   X'06'               LSR 6                         00007280
000007                             728 #R7      EQU   X'07'               LSR 7                         00007290
000008                             729 #R8      EQU   X'08'               LSR 8                         00007300
000009                             730 #R9      EQU   X'09'               LSR 9                         00007310
00000A                             731 #R10     EQU   X'0A'               LSR 10                        00007320
00000B                             732 #R11     EQU   X'0B'               LSR 11                        00007330
00000C                             733 #R12     EQU   X'0C'               LSR 12                        00007340
00000D                             734 #R13     EQU   X'0D'               LSR 13                        00007350
00000E                             735 #R14     EQU   X'0E'               LSR 14                        00007360
00000F                             736 #R15     EQU   X'0F'               LSR 15                        00007370
000000                             737 #R16     EQU   X'00'               LSR 16                        00007380
000001                             738 #R17     EQU   X'01'               LSR 17                        00007390
000002                             739 #R18     EQU   X'02'               LSR 18                        00007400
000003                             740 #R19     EQU   X'03'               LSR 19                        00007410
000004                             741 #R20     EQU   X'04'               LSR 20                        00007420
000005                             742 #R21     EQU   X'05'               LSR 21                        00007430
000006                             743 #R22     EQU   X'06'               LSR 22                        00007440
000007                             744 #R23     EQU   X'07'               LSR 23                        00007450
000008                             745 #R24     EQU   X'08'               LSR 24                        00007460
```

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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                                F01MAY72   9/04/73
000009                            746 #R25      EQU   X'09'              LSR 25                                      00007470
00000A                            747 #R26      EQU   X'0A'              LSR 26                                      00007480
00000B                            748 #R27      EQU   X'0B'              LSR 27                                      00007490
00000C                            749 #R28      EQU   X'0C'              LSR 28                                      00007500
00000D                            750 #R29      EQU   X'0D'              LSR 29                                      00007510
00000E                            751 #R30      EQU   X'0E'              LSR 30                                      00007520
00000F                            752 #R31      EQU   X'0F'              LSR 31                                      00007530
000000                            753 #CURCOMM  EQU   X'00' CURRENT COMMAND RELATIVE TO LAST                        00007540
000001                            754 #CTIMAGE  EQU   X'01' CHANNEL TAG IMAGE REGISTER                              00007550
000002                            755 #XOUTAIM  EQU   X'02' CROSSOVER REGISTER A OUTPUT IMAGE REG                   00007560
000003                            756 #CURADDR  EQU   X'03' CURRENT DEVICE ADDRESS RELATIVE TO LAST COMMAND         00007570
000004                            757 #WORK1    EQU   X'04' SCRATCH REGISTER1                                      00007580
000005                            758 #PNDSTS   EQU   X'05' PENDING STATUS REGISTER                                 00007590
000006                            759 #PNDADDR  EQU   X'06' PENDING STATUS DEVICE ADDRESS REG                       00007600
000007                            760 #SNSSTS2  EQU   X'07' SENSE STATUS REG 2                                      00007610
000008                            761 #STATIMG  EQU   X'08' STAT REGISTER IMAGE REG                                 00007620
000009                            762 #FLAGS    EQU   X'09' FLAGS REGISTER FOR ALU1                                00007630
00000A                            763 #FLAGS1   EQU   X'0A'   UPPER FOUR BITS ARE FLAGS                            00007640
00000A                            764 #REQTAGS  EQU   X'0A' REQUEST IN TAGS REG FOR A AND B INTFCES                 00007650
00000B                            765 #FLAGS2   EQU   X'0B'   THIRD FLAGS REG                                      00007660
00000C                            766 #SETDIA1  EQU   X'0C'   SET DIAGNOSE REG 1                                   00007670
00000D                            767 #SETDIA2  EQU   X'0D'   SET DIAGNOSE REG 2                                   00007680
00000E                            768 #SETCNT1  EQU   X'0E'   SET COUNT REG 1                                      00007690
00000F                            769 #SETCNT2  EQU   X'0F'   SET COUNT REG 2                                      00007700
000000                            770 #LINK1    EQU   X'00' LINK REGISTER 1                                        00007710
000001                            771 #LINK2    EQU   X'01' LINK REGISTER 2                                        00007720
000002                            772 #LINK3    EQU   X'02' LINK REGISTER 3                                        00007730
000003                            773 #LINK4    EQU   X'03'       LINK REGISTER 4                                  00007740
000004                            774 #XOUTBIM  EQU   X'04' CROSSOVER REGISTER B OUTPUT IMAGE REG                   00007750
000005                            775 #ALU1ERR  EQU   X'05'   ALU1 HARDWARE DETECTED ERRORS                        00007760
000006                            776 #ALU2ERR  EQU   X'06'   ALU2 HARDWARE DETECTED ERRORS                        00007770
000007                            777 #WORK2    EQU   X'07' WORK REGISTER 2                                        00007780
000008                            778 #LINK5    EQU   X'08' WORK REGISTER 2                                        00007790
000009                            779 #LINK6    EQU   X'09' WORK REGISTER 2                                        00007800
00000A                            780 #SEVMODA  EQU   X'0A' SEVEN TRACK MODE REG  A                                00007810
00000B                            781 #SEVMODB  EQU   X'0B' SEVEN TRACK MODE REG B                                 00007820
00000C                            782 #WORK4    EQU   X'0C' .             WORK REGISTER                          00007830
00000D                            783 #FRUREG   EQU   X'0D'              ALU1 FRU REG                          00007840
                                  784 ************** XOUTA DATA FLOW MASK EQUATES ************************** 00007850
000004                            785 WRITE     EQU   X'04' BIT INDICATES WRITE COMMAND TO DF                      00007860
000002                            786 MODE64    EQU   X'02' BIT INDICATES 6250 LAST MODE SET TO ALU2               00007870
0000AC                            787 SAGC1     EQU   X'AC'                                                        00007880
000082                            788 FORMT01   EQU   X'82'                                                        00007890
000081                            789 FORMT10   EQU   X'81'                                                        00007900
000080                            790 FORMT00   EQU   X'80'                                                        00007910
00008C                            791 FORMT11   EQU   X'8C'                                                        00007920
00009C                            792 TM64      EQU   X'9C'                                                        00007930
000092                            793 TM0       EQU   X'92'                                                        00007940
000088                            794 MARK1     EQU   X'88'                                                        00007950
000084                            795 MARK2     EQU   X'84'                                                        00007960
000090                            796 FORMTM    EQU   X'90' CALL FOR TAPE MARK                                     00007970
000040                            797 ALOWEND   EQU   X'40' ALLOW EOD              ME                              00007980
000001                            798 NRZMODE   EQU   X'01' BIT INDICATES NRZI LAST MODE TO ALU2                    00007990
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  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   9/04/73
                                     800 ************* STAT REGISTER EQUATES ********************************** 00008010
000080                               801 STOP      EQU   X'80' BIT INDICATES STOP DATA XFER TO CHANNEL          00008020
000040                               802 SENSE     EQU   X'40' BIT INDICATES TO DF A SENSE OP IS IN PROGRESS    00008030
000020                               803 CONTROL   EQU   X'20' INDICATES CONTROL CMD TO DATA FLOW               00008040
000010                               804 DIAGMODE  EQU   X'10' BIT INDICATES TO DF DIAG MODE IS IN EFFECT       00008050
000008                               805 SETSTATA  EQU   X'08'  SET STAT A                                      00008060
000004                               806 SETSTATB  EQU   X'04'  SET STAT B                                      00008070
000002                               807 SETSTATC  EQU   X'02'  SET STAT C                                      00008080
000001                               808 SETSTATD  EQU   X'01'  SET STAT D                                      00008090

                                     810 *************CHANNEL TAG REGISTER EQUATES *************************** 00008110
000080                               811 HOLDA     EQU   X'80' CHAINING/HOLD INTFCE A TO PREVENT METER DISABLE  00008120
000040                               812 HOLDB     EQU   X'40' CHAINING/HOLD INTFCE B TO PREVENT METER DISABLE  00008130
000020                               813 HOLDINT   EQU   X'20' HOLD PRESENT INTERFACE AND BUSY OUT THE OTHER     00008140
000010                               814 CUBUSY    EQU   X'10' SET CONTROL UNIT BUSY TO BOTH INTERFACES         00008150
000008                               815 SVCIN     EQU   X'08' SET SERVICE IN TAG                               00008160
000004                               816 STSIN     EQU   X'04' SET STATUS IN TAG                                00008170
000002                               817 ADDIN     EQU   X'02' SET ADDRESS IN TAG                               00008180
000001                               818 OPIN       EQU   X'01' SET OP IN TAG                                   00008190

                                     820 ************* FLAGS REGISTER EQUATES ********************************* 00008210
000080                               821 CONCON    EQU   X'80'   CONTINGENT CONNECTION FLAG                     00008220
000040                               822 CUEA      EQU   X'40' SET CONTROL UNIT END FLAG FOR INTF A             00008230
000020                               823 INTFB     EQU   X'20' SET INTF B SELECTING FLAG                        00008240
000010                               824 CUEB      EQU   X'10' SET CONTROL UNIT END FLAG FOR INTF B             00008250
000008                               825 RESETOK   EQU   X'08' SET UNTAGGED INTERRUPT FLAG                      00008260
000004                               826 STATPNDG  EQU   X'04' SET STATUS PENDING FLAG                          00008270
000002                               827 STACK     EQU   X'02' SET STACK FLAG                                   00008280
000001                               828 CHAIN     EQU   X'01' SET CHAIN FLAG                                   00008290

                                     830 ************* STAT IMAGE REGISTER EQUATES *************************** 00008310
                                     831 * THESE EQUATES ARE THE SAME AS THE STAT REGISTER EQUATES             00008320

                                     833 ************* REQUEST IN TAG REGISTER EQUATES ************************ 00008340
000004                               834 REQINA    EQU   X'04' SET NON-SUPPRESSIBLE REQUEST IN - CHAN A         00008350
000008                               835 SUPREQA   EQU   X'08' SET NON-SUPPRESSEBLE REQUEST IN - CHAN A         00008360
000001                               836 REQINB    EQU   X'01' SET NON-SUPPRESSIBLE REQUEST IN - CHAN B         00008370
000002                               837 SUPREQB   EQU   X'02' SET NON-SUPPRESSIBLE REQUEST IN - CHAN B         00008380
000080                               838 BNRZI     EQU   X'80' SET INTERFACE B NRZI FLAG                        00008390
000040                               839 ANRZI     EQU   X'40' SET INTERFACE A NRZI FLAG                        00008400
000020                               840 CURFLAG   EQU   X'20' SET CU RESERVED FLAG                              00008410
000010                               841 ALLOWDSE  EQU   X'10' SET ALLOW DATA SECURITY ERASE FLAG                00008420

                                     843 ************* SENSE STATUS REGISTER 1 EQUATES ********************** 00008440
000080                               844 NOISE     EQU   X'80' SET SENSE DATA NOISE BIT                         00008450
000040                               845 REJTU     EQU   X'40' SET SENSE DATA REJECT TAPE UNIT                  00008460
000040                               846 NSUBSYS   EQU   X'40' .       IDENTIFIER FOR 3803 CONTROL UNIT       00008470
000001                               847 CURSVD    EQU   X'01' .       CONTROL UNIT RESERVED IN SENSE         00008480
000001                               848 NOTCOMP   EQU   X'01' SET SENSE DATA NOT COMPATIBLE BIT                00008490

                                     850 ************* SENSE STATUS REGISTER 2 EQUATES ********************** 00008510
000080                               851 CMDREJ    EQU   X'80' SET SENSE DATA COMMAND REJECT BIT                00008520
000040                               852 INTREQ    EQU   X'40' SET SENSE DATA INTERVENTION REQUIRED             00008530
000020                               853 BUSOC     EQU   X'20' SET SENSE DATA BUS OUT CHECK                     00008540
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72  9/04/73
000010                            854 EQUIPCK  EQU   X'10' SET SENSE DATA EQUIPMENT CHECK                  00008550
000008                            855 DATACK   EQU   X'08' SET SENSE DATA DATA CHECK                      00008560
000004                            856 OVERUN   EQU   X'04' SET SENSE DATA OVERRUN                         00008570
000002                            857 WDCNT0   EQU   X'02' SET SENSE DATA WORD COUNT ZERO                 00008580
000001                            858 RDNOISE  EQU   X'01'  READ NOISE BIT (PE ONLY)                     00008590

                                  860 ************** PENDING STATUS REGISTER EQUATES ********************** 00008610
000020                            861 CUE      EQU   X'20' SET STATUS BIT FOR CONTROL UNIT END           00008620
000010                            862 BUSY     EQU   X'10' SET STATUS BIT FOR DEVICE BUSY                00008630
000008                            863 CHANEND  EQU   X'08' SET STATUS BIT FOR CHANNEL END                 00008640
000004                            864 DEVEND   EQU   X'04' SET STATUS BIT FOR DEVICE END                  00008650
000002                            865 UNITCHK  EQU   X'02' SET STATUS BIT FOR UNIT CHECK                  00008660
000001                            866 UNITEXC  EQU   X'01' SET STATUS BIT FOR UNIT EXCEPTION              00008670

                                  868 ************** TAPE UNIT ADDRESS REG EQUATES ************************ 00008690
000020                            869 BINTFC   EQU   X'20' B INTERFACE TAG                                00008700
000010                            870 SWSEL    EQU   X'10' SWITCH SELECT TAG                             00008710
000000                            871 DEV0     EQU   X'00' DEVICE ADDRESS 0                              00008720

                                  873 ********************** TAPE UNIT SENSE BYTE ZERO ********************** 00008740
                                  874 *                                                                  * 00008750
000080                            875 BACKWARD EQU   X'80' .     BACKWARD SENSE BIT                      00008760
000040                            876 NFP      EQU   X'40' .     NOT FILE PROTECT SENSE BIT              00008770
000020                            877 EOT      EQU   X'20' .     END OF TAPE SENSE BIT                   00008780
000010                            878 BOT      EQU   X'10' .     BEGINNING OF TAPE SENSE BIT             00008790
000008                            879 WRSTATUS EQU   X'08' .     WRITE STATUS BIT                        00008800
000004                            880 START    EQU   X'04' .     START BIT                               00008810
000002                            881 DEVCHK   EQU   X'02' .     DEVICE CHECK BIT                        00008820
000001                            882 NOTBUSY  EQU   X'01' .     NOT BUSY BIT                            00008830
                                  883 *                                                                  * 00008840
                                  884 ************************TAPE UNIT SENSE BYTE ONE ********************** 00008850
                                  885 *                                                                  * 00008860
000010                            886 NOTPE    EQU   X'10' .     OTHER THAN 1600 BPI                     00008870
                                  887 *                                                                  * 00008880

                                  889 *** FLAGS2 REGISTER EQUATES                                        00008900
000080                            890 FORCEUC  EQU   X'80'   FORCE UNIT CHECK FLAG                       00008910
000040                            891 ALUFAIL  EQU   X'40'   ALU HARD ERROR FLAG                         00008920
000020                            892 A64      EQU   X'20' 6400 FLG INTF A                               00008930
000010                            893 B64      EQU   X'10' 6400 FLG INTF B                               00008940
                                  894 ********************************************************************** 00008950
                                  895 * SET DIAGNOSE REGISTER EQUATES                                    * 00008960
                                  896 ********************************************************************** 00008970
000080                            897 DIAWRT   EQU   X'80'   SET DIAG WRT FLAG (ELDORA ONLY)             00008980
000040                            898 VEL      EQU   X'40'   SET VELOCITY FLAG (ELDORA ONLY)             00008990
000004                            899 LWROP    EQU   X'04'   SET LOOP WRITE TO READ FLAG                 00009000
000080                            900 BLKDC    EQU   X'80'   SET BLOCK DATA CHECK FLAG                   00009010
000010                            901 SETCUB   EQU   X'10'   SET CONTROL UNIT BUSY FLAG                  00009020
000040                            902 DEVBSY   EQU   X'40' SET DEVICE BUSY TEST GLAG                     00009030
000020                            903 BLKINTS  EQU   X'20'   SET BLOCK INTERRUPTS FLAG                   00009040
000010                            904 GDT      EQU   X'10'   SET GOT FLAG                                00009050
000040                            905 IBGMSR   EQU   X'40'   SET IBG MEASURE FLAG                        00009060
000004                            906 DMR      EQU   X'04'   SET DIAG MEASURE AND READ                   00009070
000002                            907 FORCERR  EQU   X'02'    SET FORCE HARDWARE ERRS FLAG               00009080
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   9/04/73
000008                            908 INHPRE   EQU   X'08'  INHIBIT PE PREAMBLE                          00009090
000020                            909 INHPOST  EQU   X'20'   INHIBIT PE POSTAMBLE                        00009100
000001                            910 TAPSLIP  EQU   X'01'  SET TAPE SLIP FLAG                          00009110
000020                            911 RDACC    EQU   X'20'   SET READ ACCESS FLAG                       00009120
000001                            912 CHGSTS   EQU   X'01'                CHANGE DEVICE STATUS          00009130
000002                            913 TUBOMSK  EQU   X'02'                SET TU BUS OUT MASK           00009140
000008                            914 RDSTOP   EQU   X'08'                DO READ STOP MEASUREMENT      00009150
                                  915 **********************EXTRA EQUATES ************************************ 00009160
0000FF                            916 ONES     EQU   X'FF'                ALL ONES BYTE                 00009170
000000                            917 ZERO     EQU   X'00'                ALL ZEROES BYTE               00009180
000001                            918 BUMP1    EQU   X'01'   BUMP BY ONE CONSTANT                       00009190
000080                            919 ALUERR   EQU   X'80'     ALU ERROR SENSE BIT                     00009200

000080                            921 CNT40    EQU   X'80' .      FLAG TO INDICATE WHETHER TO ADD 1 OR 40 00009220
000010                            922 #CNT40   EQU   X'10' .      BR ON DREG                             00009230
000040                            923 SNSON    EQU   X'40' .      FLAG TO TURN ON SENSE IN STATIMG       00009240
000020                            924 SNSOFF   EQU   X'20' .      FLAG TO TURN OFF SENSE IN STATIMG      00009250
                                  926 ************************************************************************ 00009270
                                  927 ********************** ALU2 ROS ENTRY BRANCH TABLE ********************** 00009280
                                  928 ************************************************************************ 00009290
                                  929 *   ALU2 IS ALWAYS SLAVED TO ALU1. ANY OPERATION EXECUTED BY ALU2     * 00009300
                                  930 *   MUST ALWAY BE INITIATED BY ALU1 VIA A XOUTB. THE XOUTB BY ALU1    * 00009310
                                  931 *   TRAPS ALU2 TO LOCATION 000. ALU2,BEGINNING EXECUTION AT 000,      * 00009320
                                  932 *   FETCHES AN INDEX BYTE FROM ALU1 AND MOVES IT TO THE INSTRUCTION   * 00009330
                                  933 *   COUNTER. THE INDEX BYTE WILL POINT TO ONE OF THE BRANCH INSTRUCT-  * 00009340
                                  934 *   IONS IN THE BRANCH TABLE. THE SELECTED BRANCH INST WILL BE        * 00009350
                                  935 *   EXECUTED AND THE DESIRED ROUTINE WILL BE ENTERED. WHEN THE        * 00009360
                                  936 *   SELECTED ROUTINE COMPLETES, STAT D WILL BE SET INDICATING TO      * 00009370
                                  937 *   ALU1 THAT THE DESIRED FUNCTION HAS BEEN COMPLETED. ALU2 WILL THEN * 00009380
                                  938 *   BE HELD AT LOCATION 000 UNTIL ACTUATED BY ALU1 VIA XOUTB TRAP     * 00009390
                                  939 ************************************************************************ 00009400

000005                            941 NDXTST3  EQU   5                GO DO ALU 2 CHECKOUT           00009420
000006                            942 NDXDES   EQU   6                HIO NOT OPRTING--GO DESELECT TU 00009430
000007                            943 NDXPOLL  EQU   7                GO POLL DEVICE FOR STATUS      00009440
000008                            944 NDXGRST  EQU   8                GO DO GENERAL RESET            00009450
000009                            945 NDXSRST  EQU   9                GO DO SELECTIVE RESET          00009460
00000A                            946 NDXSDE   EQU   10               GO SET DEVICE END              00009470
00000B                            947 NDXABRT  EQU   11                                             00009480
00000C                            948 NDXDMR   EQU   12                GO DO DIAG MEASERE             00009490
00000D                            949 NDXAXESS EQU   13               GO GET READ ACCESS TIME        00009500
00000E                            950 NDXFLAGS EQU   14               BRING IN FLAG BYTE             00009510
00000F                            951 NDXSNSR  EQU   15                                             00009520
000010                            952 NDXFLAG2 EQU   16               GET TUBO MASK (SET FLAGS #3)   00009530
000035                            953 NDXFSF   EQU   X'35' .          GO DO FORWARD SPACE FILE       00009540
000031                            954 NDXERS   EQU   X'31' .          GO DO ERASE TO END OF TAPE(EOT) 00009550
000037                            955 NDXFSR   EQU   X'37' .          GO DO FORWARD SPACE RECORD     00009560
000033                            956 NDXRDF   EQU   X'33' .          GO DO READ FORWARD             00009570
00003C                            957 NDXBSF   EQU   X'3C' .          GO DO BACKSPACE FILE           00009580
00003E                            958 NDXBSR   EQU   X'3E' .          GO DO BACKSPACE RECORD         00009590
00003A                            959 NDXRDB   EQU   X'3A' .          GO DO READ BACKWARD            00009600
000013                            960 NDXWRT   EQU   X'13' .          GO DO WRITE OPERATION          00009610
000020                            961 NDXWTM   EQU   X'20' .          GO DO WRITE TAPE MARK          00009620
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                                    F01MAY72   9/04/73
000022                              962 NDXERG    EQU    X'22' .                 GO 4O ERASE RECORD GAP                  00009630
00002F                              963 NDXRWD    EQU    X'2F' .                 GO DO REWIND                            00009640
000029                              964 NDXRWU    EQU    X'29' .                 GO DO REWIND UNLOAD                     00009650
0000EB                              965 NDXSTS    EQU    X'EB' .                 GO DO INITIAL STATUS                    00009660
0000D6                              966 NDXSNS    EQU    X'D6' .                 GO DO SENSE OP                          00009670
0000EA                              967 NDXADR    EQU    X'EA'                                                           00009680
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   9/04/73
000000                            969 BEGIN    CSECT                                                  00009700
                                  970 */*    ALU1: BEGIN   */                                         00009710
                                  971 *** POWER ON RESET IS CHECKED FIRST TO INSURE THAT LSRS HAVE GOOD 00009720
                                  972 *** PARITY PRIOR TO THE ENSUING ALU OPS.                         00009730
000000                            973 STEP0001 EQU   *                NORMAL PATH FOR POWER ON RESET    00009740
000000 2FF5                       975 CHKRSTS  BOC   PWRRST,MODEREGS  BRANCH IF POWER ON RESET          00009750
000001 3C04                       978          BOC   NGENR,NORESETS   BRANCH IF NOT GENERAL RESET      00009760
000002 C1F0                       981          AND   CTIMAGE,X'F0'    CLEAR CHANNEL TAGS               00009770
000003 4150                       984          XFR   CTIMAGE,CTI      SET TO HARDWARE                  00009780

                                  987 ***************************** ALU FAIL CHECK ************************ 00009800
                                  988 *  EACH TIME ALU1 IS TRAPPED TO LOC 0, THE ALU HARDWARE ERROR REGS ARE* 00009810
                                  989 * TESTED FOR A FAILURE. THE TWO EXCEPTIONS ARE:                    * 00009820
                                  990 *        1. POWER ON RESET                                       * 00009830
                                  991 *        2. A PRIOR FAILURE THAT HAS NOT BEEN CLEARED BY A SENSE OP * 00009840
                                  992 *  ONCE A FAILURE HAS BEEN DETECTED, THE ALU ERROR REGS ARE SAVED IN * 00009850
                                  993 * LSRS AND WILL REMAIN UNTIL A SENSE OP IS ISSUED. THE ALUFAIL FLAG * 00009860
                                  994 * PREVENTS OVERLAYING THE LSRS WHEN THEY ARE HOLDING PRIOR ERROR DATA * 00009870
                                  995 *  THE FIRST SIO/TIO (OTHER THAN SENSE) SUBSEQUENTLY ISSUED TO THE  * 00009880
                                  996 *CONTROLLER AFTER AN ALU FAILURE WILL BE UNIT CHECKED. SUCCEEDING   * 00009890
                                  997 * SIO/TIO'S WILL RECEIVE AVAILABE STATUS IF THE ONLINE PROGRAM CHOOSES* 00009900
                                  998 * TO IGNORE THE INITIALLY UNIT CHECKED SIO/TIO.                   * 00009910
                                  999 ********************************************************************** 00009920

000004 0200                      1002 NORESETS STO   XOUTAIM,0          CLEAR DATA FLOW CROSSOVER        00009940
000005 C89F                      1005          AND  STATIMG,ONES-CONTROL-SENSE  RESET LCONTROLS        00009950
000006 DB40                      1008          ANDM  FLAGS2,ALUFAIL     MASK FOR PREVIOUS ALU FAILURE   00009960
000007 310B                      1011          BOC   DREG1,ANYMOR       BRANCH IF THERE WAS             00009970
000008 5681                      1014          XFR   ALU2ERR,EXT        FETCH ALU2 HARDWARE ERRORS      00009980
000009 5584                      1017          XFR   ALU1ERR,HDWR       FETCH ALU1 HARDWARE ERRORS      00009990
00000A 2220                      1020          BOC   ALUR,HNDLERR      BRANCH IF ANY ALU ERRORS        00010000
00000B 2225                      1023 ANYMOR   BOC   ALUR,CLEARIT      BRANCH IF ERROR TO CLEAR        00010010
00000C 140B                      1026 SETABRT  STO   XOUTBIM,NDXABRT        SET XOUTB IMAGE FOR USE LATER 00010020
00000D CAF0                      1029          AND   REQTAGS,ONES-15    MASK ALL REQUEST DOWN           00010030
00000E 4A48                      1032          XFR   REQTAGS,MIST       RESET TO HDWE                   00010040
00000F 2E15                      1035          BOC   SCB,MIFTR12        BRANCH IF MIS AVAILABLE      ***00010050
000010 8180                      1038 SETHOLDA ORI   CTIMAGE,HOLDA      RAISE CHAINING HOLD LINE        00010060
000011 3D2A                      1041 CHKISEL  BOC   ISEL,INSELCHK      BRANCH IF CHANNEL POLL OR SELECT 00010070
000012 5441                      1044          XFR   XOUTBIM,XOUTB      TRAP ALU2 TO INITIALIZE         00010080
000013 3C17                      1047          BOC   NGENR,CKSELRST     BRANCH IF NOT GENERAL RESET     00010090
000014                           1049 STEP0005 EQU   *                                                  00010100
000014 6354                      1051 EXECRST  BU    GENRESET           GO DO GENERAL RESET             00010110
000015 8140                      1054 MIFTR12  ORI   CTIMAGE,HOLDB      RAISE CHAINING - HOLD B         00010120
000016 6011                      1057          BU    CHKISEL                                            00010130

000017 2C19                      1061 CKSELRST BOC   SELRST,SELRTN0     DO SELECTIVE RESET ROUTINE.     00010150
000018 6513                      1064 GODOALU  BU    ALUCHECK           DO ALU CHECKOUT.                00010160

000019 14EA                      1068 SELRTN0  STO   XOUTBIM,NDXADR     LOAD ROS2 INDEX                 00010180
00001A 4642                      1071          XFR   PNDADDR,XOUTA      SUPPLY ADR TO ROS2              00010190
00001B 5441                      1074          XFR   XOUTBIM,XOUTB      TRAP ROS2                       00010200
00001C 4624                      1077          XFR   PNDADDR,TUADR      SET UP HDW DECODE               00010210
00001D 3B1F                      1080 ZZZ      BOC   STATD,MOVEON2      WAIT FOR STATD                  00010220
00001E 601D                      1083          BU    ZZZ                                                00010230
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                        F01MAY72   9/04/73
00001F 6362                      1086 MOVEON2  BU    SELRESET                                                00010240


000020 1D00                      1090 HNDLERR  STO   FRUREG,0            CLEAR SENS FRU REG                  00010260
000021 5E21                      1093          XFR   FRUSAV,AR           MOVE FAIL INDICATOR TO ALU A REG    00010270
000022 5006                      1096          XFRH  LSR                 SET HIGH LSR'S                      00010280
000023 8D00                      1099          ORI   FRUREG,0            MOVE FAIL IND. INTO SENSE FRU REG   00010290
000024 4006                      1102          XFR   LSR                 SET LO LSRS                         00010300
000025 8BC0                      1105 CLEARIT  ORI   FLAGS2,ALUFAIL+FORCEUC OTHERWISE SET FAIL FLAGS        00010310
000026 2C19                      1108          BOC   SELRST,SELRTN0      BRANCH IF SELECTIVE RESET           00010320
000027 4012                      1111          XFR   CLEAR               CLEAR THE ERROR                     00010330
000028 4012                      1114          XFR   CLEAR               CLEAR THE ERROR                     00010340
000029 600C                      1117          BU    SETABRT             RETURN TO MAINLINE                  00010350

                                 1120 ************************************************************************ 00010370
                                 1121 * WHEN INSELCHK IS REACHED WE HAVE BEEN TRAPPED FOR INITIAL SELECTION * 00010380
                                 1122 * OR A POLL. IF ADDRESS OUT IS UP---INITIAL SELECTION IS INDICATED.   * 00010390
                                 1123 ************************************************************************ 00010400

00002A 2895                      1126 INSELCHK BOC   ADROUT,SIORTN       BRANCH IF SIO.  IF NOT, POLL ACC    00010420
00002B D906                      1129          ANDM  FLAGS,STATPNDG+STACK TEST FOR PENDING ORASTACK           00010430
00002C 202E                      1132          BOC   DBUS,POLLED         BRANCH IF NOT PNDG OR STACK.        00010440
00002D 6032                      1135          BU    INTFCHK             GO HANDLE PENDING STATUS            00010450

                                 1138 ************************************************************************ 00010470
                                 1139 *  POLL ACCEPTED. IF STATUS IS PENDING OR STACKED THE PENDING ADDRESS * 00010480
                                 1140 * REG IS USED TO VERIFY THE CORRECT CHANNEL. OTHERWISE THE               00010490
                                 1141 * CONTROL UNIT ADDRESS FOR THE CHANNEL POLLING IS MOVED FROM CHANNEL   * 00010500
                                 1142 * BUS OUT TO THE PENDING ADDRESS REG. IF STATUS IS DUE TO A SECURITY   * 00010510
                                 1143 * DEVICE END OR DEVICE END DUE TO A PRIME, ALU2 WILL BE SPINNING       * 00010520
                                 1144 * WAITING TO CLEAR THE DEV END CONDITION IF CHANNEL ACCEPTES STATUS.   * 00010530
                                 1145 ************************************************************************ 00010540


00002E 43A0                      1150 POLLED   XFR   CURADDR,CBO         GET CU ADDRESS FROM HARDWARE        00010580
00002F C60F                      1153          AND   PNDADDR,X'0F'       CLEAR HIGH ORDER                    00010590
000030 4321                      1156          XFR   CURADDR,AR          MOVE CU ADDRESS TO ALU INPUT REG    00010600
000031 8600                      1159          ORI   PNDADDR,ZERO        MERGE DEV AND CU ADDRESSES          00010610

000032 4660                      1163 INTFCHK  XFR   PNDADDR,CBI         MOVE ASSEMBLED ADDRESS TO CHAN BUSIN 00010630
000033 8103                      1166          ORI   CTIMAGE,ADDIN+OPIN  RAISE OP AND ADDRESS IN             00010640
000034 4150                      1169          XFR   CTIMAGE,CTI         SET TO HDWE                         00010650
000035 C1FD                      1172          AND   CTIMAGE,ONES-ADDIN  RESET ADDRESS-IN IN  IMAGE REG      00010660
                                 1174 *** IF MIS GO CHECK FOR PROPER INTERFACE POLLING                        00010670
000036                           1175 MIFTR00  EQU   *                   ENTRY POINT FROM POLLED             00010680

000036 D920                      1178 NOTBOTH  ANDM  FLAGS,INTFB         MASK INTF B FLAG FOR TEST           00010700
000037 203A                      1181          BOC   DBUS,NOTBINT        BRANCH IF OFF__INTF A INTERRUPTING  00010710
000038 2E3C                      1184          BOC   SCB,NOTAINT         BRANCH IF CHAN B SELECTING          00010720

                                 1187 * GO TO MAP 13-080                                                      00010740
000039 6039                      1189 WRONGCHN BU    WRONGCHN            INTF B INTERRUPTING AND CHAN A SLCTG 00010750
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 LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT

00003A 2E39                       1193 NOTBINT  BOC   SCB,WRONGCHN        BRANCH IF B SELECTING                    00010770
00003B 603F                       1196          BU    NOTBINT1            CONTINUE ALL IS OK                       00010780

00003C D910                       1200 NOTAINT  ANDM  FLAGS,CUEB          MASK FOR CONTROL UNIT END B              00010800
00003D 2042                       1203          BOC   DBUS,MOVEOUT        BR IF OOF                                00010810
00003E 6041                       1206          BU    DOACUE              GO SET CUE IN STATUS                     00010820

                                  1209 *** CHECK TO SEE IF CONTROL UNIT END SHOULD BE ADDED TO STATUS             00010840
00003F D940                       1211 NOTBINT1 ANDM  FLAGS,CUEA          MASK FOR CONTROL UNIT END A              00010850
000040 2042                       1214          BOC   DBUS,MOVEOUT        BRANCH IF OFF                            00010860

000041 8520                       1218 DOACUE   ORI   PNDSTS,CUE          SET CUE IN STATUS                        00010880

000042                            1221 MOVEOUT  EQU   *                                                        00010900
000042 105A                       1223 SETLINK  STO   LINK1,SRETURN0      ACCEPTED STATUS RETURN                   00010910
000043 115B                       1226          STO   LINK2,SRETURN1      STACK STATUS RETURN                      00010920
000044 12C8                       1229          STO   LINK3,PRETURN0      HALTI/O RETURN NOT OPERATING             00010930
000045 2960                       1232 CMOUP    BOC   CMDOUT,RSTADDIN     WAIT COMMAND OUT RISE                    00010940
000046 28C8                       1235          BOC   ADROUT,PRETURN0      BRANCH IF HIO                            00010950
000047 6045                       1238          BU    CMOUP               WAIT                                     00010960
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   9/04/73
                                   1241 ************************************************************************ 00010980
                                   1242 * ENTRY TO THIS SUBROUTINE IS FROM: CONTINIT AND CLEANIT AND MODELINK * 00010990
                                   1243 * PRIOR TO PRESENTING INITIAL STATUS TO CHANNEL. IF CHAINING IS NOT IN* 00011000
                                   1244 * EFFECT THE FIRST TWO DIAGNOSTIC FLAG BYTES WILL BE CLEARED AND BYTE0* 00011010
                                   1245 * PASSED TO ALU2.                                                    * 00011020
                                   1246 ************************************************************************ 00011030

000048 6291                        1249 TERMATE  BU    TERMSTAT            U.C. ON SIO RETURN                  00011050
000049 63D7                        1252 GRETURN0 BU    CHEKSNS             RETURN FOR MODE CMDS                00011060

00004A 1360                        1256 GODODIA0 STO   LINK4,STATRTN-BEGIN SET CTL AND BURST CMD RETURNS       00011080
00004B D901                        1259 GODODIA  ANDM  FLAGS,CHAIN         MASK FOR CHAIN FLAG                 00011090
00004C 3753                        1262         BOC   DREG7,ALU2DIA       BRANCH IF ON                        00011100
00004D F08B                        1265         XOM   CURCOMM,X'8B'       MASK FOR LWR COMMAND                00011110
00004E 2053                        1268         BOC   DBUS,ALU2DIA        BRANCH IF SO                        00011120
00004F F00B                        1271         XOM   CURCOMM,X'0B'       MASK FOR DIAG WRT                   00011130
000050 2053                        1274         BOC   DBUS,ALU2DIA        BRANCH IF SO                        00011140
000051 0C00                        1277         STO   SETDIA1,0           CLEAR FLAG BYTE ONE                 00011150
000052 0D00                        1280         STO   SETDIA2,0           CLEAR FLAG BYTE TWO                 00011160
000053 4C42                        1283 ALU2DIA  XFR   SETDIA1,XOUTA       MOVE FIRST FLAG BYTE TO ALU2        00011170
000054 8801                        1286         ORI   STATIMG,SETSTATD    SET STATD TO INDICATE SNS RESET     00011180
000055 4828                        1289         XFR   STATIMG,STAT        SET TO HARDWARE                     00011190
000056 C8FE                        1292         AND   STATIMG,ONES-SETSTATD RESET STAT D IN IMAGE REG         00011200
000057 170E                        1295         STO   WORK2,NDXFLAGS        FETCH ALU2 SET DIAGNOSE INDEX     00011210
000058 5741                        1298         XFR   WORK2,XOUTB         KICK ALU2 OFF TO FETCH BYTE         00011220
000059 5322                        1301         XFR   LINK4,IC            RETURN TO INITIAL STATUS            00011230
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 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72  9/04/73
                                  1307 ********************************* STATUS SUBROUTINE ***************** 00011280
                                  1308 *  THE STATUS ROUTINE HANDLES INTERLOCKING OF INTERFACE LINES AND     * 00011290
                                  1309 * BRANCHES TO THE APPROPRIATE SUBROUTINE DEPENDING ON THE CHANNEL     * 00011300
                                  1310 * RESPONSE TO STATUS IN. THE INTERFACE WILL ALSO BE MONITORED FOR A   * 00011310
                                  1311 * HIO CONDITION AND THE LINK RETURN WILL BE EXECUTED IF HIO SHOULD     * 00011320
                                  1312 * OCCUR. IF THE CHANNEL ERRONEOUSLY STACKS CLEAN INITIAL STATUS A     * 00011330
                                  1313 * HANG WILL OCCUR IN THE INTFERR LOOP                                 * 00011340
                                  1314 ************************************************************************ 00011350

00005A 62C5                       1317 SRETURN0 BU    TERMACC             RETURN FOR ACCEPTED STATUS          00011370
00005B 62BF                       1320 SRETURN1 BU    TERMSTAK            RETURN FOR STACKED STATUS           00011380
00005C 6185                       1323 SRETURN2 BU    SENSE0              RETURN TO SENSE ROUTINE             00011390
00005D 623B                       1326 SRETURN4 BU    CONTSERV            RETURN FOR SERVICE                  00011400
00005E 623C                       1329 SRETURN5 BU    CONTSTAK            RETURN TO STACK                     00011410
00005F 65A3                       1332 SRETURN6 BU    CLEANGO             RETURN FOR ACCEPTED STATUS          00011420

000060                            1335 STATRTN  EQU   *                   DEFINE ENTRY POINT                  00011440
000060 4150                       1337 RSTADDIN XFR   CTIMAGE,CTI         RESET ADDRESS-IN TO HDWE            00011450
000061                            1339 STATRTN1 EQU   *                   DEFINE ENTRY POINT                  00011460
                                  1340 * GO TO MAP 13-100                                                     00011470
000061 2890                       1342 SVCOUTUP BOC   ADROUT,HIOLINK      HALT I/O LINK                       00011480
                                  1344 * GO TO MAP 13-100                                                     00011490
000062 2D61                       1346 CMDOUTUP BOC   SVCOUT,SVCOUTUP     SVC OUT UP WAIT FOR DROP            00011500
000063 2961                       1349          BOC   CMDOUT,SVCOUTUP     CMD OUT UP WAIT FOR DROP            00011510
000064 2D61                       1352          BOC   SVCOUT,SVCOUTUP                                         00011520
000065 2D61                       1355          BOC   SVCOUT,SVCOUTUP                                         00011530
000066 4560                       1358          XFR   PNDSTS,CBI          MOVE STATUS TO BUS IN               00011540
000067 8104                       1361          ORI   CTIMAGE,STSIN       MASK STATUS IN TAG UP               00011550
000068 4150                       1364          XFR   CTIMAGE,CTI         RAISE STATUS IN                     00011560
000069 C1FB                       1367          AND   CTIMAGE,ONES-STSIN  MASK STATUS IN DOWN                 00011570
00006A                            1369 INTFERR  EQU   *                   RETURN FOR STACKED CLEAN INIT STS   00011580
                                  1370 * GO TO MAP 13-110                                                     00011590
00006A 2891                       1372 WATESUM  BOC   ADROUT,HIOLINK1     HALT I/O LINK                       00011600
                                  1374 * GO TO MAP 13-110                                                     00011610
00006B 296F                       1376          BOC   CMDOUT,STAKLINK     STACK LINK                          00011620
                                  1378 * GO TO MAP 13-110                                                     00011630
00006C 2D7D                       1380          BOC   SVCOUT,TAKELINK     ACCEPT LINK                         00011640
                                  1382 * GO TO MAP 13-110                                                     00011650
00006D 606A                       1384          BU    WATESUM                                               00011660

                                  1387 ************************************************************************ 00011680
                                  1388 *THE STAKLINK OCCURS WHENEVER COMMAND OUT ANSWERS STATUS IN. THE STACK* 00011690
                                  1389 *FLAG IS SET FOR NON-STACKABLE STATUS AND LINK2 RETURN EXECUTED.      * 00011700
                                  1390 * CHAINING IS RESET FOR ALL STATUS EXCEPT A CHANNEL END ALONE (CONTROL* 00011710
                                  1391 * CMD INITIAL STATUS)                                                 * 00011720
                                  1392 ************************************************************************ 00011730


00006E 4150                       1395 STAKDISC XFR   CTIMAGE,CTI         RESET OP IN RAISE CUB               00011750

00006F C9FE                       1399 STAKLINK AND   FLAGS,ONES-CHAIN    RESET CHAIN BIT                     00011770
000070 F504                       1402          XOM   PNDSTS,DEVEND       MASK FOR DEV END ALONE STATUS       00011780
000071 207A                       1405          BOC   DBUS,NOSTACK        BRANCH IF SO                        00011790
000072 F506                       1408          XOM   PNDSTS,DEVEND+UNITCHK  IS STATUS READY DROP ON REW/DSE  00011800
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   9/04/73
000073 207A                      1411           BOC    DBUS,NOSTACK        BRANCH IF YES TO PREVENT STACK      00011810
000074 F510                      1414           XOM    PNDSTS,BUSY         MASK FOR BUSY ALONE IN STATUS       00011820
000075 207A                      1417           BOC    DBUS,NOSTACK        BRANCH IF IT IS TO PREVENT STACK    00011830
000076 F520                      1420           XOM    PNDSTS,CUE          IS IT CUE ALONE                     00011840
000077 207A                      1423           BOC    DBUS,NOSTACK        BR IF SO                            00011850
000078 8902                      1426           ORI    FLAGS,STACK         SET STACK BIT                       00011860
000079 5122                      1429 STOPLINK  XFR    LINK2,IC            XFR LINK TO IC                      00011870
00007A 62C1                      1432 NOSTACK   BU     TERMSTK1            GO RESET CHAN TAGS                  00011880

                                 1435 ************************************************************************ 00011900
                                 1436 *THE TAKELINK ROUTINE IS ENTERED BY SERVICE OUT RESPONSE TO STATUS IN.* 00011910
                                 1437 *THE CHAIN, STACK, AND STATUS PENDING FLAGS ARE MANIPULATED AND CUE   * 00011920
                                 1438 *FOR SELECTED CHANNEL IS RESET. THE ALLOW DATA SECURITY ERASE FLAG    * 00011930
                                 1439 *IS ALSO MAINTAINED HERE DEPENDENT UPON CHAINING. RETURN IS VIA       * 00011940
                                 1440 *LINK1                                                               * 00011950
                                 1441 ************************************************************************ 00011960

00007B 4150                      1444 TAKEDISC  XFR    CTIMAGE,CTI         RESET OP IN RAISE CUB               00011980
00007C 607E                      1447           BU     SKIPSUPO             SKIP CHAINING CHECK            00011990

00007D 3987                      1451 TAKELINK  BOC    SUPO,SETCHAIN       CHAIN INDICATION                    00012010
00007E C9F0                      1454 SKIPSUPO  AND    FLAGS,CUEA+CUEB+INTFB+CONCON RESET CHAIN,STATUS PENDING, 00012020
                                 1456 *                                    AND STACK FLAGS                     00012030
00007F CAEF                      1458           AND    FLAGS1,ONES-ALLOWDSE RESET ALLOW DAT SEC ERS FLAG       00012040

                                 1461 * GO TO MAP 13-130                                                       00012060
000080 D520                      1463 TAKELIN1  ANDM   PNDSTS,CUE          DID WE PRESENT CONTROL UNIT END     00012070
                                 1465 * GO TO MAP 13-130                                                       00012080
000081 2086                      1467           BOC    DBUS,SERVLINK       BRANCH IF NOT                       00012090

                                 1470 *** A CUE WAS PRESENTED--DETERMINE THE SELECTING CHANNEL AND RESET       00012110
                                 1471 *** THE CORRESPONDING CUE FLAG                                           00012120
000082 2E85                      1473 MIFTR01   BOC    SCB,CUERSTB         BRANCH IF SWITCHED TO CHNL B        00012130
000083 C9BF                      1476 RSTCUEA   AND    FLAGS,ONES-CUEA     RESET CUE A FLAG                    00012140
000084 6086                      1479           BU     SERVLINK            GO BACK AND DO EXIT                 00012150
000085 C9EF                      1482 CUERSTB   AND    FLAGS,ONES-CUEB     RESET CUE B FLAG                    00012160

                                 1485 * GO TO MAP 13-130                                                       00012180
000086 5022                      1487 SERVLINK  XFR    LINK1,IC            XFR LINK TO IC                      00012190

                                 1490 * GO TO MAP 13-130                                                       00012210
000087 8901                      1492 SETCHAIN  ORI    FLAGS,CHAIN         SET CHAIN FLAG                      00012220
                                 1494 * GO TO MAP 13-130                                                       00012230
000088 8120                      1496           ORI    CTIMAGE,HOLDINT     RAISE HOLD INTERFACE BIT            00012240
                                 1498 * GO TO MAP 13-130                                                       00012250
000089 F017                      1500           XOM    CURCOMM,X'17'       IS LAST COMMAND ERASE               00012260
                                 1502 * GO TO MAP 13-130                                                       00012270
00008A 208E                      1504           BOC    DBUS,ENABLDSE       BRANCH IF SO                        00012280
                                 1506 * GO TO MAP 13-130                                                       00012290
00008B CAEF                      1508           AND    FLAGS1,ONES-ALLOWDSE  RESET DSE BIT                    00012300
                                 1510 * GO TO MAP 13-130                                                       00012310
00008C C9F1                      1512 SKIPIT    AND FLAGS,CHAIN+CUEB+CUEA+INTFB+CONCON RESET OTHER FLAGS       00012320
                                 1514 * GO TO MAP 13-130                                                       00012330
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                    F01MAY72   9/04/73
00008D 6080                      1516          BU    TAKELIN1                                            00012340

00008E 8A10                      1520 ENABLDSE ORI   FLAGS1,ALLOWDSE     SET THE ALLOW DSE BIT           00012360
00008F 608C                      1523          BU    SKIPIT              RETURN                          00012370


                                 1527 ************************************************************************ 00012400
                                 1528 * HIO LINK IS ENTERED IF ADDRESS OUT IS UP OR RISE WHILE THE STATRTN  * 00012410
                                 1529 * ISBEING EXECUTED. RETURN IS VIA LINK 3 WHICH IS SET UP BY THE      * 00012420
                                 1530 * STATRTN CALLER                                                    * 00012430
                                 1531 ************************************************************************ 00012440

000090 5222                      1534 HIOLINK  XFR   LINK3,IC             GO HANDLE HIO                   00012460


000091 E111                      1538 HIOLINK1 XO    CTIMAGE,OPIN+CUBUSY RESET OP IN RAISE CUB           00012480
000092 2D7B                      1541          BOC    SVCOUT,TAKEDISC    BRANCH IF STATUS ACCEPTED       00012490
000093 296E                      1544          BOC   CMDOUT,STAKDISC     BRANCH IF STATUS REJECTED       00012500
000094 6090                      1547          BU    HIOLINK             OTHERWISE GO TO HIO NOT OPERATING 00012510

                                 1550 ************************************* SIO ROUTINE ****************** 00012530
                                 1551 * THE START IO ROUTINE CHECKS FOR SHORT BUSY CONDITIONS. IF NONE FOUND* 00012540
                                 1552 * IT BRANCHES TO THE NO SHORT ROUTINE TO ANSWER THE SIO.              * 00012550
                                 1553 ************************************************************************ 00012560


000095 43A0                      1556 SIORTN   XFR   CURADDR,CBO          FETCH CURRENT ADDRESS           00012580
000096 44A0                      1559          XFR   WORK1,CBO            ADDRESS TO SCRATCH AREA         00012590
000097 12C8                      1562          STO   LINK3,PRETURN0       SET HIO LINK FOR NOT OPERATING  00012600
000098 5441                      1565          XFR   XOUTBIM,XOUTB        TRAP ALU2 TO LOC 0              00012610
000099 D986                      1568          ANDM  FLAGS,STATPNDG+STACK+CONCON MASK FOR PENDING OR STACKED 00012620
                                 1570 *                                   STATUS AND CONTINGENT CONN. FLAGS 00012630
00009A 20AA                      1572          BOC   DBUS,NOSHORT         BRANCH IF ALL ARE OFF           00012640
00009B 359E                      1575          BOC   DREG5,NOTCONT        BRANCH IF STACK                 00012650
00009C 369E                      1578          BOC   DREG6,NOTCONT        BRANCH IF STATUS PENDING        00012660
00009D 0500                      1581          STO   PNDSTS,0             CONT CONN--CLEAR THE STAUS REG  00012670
00009E 4621                      1584 NOTCONT  XFR   PNDADDR,AR           MOVE PEND ADDRESS TO AREG       00012680
00009F F400                      1587          XOM   WORK1,0              TEST FOR MATCH                  00012690
0000A0 20AA                      1590          BOC   DBUS,NOSHORT         BRANCH IF MATCH                 00012700
                                 1592 ************************************************************************ 00012710
                                 1593 *THE SHORTBUSY ROUTINE USES THE UPROGRAM TO MANIPULATE  BUS IN AND    * 00012720
                                 1594 *TAGS IN FOR A SHORT BUSY SEQUENCE. CUE IS SET IN THE STATUS.         * 00012730
                                 1595 ************************************************************************ 00012740
0000A1 8110                      1597 SHORTBSY ORI   CTIMAGE,CUBUSY       SET UP CUB BIT IN CTI IMAGE REG 00012750
0000A2 4150                      1600          XFR   CTIMAGE,CTI          MOVE TO CHANNEL TAG IN REG      00012760
0000A3 8520                      1603          ORI   PNDSTS,CUE           POST CUE WITH STATUS            00012770
0000A4 6296                      1606          BU    TERMSTA2            GO RESET CUE LATCH FOR SELECTING 00012780
                                 1608 *                                   INTERFACE                       00012790


                                 1610 ************************************************************************ 00012810
                                 1611 *THE NOSHORT RTN ANSWERS ADDRESS OUT AND INITIALIZES ALU 2 TO ASSEMBLE* 00012820
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   9/04/73
                                   1612 *TU STATUS. VARIOUS FLAGS AND REGISTERS ARE INITIALIZED AND A CHECK    * 00012830
                                   1613 *IS MADE TO SEE IF A HIO WAS RECEIVED BY HARDWARE AFTER OP-IN WAS      * 00012840
                                   1614 *RAISED.                                                               * 00012850
                                   1615 ********************************************************************** 00012860

0000A5 8920                        1618 BFLAG    ORI   FLAGS,INTFB          SET INTERFACE B FLAG IN FLAG REG     00012880
0000A6 8420                        1621          ORI   WORK1,BINTFC         SET INTERFACE B BIT IN SELECT ADDR   00012890
0000A7 8804                        1624          ORI   STATIMG,SETSTATB     RAISE STAT B FOR ALU2                00012900
0000A8 D916                        1627          ANDM  FLAGS,STATPNDG+STACK+CUEB MASK FOR PENDING STATUS        00012910
0000A9 60B5                        1630          BU    CHKPNDG              RETURN TO SELECT DEVICE              00012920

0000AA 8101                        1634 NOSHORT  ORI   CTIMAGE,OPIN         MASK OP IN UP                        00012940
0000AB 4150                        1637          XFR   CTIMAGE,CTI          RAISE OP IN                          00012950
0000AC 0800                        1640          STO   STATIMG,0            CLEAR THE STATIMAGE REG              00012960
0000AD 0600                        1643          STO   PNDADDR,0            CLEAR CURRENT ADDRESS REG FOR MASK   00012970
0000AE 4321                        1646          XFR   CURADDR,AR           XFR SELECT  ADDRESS TO ALU INPUT REG 00012980
0000AF 8600                        1649          ORI   PNDADDR,0            MOVE ADDRESS TO PNDG ADDRESS REG     00012990
0000B0 C40F                        1652 STRIPADD AND   WORK1,X'0F'          STRIP HIGH ORDER                     00013000
0000B1 4442                        1655          XFR   WORK1,XOUTA          GIVE ALU 2 ADDRESS                   00013010

                                   1658 *** DETERMINE WHICH CHANNEL IS SELECTING AND INITIALIZE THE STAT REG,  00013030
                                   1659 *** TU ADDRESS REG AND FLAGS REG.                                      00013040
0000B2 2EA5                        1661 MIFTR03  BOC   SCB,BFLAG            IS B SELECTING                       00013050
0000B3 C9DF                        1664 SETSWSEL AND   FLAGS,ONES-INTFB     RESET B FLAG                         00013060
0000B4 D946                        1667          ANDM  FLAGS,STATPNDG+STACK+CUEA  ANY STATUS BEING HELD         00013070
0000B5 20B8                        1670 CHKPNDG  BOC   DBUS,SETADDR         BRANCH IF NONE PENDING               00013080
0000B6 35B9                        1673          BOC   DREG5,STRTALU2       BRANCH IF STATUS PENDING             00013090
0000B7 8802                        1676          ORI   STATIMG,SETSTATC     SET SHORT INIT SEL TO ALU2           00013100

0000B8 14EB                        1680 SETADDR  STO   XOUTBIM,NDXSTS           FETCH ALU2'S STATUS RTN INDEX  00013120
0000B9 4828                        1683 STRTALU2 XFR   STATIMG,STAT         SET STATS TO HDWE                    00013130
0000BA 4424                        1686          XFR   WORK1,TUADR          SET ADDRESS REG                      00013140
0000BB 5441                        1689          XFR   XOUTBIM,XOUTB        TRAP ALU 2                           00013150
0000BC 8102                        1692          ORI   CTIMAGE,ADDIN        MASKADDRESS IN UP                    00013160
0000BD 4360                        1695          XFR   CURADDR,CBI          RAISE ADDRESS ON BUS IN              00013170

0000BE 28C7                        1699 ADROUTUP BOC   ADROUT,SELOUTUP      WAIT FOR ADRESS OUT FALL             00013190
0000BF 4150                        1702 SETADRIN XFR   CTIMAGE,CTI          RAISE ADDR IN                        00013200

                                   1705 ********************************************************************** 00013220
                                   1706 *ASSEMBLE DATA FLOW MASK WHILE SYSTEM BRINGS UP CMD OUT.                * 00013230
                                   1707 ********************************************************************** 00013240

0000C0 D901                        1710 MASEMBLE ANDM  FLAGS,CHAIN          SET UP FLAGS FOR TEST                00013260
0000C1 20C9                        1713          BOC   DBUS,RSTDIAG         IS CHAIN FLAG ON?                    00013270
0000C2 DC80                        1716          ANDM  SETDIA1,DIAWRT       MASK TO TEST DIAG WRT BIT            00013280
0000C3 20CB                        1719          BOC   DBUS,CHKFTR          BRANCH IF DIAG MODE OFF              00013290
0000C4 8810                        1722          ORI   STATIMG,DIAGMODE     SET DIAG MODE BIT IN STAT REG        00013300
0000C5 4828                        1725          XFR   STATIMG,STAT         SET STATS TO HDWE                    00013310
0000C6 648B                        1728          BU    SETSEV               GO CHECK NRZI                        00013320
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   9/04/73
0000C7 26BE                      1732 SELOUTUP BOC    SELO,ADROUTUP       BRANCH IF NOT HIO                 00013340
0000C8 6344                      1735 PRETURN0 BU     HIONOP              GO TO HIO NOT OPERATING           00013350

0000C9 0C00                      1739 RSTDIAG  STO    SETDIA1,0           RESET DIAG MODE BITS              00013370
0000CA 0D00                      1742          STO    SETDIA2,0                                             00013380

0000CB 648B                      1746 CHKFTR   BU     SETSEV              BRANCH    SEVEN TK FEAT  ***      00013400

0000CC DA40                      1750 CHKNRZ   ANDM   REQTAGS,ANRZI        CHECK FOR NRZI FLAG               00013420
0000CD 20CF                      1753          BOC    DBUS,CMDWAIT0       BRANCH IF NRZI BIT OFF            00013430
0000CE 8201                      1756          ORI    XOUTAIM,NRZMODE     SET XOUTA IMAGE NRZ BIT           00013440
0000CF DB20                      1759 CMDWAIT0 ANDM   FLAGS2,A64          WASS LAST MODE SET 6400           00013450
0000D0 20D2                      1762          BOC    DBUS,CMDWAIT        BR                                00013460
0000D1 8202                      1765          ORI    XOUTAIM,MODE64      SET 6400 FOR ALU2                 00013470


                                 1768 ************************************************************************ 00013490
                                 1769 * WAIT FOR AND PROCESS COMMAND OUT. DETERMINE WHETHER OPERATION       * 00013500
                                 1770 * CAN PROCEED.                                                        * 00013510
                                 1771 ************************************************************************ 00013520


                                 1774 * GO TO MAP 13-140                                                     00013550
0000D2 28C8                      1776 CMDWAIT  BOC    ADROUT,PRETURN0     HALT IO NOT OPERATING             00013560
                                 1778 * GO TO MAP 13-140                                                     00013570
0000D3 29DA                      1780          BOC    CMDOUT,CMDWAIT1     FIRST COMMAND OUT                 00013580
                                 1782 * GO TO MAP 13-140                                                     00013590
0000D4 60D2                      1784          BU     CMDWAIT             WAIT                              00013600

                                 1787 ************************************************************************ 00013620
                                 1788 *THE COMPARER HANDLES BUS OUT CHECKS DURING COMMAND TRANSFER.         * 00013630
                                 1789 ************************************************************************ 00013640
0000D5 8720                      1791 CMDPARER ORI    SNSSTS2,BUSOC       POST BUS OUT CHECK                00013650
0000D6 D906                      1794 CMDPAR0  ANDM   FLAGS,STATPNDG+STACK TEST FOR STATUS PENDING OR STACK   00013660
0000D7 20E6                      1797          BOC    DBUS,CMDPAR1        BRANCH IF NO                      00013670
0000D8 8510                      1800          ORI    PNDSTS,BUSY         POST BUSY IN STATUS               00013680
0000D9 60DE                      1803          BU     CMDWAIT4            GO TO STORE LINKS                 00013690
0000DA C1FD                      1806 CMDWAIT1 AND    CTIMAGE,ONES-ADDIN  MASK ADDR IN DOWN                 00013700
0000DB 24D5                      1809          BOC    BOPE,CMDPARER       BRANCH IF CMD PAR ERR             00013710


0000DC 40A0                      1814 CMDPAREX XFR    CURCOMM,CBO         MOVE CMD TO LSR                   00013740

                                 1817 *** IF MIS AVAILABLE GO CHECK TO SEE IF CONTINGENT CONNECTION FLAG     00013760
                                 1818 *** IS TO BE RESET                                                     00013770
0000DD 2312                      1820          BOC    MIFTR,MIFTR04       BRANCH IF MIS AVAILABLE           00013780
0000DE 4150                      1823 CMDWAIT4 XFR    CTIMAGE,CTI         DROP ADDRESS IN                   00013790
0000DF D904                      1826          ANDM   FLAGS,STATPNDG        STATUS PNDING                   00013800
0000E0 20E5                      1829          BOC    DBUS,CMDPROC        NO, GO TO CMD PROCESS             00013810

0000E1 9000                      1833 CMDWAIT3 ORM    CURCOMM,ZERO        IS IT TEST IO                     00013830
0000E2 20E4                      1836          BOC    DBUS,PENDLINK       IF YES SEND STATUS                00013840
0000E3 8510                      1839          ORI    PNDSTS,BUSY         IF NO POST BUSY                   00013850
```

LOC	OBJECT CODE	ADDR1	ADDR2	STMT	SOURCE STATEMENT			F01MAY72 9/04/73
0000E4	6291			1842	PENDLINK	BU	TERMSTAT	GO TO RAISE STATUS IN 00013860
0000E5	6100			1846	CMDPROC	BU	COMDECOD	GO DECODE THE CMD 00013880
0000E6	0502			1849	CMDPAR1	STO	PNDSTS,UNITCHK	POST A UNIT CHECK 00013890
0000E7	8904			1852		ORI	FLAGS,STATPNDG	POST STATUS PNDG FLAG 00013900
0000E8	CB7F			1855		AND	FLAGS2,ONES-FORCEUC	RESET FORCE UNIT CHECK FLAG 00013910
0000E9	140B			1858		STO	XOUTBIM,NDXABRT	BRT LOAD ALU2 INIT ADDRESS 00013920
0000EA	5441			1861		XFR	XOUTBIM,XOUTB	TRAP ALU2 TO PREVENT DE RESET 00013930
0000EB	4150			1864		XFR	CTIMAGE,CTI	DROP ADDRESS-IN 00013940
0000EC	6291			1867		BU	TERMSTAT	GO TO STORE LINKS 00013950
0000ED	0502			1871	DOITNOW	STO	PNDSTS,UNITCHK	IMAGE UNIT CHK 00013970
0000EE	8904			1874		ORI	FLAGS,STATPNDG	SET FLAG 00013980
0000EF	4150			1877		XFR	CTIMAGE,CTI	DROP ADDR IN 00013990
0000F0	1348			1880		STO	LINK4,TERMATE	LOAD LINK RETURN 00014000
0000F1	604B			1883		BU	GODODIA	00014010
0000F2	0000			1886		STO	CURCOMM,0	POWER ON RESET 00014020
0000F3	1F00			1889		STO	FORMAT,0	POWER ON RESET 00014030
0000F4	1800			1892		STO	LINK5,0	POWER ON RESET 00014040
0000F5				1894	STEP0002	EQU	*	00014050
0000F5	1A90			1896	MODEREGS	STO	SEVMODA,X'90'	00014060
0000F6				1898	STEP0003	EQU	*	00014070
0000F6	1B90			1900		STO	SEVMODB,X'90'	00014080
0000F7				1902	STEP0004	EQU	*	00014090
0000F7	6014			1904		BU	EXECRST	00014100

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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   9/04/73
000100                           1908          ORG   BEGIN+X'100'                                      00014130
                                 1909 ************************************ COMMAND DECODE ***************** 00014140
                                 1910 * THE COMMAND WILL BE DECODED IF THEIR IS NO STATUS PENDING OR        * 00014150
                                 1911 * STACKED. EACH COMMAND(EXCEPT MODE TYPE) WILL BE CHECKED FOR        * 00014160
                                 1912 * DISCRETE CODES AND COMMAND REJECTED IF NOT RECOGNIZED.             * 00014170
                                 1913 ********************************************************************** 00014180

000100 9000                      1916 COMDECOD ORM   CURCOMM,0          MASK COMMAND CODE FOR TESTING       00014200
000101 3718                      1919          BOC   DREG7,IS6ON        BRANCH IF BIT 7 ON TO CHK BIT 6     00014210
000102 3639                      1922          BOC   DREG6,READTYPE     BRANCH IF BIT 6 ON (READ CMD)       00014220
000103 353B                      1925          BOC   DREG5,CHKRDB       BRANCH IF BIT 5 ON                  00014230
000104 2041                      1928          BOC   DBUS,DOTESTIO      CHECK FOR TEST I/O                  00014240
000105 6108                      1931          BU    COMREJCT           GO REJECT COMMAND                   00014250

                                 1935 ********************************************************************** 00014280
                                 1936 *COMMAND MUST BE CONTROL SINCE BITS 5,6,AND 7 ARE PRESENT.           * 00014290
                                 1937 ********************************************************************** 00014300

000106 F097                      1940 CKDSE    XOM   CURCOMM,X'97'      MASK FOR DATA SECURITY ERASE CMD    00014320
000107 2023                      1943          BOC   DBUS,DODSE         BRANCH IF IT IS                     00014330

                                 1946 ************************** COMMAND REJECT ************************** 00014350
                                 1947 * COMMAND REJECT WILL BE BRANCHED INTO BY SEVERAL COMMAND DECODE      * 00014360
                                 1948 * ROUTINES. SENSE DATA WILL BE CLEARED AND COMMAND REJECT WILL BE    * 00014370
                                 1949 * POSTED IN SENSE BYTE 0                                            * 00014380
                                 1950 ********************************************************************** 00014390

000108 13D0                      1953 COMREJCT STO   LINK4,RTNCOMR      SET OPENERS RETURN                  00014410
000109 64D5                      1956          BU    OPENERS            GO CHECK DEV STATUS                 00014420

00010A 3006                      1960 CONTCMD  BOC   DREG0,CKDSE        BRANCH IF HI ORDER BIT IS ON        00014440
00010B 3108                      1963          BOC   DREG1,COMREJCT     COMMAND REJECT IF BIT 1 IS ON       00014450

00010C 3414                      1967          BOC   DREG4,COMTESTA     BRANCH IF CMD IS 00XX1111           00014470
00010D 3320                      1970          BOC   DREG3,COMTESTB     BRANCH IF CMD IS 00X10111           00014480
00010E 322F                      1973          BOC   DREG2,DOBKSPBL     IF 1, MUST BE BACKSPACE BLOCK       00014490

                                 1976 ********************************************************************** 00014510
                                 1977 *REWIND IS DECODED AT THIS POINT. CAN WE PERFORM IT? MAKE TESTS       * 00014520
                                 1978 ********************************************************************** 00014530

00010F 142F                      1981 DOREWIND STO   XOUTBIM,NDXRWD          EMIT ALU2 BRANCH ADDRESS ***  00014550
000110 8808                      1984          ORI   STATIMG,SETSTATA   SET RWD INDICATOR FOR CONTEND       00014560
000111 4828                      1987          XFR   STATIMG,STAT       SET STATA IN HDWE                   00014570
000112 1037                      1990 DORWD1   STO   LINK1,CONTINIT     LINK TO CONTROL INIT STATUS         00014580
000113 6228                      1993          BU    TUTEST             GO TO TU STATUS TEST                00014590

000114 3329                      1997 COMTESTA BOC   DREG3,COMTESTC     BRANCH IF CMD IS 00X11111           00014610
000115 3233                      2000          BOC   DREG2,DOBAKFIL     IF=1, MUST BE BACKSPACE FILE        00014620
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                         2003 * COMMAND IS 00001111 OR REWIND UNLOAD                          00014640
000116 1429              2005 DORUNLOD STO   XOUTBIM,NDXRWU          EMIT ALU2 BRANCH ADDRESS *** 00014650
000117 6112              2008          BU    DORWD1                                            00014660

000118 3649              2012 IS6ON    BOC   DREG6,IS5ON                                       00014680
000119 F001              2015 WRTCHECK XOM   CURCOMM,X'01'       CHECK FOR DISCRETE CMD        00014690
00011A 201C              2018          BOC   DBUS,ITSOK          BRANCH IF IT IS               00014700
00011B 6108              2021          BU    COMREJCT           OTHERWISE REJECT COMMAND      00014710

00011C 8204              2025 ITSOK    ORI   XOUTAIM,WRITE      ADD WRITE TO DATA FLOW MASK   00014730
00011D 1413              2028          STO   XOUTBIM,NDXWRT          EMIT ALU2 BRANCH ADDRESS *** 00014740
00011E 1079              2031          STO   LINK1,CLEANIT      LINK TO CLEAN INITIAL STAUTS RTN 00014750
00011F 621E              2034          BU    PROTEST                                           00014760

000120 3235              2038 COMTESTB BOC   DREG2,DOFORBLK     IF 1 MUST BE FORWARD SPACE BLOCK 00014780
                         2040 * COMMAND IS 00010111 OR ERASE GAP                              00014790
000121 1422              2042 DOERG    STO   XOUTBIM,NDXERG          EMIT ALU2 BRANCH ADDRESS *** 00014800
000122 612B              2045          BU    DOWTM1                                            00014810

000123 DA10              2049 DODSE    ANDM  FLAGS1,ALLOWDSE    MASK TO TEST ALLOW DSE FLAG BIT  00014830
000124 2008              2052          BOC   DBUS,COMREJCT      BRANCH IF OFF TO CMD REJECT      00014840
000125 1431              2055          STO   XOUTBIM,NDXERS        EMIT ALU2 BRANCH ADDRESS *** 00014850
000126 8808              2058          ORI   STATIMG,SETSTATA   SET DSE INDICATOR FOR CONTEND    00014860
000127 4828              2061          XFR   STATIMG,STAT       SET TO HDWE                      00014870
000128 612B              2064          BU    DOWTM1             GO SET DF MASK                   00014880

000129 3237              2068 COMTESTC BOC   DREG2,DOFORFIL     IF 1,  MUST BE FSF               00014900

                         2071 * COMMAND IS 00011111 OR WRITE TAPE MARK                        00014920
00012A 1420              2073 DOWTM    STO   XOUTBIM,NDXWTM          EMIT ALU2 BRANCH ADDRESS *** 00014930
00012B 8204              2076 DOWTM1   ORI   XOUTAIM,WRITE        ADD WRITE AND CONTROL TO DF MASK 00014940
00012C 8820              2079          ORI   STATIMG,CONTROL                                   00014950
00012D 1037              2082          STO   LINK1,CONTINIT     LINK TO CONTROL INITIAL STATUS   00014960
00012E 621E              2085          BU    PROTEST            GO TO TEST FILE PROTECT          00014970

                         2088 * COMMAND IS 00100111 OR BACKSPACE RECORD                       00014990
00012F 143E              2090 DOBKSPBL STO   XOUTBIM,NDXBSR          EMIT ALU2 BRANCH ADDRESS *** 00015000
000130 8820              2093 DOCONTRL ORI   STATIMG,CONTROL    SET CONTROL BIT IN DATA FLOW MASK 00015010
000131 1037              2096          STO   LINK1,CONTINIT     SET RETURN TO CONTROL COMMANDS   00015020
000132 6145              2099          BU    DOREAD2            GO SET READ BACK MASK BIT        00015030

                         2102 * COMMAND IS 00101111 OR BACKSPACE FILE                         00015050
000133 143C              2104 DOBAKFIL STO   XOUTBIM,NDXBSF          EMIT ALU2 BRANCH ADDRESS *** 00015060
000134 6130              2107          BU    DOCONTRL           GO SET DF MASK BITS              00015070

                         2110 * COMMAND IS 00110111 OR FORWARD SPACE RECORD                   00015090
000135 1437              2112 DOFORBLK STO   XOUTBIM,NDXFSR          EMIT ALU2 BRANCH ADDRESS *** 00015100
000136 6130              2115          BU    DOCONTRL           GO SET DF CONTROL BIT            00015110
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   9/04/73
                                   2118 * COMMAND IS 00111111 OR FORWARD SPACE FILE                      00015130
000137 1435                        2120 DOFORFIL STO   XOUTBIM,NDXFSF          EMIT ALU2 BRANCH ADDRESS ***  00015140
000138 6130                        2123          BU    DOCONTRL           GO SET DF CONTROL BIT          00015150

                                   2126 ************************************************************** 00015170
                                   2127 *SEPARATE READ TYPE COMMANDS BY FURTHER DECODING                * 00015180
                                   2128 ************************************************************** 00015190
000139 F002                        2130 READTYPE XOM   CURCOMM,X'02'       TEST FOR READ CODE             00015200
00013A 2043                        2133          BOC   DBUS,DOREAD         BRANCH IF READ                 00015210
00013B F00C                        2136 CHKRDB   XOM   CURCOMM,X'0C'       TEST FOR READ BACKWARD         00015220
00013C 2046                        2139          BOC   DBUS,DORDBACK       BRANCH IF READ BACKWARD        00015230
00013D F004                        2142          XOM   CURCOMM,X'04'       TEST FOR SENSE CODE            00015240
00013E 207F                        2145          BOC   DBUS,DOSENSE        BRANCH IF SENSE                00015250
00013F 231C                        2148          BOC   MIFTR,CHKRSRV       BRANCH IF MIS AVAILABLE    *** 00015260
                                   2150 * IF COMMAND OP CODE WAS NONE OF THE ABOVE, IT IS INVALID AND WILL  00015270
                                   2151 * BE REJECTED                                                    00015280
000140 6108                        2153          BU    COMREJCT            GO REJECT COMMAND             00015290

000141 1091                        2157 DOTESTIO STO   LINK1,TERMSTAT      EMIT LINK TO TERMINAL STATUS RTN  00015310
000142 622A                        2160          BU    TUTEST1             TEST TU STATUS                00015320

000143 1433                        2164 DOREAD   STO   XOUTBIM,NDXRDF          EMIT ALU2 BRANCH ADDRESS ***  00015340
000144 1079                        2167 DOREAD1  STO   LINK1,CLEANIT       LINK TO CLEAN INITIAL ROUTINE     00015350
                                   2169 *OREAD2  ORI   XOUTAIM,RDRDB       ADD RD OR RDB BIT TO DF MASK      00015360
000145 6228                        2171 DOREAD2  BU    TUTEST              GO TO TEST TU STATUS              00015370

000146 143A                        2175 DORDBACK STO   XOUTBIM,NDXRDB          EMIT ALU2 BRANCH ADDRESS ***  00015390
                                   2177 *        AND   XOUTAIM,ONES-DATCON RESET DATA CONVERT IF SEV TRK  00015400
000147 6144                        2179          BU    DOREAD1             GO TO READ INITIALIZE         00015410
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                        F01MAY72   9/04/73
                                   2182 ****************************** MODE COMMAND DECODE ****************** 00015430
                                   2183 * DECODE MODETYPE COMMANDS FURTHER AND PERFORM FUNCTION REQUIRED.     * 00015440
                                   2184 * SET CHANNEL END-DEVICE END IN INITIAL STATUS. REQ TIE AND SET       * 00015450
                                   2185 * DIAGNOSE COMMANDS WILL LINK TO THE WRITE ROUTINE TO FETCH THE FIRST * 00015460
                                   2186 * BYTE OF DATA. THE 7 TRK FEATURE WILL BE CHECKED TO SEE IF IT IS      * 00015470
                                   2187 * PRESENT. ALL MODE TYPE COMMAND ARE VALID. ANY NOT SPECIFICALLY      * 00015480
                                   2188 * RECOGNIZED TO PERFORM A FUNCTION WILL BE TREATED AS SENSE RESET      * 00015490
                                   2189 * NO-OPS.                                                           * 00015500
                                   2190 ********************************************************************** 00015510
                                   2191 ********************************************************************** 00015520

000148 6579                        2194 GOSETDIA BU    DOSETDIA             GO EXECUTE SET DIAGNOSE CMD       00015540

000149 350A                        2198 IS5ON    BOC   DREG5,CONTCMD                                          00015560
00014A 3154                        2201 MODETYPE BOC   DREG1,CKHIMODE       BRANCH TO CHECK HI MODES(X1XXX011) 00015570
00014B F00B                        2204         XOM   CURCOMM,X'0B'         MASK FOR DIAGNOSTIC MODE SET      00015580
00014C 206C                        2207         BOC   DBUS,DODIAMS          BRANCH IF YES                     00015590
00014D F01B                        2210         XOM   CURCOMM,X'1B'         MASK FOR TRACK IN ERROR MODE SET  00015600
00014E 2070                        2213         BOC   DBUS,DOTIEMS          BRANCH IF IT IS                   00015610
00014F F003                        2216         XOM   CURCOMM,X'03'         MASK FOR NO-OP COMMAND            00015620
000150 205E                        2219         BOC   DBUS,ISNOOP           BRANCH IF IT IS                   00015630
000151 F08B                        2222         XOM   CURCOMM,X'8B'         MASK FOR LWR COMMAND              00015640
000152 206E                        2225         BOC   DBUS,DOLWR            BRANCH IF IT IS                   00015650
000153 647D                        2228         BU    CHK7TK                BRANCH TO CHECK 7 TRACK           00015660

000154 F0CB                        2232 CKHIMODE XOM   CURCOMM,X'CB'         MASK FOR NRZI MODE SET            00015680
000155 2069                        2235         BOC   DBUS,DONRZMS          BRANCH IF IT IS                   00015690
000156 F0C3                        2238         XOM   CURCOMM,X'C3'         MASK FOR PE MODE SET              00015700
000157 2064                        2241         BOC   DBUS,DOPEMS           BRANCH IF IT IS                   00015710
000158 F0D3                        2244         XOM   CURCOMM,X'D3'         MASK FOR 6250 MODE SET            00015720
000159 2060                        2247         BOC   DBUS,DO64MS           BR IF SO                          00015730
00015A F04B                        2250         XOM   CURCOMM,X'4B'         MASK FOR SET DIAGNOSE CMD         00015740
00015B 2070                        2253         BOC   DBUS,DOTIEMS          BRANCH IF IT IS                   00015750
00015C 3067                        2256         BOC   DREG0,MODELINK        BR IF NONE OF ABOVE AND MODE 2 SET 00015760
00015D 647D                        2259 ANY7TK   BU    CHK7TK                BRANCH                            00015770

00015E 101B                        2263 ISNOOP   STO   LINK1,TRETURN3        SET NO-OP RETURN                  00015790
00015F 622A                        2266         BU    TUTEST1               GO CHECK TU STATUS                00015800

000160 2E7A                        2270 DO64MS   BOC   SCB,DO64B                                              00015820
000161 8B20                        2273 DO64A    ORI   FLAGS2,A64            SET ITF A FLG                     00015830
000162 CABF                        2276         AND   FLAGS1,ONES-ANRZI     RESET A NRZ FLG                   00015840
000163 6167                        2279         BU    MODELINK                                                00015850

000164 2E77                        2283 DOPEMS   BOC   SCB,DOPEB             BRANCH IF MIS AVAILABLE           00015870
000165 CABF                        2286 DOPEA    AND   FLAGS1,ONES-ANRZI     RESET THE NRZI FLAG FOR INTF A    00015880
000166 CBDF                        2289 DOPEA2   AND   FLAGS2,ONES-A64       RESET 6250 FLG                    00015890
000167 1019                        2292 MODELINK STO   LINK1,TRETURN2        SET TU TEST ROUTINE RETURN        00015900
000168 6228                        2295         BU    TUTEST                GO TO TEST THE DEV                00015910

000169 2E7D                        2299 DONRZMS  BOC   SCB,DONRZB            BRANCH IF MIS AVAILABLE           00015930
00016A 8A40                        2302 DONRZA   ORI   FLAGS1,ANRZI          SET NRZI MODE FLAG  FOR INTF A    00015940
00016B 6166                        2305         BU    DOPEA2                GO SET RETURN                     00015950
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   9/04/73
00016C 8C80                       2309 DODIAMS  ORI   SETDIA1,DIAWRT      SET THE DIAG MODE FLAG          00015970
00016D 6167                       2312          BU    MODELINK            GO SET RETURN                   00015980

00016E 8C04                       2316 DOLWR    ORI   SETDIA1,LWROP       SET LOOP WRITE TO READ FLAG     00016000
00016F 611C                       2319          BU    ITSOK               RETURN TO WRITE ROUTINE         00016010

000170 1079                       2323 DOTIEMS  STO   LINK1,CLEANIT       SET TU TEST ROUTINE RETURN      00016030
000171 6228                       2326          BU    TUTEST              GO TEST DRIVE STATUS            00016040

000172 F04B                       2330 DOTIEMS1 XOM   CURCOMM,X'4B'       MASK FORSET DIAGNOSE CMD        00016060
000173 2048                       2333          BOC   DBUS,GOSETDIA       BRANCH IF IT IS                 00016070
000174 42A0                       2336          XFR   XOUTAIM,CBO         FETCH TIE BYTE                  00016080
000175 4150                       2339          XFR   CTIMAGE,CTI     RESET SERVICE IN                    00016090
000176 6700                       2342          BU    SCREENTI                                              00016100


000177 CA7F                       2347 DOPEB    AND   FLAGS1,ONES-BNRZI   RESET B INTF NRZI FLAG          00016130
000178 CBEF                       2350 DOPEB2   AND   FLAGS2,ONES-B64     RESET 6250 B FLG                00016140
000179 6167                       2353          BU    MODELINK            RETURN TO SET STATUS IN         00016150


00017A 8B10                       2358 DO64B    ORI   FLAGS2,B64          SET 6250 FLG                    00016180
00017B CA7F                       2361          AND   FLAGS1,ONES-BNRZI   RESET NRZI FLG                  00016190
00017C 6167                       2364          BU    MODELINK                                              00016200

00017D 8A80                       2368 DONRZB   ORI   FLAGS1,BNRZI        SET NRZI FOR B INTF             00016220
00017E 6178                       2371          BU    DOPEB2 K            RETURN TO RAISE STATUS          00016230
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   9/04/73

                                   2375 ***************************** SENSE OP ********************************* 00016260
                                   2376 *THIS ROUTINE CONTROLS THE SENSE OPERATION.                            * 00016270
                                   2377 *THE SENSE BYTES WHICH ARE ASSEMBLED BY ALU2 ARE PASSED VIA THE XOVER  * 00016280
                                   2378 *REGISTERS . WHEN A BYTE OF SENSE INFO DOES NOT APPLY THEN THE XOVER   * 00016290
                                   2379 *WILL CONTAIN ZEROS. SENSE BYTES 2, 3, 4 13, 14, AND 17 ARE GATED BY   * 00016300
                                   2380 *BITS SET IN ALU1 XOVER REG XOUTA AND THE SENSE STAT TURNED ON.        * 00016310
                                   2381 ************************************************************************ 00016320

00017F 13D1                        2384 DOSENSE  STO LINK4,RTNSENS          SET OPENERS RETURN                  00016340
000180 64D5                        2387          BU    OPENERS              GO CHECK DEVICE STATUS              00016350

000181 0500                        2391 SENSEOK  STO   PNDSTS,ZERO          CLEAR REG OF OLD STATUS             00016370
000182 105C                        2394          STO   LINK1,SRETURN2       RETURN TO SENSE0                    00016380
000183 116A                        2397          STO   LINK2,WATESUM        SET UP IN CASE OF INTERFACE ERR     00016390
000184 6060                        2400          BU    STATRTN              GO PRESENT STATUS                   00016400

000185 4150                        2404 SENSE0   XFR   CTIMAGE,CTI          DROP STATUS IN                      00016420
000186 14D6                        2407          STO   XOUTBIM,NDXSNS           LOAD INDEX FOR ALU2  ***       00016430
000187 5441                        2410          XFR   XOUTBIM,XOUTB        START ALU2 OFF                      00016440
000188 138A                        2413          STO   LINK4,SENSE1         RETURN TO SENSE1                    00016450
000189 61E8                        2416          BU    PULL2                GO GET 1ST 2 BYTES                  00016460

                                   2419 *  SENSE BYTES 0 AND 1                                                  00016480

00018A 04FE                        2422 SENSE1   STO   WORK1,X'FE'          TRANSFER                            00016500
00018B 4721                        2425          XFR   SNSSTS2,AR           SENSE STATUS 2 TO                   00016510
00018C C400                        2428          AND   WORK1,0                WORK1 WITHOUT                     00016520
00018D 4F90                        2431          XFR   SETCNT2,XINA            THE NOISE                       00016530
00018E 4F21                        2434          XFR   SETCNT2,AR              BIT IF                          00016540
00018F 8400                        2437          ORI   WORK1,0                  ON                            00016550
000190 2097                        2440          BOC   DBUS,TSTERRS                                           00016560
000191 D701                        2443 CHKNOIS  ANDM  SNSSTS2,RDNOISE      SET NOISE                           00016570
000192 2094                        2446          BOC   DBUS,SENSE2           IN BYTE 1                         00016580
000193 8E80                        2449          ORI   SETCNT1,NOISE         IF ON                             00016590
000194 139B                        2452 SENSE2   STO   LINK4,SENSE3         RETURN TO SENSE3                    00016600
000195 0F00                        2455          STO   SETCNT2,0            CLEAR THIS REG (HOLDS FLAGS FOR SNS) 00016610
000196 61CF                        2458          BU    SNSEVEN              GO SHIP 2 BYTES                     00016620

000197 DB40                        2462 TSTERRS  ANDM  FLAGS2,ALUFAIL       MASK ALU FAIL FLAG                  00016640
000198 2091                        2465          BOC   DBUS,CHKNOIS         BRANCH IF OFF                       00016650
000199 8420                        2468          ORI   WORK1,BUSOC          OTHERWISE SET BUS OUT CHK           00016660
00019A 6191                        2471          BU    CHKNOIS              RETURN                              00016670

                                   2474 *  SENSE BYTES 2 AND 3                                                  00016690

00019B 8840                        2477 SENSE3   ORI   STATIMG,SENSE        RESET SENSE TO DF                   00016710
00019C 0200                        2480          STO   XOUTAIM,0            CLEAR XOUTAIM (HOLDS CNT TO         00016720
00019D 8F40                        2483          ORI   SETCNT2,SNSON          GATE BYTES FROM DF                00016730
00019E 13A0                        2486          STO   LINK4,SENSE4         RETURN TO SENSE 4                   00016740
00019F 61CE                        2489          BU    SNSEVEN1             GO BUMP ONE THEN SHIP EM            00016750

                                   2492 *   SENSE BYTES 4 AND 5                                                 00016770
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   9/04/73
0001A0 0F00                      2495 SENSE4   STO   SETCNT2,0          CLEAR REG FOR TEST          00016790
0001A1 5521                      2498          XFR   ALU1ERR,AR         DO WE                       00016800
0001A2 5621                      2501          XFR   ALU2ERR,AR          HAVE AN                    00016810
0001A3 9F00                      2504          ORM   SETCNT2,0             ERROR                    00016820
0001A4 20A7                      2507          BOC   DBUS,SENSE5         BR IF NOT                   00016830
0001A5 8480                      2510          ORI   WORK1,ALUERR        SET ON IF SO                00016840
0001A6 CB3F                      2513          AND   FLAGS2,ONES-ALUFAIL-FORCEUC  RESET ALU FAIL FLAGS 00016850
0001A7 0F20                      2516 SENSE5   STO   SETCNT2,SNSOFF      SET FLAG TO TURN SNS OFF    00016860
0001A8 8E40                      2519          ORI   SETCNT1,NSUBSYS     SET BIT TO INDICATE 3803    00016870
0001A9 13AB                      2522          STO   LINK4,SENSE6        RETURN TO SENSE 6           00016880
0001AA 61CE                      2525          BU    SNSEVEN1            GO BUMP ON THEN SHIP 2 MORE 00016890

                                 2528 *  SENSE BYTES 6 AND 7                                       00016910

0001AB 13AD                      2531 SENSE6   STO   LINK4,SENSE7        RETURN TO SENSE 7           00016930
0001AC 61CE                      2534          BU    SNSEVEN1            GO TO BUMP XOUTAIM TO CLEAR BITS 6-7 00016940

                                 2537 *  SENSE BYTES 8 AND 9                                       00016960

0001AD 8E08                      2540 SENSE7   ORI   SETCNT1,X'08'       SET HIGH DENSITY BIT ON     00016980
0001AE DA20                      2543          ANDM  FLAGS1,CURFLAG      ARE WE RESERVED             00016990
0001AF 20B1                      2546          BOC   DBUS,SENSE8         BR IF NOT                   00017000
0001B0 8E01                      2549          ORI   SETCNT1,CURSVD      TELL THE WORLD IF SO        00017010
0001B1 13B5                      2552 SENSE8   STO   LINK4,SENSE9        RETURN TO SENSE 9           00017020
0001B2 0F40                      2555          STO   SETCNT2,SNSON        TRN ON CONTROL BIT          00017030
0001B3 020F                      2558          STO   XOUTAIM,15          LOAD GATES FOR HARDWARE     00017040
0001B4 61CF                      2561          BU    SNSEVEN             GO SHIP 'EM                 00017050

                                 2564 *  SENSE BYTES 10 AND 11                                     00017070

0001B5 5521                      2567 SENSE9   XFR   ALU1ERR,AR         GET ALU1 ERRORS             00017090
0001B6 8E00                      2570          ORI   SETCNT1,0             IF SO                   00017100
0001B7 13B9                      2573          STO   LINK4,SENSEA        RETURN TO SENSEA            00017110
0001B8 61C6                      2576          BU    SENSEDS             GO SHIP 'EM                 00017120

                                 2579 *    SENSE BYTES 12 AND 13                                   00017140

0001B9 0FC0                      2582 SENSEA   STO   SETCNT2,SNSON+CNT40  DO SENSE AND ADD 40 WHEN APPLIES 00017160
0001BA 5660                      2585          XFR   ALU2ERR,CBI         SEND ALU 2 ERRORS           00017170
0001BB 13BE                      2588          STO   LINK4,SENSEB        RETURN TO SENSE B           00017180
0001BC 0220                      2591          STO   XOUTAIM,X'20'       INIT LSR                    00017190
0001BD 61D0                      2594          BU    SNSEVEN2            GO SHIP 'EM                 00017200

                                 2597 *    SENSE BYTES 14 AND 15                                   00017220

0001BE 0F20                      2600 SENSEB   STO   SETCNT2,SNSOFF      TURN SENSE OFF WHEN APPLIES 00017240
0001BF 13C2                      2603          STO   LINK4,SENSEC        RETURN TO SENSEC            00017250
0001C0 A240                      2606          ADD   XOUTAIM,X'40'       BUMP GATES FOR HARDWARE     00017260
0001C1 61CF                      2609          BU    SNSEVEN             GO SHIP 'EM                 00017270

                                 2612 *    SENSE BYTES 16 AND 17                                   00017290

0001C2 0FC0                      2615 SENSEC   STO   SETCNT2,SNSON+CNT40   TURN SENSE ON AND ADD 40   00017310
0001C3 13C5                      2618          STO   LINK4,SENSED        RETURN TO SENSE D           00017320
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72  9/04/73
0001C4 61CF                      2621          BU    SNSEVEN            GO SHIP 'EM                  00017330

                                 2624 *   SENSE BYTES 18 AND 19                                      00017350

0001C5 13C9                      2627 SENSED   STO   LINK4,SENSEE       LOAD LINK RETURN             00017370
0001C6 C8BF                      2630 SENSEDS  AND   STATIMG,ONES-SENSE  RESET SENSE IN REG           00017380
0001C7 0F00                      2633          STO   SETCNT2,0           CLEAR FLAGS OUT              00017390
0001C8 61CF                      2636          BU    SNSEVEN            GO SHIP 'EM                  00017400

                                 2639 *   SENSE BYTES 20 AND 21                                      00017420

0001C9 13CB                      2642 SENSEE   STO   LINK4,SENSEF       RETURN TO SENSE F            00017440
0001CA 61CF                      2645          BU    SNSEVEN            GO SHIP 'EM SOME MORE        00017450

                                 2648 *   SENSE BYTES 22 AND 23                                      00017470
0001CB 5D21                      2650 SENSEF   XFR   FRUREG,AR          GET ALU 1 FRU REG            00017480
0001CC 8400                      2653          ORI   WORK1,0               IN REG TO SEND           00017490
0001CD 13F5                      2656          STO   LINK4,CANCEL1       THATS ALL - RETURN TO CANCEL 00017500

                                 2659 ************************************************************** 00017520
                                 2660 *  ENTRY TO SEND WORK1 AND SETCNT1 TO CHANNEL                  00017530
0001CE A201                      2662 SNSEVEN1 ADD   XOUTAIM,1           BUMP GATES                   00017540
0001CF 4460                      2665 SNSEVEN  XFR   WORK1,CBI           SET ON CHANNEL BUS IN        00017550
0001D0 8808                      2668 SNSEVEN2 ORI   STATIMG,SETSTATA    SET STAT A ON                00017560
0001D1 4242                      2671 EXIT     XFR   XOUTAIM,XOUTA       THIS WILL SET CONTROLS       00017570
0001D2 4828                      2674          XFR   STATIMG,STAT          TO HARDWARE                00017580
0001D3 1001                      2677          STO   LINK1,BRETURN2      SET UP                       00017590
0001D4 118B                      2680          STO   LINK2,CANCEL          RETURN                     00017600
0001D5 128B                      2683          STO   LINK3,CANCEL            LINKAGE                  00017610
0001D6 620A                      2686          BU    SERVRTN            GO DO SERVICE                00017620
                                 2688 ************************************************************** 00017630

                                 2690 ************************************************************** 00017650
                                 2691 *   RETURN AFTER SENDING THE EVEN SENSE BYTE                   00017660
                                 2692 ************************************************************** 00017670

0001D7 DF40                      2695 SNSODD   ANDM  SETCNT2,SNSON       SET SENSE ON                 00017690
0001D8 20E0                      2698          BOC   DBUS,SNSODD2        BR IF NOT                    00017700
0001D9 8840                      2701          ORI   STATIMG,SENSE       SET SENSE GATE FOR HDWE      00017710
0001DA 9F00                      2704          ORM   SETCNT2,0           ADD ONE OR 40                00017720
0001DB 30E4                      2707          BOC   CNT40,SNSODD3       BR IF ADD 40                 00017730
0001DC A201                      2710          ADD   XOUTAIM,1           BUMP ONE                     00017740
0001DD C8F7                      2713 SNSODD1  AND   STATIMG,ONES-SETSTATA  RESET STAT A               00017750
0001DE 4E60                      2716          XFR   SETCNT1,CBI         SET ODD SENSE BYTE ON CBI    00017760
0001DF 61D1                      2719          BU    EXIT                RETURN TO PULL 2             00017770

0001E0 DF20                      2723 SNSODD2  ANDM  SETCNT2,SNSOFF      TURN OFF SENSE               00017790
0001E1 20DD                      2726          BOC   DBUS,SNSODD1        BR IF NOT                    00017800
0001E2 C8BF                      2729          AND   STATIMG,ONES-SENSE  DO IT IF OS                  00017810
0001E3 61DD                      2732          BU    SNSODD1             CONTINUE ON                  00017820

0001E4 A240                      2736 SNSODD3  ADD   XOUTAIM,X'40'       BUMP GATE                    00017840
0001E5 61DD                      2739          BU    SNSODD1             CONTINUE SOME MORE           00017850
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  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72  9/04/73
0001E6 4150                       2743 SNSLINK  XFR   CTIMAGE,CTI          RESET SERVICE IN                00017870
0001E7 2AD7                       2746          BOC   STATA,SNSODD         IF A ON GO TO SNS ODD           00017880
0001E8 3AEC                       2749 PULL2    BOC   STATC,PULLAB         BR IF ALU2 DONE WITH            00017890
0001E9 3BF6                       2752          BOC   STATD,CLEARAB         1ST 2 SENSE BYTES              00017900
0001EA 28F5                       2755          BOC   ADROUT,CANCEL1       BR IF HIO                       00017910
0001EB 61E8                       2758          BU    PULL2                WAIT SOME MORE                  00017920

0001EC 4490                       2762 PULLAB   XFR   WORK1,XINA           GET EVEN SENSE BYTE FROM ALU2   00017940
0001ED 4E88                       2765          XFR   SETCNT1,XINB         GET EVEN SENSE BYTE FROM ALU2   00017950
0001EE 8801                       2768 NOTPULL  ORI   STATIMG,SETSTATD     SET D TO IND                    00017960
0001EF 4828                       2771          XFR   STATIMG,STAT          GOT 'EM                         00017970
0001F0 28F5                       2774 PULLAB1  BOC   ADROUT,CANCEL1       WAIT TO ASSURE                  00017980
0001F1 3BF3                       2777          BOC   STATD,PULLAB2         ALU2 HAS SEEN D.                00017990
0001F2 3AF0                       2780          BOC   STATC,PULLAB1          ON                            00018000
0001F3 C8FE                       2783 PULLAB2  AND   STATIMG,ONES-SETSTATD   THEN RESET IT                 00018010
0001F4 5322                       2786          XFR   LINK4,IC               RETURN WITH 2 BYTES FROM ALU2   00018020

0001F5 628B                       2790 CANCEL1  BU    CANCEL                        POINT SO EXIT             00018040

0001F6 0400                       2794 CLEARAB  STO   WORK1,0               CLEAR WORK1                     00018060
0001F7 0E00                       2797          STO   SETCNT1,0            CLEAR COUNT REG 2               00018070
0001F8 61EE                       2800          BU    NOTPULL              RETURN TO DO ONLY ALU1          00018080
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                   F01MAY72   9/04/73

000200                           2804          ORG   BEGIN+X'200'                                        00018110
                                 2805 **************************** SERVICE ROUTINE ************************ 00018120
                                 2806 *SERVICE IN SBR TESTS FOR ALL OUT TAGS DOWN, RAISES SERVICE IN AND    * 00018130
                                 2807 *LINKS TO ADDRESSES STORED IN LNK 1 2 AND 3 WHEN A TAG IS RECEIVED IN * 00018140
                                 2808 *REPLY                                                                * 00018150
                                 2809 ********************************************************************** 00018160

000200 65E1                      2812 DMRRTN1  BU    DMRLNK              RETURN TO DMR ROUTINE              00018180
000201 61E6                      2815 BRETURN2 BU    SNSLINK             RETURN TO SENSE OP                 00018190
000202 6583                      2818 BRETURN4 BU    DIALINK             RETURN TO SET DIAGNOSE             00018200

000203 1082                      2822 WRTBGN   STO   LINK1,WRTFST         SET SERVICE SUBRTN RETURN          00018220
000204 117E                      2825          STO   LINK2,WC0STOP        SET STOP LINK                      00018230
000205 127F                      2828          STO   LINK3,WC0HIO        SET HIO LINK                       00018240
000206 CCFB                      2831          AND   SETDIA1,ONES-LWROP  RESET BIT FOR NEXT OPERATION       00018250
000207 8702                      2834          ORI   SNSSTS2,WDCNT0      SET WORD COUNT ZERO ON             00018260
000208 4560                      2837          XFR   PNDSTS,CBI          CLEAR BUS IN                       00018270
000209 C400                      2840          AND   WORK1,ZERO          CLEAR WORK REG 1                   00018280

00020A 380C                      2844 SERVRTN  BOC   OPRIN,SERVRTN0      BRANCH IF OP IN STILL UP(NO HIO)   00018300
00020B 5222                      2847 HIOLK    XFR   LINK3,IC            RETURN TO HIO ENTRY                00018310

00020C 8108                      2851 SERVRTN0 ORI   CTIMAGE,SVCIN       MASK SERVICE IN UP                 00018330
00020D 280B                      2854 SERVRTN1 BOC   ADROUT,HIOLK        TEST FOR  HALT I/O                 00018340
00020E 2D0D                      2857          BOC   SVCOUT,SERVRTN1     WAIT FOR TAG TO FALL               00018350
00020F 290D                      2860          BOC   CMDOUT,SERVRTN1     WAIT FOR TAG TO FALL               00018360
000210 390D                      2863          BOC   SUPO,SERVRTN1       BRANCH TO SUPPRESS DATA            00018370
000211 4150                      2866          XFR   CTIMAGE,CTI         RAISE SERVICE IN                   00018380
000212 C1F7                      2869          AND   CTIMAGE,ONES-SVCIN  MASK SERVICE IN DOWN               00018390

                                 2872 * GO TO MAP 13-170                                                    00018410
000213 280B                      2874 SERVRTN2 BOC   ADROUT,HIOLK        TEST FOR HALT I/O                  00018420
                                 2876 * GO TO MAP 13-170                                                    00018430
000214 2917                      2878          BOC   CMDOUT,WHOA        STOPLINK TO PROGRAM                00018440
                                 2880 * GO TO MAP 13-170                                                    00018450
000215 2D36                      2882          BOC   SVCOUT,TUTRTN       SERVICE OUT RESPONSE TO SERVICE IN 00018460
                                 2884 * GO TO MAP 13-170                                                    00018470
000216 6213                      2886          BU    SERVRTN2            WAIT                               00018480

                                 2889 *** COMMAND OUT RESPONSE TO SERVICE IN SAYS STOP                      00018500
000217 4150                      2891 WHOA     XFR   CTIMAGE,CTI         DROP SERVICE IN                    00018510
000218 5122                      2894          XFR   LINK2,IC            LINK TO PROGRAM                    00018520



                                 2898 **************************** TEST TAPE UNIT ************************ 00018550
                                 2899 *THIS ROUTINE DETERMINES WHETHER THE TU STATUS PERMITS THE INITIATION * 00018560
                                 2900 *OF THE COMMAND. IT THEN LINKS TO THE PROPER INITIAL STATUS ROUTINE   * 00018570
                                 2901 ********************************************************************** 00018580

000219 1349                      2904 TRETURN2 STO   LINK4,GRETURN0      SET MODE RETURN                    00018600
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72  9/04/73
00021A 604B                      2907           BU     GODODIA          RETURN TO PRESENT MODE STATUS      00018610
00021B 63DA                      2910 TRETURN3  BU     BSTWAIT2         NO-OP RETURN                       00018620
00021C 60E6                      2913 TRETURN0  BU     CMDPAR1          GO TO TERM UCK RTN                 00018630
00021D 60ED                      2916 SNSRESET  BU     DOITNOW                                             00018640

                                 2919 *** PROTEST IS ENTERED ONLY BY WRITE TYPE COMMANDS TO CHECK FOR       00018660
                                 2920 *** FILE PROTECT                                                     00018670
00021E 13D2                      2922 PROTEST   STO    LINK4,RTNPROT    SET OPENERS RETURN                 00018680
00021F 64D5                      2925           BU     OPENERS          GO CHECK DEVICE STATUS             00018690

000220 3A2C                      2929 PROTEST1  BOC    STATC,TUTESTIT   BRANCH IF NOT READY                00018710

000221 DC04                      2933 CHKLWR    ANDM   SETDIA1,LWROP    MASK FOR LOOP WRITE TO READ OP     00018730
000222 2025                      2936           BOC    DBUS,CHKNFP      BRANCH IF OFF                      00018740
000223 8802                      2939           ORI    STATIMG,SETSTATC OTHERWISE SET STAT FOR ALU2        00018750
000224 4828                      2942           XFR    STATIMG,STAT     SET TO HARDWARE                    00018760

000225 D440                      2946 CHKNFP    ANDM   WORK1,NFP        TEST FOR NOT FILE PROTECT          00018780
000226 312C                      2949           BOC    DREG1,TUTESTIT   BRANCH IF NOT FP                   00018790
000227 6400                      2952           BU     COMREJC1         GO TO COMMAND REJECT ROUTINE       00018800

000228 13D3                      2956 TUTEST    STO    LINK4,RTNTUTST   SET OPENERS RETURN                 00018820
000229 64D5                      2959           BU     OPENERS          GO CHECK DEVICE STATUS             00018830

00022A 13D4                      2963 TUTEST1   STO    LINK4,RTNTUTS1   SET OPENERS RETURN                 00018850
00022B 64D5                      2966           BU     OPENERS          GO CHECK DEVICE STATUS             00018860

00022C DB80                      2970 TUTESTIT  ANDM   FLAGS2,FORCEUC   MASK FOR ALU FAILURE               00018880
00022D 301C                      2973           BOC    DREG0,TRETURN0   BRANCH IF SO TO SET UNIT CHECK      00018890
00022E 0700                      2976           STO    SNSSTS2,ZERO     RESET SENSE                        00018900
00022F 4012                      2979           XFR    CLEAR            RESET DATA FLOW SENSE              00018910
000230 4012                      2982           XFR    CLEAR            RESET DATA FLOW SENSE              00018920
000231 3A1D                      2985           BOC    STATC,SNSRESET   BR ON UC                          00018930
000232 5022                      2988           XFR    LINK1,IC         TETURN                             00018940

000233 3A1C                      2992 TUTEST2   BOC    STATC,TRETURN0   GO TO TERMINAL UNIT CHECK ROUTINE. 00018960
000234 DB80                      2995           ANDM   FLAGS2,FORCEUC   IS FORCE UNIT CHK FLAG ON           00018970
000235 301C                      2998           BOC    DREG0,TRETURN0   BR IF SO                           00018980

000236 5022                      3002 TUTRTN    XFR    LINK1,IC         LINK TO STATUS HANDLING ROUTINE    00019000


                                 3006 ********************************** CONTROL COMMANDS ****************** 00019030
                                 3007 ************************************************************************ 00019040
                                 3008 *CONTINIT ROUTINE HANDLES THE PRESENTATION OF INITIAL STATUS FOR ALL  * 00019050
                                 3009 *ACCEPTED CONTROL IMMEDIATE COMMANDS.                                 * 00019060
                                 3010 ************************************************************************ 00019070


000237 0508                      3013 CONTINIT  STO    PNDSTS,CHANEND   EMIT CHANNEL END STATUS            00019090
000238 105D                      3016           STO    LINK1,SRETURN4   EMIT ACCEPT RETURN                 00019100
000239 115E                      3019           STO    LINK2,SRETURN5   EMIT STACK RETURN                  00019110
00023A 604A                      3022           BU     GODODIA0         GO TO PRESENT STATUS               00019120
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   9/04/73
                                   3025 *** CHANNEL RESPONDED WITH SERVICE OUT TO STATUS IN OR STATUS WAS      00019140
                                   3026 *** ACCEPTED                                                          00019150
00023B 0500                        3028 CONTSERV STO   PNDSTS,ZERO          RESET STATUS REGISTER           00019160
                                   3030 *** ENTRY AT CONTSTAK SAYS THE CHANNEL RESPONDED TO STATUS IN WITH    00019170
                                   3031 *** COMMAND OUT AND THE CHANNEL END IS STILL PENDING                  00019180
00023C 4242                        3033 CONTSTAK XFR   XOUTAIM,XOUTA        SET DATA FLOW MASK              00019190
00023D 4828                        3036          XFR   STATIMG,STAT        RESET STAT D IF ON              00019200
00023E CCFB                        3039          AND   SETDIA1,ONES-LWROP  RESET LWR BIT FOR NEXT OPERATION00019210
00023F 2A4B                        3042          BOC   STATA,CKCHAIN       BRANCH IF REWIND OR DSE         00019220

000240 4828                        3046 GODOIT   XFR   STATIMG,STAT        SET STATS TO HDWE               00019240
000241 F01F                        3049          XOM   CURCOMM,X'1F'       CHK FOR WTM                     00019250
000242 2066                        3052          BOC   DBUS,DOWTM64        BR IF SO                        00019260
000243 F017                        3055          XOM   CURCOMM,X'17'       ARE WE DS   ERG                 00019270
000244 2066                        3058          BOC   DBUS,DOWTM64        BR  IF SO                       00019280
000245 5441                        3061          XFR   XOUTBIM,XOUTB       TRAP ALU 2 TO PERFORM OP        00019290
000246 C1FE                        3064 SKIPALU2 AND    CTIMAGE,ONES-OPIN  DROP OP IN                      00019300
000247 8110                        3067          ORI   CTIMAGE,CUBUSY      RAISE CTL UNIT BUSY             00019310
000248 4150                        3070          XFR   CTIMAGE,CTI         CHANGE TAGS                     00019320

                                   3073 * GO TO MAP 13-190                                                    00019340
000249 3B5C                        3075 CTLWAIT  BOC   STATD,CHKERRS       IS ALU 2 FINISHED?              00019350
                                   3077 * GO TO MAP 13-190                                                    00019360
00024A 6249                        3079          BU    CTLWAIT             WAIT                            00019370

00024B D901                        3083 CKCHAIN  ANDM  FLAGS,CHAIN         MASK TO CHECK CHAIN BIT         00019390
00024C 2051                        3086          BOC   DBUS,CKEOTBOT       BRANCH IF NOT CHAINED           00019400
00024D DD40                        3089          ANDM  SETDIA2,DEVBSY      TEST FOR DEV BSY FLG            00019410
00024E 3150                        3092          BOC   DREG1,RESETA        BRANCH IF ON TO RESET A STAT    00019420
00024F 8801                        3095          ORI   STATIMG,SETSTATD    SET STAT D TO INDICATE CHAING   00019430
000250 C8F7                        3098 RESETA   AND   STATIMG,ONES-SETSTATA    RESET STAT A               00019440

000251 CDBF                        3102 CKEOTBOT AND   SETDIA2,ONES-DEVBSY RST THE DEV BSY DIAG FLAG        00019460
000252 F007                        3105          XOM   CURCOMM,X'07'       MASK FOR REWIND COMMAND         00019470
000253 2057                        3108          BOC   DBUS,CHKBOT         BRANCH IF IT IS TO CHECK BOT    00019480
000254 D420                        3111          ANDM  WORK1,EOT           CMD IS DSE--CHECK EOT           00019490
000255 2040                        3114          BOC   DBUS,GODOIT         BRANCH IF NOT EOT               00019500
000256 6259                        3117          BU    RSTSTATA            GO RESET STAT A EOT IS ON       00019510

000257 D410                        3121 CHKBOT   ANDM  WORK1,BOT           MASK TO CHECK BOT               00019530
000258 2040                        3124          BOC   DBUS,GODOIT         BRANCH IF NOT ON                00019540
000259 C8F6                        3127 RSTSTATA AND   STATIMG,ONES-SETSTATA-SETSTATD OT ON--RESET STATA    00019550
00025A 4828                        3130          XFR   STATIMG,STAT        RESET TO HDWE                   00019560
00025B 6246                        3133          BU    SKIPALU2            GO TO SKIP ALU2 AND HANDLE INTRPT00019570

00025C 2267                        3137 CHKERRS  BOC   ALUR,BIGPROB        WAS EXECUTION ERROR FREE?       00019590


                                   3140 ***************************** CONTROL CMD END ************************ 00019610
                                   3141 * DETERMINE CONTROL CMD ENDING STATUS---ALU2 IS FINISHED. IF CHANNEL  * 00019620
                                   3142 * END IS NOT PENDING AND NO OTHER STATUS IS TO BE PRESENTED, HAVE ALU2* 00019630
                                   3143 * ARM THE DEVICE END PRIME. OTHERWISE SET STATUS PENDING FLAG. CHECK  * 00019640
                                   3144 * FOR CATASTROPHIC ERROR IN ALU2 AND SET EQUIPMENT CHECK IF SO. GO TO * 00019650
                                   3145 * TERMSTAT ROUTINE TO PRESENT STATUS IF THERE IS ANY.                 * 00019660
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                    F01MAY72   9/04/73
                                   3146 ********************************************************************** 00019670



000025D 3A68                       3150 CONTEND  BOC   STATC,SIGUC          BRANCH IF ALU2 SIGNALLED UNIT CHECK  00019700
000025E 276E                       3153          BOC   DFLER,WRTPROB        BRANCH IF DATA FLOW HAD AN ERROR     00019710
000025F 2B6C                       3156 CONTEND1 BOC   STATB,SIGUX          BRANCH IF ALU2 SIGNALLED UNIT EXCP   00019720
000260 8504                        3159 CONTEND2 ORI   PNDSTS,DEVEND        SET DEVICE END IN STATUS             00019730
000261 F504                        3162 CONTEND3 XOM   PNDSTS,DEVEND        IS STATUS DEV END ALONE              00019740
000262 2072                        3165          BOC   DBUS,ONLYDE          BRANCH IF YES                        00019750
000263 2A72                        3168          BOC   STATA,ONLYDE         BRANCH IF UNCHAINED RWD OR DSE       00019760
000264 8904                        3171          ORI   FLAGS,STATPNDG       SET STATUS PENDING FLAG              00019770
000265 6291                        3174          BU    TERMSTAT             GO TO TERMINAL STATUS                00019780
000266 6609                        3177 DOWTM64  BU    BEGWRTTM                                                  00019790

000267 8710                        3181 BIGPROB  ORI   SNSSTS2,EQUIPCK      SET EQUIPMENT CHECK IN SENSE DATA    00019810
000268 8526                        3184 SIGUC    ORI   PNDSTS,DEVEND+UNITCHK+CUE SET DE,CUE,UC IN STATUS        00019820
000269 C8F7                        3187          AND   STATIMG,ONES-SETSTATA   RESET STAT IN REG                 00019830
00026A 4828                        3190          XFR   STATIMG,STAT             FOR LATER                      00019840
00026B 625F                        3193          BU    CONTEND1             GO BACK                              00019850

00026C 8525                        3197 SIGUX    ORI   PNDSTS,DEVEND+UNITEXC+CUE SET DE,CUE,UX IN STATUS        00019870
00026D 6260                        3200          BU    CONTEND2             GO BACK                              00019880

00026E 8708                        3204 WRTPROB  ORI   SNSSTS2,DATACK       SET DAT CHECK IN SENSE               00019900
00026F 6268                        3207          BU    SIGUC                 GO SET NIT CHECK                    00019910

000270 C508                        3211 NOTNOW   AND   PNDSTS,CHANEND       CLEAR PENDING STATUS REG             00019930
000271 6296                        3214          BU    TERMSTA2             GO TO TERMINAL STATUS                00019940

000272 140A                        3218 ONLYDE   STO   XOUTBIM,NDXSDE       RT EMIT ALU2 BRANCH ADDRESS      *** 00019960
000273 5441                        3221          XFR   XOUTBIM,XOUTB        TRAP ALU2 TO SET DE PRIME            00019970
000274 C8FC                        3224          AND   STATIMG,ONES-SETSTATC-SETSTATD RESET STATS C AND D       00019980
000275 4828                        3227          XFR   STATIMG,STAT         SET TO HDWE                          00019990
000276 3B8F                        3230 DEDUN    BOC   STATD,CKDEER         BRANCH IF DONE                       00020000
000277 3A8F                        3233          BOC   STATC,CKDEER         BRANCH IF ALU2 HAS PRIMED            00020010
000278 6276                        3236          BU    DEDUN                GO BACK IF NOT DONE                  00020020

                                   3239 ********************************************************************** 00020040
                                   3240 *CLEANIT  ROUTINE HANDLES THE PRESENTATION OF INITIAL STATUS FOR ALL  * 00020050
                                   3241 *ACCEPTED NON IMMEDIATE COMMANDS EXCEPT SENSE.                        * 00020060
                                   3242 ********************************************************************** 00020070


000279 0500                        3245 CLEANIT  STO   PNDSTS,ZERO          EMIT CLEAN STATUS                    00020090
00027A 105F                        3248          STO   LINK1,SRETURN6       EMIT ACCEPT RETURN                   00020100
00027B 116A                        3251          STO   LINK2,WATESUM        EMIT STACK RETURN                    00020110
00027C 604A                        3254          BU    GODODIA0             GO SET DIAGNOSTIC FLAGS              00020120

                                   3257 *                                                                    00020140
                                   3258 ***************************** WRITE ROUTINE ***************************** 00020150
                                   3259 ********************************************************************** 00020160
                                   3260 * WRITINIT FETCHES THE FIRST BYTE OF WRITE DATA, CHECKS FOR WORD COUNT* 00020170
```

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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                        F01MAY72   9/04/73
                                   3261 * ZERO AND TRAPS ALU2 TO EXECUTE THE WRITE OP. IN ADDITION, A RIPPLE  * 00020180
                                   3262 * PATTERN IS GENERATED FOR OFF LINE MODE. THE PATTERN IS UPDATED AT   * 00020190
                                   3263 * EACH SERVICE OUT AND XFERRED TO CHAN BUS IN REG. IN OFF LINE MODE   * 00020200
                                   3264 * THE CHAN BUS IN REG IS WRAPPED AROUND TO CHAN BUS OUT TO PROVIDE     * 00020210
                                   3265 * RIPPLE WRITE DATA. REQ TIE AND SET DIAGNOSE COMMANDS WILL ALSO USE  * 00020220
                                   3266 * THIS ROUTINE TO FETCH THE FIRST BYTE OF DATA.                       * 00020230
                                   3267 ************************************************************************ 00020240

00027D 6172                        3270 BRETURN1 BU    DOTIEMS1            RETURN TO TIE MODE SET ROUTINE       00020260

00027E 63DD                        3274 WC0STOP  BU    SETUNTCK            GE SET DATA CHECK DEV NOT STARTED    00020280

00027F 050E                        3278 WC0HIO   STO   PNDSTS,CHANEND+DEVEND+UNITCHK SET DE,CE,AND UC IN STATUS 00020300
000280 8904                        3281         ORI   FLAGS,STATPNDG      SET STATUS PENDING FLAG              00020310
000281 6344                        3284         BU    HIONOP              GO TO HIO NOT OPERATING              00020320

000282 C7FD                        3288 WRTFST   AND   SNSSTS2,ONES-WDCNT0 RESET WORD COUNT ZERO IN SENSE      00020340
000283 D0C8                        3291         ANDM  CURCOMM,X'C8'       MASK FOR MODE SET TYPE CMD           00020350
000284 3086                        3294         BOC   DREG0,BUMPRIP       BRANCH IF LWR CMD                    00020360
000285 347D                        3297         BOC   DREG4,BRETURN1      BRANCH IF SO                         00020370

000286 2488                        3301 BUMPRIP  BOC   BOPE,SETFLAG                                           00020390
000287 660C                        3304         BU    BEGWRITE                                             00020400
000288 8720                        3307 SETFLAG  ORI   SNSSTS2,BUSOC       SET BUS OUT CHK                      00020410
000289 660C                        3310         BU    BEGWRITE                                             00020420

00028A 634D                        3314 WRTHIO   BU    HIOPERG                 GO TO HIO OPERATING ROUTINE  00020440


00028B C8B7                        3319 CANCEL   AND   STATIMG,ONES-SENSE-SETSTATA   RESET SENSE STATS       00020470
00028C 8880                        3322 SETSTOP  ORI   STATIMG,STOP        SET STOP IN STAT IMAGE REG           00020480
00028D 4828                        3325 SETSTOP1 XFR   STATIMG,STAT        XFR IMAGE REG TO HDWE STAT REG       00020490
00028E 63B8                        3328         BU    BSTWAIT             GO WAIT FOR ALU2 COMPLETION          00020500

00028F 2268                        3332 CKDEER   BOC   ALUR,SIGUC          BRANCH IF ALU ERROR                  00020520
000290 2A70                        3335         BOC   STATA,NOTNOW        BRANCH IF REWIND OR DSE              00020530
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   9/04/73
                                   3338 ***************************** TERMINAL STATUS ********************** 00020550
                                   3339 * TERMINAL STATUS IS USED BY ALL FUNCTIONAL COMMANDS TO PRESENT       * 00020560
                                   3340 * ENDING STATUS.  THE CALLING ROUTINE, UP ON ENTRY, MUST HAVE SET THE * 00020570
                                   3341 * PENDING DEVICE ADDRESS REG AND THE PENDING STATUS REG.  TERM STAT   * 00020580
                                   3342 * WILL DETERMINE IF CONTROL UNIT END MUST BE ADDED TO THE STATUS AND  * 00020590
                                   3343 * THEN WILL PRESENT THE STATUS IN THE APPROPRIATE MANNER. IF THE CHAN-* 00020600
                                   3344 * NEL REMAINED CONNECTED STATUS IN WILL BE RAISED IMMEDIATELY. IF NOT * 00020610
                                   3345 * AN INTERRUPT CYCLE WILL BE INITIATED WITH THE APPROPRIATE REQUEST-  * 00020620
                                   3346 * IN DEPENDING ON CHAINING. CONTROL UNIT BUSY WILL BE RESET IF APPLI- * 00020630
                                   3347 * CABLE AND HOLD INTERFACE WILL BE SET IF STATUS PENDING OR STACK FLAG* 00020640
                                   3348 * IS SET. IF PENDING STATUS IS CLEAN (RWD OR DSE) STATUS WILL NOT BE  * 00020650
                                   3349 * PRESENTED. THE CHECKING FOR CUE PORTION IS ALSO USED BY IDLESCAN    * 00020660
                                   3350 * ROUTINE UNDER THE CONTROL OF STATA. A GENERAL RESET WILL BE TERM-   * 00020670
                                   3351 * INATED BY THIS ROUTINE VIA IDLESCAN.                               * 00020680
                                   3352 ********************************************************************** 00020690

000291 38A0                        3355 TERMSTAT BOC   OPRIN,TERMSTA1      IS OP-IN UP                          00020710

000292 2334                        3359 BHERE    BOC   MIFTR,CHKCONT       BRANCH IF MIS AVAILABLE          *** 00020730

000293 D986                        3363 TERMSTA0 ANDM  FLAGS,STATPNDG+STACK+CONCON NEED TO HOLD INTF             00020750
000294 2096                        3366          BOC   DBUS,TERMSTA2       NO, SKIP TO RESET CUB                00020760
000295 8120                        3369          ORI   CTIMAGE,HOLDINT     RAISE HOLD INTERFACE                 00020770

000296                             3372 TERMSTA2 EQU   *                                                        00020790
000296 C8F5                        3374          AND   STATIMG,ONES-SETSTATA-SETSTATC    (DSE OR RWD SWITCH)  00020800
000297 4828                        3377          XFR   STATIMG,STAT        SET STATS TO HDWE                    00020810
000298 C1EF                        3380          AND   CTIMAGE,ONES-CUBUSY RESET CONTROL UNIT BUSY              00020820
000299 4150                        3383          XFR   CTIMAGE,CTI         XFR CHANNEL TAG IMAGE TO HDWE        00020830

00029A 2329                        3387 TERMSTA3 BOC   MIFTR,MIFTR05       BRANCH IF MIS AVAILABLE          *** 00020850
                                   3389 * GO TO MAP 13-200                                                     00020860
00029B 25A6                        3391 ANYCUEA  BOC   NCUEA,CHKAFLG       BRANCH IF NOT CUE ON A               00020870
                                   3393 * GO TO MAP 13-200                                                     00020880
00029C 8520                        3395          ORI   PNDSTS,CUE          SET CONTROL UNIT END IN STATUS       00020890
                                   3397 * GO TO MAP 13-200                                                     00020900
00029D 8940                        3399          ORI   FLAGS,CUEA          SET CONTROL UNIT END IN FLAGS        00020910
                                   3401 * GO TO MAP 13-200                                                     00020920
00029E 4009                        3403          XFR   CUREA               ATTEMPT TO RESET CUEA                00020930
                                   3405 * GO TO MAP 13-200                                                     00020940
00029F 629B                        3407          BU    ANYCUEA             GO CHECK RESET                       00020950

0002A0 8101                        3411 TERMSTA1 ORI   CTIMAGE,OPIN        RAISE MICROPGM OP IN                 00020970
0002A1 28A4                        3414          BOC   ADROUT,HADHIO       BRANCH IF HIO                        00020980
0002A2 4150                        3417          XFR   CTIMAGE,CTI         SET TO HARDWARE                      00020990
0002A3 3892                        3420          BOC   OPRIN,BHERE         OP IN STILL UP?                      00021000
0002A4 C1FE                        3423 HADHIO   AND   CTIMAGE,ONES-OPIN   RESET UPGM OP IN                     00021010
0002A5 6292                        3426          BU    BHERE               NO, CHANNEL DISCONNECTED             00021020

0002A6 4009                        3430 CHKAFLG  XFR   CUREA               RESET GEN RESET LATCH IF ON          00021040
0002A7 D940                        3433          ANDM  FLAGS,CUEA          MASK FOR CUE A FLAG                  00021050
0002A8 20AA                        3436          BOC   DBUS,CHKCHAIN       BRANCH IF OFF                        00021060
0002A9 8520                        3439 CUEPNDG  ORI   PNDSTS,CUE          SET CUE IN STATUS                    00021070
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0002AA 9500                    3443 CHKCHAIN ORM   PNDSTS,0           STATUS IS CLEAN IF RWD OR DSE          00021090
0002AB 20B2                    3446          BOC   DBUS,CHEKTIO        BRANCH IF SO TO PREVENT INTERRUPT      00021100
0002AC 38BB                    3449 TERMSTA4 BOC   OPRIN,STSIMME      BRANCH IF CHANNEL STILL CONNECTED      00021110
0002AD D901                    3452          ANDM  FLAGS,CHAIN        MASK TO TEST CHAINING                  00021120
0002AE 20B5                    3455          BOC   DBUS,NOTCHAIN      BRANCH IF CHAIN BIT OFF                00021130
0002AF 233B                    3458          BOC   MIFTR,MIFTR06      BRANCH IF MIS AVAILABE           $$$   00021140
0002B0 8A04                    3461 SETREQA  ORI   REQTAGS,REQINA     RAISE NON SUPPRESSIBLE REQ-IN A        00021150
0002B1 62B9                    3464          BU    GOTOIDLE           GO WAIT FOR POLL                       00021160

0002B2 9000                    3468 CHEKTIO  ORM   CURCOMM,0          MASK FOR TIO CMD                       00021180
0002B3 20AC                    3471          BOC   DBUS,TERMSTA4      BRANCH IF IT IS                        00021190
0002B4 6304                    3474          BU    IDLESCAN           OTHERWISE GO LOOK FOR STATUS           00021200

0002B5 DD20                    3478 NOTCHAIN ANDM  SETDIA2,BLKINTS    MASK FOR DIAGNOSTIC BLOCK INTERRUPT    00021220
0002B6 32BA                    3481          BOC   DREG2,GODOIDLE     BRANCH IF ON TO BYPASS REQUEST-IN      00021230
0002B7 233F                    3484          BOC   MIFTR,MIFTR07      BRANCH IF MIS AVAILABLE          ***   00021240
0002B8 8A08                    3487 DOREQA   ORI   REQTAGS,SUPREQA    RAISE SUPPRESSIBLE REQUEST IN A        00021250
0002B9 4A48                    3490 GOTOIDLE XFR   REQTAGS,MIST       RAISE REQ-IN TO HARDWARE               00021260
0002BA 6302                    3493 GODOIDLE BU    IDLEPEND           WAIT FOR POLL                          00021270

0002BB 105A                    3497 STSIMME  STO   LINK1,SRETURN0     LOAD STS SUBRTN ACCEPT RETURN          00021290
0002BC 115B                    3500          STO   LINK2,SRETURN1     LOAD STS SUBRTN STACK RETURN           00021300
0002BD 125B                    3503          STO   LINK3,SRETURN1     LOAD STS SUBRTN HALT RETURN            00021310
0002BE 6060                    3506          BU    STATRTN            GO TO STATUS SUBROUTINE                00021320

                               3509 ************************************************************************ 00021340
                               3510 * TERMSTAK IS ENTERED WHEN ENDING STATUS IN RECEIVES A COMMAND OUT    * 00021350
                               3511 * RESPONSE (STACK). INBOUND TAGS WILL BE RESET,BUSY WILL BE REMOVED.  * 00021360
                               3512 * FROM THE STATUS (IF APPLICABLE), THE OPPOSITE INTERFACE WILL BE     * 00021370
                               3513 * RELEASED FROM PING HOLD (IF APPLICABLE), AND A NORMAL ENDUP EXIT    * 00021380
                               3514 ************************************************************************ 00021390
0002BF 8120                    3516 TERMSTAK ORI   CTIMAGE,HOLDINT    RAISE HOLD INTERFACE                   00021400
0002C0 4044                    3519          XFR   PING               RELEASE THE OTHER INTERFACE            00021410

0002C1 C1FC                    3523 TERMSTK1 AND   CTIMAGE,ONES-OPIN-ADDIN  RESET OPIN AND ADRESS IN        00021430
0002C2 C5EF                    3526          AND   PNDSTS,ONES-BUSY   RESET BUSY BIT IN STATUS               00021440
0002C3 C400                    3529 GETOFF   AND   WORK1,ZERO         CLEAR WORK1                            00021450
0002C4 62DE                    3532          BU    CLEANUP            GO TO RAISE REQ-IN                     00021460

                               3535 ************************************************************************ 00021480
                               3536 * TERMACC IS ENTERED WHEN ENDING STATUS IN RECEIVES A SERVICE OUT     * 00021490
                               3537 * RESPONSE (STATUS ACCEPTED). IF CHAINING OR CONTINGENT CONNECTION IS * 00021500
                               3538 * INDICATED, THE DEVICE WILL REMAIN COMMITTED. STAT D WILL BE SET TO  * 00021510
                               3539 * NOTIFY ALU2 TO CLEAR A DEVICE END PRIME IF APPLICABLE. THE HOLD     * 00021520
                               3540 * INTERFACE LINE WILL BE RAISED IF THE RESERVE FLAG,CHAIN FLAG,OR     * 00021530
                               3541 * CONTINGENT CONNECTION FLAG IS ON. INBOUND TAGS WILL BE RESET AND    * 00021540
                               3542 * CHAN BUS IN WILL BE CLEARED. IF NOT CHAINING EXIT WILL BE TO IDLE   * 00021550
                               3543 * TO SCAN FOR STATUS. IF CHAINING, A LOOP HANGING ON SUPPRESS OUT WILL* 00021560
                               3544 * BE EFFECTED. IF CHANNEL CALLS CHAIN OFF SUPPRESS OUT WILL DROP      * 00021570
                               3545 ************************************************************************ 00021580

0002C5 C1FE                    3548 TERMACC  AND   CTIMAGE,ONES-OPIN  RESET OP IN                            00021600
0002C6 0400                    3551          STO   WORK1,0            CLEAR A WORK REG                       00021610
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                    F01MAY72  9/04/73
0002C7 D981                       3554           ANDM  FLAGS,CHAIN+CONCON  MASK TO CHECK CHAIN AND CONT CONN  00021620
0002C8 20CA                       3557           BOC   DBUS,CKRESRV        BRANCH IF BOTH OFF                00021630
0002C9 62CC                       3560           BU    DROPTAGS            OTHERWISE GET OUT                 00021640

0002CA 2343                       3564 CKRESRV   BOC   MIFTR,MIFTR08       BRANCH IF MIS AVAILABLE      *** 00021660

0002CB C1DF                       3568 RSTHLDIN  AND   CTIMAGE,ONES-HOLDINT  RESET HOLD INTERFACE            00021680

0002CC D504                       3572 DROPTAGS  ANDM  PNDSTS,DEVEND        MASK FOR DEVICE END               00021700
0002CD 20E2                       3575           BOC   DBUS,MOVEON         BRANCH IF NOT                     00021710
0002CE 8801                       3578           ORI   STATIMG,SETSTATD     NOTIFY ALU2 TO CLEAR DEP          00021720
0002CF 4828                       3581           XFR   STATIMG,STAT        XFR STATIMG TO HDWE STAT REG      00021730

0002D0 3BE2                       3585 RSTNTDUN  BOC   STATD,MOVEON        ALU2 DONE                         00021750
0002D1 62D0                       3588           BU    RSTNTDUN            NO, GO BACK                       00021760

0002D2 9500                       3592 DODES     ORM   PNDSTS,0             MASK FOR CLEAN STATUS            00021780
0002D3 20D7                       3595           BOC   DBUS,DODES1         BRANCH IF SO TO DESELECT          00021790
0002D4 36DE                       3598           BOC   DREG6,CLEANUP                                         00021800
0002D5 D5C7                       3601           ANDM  PNDSTS,ONES-CUE-CUBUSY-CHANEND MASK FOR DES STASTS  00021810
0002D6 20DB                       3604           BOC   DBUS,ALLCLEAR       BRANCH IF NONE                    00021820
0002D7 1406                       3607 DODES1    STO   XOUTBIM,NDXDES      RT FETCH ALU2'S DESELECT DEVICE RTN 00021830
0002D8 5441                       3610           XFR   XOUTBIM,XOUTB       TRAP ALU2 TO RESET DEV COMMITTED LCH 00021840

0002D9 3BDB                       3614 DOITAGN   BOC   STATD,ALLCLEAR      BRANCH IF ALU2 COMPLETED          00021860
0002DA 62D9                       3617 RSTCMTD   BU    DOITAGN             GO BACK IF NOT                    00021870

0002DB 22DE                       3621 ALLCLEAR  BOC   ALUR,CLEANUP        TRAP HERE IF ALU2 HDWE ERROR      00021890
0002DC C400                       3624           AND   WORK1,ZERO          CLEAR A WORK REG                  00021900
0002DD 4424                       3627           XFR   WORK1,TUADR         RESET DEV ADDRESS REG             00021910
0002DE 4460                       3630 CLEANUP   XFR   WORK1,CBI           CLEAR BUS IN                      00021920
0002DF 4150                       3633           XFR   CTIMAGE,CTI         RESET CHANNEL TAGS                00021930
                                  3635 * GO TO MAP 13-210                                                    00021940
0002E0 38E0                       3637 OPINDROP  BOC   OPRIN,OPINDROP      WAIT FOR OP IN TO FALL            00021950
0002E1 6304                       3640           BU    IDLESCAN            GO TO IDLESCAN TO LOOK FOR INTS   00021960

0002E2 22E5                       3644 MOVEON    BOC   ALUR,CLRBUSIN       ALU2 ERROR TRAP HERE              00021980
0002E3 D981                       3647           ANDM  FLAGS,CHAIN+CONCON  MASK TO CHECK CHAIN AND CONT CONN  00021990
0002E4 20D2                       3650           BOC   DBUS,DODES         DESELECT DEVICE IF BOTH OFF       00022000
0002E5 D901                       3653 CLRBUSIN  ANDM  FLAGS,CHAIN         MASK FOR CHAIN                    00022010
0002E6 20DE                       3656           BOC   DBUS,CLEANUP       BRANCH IF NOT (CONT CONN)         00022020
0002E7 4460                       3659           XFR   WORK1,CBI           CLEAR CHAN BUS IN                 00022030
0002E8 DD10                       3662           ANDM  SETDIA2,CUBUSY      MASK FOR DIAGNOSTIC CU BUSY FLAG  00022040
0002E9 20EC                       3665           BOC   DBUS,RLSCHANN       BRANCH IF OFF TO LEAVE CU NOT BUSY 00022050
0002EA 8110                       3668           ORI   CTIMAGE,CUBUSY      SET CU BUSY                       00022060
0002EB CDEF                       3671           AND   SETDIA2,ONES-CUBUSY RESET THE FLAG                    00022070
0002EC 4150                       3674 RLSCHANN  XFR   CTIMAGE,CTI         DROP OP IN                        00022080
0002ED 39ED                       3677 YESCHAIN  BOC   SUPO,YESCHAIN       WAIT HERE UNTIL TRAPPED FOR       00022090
                                  3679 *                                   ANOTHER SELECTION OR RESET CHAIN  00022100
                                  3680 *                                   IF SUPPRESS OUT DROPS             00022110
0002EE C1DF                       3682           AND   CTIMAGE,ONES-HOLDINT                                  00022120
0002EF C9FE                       3685           AND   FLAGS,ONES-CHAIN    RESET CHAIN BIT WE FELL THRU      00022130
0002F0 CAEF                       3688           AND   FLAGS1,ONES-ALLOWDSE                                  00022140
0002F1 4005                       3691           XFR   RSTCOMTD            RESET DEV COMMITEED LATCH IN SWITCH 00022150
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                    F01MAY72   9/04/73
0002F2 62D7                       3694          BU    DODES1      GO TO SCAN FOR STATUS OR SOMETHING   00022160
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                   F01MAY72   9/04/73
000300                           3699          ORG   BEGIN+X'300'                                        00022200
                                 3700 ***************************** IDLESCAN ******************************* 00022210
                                 3701 * IDLESCAN SERVES PRIMARILY THREE FUNCTIONS:                        * 00022220
                                 3702 *       1.SCAN FOR CONTROL UNIT ENDS ON BOTH A AND B INTERFACES    * 00022230
                                 3703 *       2.SCAN FOR DEVICE ENDS OWED DUE TO DE PRIME BITS BEING SET * 00022240
                                 3704 *       3.MAINTAIN INTERFACE ENABLE/DISABLE SWITCHES               * 00022250
                                 3705 *                                                                  * 00022260
                                 3706 * THE PRIOR SEQUENCE DEPICTS THE ACTUAL SCANNING SEQUENCE. THE CONTROL* 00022270
                                 3707 * UNIT END LATCH FOR THE LAST SELECTING CHANNEL WILL BE SCANNED FIRST * 00022280
                                 3708 * AND THE DEVICE ENDS DUE TO DE PRIMES WILL BE PRESENTED TO INTERFACE * 00022290
                                 3709 * A FIRST.                          IN ALL THE CASES PREV-   * 00022300
                                 3710 * IOUSLY MENTIONED, A CONTROL UNIT RESERVED WILL RESULT IN ONLY THE  * 00022310
                                 3711 * RESERVING INTERFACE BEING INTERRUPTED FOR THE DURATION OF THE RESERV* 00022320
                                 3712 * ALL STATUS WILL BE HELD FOR THE OPPOSITE INTERFACE AND WILL BE PRES-* 00022330
                                 3713 * ENTED UPON THE CONTROLLERS RELEASE.                               * 00022340
                                 3714 *   WHEN A DEVICE END HAS BEEN FOUND BY ALU2, ALU1 WILL REQUEST TO  * 00022350
                                 3715 * PRESENT STATUS TO THE PROPER INTERFACE. IN THE MEANTIME,ALU2 WILL BE* 00022360
                                 3716 * SPINNING ON ALU1'S STAT D WHICH INDICATES ALU2 IS TO RELEASE THE   * 00022370
                                 3717 * DEV END PRIME. STAT D WILL BE SET BY ALU1 ONLY WHEN THE CHANNEL    * 00022380
                                 3718 * HAS ACCEPTED THE STATUS. SHOULD ALU1 RECEIVE A NON-POLLING INITIAL * 00022390
                                 3719 * SELECTION DURING THE INTERIM, ALU2 WILL BE TRAPPED TO LOCATION 0 AND* 00022400
                                 3720 * THE INTERRUPTING DE PRIME WILL NOT BE RESET.                       * 00022410
                                 3721 *   AFTER A COMPLETE SCAN HAS BEEN EXECUTED AND NO INTERRUPTABLE STS * 00022420
                                 3722 * FOUND, AN ALU CHECKOUT ROUTINE WILL BE ENTERED. UPON COMPLETION OF * 00022430
                                 3723 * THE ALU CHECKOUT IDLESCAN WILL BE RE-INVOKED. ANY ERROR IN THE ALU * 00022440
                                 3724 * CHECKOUT WILL RESULT IN A MICROCODE FORCED ALU ERROR TRAP          * 00022450
                                 3725 *  BOTH INTERFACE CHAIN HOLD LINES WILL ALSO BE MAINTAINED IN IDLE.  * 00022460
                                 3726 *  IF ANY STATUS IS FOUND(OUTSTANDING OK COMPLETED) THE CHAIN HOLD   * 00022470
                                 3727 *  LINE FOR THE RESPECTIVE INTERFACE WILL REMAIN ON. THE CHAIN HOLD  * 00022480
                                 3728 *  LINES BLOCK DISABLING AN INTERFACE IF THE CONTROLLER IS HOLDING ANY* 00022490
                                 3729 *  STATUS FOR THAT INTERFACE.                                       * 00022500
                                 3730 ************************************************************************ 00022510

000300 4011                      3733 TROUBLE  XFR   HDWERR              FORCE A HARD ERROR                  00022530
                                 3735 * GO TO MAP 13-240                                                     00022540
000301 6301                      3737 HANGHERE BU    HANGHERE            WAIT FOR SIO TIO OR SUMPIN          00022550
                                 3739 * GO TO MAP 13-220                                                     00022560
000302 6302                      3741 IDLEPEND BU    IDLEPEND            WAIT FOR SOMETHING TO HAPPEN        00022570
000303 62B8                      3744 DRETURN0 BU    DOREQA              GO DEVICE RESERVED TO A             00022580

000304                           3747 IDLESCAN EQU   *                                                 3 00022600
000304 C1EF                      3749 CHKOPIN  AND   CTIMAGE,ONES-CUBUSY RESET CONTROL UNIT BUSY           3 00022610
                                 3751 * GO TO MAP 13-250                                                     00022620
000305 3805                      3753 OPINUP   BOC   OPRIN,OPINUP        WAIT FOR OP IN FALL               3 00022630
000306 4150                      3756 IDLE     XFR   CTIMAGE,CTI         XFR TO HARDWARE                   3 00022640
000307 D906                      3759          ANDM  FLAGS,STACK+STATPNDG MASK FOR STACKED AND STS PNDNG      00022650
000308 200A                      3762          BOC   DBUS,IDLE0          BRANCH IF NOT                       00022660
000309 62B5                      3765          BU    NOTCHAIN            GO RAISE REQ-IN                     00022670

00030A 1E01                      3769 IDLE0    STO   FRUSAV,1            BUMP FRU REG                        00022690
00030B 2399                      3772          BOC   MIFTR,MIFTR17       BRANCH IF MIS                     1 00022700
00030C F506                      3775 IDLE1    XOM   PNDSTS,UNITCHK+DEVEND MASK FOR DEP STATUS              1 00022710
00030D 2010                      3778          BOC   DBUS,SETSPIN         BRANCH IF IT IS                     00022720
00030E 8500                      3781          ORI   PNDSTS,0             MASK LAST STATUS PRESENTED          00022730
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   9/04/73
00030F 3601                      3784          BOC   DREG6,HANGHERE      BRANCH IF UNIT CHECK IS ON          00022740

000310 2200                      3788 SETSPIN  BOC   ALUR,TROUBLE        BRANCH IF ALU2 HAD AN ERR        1  00022760

000311 140B                      3792          STO   XOUTBIM,NDXABRT     BRT SET ALU2 TO INIT             1  00022780
000312 5441                      3795 SETSPIN1 XFR   XOUTBIM,XOUTB           TRAP ALU2                        00022790

                                 3798 * GO TO MAP 13-260                                                     00022810
000313 3B15                      3800 SETSPIN2 BOC   STATD,CLRSTS        WAIT UNTIL                           00022820
                                 3802 * GO TO MAP 13-260                                                     00022830
000314 6313                      3804          BU    SETSPIN2              ALU2 FINISHES                    00022840

000315 0500                      3808 CLRSTS   STO   PNDSTS,ZERO         CLEAR PENDING STATUS REG             00022860
000316 003F                      3811          STO   CURCOMM,ONES-192     INSURE LST CMD IS NOT TIO FOR CUE    00022870
                                 3813 *                                  SEARCH IN TERMSTAT                   00022880
000317 2346                      3815          BOC   MIFTR,MIFTR09       BRANCH IF MIS AVAILABLE       ***    00022890

000318 2A1C                      3819 ITSRSVD  BOC   STATA,RSTRESET      GO LOOK FOR DEP IF STAT A        1  00022910
000319 8808                      3822          ORI   STATIMG,SETSTATA     SET 1ST SWITCH ON                   00022920
00031A 4828                      3825          XFR   STATIMG,STAT        SET TO HARDWARE                     00022930
00031B 629A                      3828          BU    TERMSTA3            GO CHECK FOR CUE ON RESERVED INTF   00022940


00031C C9F7                      3833 RSTRESET AND   FLAGS,ONES-RESETOK   RESET THE  ALL RESET FLAG        1  00022970
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 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                   F01MAY72   9/04/73
                                  3836 ************************************************************************ 00022990
                                  3837 * DEPRIMES WILL SEARCH ALL DEVICES FOR ANY OUTSTANDING PRIMES AND     * 00023000
                                  3838 * CHECK THE DEVICE TO SEE IF IT IS STILL BUSY. WHEN A DEVICE IS FOUND * 00023010
                                  3839 * NOT BUSY,A CHECK WILL BE MADE TO SEE IF IT IS READY. IF READY,THE   * 00023020
                                  3840 * CONTROLLER WILL RAISE REQ-IN TO THE APPROPRIATE PATH AND WAIT FOR   * 00023030
                                  3841 * SELECTION TO PRESENT DEVICE END ALONE. IF NOT READY, DEVICE END,    * 00023040
                                  3842 * UNIT CHECK WILL BE PRESENTED.                                       * 00023050
                                  3843 *  DEVICE END PRIMES ARE SET ON ANY CONTROL CMD THAT COMPLETES WITHOUT* 00023060
                                  3844 * EXCEPTIONAL STATUS, A TIO TO A BUSY DEVICE(DUE TO SWITCHED), AND    * 00023070
                                  3845 * REWIND AND DATA SECURITY ERASE COMMANDS AT CHANNEL END TIME.         * 00023080
                                  3846 *  ON INITIAL KICKOFF ALU2'S STATS ACTIVE HAVE THE FOLLOWING MEANING: * 00023090
                                  3847 *              ALU2 STAT B = ALU2 FOUND A DEVICE END PRIME           * 00023100
                                  3848 *                            FOR THE DESIRED INTERFACE(A OR B)       * 00023110
                                  3849 *              ALU2 STAT D = ALU2 DID NOT FIND ANY DEP'S FOR THE     * 00023120
                                  3850 *                            DESIRE INTERFACE.                       * 00023130
                                  3851 *                                                                    * 00023140
                                  3852 *  IF ALU2 FOUND A PRIME,THEN THE STATS WILL MEAN:                   * 00023150
                                  3853 *              ALU1 STAT C = ALU1 HAS SET THE DEVICE ADDRESS PROVIDED* 00023160
                                  3854 *                            BY ALU2 IN THE TU ADDRESS REG ALONG WITH* 00023170
                                  3855 *                            SWITCH SELECT.                          * 00023180
                                  3856 *              ALU2 STAT B = ALU2 FOUND DEVICE WAS STILL BUSY BUT HAS* 00023190
                                  3857 *                            ANOTHER DEP FOR ANOTHER DEVICE          * 00023200
                                  3858 *              ALU2 STAT C = ALU2 FOUND DEVICE WAS NOT BUSY BUT READY* 00023210
                                  3859 *                            WAS DROPPED.                            * 00023220
                                  3860 *              ALU2 STAT B AND STAT C = ALU2 FOUND DEVICE NOT BUSY   * 00023230
                                  3861 *                                       AND READY                    * 00023240
                                  3862 *              ALU2 STAT D = ALU2 HAS NO MORE DEP'S TO CHECK         * 00023250
                                  3863 *                                                                    * 00023260
                                  3864 *              ALU2 STAT B AND STAT D = ALU2 FOUND LAST DEVICE BUSY  * 00023270
                                  3865 *                                       AND NO MORE DEP'S            * 00023280
                                  3866 *                                                                    * 00023290
                                  3867 * IF CONTROLLER IS RESERVED ONLY THE DEP'S FOR THE RESERVED INTERFACE * 00023300
                                  3868 * WILL BE SCANNED.                                                    * 00023310
                                  3869 ************************************************************************ 00023320
00031D 0800                       3871 DEPRIMES STO   STATIMG,ZERO       CLEAR ALL STATS                      00023330
00031E 0504                       3874          STO   PNDSTS,DEVEND      SET DEV END IN PNDING STATUS REG     00023340
00031F 1E02                       3877          STO   FRUSAV,2           BUMP FRU REG                         00023350
000320 2359                       3880          BOC   MIFTR,MIFTR0C      BRANCH IF MIS AVAILABLE          *** 00023360

000321 C9DF                       3884 DEPRIM1  AND   FLAGS,ONES-INTFB   RESET INTF B FLAG                    00023380

000322 4828                       3888 DEPRIM2  XFR   STATIMG,STAT       XFR STATS TO HDWE                    00023400
000323 1407                       3891          STO   XOUTBIM,NDXPOLL    BRT  EMIT ALU2 BRANCH ADDRESS ***    00023410
000324 5441                       3894          XFR   XOUTBIM,XOUTB      TRAP ALU2                            00023420

000325 2B28                       3898 DEPRIM3  BOC   STATB,DEPRIM4      BRANCH IF ALU2 FOUND DEP             00023440
000326 3B3A                       3901          BOC   STATD,DEPRIM7      BR ON STATD                          00023450
000327 6325                       3904          BU    DEPRIM3            GO BACK AND LOOK SOME MORE           00023460

000328 4828                       3908 DEPRIM4  XFR   STATIMG,STAT        SET STATS TO HDWE                  00023480
000329 3B3A                       3911          BOC   STATD,DEPRIM7      BRANCH IF DONE AND BSY DEV           00023490

00032A 3A38                       3915          BOC   STATC,DEPRIMA      BRANCH IF ALU2 FOUND DEV NOT BUSY    00023510
00032B 4688                       3918          XFR   PNDADDR,XINB       FETCH DEP ADDRESS FROM ALU2          00023520
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  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                    F01MAY72   9/04/73
00032C 4624                       3921          XFR   PNDADDR,TUADR       SWITCH SELECT THE DEVICE          00023530
00032D 8802                       3924          ORI   STATIMG,SETSTATC    SET STEP ALU2 STAT                00023540
00032E 4828                       3927          XFR   STATIMG,STAT        XFR IMAGE TO HDWE                 00023550
00032F C8FD                       3930          AND   STATIMG,ONES-SETSTATC RESET STAT C                      00023560
000330 6334                       3933          BU    INSDELAY             BRANCH TO INSERT DELAY             00023570

000331 3A35                       3937 DEPRIM5  BOC   STATC,DEPRIM6       BRANCH IF ALU2 FOUND DEV NOT BSY  00023590
000332 2B28                       3940          BOC   STATB,DEPRIM4       BRANCH IF ALU2 FOUND DEV BUSY     00023600
000333 3B3A                       3943          BOC   STATD,DEPRIM7       BRANCH IF ALU2 HAD NO MORE DEP'S  00023610
000334 6331                       3946 INSDELAY BU    DEPRIM5            GO BACK AND LOOK FOR ONE OF THE ABOV 00023620

000335 4828                       3950 DEPRIM6  XFR   STATIMG,STAT       SET STATS TO HDWE                 00023640
000336 2B38                       3953          BOC   STATB,DEPRIMA       BRANCH IF ALU2 FOUND DEV NOT BUSY 00023650
000337 8502                       3956          ORI   PNDSTS,UNITCHK      SET UNIT CHECK IN STATUS          00023660
000338                            3958 DEPRIMA  EQU   *                                                     00023670
000338 23AA                       3960 CHKONA   BOC   MIFTR,MIFTR18       BRANCH IF MIS AVAILABLE         3 00023680
000339 62B5                       3963          BU    NOTCHAIN           GO RAISE REQ-IN                 3 00023690

00033A 2200                       3967 DEPRIM7  BOC   ALUR,TROUBLE       BRANCH IF ALU2 ERROR              00023710
00033B 2B41                       3970          BOC   STATB,DOHOLDS      BRANCH IF A DEV BSY TO SET HOLD   00023720
00033C 2361                       3973 BMASKED  BOC   MIFTR,MIFTR0D      BRANCH IF MIS AVAILABLE       *** 00023730
00033D 4021                       3976 SETHOLDS XFR   CURCOMM,AR          MOVE CHAIN HOLD MASK TO ALU REG   00023740
00033E C100                       3979          AND   CTIMAGE,0          AND OUT CHAIN HOLD BITS           00023750
00033F 4150                       3982          XFR   CTIMAGE,CTI        SET NEW CHAIN HOLD STATUS TO HDWE 00023760
000340                            3984 STEP0091 EQU   *                                                     00023770
000340 6513                       3986 RUNALU   BU    ALUCHECK           GO DO ALU CHECK BEFORE RESCANNING  00023780

000341 2379                       3990 DOHOLDS  BOC   MIFTR,MIFTR13       BRANCH IF MIS AVAILABLE           00023800
000342 8080                       3993 MASKFORA ORI   CURCOMM,HOLDA      SET INTF A HOLD                   00023810
000343 633C                       3996          BU    BMASKED            RETURN                            00023820



                                  4001 *************************** HIO NOT OPERATING ************************ 00023860
                                  4002 *THE HIONOP ROUTINE RETURNS THE CU TO IDLE STATUS IF HALT IO OCCURS    * 00023870
                                  4003 *WITH NO OPERATION IN PROGRESS. THE TU IS RELEASED IF NO STS PNDC.     * 00023880
                                  4004 ********************************************************************** 00023890

000344 C804                       4007 HIONOP   AND   STATIMG,SETSTATB    CLEAR STAT IMAGE REG              00023910
000345 C1E0                       4010 HIONOP2  AND   CTIMAGE,HOLDINT+HOLDA+HOLDB CLEAR TAGS EXCEPT HOLDS   00023920
000346 C9FE                       4013          AND   FLAGS,ONES-CHAIN    RESET CHAIN FLAG                  00023930
000347 D986                       4016          ANDM  FLAGS,STATPNDG+STACK+CONCON  MASK FOR PENDING STATUS  00023940
000348 204C                       4019          BOC   DBUS,HIONOP1        BRANCH IF NO STATUS TO DESELECT   00023950
000349 8120                       4022          ORI    CTIMAGE,HOLDINT    RAISE HOLD INTF                   00023960
00034A C400                       4025          AND   WORK1,0             CLEAR WORK1                       00023970
00034B 62DE                       4028          BU    CLEANUP            SKIP DESELECTING THE DEVICE       00023980

00034C 62D7                       4032 HIONOP1  BU    DODES1               GO DESELECT THE DEVICE          00024000


                                  4035 ********************************************************************** 00024020
                                  4036 *************************** HIO OPERATING **************************** 00024030
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                                F01MAY72   9/04/73
                                   4037 *THE HIOPERG ROUTINE DROPS THE CU OFF LINE, FIRST RAISING CU BUSY TO  * 00024040
                                   4038 *PROTECT ALU 1 FROM CHANNEL TRAP.                                     * 00024050
                                   4039 ********************************************************************** 00024060

00034D C9FE                        4042 HIOPERG  AND   FLAGS,ONES-CHAIN     RESET THE CHAIN FLAG                 00024080
00034E 4828                        4045          XFR   STATIMG,STAT         SET STOP IF APPLICABLE               00024090
00034F C1C0                        4048          AND   CTIMAGE,HOLDA+HOLDB  RESET ALL TAGS EXCEPT CHAIN HOLDS    00024100
000350 8130                        4051          ORI   CTIMAGE,CUBUSY+HOLDINT MSET BUSY AND INTF HOLD            00024110
000351 4150                        4054          XFR   CTIMAGE,CTI          DROP CHANNEL TAGS                    00024120

000352 2852                        4058 NOTYET   BOC   ADROUT,NOTYET        WAIT FOR ADDRESS OUT TO FALL         00024140
000353 628C                        4061          BU    SETSTOP              GO TO AWAIT ALU 2 COMPLETION         00024150
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                              F01MAY72   9/04/73
                                   4064 **************************** RESETS *********************************** 00024170
                                   4065 *   GENERAL AND SELECTIVE RESETS SHARE SOME COMMON FUNCTIONS AND HAVE * 00024180
                                   4066 *BEEN INCORPORATED IN SUCH A MANNER. GENERAL RESET WILL RESET ALL      * 00024190
                                   4067 *FLAGS AND STATS AND RESERVE BITS THAT APPLY TO THE SELECTING INTER-   * 00024200
                                   4068 *FACE. SELECTIVE RESET WILL PERFORM THE SAME FUNCTIONS AS GENERAL      * 00024210
                                   4069 *RESET EXCEPT THE CU RESERVED AND HOLD INTERFACE BITS WILL NOT BE      * 00024220
                                   4070 *RESET. ALU2 WILL BE ACTUATED FOR THE PROPER RESET AFTER STATB HAS     * 00024230
                                   4071 *BEEN SET IN ACCORDANCE WITH THE SELECTING INTERFACE. CONTROL UNIT     * 00024240
                                   4072 *BUSY WILL BE SET FOR THE DURATION AND WILL BE RESET UPON SATISFACT-   * 00024250
                                   4073 *ORY COMPLETION BY ALU2.                                               * 00024260
                                   4074 *                                                                      * 00024270
                                   4075 ************************************************************************ 00024280

000354                             4077 STEP0006 EQU   *                                                         00024300
000354 1408                        4079 GENRESET STO   XOUTBIM,NDXGRST     BRT  FETCH ALU2 SEL RESET RTN INDEX  00024310
000355                             4081 STEP0007 EQU   *                                                         00024320
000355 0600                        4083          STO   PNDADDR,0           INITIALIZE DEV ADDRESS REG            00024330
000356                             4085 STEP0008 EQU   *                                                         00024340
000356 0800                        4087          STO   STATIMG,0           CLEAR STAT IMAGE REG                  00024350
000357                             4089 STEP0009 EQU   *                                                         00024360
000357 1500                        4091          STO   ALU1ERR,0           CLEAR ALU1 ERROR REG                  00024370
000358                             4093 STEP0010 EQU   *                                                         00024380
000358 1600                        4095          STO   ALU2ERR,0           CLEAR ALU2 ERROR REG                  00024390

000359                             4098 STEP0011 EQU   *                                                         00024410
000359 2F73                        4100 CHKPWRON BOC   PWRRST,PWRRESET     BRANCH IF POWER ON RESET              00024420
00035A CB30                        4103          AND   FLAGS2,A64+B64      INITIALIZE LSR                        00024430
00035B C1C0                        4106          AND   CTIMAGE,HOLDA+HOLDB RESET ALL TAGS EXCEPT CHAIN HOLDS     00024440

00035C                             4109 STEP0049 EQU   *                                                         00024460
00035C 2E61                        4111 CHKONB   BOC   SCB,BAGAIN          BRANCH IF BSELECTING             ***  00024470
00035D 1A90                        4114          STO   SEVMODA,X'90'       INIT SEV MODE REG                     00024480
00035E CA80                        4117 RSTNRZ   AND   FLAGS1,BNRZI        RESET ALL INTF A FLAGS                00024490
00035F 8B20                        4120          ORI   FLAGS2,A64          SET ERSET MODE TO 6400                00024500
000360 6369                        4123          BU    DORESETS            GO DO COMMON RESETS                   00024510
000361                             4125 STEP0050 EQU   *                                                         00024520
000361 646B                        4127 BAGAIN   BU    GENRST1             PAGE HOP                              00024530

000362 1409                        4131 SELRESET STO   XOUTBIM,NDXSRST     BRT  FETCH ALU2 SEL RESET RTN INDEX  00024550
000363 C1E0                        4134          AND   CTIMAGE,HOLDINT+HOLDA+HOLDB  ALL CHNL TAG EXCEPT HOLDS    00024560
000364 8110                        4137          ORI   CTIMAGE,CUBUSY      RAISE CONTROL UNIT BUSY               00024570
000365 CAE0                        4140 SELRST2  AND   REQTAGS,CURFLAG+ANRZI+BNRZI    RESET ALL OF FLAGS1 EXCEP 00024580
                                   4142 *                                  CU RESERVED AND RESET REQ-IN A'S      00024590
000366 0800                        4144          STO   STATIMG,0           CLEAR                                 00024600
000367 2271                        4147          BOC   ALUR,ERRRST         BRANCH IF SEL RESET IS FOR ALU ERR    00024610
000368 2371                        4150 SELRST3  BOC   MIFTR,MIFTR10       BRANCH IF MIS AVAILABLE               00024620

000369                             4153 STEP0057 EQU   *                                                         00024640
000369 4150                        4155 DORESETS XFR   CTIMAGE,CTI         RESET CHANNEL TAGS                    00024650
00036A                             4157 STEP0058 EQU   *                                                         00024660
00036A 4A48                        4159          XFR   REQTAGS,MIST        RESET REQUEST IN'S                    00024670
00036B                             4161 STEP0059 EQU   *                                                         00024680
00036B 4828                        4163 DORSTO   XFR   STATIMG,STAT        SET STAT REG FOR ALU2                 00024690
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  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                        F01MAY72   9/04/73
00036C                            4165 STEP0060 EQU   *                                                      00024700
00036C 4624                       4167 DEVRST   XFR   PNDADDR,TUADR       SET TU ADDRESS REG             00024710
00036D                            4169 STEP0061 EQU   *                   KICK OFF ROS 2, XOUTB=08       00024720
00036D 5441                       4171          XFR   XOUTBIM,XOUTB       TRAP ALU2 TO DO DESIRED RESET  00024730
00036E                            4173 STEP0062 EQU   *                   IF TCS - GO TO 65, IF NOT GO TO 63 00024740
00036E 2375                       4175          BOC   MIFTR,MIFTR11       BRANCH IF MIS AVAILABLE        00024750
00036F                            4177 STEP0063 EQU   *                                                  00024760
00036F C918                       4179 DOFORA   AND   FLAGS,CUEB+RESETOK  CLEAR FLAGS REG EXCEPT CUEB    00024770
000370                            4181 STEP0064 EQU   *                   NORMAL PATH - GO TO STEP0068   00024780
000370 6396                       4183          BU    DORST2              GO BACK AND CHECK THE RESET    00024790

000371 8802                       4187 ERRRST   ORI   STATIMG,SETSTATC    INDICATE ALU ERR RESET TO ALU2 00024810
000372 6368                       4190          BU    SELRST3             RETURN                         00024820

                                  4193 ************************** POWER ON RESET ***************************** 00024840
                                  4194 *  POWER ON RESET WILL BE EXECUTED ANYTIME THE MACHINE RESET BUTTON IS* 00024850
                                  4195 * DEPRESSED AND ON INITIAL POWER UP. IF MIS IS INSTALLED THIS ROUTINE * 00024860
                                  4196 * WILL BE EXECUTED TWICE---ONCE PER INTERFACE.                      * 00024870
                                  4197 *  VARIOUS LSR'S WILL BE CLEARED AND AN INTERFACE CHECKOUT WILL BE    * 00024880
                                  4198 * MADE. THE CHANNEL OUTBOUND TAGS USED BY THE MICROPROGRAM WILL BE    * 00024890
                                  4199 * CHECKED TO INSURE ALL ARE DOWN. ALL THE INBOUND TAGS(EXCEPT OP-IN)  * 00024900
                                  4200 * WILL BE RAISED---HARDWARE WILL 'AND' THE TAGS AND,IF ALL ARE PRESENT* 00024910
                                  4201 * FORCE \HE OUTBOUND TAGS AND INITIAL SELECTION. THE CHANNEL BUS IN    * 00024920
                                  4202 * REG WILL BE 'WRAPPED' TO CHANNEL BUS OUT. THE MICRO CODE WILL CHECK * 00024930
                                  4203 * THE TAGS FOR BEING ACRIVE AND THE BUSSES FOR HOT OR OPEN BITS. IF *  00024940
                                  4204 * ALL GOES OK A GENERAL RESET FOR THE SELECTING INTERFACE WILL COMPLETE 00024950
                                  4205 * THE OPERATION. ANY FAILURE WILL HANG IN A BU TRAP AND THE CONTROL *  00024960
                                  4206 * UNIT WILL REMAIN BUSY.                                            * 00024970
                                  4207 ********************************************************************** 00024980

000373                            4209 PWRRESET EQU   *                   ENTRY POINT                    00025000


000373                            4212 STEP0012 EQU   *                                                  00025030
                                  4213 * GO TO MAP 13-280                                                00025040
000373 2D73                       4215 SOFAIL   BOC   SVCOUT,SOFAIL       ALL CHANNEL OUTBOUND TAGS SHOULD BE 00025050
000374                            4217 STEP0013 EQU   *                                                  00025060
                                  4218 * GO TO MAP 13-290                                                00025070
000374 2974                       4220 COFAIL   BOC   CMDOUT,COFAIL        DOWN AT THIS TIME-- ANDY UP WILL  00025080
000375                            4222 STEP0014 EQU   *                                                  00025090
                                  4223 * GO TO MAP 13-300                                                00025100
000375 2875                       4225 AOFAIL   BOC   ADROUT,AOFAIL         RESULT IN A BOC TRAP UNTIL THE   00025110
000376                            4227 STEP0015 EQU   *                                                  00025120
                                  4228 * GO TO MAP 13-310                                                00025130
000376 3976                       4230 SUPOFAIL BOC   SUPO,SUPOFAIL          OUTBOUND TAG FALLS            00025140

000377                            4233 STEP0016 EQU   *                                                  00025160
000377 01FE                       4235          STO   CTIMAGE,ONES-OPIN   RAISE ALL INBOARD TAGS EXCEPT 00025170
                                  4237 *                                  OP-IN--FORCES SIO TRAP         00025180
000378                            4238 STEP0017 EQU   *                                                  00025190
000378 4150                       4240          XFR   CTIMAGE,CTI         SET TO HARDWARE                00025200
000379                            4242 STEP0018 EQU   *                                                  00025210
000379 0C00                       4244          STO   SETDIA1,0           CLEAR DIAGNOSE REG 1           00025220
00037A                            4246 STEP0019 EQU   *                                                  00025230
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   9/04/73
00037A 0A00                      4248          STO   REQTAGS,0       CLEAR REQUESTS AND FLAGS          00025240
00037B                           4250 STEP0020 EQU   *                                                 00025250
00037B 0B30                      4252          STO   FLAGS2,A64+B64   INITIALIZE LSR                   00025260

00037C                           4255 STEP0021 EQU   *                                                 00025280
00037C 3D7E                      4257          BOC   ISEL,SIOISOK     INIT SEL SHOULD BE UP           00025290
                                 4259 * GO TO MAP 13-320                                               00025300
00037D 637D                      4261 WAITSIO  BU    WAITSIO         A HANG HERE INDICATES SIO TRAP FAIL 00025310

00037E                           4264 STEP0022 EQU   *                                                 00025330
00037E 2980                      4266 SIOISOK  BOC   CMDOUT,CHKSUPO  SIO RETURN--CMD OUT SHOULD BE UP  00025340
                                 4268 * GO TO MAP 13-330                                               00025350
00037F 637F                      4270 CMOOFF   BU    CMOOFF          TRAP--CMD OUT OFF                 00025360

000380                           4273 STEP0023 EQU   *                                                 00025380
000380 3982                      4275 CHKSUPO  BOC   SUPO,CHKSVCOU   SUPPRESS OUT SHOULD BE UP         00025390
                                 4277 * GO TO MAP 13-340                                               00025400
000381 6381                      4279 SUPOOFF  BU    SUPOOFF         TRAP--SUPPRESS OUT OFF            00025410

000382                           4282 STEP0024 EQU   *                                                 00025430
000382 2D84                      4284 CHKSVCOU BOC   SVCOUT,CHKADRO  SERVICE OUT SHOULD BE UP          00025440
                                 4286 * GO TO MAP 13-350                                               00025450
000383 6383                      4288 SVOOFF   BU    SVOOFF          TRAP--SERVICE OUT OFF             00025460

000384                           4291 STEP0025 EQU   *                                                 00025480
000384 2886                      4293 CHKADRO  BOC   ADROUT,CHKBIBO  ADDRESS OUT SHOULD BE UP          00025490
                                 4295 * GO TO MAP 13-360                                               00025500
000385 6385                      4297 ADROFF   BU    ADROFF          TRAP--ADDRESS OUT OFF             00025510

000386                           4300 STEP0026 EQU   *                                                 00025530
000386 0100                      4302 CHKBIBO  STO   CTIMAGE,0       CLEAR A REG                       00025540
000387                           4304 STEP0027 EQU   *                                                 00025550
000387 638F                      4306          BU    RIPWRAP          GO SET ZEROES ACROSS  BUSSES     00025560
000388                           4308 STEP0034 EQU   *                                                 00025570
000388                           4309 STEP0042 EQU   *                                                 00025580
                                 4310 * GO TO MAP 13-370                                               00025590
000388 A1FF                      4312 RIPBIBO  ADD   CTIMAGE,ONES    BUMP REG BY ONE                   00025600
000389                           4314 STEP0035 EQU   *                                                 00025610
000389                           4315 STEP0043 EQU   *                                                 00025620
                                 4316 * GO TO MAP 13-370                                               00025630
000389 218F                      4318          BOC   NALCO,RIPWRAP   BRANCH IF NOT FINISHED            00025640
00038A                           4320 STEP0044 EQU   *                                                 00025650
00038A 0100                      4322          STO   CTIMAGE,0       INSURE TAG IMAGE IS CLEAR         00025660
00038B                           4324 STEP0045 EQU   *                                                 00025670
00038B 0900                      4326          STO   FLAGS,0         CLEAR FLAGS EEG                   00025680
00038C                           4328 STEP0046 EQU   *                                                 00025690
00038C 1D00                      4330 REGINIT  STO   FRUREG,0        CLEAR FRU REG                   3 00025700
00038D                           4332 STEP0047 EQU   *                                                 00025710
00038D 0000                      4334          STO   CURCOMM,0       CLEAR REG 0 PER XFR5            3 00025720
00038E                           4336 STEP0048 EQU   *                                                 00025730
00038E 635C                      4338          BU    CHKONB          RETURN TO RESET                 3 00025740


00038F                           4342 STEP0028 EQU   *                                                 00025770
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   9/04/73
00038F                           4343 STEP0036 EQU   *                                                 00025780
                                 4344 * GO TO MAP 13-370                                               00025790
00038F 4160                      4346 RIPWRAP  XFR   CTIMAGE,CBI       MOVE TEST   DATA TO BUS IN      00025800
000390                           4348 STEP0029 EQU   *                                                 00025810
000390                           4349 STEP0037 EQU   *                                                 00025820
                                 4350 * GO TO MAP 13-370                                               00025830
000390 0D00                      4352          STO   SETDIA2,0         KILL TIME                       00025840
000391                           4354 STEP0030 EQU   *                                                 00025850
000391                           4355 STEP0038 EQU   *                                                 00025860
                                 4356 * GO TO MAP 13-370                                               00025870
000391 44A0                      4358          XFR   WORK1,CBO         FETCH TEST   DTA FROM BUS OUT   00025880
000392                           4360 STEP0031 EQU   *                                                 00025890
000392                           4361 STEP0039 EQU   *                                                 00025900
                                 4362 * GO TO MAP 13-370                                               00025910
000392 4121                      4364          XFR   CTIMAGE,AR        MOVE TEST   REG TO ALU A REG    00025920
000393                           4366 STEP0032 EQU   *                                                 00025930
000393                           4367 STEP0040 EQU   *                                                 00025940
                                 4368 * GO TO MAP 13-370                                               00025950
000393 F400                      4370          XOM   WORK1,0           COMPARE WRAPPED DATA            00025960
000394                           4372 STEP0033 EQU   *                                                 00025970
000394                           4373 STEP0041 EQU   *                                                 00025980
                                 4374 * GO TO MAP 13-370                                               00025990
000394 2088                      4376          BOC   DBUS,RIPBIBO      BRANCH IF OK TO CHECK PARITY    00026000

                                 4379 * GO TO MAP 13-380                                               00026020
000395 6395                      4381 PICKDROP BU    PICKDROP          TRAP--BITS PICKED OR DROPPED    00026030


000396                           4385 STEP0068 EQU   *                                                 00026060
000396                           4386 DORST2   EQU   *                                               1 00026070
000396 2298                      4388 BLOWOUT1 BOC   ALUR,HRDRST       BRANCH IF ALU ERROR           1 00026080
000397                           4390 STEP0069 EQU   *                                                 00026090
000397 0700                      4392          STO   SNSSTS2,0         OTHERWISE CLEAR SENSE         1 00026100
000398                           4394 STEP0070 EQU   *                                                 00026110
000398 4012                      4396 HRDRST   XFR   CLEAR             RESET SENSE TO DATA FLOW      1 00026120
000399                           4398 STEP0071 EQU   *                                                 00026130
000399 4012                      4400          XFR   CLEAR                                             00026140
00039A                           4402 STEP0072 EQU   *                                                 00026150
00039A 0500                      4404          STO   PNDSTS,0          CLEAR PNDING STATUS REG         00026160
00039B                           4406 STEP0073 EQU   *                                                 00026170
00039B 4560                      4408          XFR   PNDSTS,CBI        CLEAR BUS IN TO CHANNEL         00026180
00039C                           4410 STEP0074 EQU   *                 NORMALLY BYPASS STEP 75 IN STEP MODE 00026190
                                 4411 * GO TO MAP 13-190                                               00026200
00039C 3B9E                      4413 DORST3   BOC   STATD,DORST4      BRANCH IF ALU2 FINISHED         00026210
00039D                           4415 STEP0075 EQU   *                                                 00026220
                                 4416 * GO TO MAP 13-190                                               00026230
00039D 639C                      4418          BU    DORST3            GO BACK AND WAIT FOR ALU2       00026240

00039E                           4421 STEP0076 EQU   *                                                 00026260
00039E 22AF                      4423 DORST4   BOC   ALUR,HARDWER      TRAP IF ALU HAD ERROR           00026270
00039F                           4425 STEP0077 EQU   *                                                 00026280
00039F 3CA9                      4427          BOC   NGENR,DORST5      BRANCH IF NOT GENERAL RESET     00026290
0003A0                           4429 STEP0078 EQU   *                                                 00026300
0003A0 D908                      4431          ANDM  FLAGS,RESETOK     MASK RESET FLAG                 00026310
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  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   9/04/73
0003A1                             4433 STEP0079 EQU   *                                                00026320
0003A1 34A9                        4435          BOC   DREG4,DORST5       BRANCH IF ON                 00026330
0003A2                             4437 STEP0080 EQU   *                                                00026340
0003A2 A601                        4439          ADD   PNDADDR,1          BUMP DEV ADDRS               00026350
0003A3                             4441 STEP0081 EQU   *                                                00026360
0003A3 F610                        4443          XOM   PNDADDR,16         MASK FOR LAST DEV            00026370
0003A4                             4445 STEP0082 EQU   *                  GO TO STEP0086 THE 16TH TIME  00026380
0003A4 20A9                        4447          BOC   DBUS,DORST5        BRANCH IF SO                 00026390
0003A5                             4449 STEP0083 EQU   *                                                00026400
0003A5 2FA7                        4451          BOC   PWRRST,DOITONB     BRANCH IF POWER ON TO RESET INTFB  00026410
0003A6 636B                        4454          BU    DORST0                                         00026420

0003A7                             4457 STEP0084 EQU   *                                                00026440
0003A7 E804                        4459 DOITONB  XO    STATIMG,SETSTATB   INVERT STAT B TO FORCE INTFB RESET  00026450
0003A8                             4461 STEP0085 EQU   *                  RETURN TO STEP 59 - REPEAT 15 TIMES  00026460
0003A8 636B                        4463          BU    DORST0           GO RESET NEXT DEVICE         00026470

0003A9                             4466 STEP0086 EQU   *                                                00026490
0003A9 0800                        4468 DORST5   STO   STATIMG,0          CLEAR THE STAT REG           00026500
0003AA                             4470 STEP0087 EQU   *                                                00026510
0003AA 4828                        4472          XFR   STATIMG,STAT       CLEAR HDWE STATS             00026520
0003AB                             4474 STEP0088 EQU   *                                                00026530
0003AB 4824                        4476          XFR   STATIMG,TUADR      CLEAR TU ADDRESS REG         00026540
0003AC                             4478 STEP0089 EQU   *                                                00026550
0003AC 8908                        4480          ORI    FLAGS,RESETOK     SET ALL DEVICES RESET FLAG   00026560

0003AD                             4483 STEP0090 EQU   *                                                00026580
0003AD 2F40                        4485 DORST6   BOC   PWRRST,RUNALU       GO DO ALU CHECK IF POWER ON  00026590
0003AE 6304                        4488          BU    IDLESCAN           OTHERWISE GO TO IDLE         00026600


0003AF 4011                        4492 HARDWER  XFR   HDWERR             ALU2 ERR IN IDLESCAN         00026620
                                   4494 * GO TO MAP 13-400                                            00026630
0003B0 63B0                        4496 YUPHANG  BU    YUPHANG            HDWERR DIDN'T TRAP           00026640
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   9/04/73
                                   4500 ***************************** BURST WAIT ******************************* 00026670
                                   4501 * BURST WAIT IS USED BY READ, WRITE, AND SENSE OPS TO WAIT FOR ALU2    * 00026680
                                   4502 * FINISH.                                                             * 00026690
                                   4503 * ADDRESS OUT WILL BE MONITORED FOR A HIO CONDITION AND IF HIO IS      * 00026700
                                   4504 * GIVEN OP-IN WILL BE RESET AND THE OPERATION TERMINATED NORMALLY.     * 00026710
                                   4505 * DATA FLOW ERRORS,ALU2 ERRORS AND UNIT EXCEPTION CONDITION WILL BE   * 00026720
                                   4506 * SET AS REQUIRED IN ENDING STATUS.                                    * 00026730
                                   4507 ********************************************************************** 00026740

0003B1 3BC0                        4510 GOSTOP    BOC    STATD,BSTDONE                                        00026760
0003B2 628C                        4513           BU     SETSTOP             GO SET STOP STAT                 00026770
0003B3 5441                        4516 LETSREAD  XFR    XOUTBIM,XOUTB       KICK OFF READ OP                 00026780
                                   4518 *         ORI    STATIMG,STOP        SET STOP FOR LATER               00026790
0003B4 284D                        4520 SVCWATE   BOC    ADROUT,HIOPERG      BRANCH IF HIO                    00026800
0003B5 2DB8                        4523           BOC    SVCOUT,BSTWAIT      BRANCH IF SERVICE IN OR OUT      00026810
0003B6 3BBC                        4526           BOC    STATD,NOSVC         BRANCH IF NO SERVICE             00026820
0003B7 63B4                        4529           BU     SVCWATE             GO BACK AND DO IT AGAIN          00026830

                                   4532 * GO TO MAP 13-410                                                    00026850
0003B8 284D                        4534 BSTWAIT   BOC    ADROUT,HIOPERG      BRANCH IF HIO ISSUED             00026860
                                   4536 * GO TO MAP 13-410                                                    00026870
0003B9 3FB1                        4538           BOC    ALLONES,GOSTOP      BRANCH IF CMD OUT IS UP          00026880
                                   4540 * GO TO MAP 13-410                                                    00026890
0003BA 3BC0                        4542 BSTWAIT1  BOC    STATD,BSTDONE       BRANCH IF ALU2 COMPLETED         00026900
                                   4544 * GO TO MAP 13-410                                                    00026910
0003BB 63B8                        4546           BU     BSTWAIT             GO BACK AND CHECK FOR FINISH     00026920

0003BC 3AC0                        4550 NOSVC     BOC    STATC,BSTDONE       BRANCH IF ALU HAD ERROR          00026940
0003BD 22DC                        4553           BOC    ALUR,ALU2HDER       BRANCH IF ALU ERROR              00026950
0003BE 2BC0                        4556           BOC    STATB,BSTDONE       BRANCH IF UNIT EXCP              00026960
0003BF 8709                        4559           ORI    SNSSTS2,RDNOISE+DATACK  NOISE IN SENSE               00026970
0003C0 4828                        4562 BSTDONE   XFR    STATIMG,STAT        SET STOP TO DATA FLOW            00026980
0003C1 22DC                        4565           BOC    ALUR,ALU2HDER       BRANCH IF ALU2 HAD HDWE ERROR    00026990
0003C2 D00B                        4568           ANDM   CURCOMM,X'0B'       MASK FOR SENSE TYPE COMMAND      00027000
0003C3 20DA                        4571           BOC    DBUS,BSTWAIT2       BRANCH IF SO                     00027010
0003C4 D001                        4574           ANDM   CURCOMM,1           MASK FOR WRITE TYPE COMMAND      00027020
0003C5 37D0                        4577           BOC    DREG7,CHEKB         BRANCH IF SO                     00027030

0003C6 DC6C                        4581           ANDM   SETDIA1,DMR+IBGMSR+RDACC+RDSTOP CHK DIAGNOSTIC BITS  00027050
0003C7 20D0                        4584           BOC    DBUS,CHEKB          BRANCH IF OFF                    00027060
0003C8 31D7                        4587           BOC    DREG1,CHEKSNS       BRANCH IF IBG MSR                00027070
0003C9 32D7                        4590           BOC    DREG2,CHEKSNS       BRANCH IF READ ACCESS            00027080

0003CA 4E88                        4594           XFR    SETCNT1,XINB        OTHERWISE FETCH MODULO CNT FROM ALU2 00027100
0003CB 4421                        4597           XFR    WORK1,AR            MOVE ALU1 MODULO TO ALU INPUT REG  00027110
0003CC EE00                        4600           XO     SETCNT1,0           COMPARE BOTH MODULO COUNT        00027120
0003CD 20D7                        4603           BOC    DBUS,CHEKSNS        BRANCH IF SAME                   00027130
0003CE 8704                        4606 HADOVERN  ORI    SNSSTS2,OVERUN      SET OVERUN BIT IN SENSE DATA     00027140
0003CF 63DD                        4609           BU     SETUNTCK            GO SET EQUIP CHK                 00027150

0003D0 2BE0                        4613 CHEKB     BOC    STATB,ALU2UNEX      BRANCH IF ALU2 SIGNALLED UX      00027170

0003D1 DD80                        4617 CHKUNCHK  ANDM   SETDIA2,BLKDC       MASK TO CHEK BLOCK DATA CHEK FLAG 00027190
0003D2 30DA                        4620           BOC    DREG0,BSTWAIT2      BRANCH IF ON TO BYPESS           00027200
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  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72  9/04/73
0003D3 28F2                        4623           BOC   ADROUT,ENDHIO       BRANCH IF HIO                    00027210
0003D4 3AE2                        4626 CHKALU2   BOC   STATC,DATCHECK      BRANCH IF ALU2 SIGNALLED UC      00027220
0003D5 27E2                        4629           BOC   DFLER,DATCHECK      BRANCH IF ANY DATA FLOW ERRORS   00027230

0003D6 3FCE                        4633 CHKOVRN   BOC   OVERRUN,HADOVERN    GO SET EQUIP CHK IF OVERRUN      00027250

0003D7 9700                        4637 CHEKSNS   ORM   SNSSTS2,0           MASK SENSE DATA FOR ERRORS       00027270
0003D8 20DA                        4640           BOC   DBUS,BSTWAIT2       BRANCH IF NO ERRORS              00027280
0003D9 63DD                        4643           BU    SETUNTCK            SENSE ERRORS--SET UNIT CHECK     00027290

0003DA 850C                        4647 BSTWAIT2  ORI   PNDSTS,CHANEND+DEVEND POST CE AND DE IN STATUS        00027310
0003DB 63DE                        4650           BU    SETPNDG             GO SET STS PENDING               00027320

0003DC 8710                        4654 ALU2HDER  ORI   SNSSTS2,EQUIPCK     SET EQUIPMENT CHECK IN SENSE     00027340
0003DD 850E                        4657 SETUNTCK  ORI   PNDSTS,CHANEND+DEVEND+UNITCHK SET CE,DE,AND UC IN STATUS 00027350
0003DE 8904                        4660 SETPNDG   ORI   FLAGS,STATPNDG       SET STATUS PENDING FLAG          00027360
0003DF 6291                        4663           BU    TERMSTAT            GO TO TERMINAL STATUS            00027370

0003E0 8501                        4667 ALU2UNEX  ORI   PNDSTS,UNITEXC      SET UNIT EXEPTION IN STATUS      00027390
0003E1 63D1                        4670           BU    CHKUNCHK            GO LOOK FOR UNIT CHECK           00027400

0003E2 D204                        4674 DATCHECK  ANDM  XOUTAIM,WRITE                                         00027420
0003E3 35EA                        4677           BOC   DREG5,SKIPNOIS      BRANCH IF NOT A READ OP          00027430
0003E4 D820                        4680           ANDM  STATIMG,CONTROL                                      00027440
0003E5 32EA                        4683           BOC   DREG2,SKIPNOIS      BRANCH IF READ CONTROL CMD       00027450
0003E6 F00C                        4686           XOM   CURCOMM,X'0C'       IS THIS A RDB OP                 00027460
0003E7 20EF                        4689           BOC   DBUS,ISLDPT         BR IF SO                         00027470

0003E8 4490                        4693 FTCHNOIS  XFR   WORK1,XINA           FETCH NOISE BIT IF APPLICABLE    00027490
0003E9 4421                        4696           XFR   WORK1,AR             MOVE TO ALU INPUT REG            00027500

0003EA 27ED                        4700 SKIPNOIS  BOC   DFLER,DODATCK       BRANCH IF DATA FLOW ERROR      3 00027520
0003EB 8700                        4703           ORI   SNSSTS2,0           OTHERWISE SET NOISE ONLY       3 00027530
0003EC 63DD                        4706           BU    SETUNTCK            GO SET UNIT CHECK              3 00027540
0003ED 8708                        4709 DODATCK   ORI   SNSSTS2,DATACK      SET NOISE AND DATA CHECK       3 00027550
0003EE 63DD                        4712           BU    SETUNTCK            GO SET UNIT CHECK              3 00027560
0003EF D410                        4715 ISLDPT    ANDM  WORK1,BOT           IS LOAD POINT ON                 00027570
0003F0 20E8                        4718           BOC   DBUS,FTCHNOIS       BR IF NOT                        00027580
0003F1 63EA                        4721           BU    SKIPNOIS            SKIP NOISE THIS TIME             00027590

0003F2 E111                        4725 ENDHIO    XO    CTIMAGE,OPIN+CUBUSY RESET OP IN RAZE CUB             00027610
0003F3 4150                        4728           XFR   CTIMAGE,CTI         SET TO HARDWARE                  00027620
0003F4 63D4                        4731           BU    CHKALU2             RETURN TO CHECK UNIT CHK COND    00027630
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   9/04/73

000400                           4736          ORG   BEGIN+X'400'                                    00027670
                                 4737 *************************** COMMAND REJECT ************************** 00027680
                                 4738 *  COMMAND REJECT IS ENTERED AFTER OPENERS AND IF AN INVALID OP CODE  * 00027690
                                 4739 * WAS RECEIVED AT CMD OUT TIME. SENSE DATA WILL BE RESET AND CMD RJCT * 00027700
                                 4740 * SENSE SET UP. THIS ROUTINE WILL NOT BE ENTERED IF OPENERS FINDS ANY * 00027710
                                 4741 * PENDING STATUS.                                               * 00027720
                                 4742 ********************************************************************** 00027730

000400 140F                      4745 COMREJC1 STO   XOUTBIM,NDXSNSR     RT FETCH ALU2 SENSE RESET INDEX  00027750
000401 5441                      4748          XFR   XOUTBIM,XOUTB       KICK OFF ALU2                    00027760
000402 8801                      4751          ORI   STATIMG,SETSTATD    SET STATD TO INDICATE SNS RESET  00027770
000403 4828                      4754          XFR   STATIMG,STAT        SET TO HARDWARE                  00027780
000404 0700                      4757          STO   SNSSTS2,0           CLEAR SENSE REG 2                00027790
000405 4012                      4760          XFR   CLEAR              RESET DATA FLOW ERRORS           00027800
000406 4012                      4763          XFR   CLEAR                                               00027810
000407 8780                      4766          ORI   SNSSTS2,CMDREJ     POST CMD REJECT                  00027820
000408 0502                      4769          STO   PNDSTS,UNITCHK      POST UNIT CHECK                  00027830
000409 8904                      4772          ORI   FLAGS,STATPNDG      POST STATUS PENDING              00027840
00040A 60E4                      4775          BU    PENDLINK                                           00027850
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 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                   F01MAY72  9/04/73
                                  4778 ******************** MULTIPLE INTERFACE SWITCH ********************** 00027870
                                  4779 *                    THE VARIOUS POINTS IN BASIC CODE THAT ARE       * 00027880
                                  4780 * SENSITIVE TO MIS        WILL TEST AND,IF THE FEATURE IS INSTALLED,  * 00027890
                                  4781 * BRANCH TO THE APPROPRIATE POINT IN THIS PAGE. STAT B AND A FLAG     * 00027900
                                  4782 * NAMED INTFB WILL BE USED THROUGHOUT WHEN MIS IS AVAILABLE. SEVEN    * 00027910
                                  4783 *                                                                    * 00027920
                                  4784 ********************************************************************** 00027930
00040B 62AA                       4786 MISRTN1  BU    CHKCHAIN          MIS RETURN                          00027940
00040C 629B                       4789 MISRTN2  BU    ANYCUEA           MIS RETURN                          00027950
00040D 62B0                       4792 MISRTN3  BU    SETREQA           MIS RETURN                          00027960
00040E 62B8                       4795 MISRTN4  BU    DOREQA            MIS RETURN                          00027970
00040F 62CB                       4798 MISRTN5  BU    RSTHLDIN          MIS RETURN                          00027980
000410 6321                       4801 MISRTN7  BU    DEPRIM1           MIS RETURN                          00027990
000411 6342                       4804 MISRTN0A BU    MASKFORA          RETURN TO MAINLINE                  00028000

000412 F000                       4809 MIFTR04  XOM   CURCOMM,0          MASK FOR TIO                        00028030
000413 201B                       4812         BOC   DBUS,CMDWAIT2      BRANCH IF TIO                       00028040
000414 F003                       4815         XOM   CURCOMM,X'03'      MASK FOR NOOP                       00028050
000415 201B                       4818         BOC   DBUS,CMDWAIT2      BRANCH IF CMD IS NOOP               00028060
000416 C97F                       4821         AND   FLAGS,ONES-CONCON     OTHERWISE RESET CONT CONN FLAG   00028070
000417 DA20                       4824 BLOUT43  ANDM  FLAGS1,CURFLAG     MASK CU RESERVE                   4 00028080
000418 201A                       4827         BOC   DBUS,NOTRSV       BRANCH IF NOT RESERVE             4 00028090
000419 60DE                       4830         BU    CMDWAIT4          BRANCH IF RESERVED                4 00028100

00041A C1DF                       4834 NOTRSV   AND   CTIMAGE,ONES-HOLDINT RESET HOLD INTERFACE           4 00028120

00041B 60DE                       4838 CMDWAIT2 BU    CMDWAIT4          RETURN TO MAIN LINE                 00028140

00041C D901                       4843 CHKRSRV  ANDM  FLAGS,CHAIN       MASK FOR CHAINING                 1 00028170
00041D 201F                       4846         BOC   DBUS,NOTCHANE      BRANCH IF NOT CHAINING            1 00028180
00041E 6108                       4849         BU    COMREJCT          OTHERWISE REJECT COMMAND          1 00028190
00041F F0F4                       4852 NOTCHANE XOM   CURCOMM,X'F4'          MASK FOR CU RESERVE CM       1 00028200
000420 2024                       4855         BOC   DBUS,SETRESRV          BRANCH IF IT IS              1 00028210
000421 F0D4                       4858         XOM   CURCOMM,X'D4'          MASK FOR CU RELEASE CMD        00028220
000422 2027                       4861         BOC   DBUS,RSTRESV           BRANCH IF IT IS                00028230
000423 6108                       4864         BU    COMREJCT               OTHERWISE RETURN TO DO SENSE   00028240

000424 8A20                       4868 SETRESRV ORI   FLAGS1,CURFLAG           SET CU RESERVE FLAG          00028260
000425 8120                       4871         ORI   CTIMAGE,HOLDINT     RAISE HOLD INTERFACE               00028270
000426 617F                       4874         BU    DOSENSE                RETURN TO SENSE                00028280

000427 CADF                       4878 RSTRESV  AND   FLAGS1,ONES-CURFLAG      RESET CU RESERVE FLAG        00028300
000428 617F                       4881         BU    DOSENSE                RETURN TO SENSE                00028310

000429 D920                       4885 MIFTR05  ANDM  FLAGS,INTFB       INTERFACE B SELECTING              00028330
00042A 200C                       4888         BOC   DBUS,MISRTN2      BRANCH IF OFF TO CHECK CUEA        00028340
                                  4890 * GO TO MAP 13-500                                                  00028350
00042B 3E30                       4892 CHKCUEB  BOC   NCUEB,CHKBFLG     BRANCH IF NOT CUE ON B             00028360
                                  4894 * GO TO MAP 13-500                                                  00028370
00042C 8520                       4896         ORI   PNDSTS,CUE        SET CONTROL UNIT END IN STATUS     00028380
                                  4898 * GO TO MAP 13-500                                                  00028390
00042D 8910                       4900         ORI   FLAGS,CUEB        SET CONTROL UNIT END IN FLAGS      00028400
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                        F01MAY72   9/04/73
                                   4902 * GO TO MAP 13-500                                                  00028410
00042E 400A                        4904          XFR   CUREB          ATTEMPT TO RESET CUEB               00028420
                                   4906 * GO TO MAP 13-500                                                  00028430
00042F 642B                        4908          BU    CHKCUEB        GO BACK AND CHECK TO INSURE RESET   00028440

000430 400A                        4912 CHKBFLG  XFR   CUREB          RESET GEN RESET IF ON               00028460
000431 D910                        4915          ANDM  FLAGS,CUEB     MASK TO CHECK CUE B FLAG            00028470
000432 200B                        4918          BOC   DBUS,MISRTN1   BRANCH IF OFF                       00028480
000433 62A9                        4921          BU    CUEPNDG        OTHERWISE GO SET CUE IN STATUS      00028490

000434 D502                        4925 CHKCONT  ANDM  PNDSTS,UNITCHK  MASK FOR UC IN PENDING STATUS REG  00028510
000435 203A                        4928          BOC   DBUS,NOTCON    BRANCH IF OFF                       00028520
000436 F506                        4931          XOM   PNDSTS,DEVEND+UNITCHK MASK FOR DEP UC STATUS(NO CONCON) 00028530
000437 203A                        4934          BOC   DBUS,NOTCON    BRANCH TO PREVENT CONCON IF SO      00028540
000438 4044                        4937 BLOUT46  XFR   PING            RESET THE PING LATCH              1 00028550
000439 8980                        4940          ORI   FLAGS,CONCON    OTHERWISE SET CONTINGENT CONN FLAG  00028560
00043A 6293                        4943 NOTCON   BU    TERMSTA0       RETURN TO RAISE REQ-IN              00028570

00043B D920                        4947 MIFTR06  ANDM  FLAGS,INTFB     INTERFACE B SELECTING               00028590
00043C 200D                        4950          BOC   DBUS,MISRTN3   NO, GO HANDLE A INTF                00028600
00043D 8A01                        4953          ORI   REQTAGS,REQINB  RAISE NON SUPPESSIBLE REQ-IN B      00028610
00043E 62B9                        4956          BU    GOTOIDLE       GO WAIT FOR POLL                    00028620

00043F D920                        4960 MIFTR07  ANDM  FLAGS,INTFB     INTERFACE B SELECTING               00028640
000440 200E                        4963          BOC   DBUS,MISRTN4   NO, GO HANDLE A INTF                00028650

000441 8A02                        4967 DOREQB   ORI   REQTAGS,SUPREQB  RAISE SUPPRESSEBLE REQUEST IN B  00028670
000442 62B9                        4970          BU    GOTOIDLE       GO SET HARDWARE AND WAIT FOR POLL   00028680

000443 DA20                        4974 MIFTR08  ANDM  FLAGS1,CURFLAG   MASK TO CHECK CONTROL UNIT RESERVE  00028700
000444 200F                        4977          BOC   DBUS,MISRTN5    BRANCH IF NOT RESERVED              00028710
000445 62CC                        4980          BU    DROPTAGS       RESERVED-DONT RESET HOLD INTERFACE  00028720

000446 DA20                        4984 MIFTR09  ANDM  FLAGS1,CURFLAG   MASK FOR CU RESERVED                00028740
000447 209D                        4987          BOC   DBUS,IDLE2     BRANCH IF NOT RESERVED              00028750
000448 D920                        4990 BLOUT42  ANDM  FLAGS,INTFB     MASK INTERFACE B FLAG             3 00028760
000449 20AC                        4993          BOC   DBUS,ARSVD     BRANCH IF A INTF                  3 00028770
00044A D940                        4996          ANDM  FLAGS,CUEA     MASK FOR CUE ON A INTF            3 00028780
00044B 314D                        4999          BOC   DREG1,STSONA   BRANCH IF SO                      3 00028790
00044C 254E                        5002          BOC   NCUEA,NIXASTS  BRANCH IF NOT CUE ON A            3 00028800
00044D 8080                        5005 STSONA   ORI   CURCOMM,HOLDA  SET CHAIN HOLD ON A INTF          3 00028810
00044E 6318                        5008 NIXASTS  BU    ITSRSVD        RETURN                            3 00028820

00044F 0F00                        5012 MIFTR0A  STO   SETCNT2,0      CLEAR A WORK REG                    00028840
000450 4921                        5015          XFR   FLAGS,AR       MOVE FLAGS REG TO ALU INPUT REG     00028850
000451 8F00                        5018          ORI   SETCNT2,0      SET FLAGS INTO WORK REG             00028860
000452 629A                        5021          BU    TERMSTA3       GO CHECK FOR CUE ON LAST INTERFACE  00028870

000453 4921                        5025 MIFTR0B  XFR   FLAGS,AR       MOVE FLAGS TO ALU INPUT REG         00028890
000454 FF00                        5028          XOM   SETCNT2,0      MASK FOR SAME FLAGS                 00028900
000455 20B1                        5031          BOC   DBUS,BLOUT44   BRANCH IF SAME          EC732424  00028910
000456 631D                        5034          BU    DEPRIMES       OTHERWISE GO LOOK FOR DEV ENDS      00028920

000457 E920                        5038 IDLE4    XO    FLAGS,INTFB    INVERT STATUS OF INTF FLAG          00028940
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                        F01MAY72   9/04/73
000458 629A                       5041          BU     TERMSTA3          GO CHECK FOR CUE ON OPPOSITE INTF    00028950

000459                            5044 MIFTR0C  EQU    *                 GO CHECK RESERVE                   1 00028970
000459 4828                       5046 BLOUT45  XFR    STATIMG,STAT      RESET STAT A                       1 00028980
00045A DA20                       5049          ANDM   FLAGS1,CURFLAG    MASK CU RESERVE                    1 00028990
00045B 645C                       5052          BU     RSVBC             RETURN TO MAINLINE                 1 00029000
00045C 2010                       5055 RSVBC    BOC    DBUS,MISRTN7      BRANCH IF NOT                      1 00029010
00045D 2AA7                       5058          BOC    STATA,XXX         BRANCH IF NON-RSVD INTF            3 00029020
00045E D920                       5061          ANDM   FLAGS,INTFB       MAKS FOR B INTERFACE               3 00029030
00045F 20A5                       5064          BOC    DBUS,YYY          BRANCH IF NOT B INTF               3 00029040
000460 64A3                       5067          BU     BLOUT40           OTHERWISE GO SET STAT A ONL        3 00029050

000461 2AA7                       5071 MIFTR0D  BOC    STATA,XXX         BRANCH IF NON-RSVD INTF            3 00029070
000462 DA20                       5074          ANDM   FLAGS1,CURFLAG    MASK FOR CTL UNIT RESERVED         3 00029080
000463 2065                       5077 BLOUT41  BOC    DBUS,DEPRIM8      BRANCH IF NOT RESERVED             3 00029090
000464 633D                       5080          BU     SETHOLDS          OTHERWISE GO SET CHAIN HOLD        3 00029100

000465 D804                       5084 DEPRIM8  ANDM   STATIMG,SETSTATB  MASK FOR B INTERFACE POLLED          00029120
000466 2068                       5087          BOC    DBUS,DEPRIM9      BRANCH IF NOT                          00029130
000467 633D                       5090          BU     SETHOLDS          GO POLL FOR MTI'S                      00029140

000468 8920                       5094 DEPRIM9  ORI    FLAGS,INTFB       SET B INTERFACE FLAG                   00029160
000469 8804                       5097          ORI    STATIMG,SETSTATB  SET B INTERFACE STAT                   00029170
00046A 6322                       5100          BU     DEPRIM2           GO CHECK FOR DE'S ON B INTF             00029180


00046B                            5104 STEP0051 EQU    *                                                        00029210
00046B 0804                       5106 GENRST1  STO    STATIMG,SETSTATB  SET B INTERFACE STAT                   00029220
00046C                            5108 STEP0052 EQU    *                                                        00029230
00046C 0920                       5110          STO    FLAGS,INTFB       SET B INTERFACE FLAG                   00029240
00046D                            5112 STEP0053 EQU    *                                                        00029250
00046D 1B90                       5114 INITSEV  STO    SEVMODB,X'90'     SET 7TK RESET MODE SET                 00029260
00046E                            5116 STEP0054 EQU    *                                                        00029270
00046E 8B10                       5118          ORI    FLAGS2,B64        SET RESET MODE TO 6400                 00029280
00046F                            5120 STEP0055 EQU    *                                                        00029290
00046F CA40                       5122          AND    FLAGS1,ANRZI      RESET B INTF FLAGS                     00029300
000470                            5124 STEP0056 EQU    *                                                        00029310
000470 6369                       5126          BU     DORESETS          GO DO COMMON RESETS                    00029320

000471 2E73                       5130 MIFTR10  BOC    SCB,SELRST1       BRANCH IF SWITCHED TO CHANNEL B        00029340
000472 6369                       5133          BU     DORESETS          RETURN TO HANDLE A INTERFACE           00029350

000473 8804                       5137 SELRST1  ORI    STATIMG,SETSTATB  SET B INTERFACE STAT                   00029370
                                  5139 *                                 CU RESERVED AND RESET REQ-IN B'S       00029380
000474 6369                       5141          BU     DORESETS          RETURN TO FINISH RESET                 00029390

000475                            5144 STEP0065 EQU    *                                                        00029410
000475 2E77                       5146 MIFTR11  BOC    SCB,DORST1        BRANCH IF SWITCHED TO CHANNEL B        00029420
000476 636F                       5149          BU     DOFORA            RETURN TO RESET A INTERFACE            00029430

000477                            5152 STEP0066 EQU    *                                                        00029450
000477 C968                       5154 DORST1   AND    FLAGS,CUEA+INTFB+RESETOK  ALL LAGSS EXCEPT CUE A       00029460
000478                            5156 STEP0067 EQU    *                                                        00029470
000478 6396                       5158          BU     DORST2            RETURN TO CLEAR SENSE DATA             00029480
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000479 D804                    5163 MIFTR13  ANDM  STATIMG,SETSTATB    MASK FOR INTF B PASS                 00029510
00047A 2011                    5166          BOC   DBUS,MISRTN0A      BRANCH IF NOT                        00029520
00047B 8040                    5169          ORI   CURCOMM,HOLDB       OTHERWISE SET HOLD B MASK ON         00029530
00047C 633C                    5172          BU    BMASKED            RETURN TO MAINLINE                   00029540
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                         5177 ********************** SEVEN TRACK MODE SETS ********************** 00029580
                         5178 * ALL SEVEN TRACK MODE SETS ENTER HERE AND SET UP SEVEN TRK MODE REGS * 00029590
                         5179 * BY INTERFACE.                                                     * 00029600
                         5180 ************************************************************************ 00029610

00047D 13F8              5183 CHK7TK    STO   LINK4,X'F8'        CLEAR TO HOLD THE COMMAND             00029630
00047E 4021              5186           XFR   CURCOMM,AR         PUT IN A REGISTER                     00029640
00047F 5006              5189           XFRH  LSR                SET TO HI REGS                        00029650
                         5191 *** SEVEN TRACK MODE SETS                                                00029660
000480 C300              5193           AND   LINK4,0            SET MODE BITS 2,3,4 IN WORK REG       00029670

000481 2E86              5197 SETBYINT  BOC   SCB,SETBMOD        TEST FOR B INTERFACE                1 00029690
000482 1A00              5200 SETAMOD   STO   SEVMODA,0          CLEAR INTF A MODE REG                 00029700
000483 5321              5203           XFR   LINK4,AR           MOVE MODE TO ALU INPUT REG            00029710
000484 8A00              5206           ORI   SEVMODA,0          SET MODE INTO INTF A MODE REG         00029720
000485 6489              5209           BU    SEVLINK            RETURN TO PRESETN STATUS              00029730

000486 1B00              5213 SETBMOD   STO   SEVMODB,0          CLER INTF B MOD REG                 1 00029750
000487 5321              5216           XFR   LINK4,AR           MOVE MODE TO ALU REG                  00029760
000488 8B00              5219           ORI   SEVMODB,0          MOVE MODE INTO A MODE REG             00029770

000489 4006              5223 SEVLINK   XFR   LSR                SET LO SET REGS                       00029790
00048A 6167              5226           BU    MODELINK           GO FINISH                             00029800

00048B D920              5230 SETSEV    ANDM  FLAGS,INTFB        MASK FOR INTERFACE B                  00029820
00048C 2096              5233           BOC   DBUS,SETSEVA       BRANCH IF OFF                         00029830
00048D 5B21              5236           XFR   SEVMODB,AR         SET MODE SET IN A REG                 00029840
00048E 8200              5239           ORI   XOUTAIM,0          SET ALSO IN XOUTAIM                   00029850
00048F DA80              5242           ANDM  FLAGS1,BNRZI       MASK INTF B NRZ FLAG                  00029860
000490 2092              5245           BOC   DBUS,SKIPNRZ       BRANCH IF OOF                         00029870
000491 8201              5248           ORI   XOUTAIM,NRZMODE    OTHERWISE, SET NRZ IN MAS RE          00029880
000492 DB10              5251 SKIPNRZ   ANDM  FLAGS2,B64         CHECK LAST MODE SET FOR 6400          00029890
000493 2095              5254           BOC   DBUS,SKIPNRZ1      BR IF NOT                             00029900
000494 8202              5257           ORI XOUTAIM,MODE64       SET 6400 TO ALU 2                     00029910
000495 60D2              5260 SKIPNRZ1  BU    CMDWAIT            GO WAIT FOR THE COMMAND               00029920

000496 5A21              5264 SETSEVA   XFR   SEVMODA,AR         MOVE INTF A MODE TO MASK REG          00029940
000497 8200              5267           ORI   XOUTAIM,0          SET MASK                              00029950
000498 60CC              5270           BU    CHKNRZ             RETURN TO CHECK 9TK NRZ               00029960

000499 D980              5274 MIFTR17   ANDM  FLAGS,CONCON       MASK FOR CONT CONN                  1 00029980
00049A 209C              5277           BOC   DBUS,BAKTOIDL      BRANCH IF OFF                       1 00029990
00049B 6301              5280           BU    HANGHERE           OTHERWISE GO HANG AND WAIT          1 00030000

00049C 630C              5284 BAKTOIDL  BU    IDLE1              RETURN TO IDLE LOOP                 1 00030020

00049D 2AA2              5288 IDLE2     BOC   STATA,IDLE3        BRANCH IF 1ST PASS SWITCH ON          00030040
00049E 8808              5291           ORI   STATIMG,SETSTATA  OTHERWISE SET 1ST PASS SWITCH         00030050
00049F 4828              5294           XFR   STATIMG,STAT       SET TO HDWE                           00030060
0004A0 234F              5297           BOC   MIFTR,MIFTR0A      BRANCH IF MIS AVAILABLE           *** 00030070
0004A1 629A              5300           BU    TERMSTA3           GO TO CHECK FOR CUE ON LAST INTF      00030080

0004A2 2353              5304 IDLE3     BOC   MIFTR,MIFTR0B      BRANCH IF MIS AVAILABLE             * 00030100
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0004A3 8808                  5308 BLOUT40  ORI   STATIMG,SETSTATA     SET STAT A                          3 00030120
0004A4 6322                  5311          BU    DEPRIM2              RETURN TO SCAN FOR DE               3 00030130

0004A5 880C                  5315 YYY      ORI   STATIMG,SETSTATA+SETSTATB SET STATS A AND B               3 00030150
0004A6 6322                  5318          BU    DEPRIM2              RETURN                              3 00030160

0004A7 E80C                  5322 XXX      XO    STATIMG,SETSTATB+SETSTATA INVERT B RESET A               3 00030180
0004A8 0504                  5325          STO   PNDSTS,DEVEND        SET DEV END IN STATUS               3 00030190
0004A9 6322                  5328          BU    DEPRIM2              RETURN                              3 00030200

0004AA 2A79                  5332 MIFTR18  BOC   STATA,MIFTR13        BRANCH IF NON RSVD INTF             3 00030220
0004AB 62B5                  5335          BU    NOTCHAIN             OTHERWISE RAISE REQ-IN              3 00030230


0004AC D910                  5341 ARSVD    ANDM  FLAGS,CUEB           MASK FOR CUE ON B INTF              3 00030270
0004AD 33AF                  5344          BOC   DREG3,STSONB         BRANCH IF SO                        3 00030280
0004AE 3EB0                  5347          BOC   NCUEB,NIXBSTS        BRANCH IF NOT CUE ON B              3 00030290
0004AF 8040                  5350 STSONB   ORI   CURCOMM,HOLDB        SET CHAIN HOLD ON B INTF            3 00030300
0004B0 6318                  5353 NIXBSTS  BU    ITSRSVD              RETURN                              3 00030310


0004B1 C9F7                  5358 BLOUT44  AND   FLAGS,ONES-RESETOK    RESET THE ALL RESET FLAG              00030340
0004B2 6457                  5361          BU    IDLE4                RETURN TO INVERT INTF B FLA           00030350
0004B3 22CF                  5364 ANYERRS  BOC   ALUR,CMDPAR00        BR ON ALU FAIL                        00030360
0004B4 2BCC                  5367          BOC   STATB,BUSYSTAT       BRANCH IF BUSY CONDITION              00030370
0004B5 D902                  5370          ANDM  FLAGS,STACK          MASK FOR STACK FLAG                   00030380
0004B6 20B8                  5373          BOC   DBUS,CONTCHK         BRANCH IF OFF TO CONTINUE             00030390
0004B7 60E1                  5376          BU    CMDWAIT3             GO PRESENT STACKED STATUS             00030400

                             5379 *** STAT B OFF--STATD ON---STATC EITHER                                     00030420
0004B8 0500                  5381 CONTCHK  STO   PNDSTS,0            CLEAR PENDING STATUS REG              00030430
0004B9                       5383 GETSNS0  EQU   *                                                          00030440
0004B9 4488                  5385          XFR   WORK1,XINB           GET TU SENSE BYTE 0                   00030450
0004BA D950                  5388          ANDM  FLAGS,CUEA+CUEB      MASK FOR CUE FLAGS                    00030460
0004BB 2EC0                  5391 MIFTR14  BOC   SCB,CUEBSTS          BRANCH IF INTF B SELECTIING           00030470
0004BC 31E5                  5394 CUEASTS  BOC   DREG1,CMDWAIT8       BR ON CUE ON A                        00030480
0004BD C8FD                  5397 TUTSTRTN AND   STATIMG,ONES-SETSTATC RESET STAT C IN IMAGE REG          00030490
0004BE 4828                  5400          XFR   STATIMG,STAT         SET TO HARDWARE                       00030500
0004BF 5322                  5403          XFR   LINK4,IC             RETURN TO TEST TAPE UNIT              00030510

0004C0 33E5                  5407 CUEBSTS  BOC   DREG3,CMDWAIT8       BR ON CUE ON B                        00030530
0004C1 64BD                  5410          BU    TUTSTRTN             OTHERWISE RETURN                      00030540

                             5413 *** STAT B ON                                                               00030560
0004C2 3BB3                  5415 CHKBUSY  BOC   STATD,ANYERRS        IF ON MUST HAVE BEEN NORMAL END       00030570
0004C3 3AC6                  5418 LOOKAGIN BOC   STATC,CONTCHK1       BRANCH IF DEV SELECTED                00030580
0004C4 3BCC                  5421          BOC   STATD,BUSYSTAT       BRANCH IF DEV SWITCHED                00030590
0004C5 64C3                  5424          BU    LOOKAGIN             GO LOOK AGAIN                         00030600

                             5427 *** STATS B AND C ON--STAT D OFF                                            00030620
0004C6 D902                  5429 CONTCHK1 ANDM  FLAGS,STACK          MASK FOR STACK FLAG                   00030630
0004C7 20CA                  5432          BOC   DBUS,CONTCHK2        BRANCH IF OFF TO CONTINUE             00030640
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   9/04/73
0004C8 8504                       5435          ORI   PNDSTS,DEVEND       OR IN DEV END IN STATUS          00030650
0004C9 60E1                       5438          BU    CMDWAIT3            GO PRESENT STACKED STATUS        00030660

                                  5441 *** NO STACKED STATUS                                               00030680
0004CA 0504                       5443 CONTCHK2 STO   PNDSTS,DEVEND       SET DEV END IN PENDING STATUS    00030690
0004CB 60E1                       5446          BU    CMDWAIT3            GO SET LINKS                     00030700

0004CC 0510                       5450 BUSYSTAT STO   PNDSTS,BUSY         BUSY IN SCRATCH REG              00030720
0004CD 60E4                       5453          BU    PENDLINK            GO TO RAISE STATUS IN            00030730

0004CE 60C8                       5457 PRETURN1 BU    PRETURN0                                             00030750
0004CF 60D6                       5460 CMDPAR00 BU    CMDPAR0                                              00030760
                                  5462 ************************************ OPENERS ************************ 00030770
                                  5463 *  OPENERS WILL RESET THE PING HOLD LATCH IN HARDWARE IF THE COMMAND  * 00030780
                                  5464 * IS OTHER THAN TIO AND THE STATUS STACKED OR PENDING FLAGS ARE OFF.  * 00030790
                                  5465 * WHEN ALU2 COMPLETES ASSEMBLING THE DEVICE STATUS, THIS ROUTINE WILL * 00030800
                                  5466 * CHECK ALU2 STATS TO DETERMINE IF THE DEVICE IS BUSY,NOT READY,OR HAS* 00030810
                                  5467 *A PENDING DEV END. IF NONE OF THE AFOREMENTIONED ITEMS APPLY THEN THE* 00030820
                                  5468 *DEVICE IS AVAILABLE AND THE COMMAND WILL BE DECODED. ALU2 STAT COMBOS* 00030830
                                  5469 *HAVE THE FOLLOWING MEANING:                                        * 00030840
                                  5470 *        STATC=DEV END,UNT CHK(READY DROP WHEN DEV END WAS PRIMED)  * 00030850
                                  5471 *        STATB AND STATC=DEV END DUE TO DEV END PRIME(REW OR DSE)   * 00030860
                                  5472 *        STATB AND STATD=DEVICE IS BUSY                             * 00030870
                                  5473 *        STATC AND STATD=DEVICE IS NOT READY                        * 00030880
                                  5474 *                                                                   * 00030890
                                  5475 ************************************************************************ 00030900

0004D0 6400                       5478 RTNCOMR  BU    COMREJC1            RETURN TO COMMAND REJECT         00030920
0004D1 6181                       5481 RTNSENS  BU    SENSEOK             RETURN TO SENSE                  00030930
0004D2 6220                       5484 RTNPROT  BU    PROTEST1            RETURN TO CHECK FILE LPROTECT    00030940
0004D3 622C                       5487 RTNTUTST BU    TUTESTIT            RETURN TO CHECK READY            00030950
0004D4 6233                       5490 RTNTUTS1 BU    TUTEST2             RETURN TO DO SENSE RESET         00030960

0004D5                            5493 OPENERS  EQU   *                                                    00030980
0004D5 D906                       5495 MIFTR02  ANDM  FLAGS,STATPNDG+STACK MASK FOR PENDING STATUS         00030990
0004D6 20D8                       5498          BOC   DBUS,MAYBETIO           BRANCH IF BOTH ARE OFF       00031000
0004D7 64DB                       5501          BU    OPENERS1                DONT RST PING-PONG HOLD LATCH 00031010

0004D8 F000                       5505 MAYBETIO XOM   CURCOMM,X'00'           MASK FOR TIO CMD             00031030
0004D9 20DB                       5508          BOC   DBUS,OPENERS0       BRANCH IF SO (NO HOLD RESET)     00031040
0004DA 4044                       5511          XFR   PING                    OTHERWISE RESET HOLD LATCH   00031050
0004DB                            5513 OPENERS0 EQU   *                                    TUS             00031060

0004DB 3BB3                       5516 OPENERS1 BOC   STATD,ANYERRS       IF ALU2 FINISHED,GO LOOK FOR ERROR 00031080
0004DC 2BC2                       5519          BOC   STATB,CHKBUSY       IF ON GO CHECK FOR PENDING DEV END 00031090
0004DD 3AE0                       5522          BOC   STATC,SEEIFUC       BRANCH IF ON TO CHECK FOR DE, UC STS 00031100
0004DE 28CE                       5525          BOC   ADROUT,PRETURN1     HALT I/O?                        00031110
0004DF 64DB                       5528          BU    OPENERS1            ALU2 STILL BUSY, GO BACK         00031120

                                  5532 *** STAT C WAS ON                                                   00031150
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   9/04/73
0004E0 3BB3                      5534 SEEIFUC  BOC    STATD,ANYERRS       BRANCH IF INT REQ                  00031160
0004E1 2BC6                      5537          BOC    STATB,CONTCHK1      BRANCH IF DEV END                  00031170
0004E2 D902                      5540          ANDM   FLAGS,STACK         MASK FOR STACK LAG                 00031180
0004E3 20E6                      5543          BOC    DBUS,SETDEUC        BRANCH IF OFF                      00031190
0004E4 8506                      5546          ORI    PNDSTS,DEVEND+UNITCHK  OTHERWISE OR IN DE AND UC       00031200
0004E5 60E1                      5549 CMDWAIT8 BU     CMDWAIT3            GO CHECK FOR TIO                   00031210
0004E6 0506                      5552 SETDEUC  STO    PNDSTS,DEVEND+UNITCHK SET UC,DE--READY DROP ON DEP DEV 00031220
0004E7 60E1                      5555          BU     CMDWAIT3                                               00031230

                                 5558 *** STAT D WAS ON                                                      00031250
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                                F01MAY72   9/04/73
000500                             5561            ORG    BEGIN+X'500'                                               00031280
                                   5562 **************************** DISPLAY LSRS *************************** 00031290
                                   5563 *  AN INDISPENSABLE ROUTINE TO ALLOW DISPLAY OF THE ALU1 LSR'S IN THE * 00031300
                                   5564 * CHANNEL BUS IN INDICATORS. ON FIRST ROUND THE 16 LOW LSR'S(0-15)     * 00031310
                                   5565 * ARE DISPLAYED. SECOND ROUND(DON'T HIT RESET) WILL DISPLAY HIGH       * 00031320
                                   5566 * LSR'S(16-31). AN ANTOMATIC STOP IS NOT EMPLOYED IN THIS ROUTINE AND * 00031330
                                   5567 * IT WILL CONTINUE TO DISPLAY HIGH LSR'S FOREVER. RESTART IS THE ONLY * 00031340
                                   5568 * WAY TO DISPLAY LOW LSR'S A SECOND TIME.                              * 00031350
                                   5569 *                                                                      * 00031360
                                   5570 *  INSTRUCTION COUNTER(IC) DISPLAY IN RELATION TO LSR'S ON             * 00031370
                                   5571 *  CHANNEL BUS IN ARE AS FOLLOWS:                                      * 00031380
                                   5572 *                                                                      * 00031390
                                   5573 * IC= 502     DISPLAY LSR0 -FIRST ROUND & LSR16-SECOND ROUND           * 00031400
                                   5574 * IC= 503     DISPLAY LSR1 -FIRST ROUND & LSR17-SECOND ROUND           * 00031410
                                   5575 * IC= 504     DISPLAY LSR2 -FIRST ROUND & LSR18-SECOND ROUND           * 00031420
                                   5576 * IC= 505     DISPLAY LSR3 -FIRST ROUND & LSR19-SECOND ROUND           * 00031430
                                   5577 * IC= 506     DISPLAY LSR4 -FIRST ROUND & LSR20-SECOND ROUND           * 00031440
                                   5578 * IC= 507     DISPLAY LSR5 -FIRST ROUND & LSR21-SECOND ROUND           * 00031450
                                   5579 * IC= 508     DISPLAY LSR6 -FIRST ROUND & LSR22-SECOND ROUND           * 00031460
                                   5580 * IC= 509     DISPLAY LSR7 -FIRST ROUND & LSR23-SECOND ROUND           * 00031470
                                   5581 * IC= 50A     DISPLAY LSR8 -FIRST ROUND & LSR24-SECOND ROUND           * 00031480
                                   5582 * IC= 50B     DISPLAY LSR9 -FIRST ROUND & LSR25-SECOND ROUND           * 00031490
                                   5583 * IC= 50C     DISPLAY LSR10-FIRST ROUND & LSR26-SECOND ROUND           * 00031500
                                   5584 * IC= 50D     DISPLAY LSR11-FIRST ROUND & LSR27-SECOND ROUND           * 00031510
                                   5585 * IC= 50E     DISPLAY LSR12-FIRST ROUND & LSR28-SECOND ROUND           * 00031520
                                   5586 * IC= 50F     DISPLAY LSR13-FIRST ROUND & LSR29-SECOND ROUND           * 00031530
                                   5587 * IC= 510     DISPLAY LSR14-FIRST ROUND & LSR30-SECOND ROUND           * 00031540
                                   5588 * IC= 511     DISPLAY LSR15-FIRST ROUND & LSR31-SECOND ROUND           * 00031550
                                   5589 ************************************************************************ 00031560

                                   5591 **************************** DISPALAY LSRS *************************** 00031580

000500 4006                        5594 TRACELSR XFR   LSR                  INSURE IN LOW SET                   00031600
000501 4060                        5597 GETHIGH  XFR   R0,CBI               TAKE LSR TO CE PANEL                00031610
000502 4160                        5600          XFR   R1,CBI               TAKE LSR TO CE PANEL                00031620
000503 4260                        5603          XFR   R2,CBI               TAKE LSR TO CE PANEL                00031630
000504 4360                        5606          XFR   R3,CBI               TAKE LSR TO CE PANEL                00031640
000505 4460                        5609          XFR   R4,CBI               TAKE LSR TO CE PANEL                00031650
000506 4560                        5612          XFR   R5,CBI               TAKE LSR TO CE PANEL                00031660
000507 4660                        5615          XFR   R6,CBI               TAKE LSR TO CE PANEL                00031670
000508 4760                        5618          XFR   R7,CBI               TAKE LSR TO CE PANEL                00031680
000509 4860                        5621          XFR   R8,CBI               TAKE LSR TO CE PANEL                00031690
00050A 4960                        5624          XFR   R9,CBI               TAKE LSR TO CE PANEL                00031700
00050B 4A60                        5627          XFR   R10,CBI              TAKE LSR TO CE PANEL                00031710
00050C 4B60                        5630          XFR   R11,CBI              TAKE LSR TO CE PANEL                00031720
00050D 4C60                        5633          XFR   R12,CBI              TAKE LSR TO CE PANEL                00031730
00050E 4D60                        5636          XFR   R13,CBI              TAKE LSR TO CE PANEL                00031740
00050F 4E60                        5639          XFR   R14,CBI              TAKE LSR TO CE PANEL                00031750
000510 4F60                        5642          XFR   R15,CBI              TAKE LSR TO CE PANEL                00031760
000511 5006                        5645          XFRH  LSR                  SET HIGH                            00031770
000512 6501                        5648 GETREST  BU    GETHIGH              WILL STAY IN HIGH UNTIL RESET       00031780
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  LOC   OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                          F01MAY72    9/04/73
                                    5651 **************************************************                    00031800
                                    5652 * THIS ROUTINE TEST THE ARITHMETIC FUNCTIONS OF  *                    00031810
                                    5653 * THE ALU1.THE TESTS PROGRESS AS FOLLOWS:        *                    00031820
                                    5654 *                                                *                    00031830
                                    5655 *       1.ALU1 STATA-ALU2-STATS B AND C TEST     *                    00031840
                                    5656 *       2.ALU ADDER RIPPLE TEST                  *                    00031850
                                    5657 *       3.OP CODES TEST                          *                    00031860
                                    5658 *       4.CROSSOVER ALL ONES CHECK               *                    00031870
                                    5659 *       5.ALU2 STAT C ON AND CROSSOVER ALL       *                    00031880
                                    5660 *         ZEROES CHECK                           *                    00031890
                                    5661 **************************************************                    00031900
000513                              5663 STEP0092 EQU   *                    START ALU CHECKOUT HERE           00031920
000513 02FF                         5665 ALUCHECK STO   R2,X'FF'             TEST                              00031930
000514 DB40                         5668          ANDM  FLAGS2,ALUFAIL       SKIP ALU CHKOUT IF                00031940
000515 3078                         5671          BOC   DREG0,LATER             FAILURE FLAG IS ON             00031950
000516 4242                         5674          XFR   R2,XOUTA              XFR TO ALU2 AND                  00031960
000517 1E03                         5677          STO   FRUSAV,3             BUMP FRU REG                      00031970
000518 0205                         5680          STO   R2,NDXTST3       T   FETCH ALU2 TEST INDEX             00031980

000519 0800                         5684          STO   STATIMG,0            CLEAR STAT IMAGE REG              00032000
00051A 4828                         5687          XFR   STATIMG,STAT SET STATS TO HARDWARE                     00032010

00051B 2A67                         5691          BOC   STATA,ZONKA          SHD BE OFF                        00032030

00051C 4241                         5695          XFR   R2,XOUTB             KICK OFF ALU2                     00032050

00051D 2B67                         5699          BOC   STATB,ZONKA          SHD BE OFF                        00032070
00051E 3A6E                         5702          BOC   STATC,ZONKC          SHD BE OFF                        00032080

00051F 1E04                         5706          STO   FRUSAV,4             BUMP FRU REG                      00032100

000520 0000                         5710 TESTONE  STO   R0,0                 CLEAR REG 0                       00032120

000521 3046                         5714          BOC   DREG0,TRAP11          BIT SHD BE OFF                   00032140
000522 3144                         5717          BOC   DREG1,TRAP10          BIT SHD BE OFF                   00032150
000523 3242                         5720          BOC   DREG2,TRAP9           BIT SHD BE OFF                   00032160
000524 3340                         5723          BOC   DREG3,TRAP8           BIT SHD BE OFF                   00032170
000525 343E                         5726          BOC   DREG4,TRAP7           BIT SHD BE OFF                   00032180
000526 353C                         5729          BOC   DREG5,TRAP6           BIT SHD BE OFF                   00032190
000527 363A                         5732          BOC   DREG6,TRAP5           BIT SHD BE OFF                   00032200
000528 3738                         5735          BOC   DREG7,TRAP4           BIT SHD BE OFF                   00032210

000529 04FF                         5739          STO   R4,ONES              FILL REG 4                        00032230

00052A A001                         5743 TEST1    ADD   R0,1                  BUMP REG 0 BY 1                  00032250
00052B 2131                         5746          BOC   NALCO,AA              BR IF NO OVERFLOW                00032260
00052C 202E                         5749          BOC   DBUS,BB               ON OVERFLOW DBUS SHD BE 0        00032270

00052D 4011                         5753 TRAP1    XFR   HDWERR                FALSE CARRY                      00032290

00052E A4FF                         5757 BB       ADD   R4,ONES               DECREMENT R4 BY ONE MORE         00032310
00052F 2147                         5760          BOC   NALCO,OPCODES         SHD BE NO CARRY HERE             00032320

000530 4011                         5764 TRAP2    XFR   HDWERR                PROBLEM                          00032340
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                          F01MAY72   9/04/73

000531 A4FF                        5768 AA       ADD R4,ONES            DECREMENT R4 BY 1                  00032360
000532 2136                        5771          BOC   NALCO,CCTRAP     SHD BE A CARRY                     00032370
000533 4421                        5774          XFR   R4,AR             R4 TO ABUS                        00032380
000534 B000                        5777          ADDM  R0,0             MATCH AGAINST R0                   00032390
000535 2137                        5780          BOC   NALCO,DD         SHD BE NO CARRY                    00032400

000536 4011                        5784 CCTRAP   XFR   HDWERR            NO CARRY WHEN XPECTED             00032420


000537 3739                        5789 DD       BOC   DREG7,EE          BIT SHD BE ON                     00032450
000538 4011                        5792 TRAP4    XFR   HDWERR           BIT WAS OFF                        00032460

000539 363B                        5796 EE       BOC   DREG6,FF          BIT SHD BE ON                     00032480
00053A 4011                        5799 TRAP5    XFR   HDWERR           BIT WAS OFF                        00032490

00053B 353D                        5803 FF       BOC   DREG5,GG          BIT SHD BE ON                     00032510
00053C 4011                        5806 TRAP6    XFR   HDWERR           BIT WAS OFF                        00032520

00053D 343F                        5810 GG       BOC   DREG4,HH          BIT SHD BE ON                     00032540
00053E 4011                        5813 TRAP7    XFR   HDWERR           BIT WAS OFF                        00032550

00053F 3341                        5817 HH       BOC   DREG3,II          BIT SHD BE ON                     00032570
000540 4011                        5820 TRAP8    XFR   HDWERR           BIT WAS OFF                        00032580

000541 3243                        5824 II       BOC   DREG2,JJ          BIT SHD BE ON                     00032600
000542 4011                        5827 TRAP9    XFR   HDWERR           BIT WAS OFF                        00032610

000543 3145                        5831 JJ       BOC   DREG1,KK          BIT SHD BE ON                     00032630
000544 4011                        5834 TRAP10   XFR   HDWERR           BIT WAS OFF                        00032640

000545 302A                        5838 KK       BOC   DREG0,TEST1       BIT SHD BE ON                     00032660
000546 4011                        5841 TRAP11   XFR   HDWERR           BIT WAS OFF                        00032670


000547 0020                        5845 OPCODES  STO   R0,X'20'          SET IN DATA                       00032690
000548 1E05                        5848          STO   FRUSAV,5         BUMP FRU REG                       00032700
000549 4021                        5851          XFR   R0,AR           SET DATA IN AR                      00032710
00054A C000                        5854          AND   R0,0               AND SAME DATA                    00032720
00054B 324D                        5857          BOC   DREG2,ALU1001   TEST FOR PROPER RESULT              00032730

00054C 4011                        5861 TRAP106  XFR   HDWERR           AND OP FAILURE                     00032750
00054D A020                        5864 ALU1001  ADD   R0,X'20'         ADD SAME DATA                      00032760
00054E 3150                        5867          BOC   DREG1,ALU1002    TEST FOR  BIT IN DREG1             00032770

00054F 4011                        5871 TRAP107  XFR   HDWERR           ADD OP FAILURE                     00032790

000550 8020                        5875 ALU1002  ORI   R0,X'20'         OR SAME DATA                       00032810
000551 3253                        5878          BOC   DREG2,ALU1003    TEST FOR BIT 2                     00032820

000552 4011                        5882 TRAP108  XFR   HDWERR           OR OP FAILURE                      00032840
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  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                                F01MAY72   9/04/73
000553 E09F                       5886 ALU1003  XO     R0,X'9F'          EXCLUSIVE OR R0 SET TO FF                  00032860
000554 A001                       5889          ADD    R0,X'01'          ADD 1 TO R0                                00032870
000555 2058                       5892          BOC    DBUS,CHEKONB      RESULT SHOULD BE ZERO                      00032880
000556 4011                       5895 TRAP109  XFR    HDWERR            EXCLUSIVE OR OP FAILURE                    00032890

000557 1E06                       5899          STO    FRUSAV,6          BUMP FRU REG                               00032910
                                  5901 * GO TO MAP 13-420                                                         00032920
000558 2B5B                       5903 CHEKONB  BOC    STATB,CHKXINS     BRANCH IF ALU2 READY                       00032930
                                  5905 * GO TO MAP 13-420                                                         00032940
000559 226A                       5907          BOC    ALUR,ZONK         BRANCH IF ALU2 DIED                        00032950
                                  5909 * GO TO MAP 13-420                                                         00032960
00055A 6558                       5911          BU     CHEKONB           WAIT                                       00032970

00055B 4090                       5915 CHKXINS  XFR    R0,XINA            CHECK                                     00032990
                                  5917 * GO TO MAP 13-430                                                         00033000
00055C A001                       5919          ADD    R0,1                XINA                                    00033010
00055D 2172                       5922          BOC    NALCO,ZONKXA        AND                                     00033020

00055E 4088                       5926          XFR    R0,XINB               XINB                                  00033040
00055F A001                       5929          ADD    R0,1                   FORALL                               00033050
000560 2176                       5932          BOC    NALCO,ZONKXB            ONES                                00033060

000561 4042                       5936          XFR     R0,XOUTA           CLEAR XOUTA FOR ALU2                    00033080
000562 1E07                       5939          STO    FRUSAV,7           BUMP FRU REG                            00033090
                                  5942 CHKSTATS STO    STATIMG,SETSTATA+SETSTATB+SETSTATC+SETSTATD+STOP            00033100
000563 088F                         +                  OP)
000564                            5943+         ORG    *-1
000564 4828                       5945          XFR    STATIMG,STAT        TRN ON THE STATS FOR TEST               00033110
000565 0800                       5948          STO    STATIMG,0          CLEAR STAT IMAGE REG                     00033120
000566 2A68                       5951          BOC    STATA,WAIT          SHD BR                                  00033130

000567 4011                       5955 ZONKA    XFR    HDWERR                                                     00033150


                                  5960 * GO TO MAP 13-440                                                         00033190
000568 3B6B                       5962 WAIT     BOC    STATD,CKALUERR     STATD SAYS END OF ROUTINE               00033200
                                  5964 * GO TO MAP 13-440                                                         00033210
000569 6568                       5966          BU     WAIT                                                       00033220

00056A 4011                       5970 ZONK     XFR    HDWERR             ALU2 FAILED                             00033240

00056B 226A                       5974 CKALUERR BOC    ALUR,ZONK          LOOK FOR ALU2 HARD ERROR                00033260
00056C 1E08                       5977          STO    FRUSAV,8           BUMP FRU REG                            00033270
00056D 3A6F                       5980 CHKC     BOC    STATC,STATSOK       SHD BE ON                              00033280

00056E 4011                       5984 ZONKC    XFR    HDWERR                                                     00033300

00056F                            5987 STATSOK  EQU    *                                                          00033320
00056F 4090                       5989          XFR    R0,XINA            CHECK                                   00033330
000570 A0FF                       5992          ADD    R0,ONES             XINA                                   00033340
000571 2173                       5995          BOC    NALCO,XINAOK          AND                                  00033350

000572 4011                       5999 ZONKXA   XFR    HDWERR                 XINB                                  00033370
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   9/04/73
000573 4088                       6003 XINAOK   XFR   R0,XINB                 FOR                    00033390
000574 A0FF                       6006          ADD   R0,ONES                  ALL                    00033400
000575 2177                       6009          BOC   NALCO,XINBOK               ZEROES               00033410

000576 4011                       6013 ZONKXB   XFR   HDWERR                                         00033430

000577                            6016 XINBOK   EQU   *                                              00033450
000577 6771                       6018          BU    CHKDISC                                        00033460
000578 6304                       6021 LATER    BU    IDLESCAN          GO BACK TO POLL              00033470
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   9/04/73
                                   6024 ************************** SET DIAGNOSE CMD ************************ 00033490
                                   6025 * DOSETDIA WILL FETCH FOUR BYTES FROM THE CHANNELAND SAVE THEM FOR    * 00033500
                                   6026 * USE LATER. THE FIRST BYTE WILL BE PASSED TO ALU2 AND IF THE FORCE   * 00033510
                                   6027 * ALU ERRORS FLAG IS ON. IF THE GDT FLAG IS ON ALU1 WILL TIME OUT THE * 00033520
                                   6028 * TIME SPECIFED IN THE LAST TWO BYTES. THIS ROUTINE IS ENTERED WHEN   * 00033530
                                   6029 * THW CHANNEL ISSUES A SET DIAGNOSE COMMAND                           * 00033540
                                   6030 ********************************************************************** 00033550

000579 4CA0                        6033 DOSETDIA XFR   SETDIA1,CBO         FETCH FIRST BYTE                    00033570
00057A 140E                        6036          STO   XOUTBIM,NDXFLAGS      RT LOAD ALU2 INDEX               00033580
00057B 4C42                        6039          XFR   SETDIA1,XOUTA       PASS 1ST BYTE TO ALU2              00033590
00057C 5441                        6042          XFR   XOUTBIM,XOUTB       TRAP ALU2 TO FETCH BYTE            00033600
00057D 1002                        6045          STO   LINK1,BRETURN4      SET BYTE RECEIVED RETURN           00033610
00057E 118C                        6048          STO   LINK2,SETSTOP       SET STOP RETURN                    00033620
00057F 128A                        6051          STO   LINK3,WRTHIO        SET HIO RETURN                     00033630
000580 1387                        6054          STO   LINK4,SAV1FCH2      SET ROUTINE LINK                   00033640
                                   6056 ********************************************************************** 00033650
                                   6057 *GOFETCH RESETS SERVICE IN FROM THE LAST BYTE FETCH AND LINKS TO      * 00033660
                                   6058 *THE SERVICE SUBROUTINE                                              * 00033670
                                   6059 ********************************************************************** 00033680
000581 4150                        6061 GOFETCH  XFR   CTIMAGE,CTI         DROP SERVICE IN                     00033690
000582 620A                        6064          BU    SERVRTN           GO GET NEXT BYTE                    00033700

                                   6067 ********************************************************************** 00033720
                                   6068 *DIALINK IS THE COMMON RETURN FROM THE SERVICE ROUTINE. LINK REG 4    * 00033730
                                   6069 *WILL BE LOADED TO RETURN TO THE APPROPRIATE BYTE FETCH               * 00033740
                                   6070 ********************************************************************** 00033750

000583 2485                        6073 DIALINK  BOC   BOPE,SETBOPE        BRANCH IF BUS OUT PARITY BAD        00033770
000584 5322                        6076          XFR   LINK4,IC                                                00033780
000585 8720                        6079 SETBOPE  ORI   SNSSTS2,BUSOC       SET BUS OUT CHECK                   00033790
000586 5322                        6082 SETBOPO  XFR   LINK4,IC                                                00033800

                                   6085 *** SAVE BYTE 1--FETCH BYTE 2                                          00033820
000587 4DA0                        6087 SAV1FCH2 XFR   SETDIA2,CBO         GO GET BYTE 1                       00033830
000588 138A                        6090          STO   LINK4,SAV2FCH3      POINT TO NEXT FETCH                 00033840
000589 6581                        6093          BU    GOFETCH           GO GET EM                           00033850

                                   6096 *** SAVE BYTE2--FETCH BYTE 3                                           00033870
00058A 4EA0                        6098 SAV2FCH3 XFR   SETCNT1,CBO         GO GET BYTE 2                       00033880
00058B 1410                        6101          STO   XOUTBIM,NDXFLAG2      RT                               00033890
00058C 4E42                        6104          XFR   SETCNT1,XOUTA       MOVE FLAGS TO XOUTA                 00033900
00058D 5441                        6107          XFR   XOUTBIM,XOUTB       KICK OFF ALU2 TO FETCH FLAGS        00033910
00058E 1390                        6110          STO   LINK4,SAV3NOFC      POINT TO NEXT SAVE--NOFETCH         00033920
00058F 6581                        6113          BU    GOFETCH           GO GET EM                           00033930

                                   6116 *** SAVE BYTE 3 DROP SERVICE IN                                        00033950
000590 4FA0                        6118 SAV3NOFC XFR   SETCNT2,CBO         GO GET BYTE 3                       00033960
000591 4150                        6121          XFR   CTIMAGE,CTI        DROP SERVICE IN                     00033970

                                   6124 ***LOOK FOR GDT FLAG AND, IF ON, TIME OUT PRIOR TO PRESENTING STATUS   00033990
000592 DC10                        6126          ANDM  SETDIA1,GDT         MASK TO CHECK GO DOWN TIME FLAG     00034000
000593 209E                        6129 PRSNTSTS BOC   DBUS,GIVSTS         BRANCH IF OFF                       00034010
000594 0400                        6132          STO   WORK1,0             CLEAR WORK REG(LOWEST CNTR)         00034020
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   9/04/73
000595 A401                       6135 INCAGN   ADD   WORK1,1           BUMP LOWEST COUNTER (400 NANOSECS)  00034030
000596 28A0                       6138          BOC   ADROUT,GDTHIO     HIO IF UP                           00034040
000597 2195                       6141          BOC   NALCO,INCAGN      BRANCH IF NO CARRY TO BUMP AGAIN    00034050
000598 AFFF                       6144          ADD   SETCNT2,ONES      DECREMENT LO CNTR (103.150 USECS)   00034060
000599 219B                       6147          BOC   NALCO,DECHICNT    BRANCH IF NO CARRY TO DECR HI CNTR  00034070
00059A 6595                       6150          BU    INCAGN            OTHERWISE, GO BUMP LOWEST AGAIN     00034080
00059B AEFF                       6153 DECHICNT ADD   SETCNT1,ONES      DECREMENT HI CNTR (27 MSECS)        00034090
00059C 219E                       6156          BOC   NALCO,GIVSTS      GET OUT IF NO CARRY (PRESENT STATUS) 00034100
00059D 6595                       6159          BU    INCAGN            OTHERWISE GO DO IT ALL AGAIN        00034110
00059E CCEF                       6162 GIVSTS   AND   SETDIA1,ONES-GDT  RESET THE FLAG                      00034120
00059F 63D7                       6165 GIVSTS1  BU    CHEKSNS           GO ASSEMBLE ENDING STATUS           00034130
0005A0 634D                       6168 GDTHIO   BU    HIOPERG           GET OUT HIO ISSUED                  00034140


0005A1 6203                       6172 WRTINIT  BU    WRTBGN            RETURN TO WRITE ROUTINE             00034160
0005A2 63B3                       6175 DOAREAD  BU    LETSREAD                                              00034170


                                  6179 ************************************************************************ 00034200
                                  6180 * CLEANGO OCCURS WHEN CLEAN INITIAL STATUS IS ACCEPTED                  00034210
                                  6181 ************************************************************************ 00034220

0005A3 4150                       6184 CLEANGO  XFR   CTIMAGE,CTI       DROP STATUS IN                      00034240
0005A4 4242                       6187          XFR   XOUTAIM,XOUTA     SET DATA FLOW MASK TO HDWE          00034250
0005A5 4828                       6190          XFR   STATIMG,STAT      RESET STAT D IF ON                  00034260
0005A6 28A1                       6193 SVCOUP   BOC   ADROUT,WRTINIT    BRANCH IF HIO                       00034270
0005A7 2DA6                       6196          BOC   SVCOUT,SVCOUP     WAIT FOR SERVICE OUT TO DROP        00034280
0005A8 9000                       6199          ORM   CURCOMM,0         MASK FOR BRANCHING                  00034290
0005A9 37A1                       6202          BOC   DREG7,WRTINIT     BRANCH IF WRITE OR TIE REQUEST      00034300
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   9/04/73

                                   6206 ************************ DIAGNOSTIC MEASURE AND READ ***************** 00034330
                                   6207 * THE DMR (DIAGNOSTIC MEASURE AND READ) IS USED TO GATHER ONLINE      * 00034340
                                   6208 * DATA FOR CAPSTAN PROFILE,VELOCITY,AND ASSYMMETRY. A SET DIAGNOSE   * 00034350
                                   6209 * COMMAND MUST BE ISSUED AFTER ISSUING A PRIOR READ TYPE OP(DETERMINES* 00034360
                                   6210 * THE DIRECTION TO BE MEASURED---FORWARD OR BACKWARD STATUS) A READ   * 00034370
                                   6211 * OR READ BACKWARD COMMAND MUST BE ISSUED FOLLOWING THE SET DIAGNOSE. * 00034380
                                   6212 * THE CONTROLLER WILL SEND BYTES TO CHANNEL CCONSISTING OF TACH TIMING* 00034390
                                   6213 * COUNTS. THE FIRST SET DIAGNOSE CNT CONTAINS A NUMBER IN TACH COUNTS * 00034400
                                   6214 * THAT GO IS TO REMAIN UP, THE SECOND COUNT IS A NUMBER THAT GO IS    * 00034410
                                   6215 * TO REMAIN DOWN. THE COUNTS WILL BE EXPIRED IN THAT ORDER. THE TIME  * 00034420
                                   6216 * THAT GO REMAINS UP AFTER GO DOWN DEPENDS ON THE CHANNEL BYTE COUNT  * 00034430
                                   6217 ********************************************************************** 00034440

0005AA 1000                        6220 CHKDMR   STO   LINK1,DMRRTN1       LOAD SERVICE OUT RESP RETURN          00034460
0005AB 118C                        6223          STO   LINK2,SETSTOP       LOAD CMD OUT RESP RETURN              00034470
0005AC 128A                        6226          STO   LINK3,WRTHIO        LOAD HIO RETURN                       00034480
0005AD DC6C                        6229          ANDM  SETDIA1,DMR+IBGMSR+RDACC+RDSTOP  CHECK DIAG BITS      00034490
0005AE 20A2                        6232          BOC   DBUS,DOAREAD        BRANCH IF OFF TO CHECK IBG MSR        00034500

0005AF 8820                        6236          ORI   STATIMG,CONTROL     SET CONTROL BIT IN XOUTA              00034520
0005B0 4828                        6239          XFR   STATIMG,STAT                                              00034530
0005B1 4242                        6242          XFR   XOUTAIM,XOUTA       SET XOUTA TO HARDWARE                 00034540
0005B2 DC6C                        6245          ANDM  SETDIA1,DMR+IBGMSR+RDACC+RDSTOP  CHECK DIAG BITS      00034550
0005B3 31E6                        6248          BOC   DREG1,DOIBGMSR       BRANCH IF IBG MEASURE BIT IS ON       00034560

0005B4 32F8                        6252          BOC   DREG2,READACC       BRANCH IF READ ACCESS BIT ON          00034580

0005B5 34E5                        6256          BOC   DREG4,DORDSTOP      BRANCH IF READ STOP MEASURE           00034600

0005B6 140C                        6260          STO   XOUTBIM,NDXDMR          LOAD ALU2 DMR BRANCH INDEX        00034620
0005B7 5441                        6263          XFR   XOUTBIM,XOUTB       START ALU2                            00034630
0005B8 18E4                        6266 GORDSTOP STO   LINK5,DMRSTOP       SET STOP POINTER                      00034640
0005B9 19CB                        6269          STO   LINK6,DMR6          SET B CHANGED STATE POINTER           00034650
0005BA 0400                        6272          STO   WORK1,0             CLEAR MODULO BYTE CNTR                00034660

0005BB AEFF                        6276 DMR1     ADD   SETCNT1,ONES        DECREMENT GO UP COUNT BY ONE          00034680
0005BC 21D9                        6279          BOC   NALCO,DMR4          BRANCH IF NO CARRY--FINISHED          00034690

0005BD 4828                        6283 DMR3     XFR   STATIMG,STAT        SET STATS TO HDWE                     00034710
0005BE 3BE3                        6286          BOC   STATD,ALU2STOP       GET OUT IF IBGMSR OR ALU2 HARD ERR  00034720
0005BF DC60                        6289          ANDM  SETDIA1,IBGMSR+RDACC  TEST FLAGS                          00034730
0005C0 20C2                        6292          BOC   DBUS,LOOKATA        BR IF  NEITHER                        00034740
0005C1 2BC7                        6295          BOC   STATB,DMR5          TEST STATB                            00034750
0005C2 2AC7                        6298 LOOKATA  BOC   STATA,DMR5          CHECK STATB FOR ON OR OFF             00034760

                                   6301 *** WAIT FOR STATB TO COME ON THEN FETCH NEXT TWO BYTES OF COUNT        00034780
0005C3 2BCA                        6303 DMR7     BOC   STATB,ITSTIME       WAIT FOR STATB TO COME ON             00034790
0005C4 28E4                        6306          BOC   ADROUT,DMRSTOP      BRANCH IF HIO                         00034800
0005C5 3BE3                        6309          BOC   STATD,ALU2STOP      BRANCH IF ALU2 HAD HARD ERROR         00034810
0005C6 65C3                        6312          BU    DMR7                GO BACK AND CHECK STAT B              00034820

                                   6315 *** WAIT FOR STATB TO GO OFF THEN FETCH NEXT TWO BYTES OF COUNT        00034840
0005C7 3BE3                        6317 DMR5     BOC   STATD,ALU2STOP      BRANCH IF ALU2 HAD HARD ERROR         00034850
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LOC	OBJECT CODE	ADDR1	ADDR2	STMT	SOURCE STATEMENT			F01MAY72 9/04/73
0005C8	28E4			6320		BOC	ADROUT,DMRSTOP	BRANCH IF HIO 00034860
0005C9	2BC7			6323		BOC	STATB,DMR5	WAIT FOR STAT B TO FALL 00034870
0005CA	5922			6327	ITSTIME	XFR	LINK6,IC	STAT B OFF GO GET NEXT 2 COUNTS 00034890
0005CB	A401			6332	DMR6	ADD	WORK1,1	BUMP MODULO BYTE COUNT 00034920
0005CC	13D1			6335		STO	LINK4,DMR2	LOAD SERVICE RETURN POINTER 00034930
0005CD	5488			6338	SERVIBG	XFR	XOUTBIM,XINB	GO FETCH HI ORDER COUNT BYTE 00034940
0005CE	5F90			6341		XFR	FORMAT,XINA	BRING IN SECOND BYTE 00034950
0005CF	5460			6344		XFR	XOUTBIM,CBI	MOVE TO CHAN BUS IN 00034960
0005D0	620A			6347		BU	SERVRTN	GO PRESENT TO CHANNEL 00034970
				6350	*** THE FIRST BYTE OF COUNT FOR ONE TACH TRANSITION HAS BEEN XFERRED 00034990			
				6351	*** NOW XFR THE SECOND BYTE 00035000			
0005D1	2AD5			6353	DMR2	BOC	STATA,DMR8	BRANCH IF ONE FULL TACH TIME SENT 00035010
0005D2	8808			6356		ORI	STATIMG,SETSTATA	OTHERWISE SET STATA AND FINISH CNTS 00035020
0005D3	13BD			6359		STO	LINK4,DMR3	LOAD SERV RTN RETURN POINTER 00035030
0005D4	65D7			6362		BU	DMR9	GO FETCH NEXT BYTE 00035040
0005D5	C8F7			6366	DMR8	AND	STATIMG,ONES-SETSTATA	RESET STAT A IN IMAGE REG 00035060
0005D6	13BB			6369		STO	LINK4,DMR1	LOAD ONE TACH SENT RETURN 00035070
0005D7	5F60			6372	DMR9	XFR	FORMAT,CBI	MOVE TO CHAN BUS IN 00035080
0005D8	620A			6375		BU	SERVRTN	GO PRESENT BYTE TO CHANNEL 00035090
0005D9	8802			6379	DMR4	ORI	STATIMG,SETSTATC	TELL ALU2 TO DROP MOVE 00035110
0005DA	0E00			6382		STO	SETCNT1,0	KEEP GO UP CNT CLEAR 00035120
0005DB	AFFF			6385		ADD	SETCNT2,ONES	DECREMENT GO DOWN COUNT REG 00035130
0005DC	21DE			6388		BOC	NALCO,DMRA	BRANCH IF DONE 00035140
0005DD	65BD			6391		BU	DMR3	OTHERWISE CONTINUE TACH TIMING 00035150
0005DE	C8FD			6395	DMRA	AND	STATIMG,ONES-SETSTATC	NOTIFY ALU2 TO RAISE MOVE AGAIN 00035170
0005DF	0F00			6398		STO	SETCNT2,0	KEED GO DOWN COUNT CLEAR 00035180
0005E0	65BD			6401		BU	DMR3	RETURN TO EXPIRE CHANNEL BYTE COUNT 00035190
				6404	*** COMMON SERVICE ROUTINE RETURN AFTER SERV OUT RESP 00035210			
0005E1	4150			6406	DMRLNK	XFR	CTIMAGE,CTI	DROP SERVICE IN 00035220
0005E2	5322			6409		XFR	LINK4,IC	RETURN TO CALLER 00035230
				6412	*** COMMON ALU2 STOPPED LINK 00035250			
0005E3	5822			6414	ALU2STOP	XFR	LINK5,IC	RETURN TO STOP 00035260
				6417	*** COMMON ALU2 HARD ERROR RETURN UNIT CHECK WILL BE SET 00035280			
0005E4	63B8			6419	DMRSTOP	BU	BSTWAIT	GO ASSEMBLE UNIT CHECK STATUS 00035290

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 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72  9/04/73
                                  6422 ***************************** IBG MEASURE ****************************** 00035310
                                  6423 *  THE IBG MEASURE ROUTINE WILL TRANSFER BYTES OF COUNT                * 00035320
                                  6424 * REPRESENTING THE TIME FOR EACH PARTIAL AND FULL TACH ENCOUNTERED     * 00035330
                                  6425 * WHILE TRAVERSING THE GAP BETWEEN TWO RECORDS. ONE BYTES EQUALS       * 00035340
                                  6426 * THE TIME FOR ONE FULL OR PARTIAL TACH. THE COMMAND ISSUED PRIOR      * 00035350
                                  6427 * TO THE SET DIAGNOSE COMMAND WILL DETERMINE THE DIRECTION OF TAPE     * 00035360
                                  6428 * MOTION                                                              * 00035370
                                  6429 ************************************************************************ 00035380

0005E5 8801                       6432 DORDSTOP ORI   STATIMG,SETSTATD    INDICATE RDSTOP TO ALU2             00035400
0005E6 143E                       6435 DOIBGMSR STO   XOUTBIM,NDXBSR          SET ALU2 INDEX TO DO BSR        00035410
0005E7 F00C                       6438          XOM   CURCOMM,X'0C'       MASK FOR RD BACK                    00035420
0005E8 20EA                       6441          BOC   DBUS,DOBWD              BRANCH IF CFF                   00035430
0005E9 1437                       6444          STO   XOUTBIM,NDXFSR          SET ALU2 INDEX TO DO FSR        00035440

0005EA 8802                       6448 DOBWD    ORI   STATIMG,SETSTATC        INDICATE IBG MEASURE TO  ALU2   00035460
0005EB 5441                       6451          XFR   XOUTBIM,XOUTB           KICK OFF SPACE OP               00035470
0005EC 18F5                       6454          STO   LINK5,IBGSTOP       SET STOP RETURN                     00035480
0005ED 19F0                       6457          STO   LINK6,SCRAP1        SET RETRN TO SYNC WITH ALU2         00035490
0005EE 2BBD                       6460 ISITUP   BOC   STATB,DMR3          BRANCH IF TAPE OP UP                00035500
0005EF 65EE                       6463          BU    ISITUP              GO BACK AND CHECK AGAIN             00035510

0005F0 8C00                       6467 SCRAP1   ORI   SETDIA1,0           MASK FOR RD STOP BIT                00035530
0005F1 34B8                       6470          BOC   DREG4,GORDSTOP      BRANCH IF IT IS                     00035540
0005F2 13BD                       6473 SCRAP2   STO   LINK4,DMR3          SET FIRST BYTE RETURN               00035550
0005F3 19CD                       6476          STO   LINK6,SERVIBG       SET SERVICE POINTER                 00035560
0005F4 65BD                       6479          BU    DMR3                GO SERVICE                          00035570

                                  6482 *** IBGSTOP IS THE RETURN BEFOR THE LAST DATA TO CHANNEL                 00035590
0005F5 18E4                       6484 IBGSTOP  STO   LINK5,DMRSTOP      SET NEW STOP RETURN                 00035600
0005F6 5F90                       6487          XFR   FORMAT,XINA         BRING IN LAST BYTR                  00035610
0005F7 65D7                       6490          BU    DMR9                GO PRESENT THE LAST BYTE TO CHANNEL 00035620

                                  6493 ************************** READ ACCESS ***************************** 00035640
                                  6494 *  THE READ ACCESS ROUTINE WILL TRANSFER TWO BYTES OF COUNT THAT      * 00035650
                                  6495 * REPRESENT THE ELAPSED TIME FROM THE RISE OF MOVE TO THE BEGINNING   * 00035660
                                  6496 * OF THE RECORD(BOR FOR PE AND FIRST BIT FOR NRZI). THE COMMAND ISSUED* 00035670
                                  6497 * PRIOR TO THE SET DIAGNOSE WILL DETERMINE THE DIRECTION.             * 00035680
                                  6498 ************************************************************************ 00035690

0005F8 140D                       6501 READACC  STO   XOUTBIM,NDXAXESS      RT  FETCH ALU2 INDEX            00035710
0005F9 5441                       6504          XFR   XOUTBIM,XOUTB       KICK OFF ALU2                       00035720
0005FA 18F5                       6507          STO   LINK5,IBGSTOP       SET STOP LINK                       00035730
0005FB 65F2                       6510          BU    SCRAP2                  TO PRESENT COUNTS TO CHANNEL    00035740
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                                F01MAY72   9/04/73
000600                           6513           ORG   BEGIN+X'600'                                                    00035760
                                 6514 ************************************************************************      00035770
                                 6515 *                                                                      *      00035780
                                 6516 *                                                                      *      00035790
                                 6517 *                6250  WRITE                                           *      00035800
                                 6518 *                                                                      *      00035810
                                 6519 *                                                                      *      00035820
                                 6520 *                                                                      *      00035830
                                 6521 * DENSITY DETERMINATION - AWAY FROM LOAD POINT THE DRIVE CONTROLS THE  *      00035840
                                 6522 * DENSITY-AT LOAD POINT DRIVE FEATURES AND LAST MODE 2 SET DETERMINES  *      00035850
                                 6523 * DENSITY.   THE FOLLOWING CHART SHOWS THE RESULTANT DENSITY ON TAPE.  *      00035860
                                 6524 *                                                                      *      00035870
                                 6525 *  TAPE         MODE SET       MODE SET       MODE SET                 *      00035880
                                 6526 *  UNIT          6250           1600           800                     *      00035890
                                 6527 *                                                                      *      00035900
                                 6528 *  6250/1600     6250           1600           6250                    *      00035910
                                 6529 *  6250          6250           6250           6250                    *      00035920
                                 6530 *  1600/800      1600           1600           800                     *      00035930
                                 6531 *  1600          1600           1600           1600                    *      00035940
                                 6532 *                                                                      *      00035950
                                 6533 *                                                                      *      00035960
                                 6534 ************************************************************************      00035970
000600 F01F                      6536 NOGO      XOM   CURCOMM,X'1F'       ONE MORE LOOK                           00035980
000601 20B7                      6539           BOC   DBUS,TRNAOFF        2ND CHANCE AT BR                        00035990
000602 F017                      6542           XOM   CURCOMM,X'17'       ARE WE ERG                              00036000
000603 20B7                      6545           BOC   DBUS,TRNAOFF        BR IF SO                                00036010
000604 2206                      6548           BOC   ALUR,BADEND         BR IF HDW ERROR                         00036020
000605 66A4                      6551           BU    FORMTEND                                                    00036030
000606 140B                      6554 BADEND    STO   XOUTBIM,NDXABRT     LOAD ALU2 INDEX                         00036040
000607 5441                      6557           XFR   XOUTBIM,XOUTB       KICK OFF ALU 2                          00036050
000608 66A4                      6560           BU    FORMTEND                                                    00036060
                                 6562 ************************************************************      00036070
                                 6563 *         ENTRY POIMT FOR WTM ***************************************      00036080
                                 6564 ************************************************************      00036090
000609 C1FE                      6566 BEGWRTTM AND    CTIMAGE,ONES-OPIN   RESET OP IN IMAGE                       00036100
00060A 8110                      6569           ORI   CTIMAGE,CUBUSY      SET CU BUSY                             00036110
00060B 66F9                      6572           BU    TMPATCH                                          EC734087 00036120
                                 6574 ************************************************************      00036130
                                 6575 *         ENTRY POINT FOR NORMAL WRITE*******************************      00036140
                                 6576 ************************************************************      00036150
00060C 4488                      6578 BEGWRITE XFR    WORK1,XINB          BRING IN TU SENSE BYTE 0                00036160
00060D 4150                      6581           XFR   CTIMAGE,CTI         DROP SVI                                00036170
00060E C1C0                      6584           AND   CTIMAGE,HOLDA+HOLDB   FOR HIO                               00036180
00060F 8130                      6587           ORI   CTIMAGE,CUBUSY+HOLDINT                                      00036190
000610 4E90                      6590 TMSKIP    XFR   SETCNT1,XINA        BRING IN FEATURE BYTE          EC734087 00036200
000611 5441                      6593           XFR   XOUTBIM,XOUTB       KICK OFF ALU2                           00036210
000612 9400                      6596           ORM   WORK1,0             SET FOR TEST                            00036220
000613 331E                      6599           BOC   DREG3,DOLPBRST      BRANCH IF LOAD POINT IS ON              00036230
                                 6601 ************************************************************      00036240
                                 6602 *LOAD POINT IS OFF ---  DETERMINE DENSITY     ********************      00036250
                                 6603 ************************************************************      00036260
000614 FE08                      6605           XOM   SETCNT1,X'08'       TEST FOR 66250                          00036270
000615 3419                      6608           BOC   DREG4,DO8OR16       BR IF NOT 6250 MODEL                    00036280
000616 9E00                      6611           ORM   SETCNT1,0           GET LSR TO DBUS FOR TEST                00036290
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   9/04/73
000617 335B                      6614          BOC   DREG3,NOBURST      WRITE IN 1600 BPI              00036300
000618 661C                      6617          BU    GODO1600                                          00036310
000619 9E00                      6620 DO8OR16  ORM   SETCNT1,0          GET LSR FOR TEST               00036320
00061A 301D                      6623          BOC   DREG0,GODO800      BR ON 7 TRK                    00036330
00061B 331D                      6626          BOC   DREG3,GODO800      BR IF IN NRZI MODE             00036340
00061C 670F                      6629 GODO1600 BU    CHKOP16                                           00036350

00061D 6740                      6633 GODO800  BU    CHKOP800                                          00036370
                                 6635 ************************************************************     00036380
                                 6636 * LOAD POINT IS ON DETERMINE DENSITY    ************************     00036390
                                 6637 ************************************************************     00036400
00061E                           6638 DOLPBRST EQU   *                                                 00036410
00061E 9E00                      6640          ORM   SETCNT1,0          GET LSR TO DBUS FOR TEST       00036420
00061F 3429                      6643          BOC   DREG4,DO16OR64     BR IF 6250 MODEL               00036430
000620 301D                      6646          BOC   DREG0,GODO800      BR ON 7 TRK                    00036440

000621 3223                      6650 LP8OR16  BOC   DREG2,LPCKDENS     BR IF DUAL DENSITY AVAILABLE   00036460
000622 661C                      6653          BU    GODO1600           GO WRITE IN 1600 MODE          00036470
000623 9800                      6656 LPCKDENS ORM   STATIMG,0          TEST FOR LWR                   00036480
000624 361C                      6659          BOC DREG6,GODO1600       BR IF LWR                      00036490
000625 9200                      6662          ORM   XOUTAIM,0          GET LSR FOR TEST               00036500
000626 361C                      6665          BOC   DREG6,GODO1600     BR IF 6250 MODE SET - (WRT # 1600)  00036510
000627 371D                      6668          BOC   DREG7,GODO800      BR IF 800 MODE SET             00036520
000628 661C                      6671          BU    GODO1600                                          00036530
000629 9800                      6674 DO16OR64 ORM   STATIMG,0          TEST FOR LWR AT LP             00036540
00062A 361C                      6677          BOC   DREG6,GODO1600                                    00036550
00062B 9E00                      6680          ORM   SETCNT1,0          SET FOR TEST                   00036560
00062C 322E                      6683          BOC   DREG2,LP16OR64     BR IF DUAL DENSITY AVAILABLE   00036570
00062D 6630                      6686          BU    GODO6400                                          00036580
00062E D203                      6689 LP16OR64 ANDM  XOUTAIM,3          GET LSR FOR TEST               00036590
00062F 201C                      6692          BOC   DBUS,GODO1600      BR IF 1600 MODE SET            00036600
000630                           6694 GODO6400 EQU   *                                                 00036610

                                 6696 ************************************************************************ 00036630
                                 6697 * STARTING AT LOAD POINT - WAIT FOR TAPE MOTION TO START              * 00036640
                                 6698 ************************************************************************ 00036650


                                 6701 * GO TO MAP 13-450                                               00036680
000630 28D2                      6703 WAITSOME BOC   ADROUT,GOTHIO1     WATCH FOR HALT I/O             00036690
                                 6705 * GO TO MAP 13-450                                               00036700
000631 2B34                      6707 HIORET1  BOC   STATB,STRTBSVI     WAIT FOR STATB                 00036710
                                 6709 * GO TO MAP 13-450                                               00036720
000632 3B00                      6711          BOC   STATD,NOGO         STATD ON MEANS TROUBLE         00036730
                                 6713 * GO TO MAP 13-450                                               00036740
000633 6630                      6715          BU    WAITSOME                                          00036750

                                 6718 ************************************************************************ 00036770
                                 6719 * WAIT NOW WHILE ALU2 WRITES ID BURST - COMPLETE ON FALL OF STATB     * 00036780
                                 6720 ************************************************************************ 00036790


000634                           6722 STRTBSVI EQU   *                                                 00036810
000634 9800                      6724 MAYBLWR  ORM   STATIMG,0            ARE WE LWR                   00036820
000635 365B                      6727          BOC   DREG6,NOBURST        SKIP BURST IF SO             00036830
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   9/04/73

                                   6730 * GO TO MAP 13-460                                                00036850
000636 28D6                        6732 STRTBRST BOC   ADROUT,GOTHIO3      WATCH FOR HIO                  00036860
                                   6734 * GO TO MAP 13-460                                                00036870
000637 3B00                        6736 HIORET3  BOC   STATD,NOGO          ERROR EXIT                     00036880
                                   6738 * GO TO MAP 13-460                                                00036890
000638 2B36                        6740         BOC   STATB,STRTBRST      WAIT FOR STAT B TO FALL        00036900

                                   6743 ************************************************************************ 00036920
                                   6744 * GET READY TO WRITE SAGC BURST - START AT RISE OF STATB                * 00036930
                                   6745 ************************************************************************ 00036940


000639 0EEA                        6749         STO   SETCNT1,ONES-21     LOAD HI CNT          *5384  *  00036970
00063A 0FF8                        6752         STO   SETCNT2,ONES-7      LOAD LO CNT        *DATA GRPS*  00036980
00063B 1F8C                        6755         STO   FORMAT,FORMT11      SET FOR SAGC BST               00036990
00063C 5F42                        6758         XFR   FORMAT,XOUTA        CALL FOR ONES                  00037000

00063D 2B41                        6762 WAITONE  BOC   STATB,BRST111       WAIT FOR STAT B                00037020
00063E 3B00                        6765         BOC   STATD,NOGO          ERROR EXIT                     00037030
00063F 28D8                        6768         BOC   ADROUT,GOTHIO4      HALT IO EXIT                   00037040
000640 663D                        6771 HIORET4  BU    WAITONE                                             00037050

000641 1343                        6775 BRST111  STO   LINK4,BRST112       LOAD LINK RETURN               00037070
000642 66CD                        6778         BU    DOITFORA                                            00037080

000643 1345                        6782 BRST112  STO   LINK4,BRST113       LOAD LINK RETURN               00037100
000644 66C8                        6785         BU    DOITFORB                                            00037110

000645 AF01                        6789 BRST113  ADD   SETCNT2,1           BUMP LO CTR                    00037130
000646 2141                        6792         BOC   NALCO,BRST111       GO BACK IF NO CARRY            00037140
000647 AE01                        6795         ADD   SETCNT1,1           BUMP HI CTR                    00037150
000648 2141                        6798         BOC   NALCO,BRST111       GO BACK IF NO CARRY            00037160

                                   6801 ************************************************************************ 00037180
                                   6802 * BURST WRITTEN - APPEND AN INVERSE TAPE MARK TO THE END OF IT          * 00037190
                                   6803 ************************************************************************ 00037200


000649 0EF9                        6807 SAGCNTM1 STO   SETCNT1,ONES-6      LOAD HI    CTR         ****    00037230
00064A 0F00                        6810         STO   SETCNT2,0           LOAD LO CTR                    00037240

00064B 1FAC                        6814 SAGCNTM2 STO   FORMAT,SAGC1                                         00037260
00064C 134E                        6817         STO   LINK4,SAGCNTM3      LOAD LINK RETURN               00037270
00064D 66CD                        6820         BU    DOITFORA                                            00037280

00064E 1350                        6824 SAGCNTM3 STO   LINK4,SAGCNTM4      LOAD LINK RETURN               00037300
00064F 66C8                        6827         BU    DOITFORB                                            00037310

000650 AF01                        6831 SAGCNTM4 ADD   SETCNT2,1           BUMP LO CTR                    00037330
000651 214B                        6834         BOC   NALCO,SAGCNTM2      IF NO CARRY - CINTINUE BURST   00037340
000652 AE01                        6837         ADD   SETCNT1,1           BUMP HI CTR                    00037350
000653 214B                        6840         BOC   NALCO,SAGCNTM2      IF NO CARRY CONTINUE BURST     00037360
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000654 8880                    6845 SAGCNTM5 ORI   STATIMG,STOP       IMAGE STOP                          00037390
000655 4828                    6848          XFR   STATIMG,STAT       SIGNAL ROS2 TO DROP WRT COND        00037400

                               6851 * GO TO MAP 13-470                                                   00037420
000656 3B00                    6853 SAGCNTM6 BOC   STATD,NOGO         ERROR EXIT                          00037430
                               6855 * GO TO MAP 13-470                                                   00037440
000657 28D4                    6857          BOC   ADROUT,GOTHIO2     WATCH FOR HIO                       00037450
                               6859 * GO TO MAP 13-470                                                   00037460
000658 2B56                    6861 HIORET2  BOC   STATB,SAGCNTM6     WAIT FOR STAT B TO FALLL            00037470
000659 C87F                    6864          AND   STATIMG,ONES-STOP  RESET STOP FOR USE LATER            00037480

00065A 4828                    6868          XFR   STATIMG,STAT       DROP STOP TO ROS 2                  00037500
00065B 28DC                    6871 NOBURST  BOC   ADROUT,GOTHIO6     WATCH FOR HIO                       00037510
00065C 3B00                    6874 HIORET6  BOC   STATD,NOGO         ERROR EXIT                          00037520
00065D 2B5F                    6877          BOC   STATB,FORMAT1      WAIT OFR STAT B                     00037530
00065E 665B                    6880          BU    NOBURST                                                 00037540

                               6884 ************************************************************************ 00037570
                               6885 * WRITE FORMATTING - NOT LOAD POINT - 6250 BPI                      * 00037580
                               6886 ************************************************************************ 00037590

00065F F01F                    6889 FORMAT1  XOM   CURCOMM,X'1F'      IS THIS WTM                         00037610
000660 20AA                    6892          BOC   DBUS,BRSTTM1       BR IF SO                            00037620
000661 F017                    6895          XOM   CURCOMM,X'17'      ARE WE ERG                          00037630
000662 20B7                    6898          BOC   DBUS,TRNAOFF       BR IF SO                            00037640
000663 1F81                    6901 FORMAT1X STO   FORMAT,FORMT10                                         00037650
000664 1368                    6904          STO   LINK4,FORMAT2      SET UP RETURN                       00037660
000665 9C00                    6907          ORM   SETDIA1,0          TEST DIAG FLAGS                     00037670
000666 346D                    6910          BOC   DREG4,FORMAT5      BR IF INHIBIT PREAMBLE              00037680
000667 66CD                    6913          BU    DOITFORA                                                00037690

000668 1F8A                    6917 FORMAT2  STO   FORMAT,FORMT01+8                                       00037710
000669 136B                    6920          STO   LINK4,FORMAT3      SET UP RETURN                       00037720
00066A 66C8                    6923          BU    DOITFORB                                                00037730

00066B 136D                    6927 FORMAT3  STO   LINK4,FORMAT5      SET UP RETURN                       00037750
00066C 66B8                    6930          BU    ONESBRST                                                00037760

00066D 1F88                    6934 FORMAT5  STO   FORMAT,MARK1                                          00037780
00066E 1370                    6937          STO   LINK4,FORMAT6      SET UP RETURN                       00037790
00066F 66CD                    6940          BU    DOITFORA                                                00037800

                               6943 * GO TO MAP 13-480                                                   00037820
000670 9D00                    6945 FORMAT6  ORM   SETDIA2,0          CHK FOR DIAG FLG                    00037830
                               6947 * GO TO MAP 13-480                                                   00037840
000671 37EE                    6949          BOC   DREG7,SUDOWRT1     BR IF ON                            00037850
                               6951 * GO TO MAP 13-480                                                   00037860
000672 1375                    6953          STO   LINK4,DATATIME     SET UP RETURN    ROLS               00037870
                               6955 * GO TO MAP 13-480                                                   00037880
000673 1F40                    6957 FORMAT60 STO   FORMAT,ALOWEND     CLEAR FORMAT CONTROLS               00037890
                               6959 * GO TO MAP 13-480                                                   00037900
000674 66C8                    6961          BU    DOITFORB                                                00037910
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   9/04/73

                                   6964 ********************************************************************** 00037930
                                   6965 * PREAMBLE COMPLETE - ALLOWEND IS ON  - WAIT FOR ALLONES OR RESYNC      00037940
                                   6966 ********************************************************************** 00037950
                                   6967 * GO TO MAP 13-480                                                     00037960
000675 0462                        6969 DATATIME STO   WORK1,ONES-157      LOAD RESYNC COUNTER                 00037970
                                   6971 * GO TO MAP 13-480                                                     00037980
000676 28E2                        6973 DATALOOP BOC   ADROUT,GOTHIO9      WATCH FOR HALT I/O                  00037990
                                   6975 * GO TO MAP 13-480                                                     00038000
000677 3F8E                        6977 HIORET9  BOC   ALLONES,WRAPUP      MONITOR END OF DATA                 00038010
                                   6979 * GO TO MAP 13-480                                                     00038020
000678 3B00                        6981         BOC   STATD,NOGO           ERROR EXIT                          00038030
                                   6983 * GO TO MAP 13-480                                                     00038040
000679 2780                        6985         BOC   CLOCKB,WAITONA1      EXIT ON RISE OF CLOCKB              00038050
                                   6987 * GO TO MAP 13-480                                                     00038060
00067A 6676                        6989         BU    DATALOOP                                                00038070

                                   6992 * GO TO MAP 13-480                                                     00038090
00067B 28E4                        6994 WAITONA  BOC   ADROUT,GOTHIO10     WATCH FOR HALT I/O                  00038100
                                   6996 * GO TO MAP 13-480                                                     00038110
00067C 3B00                        6998         BOC   STATD,NOGO           ERROR EXIT                          00038120
                                   7000 * GO TO MAP 13-480                                                     00038130
00067D 277B                        7002 HIORET10 BOC   CLOCKB,WAITONA      EXIT ON FALL OF CLOCKB              00038140
                                   7004 * GO TO MAP 13-480                                                     00038150
00067E 3F8E                        7006         BOC   ALLONES,WRAPUP                                          00038160
                                   7008 * GO TO MAP 13-480                                                     00038170
00067F 6676                        7010         BU    DATALOOP                                                00038180

                                   7013 * GO TO MAP 13-480                                                     00038200
000680 A401                        7015 WAITONA1 ADD   WORK1,1             BUMP RESYNC COUNTER                 00038210
                                   7017 * GO TO MAP 13-480                                                     00038220
000681 217B                        7019         BOC   NALCO,WAITONA       EXIT ON PASS 158                    00038230

                                   7022 * GO TO MAP 13-480                                                     00038250
000682 1F84                        7024         STO   FORMAT,MARK2                                             00038260
                                   7026 * GO TO MAP 13-480                                                     00038270
000683 1385                        7028         STO   LINK4,FORMAT7       SET UP RETURN                       00038280
                                   7030 * GO TO MAP 13-480                                                     00038290
000684 66C8                        7032         BU    DOITFORB                                                00038300

                                   7035 * GO TO MAP 13-480                                                     00038320
000685 3F8E                        7037 FORMAT7  BOC   ALLONES,WRAPUP      MONITOR FOR EOD                     00038330
                                   7039 * GO TO MAP 13-480                                                     00038340
000686 1F8C                        7041         STO   FORMAT,FORMT11                                          00038350
                                   7043 * GO TO MAP 13-480                                                     00038360
000687 1389                        7045         STO   LINK4,FORMAT8       SET UP RETURN                       00038370
                                   7047 * GO TO MAP 13-480                                                     00038380
000688 66CD                        7049         BU    DOITFORA                                                00038390

                                   7052 * GO TO MAP 13-480                                                     00038410
000689 138B                        7054 FORMAT8  STO   LINK4,FORMAT9       SET UP RETURN                       00038420
                                   7056 * GO TO MAP 13-480                                                     00038430
00068A 66C8                        7058         BU    DOITFORB                                                00038440
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   9/04/73
                                   7061 * GO TO MAP 13-480                                            00038460
00068B 1F88                        7063 FORMAT9  STO   FORMAT,MARK1                                   00038470
                                   7065 * GO TO MAP 13-480                                            00038480
00068C 1370                        7067          STO   LINK4,FORMAT6      SET UP RETURN             00038490
                                   7069 * GO TO MAP 13-480                                            00038500
00068D 66CD                        7071          BU    DOITFORA                                     00038510


                                   7074 ************************************************************ 00038530
                                   7075 * END OF DATA OR OVERRUN - ALLOW FOR RESIDUAL & CRC FRAME, THEN * 00038540
                                   7076 * FORMAT THE ENDING BURST.                                  * 00038550
                                   7077 ************************************************************ 00038560

00068E 2490                        7080 WRAPUP   BOC   BOPE,BOERR         BR ON BUS OUT EVEN          00038580
00068F 6691                        7083          BU    FORMAT10                                     00038590
000690 8720                        7086 BOERR    ORI   SNSSTS2,BUSOC      SET BUS OUT CHK             00038600

000691 1F00                        7090 FORMAT10 STO   FORMAT,0           CALL FOR RESIDUAL FRAME     00038620
000692 1395                        7093          STO   LINK4,FORMAT12     SET UP RETURN               00038630
000693 04FC                        7096 SETCT2   STO   WORK1,ONES-3       SET CNT FOR 4               00038640
000694 66BA                        7099          BU    DOTWO                                        00038650

000695 1F84                        7103 FORMAT12 STO   FORMAT,MARK2                                  00038670
000696 1398                        7106          STO   LINK4,FORMAT14     SET UP RETURN               00038680
000697 66CD                        7109          BU    DOITFORA                                     00038690

000698 139C                        7113 FORMAT14 STO   LINK4,FORMAT16     SET UP RETURN               00038710
000699 9C00                        7116          ORM   SETDIA1,0          TEST DIAG FLAGS             00038720
00069A 32A2                        7119          BOC   DREG2,FORMAT19     BR IF INHIBIT POST AMBLE    00038730
00069B 66B8                        7122          BU    ONESBRST                                     00038740


00069C 139F                        7127 FORMAT16 STO   LINK4,FORMAT18     SET UP RETURN               00038770
00069D 1F86                        7130          STO   FORMAT,FORMT01+4                             00038780
00069E 66C8                        7133          BU    DOITFORB                                     00038790

00069F 13A2                        7137 FORMAT18 STO   LINK4,FORMAT19     SET UP RETURN               00038810
0006A0 1F81                        7140          STO   FORMAT,FORMT10                               00038820
0006A1 66CD                        7143          BU    DOITFORA                                     00038830

0006A2 8880                        7147 FORMAT19 ORI   STATIMG,STOP       IMAGE STOP                  00038850
0006A3 4828                        7150          XFR   STATIMG,STAT       SET STOP                    00038860

0006A4 38A7                        7154 FORMTEND BOC   OPRIN,TOSETSTP     CHK FOR PREVIOS HIO         00038880
0006A5 C9FE                        7157          AND   FLAGS,ONES-CHAIN   YES - RESET CHAIN FLAG      00038890
0006A6 63B8                        7160          BU    BSTWAIT            BR IF YES                   00038900
0006A7 C1CF                        7163 TOSETSTP AND   CTIMAGE,ONES-CUBUSY-HOLDINT                   00038910
0006A8 8101                        7166          ORI   CTIMAGE,OPIN       RESTORE REGS                00038920
0006A9 63B8                        7169          BU    BSTWAIT            NORMAL EXIT                 00038930

                                   7172 ************************************************************   00038950
                                   7173 **********    6250  WRITE TAPE MARK    **********************   00038960
                                   7174 ************************************************************   00038970
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                    F01MAY72   9/04/73
0006AA 0EDA                      7177 BRSTTM1  STO   SETCNT1,ONES-37     LOAD HI TM CTR          ****   00038990

0006AB 1F9C                      7181 BRSTTM2  STO   FORMAT,TM64         CALL FOR TM                    00039010
0006AC 13AE                      7184          STO   LINK4,BRSTTM3       LOAD LINK RETURN               00039020
0006AD 66CD                      7187          BU    DOITFORA                                             00039030

0006AE 13B0                      7191 BRSTTM3  STO   LINK4,BRSTTM4       LOAD LINK RETURN               00039050
0006AF 66C8                      7194          BU    DOITFORB                                             00039060

0006B0 AE01                      7198 BRSTTM4  ADD   SETCNT1,1            BUMP HI CTR                    00039080
0006B1 21AB                      7201          BOC   NALCO,BRSTTM2       IF NO CARRY - CINTINUE BURST   00039090


0006B2 8880                      7206 BRSTTM5  ORI   STATIMG,STOP         IMAGE STOP                     00039120
0006B3 4828                      7209          XFR   STATIMG,STAT         SIGNAL ROS2 TO DROP WRT COND   00039130

0006B4 3B00                      7213 BRSTTM6  BOC   STATD,NOGO          ERROR EXIT                     00039150
0006B5 28DA                      7216          BOC   ADROUT,GOTHIO5       WATCH FOR HIO                  00039160
0006B6 2BB4                      7219 HIORET5  BOC   STATB,BRSTTM6       WAIT FOR STAT B TO FALLL       00039170
0006B7 6249                      7222 TRNAOFF  BU    CTLWAIT                                              00039180

                                 7226 ************************************************************************ 00039210
                                 7227 * THIS SUBROUTINE WILL CONTROL THE WRITING OF A TEN   GROUP BURST OF  * 00039220
                                 7228 * ALL ONES. A SECOND ENTRY POINT ALLOWS FOR RESIDUAL AND CRC FRAMES.  * 00039230
                                 7229 * ALSO USEFIL FOR CLOCKING NRZI CRC AND LRC BYTES, AND WRITING PE     * 00039240
                                 7230 * PREAMBLES AND POST AMBLES.                                          * 00039250
                                 7231 ************************************************************************ 00039260

0006B8 1F8C                      7234 ONESBRST STO   FORMAT,FORMT11      CALL FOR ALL ONES              00039280
0006B9 04F2                      7237          STO   WORK1,ONES-13       SET COUNT FOR 14    GROUPS     00039290
0006BA 5F42                      7240 DOTWO    XFR   FORMAT,XOUTA        GATE TO DATA FLOW              00039300

0006BB 27C2                      7244 CHKCLOCK BOC   CLOCKB,BCLOCKUP     GO TO PROPER WAIT LOOP         00039320
                                 7246 * GO TO MAP 13-510                                                  00039330
0006BC 27C3                      7248 ACLOCKUP BOC   CLOCKB,BUMPCTR      ADD TO COUNTER ON RISE OF A CLOCK 00039340
                                 7250 * GO TO MAP 13-510                                                  00039350
0006BD 3B00                      7252          BOC   STATD,NOGO           ERROR EXIT                     00039360
                                 7254 * GO TO MAP 13-510                                                  00039370
0006BE 28E6                      7256          BOC   ADROUT,GOTHIO11      WATCH FOR HALT I/O             00039380
                                 7258 * GO TO MAP 13-510                                                  00039390
0006BF 66BC                      7260 HIORET11 BU    ACLOCKUP            STAY IN LOOP TILL CLOCK A RISES 00039400

                                 7263 * GO TO MAP 13-510                                                  00039420
0006C0 28E8                      7265 ACTIVEB  BOC   ADROUT,GOTHIO12     WATCH FOR HALT I/O             00039430
                                 7267 * GO TO MAP 13-510                                                  00039440
0006C1 3B00                      7269 HIORET12 BOC   STATD,NOGO                                           00039450
                                 7271 * GO TO MAP 13-510                                                  00039460
0006C2 27C0                      7273 BCLOCKUP BOC   CLOCKB,ACTIVEB      STAY IN LOOP TILL FALL OF A CLOCK 00039470

0006C3 A401                      7277 BUMPCTR  ADD   WORK1,1              BUMP GROUP CTR                 00039490
0006C4 21BB                      7280          BOC   NALCO,CHKCLOCK       EXIT ON PASS COMPLETE          00039500
0006C5 5322                      7283          XFR   LINK4,IC             RETURN TO PROPER ROUTINE       00039510
0006C6 675B                      7286 NRZIRET2 BU    CRCTIME1            NRZI RETURN                    00039520
0006C7 6761                      7289 NRZIRET3 BU    CRCTIME2            NRZI RETURN                    00039530
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                          F01MAY72   9/04/73

                                   7293 ********************************************************************** 00039560
                                   7294 * THIS SUBROUTINE WILL GATE XOUTA, THEN WAIT FOR CLOCK B TO FALL      * 00039570
                                   7295 ********************************************************************** 00039580

                                   7297 * GO TO MAP 13-480                                                       00039600
0006C8 5F42                        7299 DOITFORB XFR   FORMAT,XOUTA        SET FORMAT CONTROLS                 00039610
                                   7301 * GO TO MAP 13-480                                                       00039620
0006C9 28DE                        7303 RIGHTON  BOC   ADROUT,GOTHIO7      WATCH FOR HALT I/O                  00039630
                                   7305 * GO TO MAP 13-480                                                       00039640
0006CA 3B00                        7307 HIORET7  BOC   STATD,NOGO          ERROR EXIT                          00039650
                                   7309 * GO TO MAP 13-480                                                       00039660
0006CB 27C9                        7311          BOC   CLOCKB,RIGHTON      WAIT FOR CLOCKB TO FALL             00039670
                                   7313 * GO TO MAP 13-480                                                       00039680
0006CC 5322                        7315 RETURN11 XFR   LINK4,IC            RETURN                              00039690

                                   7318 ********************************************************************** 00039710
                                   7319 * THIS SUBROUTINE WILL GATE XOUTA,THEN WAIT FOR CLOCKB TO RISE        * 00039720
                                   7320 ********************************************************************** 00039730

                                   7322 * GO TO MAP 13-480                                                       00039750
0006CD 5F42                        7324 DOITFORA XFR   FORMAT,XOUTA        SET FORMAT CONTROLS                 00039760
                                   7326 * GO TO MAP 13-480                                                       00039770
0006CE 27CC                        7328 RIGHTOFF BOC   CLOCKB,RETURN11     EXIT ON CLOCKB RISE                 00039780
                                   7330 * GO TO MAP 13-480                                                       00039790
0006CF 3B00                        7332          BOC   STATD,NOGO           ERROR EXIT                         00039800
                                   7334 * GO TO MAP 13-480                                                       00039810
0006D0 28E0                        7336          BOC   ADROUT,GOTHIO8      WATCH FOR HALT I/O                  00039820
                                   7338 * GO TO MAP 13-480                                                       00039830
0006D1 66CE                        7340 HIORET8  BU    RIGHTOFF            STAY IN LOOP                        00039840

                                   7343 *********************************************************************  00039860
                                   7344 * HALT IO SECTION -- GET OFF THE INEERFACE                            * 00039870
                                   7345 *********************************************************************  00039880

0006D2 4150                        7348 GOTHIO1  XFR   CTIMAGE,CTI         CROP OP IN ON HIO                   00039900
0006D3 6631                        7351          BU    HIORET1                                                 00039910
0006D4 4150                        7354 GOTHIO2  XFR   CTIMAGE,CTI         DROP OP IN ON HIO                   00039920
0006D5 6658                        7357          BU    HIORET2                                                 00039930
0006D6 4150                        7360 GOTHIO3  XFR   CTIMAGE,CTI         DROP OP IN ON HIO                   00039940
0006D7 6637                        7363          BU    HIORET3                                                 00039950
0006D8 4150                        7366 GOTHIO4  XFR   CTIMAGE,CTI         DROP OP IN ON HIO                   00039960
0006D9 6640                        7369          BU    HIORET4                                                 00039970
0006DA 4150                        7372 GOTHIO5  XFR   CTIMAGE,CTI         DROP OP IN ON HIO                   00039980
0006DB 66B6                        7375          BU    HIORET5                                                 00039990
0006DC 4150                        7378 GOTHIO6  XFR   CTIMAGE,CTI         LDROP OP IN ON HIO                  00040000
0006DD 665C                        7381          BU    HIORET6                                                 00040010
0006DE 4150                        7384 GOTHIO7  XFR   CTIMAGE,CTI         DROP OP IN ON HIO                   00040020
0006DF 66CA                        7387          BU    HIORET7                                                 00040030
0006E0 4150                        7390 GOTHIO8  XFR   CTIMAGE,CTI         DROP OP IN ON HIO                   00040040
0006E1 66D1                        7393          BU    HIORET8                                                 00040050
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   9/04/73
0006E2 4150                      7396 GOTHIO9  XFR   CTIMAGE,CTI        DROP OP IN ON HIO              00040060
0006E3 6677                      7399          BU    HIORET9                                           00040070
0006E4 4150                      7402 GOTHIO10 XFR   CTIMAGE,CTI        DROP OP IN ON HIO              00040080
0006E5 667D                      7405          BU    HIORET10                                          00040090
0006E6 4150                      7408 GOTHIO11 XFR   CTIMAGE,CTI        DROP OP IN ON HIO              00040100
0006E7 66BF                      7411          BU    HIORET11                                          00040110
0006E8 4150                      7414 GOTHIO12 XFR   CTIMAGE,CTI        DROP OP IN ON HIO              00040120
0006E9 66C1                      7417          BU    HIORET12                                          00040130
0006EA 671D                      7420 RETURN00 BU    BEGONES                                           00040140
0006EB 6720                      7423 RETURN01 BU    PEDATA1                                           00040150
0006EC 6722                      7426 RETURN02 BU    PEDATA2                                           00040160
0006ED 673B                      7429 RETURN03 BU    ENDTM                                             00040170
                                 7431 ************************************************************** 00040180
                                 7432 * MICRO DIAGNOSTIC----WITJ PROPER CONTROL BITS SET VIA SET DIAGNOSE,  * 00040190
                                 7433 * THIS CODE WILL LOOP WRITE FORMAT ONLY- NO DATA WILL BE WRITTEN.     * 00040200
                                 7434 * FORMAT LOOPED IS-- NORMAL PREAMBLE/32MARK ONES/ALLONES/32 MARK TWOS/* 00040210
                                 7435 * /NORMAL POST AMBLE.                                               * 00040220
                                 7436 ************************************************************** 00040230
0006EE 13F1                      7438 SUDOWRT1 STO   LINK4,SUDOWRT3     LOAD LINK RETURN               00040240
0006EF 04E1                      7441 SUDOWRT2 STO   WORK1,ONES-30      LOAD CTR 31 MORE               00040250
0006F0 66BA                      7444          BU    DOTWO                                             00040260

0006F1 13F5                      7448 SUDOWRT3 STO   LINK4,SUDOWRT4     LOAD LINK RETURM               00040280
0006F2 1F8C                      7451          STO   FORMAT,FORMT11     SET CONTROLS                   00040290
0006F3 04FF                      7454          STO   WORK1,ONES         LOAD CTR - 1                   00040300
0006F4 66BA                      7457          BU    DOTWO                                             00040310

0006F5 1F84                      7461 SUDOWRT4 STO   FORMAT,MARK2       CALL FOR MARK2                 00040330
0006F6 1398                      7464          STO   LINK4,FORMAT14     LOAD LINK RETURN               00040340
0006F7 04E0                      7467          STO   WORK1,ONES-31      LOAD CTR - 32                  00040350
0006F8 66BA                      7470          BU    DOTWO                                             00040360

0006F9 4150                      7474 TMPATCH  XFR   CTIMAGE,CTI        DROP OP IN                EC734087 00040380
0006FA 4488                      7477          XFR   WORK1,XINB         BRING IN SENSE BYTE       EC734087 00040390
0006FB 6610                      7480          BU    TMSKIP                                    EC734087 00040400
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                               F01MAY72   9/04/73
000700                         ,   7483            ORG   BEGIN+X'700'                                                00040420
                                   7484 *** SCREEN TIE BYTE FOR SINGLE TRACK ERROR. MOVE BYTE TO DATA FLOW           00040430
                                   7485 *** DEAD TRACK REG ONLY IF IT WAS SINGLE TRACK.                              00040440
000700 0E00                        7487 SCREENTI STO   SETCNT1,0                                                     00040450
000701 9200                        7490          ORM   XOUTAIM,0            MASK FOR TESTING                         00040460
000702 200C                        7493          BOC   DBUS,DOTIEMS2        BRANCH IF 0--CORRECT FOR TRK P           00040470
000703 0401                        7496          STO   WORK1,1              INITIALIZE WORK1 TO RIPPLE SINGLEBIT     00040480

                                   7499 ****BIT POSITION TO HEX CONVERTER***                                         00040500
                                   7500 *                                  *                                         00040510
                                   7501 * BIT     4 5 6 7   TRACK          *                                         00040520
                                   7502 *                                  *                                         00040530
                                   7503 *         0 0 0 0       P          *                                         00040540
                                   7504 *         0 0 0 1       7          $                                         00040550
                                   7505 *         0 0 1 0       6          .                                         00040560
                                   7506 *         0 0 1 1       5          *                                         00040570
                                   7507 *         0 1 0 0       4          *                                         00040580
                                   7508 *         0 1 0 1       3          *                                         00040590
                                   7509 *         0 1 1 0       2          *                                         00040600
                                   7510 *         0 1 1 1       1          *                                         00040610
                                   7511 *         1 0 0 0       0          *                                         00040620
                                   7512 *                                  *                                         00040630
                                   7513 ************************************                                         00040640

000704 0E01                        7516          STO   SETCNT1,1                                                     00040660

000705 4421                        7520 NOTLAST  XFR   WORK1,AR             SET GENERATED SINGLE BIT IN A REG        00040680
000706 F200                        7523          XOM   XOUTAIM,0            MASK FOR MATCHING BYTES                  00040690
000707 200C                        7526          BOC   DBUS,DOTIEMS2        BRANCH IF MATCH TIE BYTE ONLY HAS        00040700
000708 AE01                        7529          ADD   SETCNT1,1                                                     00040710
                                   7531 *                                   A SINGLE BIT ON                          00040720
000709 4421                        7533 DOAGAIN  XFR   WORK1,AR             XFR PATTERN BIT TO ALU INPUT REG         00040730
00070A A400                        7536          ADD   WORK1,0              SHIFT PATTERN BIT LEFT  ONE TIME         00040740
00070B 2105                        7539          BOC   NALCO,NOTLAST        BRANCH IF NOT LAST PATTERN               00040750


00070C 4E42                        7545 DOTIEMS2 XFR   SETCNT1,XOUTA        SET TIE BYTE IN DATA FLOW REG            00040790
00070D 4014                        7548          XFR   TIP                  TRANSFER TO DEAD TRACK REG               00040800
00070E 63D7                        7551          BU    CHEKSNS                                                       00040810
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72  9/04/73
                                   7554 * GO TO MAP 13-530                                        00040830
00070F 286D                        7556 CHKOP16  BOC   ADROUT,GOTHIO16     WATCH FOR HALT I/O    00040840
                                   7558 * GO TO MAP 13-530                                        00040850
000710 3B35                        7560 HIORET16 BOC   STATD,TONOGO        ERROR EXIT            00040860
                                   7562 * GO TO MAP 13-530                                        00040870
000711 2B13                        7564          BOC   STATB,READY16       WAIT FOR RISE OF B STAT 00040880
                                   7566 * GO TO MAP 13-530                                        00040890
000712 670F                        7568          BU    CHKOP16                                  00040900

000713 F01F                        7572 READY16  XOM   CURCOMM,X'1F'       IS THIS WTM           00040920
000714 2037                        7575          BOC   DBUS,TM1600         BR IF SO              00040930
000715 F017                        7578          XOM   CURCOMM,X'17'       IS THIS ERG           00040940
000716 203F                        7581          BOC   DBUS,ERGEXIT        BR IF SO              00040950
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                                   F01MAY72   9/04/73
                                   7584 ************************************************************************ 00040970
                                   7585 *                                                                      * 00040980
                                   7586 *                              1600 BPI WRITE                          * 00040990
                                   7587 *                                                                      * 00041000
                                   7588 *                                                                      * 00041010
                                   7589 ************************************************************************ 00041020

000717 13EA                        7592 PREAMBLE STO    LINK4,RETURN00       LOAD LINK RETURN - BEGONES              00041040
000718 9C00                        7595          ORM    SETDIA1,0            TEST FLAGS                              00041050
000719 341D                        7598          BOC    DREG4,BEGONES        BR IF INHIBIT PREAMBLE                  00041060
00071A 04D8                        7601 LOAD40   STO    WORK1,ONES-39        LOAD COUNT FOR PREAMBLE - 40            00041070
00071B 1F80                        7604          STO    FORMAT,FORMT00       LOAD CONTROL BYTE                       00041080
00071C 66BA                        7607          BU     DOTWO                LEAVE FOR 40 BYTES                      00041090

                                   7610 ****40 ZEROES ARE WRITTEN - SET CONTROLS TO WRITE BEGINNING ONES -          00041110
                                   7611 *** THEN TURN ON ALLOW END                                                  00041120
00071D 13EB                        7613 BEGONES  STO    LINK4,RETURN01       LOAD LINK RETURN - PE DATA1             00041130
00071E 1F88                        7616 SETFOR1  STO    FORMAT,MARK1         LOAD CONTROL BYTE                       00041140
00071F 66CD                        7619          BU     DOITFORA                                                     00041150

000720 13EC                        7623 PEDATA1  STO    LINK4,RETURN02       LOAD LINK RETURN - PEDATA2              00041170
000721 6673                        7626          BU     FORMAT60             GO TURN ON ALLOW END                    00041180

000722                             7629 PEDATA2  EQU    *                                                            00041200
                                   7630 * GO TO MAP 13-540                                                           00041210
000722 3F2C                        7632          BOC    ALLONES,POSTAMBL     WATCH FOR EOD                           00041220
                                   7634 * GO TO MAP 13-540                                                           00041230
000723 3B35                        7636 PEDATA3  BOC    STATD,TONOGO         EXIT ON EARLY TERMINATE                 00041240
                                   7638 * GO TO MAP 13-540                                                           00041250
000724 2865                        7640          BOC    ADROUT,GOTHIO14      WATCH FOR HIO                           00041260
000725                             7642 HIORET14 EQU    *                                                            00041270
                                   7643 * GO TO MAP 13-540                                                           00041280
000725 2727                        7645          BOC    CLOCKB,PEDATA5       WAIT FOR RISE OF                        00041290
                                   7647 * GO TO MAP 13-540                                                           00041300
000726 6723                        7649          BU     PEDATA3                 CLOCK B                              00041310

                                   7652 * GO TO MAP 13-540                                                           00041330
000727 3F2C                        7654 PEDATA5  BOC    ALLONES,POSTAMBL     WATCH FOR EOD                           00041340
                                   7656 * GO TO MAP 13-540                                                           00041350
000728 3B35                        7658 PEDATA6  BOC    STATD,TONOGO         EXIT ON EARLY TERMINATE                 00041360
                                   7660 * GO TO MAP 13-540                                                           00041370
000729 2867                        7662          BOC    ADROUT,GOTHIO15      WATCH FOR HIO                           00041380
                                   7664 * GO TO MAP 13-540                                                           00041390
00072A 2728                        7666 HIORET15 BOC    CLOCKB,PEDATA6       WAIT FOR FALL OF CLOCK B                00041400
                                   7668 * GO TO MAP 13-540                                                           00041410
00072B 6722                        7670          BU     PEDATA2                                                      00041420

                                   7673 *** ALL ONES WRITTEN NOW - SO WRITE ENDING 40 ZEROES    ******               00041440
00072C 1F80                        7675 POSTAMBL STO    FORMAT,X'80'         LOAD CONTROL REG                        00041450
00072D 5F42                        7678          XFR    FORMAT,XOUTA         DO IT                                   00041460
00072E 2430                        7681          BOC    BOPE,COMPL1          BR IF PARITY BZD                        00041470
00072F 6731                        7684          BU     COMPL                                                        00041480
000730 8720                        7687 COMPL1   ORI    SNSSTS2,BUSOC        SET BUS OUT CHK                         00041490
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   9/04/73
000731 13A2                       7690 COMPL    STO    LINK4,FORMAT19      LOAD LINK RETURN - AS STATED          00041500
000732 9C00                       7693          ORM    SETDIA1,0           TEST FLAGS                            00041510
000733 3236                       7696          BOC    DREG2,DOINHPST      BR IF INHIBIT POSTAMBLE               00041520
000734 671A                       7699          BU     LOAD40              GO WRITE POSTAMBLE - THEN SET STOP    00041530
000735 6600                       7702 TONOGO   BU     NOGO                                                      00041540
000736 66A2                       7705 DOINHPST BU     FORMAT19                                                  00041550
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                       F01MAY72   9/04/73
                                   7708 ************************************************************************ 00041570
                                   7709 *                                                                      * 00041580
                                   7710 *                     1600 BPI WRITE TAPE MARK                         * 00041590
                                   7711 *                                                                      * 00041600
                                   7712 *                                                                      * 00041610
                                   7713 ************************************************************************ 00041620

000737 04C0                        7717 TM1600    STO   WORK1,ONES-63       LOAD TM CTR                          00041650
000738 13ED                        7720 TM1600B   STO   LINK4,RETURN03      LOAD LINK RETURN - END   TM          00041660
000739 1F92                        7723           STO   FORMAT,TM0          LOAD CONTROL BYTE                    00041670
00073A 66BA                        7726           BU    DOTWO                                                    00041680

00073B 8880                        7730 ENDTM     ORI   STATIMG,STOP        IMAGE STOP                           00041700
00073C 4828                        7733           XFR   STATIMG,STAT        GET STOP                             00041710
00073D 1F80                        7736 STROBE    STO   FORMAT,FORMT00      SET COMTROL REG                      00041720
00073E 5F42                        7739           XFR   FORMAT,XOUTA        STOBE CONTROLS                       00041730
00073F 6249                        7742 ERGEXIT   BU    CTLWAIT             GO WAIT FOR ALU 2 TO COMPLETE        00041740
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                              F01MAY72   9/04/73
                                   7747 *********************************************************************** 00041780
                                   7748 *                                                                    *  00041790
                                   7749 *                                                                    *  00041800
                                   7750 *                  SEVEN AMD NINE TRACK NRZI WRITE                   *  00041810
                                   7751 *                                                                    *  00041820
                                   7752 *                                                                    *  00041830
                                   7753 *********************************************************************** 00041840
                                   7754 * GO TO MAP 13-520                                                      00041850
000740 286F                        7756 CHKOP800 BOC   ADROUT,GOTHIO17     WATCH FOR HIO                     00041860
                                   7758 * GO TO MAP 13-520                                                      00041870
000741 3B35                        7760 HIORET17 BOC   STATD,TONOGO        ERROR EXIT                        00041880
                                   7762 * GO TO MAP 13-520                                                      00041890
000742 2B44                        7764          BOC   STATB,READY800      WATCH FOR TAPE OP                 00041900
                                   7766 * GO TO MAP 13-520                                                      00041910
000743 6740                        7768          BU    CHKOP800                                              00041920

000744 F001                        7772 READY800 XOM   CURCOMM,1           IS THIS A WRITE                   00041940
000745 2049                        7775          BOC   DBUS,WRITESUM       BR IF SO                          00041950
000746 F08B                        7778          XOM   CURCOMM,X'8B'       CHK FOR LWR                       00041960
000747 2049                        7781          BOC   DBUS,WRITESUM       BR IF SO                          00041970
000748 673D                        7784          BU    STROBE              MUST BE ERG OR WTM -- EXIT        00041980

000749 1F40                        7788 WRITESUM STO   FORMAT,ALOWEND                                        00042000
00074A 5F42                        7791          XFR   FORMAT,XOUTA        SET ALLOW END  CONTROL            00042010

                                   7794 * GO TO MAP 13-520                                                      00042030
00074B 3F54                        7796 PHASE1   BOC   ALLONES,DOCRC       EXIT IF DONE                      00042040
                                   7798 * GO TO MAP 13-520                                                      00042050
00074C 2869                        7800 WRITELUP BOC   ADROUT,GOTHIO18     WATCH FOR HIO                     00042060
                                   7802 * GO TO MAP 13-520                                                      00042070
00074D 3B35                        7804 HIORET18 BOC   STATD,TONOGO        ERROR EXIT                        00042080
                                   7806 * GO TO MAP 13-520                                                      00042090
00074E 274C                        7808          BOC   CLOCKB,WRITELUP     WAIT FOR FALL                     00042100

                                   7811 * GO TO MAP 13-520                                                      00042120
00074F 3F54                        7813 PHASE2   BOC   ALLONES,DOCRC       EXIT IF TIME                      00042130
                                   7815 * GO TO MAP 13-520                                                      00042140
000750 286B                        7817 PHASE3   BOC   ADROUT,GOTHIO19     WATCH FOR HIO                     00042150
                                   7819 * GO TO MAP 13-520                                                      00042160
000751 3B35                        7821 HIORET19 BOC   STATD,TONOGO        EARLT EXIT                        00042170
                                   7823 * GO TO MAP 13-520                                                      00042180
000752 274B                        7825          BOC   CLOCKB,PHASE1       WAIT FOR RISE                     00042190
                                   7827 * GO TO MAP 13-520                                                      00042200
000753 6750                        7829          BU    PHASE3                                                00042210

000754 2456                        7833 DOCRC    BOC   BOPE,DOCRC3         BR IF PARITY BAD                  00042230
000755 6757                        7836          BU    DOCRC2                                                00042240
000756 8720                        7839 DOCRC3   ORI   SNSSTS2,BUSOC       SET BUS OUT CHK                   00042250

000757 13C6                        7843 DOCRC2   STO   LINK4,NRZIRET2      LOAD LINK RETURM- CRCTIME1        00042270
000758 04FE                        7846          STO   WORK1,ONES-1        SET CNT TO 2                      00042280
000759 1F80                        7849 DOCRC1   STO   FORMAT,FORMT00      LOAD CONTROLS                     00042290
00075A 66BA                        7852          BU    DOTWO                                                 00042300
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT
00075B 13C7                       7857 CRCTIME1 STO   LINK4,NRZIRET3      LOAD LINK RET                00042330
00075C 1F00                       7860          STO   FORMAT,0            CLEAR CONTROL REG            00042340
00075D 04FF                       7863          STO   WORK1,ONES          SET CRT TO 1                 00042350
00075E 9E00                       7866          ORM   SETCNT1,0           TEST FOE  7 TRK              00042360
00075F 3062                       7869          BOC   DREG0,CRCTIME3      BR IF IT IS                  00042370
000760 66BA                       7872          BU    DOTWO                                            00042380

000761 04FC                       7876 CRCTIME2 STO   WORK1,ONES-3        SET CTR TO 4                 00042400
000762 13A2                       7879 CRCTIME3 STO   LINK4,FORMAT19      LOAD LINK RETURN             00042410
000763 6759                       7882          BU    DOCRC1                                           00042420
000764 66A2                       7885 CRCTIME7 BU    FORMAT19            7 TRK EXIT                   00042430

000765 4150                       7889 GOTHIO14 XFR   CTIMAGE,CTI                                      00042450
000766 6725                       7892          BU    HIORET14                                         00042460
000767 4150                       7895 GOTHIO15 XFR   CTIMAGE,CTI                                      00042470
000768 672A                       7898          BU    HIORET15                                         00042480
000769 4150                       7901 GOTHIO18 XFR   CTIMAGE,CTI         GET OFF INTER FACE           00042490
00076A 674D                       7904          BU    HIORET18                                         00042500
00076B 4150                       7907 GOTHIO19 XFR   CTIMAGE,CTI                                      00042510
00076C 6751                       7910          BU    HIORET19                                         00042520

00076D 4150                       7914 GOTHIO16 XFR   CTIMAGE,CTI                                      00042540
00076E 6710                       7917          BU    HIORET16                                         00042550
00076F 4150                       7920 GOTHIO17 XFR   CTIMAGE,CTI                                      00042560
000770 6741                       7923          BU    HIORET17                                         00042570

000771                            7926 CHKDISC  EQU   *                                                00042590
000771 DD02                       7928          ANDM  SETDIA2,2           TEST FOR DISC IN FLAG        00042600
000772 2075                       7931          BOC   DBUS,NOTHISTM       BR IF OFF                    00042610
000773 CDFD                       7934          AND   SETDIA2,ONES-2      RESET FLG                    00042620
000774 4011                       7937          XFR   HDWERR              TESY                         00042630
000775                            7939 NOTHISTM EQU   *                                                00042640
000775 1E09                       7941          STO   FRUSAV,9            BUMP FRU REG                 00042650
000776 4828                       7944          XFR   STATIMG,STAT        SET STATS TO HARDWARE        00042660
000777 6304                       7947          BU    IDLESCAN                                         00042670
                                  7949 */*    ALU1: END     */                                         00042680
                                  7950          END   BEGIN                                            00042690
```

SYMBOL	LEN	VALUE	DEFN	REFERENCES
#ADROUT	00001	000008	00598	1126 1235 1342 1372 1699 1776 2755 2774 2854 2874 3414 4058 4225 4293 4520 4534 4623 5525 6138 6193 6306 6320 6703 6732 6768 6857 6871 6973 6994 7216 7256 7265 7303 7336 7556 7640 7662 7756 7800 7817
#ALLONES	00001	00001F	00623	4538 6977 7006 7037 7632 7654 7796 7813
#ALUR	00001	000002	00591	1020 1023 3137 3332 3621 3644 3788 3967 4147 4388 4423 4553 4565 5364 5907 5974 6548
#ALU1ERR	00001	000005	00775	
#ALU2ERR	00001	000006	00776	
#BOPE	00001	000004	00593	1809 3301 6073 7080 7681 7833
#CLOCKB	00001	000007	00597	6985 7002 7244 7248 7273 7311 7328 7645 7666 7808 7825
#CMDOUT	00001	000009	00599	1232 1349 1376 1544 1780 2860 2878 4220 4266
#CNT40	00001	000010	00922	2707
#CTIMAGE	00001	000001	00754	0981 1038 1054 1166 1172 1361 1367 1496 1538 1597 1634 1692 1806 2851 2869 3064 3067 3369 3380 3411 3423 3516 3523 3548 3568 3668 3682 3749 3979 4010 4022 4048 4051 4106 4134 4137 4312 4725 4834 4871 6566 6569 6584 6587 7163 7166
#CURADDR	00001	000003	00756	
#CURCOMM	00001	000000	00753	1265 1271 1500 1833 1916 1940 2015 2130 2136 2142 2204 2210 2216 2222 2232 2238 2244 2250 2330 3049 3055 3105 3291 3468 3993 4568 4574 4686 4809 4815 4852 4858 5005 5169 5350 5505 6199 6438 6536 6542 6889 6895 7572 7578 7772 7778
#DBUS	00001	000000	00589	1132 1181 1203 1214 1268 1274 1405 1411 1417 1423 1467 1504 1572 1590 1670 1713 1719 1753 1762 1797 1829 1836 1928 1943 2018 2052 2133 2139 2145 2207 2213 2219 2225 2235 2241 2247 2253 2333 2440 2446 2465 2507 2546 2698 2726 2936 3052 3058 3086 3108 3114 3124 3165 3366 3436 3446 3455 3471 3557 3575 3595 3604 3650 3656 3665 3762 3778 4019 4376 4447 4571 4584 4603 4640 4689 4718 4812 4818 4827 4846 4855 4861 4888 4918 4928 4934 4950 4963 4977 4987 4993 5031 5055 5064 5077 5087 5166 5233 5245 5254 5277 5373 5432 5498 5508 5543 5749 5892 6129 6232 6292 6441 6539 6545 6692 6892 6898 7493 7526 7575 7581 7775 7781 7931
#DFLER	00001	000007	00596	3153 4629 4700
#DREG0	00001	000010	00607	1960 2256 2973 2998 3294 4620 5671 5714 5838 6623 6646 7869
#DREG1	00001	000011	00608	1011 1963 2201 2949 3092 4587 4999 5394 5717 5831 5867 6248
#DREG2	00001	000012	00609	1973 2000 2038 2068 3481 4590 4683 5720 5824 5857 5878 6252 6650 6683 7119 7696
#DREG3	00001	000013	00610	1970 1997 5344 5407 5723 5817 6599 6614 6626
#DREG4	00001	000014	00611	1967 3297 4435 5726 5810 6256 6470 6608 6643 6910 7598
#DREG5	00001	000015	00612	1575 1673 1925 2198 4677 5729 5803
#DREG6	00001	000016	00613	1578 1922 2012 3598 3784 5732 5796 6659 6665 6677 6727
#DREG7	00001	000017	00614	1262 1919 4577 5735 5789 6202 6668 6949
#FLAGS	00001	000009	00762	1129 1178 1200 1211 1259 1399 1426 1454 1476 1482 1492 1512 1568 1618 1627 1664 1667 1710 1794 1826 1852 1874 3083 3171 3281 3363 3399 3433 3452 3554 3647 3653 3685 3759 3833 3884 4013 4016 4042 4179 4431 4480 4660 4772 4821 4843 4885 4900 4915 4940 4947 4960 4990 4996 5038 5061 5094 5154 5230 5274 5341 5358 5370 5388 5429 5495 5540 7157
#FLAGS1	00001	00000A	00763	1458 1508 1520 2049 2276 2286 2302 2347 2361 2368 2543 3688 4117 4824 4868 4878 4974 4984 5049 5074 5122 5242
#FLAGS2	00001	00000B	00765	1008 1105 1759 1855 2273 2289 2350 2358 2462 2513 2970 2995 4103 4120 5118 5251 5668
#FRUREG	00001	00000D	00783	1099
#ISEL	00001	00001D	00620	1041 4257
#LINK1	00001	000000	00770	
#LINK2	00001	000001	00771	
#LINK3	00001	000002	00772	

SYMBOL	LEN	VALUE	DEFN	REFERENCES
#LINK4	00001	000003	00773	5193
#LINK5	00001	000008	00778	
#LINK6	00001	000009	00779	
#MIFTR	00001	000003	00592	1820 2148 3359 3387 3458 3484 3564 3772 3815 3880 3960 3973 3990 4150 4175 5297 5304
#NALCO	00001	000001	00590	4318 5746 5760 5771 5780 5922 5932 5995 6009 6141 6147 6156 6279 6388 6792 6798 6834 6840 7019 7201 7280 7539
#NCUEA	00001	000005	00594	3391 5002
#NCUEB	00001	00001E	00621	4892 5347
#NGENR	00001	00001C	00619	0978 1047 4427
#OPRIN	00001	000018	00615	2844 3355 3420 3449 3637 3753 7154
#OVERRUN	00001	00001F	00622	4633
#PNDADDR	00001	000006	00759	1153 1159 1649 4439 4443
#PNDSTS	00001	000005	00758	1218 1402 1408 1414 1420 1463 1603 1800 1839 3159 3162 3184 3197 3211 3395 3439 3443 3526 3572 3592 3601 3775 3781 3956 4647 4657 4667 4896 4925 4931 5435 5546
#PWRRST	00001	00000F	00605	0975 4100 4451 4485
#REQTAGS	00001	00000A	00764	1029 1750 3461 3487 4140 4953 4967
#R0	00001	000000	00721	5743 5777 5854 5864 5875 5886 5889 5919 5929 5992 6006
#R1	00001	000001	00722	
#R10	00001	00000A	00731	
#R11	00001	00000B	00732	
#R12	00001	00000C	00733	
#R13	00001	00000D	00734	
#R14	00001	00000E	00735	
#R15	00001	00000F	00736	
#R16	00001	000000	00737	
#R17	00001	000001	00738	
#R18	00001	000002	00739	
#R19	00001	000003	00740	
#R2	00001	000002	00723	
#R20	00001	000004	00741	
#R21	00001	000005	00742	
#R22	00001	000006	00743	
#R23	00001	000007	00744	
#R24	00001	000008	00745	
#R25	00001	000009	00746	
#R26	00001	00000A	00747	
#R27	00001	00000B	00748	
#R28	00001	00000C	00749	
#R29	00001	00000D	00750	
#R3	00001	000003	00724	
#R30	00001	00000E	00751	
#R31	00001	00000F	00752	
#R4	00001	000004	00725	5757 5768
#R5	00001	000005	00726	
#R6	00001	000006	00727	
#R7	00001	000007	00728	
#R8	00001	000008	00729	
#R9	00001	000009	00730	
#SCB	00001	00000E	00604	1035 1184 1193 1473 1661 2270 2283 2299 4111 5130 5146 5197 5391
#SELO	00001	000006	00595	1732
#SELRST	00001	00000C	00602	1061 1108
#SETCNT1	00001	00000E	00768	2449 2519 2540 2549 2570 4600 6153 6276 6605 6611 6620 6640 6680 6795 6837

SYMBOL	LEN	VALUE	DEFN	REFERENCES														
				7198	7529	7866												
#SETCNT2	00001	00000F	00769	2483	2504	2695	2704	2723	5018	5028	6144	6385	6789	6831				
#SETDIA1	00001	00000C	00766	1716	2309	2316	2831	2933	3039	4581	6126	6162	6229	6245	6289	6467	6907	7116
				7595	7693													
#SETDIA2	00001	00000D	00767	3089	3102	3478	3662	3671	4617	6945	7928	7934						
#SEVMODA	00001	00000A	00780	5206														
#SEVMODB	00001	00000B	00781	5219														
#SNSSTS2	00001	000007	00760	1791	2443	2834	3181	3204	3288	3307	4559	4606	4637	4654	4703	4709	4766	6079
				7086	7687	7839												
#STATA	00001	00000A	00600	2746	3042	3168	3335	3819	5058	5071	5288	5332	5691	5951	6298	6353		
#STATB	00001	00000B	00601	3156	3898	3940	3953	3970	4556	4613	5367	5519	5537	5699	5903	6295	6303	6323
				6460	6707	6740	6762	6861	6877	7219	7564	7764						
#STATC	00001	00001A	00617	2749	2780	2929	2985	2992	3150	3233	3915	3937	4550	4626	5418	5522	5702	5980
#STATD	00001	00001B	00618	1080	2752	2777	3075	3230	3585	3614	3800	3901	3911	3943	4413	4510	4526	4542
				5415	5421	5516	5534	5962	6286	6309	6317	6711	6736	6765	6853	6874	6981	6998
				7213	7252	7269	7307	7332	7560	7636	7658	7760	7804	7821				
#STATIMG	00001	000008	00761	1005	1286	1292	1624	1676	1722	1984	2058	2079	2093	2477	2630	2668	2701	2713
				2729	2768	2783	2939	3095	3098	3127	3187	3224	3319	3322	3374	3578	3822	3924
				3930	4007	4187	4459	4680	4751	5084	5097	5137	5163	5291	5308	5315	5322	5397
				6236	6356	6366	6379	6395	6432	6448	6656	6674	6724	6845	6864	7147	7206	7730
#SUPO	00001	000019	00616	1451	2863	3677	4230	4275										
#SVCOUT	00001	00000D	00603	1346	1352	1355	1380	1541	2857	2882	4215	4284	4523	6196				
#WORK1	00001	000004	00757	1587	1621	1652	2428	2437	2468	2510	2653	2840	2946	3111	3121	3529	3624	4025
				4370	4715	6135	6332	6596	7015	7277	7536							
#WORK2	00001	000007	00777															
#WORK4	00001	00000C	00782															
#XOUTAIM	00001	000002	00755	1756	1765	2025	2076	2606	2662	2710	2736	4674	5239	5248	5257	5267	6662	6689
				7490	7523													
#XOUTBIM	00001	000004	00774															
AA	00001	000531	05768	5746														
ACLOCKUP	00001	0006BC	07248	7260														
ACTIVEB	00001	0006C0	07265	7273														
ADDIN	00001	000002	00817	1166	1172	1692	1806	3523										
ADROFF	00002	000385	04297	4297														
ADROUTUP	00001	0000BE	01699	1732														
ALLCLEAR	00001	0002DB	03621	3604	3614													
ALLOWDSE	00001	000010	00841	1458	1508	1520	2049	3688										
ALOWEND	00001	000040	00797	6957	7788													
ALUCHECK	00001	000513	05665	1064	3986													
ALUERR	00001	000080	00919	2510														
ALUFAIL	00001	000040	00891	1008	1105	2462	2513	5668										
ALU1ERR	00001	000015	00708	1017	2498	2567	4091											
ALU1001	00001	00054D	05864	5857														
ALU1002	00001	000550	05875	5867														
ALU1003	00001	000553	05886	5878														
ALU2DIA	00001	000053	01283	1262	1268	1274												
ALU2ERR	00001	000016	00709	1014	2501	2585	4095											
ALU2HDER	00001	0003DC	04654	4553	4565													
ALU2STOP	00001	0005E3	06414	6286	6309	6317												
ALU2UNEX	00001	0003E0	04667	4613														
ANRZI	00001	000040	00839	1750	2276	2286	2302	4140	5122									
ANYCUEA	00001	00029B	03391	3407	4789													
ANYERRS	00001	0004B3	05364	5415	5516	5534												
ANYMOR	00001	00000B	01023	1011														

ROS1 CROSS-REFERENCE 9/04/73

SYMBOL	LEN	VALUE	DEFN	REFERENCES
ANY7TK	00002	00015D	02259	
AOFAIL	00001	000375	04225	4225
AR	00001	000021	00631	1093 1156 1584 1646 2425 2434 2498 2501 2567 2650 3976 4364 4597 4696 5015 5025 5186 5203 5216 5236 5264 5774 5851 7520 7533
ARSVD	00001	0004AC	05341	4993
A64	00001	000020	00892	1759 2273 2289 4103 4120 4252
BACKWARD	00001	000080	00875	
BADEND	00001	000606	06554	6548
BAGAIN	00002	000361	04127	4111
BAKTOIDL	00002	00049C	05284	5277
BB	00001	00052E	05757	5749
BCLOCKUP	00001	0006C2	07273	7244
BEGIN	00001	000000	00969	0975 0978 1011 1020 1023 1035 1041 1047 1061 1080 1108 1126 1132 1181 1184 1193 1203 1214 1223 1226 1229 1232 1235 1256 1262 1268 1274 1342 1346 1349 1352 1355 1372 1376 1380 1405 1411 1417 1423 1451 1467 1473 1504 1541 1544 1562 1572 1575 1578 1590 1661 1670 1673 1699 1713 1719 1732 1753 1762 1776 1780 1797 1809 1820 1829 1836 1880 1908 1919 1922 1925 1928 1943 1953 1960 1963 1967 1970 1973 1990 1997 2000 2012 2018 2031 2038 2052 2068 2082 2096 2133 2139 2145 2148 2157 2167 2198 2201 2207 2213 2219 2225 2235 2241 2247 2253 2256 2263 2270 2283 2292 2299 2323 2333 2384 2394 2397 2413 2440 2446 2452 2465 2486 2507 2522 2531 2546 2552 2573 2588 2603 2618 2627 2642 2656 2677 2680 2683 2698 2707 2726 2746 2749 2752 2755 2774 2777 2780 2804 2822 2825 2828 2844 2854 2857 2860 2863 2874 2878 2882 2904 2922 2929 2936 2949 2956 2963 2973 2985 2992 2998 3016 3019 3042 3052 3058 3075 3086 3092 3108 3114 3124 3137 3150 3153 3156 3165 3168 3230 3233 3248 3251 3294 3297 3301 3332 3335 3355 3359 3366 3387 3391 3414 3420 3436 3446 3449 3455 3458 3471 3481 3484 3497 3500 3503 3557 3564 3575 3585 3595 3598 3604 3614 3621 3637 3644 3650 3656 3665 3677 3699 3753 3762 3772 3778 3784 3788 3800 3815 3819 3880 3898 3901 3911 3915 3937 3940 3943 3953 3960 3967 3970 3973 3990 4019 4058 4100 4111 4147 4150 4175 4215 4220 4225 4230 4257 4266 4275 4284 4293 4318 4376 4388 4413 4423 4427 4435 4447 4451 4485 4510 4520 4523 4526 4534 4538 4542 4550 4553 4556 4565 4571 4577 4584 4587 4590 4603 4613 4620 4623 4626 4629 4633 4640 4677 4683 4689 4700 4718 4736 4812 4818 4827 4846 4855 4861 4888 4892 4918 4928 4934 4950 4963 4977 4987 4993 4999 5002 5031 5055 5058 5064 5071 5077 5087 5130 5146 5166 5197 5233 5245 5254 5277 5288 5297 5304 5332 5344 5347 5364 5367 5373 5391 5394 5407 5415 5418 5421 5432 5498 5508 5516 5519 5522 5525 5534 5537 5543 5561 5671 5691 5699 5702 5714 5717 5720 5723 5726 5729 5732 5735 5746 5749 5760 5771 5780 5789 5796 5803 5810 5817 5824 5831 5838 5857 5867 5878 5892 5903 5907 5922 5932 5951 5962 5974 5980 5995 6009 6045 6048 6051 6054 6073 6090 6110 6129 6138 6141 6147 6156 6193 6196 6202 6220 6223 6226 6232 6248 6252 6256 6266 6269 6279 6286 6292 6295 6298 6303 6306 6309 6317 6320 6323 6335 6353 6359 6369 6388 6441 6454 6457 6460 6470 6473 6476 6484 6507 6513 6539 6545 6548 6599 6608 6614 6623 6626 6643 6646 6650 6659 6665 6668 6677 6683 6692 6703 6707 6711 6727 6732 6736 6740 6762 6765 6768 6775 6782 6792 6798 6817 6824 6834 6840 6853 6857 6861 6871 6874 6877 6892 6898 6904 6910 6920 6927 6937 6949 6953 6973 6977 6981 6985 6994 6998 7002 7006 7019 7028 7037 7045 7054 7067 7080 7093 7106 7113 7119 7127 7137 7154 7184 7191 7201 7213 7216 7219 7244 7248 7252 7256 7265 7269 7273 7280 7303 7307 7311 7328 7332 7336 7438 7448 7464 7483 7493 7526 7539 7556 7560 7564 7575 7581 7592 7598 7613 7623 7632 7636 7640 7645 7654 7658 7662 7666 7681 7690 7696 7720 7756 7760 7764 7775 7781 7796 7800 7804 7808 7813 7817 7821 7825 7833 7843 7857 7869 7879 7931 7950
BEGONES	00001	00071D	07613	7420 7598
BEGWRITE	00001	00060C	06578	3304 3310

SYMBOL	LEN	VALUE	DEFN	REFERENCES
BEGWRTTM	00001	000609	06566	3177
BFLAG	00001	0000A5	01618	1661
BHERE	00001	000292	03359	3420 3426
BIGPROB	00001	000267	03181	3137
BINTFC	00001	000020	00869	1621
BLKDC	00001	000080	00900	4617
BLKINTS	00001	000020	00903	3478
BLOUT40	00001	0004A3	05308	5067
BLOUT41	00001	000463	05077	
BLOUT42	00001	000448	04990	
BLOUT43	00001	000417	04824	
BLOUT44	00001	0004B1	05358	5031
BLOUT45	00001	000459	05046	
BLOUT46	00002	000438	04937	
BLOWOUT1	00001	000396	04388	
BMASKED	00001	00033C	03973	3996 5172
BNRZI	00001	000080	00838	2347 2361 2368 4117 4140 5242
BOERR	00001	000690	07086	7080
BOT	00001	000010	00878	3121 4715
BRETURN1	00002	00027D	03270	3297
BRETURN2	00002	000201	02815	2677
BRETURN4	00002	000202	02818	6045
BRSTTM1	00001	0006AA	07177	6892
BRSTTM2	00001	0006AB	07181	7201
BRSTTM3	00001	0006AE	07191	7184
BRSTTM4	00001	0006B0	07198	7191
BRSTTM5	00001	0006B2	07206	
BRSTTM6	00001	0006B4	07213	7219
BRST111	00001	000641	06775	6762 6792 6798
BRST112	00001	000643	06782	6775
BRST113	00001	000645	06789	6782
BSTDONE	00001	0003C0	04562	4510 4542 4550 4556
BSTWAIT	00001	0003B8	04534	3328 4523 4546 6419 7160 7169
BSTWAIT1	00001	0003BA	04542	
BSTWAIT2	00001	0003DA	04647	2910 4571 4620 4640
BUMPCTR	00001	0006C3	07277	7248
BUMPRIP	00001	000286	03301	3294
BUMP1	00001	000001	00918	
BUSOC	00001	000020	00853	1791 2468 3307 6079 7086 7687 7839
BUSY	00001	000010	00862	1414 1800 1839 3526 5450
BUSYSTAT	00001	0004CC	05450	5367 5421
B64	00001	000010	00893	2350 2358 4103 4252 5118 5251
CANCEL	00001	00028B	03319	2680 2683 2790
CANCEL1	00002	0001F5	02790	2656 2755 2774
CBI	00001	000060	00632	1163 1358 1695 2585 2665 2716 2837 3630 3659 4346 4408 5597 5600 5603 5606 5609 5612 5615 5618 5621 5624 5627 5630 5633 5636 5639 5642 6344 6372
CBO	00001	0000A0	00637	1150 1556 1559 1814 2336 4358 6033 6087 6098 6118
CCTRAP	00002	000536	05784	5771
CHAIN	00001	000001	00828	1259 1399 1492 1512 1710 3083 3452 3554 3647 3653 3685 4013 4042 4843 7157
CHANEND	00001	000008	00863	3013 3211 3278 3601 4647 4657
CHEKB	00001	0003D0	04613	4577 4584
CHEKONB	00001	000558	05903	5892 5911
CHEKSNS	00001	0003D7	04637	1252 4587 4590 4603 6165 7551
CHEKTIO	00001	0002B2	03468	3446

SYMBOL	LEN	VALUE	DEFN	REFERENCES
CHGSTS	00001	000001	00912	
CHKADRO	00001	000384	04293	4284
CHKAFLG	00002	0002A6	03430	3391
CHKALU2	00001	0003D4	04626	4731
CHKBFLG	00002	000430	04912	4892
CHKBIBO	00001	000386	04302	4293
CHKBOT	00001	000257	03121	3108
CHKBUSY	00001	0004C2	05415	5519
CHKC	00001	00056D	05980	
CHKCHAIN	00001	0002AA	03443	3436 4786
CHKCLOCK	00001	0006BB	07244	7280
CHKCONT	00001	000434	04925	3359
CHKCUEB	00001	00042B	04892	4908
CHKDISC	00001	000771	07926	6018
CHKDMR	00001	0005AA	06220	
CHKERRS	00001	00025C	03137	3075
CHKFTR	00002	0000CB	01746	1719
CHKISEL	00001	000011	01041	1057
CHKLWR	00001	000221	02933	
CHKNFP	00001	000225	02946	2936
CHKNOIS	00001	000191	02443	2465 2471
CHKNRZ	00001	0000CC	01750	5270
CHKONA	00001	000338	03960	
CHKONB	00001	00035C	04111	4338
CHKOPIN	00001	000304	03749	
CHKOP16	00001	00070F	07556	6629 7568
CHKOP800	00001	000740	07756	6633 7768
CHKOVRN	00001	0003D6	04633	
CHKPNDG	00001	0000B5	01670	1630
CHKPWRON	00001	000359	04100	
CHKRDB	00001	00013B	02136	1925
CHKRSRV	00001	00041C	04843	2148
CHKRSTS	00001	000000	00975	
CHKSTATS	00001	000563	05942	
CHKSUPO	00001	000380	04275	4266
CHKSVCOU	00001	000382	04284	4275
CHKUNCHK	00001	0003D1	04617	4670
CHKXINS	00001	00055B	05915	5903
CHK7TK	00001	00047D	05183	2228 2259
CKALUERR	00001	00056B	05974	5962
CKCHAIN	00001	00024B	03083	3042
CKDEER	00001	00028F	03332	3230 3233
CKDSE	00001	000106	01940	1960
CKEOTBOT	00001	000251	03102	3086
CKHIMODE	00001	000154	02232	2201
CKRESRV	00001	0002CA	03564	3557
CKSELRST	00001	000017	01061	1047
CLEANGO	00001	0005A3	06184	1332
CLEANIT	00001	000279	03245	2031 2167 2323
CLEANUP	00001	0002DE	03630	3532 3598 3621 3656 4028
CLEAR	00001	000012	00629	1111 1114 2979 2982 4396 4400 4760 4763
CLEARAB	00001	0001F6	02794	2752
CLEARIT	00001	000025	01105	1023
CLRBUSIN	00001	0002E5	03653	3644

SYMBOL	LEN	VALUE	DEFN	REFERENCES
CLRSTS	00001	000315	03808	3800
CMDOUTUP	00001	000062	01346	
CMDPARER	00001	0000D5	01791	1809
CMDPAREX	00001	0000DC	01814	
CMDPAR0	00001	0000D6	01794	5460
CMDPAR00	00002	0004CF	05460	5364
CMDPAR1	00001	0000E6	01849	1797 2913
CMDPROC	00002	0000E5	01846	1829
CMDREJ	00001	000080	00851	4766
CMDWAIT	00001	0000D2	01776	1762 1784 5260
CMDWAIT0	00001	0000CF	01759	1753
CMDWAIT1	00001	0000DA	01806	1780
CMDWAIT2	00002	00041B	04838	4812 4818
CMDWAIT3	00001	0000E1	01833	5376 5438 5446 5549 5555
CMDWAIT4	00001	0000DE	01823	1803 4830 4838
CMDWAIT8	00002	0004E5	05549	5394 5407
CMOOFF	00002	00037F	04270	4270
CMOUP	00001	000045	01232	1238
CNT40	00001	000080	00921	2582 2615
COFAIL	00001	000374	04220	4220
COMDECOD	00001	000100	01916	1846
COMPL	00001	000731	07690	7684
COMPL1	00001	000730	07687	7681
COMREJCT	00001	000108	01953	1931 1963 2021 2052 2153 4849 4864
COMREJC1	00001	000400	04745	2952 5478
COMTESTA	00001	000114	01997	1967
COMTESTB	00001	000120	02038	1970
COMTESTC	00001	000129	02068	1997
CONCON	00001	000080	00821	1454 1512 1568 3363 3554 3647 4016 4821 4940 5274
CONTCHK	00001	0004B8	05381	5373
CONTCHK1	00001	0004C6	05429	5418 5537
CONTCHK2	00001	0004CA	05443	5432
CONTCMD	00001	00010A	01960	2198
CONTEND	00001	00025D	03150	
CONTEND1	00001	00025F	03156	3193
CONTEND2	00001	000260	03159	3200
CONTEND3	00001	000261	03162	
CONTINIT	00001	000237	03013	1990 2082 2096
CONTROL	00001	000020	00803	1005 2079 2093 4680 6236
CONTSERV	00001	00023B	03028	1326
CONTSTAK	00001	00023C	03033	1329
CRCTIME1	00001	00075B	07857	7286
CRCTIME2	00001	000761	07876	7289
CRCTIME3	00001	000762	07879	7869
CRCTIME7	00002	000764	07885	
CTI	00001	000050	00633	0984 1169 1337 1364 1395 1444 1600 1637 1702 1823 1864 1877 2339 2404 2743 2866 2891 3070 3383 3417 3633 3674 3756 3982 4054 4155 4240 4728 6061 6121 6184 6406 6581 7348 7354 7360 7366 7372 7378 7384 7390 7396 7402 7408 7414 7474 7889 7895 7901 7907 7914 7920
CTIMAGE	00001	000001	00687	0984 1169 1337 1364 1395 1444 1600 1637 1702 1823 1864 1877 2339 2404 2743 2866 2891 3070 3383 3417 3633 3674 3756 3982 4054 4155 4235 4240 4302 4322 4346 4364 4728 6061 6121 6184 6406 6581 7348 7354 7360 7366 7372 7378 7384 7390 7396 7402 7408 7414 7474 7889 7895 7901 7907 7914 7920
CTLWAIT	00001	000249	03075	3079 7222 7742

SYMBOL	LEN	VALUE	DEFN	REFERENCES														
CUBUSY	00001	000010	00814	1538	1597	3067	3380	3601	3662	3668	3671	3749	4051	4137	4725	6569	6587	7163
CUE	00001	000020	00861	1218	1420	1463	1603	3184	3197	3395	3439	3601	4896					
CUEA	00001	000040	00822	1211	1454	1476	1512	1667	3399	3433	4996	5154	5388					
CUEASTS	00001	0004BC	05394															
CUEB	00001	000010	00824	1200	1454	1482	1512	1627	4179	4900	4915	5341	5388					
CUEBSTS	00001	0004C0	05407	5391														
CUEPNDG	00001	0002A9	03439	4921														
CUERSTB	00001	000085	01482	1473														
CURADDR	00001	000003	00689	1150	1156	1556	1646	1695										
CURCOMM	00001	000000	00686	1814	1886	3811	3976	4334	5186									
CUREA	00001	000009	00646	3403	3430													
CUREB	00001	00000A	00647	4904	4912													
CURFLAG	00001	000020	00840	2543	4140	4824	4868	4878	4974	4984	5049	5074						
CURSVD	00001	000001	00847	2549														
DATACK	00001	000008	00855	3204	4559	4709												
DATALOOP	00001	000676	06973	6989	7010													
DATATIME	00001	000675	06969	6953														
DATCHECK	00001	0003E2	04674	4626	4629													
DD	00001	000537	05789	5780														
DECHICNT	00001	00059B	06153	6147														
DEDUN	00001	000276	03230	3236														
DEPRIMA	00001	000338	03958	3915	3953													
DEPRIMES	00001	00031D	03871	5034														
DEPRIM1	00001	000321	03884	4801														
DEPRIM2	00001	000322	03888	5100	5311	5318	5328											
DEPRIM3	00001	000325	03898	3904														
DEPRIM4	00001	000328	03908	3898	3940													
DEPRIM5	00001	000331	03937	3946														
DEPRIM6	00001	000335	03950	3937														
DEPRIM7	00001	00033A	03967	3901	3911	3943												
DEPRIM8	00001	000465	05084	5077														
DEPRIM9	00001	000468	05094	5087														
DEVBSY	00001	000040	00902	3089	3102													
DEVCHK	00001	000002	00881															
DEVEND	00001	000004	00864	1402	1408	3159	3162	3184	3197	3278	3572	3775	3874	4647	4657	4931	5325	5435
				5443	5546	5552												
DEVRST	00001	00036C	04167															
DEV0	00001	000000	00871															
DIAGMODE	00001	000010	00804	1722														
DIALINK	00001	000583	06073	2818														
DIAWRT	00001	000080	00897	1716	2309													
DMR	00001	000004	00906	4581	6229	6245												
DMRA	00001	0005DE	06395	6388														
DMRLNK	00001	0005E1	06406	2812														
DMRRTN1	00002	000200	02812	6220														
DMRSTOP	00002	0005E4	06419	6266	6306	6320	6484											
DMR1	00001	0005BB	06276	6369														
DMR2	00001	0005D1	06353	6335														
DMR3	00001	0005BD	06283	6359	6391	6401	6460	6473	6479									
DMR4	00001	0005D9	06379	6279														
DMR5	00001	0005C7	06317	6295	6298	6323												
DMR6	00001	0005CB	06332	6269														
DMR7	00001	0005C3	06303	6312														
DMR8	00001	0005D5	06366	6353														

ROS1 CROSS-REFERENCE 9/04/73

SYMBOL	LEN	VALUE	DEFN	REFERENCES
DMR9	00001	0005D7	06372	6362 6490
DOACUE	00001	000041	01218	1206
DOAGAIN	00001	000709	07533	
DOAREAD	00002	0005A2	06175	6232
DOBAKFIL	00001	000133	02104	2000
DOBKSPBL	00001	00012F	02090	1973
DOBWD	00001	0005EA	06448	6441
DOCONTRL	00001	000130	02093	2107 2115 2123
DOCRC	00001	000754	07833	7796 7813
DOCRC1	00001	000759	07849	7882
DOCRC2	00001	000757	07843	7836
DOCRC3	00001	000756	07839	7833
DODATCK	00001	0003ED	04709	4700
DODES	00001	0002D2	03592	3650
DODES1	00001	0002D7	03607	3595 3694 4032
DODIAMS	00001	00016C	02309	2207
DODSE	00001	000123	02049	1943
DOERG	00001	000121	02042	
DOFORA	00001	00036F	04179	5149
DOFORBLK	00001	000135	02112	2038
DOFORFIL	00001	000137	02120	2068
DOHOLDS	00001	000341	03990	3970
DOIBGMSR	00001	0005E6	06435	6248
DOINHPST	00002	000736	07705	7696
DOITAGN	00001	0002D9	03614	3617
DOITFORA	00001	0006CD	07324	6778 6820 6913 6940 7049 7071 7109 7143 7187 7619
DOITFORB	00001	0006C8	07299	6785 6827 6923 6961 7032 7058 7133 7194
DOITNOW	00001	0000ED	01871	2916
DOITONB	00001	0003A7	04459	4451
DOLPBRST	00001	00061E	06638	6599
DOLWR	00001	00016E	02316	2225
DONRZA	00001	00016A	02302	
DONRZB	00001	00017D	02368	2299
DONRZMS	00001	000169	02299	2235
DOPEA	00001	000165	02286	
DOPEA2	00001	000166	02289	2305
DOPEB	00001	000177	02347	2283
DOPEB2	00001	000178	02350	2371
DOPEMS	00001	000164	02283	2241
DORDBACK	00001	000146	02175	2139
DORDSTOP	00001	0005E5	06432	6256
DOREAD	00001	000143	02164	2133
DOREAD1	00001	000144	02167	2179
DOREAD2	00002	000145	02171	2099
DOREQA	00001	0002B8	03487	3744 4795
DOREQB	00001	000441	04967	
DORESETS	00001	000369	04155	4123 5126 5133 5141
DOREWIND	00001	00010F	01981	
DORST0	00001	00036B	04163	4454 4463
DORST1	00001	000477	05154	5146
DORST2	00001	000396	04386	4183 5158
DORST3	00001	00039C	04413	4418
DORST4	00001	00039E	04423	4413
DORST5	00001	0003A9	04468	4427 4435 4447

SYMBOL	LEN	VALUE	DEFN	REFERENCES
DORST6	00001	0003AD	04485	
DORUNLOD	00001	000116	02005	
DORWD1	00001	000112	01990	2008
DOSENSE	00001	00017F	02384	2145 4874 4881
DOSETDIA	00001	000579	06033	2194
DOTESTIO	00001	000141	02157	1928
DOTIEMS	00001	000170	02323	2213 2253
DOTIEMS1	00001	000172	02330	3270
DOTIEMS2	00001	00070C	07545	7493 7526
DOTWO	00001	0006BA	07240	7099 7444 7457 7470 7607 7726 7852 7872
DOWTM	00001	00012A	02073	
DOWTM1	00001	00012B	02076	2045 2064
DOWTM64	00002	000266	03177	3052 3058
DO16OR64	00001	000629	06674	6643
DO64A	00001	000161	02273	
DO64B	00001	00017A	02358	2270
DO64MS	00001	000160	02270	2247
DO8OR16	00001	000619	06620	6608
DRETURN0	00002	000303	03744	
DROPTAGS	00001	0002CC	03572	3560 4980
EE	00001	000539	05796	5789
ENABLDSE	00001	00008E	01520	1504
ENDHIO	00001	0003F2	04725	4623
ENDTM	00001	00073B	07730	7429
EOT	00001	000020	00877	3111
EQUIPCK	00001	000010	00854	3181 4654
ERGEXIT	00002	00073F	07742	7581
ERRRST	00001	000371	04187	4147
EXECRST	00002	000014	01051	1904
EXIT	00001	0001D1	02671	2719
EXT	00001	000081	00648	1014
FF	00001	00053B	05803	5796
FLAGS	00001	000009	00695	4326 5015 5025 5110
FLAGS1	00001	00000A	00696	
FLAGS2	00001	00000B	00698	4252
FORCERR	00001	000002	00907	
FORCEUC	00001	000080	00890	1105 1855 2513 2970 2995
FORMAT	00001	00001F	00718	1889 6341 6372 6487 6755 6758 6814 6901 6917 6934 6957 7024 7041 7063 7090 7103 7130 7140 7181 7234 7240 7299 7324 7451 7461 7604 7616 7675 7678 7723 7736 7739 7788 7791 7849 7860
FORMAT1	00001	00065F	06889	6877
FORMAT1X	00001	000663	06901	
FORMAT10	00001	000691	07090	7083
FORMAT12	00001	000695	07103	7093
FORMAT14	00001	000698	07113	7106 7464
FORMAT16	00001	00069C	07127	7113
FORMAT18	00001	00069F	07137	7127
FORMAT19	00001	0006A2	07147	7119 7137 7690 7705 7879 7885
FORMAT2	00001	000668	06917	6904
FORMAT3	00001	00066B	06927	6920
FORMAT5	00001	00066D	06934	6910 6927
FORMAT6	00001	000670	06945	6937 7067
FORMAT60	00001	000673	06957	7626
FORMAT7	00001	000685	07037	7028

SYMBOL	LEN	VALUE	DEFN	REFERENCES								
FORMAT8	00001	000689	07054	7045								
FORMAT9	00001	00068B	07063	7054								
FORMTEND	00001	0006A4	07154	6551	6560							
FORMTM	00001	000090	00796									
FORMT00	00001	000080	00790	7604	7736	7849						
FORMT01	00001	000082	00788	6917	7130							
FORMT10	00001	000081	00789	6901	7140							
FORMT11	00001	00008C	00791	6755	7041	7234	7451					
FRUREG	00001	00001D	00716	1090	2650	4330						
FRUSAV	00001	00001E	00717	1093	3769	3877	5677	5706	5848	5899	5939	5977	7941
FTCHNOIS	00001	0003E8	04693	4718								
GDT	00001	000010	00904	6126	6162							
GDTHIO	00002	0005A0	06168	6138								
GENRESET	00001	000354	04079	1051								
GENRST1	00001	00046B	05106	4127								
GETHIGH	00001	000501	05597	5648								
GETOFF	00001	0002C3	03529									
GETREST	00002	000512	05648									
GETSNS0	00001	0004B9	05383									
GG	00001	00053D	05810	5803								
GIVSTS	00001	00059E	06162	6129	6156							
GIVSTS1	00002	00059F	06165									
GODOALU	00002	000018	01064									
GODODIA	00001	00004B	01259	1883	2907							
GODODIA0	00001	00004A	01256	3022	3254							
GODOIDLE	00002	0002BA	03493	3481								
GODOIT	00001	000240	03046	3114	3124							
GODO1600	00002	00061C	06629	6617	6653	6659	6665	6671	6677	6692		
GODO6400	00001	000630	06694	6686								
GODO800	00002	00061D	06633	6623	6626	6646	6668					
GOFETCH	00001	000581	06061	6093	6113							
GORDSTOP	00001	0005B8	06266	6470								
GOSETDIA	00002	000148	02194	2333								
GOSTOP	00001	0003B1	04510	4538								
GOTHIO1	00001	0006D2	07348	6703								
GOTHIO10	00001	0006E4	07402	6994								
GOTHIO11	00001	0006E6	07408	7256								
GOTHIO12	00001	0006E8	07414	7265								
GOTHIO14	00001	000765	07889	7640								
GOTHIO15	00001	000767	07895	7662								
GOTHIO16	00001	00076D	07914	7556								
GOTHIO17	00001	00076F	07920	7756								
GOTHIO18	00001	000769	07901	7800								
GOTHIO19	00001	00076B	07907	7817								
GOTHIO2	00001	0006D4	07354	6857								
GOTHIO3	00001	0006D6	07360	6732								
GOTHIO4	00001	0006D8	07366	6768								
GOTHIO5	00001	0006DA	07372	7216								
GOTHIO6	00001	0006DC	07378	6871								
GOTHIO7	00001	0006DE	07384	7303								
GOTHIO8	00001	0006E0	07390	7336								
GOTHIO9	00001	0006E2	07396	6973								
GOTOIDLE	00001	0002B9	03490	3464	4956	4970						
GRETURN0	00002	000049	01252	2904								

SYMBOL	LEN	VALUE	DEFN	REFERENCES
HADHIO	00001	0002A4	03423	3414
HADOVERN	00001	0003CE	04606	4633
HANGHERE	00002	000301	03737	3737 3784 5280
HARDWER	00002	0003AF	04492	4423
HDWERR	00001	000011	00628	3733 4492 5753 5764 5784 5792 5799 5806 5813 5820 5827 5834 5841 5861 5871 5882 5895 5955 5970 5984 5999 6013 7937
HDWR	00001	000084	00636	1017
HH	00001	00053F	05817	5810
HIOLINK	00001	000090	01534	1342 1547
HIOLINK1	00001	000091	01538	1372
HIOLK	00001	00020B	02847	2854 2874
HIONOP	00001	000344	04007	1735 3284
HIONOP1	00002	00034C	04032	4019
HIONOP2	00001	000345	04010	
HIOPERG	00001	00034D	04042	3314 4520 4534 6168
HIORET1	00001	000631	06707	7351
HIORET10	00001	00067D	07002	7405
HIORET11	00002	0006BF	07260	7411
HIORET12	00001	0006C1	07269	7417
HIORET14	00001	000725	07642	7892
HIORET15	00001	00072A	07666	7898
HIORET16	00001	000710	07560	7917
HIORET17	00001	000741	07760	7923
HIORET18	00001	00074D	07804	7904
HIORET19	00001	000751	07821	7910
HIORET2	00001	000658	06861	7357
HIORET3	00001	000637	06736	7363
HIORET4	00002	000640	06771	7369
HIORET5	00001	0006B6	07219	7375
HIORET6	00001	00065C	06874	7381
HIORET7	00001	0006CA	07307	7387
HIORET8	00002	0006D1	07340	7393
HIORET9	00001	000677	06977	7399
HNDLERR	00001	000020	01090	1020
HOLDA	00001	000080	00811	1038 3993 4010 4048 4106 4134 5005 6584
HOLDB	00001	000040	00812	1054 4010 4048 4106 4134 5169 5350 6584
HOLDINT	00001	000020	00813	1496 3369 3516 3568 3682 4010 4022 4051 4134 4834 4871 6587 7163
HRDRST	00002	000398	04396	4388
IBGMSR	00001	000040	00905	4581 6229 6245 6289
IBGSTOP	00001	0005F5	06484	6454 6507
IC	00001	000022	00634	1301 1429 1487 1534 2786 2847 2894 2988 3002 5403 6076 6082 6327 6409 6414 7283 7315
IDLE	00001	000306	03756	
IDLEPEND	00002	000302	03741	3493 3741
IDLESCAN	00001	000304	03747	3474 3640 4488 6021 7947
IDLE0	00001	00030A	03769	3762
IDLE1	00001	00030C	03775	5284
IDLE2	00001	00049D	05288	4987
IDLE3	00001	0004A2	05304	5288
IDLE4	00001	000457	05038	5361
II	00001	000541	05824	5817
INCAGN	00001	000595	06135	6141 6150 6159
INHP	00001	000082	00635	
INHPOST	00001	000020	00909	

SYMBOL	LEN	VALUE	DEFN	REFERENCES
INHPRE	00001	000008	00908	
INITSEV	00001	00046D	05114	
INSDELAY	00002	000334	03946	3933
INSELCHK	00001	00002A	01126	1041
INTFB	00001	000020	00823	1178 1454 1512 1618 1664 3884 4885 4947 4960 4990 5038 5061 5094 5110 5154 5230
INTFCHK	00001	000032	01163	1135
INTFERR	00001	00006A	01369	
INTREQ	00001	000040	00852	
ISITUP	00001	0005EE	06460	6463
ISLDPT	00001	0003EF	04715	4689
ISNOOP	00001	00015E	02263	2219
IS5ON	00001	000149	02198	2012
IS6ON	00001	000118	02012	1919
ITSOK	00001	00011C	02025	2018 2319
ITSRSVD	00001	000318	03819	5008 5353
ITSTIME	00001	0005CA	06327	6303
JJ	00001	000543	05831	5824
KK	00001	000545	05838	5831
LATER	00002	000578	06021	5671
LETSREAD	00001	0003B3	04516	6175
LINK1	00001	000010	00703	1223 1487 1990 2031 2082 2096 2157 2167 2263 2292 2323 2394 2677 2822 2988 3002 3016 3248 3497 6045 6220
LINK2	00001	000011	00704	1226 1429 2397 2680 2825 2894 3019 3251 3500 6048 6223
LINK3	00001	000012	00705	1229 1534 1562 2683 2828 2847 3503 6051 6226
LINK4	00001	000013	00706	1256 1301 1880 1953 2384 2413 2452 2486 2522 2531 2552 2573 2588 2603 2618 2627 2642 2656 2786 2904 2922 2956 2963 5183 5203 5216 5403 6054 6076 6082 6090 6110 6335 6359 6369 6409 6473 6775 6782 6817 6824 6904 6920 6927 6937 6953 7028 7045 7054 7067 7093 7106 7113 7127 7137 7184 7191 7283 7315 7438 7448 7464 7592 7613 7623 7690 7720 7843 7857 7879
LINK5	00001	000018	00711	1892 6266 6414 6454 6484 6507
LINK6	00001	000019	00712	6269 6327 6457 6476
LOAD40	00001	00071A	07601	7699
LOOKAGIN	00001	0004C3	05418	5424
LOOKATA	00001	0005C2	06298	6292
LPCKDENS	00001	000623	06656	6650
LP16OR64	00001	00062E	06689	6683
LP8OR16	00001	000621	06650	
LSR	00001	000006	00627	1096 1102 5189 5223 5594 5645
LWROP	00001	000004	00899	2316 2831 2933 3039
MARK1	00001	000088	00794	6934 7063 7616
MARK2	00001	000084	00795	7024 7103 7461
MASEMBLE	00001	0000C0	01710	
MASKFORA	00001	000342	03993	4804
MAYBETIO	00001	0004D8	05505	5498
MAYBLWR	00001	000634	06724	
MIFTR0A	00001	00044F	05012	5297
MIFTR0B	00001	000453	05025	5304
MIFTR0C	00001	000459	05044	3880
MIFTR0D	00001	000461	05071	3973
MIFTR00	00001	000036	01175	
MIFTR01	00001	000082	01473	
MIFTR02	00001	0004D5	05495	
MIFTR03	00001	0000B2	01661	

SYMBOL	LEN	VALUE	DEFN	REFERENCES					
MIFTR04	00001	000412	04809	1820					
MIFTR05	00001	000429	04885	3387					
MIFTR06	00001	00043B	04947	3458					
MIFTR07	00001	00043F	04960	3484					
MIFTR08	00001	000443	04974	3564					
MIFTR09	00001	000446	04984	3815					
MIFTR10	00001	000471	05130	4150					
MIFTR11	00001	000475	05146	4175					
MIFTR12	00001	000015	01054	1035					
MIFTR13	00001	000479	05163	3990	5332				
MIFTR14	00001	0004BB	05391						
MIFTR17	00001	000499	05274	3772					
MIFTR18	00001	0004AA	05332	3960					
MISRTN0A	00002	000411	04804	5166					
MISRTN1	00002	00040B	04786	4918					
MISRTN2	00002	00040C	04789	4888					
MISRTN3	00002	00040D	04792	4950					
MISRTN4	00002	00040E	04795	4963					
MISRTN5	00002	00040F	04798	4977					
MISRTN7	00002	000410	04801	5055					
MIST	00001	000048	00643	1032	3490	4159			
MODELINK	00001	000167	02292	2256	2279	2312	2353	2364	5226
MODEREGS	00001	0000F5	01896	0975					
MODETYPE	00001	00014A	02201						
MODE64	00001	000002	00786	1765	5257				
MOVEON	00001	0002E2	03644	3575	3585				
MOVEON2	00002	00001F	01086	1080					
MOVEOUT	00001	000042	01221	1203	1214				
NDXABRT	00001	00000B	00947	1026	1858	3792	6554		
NDXADR	00001	0000EA	00967	1068					
NDXAXESS	00001	00000D	00949	6501					
NDXBSF	00001	00003C	00957	2104					
NDXBSR	00001	00003E	00958	2090	6435				
NDXDES	00001	000006	00942	3607					
NDXDMR	00001	00000C	00948	6260					
NDXERG	00001	000022	00962	2042					
NDXERS	00001	000031	00954	2055					
NDXFLAGS	00001	00000E	00950	1295	6036				
NDXFLAG2	00001	000010	00952	6101					
NDXFSF	00001	000035	00953	2120					
NDXFSR	00001	000037	00955	2112	6444				
NDXGRST	00001	000008	00944	4079					
NDXPOLL	00001	000007	00943	3891					
NDXRDB	00001	00003A	00959	2175					
NDXRDF	00001	000033	00956	2164					
NDXRWD	00001	00002F	00963	1981					
NDXRWU	00001	000029	00964	2005					
NDXSDE	00001	00000A	00946	3218					
NDXSNS	00001	0000D6	00966	2407					
NDXSNSR	00001	00000F	00951	4745					
NDXSRST	00001	000009	00945	4131					
NDXSTS	00001	0000EB	00965	1680					
NDXTST3	00001	000005	00941	5680					
NDXWRT	00001	000013	00960	2028					

SYMBOL	LEN	VALUE	DEFN	REFERENCES
NDXWTM	00001	000020	00961	2073
NFP	00001	000040	00876	2946
NIXASTS	00002	00044E	05008	5002
NIXBSTS	00002	0004B0	05353	5347
NOBURST	00001	00065B	06871	6614 6727 6880
NOGO	00001	000600	06536	6711 6736 6765 6853 6874 6981 6998 7213 7252 7269 7307 7332 7702
NOISE	00001	000080	00844	2449
NORESETS	00001	000004	01002	0978
NOSHORT	00001	0000AA	01634	1572 1590
NOSTACK	00002	00007A	01432	1405 1411 1417 1423
NOSVC	00001	0003BC	04550	4526
NOTAINT	00001	00003C	01200	1184
NOTBINT	00001	00003A	01193	1181
NOTBINT1	00001	00003F	01211	1196
NOTBOTH	00001	000036	01178	
NOTBUSY	00001	000001	00882	
NOTCHAIN	00001	0002B5	03478	3455 3765 3963 5335
NOTCHANE	00001	00041F	04852	4846
NOTCOMP	00001	000001	00848	
NOTCON	00002	00043A	04943	4928 4934
NOTCONT	00001	00009E	01584	1575 1578
NOTHISTM	00001	000775	07939	7931
NOTLAST	00001	000705	07520	7539
NOTNOW	00001	000270	03211	3335
NOTPE	00001	000010	00886	
NOTPULL	00001	0001EE	02768	2800
NOTRSV	00001	00041A	04834	4827
NOTYET	00001	000352	04058	4058
NRZIRET2	00002	0006C6	07286	7843
NRZIRET3	00002	0006C7	07289	7857
NRZMODE	00001	000001	00798	1756 5248
NSUBSYS	00001	000040	00846	2519
ONES	00001	0000FF	00916	1005 1029 1172 1292 1367 1399 1458 1476 1482 1508 1664 1806 1855 2276 2286 2289 2347 2350 2361 2513 2630 2713 2729 2783 2831 2869 3039 3064 3098 3102 3127 3187 3224 3288 3319 3374 3380 3423 3523 3526 3548 3568 3601 3671 3682 3685 3688 3749 3811 3833 3884 3930 4013 4042 4235 4312 4821 4834 4878 5358 5397 5739 5757 5768 5992 6006 6144 6153 6162 6276 6366 6385 6395 6566 6749 6752 6807 6864 6969 7096 7157 7163 7177 7237 7441 7454 7467 7601 7717 7846 7863 7876 7934
ONESBRST	00001	0006B8	07234	6930 7122
ONLYDE	00001	000272	03218	3165 3168
OPCODES	00001	000547	05845	5760
OPENERS	00001	0004D5	05493	1956 2387 2925 2959 2966
OPENERS0	00001	0004DB	05513	5508
OPENERS1	00001	0004DB	05516	5501 5528
OPIN	00001	000001	00818	1166 1538 1634 3064 3411 3423 3523 3548 4235 4725 6566 7166
OPINDROP	00001	0002E0	03637	3637
OPINUP	00001	000305	03753	3753
OVERUN	00001	000004	00856	4606
PEDATA1	00001	000720	07623	7423
PEDATA2	00001	000722	07629	7426 7670
PEDATA3	00001	000723	07636	7649
PEDATA5	00001	000727	07654	7645
PEDATA6	00001	000728	07658	7666

SYMBOL	LEN	VALUE	DEFN	REFERENCES
PENDLINK	00002	0000E4	01842	1836 4775 5453
PHASE1	00001	00074B	07796	7825
PHASE2	00001	00074F	07813	
PHASE3	00001	000750	07817	7829
PICKDROP	00002	000395	04381	4381
PING	00001	000044	00644	3519 4937 5511
PNDADDR	00001	000006	00692	1071 1077 1163 1584 1643 3918 3921 4083 4167
PNDSTS	00001	000005	00691	1358 1581 1849 1871 2391 2837 3013 3028 3245 3278 3808 3874 4404 4408 4769
				5325 5381 5443 5450 5552
POLLED	00001	00002E	01150	1132
POSTAMBL	00001	00072C	07675	7632 7654
PREAMBLE	00001	000717	07592	
PRETURN0	00002	0000C8	01735	1229 1235 1562 1776 5457
PRETURN1	00002	0004CE	05457	5525
PROTEST	00001	00021E	02922	2034 2085
PROTEST1	00001	000220	02929	5484
PRSNTSTS	00001	000593	06129	
PULLAB	00001	0001EC	02762	2749
PULLAB1	00001	0001F0	02774	2780
PULLAB2	00001	0001F3	02783	2777
PULL2	00001	0001E8	02749	2416 2758
PWRRESET	00001	000373	04209	4100
RDACC	00001	000020	00911	4581 6229 6245 6289
RDNOISE	00001	000001	00858	2443 4559
RDSTOP	00001	000008	00914	4581 6229 6245
READACC	00001	0005F8	06501	6252
READTYPE	00001	000139	02130	1922
READY16	00001	000713	07572	7564
READY800	00001	000744	07772	7764
REGINIT	00001	00038C	04330	
REJTU	00001	000040	00845	
REQINA	00001	000004	00834	3461
REQINB	00001	000001	00836	4953
REQTAGS	00001	00000A	00697	1032 3490 4159 4248
RESETA	00001	000250	03098	3092
RESETOK	00001	000008	00825	3833 4179 4431 4480 5154 5358
RETURN00	00002	0006EA	07420	7592
RETURN01	00002	0006EB	07423	7613
RETURN02	00002	0006EC	07426	7623
RETURN03	00002	0006ED	07429	7720
RETURN11	00001	0006CC	07315	7328
RIGHTOFF	00001	0006CE	07328	7340
RIGHTON	00001	0006C9	07303	7311
RIPBIBO	00001	000388	04312	4376
RIPWRAP	00001	00038F	04346	4306 4318
RLSCHANN	00001	0002EC	03674	3665
RSTADDIN	00001	000060	01337	1232
RSTCMTD	00002	0002DA	03617	
RSTCOMTD	00001	000005	00626	3691
RSTCUEA	00001	000083	01476	
RSTDIAG	00001	0000C9	01739	1713
RSTHLDIN	00001	0002CB	03568	4798
RSTNRZ	00001	00035E	04117	
RSTNTDUN	00001	0002D0	03585	3588

SYMBOL	LEN	VALUE	DEFN	REFERENCES
RSTRESET	00001	00031C	03833	3819
RSTRESV	00001	000427	04878	4861
RSTSTATA	00001	000259	03127	3117
RSVBC	00001	00045C	05055	5052
RTNCOMR	00002	0004D0	05478	1953
RTNPROT	00002	0004D2	05484	2922
RTNSENS	00002	0004D1	05481	2384
RTNTUTST	00002	0004D3	05487	2956
RTNTUTS1	00002	0004D4	05490	2963
RUNALU	00002	000340	03986	4485
R0	00001	000000	00654	5597 5710 5845 5851 5915 5926 5936 5989 6003
R1	00001	000001	00655	5600
R10	00001	00000A	00664	5627
R11	00001	00000B	00665	5630
R12	00001	00000C	00666	5633
R13	00001	00000D	00667	5636
R14	00001	00000E	00668	5639
R15	00001	00000F	00669	5642
R16	00001	000010	00670	
R17	00001	000011	00671	
R18	00001	000012	00672	
R19	00001	000013	00673	
R2	00001	000002	00656	5603 5665 5674 5680 5695
R20	00001	000014	00674	
R21	00001	000015	00675	
R22	00001	000016	00676	
R23	00001	000017	00677	
R24	00001	000018	00678	
R25	00001	000019	00679	
R26	00001	00001A	00680	
R27	00001	00001B	00681	
R28	00001	00001C	00682	
R29	00001	00001D	00683	
R3	00001	000003	00657	5606
R30	00001	00001E	00684	
R31	00001	00001F	00685	
R4	00001	000004	00658	5609 5739 5774
R5	00001	000005	00659	5612
R6	00001	000006	00660	5615
R7	00001	000007	00661	5618
R8	00001	000008	00662	5621
R9	00001	000009	00663	5624
SAGCNTM1	00001	000649	06807	
SAGCNTM2	00001	00064B	06814	6834 6840
SAGCNTM3	00001	00064E	06824	6817
SAGCNTM4	00001	000650	06831	6824
SAGCNTM5	00001	000654	06845	
SAGCNTM6	00001	000656	06853	6861
SAGC1	00001	0000AC	00787	6814
SAV1FCH2	00001	000587	06087	6054
SAV2FCH3	00001	00058A	06098	6090
SAV3NOFC	00001	000590	06118	6110
SCRAP1	00001	0005F0	06467	6457
SCRAP2	00001	0005F2	06473	6510

SYMBOL	LEN	VALUE	DEFN	REFERENCES
SCREENTI	00001	000700	07487	2342
SEEIFUC	00001	0004E0	05534	5522
SELOUTUP	00001	0000C7	01732	1699
SELRESET	00001	000362	04131	1086
SELRST1	00001	000473	05137	5130
SELRST2	00001	000365	04140	
SELRST3	00001	000368	04150	4190
SELRTN0	00001	000019	01068	1061 1108
SENSE	00001	000040	00802	1005 2477 2630 2701 2729 3319
SENSEA	00001	0001B9	02582	2573
SENSEB	00001	0001BE	02600	2588
SENSEC	00001	0001C2	02615	2603
SENSED	00001	0001C5	02627	2618
SENSEDS	00001	0001C6	02630	2576
SENSEE	00001	0001C9	02642	2627
SENSEF	00001	0001CB	02650	2642
SENSEOK	00001	000181	02391	5481
SENSE0	00001	000185	02404	1323
SENSE1	00001	00018A	02422	2413
SENSE2	00001	000194	02452	2446
SENSE3	00001	00019B	02477	2452
SENSE4	00001	0001A0	02495	2486
SENSE5	00001	0001A7	02516	2507
SENSE6	00001	0001AB	02531	2522
SENSE7	00001	0001AD	02540	2531
SENSE8	00001	0001B1	02552	2546
SENSE9	00001	0001B5	02567	2552
SERVIBG	00001	0005CD	06338	6476
SERVLINK	00001	000086	01487	1467 1479
SERVRTN	00001	00020A	02844	2686 6064 6347 6375
SERVRTN0	00001	00020C	02851	2844
SERVRTN1	00001	00020D	02854	2857 2860 2863
SERVRTN2	00001	000213	02874	2886
SETABRT	00001	00000C	01026	1117
SETADDR	00001	0000B8	01680	1670
SETADRIN	00001	0000BF	01702	
SETAMOD	00001	000482	05200	
SETBMOD	00001	000486	05213	5197
SETBOPE	00001	000585	06079	6073
SETBOPO	00001	000586	06082	
SETBYINT	00001	000481	05197	
SETCHAIN	00001	000087	01492	1451
SETCNT1	00001	00000E	00701	2716 2765 2797 4594 6098 6104 6382 6590 6749 6807 7177 7487 7516 7545
SETCNT2	00001	00000F	00702	2431 2434 2455 2495 2516 2555 2582 2600 2615 2633 5012 6118 6398 6752 6810
SETCT2	00001	000693	07096	
SETCUB	00001	000010	00901	
SETDEUC	00001	0004E6	05552	5543
SETDIA1	00001	00000C	00699	1277 1283 1739 4244 6033 6039
SETDIA2	00001	00000D	00700	1280 1742 4352 6087
SETFLAG	00001	000288	03307	3301
SETFOR1	00001	00071E	07616	
SETHOLDA	00001	000010	01038	
SETHOLDS	00001	00033D	03976	5080 5090
SETLINK	00001	000042	01223	

SYMBOL	LEN	VALUE	DEFN	REFERENCES														
SETPNDG	00001	0003DE	04660	4650														
SETREQA	00001	0002B0	03461	4792														
SETRESRV	00001	000424	04868	4855														
SETSEV	00001	00048B	05230	1728	1746													
SETSEVA	00001	000496	05264	5233														
SETSPIN	00001	000310	03788	3778														
SETSPIN1	00001	000312	03795															
SETSPIN2	00001	000313	03800	3804														
SETSTATA	00001	000008	00805	1984	2058	2668	2713	3098	3127	3187	3319	3374	3822	5291	5308	5315	5322	5942
				6356	6366													
SETSTATB	00001	000004	00806	1624	4007	4459	5084	5097	5106	5137	5163	5315	5322	5942				
SETSTATC	00001	000002	00807	1676	2939	3224	3374	3924	3930	4187	5397	5942	6379	6395	6448			
SETSTATD	00001	000001	00808	1286	1292	2768	2783	3095	3127	3224	3578	4751	5942	6432				
SETSTOP	00001	00028C	03322	4061	4513	6048	6223											
SETSTOP1	00001	00028D	03325															
SETSWSEL	00001	0000B3	01664															
SETUNTCK	00001	0003DD	04657	3274	4609	4643	4706	4712										
SEVLINK	00002	000489	05223	5209														
SEVMODA	00001	00001A	00713	1896	4114	5200	5264											
SEVMODB	00001	00001B	00714	1900	5114	5213	5236											
SHORTBSY	00001	0000A1	01597															
SIGUC	00001	000268	03184	3150	3207	3332												
SIGUX	00001	00026C	03197	3156														
SIOISOK	00001	00037E	04266	4257														
SIORTN	00001	000095	01556	1126														
SKIPALU2	00001	000246	03064	3133														
SKIPIT	00001	00008C	01512	1523														
SKIPNOIS	00001	0003EA	04700	4677	4683	4721												
SKIPNRZ	00001	000492	05251	5245														
SKIPNRZ1	00002	000495	05260	5254														
SKIPSUPO	00001	00007E	01454	1447														
SNSEVEN	00001	0001CF	02665	2458	2561	2609	2621	2636	2645									
SNSEVEN1	00001	0001CE	02662	2489	2525	2534												
SNSEVEN2	00001	0001D0	02668	2594														
SNSLINK	00001	0001E6	02743	2815														
SNSODD	00001	0001D7	02695	2746														
SNSODD1	00001	0001DD	02713	2726	2732	2739												
SNSODD2	00001	0001E0	02723	2698														
SNSODD3	00001	0001E4	02736	2707														
SNSOFF	00001	000020	00924	2516	2600	2723												
SNSON	00001	000040	00923	2483	2555	2582	2615	2695										
SNSRESET	00002	00021D	02916	2985														
SNSSTS2	00001	000007	00693	2425	2976	4392	4757											
SOFAIL	00001	000373	04215	4215														
SRETURN0	00002	00005A	01317	1223	3497													
SRETURN1	00002	00005B	01320	1226	3500	3503												
SRETURN2	00002	00005C	01323	2394														
SRETURN4	00002	00005D	01326	3016														
SRETURN5	00002	00005E	01329	3019														
SRETURN6	00002	00005F	01332	3248														
STACK	00001	000002	00827	1129	1426	1568	1627	1667	1794	3363	3759	4016	5370	5429	5495	5540		
STAKDISC	00001	00006E	01395	1544														
STAKLINK	00001	00006F	01399	1376														
START	00001	000004	00880															

SYMBOL	LEN	VALUE	DEFN	REFERENCES
STAT	00001	000028	00642	1289 1683 1725 1987 2061 2674 2771 2942 3036 3046 3130 3190 3227 3325 3377 3581 3825 3888 3908 3927 3950 4045 4163 4472 4562 4754 5046 5294 5400 5687 5945 6190 6239 6283 6848 6868 7150 7209 7733 7944
STATIMG	00001	000008	00694	1289 1640 1683 1725 1987 2061 2674 2771 2942 3036 3046 3130 3190 3227 3325 3377 3581 3825 3871 3888 3908 3927 3950 4045 4087 4144 4163 4468 4472 4476 4562 4754 5046 5106 5294 5400 5684 5687 5942 5945 5948 6190 6239 6283 6848 6868 7150 7209 7733 7944
STATPNDG	00001	000004	00826	1129 1568 1627 1667 1794 1826 1852 1874 3171 3281 3363 3759 4016 4660 4772 5495
STATRTN	00001	000060	01335	1256 2400 3506
STATRTN1	00001	000061	01339	
STATSOK	00001	00056F	05987	5980
STEP0001	00001	000000	00973	
STEP0002	00001	0000F5	01894	
STEP0003	00001	0000F6	01898	
STEP0004	00001	0000F7	01902	
STEP0005	00001	000014	01049	
STEP0006	00001	000354	04077	
STEP0007	00001	000355	04081	
STEP0008	00001	000356	04085	
STEP0009	00001	000357	04089	
STEP0010	00001	000358	04093	
STEP0011	00001	000359	04098	
STEP0012	00001	000373	04212	
STEP0013	00001	000374	04217	
STEP0014	00001	000375	04222	
STEP0015	00001	000376	04227	
STEP0016	00001	000377	04233	
STEP0017	00001	000378	04238	
STEP0018	00001	000379	04242	
STEP0019	00001	00037A	04246	
STEP0020	00001	00037B	04250	
STEP0021	00001	00037C	04255	
STEP0022	00001	00037E	04264	
STEP0023	00001	000380	04273	
STEP0024	00001	000382	04282	
STEP0025	00001	000384	04291	
STEP0026	00001	000386	04300	
STEP0027	00001	000387	04304	
STEP0028	00001	00038F	04342	
STEP0029	00001	000390	04348	
STEP0030	00001	000391	04354	
STEP0031	00001	000392	04360	
STEP0032	00001	000393	04366	
STEP0033	00001	000394	04372	
STEP0034	00001	000388	04308	
STEP0035	00001	000389	04314	
STEP0036	00001	00038F	04343	
STEP0037	00001	000390	04349	
STEP0038	00001	000391	04355	
STEP0039	00001	000392	04361	
STEP0040	00001	000393	04367	
STEP0041	00001	000394	04373	
STEP0042	00001	000388	04309	

SYMBOL	LEN	VALUE	DEFN	REFERENCES
STEP0043	00001	000389	04315	
STEP0044	00001	00038A	04320	
STEP0045	00001	00038B	04324	
STEP0046	00001	00038C	04328	
STEP0047	00001	00038D	04332	
STEP0048	00001	00038E	04336	
STEP0049	00001	00035C	04109	
STEP0050	00001	000361	04125	
STEP0051	00001	00046B	05104	
STEP0052	00001	00046C	05108	
STEP0053	00001	00046D	05112	
STEP0054	00001	00046E	05116	
STEP0055	00001	00046F	05120	
STEP0056	00001	000470	05124	
STEP0057	00001	000369	04153	
STEP0058	00001	00036A	04157	
STEP0059	00001	00036B	04161	
STEP0060	00001	00036C	04165	
STEP0061	00001	00036D	04169	
STEP0062	00001	00036E	04173	
STEP0063	00001	00036F	04177	
STEP0064	00001	000370	04181	
STEP0065	00001	000475	05144	
STEP0066	00001	000477	05152	
STEP0067	00001	000478	05156	
STEP0068	00001	000396	04385	
STEP0069	00001	000397	04390	
STEP0070	00001	000398	04394	
STEP0071	00001	000399	04398	
STEP0072	00001	00039A	04402	
STEP0073	00001	00039B	04406	
STEP0074	00001	00039C	04410	
STEP0075	00001	00039D	04415	
STEP0076	00001	00039E	04421	
STEP0077	00001	00039F	04425	
STEP0078	00001	0003A0	04429	
STEP0079	00001	0003A1	04433	
STEP0080	00001	0003A2	04437	
STEP0081	00001	0003A3	04441	
STEP0082	00001	0003A4	04445	
STEP0083	00001	0003A5	04449	
STEP0084	00001	0003A7	04457	
STEP0085	00001	0003A8	04461	
STEP0086	00001	0003A9	04466	
STEP0087	00001	0003AA	04470	
STEP0088	00001	0003AB	04474	
STEP0089	00001	0003AC	04478	
STEP0090	00001	0003AD	04483	
STEP0091	00001	000340	03984	
STEP0092	00001	000513	05663	
STOP	00001	000080	00801	3322 5942 6845 6864 7147 7206 7730
STOPLINK	00001	000079	01429	
STRIPADD	00001	0000B0	01652	
STROBE	00001	00073D	07736	7784

SYMBOL	LEN	VALUE	DEFN	REFERENCES					
STRTALU2	00001	0000B9	01683	1673					
STRTBRST	00001	000636	06732	6740					
STRTBSVI	00001	000634	06722	6707					
STSIMME	00001	0002BB	03497	3449					
STSIN	00001	000004	00816	1361	1367				
STSONA	00001	00044D	05005	4999					
STSONB	00001	0004AF	05350	5344					
SUDOWRT1	00001	0006EE	07438	6949					
SUDOWRT2	00001	0006EF	07441						
SUDOWRT3	00001	0006F1	07448	7438					
SUDOWRT4	00001	0006F5	07461	7448					
SUPOFAIL	00001	000376	04230	4230					
SUPOOFF	00002	000381	04279	4279					
SUPREQA	00001	000008	00835	3487					
SUPREQB	00001	000002	00837	4967					
SVCIN	00001	000008	00815	2851	2869				
SVCOUP	00001	0005A6	06193	6196					
SVCOUTUP	00001	000061	01342	1346	1349	1352	1355		
SVCWATE	00001	0003B4	04520	4529					
SVOOFF	00002	000383	04288	4288					
SWSEL	00001	000010	00870						
TAKEDISC	00001	00007B	01444	1541					
TAKELINK	00001	00007D	01451	1380					
TAKELIN1	00001	000080	01463	1516					
TAPSLIP	00001	000001	00910						
TERMACC	00001	0002C5	03548	1317					
TERMATE	00002	000048	01249	1880					
TERMSTAK	00001	0002BF	03516	1320					
TERMSTAT	00001	000291	03355	1249	1842	1867	2157	3174	4663
TERMSTA0	00001	000293	03363	4943					
TERMSTA1	00001	0002A0	03411	3355					
TERMSTA2	00001	000296	03372	1606	3214	3366			
TERMSTA3	00001	00029A	03387	3828	5021	5041	5300		
TERMSTA4	00001	0002AC	03449	3471					
TERMSTK1	00001	0002C1	03523	1432					
TESTONE	00001	000520	05710						
TEST1	00001	00052A	05743	5838					
TIP	00001	000014	00645	7548					
TMPATCH	00001	0006F9	07474	6572					
TMSKIP	00001	000610	06590	7480					
TM0	00001	000092	00793	7723					
TM1600	00001	000737	07717	7575					
TM1600B	00001	000738	07720						
TM64	00001	00009C	00792	7181					
TONOGO	00002	000735	07702	7560	7636	7658	7760	7804	7821
TOSETSTP	00001	0006A7	07163	7154					
TRACELSR	00002	000500	05594						
TRAP1	00002	00052D	05753						
TRAP10	00002	000544	05834	5717					
TRAP106	00002	00054C	05861						
TRAP107	00002	00054F	05871						
TRAP108	00002	000552	05882						
TRAP109	00002	000556	05895						
TRAP11	00002	000546	05841	5714					

SYMBOL	LEN	VALUE	DEFN	REFERENCES													
TRAP2	00002	000530	05764														
TRAP4	00002	000538	05792	5735													
TRAP5	00002	00053A	05799	5732													
TRAP6	00002	00053C	05806	5729													
TRAP7	00002	00053E	05813	5726													
TRAP8	00002	000540	05820	5723													
TRAP9	00002	000542	05827	5720													
TRETURN0	00002	00021C	02913	2973	2992	2998											
TRETURN2	00001	000219	02904	2292													
TRETURN3	00002	00021B	02910	2263													
TRNAOFF	00002	0006B7	07222	6539	6545	6898											
TROUBLE	00002	000300	03733	3788	3967												
TSTERRS	00001	000197	02462	2440													
TUADR	00001	000024	00630	1077	1686	3627	3921	4167	4476								
TUBOMSK	00001	000002	00913														
TUTEST	00001	000228	02956	1993	2171	2295	2326										
TUTESTIT	00001	00022C	02970	2929	2949	5487											
TUTEST1	00001	00022A	02963	2160	2266												
TUTEST2	00001	000233	02992	5490													
TUTRTN	00001	000236	03002	2882													
TUTSTRTN	00001	0004BD	05397	5410													
UNITCHK	00001	000002	00865	1408	1849	1871	3184	3278	3775	3956	4657	4769	4925	4931	5546	5552	
UNITEXC	00001	000001	00866	3197	4667												
VEL	00001	000040	00898														
WAIT	00001	000568	05962	5951	5966												
WAITONA	00001	00067B	06994	7002	7019												
WAITONA1	00001	000680	07015	6985													
WAITONE	00001	00063D	06762	6771													
WAITSIO	00002	00037D	04261	4261													
WAITSOME	00001	000630	06703	6715													
WATESUM	00001	00006A	01372	1384	2397	3251											
WC0HIO	00001	00027F	03278	2828													
WC0STOP	00002	00027E	03274	2825													
WDCNT0	00001	000002	00857	2834	3288												
WHOA	00001	000217	02891	2878													
WORK1	00001	000004	00690	1559	1655	1686	2422	2665	2762	2794	3551	3627	3630	3659	4358	4597	4693	4696
				5385	6132	6272	6578	6969	7096	7237	7441	7454	7467	7477	7496	7520	7533	7601
				7717	7846	7863	7876											
WORK2	00001	000017	00710	1295	1298													
WORK4	00001	00001C	00715															
WRAPUP	00001	00068E	07080	6977	7006	7037												
WRITE	00001	000004	00785	2025	2076	4674												
WRITELUP	00001	00074C	07800	7808														
WRITESUM	00001	000749	07788	7775	7781													
WRONGCHN	00002	000039	01189	1189	1193													
WRSTATUS	00001	000008	00879															
WRTBGN	00001	000203	02822	6172														
WRTCHECK	00001	000119	02015															
WRTFST	00001	000282	03288	2822														
WRTHIO	00002	00028A	03314	6051	6226													
WRTINIT	00002	0005A1	06172	6193	6202													
WRTPROB	00001	00026E	03204	3153														
XINA	00001	000090	00638	2431	2762	4693	5915	5989	6341	6487	6590							
XINAOK	00001	000573	06003	5995														

CROSS-REFERENCE

SYMBOL	LEN	VALUE	DEFN	REFERENCES														
XINB	00001	000088	00639	2765	3918	4594	5385	5926	6003	6338	6578	7477						
XINBOK	00001	000577	06016	6009														
XOUTA	00001	000042	00640	1071	1283	1655	2671	3033	5674	5936	6039	6104	6187	6242	6758	7240	7299	7324
				7545	7678	7739	7791											
XOUTAIM	00001	000002	00688	1002	2336	2480	2558	2591	2671	3033	6187	6242						
XOUTB	00001	000041	00641	1044	1074	1298	1565	1689	1861	2410	3061	3221	3610	3795	3894	4171	4516	4748
				5695	6042	6107	6263	6451	6504	6557	6593							
XOUTBIM	00001	000014	00707	1026	1044	1068	1074	1565	1680	1689	1858	1861	1981	2005	2028	2042	2055	2073
				2090	2104	2112	2120	2164	2175	2407	2410	3061	3218	3221	3607	3610	3792	3795
				3891	3894	4079	4131	4171	4516	4745	4748	6036	6042	6101	6107	6260	6263	6338
				6344	6435	6444	6451	6501	6504	6554	6557	6593						
XXX	00001	0004A7	05322	5058	5071													
YESCHAIN	00001	0002ED	03677	3677														
YUPHANG	00002	0003B0	04496	4496														
YYY	00001	0004A5	05315	5064														
ZERO	00001	000000	00917	1159	1833	2391	2840	2976	3028	3245	3529	3624	3808	3871				
ZONK	00002	00056A	05970	5907	5974													
ZONKA	00002	000567	05955	5691	5699													
ZONKC	00002	00056E	05984	5702														
ZONKXA	00002	000572	05999	5922														
ZONKXB	00002	000576	06013	5932														
ZZZ	00001	00001D	01080	1083														

```
  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                         F01MAY72   2/04/74
000000                                 2          START                                                       00000030

                                       6 ********************************************************************** 00000070
                                       7 *                                                                    * 00000080
                                       8 *        3803-2 MICROPROGRAM LISTING  ROS2 (ALU2)                    * 00000090
                                       9 *                                                                    * 00000100
                                      10 *        DRIVE AND DATAFLOW CONTROL                                  * 00000110
                                      11 *                                                                    * 00000120
                                      12 *        P/N 1846378   SYSTEM EC 736697                              * 00000130
                                      13 *        CARD ASSEMBLY 8237119   MODULE EC 736696                    * 00000140
                                      14 *                                                                    * 00000150
                                      15 *                                                                    * 00000160
                                      16 *        COPYRIGHT 1972  INTERNATIONAL BUSINESS MACHINES CORP        * 00000170
                                      17 *                                                                    * 00000180
                                      18 *                                                                    * 00000190
                                      19 *        3803-2                                                        00000200
                                      20 ********************************************************************** 00000210

                                      25 ************** ALU 2 INDEX BY ROUTINE  ( ADDRESS IS HEX )              00000260
                                      26 *                                               **************       * 00000270
                                      27 *                                                     *          *   * 00000280
                                      28 *                                                     ***************  * 00000290
                                      29 *         ABORT                                                      * 00000300
                                      30 *        ALU CHECKOUT                                   59C          * 00000310
                                      31 *        BACKSPACE FILE                                 03C            00000320
                                      32 *        BACKSPACE RECORD                               03E            00000330
                                      33 *        DATA SECURITY ERASE                            031          * 00000340
                                      34 *        DESELECT                                       1BB          * 00000350
                                      35 *        DIAGNOSTIC MEASURE (DMR)                       561          * 00000360
                                      36 *        ENDUP                                          1D0          * 00000370
                                      37 *        ERASE GAP                                      022          * 00000380
                                      38 *        FETCH DRIVE STATUS                             2E1          * 00000390
                                      39 *        FORWARD SPACE FILE                             035          * 00000400
                                      40 *        FORWARD SPACE RECORD                           037          * 00000410
                                      41 *        GENERAL RESET                                  1A1          * 00000420
```

LOC	OBJECT CODE	ADDR1	ADDR2	STMT	SOURCE STATEMENT		F01MAY72 2/04/74
				42 *	IBG MEASURE (NRZI)	544	* 00000430
				43 *	IBG MEASURE (PE GCR)	513	* 00000440
				44 *	INITIAL SELECTION	0EA	* 00000450
				45 *	READ ACCESS UDIAGNOSTIC	58D	* 00000460
				46 *	READ BACKWARD	03A	* 00000470
				47 *	READ FORWARD	033	* 00000480
				48 *	REWIND	02F	* 00000490
				49 *	REWIND UNLOAD	029	* 00000500
				50 *	SCAN FOR DEVICE ENDS	34D	* 00000510
				51 *	SELECTIVE RESET	1A7	* 00000520
				52 *	SENSE	0D6	* 00000530
				53 *	SET DEVICE ENDS	200	* 00000540
				54 *	TURNAROUND	138	* 00000550
				55 *	VELOCITY CHECK- WRITE (PE NRZI)	300	* 00000560
				56 *	VELOCITY CHECK- WRITE (GCR)	7AD	* 00000570
				57 *	VELOCITY (GET TAPE TO SPEED - ALL OPS)	219	* 00000580
				58 *	WRITE	013	* 00000590
				59 *	WRITE ID BURST	6D0	* 00000600
				60 *	WRITE TAPE MARK	020	* 00000610
				61 *	WRITE SAGC	705	* 00000620
				62 *	POSITION ERASE HEAD	733	* 00000630
				63 *	DISPLAY LSRS	500	* 00000640
				64 *	FOUND TRACK (NRZI 9TRK)	445	* 00000650

```
  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                                   F01MAY72   2/04/74
                                     66 ********************************************************************** 00000670
                                     67 ********************************************************************** 00000680
                                     68 * TAPE UNIT COMMAND STATUS BYTE         TAPE UNIT CONTROL STATUS BYTE * 00000690
                                     69 *                                                                     * 00000700
                                     70 * 0 BACKWARD                            0 RUN                         * 00000710
                                     71 * 1 GAP CONTROL                         1                             * 00000720
                                     72 * 2 DIAGNOSTIC MODE                     2HIGH                         * 00000730
                                     73 * 3 OPPOSITE DIRECTION                  3ALT DEN                      * 00000740
                                     74 * 4 WRITE STATUS                        4LOW                          * 00000750
                                     75 * 5 EXTENDED STOP                       5 ERASE                       * 00000760
                                     76 * 6 UNIT CHECK                          6 ERASE MODE                  * 00000770
                                     77 * 7 POSITIONING                         7 REW                         * 00000780
                                     78 *                                                                     * 00000790
                                     79 ********************************************************************** 00000800
                                     80 * TAPE UNIT COMMANDS                                                  * 00000810
                                     81 * COMMAND TAG UP          CONTROL TAG UP              TAG LINES       * 00000820
                                     82 *                                                                     * 00000830
                                     83 * 0 SET BACKWARD READ     0 RUN                       0               * 00000840
                                     84 * 1 SET FORWARD READ      1                           1               * 00000850
                                     85 * 2 SET DIAGNOSTIC        2 SET HIGH SENSE            2               * 00000860
                                     86 * 3 SET PULSE             3 SET ALT DEN+SAGC          3               * 00000870
                                     87 * 4 SET WRITE             4 SET LOW SENSE             4 DEV SEL       * 00000880
                                     88 * 5 SET EXTENDED STOP     5 ERASE TO TI               5 CONTROL       * 00000890
                                     89 * 6 RESET                 6 SET ERASE MODE            6 COMMAND       * 00000900
                                     90 * 7 UNUSEABLE             7 REW                       7 MOVE          * 00000910
                                     91 *                                                                     * 00000920
                                     92 *                                                                     * 00000930
                                     93 *                                                                     * 00000940
                                     94 *                                                                     * 00000950
                                     95 *                                                                     * 00000960
                                     96 * ALU2 XOUTA DATA FLOW CONTROL         ALU2 STATS                     * 00000970
                                     97 *                                                                     * 00000980
                                     98 * 0 PE BIT                             0 TAPE OP                      * 00000990
                                     99 * 1 FORWARD                            1PERMIT READ/WRITE             * 00001000
                                    100 * 2 ALLOW ENVELOPE LOSS                2 WRITE P BURST                * 00001010
                                    101 * 3 SYNC                               3 SEVEN TRK                    * 00001020
                                    102 * 4 6250                               A ALU2 BOC                     * 00001030
                                    103 * 5 & 7  IPS   200                     B ALU1 BOC                     * 00001040
                                    104 * 5      .IPS  125                     C ALU1 BOC                     * 00001050
                                    105 * 6 & 7  IPS   75                      D ALU1 BOC - ALU2 TERM         * 00001060
                                    106 * 6 LOGAIN                                                            * 00001070
                                    107 ********************************************************************** 00001080
```

```
  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                        F01MAY72   2/04/74
***********************************************************************
* TAPE UNIT SENSE BYTES                                               *
*                                                                     *
* TO OBTAIN SENSE BYTES ALU1 MUST LOAD THE TU ADDRESS REGISTER WITH
* THE PROPER ADDRESS.  ALU2 MUST TURN ON DEVICE SELECT BY ITSELF AND  *
* PUT THE PROPER BIT ON THE BUS OUT.                                  *
*                                                                     *
* TUBO   BIT 7 (01)    BRINGS IN SENSE BYTE 0      STATUS             *
* TUBO   BIT 6 (02)    BRINGS IN SENSE BYTE 1      FEATURES & MODEL   *
* TUBO   BIT 5 (04)    BRINGS IN SENSE BYTE 2      ERRORS             *
* TUBO   BIT 4 (08)    BRINGS IN SENSE BYTE 3      SERIAL NUMBER      *
* TUBO   BIT 3 (10)    BRINGS IN SENSE BYTE 4      SERIAL NUMBER      *
* TUBO   BIT 2 (20)    BRINGS IN SENSE BYTE 5      EC LEVEL           *
* TUBO   BIT 1 (40)    ALLOWS READ BUS AND TACH PULSES                *
* TUBO   BIT 0 (80)    MONITORS THREAD AND LOAD SEQUENCE              *
*                                                                     *
*                                                                     *
*                                                                     *
* BYTE 0                      BYTE 1                BYTE 2            *
*                                                                     *
* 0 BACKWARD                  0 7 TRACK             0 LAMP FAILURE    *
* 1 NOT FILE PROTECT          1 WRT&CURRENT&FAIL&   1 LEFT COL FAILURE    *
* 2 END OF TAPE               2 DUAL-DENSITY        2 RIGHT COL FAILURE   *
* 3 BEGINNING OF TAPE         3  ALT DEN            3 STOP KEY        *
* 4 WRITE STATUS              4 6250                4  DATA SECURITY ERASE *
* 5 START                     5 MODEL               5 ERASE HEAD FAILURE  *
* 6 UNIT CHECK                6 MODEL               6 AIR BEARING FAILURE *
* 7 NOT BUSY                  7 MODEL               7 LOAD FAILURE    *
*                                                                     *
* BYTE 3                      BYTE 4                BYTE 5            *
*                                                                     *
* 0                           0                     0 THERMAL/VOLTAGE CHK *
* 1 DEVICE                    1 DEVICE              1 SPARE           *
* 2 SERIAL                    2 SERIAL              2 SPARE           *
* 3   NUMBER                  3   NUMBER            3 SPARE           *
* 4    HIGH                   4    LOW              4 ENGINEERING     *
* 5     ORDER                 5     ORDER           5  CHANGE         *
* 6                           6                     6   LEVEL         *
* 7                           7                     7    OF DRIVE     *
*                                                                     *
* LOAD AND THREAD SENSE BYTE                                          *
*                                                                     *
* 0 LOAD BUTTON DEPRESSED      WITH BIT 0 ON TUBO,THESE SIGNALS       *
* 1 LEFT REEL TURNING           RETURN TO THE CONTROLLER REAL TIME.   *
* 2 RIGHT REEL TURNING           THE SEQUENCE IS BITS 0 TO 6 IN THE   *
* 3 TAPE PRESENT                  ORDER SHOWN. IF AN ERROR IS DETECT- *
* 4 REELS LOADED                   ED BY THE DRIVE,BIT 7 WILL APPEAR. *
* 5 LOAD REWIND                     IF A CARTRIDGE IS BEING USED, BIT *
* 6 LOAD COMPLETE                    7 INITITIATES A RETRY.           *
* 7 LOAD CHECK                                                        *
***********************************************************************
```

```
*************************************************************************** 00001630
* ALU2 LSR LAYOUT AND ASSIGNED BIT POSITIONS                              * 00001640
*                                                                         * 00001650
* LSR0-WORK1             LSR1-WORK2               LSR2-WORK3              * 00001660
* 0 SCRATCH              0 SCRATCH                0 SCRATCH               * 00001670
* 7 REGISTER             7 REGISTER               7 REGISTER              * 00001680
*                                                                         * 00001690
* LSR3-WORK4             LSR4-STATIMG             LSR5-FLAGS              * 00001700
* 0 SCRATCH              0 TAPE OP                0 DIAGNOSTIC WRITE      * 00001710
* 7 REGISTER             1 PERMIT READ/WRITE      1                       * 00001720
*                        2 WRITE P BURST          2 INHIBIT POSTAMBLE     * 00001730
*                        3 NRZI                   3                       * 00001740
*                        4 ALU2 BOC STATA         4 INHIBIT PREAMBLE      * 00001750
*                        5 ALU1 BOC STATB         5 LOOP WRT/RD OP        * 00001760
*                        6 ALU1 BOC STATC         6 TUBO MASK             * 00001770
*                        7 ALU1 BOC STATD TERM    7 CHANGE DIRECTION      * 00001780
*                                                                         * 00001790
* LSR6-SENSE1            LSR7-SENSE2              LSR8-TRACER(READ OP)    * 00001800
* 0 BACKWARD             0 7 TRACK                0 CREASE OP             * 00001810
* 1 NOT FILE PROTECT     1 WRT CURRENT FAIL       1 BOR MARK              * 00001820
* 2 END OF TAPE          2 DUAL-DENSITY           2                       * 00001830
* 3 BEGINNING OF TAPE    3 NRZI                   3 IBG MARK              * 00001840
* 4 WRITE STATUS         4 BIRCH                  4 TAK MARK              * 00001850
* 5 START                5 & 7 ASPEN 200          5 FILE OP               * 00001860
* 6 UNIT CHECK           5     ASPEN 125          6 READ OP               * 00001870
* 7 NOT BUSY             6 & 7 ASPEN 75           7 SPACE OP              * 00001880
*                                                                         * 00001890
* LSR8-TRACER(WRITE OP) LSR9-FRU                  LSR10-DTACHK2           * 00001900
* 0                      0 DEFINED                0                       * 00001910
* 1 LPMARK               7 ELSEWHERE              1                       * 00001920
* 2 CHKBURST                                      2 WTM ERROR             * 00001930
* 3 ERGFLAG                                       3 PE ID BURST CHK       * 00001940
* 4 TAK MARK                                      4 START READ CHK        * 00001950
* 5 ERG OP                                        5 PARTIAL RECORD        * 00001960
* 6 WTM OP                                        6 EXCESSIVE POSTAMBLE   * 00001970
* 7                                               7                       * 00001980
*                                                                         * 00001990
* LSR11-TUADDR           LSR12-DTACHK1            LSR13-XOUTAIM           * 00002000
* 0 SEL TU7              0 IBGDROP                0 PE BIT                * 00002010
* 1 SEL TU6              1 FEEDTHRU               1 FORWARD               * 00002020
* 2 SEL TU5              2 6400CRC                2 ALLOW LOSS            * 00002030
* 3 SEL TU4              3 EARLY IBG DROP         3 SYNC                  * 00002040
* 4 SEL TU3              4 SAGC                   4 BIRCH                 * 00002050
* 5 SEL TU2              5 SLOW BEGINNING         5 TU MODEL              * 00002060
* 6 SEL TU1              6 SLOW ENDING            6 LOGAIN                * 00002070
* 7 SEL TU0              7 VELOCITY RETRY         7 TU MODEL              * 00002080
*                                                                         * 00002090
```

LOC OBJECT CODE ADDR1 ADDR2 STMT SOURCE STATEMENT F01MAY72 2/04/74

```
 210 * LSR14-LODEPA          LSR15-LODEPB          LSR16-WORK1 (HIGH)     * 00002110
 211 * 0 DEP TU 7            0 DEP TU 7            0 SCRATCH              * 00002120
 212 * 1 DEP TU 6            1 DEP TU 6            7 REGISTER             * 00002130
 213 * 2 DEP TU 5            2 DEP TU 5                                   * 00002140
 214 * 3 DEP TU 4            3 DEP TU 4                                   * 00002150
 215 * 4 DEP TU 3            4 DEP TU 3                                   * 00002160
 216 * 5 DEP TU 2            5 DEP TU 2                                   * 00002170
 217 * 6 DEP TU 1            6 DEP TU 1                                   * 00002180
 218 * 7 DEP TU 0            7 DEP TU 0                                   * 00002190
 219 *                                                                    * 00002200
 220 * LSR17-WORK2(HIGH)     LSR18-WORK3(HIGH)     LSR19-WORK4(HIGH)      * 00002210
 221 * 0 SCRATCH            0 SCRATCH             0 SCRATCH              * 00002220
 222 * 7 REGISTER           7 REGISTER            7 REGISTER             * 00002230
 223 *                                                                    * 00002240
 224 * LSR20-STATIMG(HIGH)  LSR21-WORK5           LSR22-SENSE1(HIGH)     * 00002250
 225 * 0 SAME AS            0 SCRATCH             0 SAME AS              * 00002260
 226 * 7 LSR 4              7 REGISTER            7 LSR6                 * 00002270
 227 *                                                                    * 00002280
 228 * LSR23-TIEBYTE        LSR24-MPGMERR         LSR25-LINK2            * 00002290
 229 * 0 HOLDS NRZI         0 NOISE               0 SECOND LEVEL         * 00002300
 230 * 7 TIEBYTE            1 EXCESSIVE VEL CHG   7 LINK LSR             * 00002310
 231 *                      2                                            * 00002320
 232 *                      3 END DATA CHK                               * 00002330
 233 *                      4                                            * 00002340
 234 *                      5                                            * 00002350
 235 *                      6                                            * 00002360
 236 *                      7 NOT CAPABLE                                * 00002370
 237 *                                                                   * 00002380
 238 * LSR26-LINK3          LSR27-TUADDR          LSR28-LINK1            * 00002390
 239 * 0 THIRD LEVEL        0 SEL TU F            0 FIRS LEVEL           * 00002400
 240 * 7 LINK LSR           1 SEL TU E            7 LINK LSR             * 00002410
 241 *                      2 SEL TU D                                   * 00002420
 242 *                      3 SEL TU C                                   * 00002430
 243 *                      4 SEL TU B                                   * 00002440
 244 *                      5 SEL TU A                                   * 00002450
 245 *                      6 SEL TU 9                                   * 00002460
 246 *                      7 SEL TU 8                                   * 00002470
 247 *                                                                   * 00002480
 248 * LSR29-EQUIPCHK       LSR30-LODEPA(HIGH)    LSR31-LODEPB(HIGH)     * 00002490
 249 * 0 CMD STATUS REJ     0 DEP TU F            0 DEP TU F             * 00002500
 250 * 1 REJECT TU          1 DEP TU E            1 DEP TU E             * 00002510
 251 * 2 CNTRL STATUS REJ   2 DEP TU D            2 DEP TU D             * 00002520
 252 * 3 NO BLOCK           3 DEP TU C            3 DEP TU C             * 00002530
 253 * 4 DYNAMIC REVERSAL   4 DEP TU B            4 DEP TU B             * 00002540
 254 * 5 NO TACH            5 DEP TU A            5 DEP TU A             * 00002550
 255 * 6 SAGC               6 DEP TU 9            6 DEP TU 9             * 00002560
 256 * 7 VELOCITY FAIL      7 DEP TU 8            7 DEP TU 8             * 00002570
 257 *                                                                   * 00002580
 258 ********************************************************************* 00002590
 259 ********************************************************************* 00002600
 260 ********************************************************************* 00002610
 261 *                                                                   * 00002620
 262 * THIS IS A LIST OF NAMES WHICH ARE USED IN PLACE OF THE HEX VALUE OF * 00002630
 263 * TRANSFERS, BRANCH ON CONDITIONS, LOCAL STORE REGISTERS, DATA FLOW   * 00002640
```

```
 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                        F01MAY72   2/04/74
                                   264 * CONTROLS, DRIVE CONTROLS AND THE VARIOUS BITS IN THE LSR'S.          * 00002650
                                   265 *                                                                      * 00002660
                                   266 ************************************************************************ 00002670
                                   267 ************************************************************************ 00002680


                                   269 ********************** ALU 2 TRANSFER ADDRESSES ********************** 00002700
                                   270 *                                                                      * 00002710
000084                             271 XADDR     EQU   X'84' .            EXT ADDR REG                        00002720
                                   272 *                                  DECODES THE ADDRESS FROM ALU1       00002730
                                   273 *                                  TUADDR REG TO A SINGLE BIT WHICH    00002740
                                   274 *                                  CORRESPONDS TO THE ADDR BIT POSITION 00002750
                                   275 *                                  OF THE TUADDR REG ALU2.             00002760
00000A                             276 CRC       EQU   X'0A'              SHIFT CRC PULSE                     00002770
000006                             277 LSR       EQU   X'06' .            SET CONTROL FOR &I OR LO LSRS       00002780
000021                             278 AR        EQU   X'21' .            ALU INPUT REGISTER                  00002790
000060                             279 TUBO      EQU   X'60' .            TAPE UNIT BUS OUT                   00002800
000009                             280 RESETERR  EQU   X'09' .            RESET ERRORS SINGLE BYTE NOISE      00002810
000011                             281 INDF      EQU   X'11' .            ISSUED FOR DIAG CHANNEL BUFFER READ 00002820
000024                             282 TUTAG     EQU   X'24' .            TAPE UNIT OUT TAG REG               00002830
000014                             283 REDLIGHT  EQU   X'14' .   CE PANEL LIGHT FOR MPGM DETECTED ERRORS     00002840
                                   284 *                                   DURING A TAPE OPERATION        * 00002850
000022                             285 IC        EQU   X'22' .            INSTRUCTION COUNTER                 00002860
000082                             286 INHP      EQU   X'82' .            INHIBIT PARITY ON 'B' BUSS          00002870
000050                             287 COMITD    EQU   X'50' .            RESETS UNIT COMMITTED LATCH IN    * 00002880
                                   288 *                                   DEVICE SWITCH                  * 00002890
000081                             289 TUBI      EQU   X'81' .            TAPE UNIT BUSS IN                   00002900
000090                             290 XINA      EQU   X'90' .            CROSSOVER INPUT REG A               00002910
000088                             291 XINB      EQU   X'88' .            CROSSOVER INPUT REG B               00002920
000042                             292 XOUTA     EQU   X'42' .            CROSSOVER OUTPUT REG A              00002930
000041                             293 XOUTB     EQU   X'41' .            CROSSOVER OUTPUT REG B              00002940
000043                             294 XANXB     EQU   X'43' .            VALUE FOR BOTH XOUTA AND XOUTB      00002950
000028                             295 STAT      EQU   X'28' .            GLITCHLESS CONTROL REG              00002960
000044                             296 HDWERR    EQU   X'44' .            SET ERROR LATCH FOR ALU ERRORS      00002970
                                   297 *                                   ALSO SETS BIT 4 IN SENSE BYTE 12 * 00002980
000012                             298 POINTERS  EQU   X'12'                                                  00002990
000018                             299 BUFFCRC   EQU   X'18'              SAMPLE BUFFER CRC ERROR LATCH       00003000
```

```
  LOC   OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                           F01MAY72   2/04/74
                                     301 ************************** BRANCH CONDITIONS ************************** 00003020
                                     302 *                                                                    * 00003030
000000                               303 #DBUS     EQU   X'00' .        D BUS EQUAL TO ZERO                    00003040
000001                               304 #NALCO    EQU   X'01' .        NOT ALU CARRY OUT                      00003050
000002                               305 #ROCROT   EQU   X'02'          FLIP FLOP CHANGES EACH ROC ROTATION    00003060
000003                               306 #NRZFEAT  EQU   X'03' .        BR IF NRZI FEATURE IS INSTALLED        00003070
000002                               307 #CRCNEPR  EQU   X'02' .        CRC NOT EQU EPR                        00003080
000004                               308 #RDTIME   EQU   X'04' .        FREQUENCY OFF SDC OSCILLATOR         * 00003090
                                     309 *                              PE  = 1600 BPI BY MODEL              * 00003100
                                     310 *                              NRZI = 800 BPI BY MODEL              * 00003110
000006                               311 #TACHFF   EQU   X'06' .    DRIVEN BY TACH PULSES- FLIP FLOP           00003120
000007                               312 #STOP     EQU   X'07' .        STOP (ALU 1 STAT BIT 0)                00003130
000008                               313 #CRCMAT   EQU   X'08' .        CRC = MATCH                            00003140
000008                               314 #ENDATA   EQU   X'08' .        END DATA (ENDING ONES OR RDD 173)      00003150
000009                               315 #NCONVCK   EQU   X'09' .        DATA CONVERTER CHECK                  00003160
000009                               316 #NSAGCID  EQU   X'09'          INVERSE TAPE MARKER                    00003170
00000C                               317 #NPTE     EQU   X'0C' .        P TRACK ENVELOP                        00003180
00000C                               318 #DEN556   EQU   X'0C'          DENSIT 556                             00003190
000005                               319 #NSEVEN   EQU   X'05' .        NOT SEVEN TRK                          00003200
00000D                               320 #DATARDY  EQU   X'0D' .        DATA FROM SKEW BUFFER READY            00003210
00000E                               321 #BOR      EQU   X'0E' .        BEGINNING OF RECORD                    00003220
00000F                               322 #IBG      EQU   X'0F' .        IBG DETECTION CONTROLS                 00003230
000010                               323 #DREG0    EQU   X'10' .        D REGISTER BIT 0                       00003240
000011                               324 #DREG1    EQU   X'11' .        D REGISTER BIT 1                       00003250
000012                               325 #DREG2    EQU   X'12' .        D REGISTER BIT 2                       00003260
000013                               326 #DREG3    EQU   X'13' .        D REGISOER BIT 3                       00003270
000014                               327 #DREG4    EQU   X'14' .        D REGISTER BIT 4                       00003280
000015                               328 #DREG5    EQU   X'15' .        D REGISTER BIT 5                       00003290
000016                               329 #DREG6    EQU   X'16' .        D REGISTER BIT 6                       00003300
000017                               330 #DREG7    EQU   X'17' .        D REGISTER BIT 7                       00003310
000018                               331 #6250     EQU   X'18'          BR ON XOUTA BIT 4                      00003320
000019                               332 #N1TE     EQU   X'19' .        NOT ONE TRK ENVELOPE                   00003330
000019                               333 #DEN200   EQU   X'19'          DENSITY 200                            00003340
00000A                               334 #STATA    EQU   X'0A' .        STAT A ALU 2                           00003350
00000B                               335 #STATB    EQU   X'0B' .        STAT B ALU 1                           00003360
00001A                               336 #STATC    EQU   X'1A' .        ALU 1 STAT C                           00003370
00001B                               337 #STATD    EQU   X'1B' .        ALU 1 STAT D                           00003380
00001C                               338 #NENVLOS  EQU   X'1C' .        NO ENVELOP LOSS                        00003390
00001C                               339 #NBLOCK   EQU   X'1C' .        NO  ZONE UP                            00003400
00001D                               340 #NTM      EQU   X'1D' .        TAPE MARK BR COND                      00003410
00000D                               341 #NRPQ     EQU   X'0D'                                                 00003420
00001E                               342 #BSYTACH  EQU   X'1E' .        WITH 'DEVSEL' CONDITION INDICATES    * 00003430
                                     343 *                               DEVICE IS SWITCHED                  * 00003440
                                     344 *                              WITHOUT 'DEVSEL' INDICATES DEVICE    * 00003450
                                     345 *                               IS BUSY                             * 00003460
00001F                               346 #DEVATTN  EQU   X'1F' .        INTERRUPT FROM THE DRIVE               00003470
                                     347 *                              CONDITIONS WHICH GENERATE 'DEVATTN'* 00003480
                                     348 *                               1. NOT READY TO READY               * 00003490
                                     349 *                               2. READY DROP WITH MOVE ACTIVE      * 00003500
                                     350 *                               3. BKWD INTO LP WITH MOVE ACTIVE    * 00003510
                                     351 *                              * NOTE: WILL NOT BE SEEN AFTER MOVE* 00003520
                                     352 *                                      IS DROPPED IN 2 & 3 ABOVE. * 00003530
                                     353 ********************************************************************** 00003540
                                     354 * LSR REGISTERS USED FOR COMMAND, ADDRESS, AND STATUS.                 00003550
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                      F01MAY72    2/04/74
000000                              355 R0        EQU    X'00' .             LSR 0                          00003560
000001                              356 R1        EQU    X'01' .             LSR 1                          00003570
000002                              357 R2        EQU    X'02' .             LSR 2                          00003580
000003                              358 R3        EQU    X'03' .             LSR 3                          00003590
000004                              359 R4        EQU    X'04' .             LSR 4                          00003600
000005                              360 R5        EQU    X'05' .             LSR 5                          00003610
000006                              361 R6        EQU    X'06' .             LSR 6                          00003620
000007                              362 R7        EQU    X'07' .             LSR 7                          00003630
000008                              363 R8        EQU    X'08' .             LSR 8                          00003640
000009                              364 R9        EQU    X'09' .             LSR 9                          00003650
00000A                              365 R10       EQU    X'0A' .     118     LSR 10                         00003660
00000B                              366 R11       EQU    X'0B' .             LSR 11                         00003670
00000C                              367 R12       EQU    X'0C' .             LSR 12                         00003680
00000D                              368 R13       EQU    X'0D' .             LSR 13                         00003690
00000E                              369 R14       EQU    X'0E' .             LSR 14                         00003700
00000F                              370 R15       EQU    X'0F' .             LSR 15                         00003710
000010                              371 R16       EQU    X'10' .             LSR 16                         00003720
000011                              372 R17       EQU    X'11' .             LSR 17                         00003730
000012                              373 R18       EQU    X'12' .             LSR 18                         00003740
000013                              374 R19       EQU    X'13' .             LSR 19                         00003750
000014                              375 R20       EQU    X'14' .             LSR 20                         00003760
000015                              376 R21       EQU    X'15' .             LSR 21                         00003770
000016                              377 R22       EQU    X'16' .             LSR 22                         00003780
000017                              378 R23       EQU    X'17' .             LSR 23                         00003790
000018                              379 R24       EQU    X'18' .             LSR 24                         00003800
000019                              380 R25       EQU    X'19' .             LSR 25                         00003810
00001A                              381 R26       EQU    X'1A' .             LSR 26                         00003820
00001B                              382 R27       EQU    X'1B' .             LSR 27                         00003830
00001C                              383 R28       EQU    X'1C' .             LSR 28                         00003840
00001D                              384 R29       EQU    X'1D' .             LSR 29                         00003850
00001E                              385 R30       EQU    X'1E' .             LSR 30                         00003860
00001F                              386 R31       EQU    X'1F' .             LSR 31                         00003870
                                    387 *                                                                 * 00003880
                                    388 ************************** ALU2 LSR EQUATES ************************** 00003890
000000                              389 WORK1     EQU    X'00' . LSR 0--WORK AREA                           00003900
000001                              390 WORK2     EQU    X'01' . LSR 1--WORK AREA                           00003910
000002                              391 WORK3     EQU    X'02' . LSR 2--WORK AREA                           00003920
000003                              392 WORK4     EQU    X'03' . LSR 3--WORK AREA                           00003930
000004                              393 STATIMG   EQU    X'04' . LSR 4--STAT REGISTER IMAGE                 00003940
000005                              394 FLAGS     EQU    X'05' .LSR 5--HOLDS DIAGNOSTIC FLAGS               00003950
000006                              395 SENSE1    EQU    X'06' .LSR 6--HOLDS TU SENSE BYTE 0                00003960
000007                              396 SENSE2    EQU    X'07' . LSR 7--HOLDS TU SENSE BYTE 1               00003970
000008                              397 TRACER    EQU    X'08' . LSR 8--FLAGS FOR OPERATION                 00003980
000009                              398 FRU       EQU    X'09' . LSR 9--                                    00003990
00000A                              399 DTACHK2   EQU    X'0A' . LSR 10-MICRO PGM DETECTED DATA CHKS        00004000
00000B                              400 TUADDR    EQU    X'0B' . LSR 11-HOLDS TU ADDRESS                    00004010
00000C                              401 DTACHK1   EQU    X'0C' . LSR 12-MICRO PGM DETECTED DATA CHKS        00004020
00000D                              402 XOUTAIM   EQU    X'0D' . LSR 13-XOUTA REGISTER IMAGE                00004030
00000E                              403 LODEPA    EQU    X'0E' . LSR14-HOLDS DEV END PRIMES - INTF A        00004040
00000F                              404 LODEPB    EQU    X'0F' . LSR 15-'OLDS DEV END PRIMES - INTF B       00004050
000015                              405 WORK5     EQU    X'15' . LSR 21-WORK AREA                           00004060
000017                              406 TIEBYTE   EQU    X'17'           HOLDS NRZI TRK IN ERROR            00004070
000018                              407 MPGMERR   EQU    X'18' . LSR 24-MICRO PGM DETECTED ERRORS           00004080
000019                              408 LINK2     EQU    X'19' . LSR 25-SECOND LEVEL LINK                   00004090
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  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                                F01MAY72   2/04/74
00001A                              409 LINK3     EQU   X'1A' . LSR 26-THIRD LEVEL LINK                          00004100
00001C                              410 LINK1     EQU   X'1C' . LSR 28-FIRST LEVEL LINK                         00004110
00001D                              411 EQUIPCK   EQU   X'1D' . LSR 29-MICRO PGM DETECTED EQIP CHKS              00004120
                                    412 ****** THESE LSR EQUATES ARE USED BY LOGICAL MACROS ONLY**************  00004130
                                    413 ****** AND SHOULD NOT BE CODED ***************************************** 00004140
000000                              414 #R0       EQU   X'00' .             LSR 0                               00004150
000001                              415 #R1       EQU   X'01' .             LSR 1                               00004160
000002                              416 #R2       EQU   X'02' .             LSR 2                               00004170
000003                              417 #R3       EQU   X'03' .             LSR 3                               00004180
000004                              418 #R4       EQU   X'04' .             LSR 4                               00004190
000005                              419 #R5       EQU   X'05' .             LSR 5                               00004200
000006                              420 #R6       EQU   X'06' .             LSR 6                               00004210
000007                              421 #R7       EQU   X'07' .             LSR 7                               00004220
000008                              422 #R8       EQU   X'08' .             LSR 8                               00004230
000009                              423 #R9       EQU   X'09' .             LSR 9                               00004240
00000A                              424 #R10      EQU   X'0A' .             LSR 10                              00004250
00000B                              425 #R11      EQU   X'0B' .             LSR 11                              00004260
00000C                              426 #R12      EQU   X'0C' .             LSR 12                              00004270
00000D                              427 #R13      EQU   X'0D' .             LSR 13                              00004280
00000E                              428 #R14      EQU   X'0E' .             LSR 14                              00004290
00000F                              429 #R15      EQU   X'0F' .             LSR 15                              00004300
000000                              430 #R16      EQU   X'00' .             LSR 16                              00004310
000001                              431 #R17      EQU   X'01' .             LSR 17                              00004320
000002                              432 #R18      EQU   X'02' .             LSR 18                              00004330
000003                              433 #R19      EQU   X'03' .             LSR 19                              00004340
000004                              434 #R20      EQU   X'04' .             LSR 20                              00004350
000005                              435 #R21      EQU   X'05' .             LSR 21                              00004360
000006                              436 #R22      EQU   X'06' .             LSR 22                              00004370
000007                              437 #R23      EQU   X'07' .             LSR 23                              00004380
000008                              438 #R24      EQU   X'08' .             LSR 24                              00004390
000009                              439 #R25      EQU   X'09' .             LSR 25                              00004400
00000A                              440 #R26      EQU   X'0A' .             LSR 26                              00004410
00000B                              441 #R27      EQU   X'0B' .             LSR 27                              00004420
00000C                              442 #R28      EQU   X'0C' .             LSR 28                              00004430
00000D                              443 #R29      EQU   X'0D' .             LSR 29                              00004440
00000E                              444 #R30      EQU   X'0E' .             LSR 30                              00004450
00000F                              445 #R31      EQU   X'0F' .             LSR 31                              00004460
000000                              446 #WORK1     EQU   X'00' . LSR 0--WORK AREA                               00004470
000001                              447 #WORK2     EQU   X'01' . LSR 1--WORK AREA                               00004480
000002                              448 #WORK3     EQU   X'02' . LSR 2--WORK AREA                               00004490
000003                              449 #WORK4     EQU   X'03' . LSR 3--WORK AREA                               00004500
000004                              450 #STATIMG   EQU   X'04' . LSR 4--STAT REGISTER IMAGE                      00004510
000005                              451 #FLAGS     EQU   X'05' .LSR 5--HOLDS DIAGNOSTIC FLAGS                   00004520
000006                              452 #SENSE1    EQU   X'06' .LSR 6--HOLDS TU SENSE BYTE 0                    00004530
000007                              453 #SENSE2    EQU   X'07' . LSR 7--HOLDS TU SENSE BYTE 1                   00004540
000008                              454 #TRACER    EQU   X'08' . LSR 8--FLAGS FOR OPERATION                     00004550
000009                              455 #FRU       EQU   X'09' . LSR 9--                                        00004560
00000A                              456 #DTACHK2   EQU   X'0A' . LSR 10-MICRO PGM DETECTED DATA CHKS            00004570
00000B                              457 #TUADDR    EQU   X'0B' . LSR 11-HOLDS TU ADDRESS                        00004580
00000C                              458 #DTACHK1   EQU   X'0C' . LSR 12-MICRO PGM DETECTED DATA CHKS            00004590
00000D                              459 #XOUTAIM   EQU   X'0D' . LSR 13-XOUTA REGISTER IMAGE                    00004600
00000E                              460 #LODEPA    EQU   X'0E' . LSR14-HOLDS DEV END PRIMES - INTF A            00004610
00000F                              461 #LODEPB    EQU   X'0F' . LSR 15-'OLDS DEV END PRIMES - INTF B           00004620
000005                              462 #WORK5     EQU   X'05' . LSR 21-WORK AREA                               00004630
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   2/04/74
000008                            463 #MPGMERR  EQU   X'08' . LSR 24-MICRO PGM DETECTED ERRORS          00004640
000007                            464 #TIEBYTE EQU   X'07'              HOLDS NRZI TRK IN ERROR          00004650
                                  465 *                                                                * 00004660
                                  466 ************************************************************************ 00004670
                                  467 ************************** TAPE INTERFACE EQUATES ********************** 00004680
                                  468 *                                                                * 00004690
                                  469 ************************** TU BUS OUT EQUATES ************************** 00004700
                                  470 *                                                                * 00004710
                                  471 ************************** DEVICE COMMAND TAGS ************************* 00004720
                                  472 *                                                                * 00004730
000080                            473 RDBKWD   EQU   X'80' .     READ BACKWARD BIT                      00004740
000040                            474 RDFWDD   EQU   X'40' .     READ FORWARD BIT                       00004750
000020                            475 SETDIAG  EQU   X'20' .     SET DIAGNOSTIC BIT                     00004760
000012                            476 #SETDIAG EQU   X'12' .           BR ON DREG                       00004770
000008                            477 WRITE    EQU   X'08' .     SET WRITE BIT                          00004780
000002                            478 RESET    EQU   X'02' .     SET DEV RESET BIT                      00004790
                                  479 *                                                                * 00004800
                                  480 ************************** COMMAND STATUS BYTE EQUATES ***************** 00004810
                                  481 *                                                                * 00004820
                                  482 *BACKWD  EQU   X'80' .     DEVICE IN BACKWARD STATUS              00004830
000011                            483 #GAPCTRL EQU   X'11' .           INDICATES GAP CONTRL IS ON-BR ON DREG 00004840
000040                            484 GAPCTRL  EQU   X'40'                                               00004850
000020                            485 DIAGMODE EQU   X'20' .     DEVICE IS IN DIAGNOSTIC MODE           00004860
                                  486 *WRSTAT  EQU   X'08' .     DEVICE IS IN WRITE STATUS              00004870
000001                            487 POSIT    EQU   X'01'             DEVICE IS IN STOP DELAY          00004880
000010                            488 OPPDIR   EQU   X'10'              OPPOSITE DIRECTION INDICATED    00004890
000013                            489 #OPPDIR  EQU   X'13'              BR ON DREG                      00004900
000004                            490 EXTEND   EQU   X'04'                                               00004910
                                  491 *                                                                * 00004920
                                  492 ************************** DEVICE CONTROL TAGS ************************* 00004930
                                  493 *                                                                * 00004940
000080                            494 RUN      EQU   X'80' .     SET REWIND UNLOAD BIT                  00004950
000010                            495 SETDENS  EQU   X'10' .     SET ALTERNATE DENSITY                  00004960
000004                            496 ERGTOTI  EQU   X'04' .     SET ERASE TO TI                        00004970
000001                            497 REWIND   EQU   X'01' .     SET REWIND BIT                         00004980
000001                            498 REW      EQU   X'01' .     DEVICE IS IN REWIND STATUS             00004990
000002                            499 SETERASE EQU   X'02'             SET ERASE MODE                   00005000
                                  500 *                                                                * 00005010
                                  501 ************************** DEVICE CONTROL STATUS *********************** 00005020
                                  502 *                                                                * 00005030
                                  503 *  ALL STATUS RESPONSE IS CORRESPONDING BIT OF CONTROL COMMAND    * 00005040
                                  504 *                                                                * 00005050
                                  505 ************************** TU TAGS OUT EQUATES ************************* 00005060
                                  506 *                                                                * 00005070
000008                            507 DEVSEL   EQU   X'08' .     SET DEVICE SELECT TAG                  00005080
000004                            508 CONTROL  EQU   X'04' .     SET DEVICE CONTROL TAG                 00005090
000002                            509 COMMAND  EQU   X'02' .     SET DEVICE COMMAND TAG                 00005100
000001                            510 MOVE     EQU   X'01' .     SET DEVICE MOVE TAG                    00005110
                                  511 *                                                                * 00005120
                                  512 ************************** XOUTA REGISTER EQUATES ********************** 00005130
                                  513 *                                                                * 00005140
000080                            514 PEBIT    EQU   X'80' .     PE BIT FOR DATA FLOW                   00005150
000040                            515 FWDDATA  EQU   X'40' .     FORWARD  FOR DATA FLOW                 00005160
000011                            516 #FWDDATA EQU   X'11'             BR ON DREG                       00005170
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  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   2/04/74
000020                              517 NOLOSS    EQU    X'20' .      NOT ALLOW ENVELOPE LOSS          00005180
000010                              518 SYNC      EQU    X'10' .           SYNC LINE FOR READ DETECTION 00005190
000013                              519 #SYNC     EQU    X'13' .           SYNC LINE FOR READ DETECTION 00005200
000008                              520 HIDEN     EQU    X'08' .           6400 DEVI250                 00005210
000014                              521 #HIDEN    EQU    X'14' .           6400 DEVI250                 00005220
000002                              522 LOGAIN    EQU    X'02'             LOW GAIN TO DET CIRCUITS     00005230
                                    523 *                                                            * 00005240
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  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                        F01MAY72   2/04/74
                                     525 ***************************** STAT BIT EQUATES ************************ 00005260
                                     526 *                                                                     * 00005270
000080                               527 TAPEOP    EQU   X'80' .     TAPE OP CONTROL BIT                       00005280
000040                               528 PERMRDWT  EQU   X'40' .     PERMIT READ OR WRITE CONDITION            00005290
000020                               529 WRTBURST  EQU   X'20' .     WRITE PE LP BURST CONTROL BIT             00005300
000010                               530 NRZI7     EQU   X'10' .           SET NRZI                            00005310
000013                               531 #NRZI7    EQU   X'13' .          BR ON DREG                           00005320
000008                               532 SETSTATA  EQU   X'08' .     SET STAT REG A BIT                        00005330
000004                               533 SETSTATB  EQU   X'04' .     SET STAT REG B BIT                        00005340
000002                               534 SETSTATC  EQU   X'02' .     SET STAT REG C BIT                        00005350
000001                               535 SETSTATD  EQU   X'01' .     STAT INDICATES ALU2 FINISHED              00005360
                                     536 *                                                                     * 00005370
                                     537 ************************** SENSE BIT EQUATES ************************** 00005380
                                     538 *                                                                     * 00005390
                                     539 ********************** TAPE UNIT SENSE BYTE ZERO ********************** 00005400
                                     540 *                                                                     * 00005410
                                     541 *BACKWD   EQU   X'80' .     DEVICE IN BACKWARD STATUS                 00005420
000011                               542 #NFP      EQU   X'11' .     NOT FILE PROTECT SENSE BIT-BR ON DREG      00005430
000020                               543 EOT       EQU   X'20' .     END OF TAPE SENSE BIT                     00005440
000012                               544 #EOT      EQU   X'12' .           BR ON D REG                         00005450
000010                               545 BOT       EQU   X'10' .     BEGINNING OF TAPE SENSE BIT               00005460
000013                               546 #BOT      EQU   X'13' .           BR ON D REG                         00005470
000008                               547 WRSTAT    EQU   X'08' .     WRITE STATUS BIT                          00005480
000014                               548 #WRTSTAT  EQU   X'14' .           BR ON D REG                         00005490
000015                               549 #START    EQU   X'15' .          BR ON DREG                           00005500
000002                               550 DEVCHK    EQU   X'02' .     DEVICE CHECK BIT                          00005510
000017                               551 #NOTBUSY  EQU   X'17' .     NOT BUSY BIT-BR ON DREG                   00005520
                                     552 *                                                                     * 00005530
                                     553 ************************TAPE UNIT SENSE BYTE ONE ********************** 00005540
                                     554 *                                                                     * 00005550
000080                               555 SEVTRK    EQU   X'80' .     7 TRACK BIT                               00005560
000010                               556 #SEVTRK   EQU   X'10' .           BR ON DREG                          00005570
000020                               557 DUALDEN   EQU   X'20' .     DUAL DENSITY                              00005580
000012                               558 #DUALDEN  EQU   X'12'             BR ON DREG                          00005590
000010                               559 NOTPE     EQU   X'10' .     OTHER THAN 1600 BPI                       00005600
000013                               560 #NOTPE    EQU   X'13' .           BR ON DREG                          00005610
                                     561 *                                                                     * 00005620
                                     562 ********************************************************************** 00005630
                                     563 * EXTRA EQUATES                                                       00005640
000010                               564 PULSE     EQU   X'10' .                                               00005650
000013                               565 TM9TRK    EQU   X'13' .           TAPE MARK CONFIG FOR 9 TRK NRZI     00005660
00000F                               566 TM7TRK    EQU   X'0F' .           TAPE MARK CONFIG FOR 7 TRK NRZI     00005670
0000FF                               567 ONES      EQU   X'FF' .                                               00005680
000000                               568 ZERO      EQU   X'00' .                                               00005690
000017                               569 #ALU1NRZ  EQU  X'17'  .           ALU1 XOUTA NRZI BIT                 00005700
000001                               570 ONE       EQU   X'01' .           FOR INCREMENT                       00005710
000040                               571 DVESNS6   EQU   X'40' .           SENSE TO DRIVE FOR READ BUS & TACH  00005720
000014                               572 #SELHIGH  EQU   X'14' .           HI ORDER ADDR BIT                   00005730
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   2/04/74
                                    574 ********************* CONTROL UNIT SENSE EQUATES ********************** 00005750

000001                              576 CONVCK    EQU   X'01' .            SET DATA CONVERTER CHECK              00005770
000010                              577 SEVENTRK  EQU   X'10' .                 SEVEN TRACK BIT                 00005780
000040                              578 INTREQ    EQU   X'40' .             INTERVENTION REQUIRED               00005790
000040                              579 TUSTA     EQU   X'40' .             TU STATUS A                         00005800
000020                              580 TUSTB     EQU   X'20' .             TU STATUS B                         00005810
000008                              581 LDPT      EQU   X'08' .             LOAD POINT                          00005820
000004                              582 WRSTA     EQU   X'04' .             WRITE STATUS                        00005830
000002                              583 FP        EQU   X'02' .             FILE PROTECTED                      00005840
000004                              584 PE        EQU   X'04' .             PHASE ENCODING                      00005850
000002                              585 BKWD      EQU   X'02' .             BACKWARD                            00005860
000010                              586 EQCHK     EQU   X'10' .             EQUIPMENT CHECK                     00005870
000008                              587 DATACK    EQU   X'08' .             DATA CHECK                          00005880
000008                              588 UDETERR   EQU   X'08' .           MICRO PGM DETECTED ERROR              00005890
                                    589 *                                                                   * 00005900

                                    591 ********************* MPGMERR REG MISC ERRORS ********************** 00005920
                                    592 *                                                                   * 00005930
000080                              593 NOISE     EQU   X'80' .             NOISE ERROR                         00005940
000040                              594 EXVCHG    EQU   X'40' .             EXCESSIVE VELOCITY CHANGE WHILE WRT 00005950
000010                              595 ENDATAER  EQU   X'10' .             END DATA CHK                        00005960
000001                              596 NOTCAP    EQU   X'01' .             NOT CAPABLE                         00005970
                                    597 ************************************************************************ 00005980
                                    598 ******************* DATA CHECK REG ONE SENSE BYTE 8 ******************** 00005990
                                    599 *                                                                   * 00006000
000080                              600 IBGDROP   EQU   X'80' .             NOT DIAG MODE IBG DROP AFTER BLOCK  00006010
000040                              601 FDTHRU    EQU   X'40' .             FEED THROUGH CHECK                  00006020
000010                              602 FASTBGN   EQU   X'10' .             EARLY IBG DROP OR DATA READY        00006030
000008                              603 TSAGC     EQU   X'08' .             TEMPORARY SAGC ERROR                00006040
000004                              604 SLOWBGN   EQU   X'04' .             SLOW BEGIN READ BACK CHK            00006050
000002                              605 SLOWEND   EQU   X'02' .             SLOW ENDING READ BACK CHK           00006060
000001                              606 RESTART   EQU   X'01' .             FLAG BIT FOR RESTART AND            00006070
000001                              607 VELTRY    EQU   X'01' .             VELOCITY RETRY                      00006080
                                    608 ************************************************************************ 00006090
                                    609 ******************* DATA CHECK REG TWO SENSE BYTE 5 ******************* 00006100
                                    610 *                                                                   * 00006110
000020                              611 WTMERR    EQU   X'20' .             WRITE MARK ERROR                    00006120
000010                              612 FORMATCK  EQU   X'10' .             PE ID BURST CHK                     00006130
000008                              613 STREADCK  EQU   X'08' .             START READ CHECK                    00006140
000004                              614 PARTREC   EQU   X'04' .             PARTIAL RECORD                      00006150
000002                              615 EXCPOST   EQU   X'02' .             EXCESSIVE POSTABBLE                 00006160
                                    616 ************************************************************************ 00006170
                                    617 ****************** EQUIPMENT CHECK REG SENSE BYTE 10 ****************** 00006180
                                    618 *                                                                   * 00006190
000080                              619 REJCMD    EQU   X'80' .             COMMAND STATUS REJECT               00006200
000040                              620 REJTU     EQU   X'40' .             REJECT TAPE UNIT                    00006210
000020                              621 REJCTRL   EQU   X'20' .             CONTROL STATUS REJECT               00006220
000010                              622 NBLOCK    EQU   X'10' .             NO BLOCK ON WRITE OP                00006230
000008                              623 DYREV     EQU   X'08' .             DYNAMIC REVERSAL ERROR              00006240
000004                              624 NTACH     EQU   X'04' .             TACH START FAIL                     00006250
000002                              625 PERR      EQU   X'02'               PERMANENT SAGC ERROR                00006260
000001                              626 VELOCERR  EQU   X'01' .             DID NOT MAKE VELOCITY IN 28 CNTS    00006270
                                    627 ************************************************************************ 00006280
```

```
  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                    F01MAY72   2/04/74
                                    628 ********************************* FLAGS FOR OPERATION ******************** 00006290
                                    629 *                                                                        * 00006300
000001                              630 MK800     EQU   X'01'               NRZI MODE FLAG                     00006310
000017                              631 #MK800    EQU   X'17'               BR ON DREG                         00006320
000012                              632 #FIRST    EQU   X'12'  .            BR ON DREG                         00006330
000014                              633 #CNTRDY   EQU   X'14'  .            BR ON DREG                         00006340
000008                              634 CNTRDY    EQU   X'08'  .            FLAG USED AFTER INITIAL 4 COUNT    00006350
000020                              635 FIRST     EQU   X'20'  .          INDICATE FIRST ENTRY ON FC-3 VELOCITY 00006360
000080                              636 DATATIM   EQU   X'80'  .            WRT DATA TIME IN VELOCITY RTN      00006370
000004                              637 ERGOP     EQU   X'04'  .            ERASE GAP ROUTINE IN CTRL.         00006380
000002                              638 WTMOP     EQU   X'02'  .            WRITE TAPE MARK ROUTINE IN CTRL.   00006390
000015                              639 #ERGOP    EQU   X'15'  .            BR ON DREG                         00006400
000004                              640 FORFLAG   EQU   X'04'  .            FORCE HAS BEEN SET TO DF           00006410
000008                              641 TAKTR     EQU   X'08'  .            TRACE BIT FOR TAK CTR              00006420
000014                              642 #TAKTR     EQU   X'14' .             BR ON DREG                         00006430
000010                              643 ERGFLAG   EQU   X'10'  .            FLAG BIT                           00006440
000040                              644 CHKBRST   EQU   X'40'               CHECK BURST FLG                    00006450
000020                              645 LPMARK    EQU   X'20'                                                  00006460
000011                              646 #CHKBRST  EQU   X'11'               BR ON DREG                         00006470
000012                              647 #LPMARK   EQU   X'12'               BR ON DREG                         00006480
                                    648 ************************************************************************ 00006490
                                    649 *                                                                        * 00006500
                                    650 *                                                                        * 00006510
000010                              651 #CREASER  EQU   X'10'  .            BR ON DREG                         00006520
000080                              652 CREASER   EQU   X'80'  .            CREASE TAPE (PE) FLAG              00006530
000002                              653 READOP    EQU   X'02'  .            READ TRACE BIT                     00006540
000016                              654 #READOP   EQU   X'16'  .            BR ON DREG                         00006550
000004                              655 FILEOP    EQU   X'04'  .            FILE TRACE BIT                     00006560
000010                              656 IBGMARK   EQU   X'10'  .            IBG TRACE BIT                      00006570
000013                              657 #IBGMARK  EQU   X'13'  .            BR ON DREG                         00006580
000040                              658 BORMARK   EQU   X'40'  .            BOR MARK ON THE WALL               00006590
000011                              659 #BORMARK  EQU   X'11'  .            BR ON DREG                         00006600
000001                              660 SPACEOP   EQU   X'01'  .            SPACE COMMAND BIT                  00006610
000017                              661 #SPACEOP  EQU   X'17'  .            BR ON DREG                         00006620
000080                              662 BACKWD    EQU   X'80'  .            BACKWARD BIT FOR READ OP           00006630
000010                              663 #BACKWD   EQU   X'10'  .            BR ON DREG                         00006640
000016                              664 #WTMOP    EQU   X'16'  .            BR ON DREG                         00006650
                                    665 ************************************************************************ 00006660
                                    666 *                                                                        * 00006670
                                    667 ********************SET DIAGNOSE REGISTER EQUATES ********************** 00006680
                                    668 *                                                                        * 00006690
000004                              669 LWROP     EQU   X'04'  .            SET LOOP WRITE TO READ FLAG        00006700
000015                              670 #LWROP    EQU   X'15'  .            BR ON DREG                         00006710
000017                              671 #CHGDIR   EQU  X'17'   .            EQRLY EXIT BEFORE RAISE OF MOVE    00006720
000002                              672 TUBOMSK   EQU   X'02'  .            SET WORK 5 TO TUBO                 00006730
                                    673 ************************************************************************ 00006740
                                    674 ********************** CONTROL UNIT SENSE BYTES ********************** 00006750
                                    675 *                                                                        * 00006760
                                    676 *  THE SENSE BITS WILL BE PRESENTED IN XOUTA OR XOUTB IN THE PROPER      * 00006770
                                    677 *  POSITION TO BE OR'ED INTO THE CONTROL UNIT SENSE BYTE.                * 00006780
                                    678 *  THE FOLLOWING SENSE BITS WITH '*' IN FRONT ARE SET OR DECODED         * 00006790
                                    679 *  BY ALU2 ALL OTHERS ARE SET BY ALU1, C.U. HARDWARE OR DEVICE           * 00006800
                                    680 ************************************************************************ 00006810
                                    681 *    SENSE BYTE 0                        SENSE BYTE 11                 * 00006820
```

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 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                            F01MAY72   2/04/74
                                   682 *                                                                    * 00006830
                                   683 *BIT                                 BIT                              * 00006840
                                   684 * 0 COMMAND REJECT                    0 B1 BUS PARITY-LSR ADDRESS ERR  * 00006850
                                   685 **1 INTERVENTION REQUIRED             1 ROS1 PARITY ERROR              * 00006860
                                   686 * 2 BUS OUT CHECK                     2 XFR-LO IC1 ERROR               * 00006870
                                   687 **3 EQUIPMENT CHECK                   3 INSTR DECODE 1HI IC-BR ON COND. * 00006880
                                   688 **4 DATA CHECK                        4 MICRO-PGM DETECT MALFUNCTION   * 00006890
                                   689 * 5 OVERRUN                           5 D BUS PARITY ALU1              * 00006900
                                   690 * 6 WORD COUNT ZERO                   6 SPARE                          * 00006910
                                   691 **7 DC CHECK                          7 BRANCH ON COND.(BOC) ALU1      * 00006920
                                   692 ********************************************************************** 00006930
                                   693 *    SENSE BYTE 1                           SENSE BYTE 12            * 00006940
                                   694 *                                                                    * 00006950
                                   695 *BIT                                 BIT                              * 00006960
                                   696 **0 NOISE                             0 B2 BUS PARITY-LSR ADDRESS ERROR * 00006970
                                   697 **1 TU STATUS A                       1 ROS2 PARITY ERROR              * 00006980
                                   698 **2 TU STATUS B                       2 XFR-LO IC2 ERROR               * 00006990
                                   699 **3 7 TRACK                           3 INSTR DECODE 2(HI IC)BR ON COND.* 00007000
                                   700 **4 LOAD POINT                       *4 MICRO-PGM DETECT MALFUNCTION   * 00007010
                                   701 **5 WRITE STATUS                      5 D BUS PARITY ALU2              * 00007020
                                   702 **6 FILE PROTECTED                    6 SPARE                          * 00007030
                                   703 **7 NOT CAPABLE                       7 BRANCH ON COND.(BOC)ALU2       * 00007040
                                   704 ********************************************************************** 00007050
                                   705 *    SENSE BYTE 2                           SENSE BYTE 13            * 00007060
                                   706 *                                                                    * 00007070
                                   707 * TRACK IN ERROR                    BIT                              * 00007080
                                   708 *                                     0 < 00 NO FEATURES               * 00007090
                                   709 *                                     1 < 01 7 TRACK FEATURE           * 00007100
                                   710 *                                       < 10 9 TRACK FEATURE           * 00007110
                                   711 *                                       < 11 SPARE                     * 00007120
                                   712 *                                                                    * 00007130
                                   713 *                                     2 THRU 7 CU SERIAL NO - HIGH     * 00007140
                                   714 ********************************************************************** 00007150
                                   715 *    SENSE BYTE 3                           SENSE BYTE 14            * 00007160
                                   716 *                                                                    * 00007170
                                   717 *BIT                                  CONTROL UNIT UNIQUE ID-LOW      * 00007180
                                   718 * 0 R-W VRC                                                          * 00007190
                                   719 * 1 MULTIPLE TRACK IN ERR/LRCR              SENSE BYTE 15            * 00007200
                                   720 * 2 SKEW                              TU UNIQUE ID (SERIAL NUMBER-HIGH) * 00007210
                                   721 * 3 END DATA CHECK-CRCR                                              * 00007220
                                   722 * 4 SKEW REG VRC/ENV CHECK                    SENSE BYTE 16            * 00007230
                                   723 * 5 1600 BPI SET IN TU                TAPE UNIT ID-LOW                 * 00007240
                                   724 * 6 BACKWARD                                                         * 00007250
                                   725 * 7 C COMPARE                                                        * 00007260
                                   726 ********************************************************************** 00007270
```

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 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                                F01MAY72   2/04/74
                                   728 *     SENSE BYTE 4                        SENSE BYTE 17                    * 00007290
                                   729 *BIT                                  BIT                                  * 00007300
                                   730 **0 ALU HARDWARE ERROR                 0 MULTI INTERFACE SW                * 00007310
                                   731 **1 REJECT TU                          1< 000 SELECTION LOGIC              * 00007320
                                   732 **2 TAPE INDICATE                      2< 001 2 X 8 DEV ADDR LOW           * 00007330
                                   733 * 3 WRITE TGR VRC                      3< 010 3 X 8 DEV ADDR LOW           * 00007340
                                   734 **4                                     < 011 4 X 8 DEV ADDR LOW           * 00007350
                                   735 **5 LOOP WRITE TO READ                  < 100 COMMUNICATOR FEAT ONLY       * 00007360
                                   736 **6 TAPE UNIT CHECK                     < 101 2 X 8 DEV ADDR HIGH          * 00007370
                                   737 * 7 SPARE                               < 110 3 X 8 DEV ADDR HIGH          * 00007380
                                   738 *                                       < 111 4 X 8 DEV ADDR HIGH          * 00007390
                                   739 *                                      4 THRU 7     EC LVL OF CU           * 00007400
                                   740 *                                                                          * 00007410
                                   741 ************************************************************************** 00007420
                                   742 *     SENSE BYTE 5                        SENSE BYTE 18                    * 00007430
                                   743 *                                                                          * 00007440
                                   744 *BIT                                  BIT                                  * 00007450
                                   745 * 0 NEW SUBSYSTEM 3803=0               0 POWER CHECK AND OVERTEMP          * 00007460
                                   746 * 1 NEW SUBSYSTEM 3803 = 1             1 SPARE                             * 00007470
                                   747 **2 WRITE TM CHECK                     2 SPARE                             * 00007480
                                   748 **3    ID BURST CHECK                  3 SPARE                             * 00007490
                                   749 **4 START READ CHECK                   4 EC LEVEL OF DRIVE                 * 00007500
                                   750 **5 PARTIAL RECORD                     5 EC LEVEL OF DRIVE                 * 00007510
                                   751 **6 EXCESSIVE POSTAMBLE                6 EC LEVEL OF DRIVE                 * 00007520
                                   752 * 7 RESERVED FOR RPQ                   7 EC LEVEL OF DRIVE                 * 00007530
                                   753 *                                                                          * 00007540
                                   754 ************************************************************************** 00007550
                                   755 *     SENSE BYTE 6                        SENSE BYTE 19                    * 00007560
                                   756 *                                                                          * 00007570
                                   757 *BIT                                  BIT                                  * 00007580
                                   758 * 0 7 TRACK UNIT                       0 PRIMED FOR DEV END DR 7           * 00007590
                                   759 * 1 WRITE CURRENT FAILURE              1 PRIMED FOR DEV END DR 6           * 00007600
                                   760 * 2 DUAL DENSITY                       2 PRIMED FOR DEV END DR 5           * 00007610
                                   761 * 3 ALT  DENSITY                       3 PRIMED FOR DEV END DR 4           * 00007620
                                   762 * 4 TU MODEL                           4 PRIMED FOR DEV END DR 3           * 00007630
                                   763 * 5 TU MODEL                           5 PRIMED FOR DEV END DR 2           * 00007640
                                   764 * 6 TU MODEL                           6 PRIMED FOR DEV END DR 1           * 00007650
                                   765 * 7 TU MODEL                           7 PRIMED FOR DEV END DR 0           * 00007660
                                   766 *                                                                          * 00007670
                                   767 ************************************************************************** 00007680
                                   768 *     SENSE BYTE 7                        SENSE BYTE 20                    * 00007690
                                   769 *                                                                          * 00007700
                                   770 *BIT                                  BIT                                  * 00007710
                                   771 * 0 LAMP FAILURE                       0 PRIMED FOR DEV END DR F           * 00007720
                                   772 * 1 TAPE BOTTOM LEFT                   1 PRIMED FOR DEV END DR E           * 00007730
                                   773 * 2 TAPE BOTTOM RIGHT                  2 PRIMED FOR DEV END DR D           * 00007740
                                   774 * 3 RESET KEY                          3 PRIMED FOR DEV END DR C           * 00007750
                                   775 * 4 DATA SECURITY ERASE                4 PRIMED FOR DEV END DR B           * 00007760
                                   776 * 5 ERASE HEAD FAIL                    5 PRIMED FOR DEV END DR A           * 00007770
                                   777 * 6 AIR BEARING PRESSURE               6 PRIMED FOR DEV END DR 9           * 00007780
                                   778 * 7 LOAD FAILURE                       7 PRIMED FOR DEV END DR 8           * 00007790
                                   779 *                                                                          * 00007800
                                   780 ************************************************************************** 00007810
```

```
  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                                F01MAY72   2/04/74
                                      782 *    SENSE BYTE 8                        SENSE BYTE 21                * 00007830
                                      783 *                                                                     * 00007840
                                      784 *BIT                                  BIT                             * 00007850
                                      785 **0 IBG DROP WHILE WRITING             0 LOAD BUTTON DEPRESSED        * 00007860
                                      786 **1                                    1 LEFT REEL TURNING            * 00007870
                                      787 * 2                                    2 RIGHT REEL TURNING           * 00007880
                                      788 **3 EARLY BEGIN READ BACK CHECK        3 TAPE PRESENT                 * 00007890
                                      789 **4 SAGC                         K     4 REELS LOADED                 * 00007900
                                      790 **5 SLOW BEGIN                ECK     05 LOAD REWIND                 * 00007910
                                      791 **6 SLOW END READ BACK CHECK           6 LOAD COMPLETE                * 00007920
                                      792 **7 VELOCITY RETRY OR RESTART          7 LOAD CHECK                   * 00007930
                                      793 *                                                                     * 00007940
                                      794 ********************************************************************* 00007950
                                      795 *    SENSE BYTE 9                        SENSE BYTE 22                * 00007960
                                      796 *                                                                     * 00007970
                                      797 *BIT                                   FRU IDENTIFIERS(CU)-ALU 1      * 00007980
                                      798 * 0 GCR CORRECTION                                                   * 00007990
                                      799 **1 VELOCITY DURING WRITE                   SENSE BYTE 23             * 00008000
                                      800 * 2 CHANNEL BUFFER CK                                                 * 00008010
                                      801 * 3 CRC III                           *FRU IDENTIFIERS(CU)-ALU 2      * 00008020
                                      802 * 4 6250 TCU                                                          * 00008030
                                      803 * 5 SPARE                                                             * 00008040
                                      804 * 6 SPARE                                                             * 00008050
                                      805 * 7 CONTROL UNIT RESERVED                                             * 00008060
                                      806 *                                                                     * 00008070
                                      807 ********************************************************************* 00008080
                                      808 *    SENSE BYTE 10                                                  * 00008090
                                      809 *                                                                     * 00008100
                                      810 *BIT                                                                  * 00008110
                                      811 **0 COMMAND STATUS REJECT                                             * 00008120
                                      812 * 1 SPARE                                                           * 00008130
                                      813 **2 CONTROL STATUS REJECT                                             * 00008140
                                      814 **3 NO BLK ON RECORD READ BACK CHK                                    * 00008150
                                      815 **4 DYNAMIC REVERSAL ERROR                                            * 00008160
                                      816 **5 TACH START FAIL                                                   * 00008170
                                      817 * 6                                                                   * 00008180
                                      818 **7 VELOCITY CHECK                                                    * 00008190
                                      819 ********************************************************************* 00008200
```

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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                    F01MAY72   2/04/74
000000                            821 BEGIN    CSECT                                                    00008220
                                  822 ************************************************************************ 00008230
                                  823 ********************* ALU2 ROS ENTRY BRANCH TABLE ********************** 00008240
                                  824 ************************************************************************ 00008250
                                  825 *   ALU2 IS ALWAYS SLAVED TO ALU1. ANY OPERATION EXECUTED BY ALU2     * 00008260
                                  826 *   MUST ALWAY BE INITIATED BY ALU1 VIA A XOUTB. THE XOUTB BY ALU1    * 00008270
                                  827 *   TRAPS ALU2 TO LOCATION 000. ALU2,BEGINNING EXECUTION AT 000,      * 00008280
                                  828 *   FETCHES AN INDEX BYTE FROM ALU1 AND MOVES IT TO THE INSTRUCTION   * 00008290
                                  829 *   COUNTER. THE INDEX BYTE WILL POINT TO ONE OF THE BRANCH INSTRUCT- * 00008300
                                  830 *   IONS IN THE BRANCH TABLE. THE SELECTED BRANCH INST WILL BE        * 00008310
                                  831 *   EXECUTED AND THE DESIRED ROUTINE WILL BE ENTERED. WHEN THE        * 00008320
                                  832 *   SELECTED ROUTINE COMPLETES, STAT D WILL BE SET INDICATING TO      * 00008330
                                  833 *   ALU1 THAT THE DESIRED FUNCTION HAS BEEN COMPLETED. ALU2 WILL THEN * 00008340
                                  834 *   BE HELD AT LOCATION 000 UNTIL ACTUATED BY ALU1 VIA XOUTB TRAP     * 00008350
                                  835 ************************************************************************ 00008360

000000                            837 STEP0001 EQU   *                                                  00008380
000000 4188                       839 BYPASS   XFR   WORK2,XINB          FETCH ALU1 INDEX              00008390
000001                            841 STEP0002 EQU   *                                                  00008400
000001 0400                       843          STO   STATIMG,ZERO       CLEAR STAT IMAGE REG          00008410
000002                            845 STEP0003 EQU   *                                                  00008420
000002 1400                       847          STOH  STATIMG,0           CLEAR STAT IMAGE REG HIGH    00008430
000003                            849 STEP0004 EQU   *                                                  00008440
000003 4428                       851          XFR   STATIMG,STAT       CLEAR ANY OUTSTANDING STATS   00008450
000004                            853 STEP0005 EQU   *                                                  00008460
000004 4122                       855          XFR   WORK2,IC           MOVE INDEX TO INST CTR        00008470
000005                            857 STEP0074 EQU   *                                                  00008480
000005 659C                       859 NDXTST3  BU    EXECTST3           GO DO ALU 2 CHECKOUT          00008490
000006 61BB                       862 NDXDES   BU    EXECDES            HIO NOT OPRTING--GO DESELECT TU 00008500
000007 634D                       865 NDXPOLL  BU    EXECPOLL           GO POLL DEVICE FOR STATUS     00008510
000008                            867 STEP0006 EQU   *                                                  00008520
000008 61A1                       869 NDXGRST  BU    EXECGRST           GO DO GENERAL RESET           00008530
000009 61A7                       872 NDXSRST  BU    EXECSRST           GO DO SELECTIVE RESET         00008540
00000A 6202                       875 NDXSDE   BU    EXECSDE            GO SET DEVICE END             00008550
00000B 61CB                       878 NDXABRT  BU    EXECABRT                                         00008560
00000C 6563                       881 NDXDMR   BU    EXECDMR             GO DO DIAG MEASERE           00008570
00000D 658D                       884 NDXAXESS BU    ACCESS             GO GET READ ACCESS TIME       00008580
00000E 4590                       887 NDXFLAGS XFR   FLAGS,XINA         BRING IN FLAG BYTE            00008590
00000F                            889 NDXSNSR  EQU   *                                                  00008600
00000F 61A9                       891          BU    ZAPIM          USE ON SENSE RESET & SEL RESET RETURN 00008610
000010 5590                       894 NDXFLAG2 XFR   WORK5,XINA           GET TUBO MASK (SET FLAGS #3)  00008620
```

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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                   F01MAY72   2/04/74
000011                            897 STEP0062 EQU   *                                                 00008640
000011 0401                       899 SETDLONE STO   STATIMG,SETSTATD    TURN ON STATD                00008650
000012                            901 STEP0063 EQU   *                   RETURN TO ADDRESS 000        00008660
000012 4428                       903          XFR   STATIMG,STAT        AND STOP                     00008670

                                  906 *************************** WRITE ROUTINE ***************************** 00008690
                                  907 *  INTITIAL ENTRY ON WRITE COMMANDS EITHER PE, NRZI OR LWR EITHER     * 00008700
                                  908 *  DENSITY. THE COMMAND IS SET IN REGISTER WORK4 AND REGISTER LINK1   * 00008710
                                  909 *  CONTAINS THE ADDRESS OF THE ENTRY TO THE WRITE ROUTINE IN 'PAGE 2' * 00008720
                                  910 *  PART OF THIS ROUTINE IS SHARED BY WTM AND ERG ROUTINES             * 00008730
                                  911 ********************************************************************** 00008740

000013 0800                       914 EXECWRT  STO   TRACER,ZERO         SET IDENTITY                 00008760
000014 0308                       917 SETUP    STO   WORK4,WRITE         SET WRITE COMMAND            00008770
000015 1C0F                       920          STO   LINK1,WRTSTR        SET RETURN ENTRY             00008780
000016 3A18                       923 TESTLWR  BOC   STATC,SETLPCMD      BR IF LWR OR LWTM            00008790
000017 6733                       926          BU    NEEDERG           BR TO TURNAROUND             00008800

                                  929 ********************************************************************** 00008820
                                  930 *  STATC ON FROM ALU1 INDICATES A LWR OR LWTM.                       * 00008830
                                  931 *  THE COMMAND IS SET TO ALLOW TURN-AROUND ROUTINE TO PROCESS THE     * 00008840
                                  932 *  COMMAND AND SET DATA FLOW MASKS. THERE WILL NOT BE ANY TURNAROUND  * 00008850
                                  933 *  DELAYS TAKEN.                                                     * 00008860
                                  934 ********************************************************************** 00008870

000018                            936 SETLPCMD EQU   *                                               00008890
000018 0328                       938 WRSTALP  STO   WORK4,WRITE+SETDIAG   SET WRITE AND DIAG CMD     00008900
000019 C6EF                       941          AND   SENSE1,ONES-BOT     TURN OFF BOT IF ON           00008910
00001A 341D                       944          BOC   WRTSTAT,GOTURN      BR WRITE STATUS              00008920
00001B 301E                       947          BOC   BACKWD,RDBKLP       BR BACKWARD STATUS           00008930
00001C 0360                       950          STO   WORK4,RDFWDD+SETDIAG  SET READ FWD AND DIAG CMD  00008940
00001D 6138                       953 GOTURN   BU    TRNARND             GO TO TURNAROUND             00008950
00001E 03A0                       956 RDBKLP   STO   WORK4,RDBKWD+SETDIAG  SET READ BKWD AND DIAG CMD  00008960
00001F 6138                       959          BU    TRNARND             GO TO TURNAROUND             00008970


                                  962 ********************** WRITE TAPE MARK ROUTINE ********************** 00008990
                                  963 *  INITIAL ENTRY ON WRITE TAPE MARK COMMAND EITHER PE, NRZI          * 00009000
                                  964 *  OR LOOP WRITE TAPE MARK.                                          * 00009010
                                  965 *  THE WTM TRACE BIT IS SET ON IN TRACER REGISTER AND THEN           * 00009020
                                  966 *  A BRANCH IS MADE TO SHARE THE REST OF THE SET UP WITH             * 00009030
                                  967 *  THE WRITE ROUTINE.                                                * 00009040
                                  968 ********************************************************************** 00009050
000020 0802                       970 EXECWTM  STO   TRACER,WTMOP        SET ROUTINE IDENTITY         00009060
000021 6014                       973          BU    SETUP             GO GET GOING                 00009070
```

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 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   2/04/74
                                   976 ************************* ERASE RECORD GAP ************************** 00009090
                                   977 *  INITIAL ENTRY FOR ERASE GAP OP. THE REG TRACE BIT IS SET          * 00009100
                                   978 *  IN THE TRACER REGISTER AND A BRANCH MADE TO SHARE THE REST OF THE  * 00009110
                                   979 *  SETUP WITH THE WRITE ROUTINE.                                      * 00009120
                                   980 *  THE TAK ROUTINE WILL DO THE COUNTING OF TACH PULSES AND ALSO       * 00009130
                                   981 *  MONITER THE TU BUS IN TO ASSURE NO DATA IS PRESENT. IF ANY DATA    * 00009140
                                   982 *  IS DETECTED THEN NOISE ERROR WILL BE SET.                          * 00009150
                                   983 *                                                                     * 00009160
                                   984 *  THERE ARE 106 TACH PULSES PER IN.                                  * 00009170
                                   985 ********************************************************************** 00009180

000022 0804                        988 EXECERG  STO   TRACER,ERGOP       SET ERASE GAP OPERATION FLAG          00009200
000023 6014                        991          BU    SETUP              GO CONTINUE SET UP                    00009210

000024 1948                        995 ERGSTR   STO   LINK2,GOENDUP      SET UP RETURN TO ENDUP                00009230
000025 01B4                        998 ERGCTR   STO   WORK2,ONES-75      SET COUNT FOR 336                     00009240
000026 00FE                       1001          STO   WORK1,ONES-1       TAC COUNTS                            00009250
000027 8810                       1004 SETERGF  ORI   TRACER,ERGFLAG     SET FLAG TO CHECK FOR ERROR           00009260
000028 621C                       1007          BU    TAKS               GO TO TAK RTN                         00009270

                                  1010 ****************** REWIND OR REWIND UNLOAD ************************** 00009290
                                  1011 *  REWIND, REWIND UNLOAD AND DATA SECURITY ERASE SHARE A              * 00009300
                                  1012 *  COMMON ROUTINE. THE ENTRY POINTS VARY SO THE COMMAND               * 00009310
                                  1013 *  CAN BE SET IN WORK4. REWIND UNLOAD WILL SET STAT C ON              * 00009320
                                  1014 *  THEN STAT A IS SET TO IDENTIFY THESE THREE COMMANDS TO             * 00009330
                                  1015 *  TURNAROUND ROUTINE AND TO ENDUP ROUTINE.                           * 00009340
                                  1016 ********************************************************************** 00009350
000029 0380                       1018 EXECRWU  STO   WORK4,RUN          LOAD REWIND UNLOAD CMD                00009360
00002A 8402                       1021          ORI   STATIMG,SETSTATC    FLAG UNIT CHK                      00009370
00002B 1CD0                       1024 LKREWRUN STO   LINK1,ENDUP        SET RETURN ADDRESS AFTER CMD EXEC     00009380
00002C 8408                       1027 CTRLSETA ORI   STATIMG,SETSTATA   SET STATA ON TO                       00009390
00002D 4428                       1030          XFR   STATIMG,STAT        INDICATE REW, RUN OR DSE           00009400
00002E 6138                       1033 SCOOT    BU    TRNARND            GO TO TURNA ROUND                     00009410

00002F 0301                       1037 EXECRWD  STO   WORK4,REWIND       LOAD REW CMD                          00009430
000030 602B                       1040          BU    LKREWRUN           GO SET LINKAGE REG & STAT A           00009440

                                  1043 ********************** DATA SECURITY ERASE ************************** 00009460
                                  1044 *  INITIAL ENTRY FOR DATA SECURITY ERASE OP.                          * 00009470
                                  1045 *  THE COMMAND IS SET IN WORK 4 REGISTER AND A BRANCH IS              * 00009480
                                  1046 *  MADE TO SHARE THE SETUP WITH REWIND AND REWIND                     * 00009490
                                  1047 *  IF ALL TESTS ARE OK. THE DRIVE WILL THEN CONTINUE TO ERASE         * 00009500
                                  1048 *  TO END OF TAPE.                                                    * 00009510
                                  1049 ********************************************************************** 00009520

000031 0304                       1052 EXECDSE  STO   WORK4,ERGTOTI      PUT CMD IN LSR                        00009540
000032 602B                       1055          BU    LKREWRUN           GO SET STATA ON                       00009550
```

LOC OBJECT CODE ADDR1 ADDR2 STMT SOURCE STATEMENT F01MAY72 2/04/74

```
                                1059 ************************************************************************ 00009580
                                1060 *                                                                      * 00009590
                                1061 *                                                                      * 00009600
                                1062 ************************************************************************ 00009610
                                1063 *              ***  ****  **  ***      **  ***                       * 00009620
                                1064 *              *  * *    *  * *  *    *  * *  *                      * 00009630
                                1065 *              ***  ***  **** *  *    *  * ***                       * 00009640
                                1066 *              * *  *    *  * *  *    *  * *                         * 00009650
                                1067 *              *  * **** *  * ***     **  *                          * 00009660
                                1068 ***********READ OPERATION  INPUT BRANCH TABLE************************** 00009670
                                1069 *                                                                      * 00009680
                                1070 * DEPENDING ON THE TYPE OF OPERATION- ONE OF THE SIX INPUT LEGS WILL  * 00009690
                                1071 * BE SELECTED. EACH LEG  STORES AN APPROPRIATE TRACER ( NOT CE TRACE )* 00009700
                                1072 * TO ENABLE THE MICROPROGRAM TO KEEP TABS ON WHAT IT IS DOING..THE SIX* 00009710
                                1073 * INPUT LEGS AND THE TRACERS THEY SET ARE;                           * 00009720
                                1074 *        1.    READ BACKWARD       TRACER 6                          * 00009730
                                1075 *        2.    READ FORWARD        TRACER 6                          * 00009740
                                1076 *        3.    BACKSPACE FILE      TRACER 5                          * 00009750
                                1077 *        4.    FORWARD SPACE FILE  TRACER 5                          * 00009760
                                1078 *        5.    BACKSPACE RECORD    TRACER 7                          * 00009770
                                1079 *        6.    FORWARDSPACE RECORD TRACER 7                          * 00009780
                                1080 *                                                                      * 00009790
                                1081 *         TRACE REG                                                    * 00009800
                                1082 *         0 CREASER                                                    * 00009810
                                1083 *          1 BOR TRACE                                                 * 00009820
                                1084 *            2      CREASE POSSIBLR                                    * 00009830
                                1085 *             3 IBGTRACE                                               * 00009840
                                1086 *              4 TACH TRACE                                            * 00009850
                                1087 *               5 FILE OP                                              * 00009860
                                1088 *                6 READ OP                                             * 00009870
                                1089 *                 7 SPACE OP                                           * 00009880
                                1090 ************************************************************************ 00009890

000033 0802                     1093 EXECRDF  STO   TRACER,READOP      TURN ON THE READ TRACER               00009910
000034 6038                     1096         BU    SETFWD                                                    00009920
000035 0804                     1100 EXECFSF  STO   TRACER,X'04'       TURN ON FILE TRACER                   00009940
000036 6038                     1103         BU    SETFWD                                                    00009950
000037 0801                     1107 EXECFSR  STO   TRACER,SPACEOP     TURN ON SPACE TRACER                  00009970
```

```
  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                           F01MAY72   2/04/74
                                   1110 ********************************************************************** 00009990
                                   1111 * NOW THAT THE OP TRACERS ARE STORED, PUT THE PROPER READ  COMMAND    * 00010000
                                   1112 * IN WORK4 AND BRANCH TO START TAPE MOTION.                           * 00010010
                                   1113 ********************************************************************** 00010020

000038 0340                        1116 SETFWD   STO   WORK4,RDFWDD          SET RD FWD TO LSR                   00010040
000039 6040                        1119          BU    CHGDIREC             ALL SET,GO AHEAD                     00010050

00003A 0802                        1123 EXECRDB  STO   TRACER,READOP         TRN ON READ TRACER                  00010070
00003B 603F                        1126          BU    SETBKWD                                                   00010080
00003C 0804                        1129 EXECBSF  STO   TRACER,FILEOP         TRN ON THE FILE TRACER              00010090
00003D 603F                        1132          BU    SETBKWD                                                   00010100
00003E 0801                        1135 EXECBSR  STO   TRACER,SPACEOP        TRN ON THE SPACE TRACER             00010110
00003F 0380                        1138 SETBKWD  STO   WORK4,RDBKWD          SET RD BKWD TO LSR                  00010120
000040 1C56                        1141 CHGDIREC STO   LINK1,STARTAPE       SET UP RETURN REG                    00010130
000041 6138                        1144          BU    TRNARND               AND BR TO TURNAOUND                 00010140
000042 0009                        1147 CREMOVE  STO   WORK1,DEVSEL+MOVE    BRING MOVE                           00010150
000043 1000                        1150          STOH  WORK1,0              SET HIGH SENSE                       00010160
000044 5060                        1153          XFRH  WORK1,TUBO              TO TAPE UNIT                      00010170
000045 4024                        1156          XFR   WORK1,TUTAG            BACK UP                            00010180
```

```
  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                                  F01MAY72   2/04/74
                                   1161 ********************************************************************** 00010220
                                   1162 *              READ  --  NOT LOAD POINT                                * 00010230
                                   1163 ********************************************************************** 00010240
                                   1164 * THIS IS THE ENTRY POINT IF BOT IS NOT ON IN TU SENSE      BYTE 0.    * 00010250
                                   1165 * HERE WE CYCLE  UNTIL A BOR,TU INTERRUPT,TAPE MARK OR IBG DROPS US    * 00010260
                                   1166 * OUT OF THE LOOP. A TM WILL NOT DROP US OUT  OF THE LOOP UNTIL WE     * 00010270
                                   1167 * ARE SATISFIED THAT IT IT A TRUE TAPE MARK (20 CELLS OF TM BOC).      * 00010280
                                   1168 ********************************************************************** 00010290

000046                             1170 MODE6400 EQU   *                                                        00010310
000046 8440                        1172 READTAPE ORI   STATIMG,PERMRDWT    SET READ CONDITION                   00010320
000047 4428                        1175          XFR   STATIMG,STAT         TO DATA FLOW                        00010330
000048 D802                        1178          ANDM  TRACER,READOP       IF WE ARE NOT A READ OP              00010340
000049 204C                        1181          BOC   DBUS,NOTREAD           DONT SET SYNC                     00010350
00004A 8D10                        1184          ORI   XOUTAIM,SYNC        IMAGE SYNC                           00010360
00004B 4D42                        1187          XFR   XOUTAIM,XOUTA       SET SYNC TO HARDWARE                 00010370
00004C 0101                        1190 NOTREAD  STO   WORK2,1             SET NOISE BIT FOR ALU1               00010380
00004D 00EC                        1193 SETUXCNT STO   WORK1,ONES-19       SET CNT FOR 20 BIT CELLS             00010390
00004E 0244                        1196          STO WORK3,ONES-187        LOAD SAGC ID CTR                     00010400
00004F 0300                        1199          STO   WORK4,0             CLEAR SKEW CTR                       00010410
000050 09FA                        1202          STO   FRU,ONES-5          SET  NOISE RECORD BYPASS             00010420
000051 2453                        1205 CHKCLOCK BOC   RDTIME,CHKBOR       WAIT FOR READTIME                    00010430
000052 6051                        1208          BU    CHKCLOCK              TO RISE                            00010440
000053 2E6B                        1211 CHKBOR   BOC   BOR,TRACEBOR        BR ON BOR                            00010450
000054 3FB2                        1214 CHKINTPT BOC   DEVATTN,ABORTRD    BR ON TU INTERRUPT                    00010460
000055 9D00                        1217          ORM   XOUTAIM,0           TEST LSR                             00010470
000056 3158                        1220          BOC   DREG1,FWDRD         BR IF FWD STATUS ON                  00010480
000057 38CA                        1223          BOC   6250,LOOKSUM        BR IF GCR                            00010490
000058 3D61                        1226 FWDRD    BOC   NTM,CHKIBG          BR IF TAPE MARK NOT DET              00010500

                                   1229 ********************************************************************** 00010520
                                   1230 * POSSIBLE TM CONFIGURATION.BUMP A COUNTER AMD RETURN.WHEN COUNT       * 00010530
                                   1231 * GETS LARGE ENOUGH, CALL IT A TM AND GO WAIT FOR IBG                  * 00010540
                                   1232 * 20 BIT CELLS OF TM BOC NEEDED TO RECOGNIZE A TAPE MARK.              * 00010550
                                   1233 * THESE 20 BIT CELLS DO NOT HAVE TO BE CONTIGUOUS.                     * 00010560
                                   1234 ********************************************************************** 00010570
000059 A001                        1236 TMCONFIG ADD   WORK1,1            BUMP UEX CNT BY ONR                   00010580
00005A 2161                        1239          BOC   NALCO,CHKIBG        ******                             W 00010590
00005B CDEF                        1242          AND   XOUTAIM,ONES-SYNC   RESET SYNC - DONT NEED UT            00010600
00005C 4D42                        1245          XFR   XOUTAIM,XOUTA                                            00010610
00005D                             1247 CHKUEX   EQU   *                                                        00010620
00005D 9800                        1249          ORM   TRACER,0            GET TRACE REG TO DBUS FOR BRANCHING  00010630
00005E 35AF                        1252          BOC   DREG5,WAITEND       SKIP IF FILE SEARCH IS ON            00010640
                                   1254 * SET UNIT EXCEPTION                                                    00010650
00005F 8404                        1256          ORI   STATIMG,SETSTATB    TRN ON STAT B FOR ENDUP              00010660
000060 60AF                        1259          BU    WAITEND               FLAGS UNIT EXCEPTION TO ALU1       00010670
000061 2F87                        1262 CHKIBG   BOC   IBG,IBGYES1        BR IF IBG IS ON                       00010680
000062 A301                        1265          ADD   WORK4,1             BUMP SKEW CTR                        00010690
000063 3C69                        1268          BOC   NBLOCK,CLOKWAIT      BR NO DATA DETECTED                 00010700
000064 D820                        1271          ANDM  TRACER,X'20'        IS FWD HITCH ON                      00010710
000065 2069                        1274          BOC   DBUS,CLOKWAIT       BE GOING ON IF NOT                   00010720

000066 A901                        1278 BLOCKCHK ADD   FRU,1                BUMP BYPASS CNT BY 1                00010740
```

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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   2/04/74
000067 2169                      1281          BOC    NALCO,CLOKWAIT      RETURN ON NO CARRY              00010750
000068 8810                      1284          ORI    TRACER,IBGMARK      TURN ON IBGTRACE                00010760
000069 2469                      1287 CLOKWAIT BOC    RDTIME,CLOKWAIT     WAIT FOR READTIME               00010770
00006A 6051                      1290          BU     CHKCLOCK              TO FALL                       00010780



                                 1296 ************************************************************************ 00010830
                                 1297 * A BOR DETECTED WILL GET US HERE , BUT IF WE  ARE  NOT A READ OP     * 00010840
                                 1298 * WE WILL RETURN TO THE ORIGINAL LOOP.                                * 00010850
                                 1299 ************************************************************************ 00010860
00006B 8840                      1301 TRACEBOR ORI    TRACER,BORMARK      TURN ON BOR TRACE BIT           00010870
00006C 367A                      1304          BOC    READOP,READYES      BR IF A READ OP                 00010880
00006D 6054                      1307          BU     CHKINTPT            GO BACK TO STARTING LOOP        00010890
```

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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                            F01MAY72   2/04/74
                                   1312 ********************************************************************** 00010930
                                   1313 * WE ARE NOW A READ OP SO COUNT    BIT CELLS- THEN DROP SYNC  AND       * 00010940
                                   1314 * NOT ALLOW ENVELOPE LOSS TO THE DATA FLOW,ALSO SET READ CONDITION.    * 00010950
                                   1315 ********************************************************************** 00010960

00006E A901                        1318 CNTABIT2 ADD    FRU,1              BUMP CTR BY 1                     00010980
00006F 2176                        1321          BOC    NALCO,TRYAGAIN     TEST FOR CTR 16                   00010990

000070                             1324 COUNT16  EQU    *                                                    00011010
000070 8D20                        1326          ORI    XOUTAIM,NOLOSS     TRN NOLOSS ON                     00011020
000071 4D42                        1329          XFR    XOUTAIM,XOUTA      STROBE CONTROLS                   00011030
000072 9D00                        1332          ORM    XOUTAIM,0          TEST FOR LOGAIN                   00011040
000073 3684                        1335          BOC    DREG6,FORCEON      BR IF LOGAIN IS ON                00011050
000074 09FA                        1338          STO    FRU,ONES-5         SET CT FOR 6                      00011060
000075 8D02                        1341          ORI    XOUTAIM,LOGAIN                                       00011070
000076 2FAC                        1344 TRYAGAIN BOC    IBG,SETRDCHK       ABEND IF IBG                      00011080
000077 2476                        1347          BOC    RDTIME,TRYAGAIN    WAIT FOR RD TIME TO FALL          00011090
000078 607C                        1350          BU     CNTABIT            GO COUNT AGAIN   IT               00011100
000079 62AB                        1353 NOT1600A BU     NOT1600                                              00011110

00007A 3879                        1357 READYES  BOC    6250,NOT1600A      BR IF 6250 MODE                   00011130
00007B 09F5                        1360          STO    FRU,ONES-10        SET CNT FOR 11 BIT CELLS          00011140

00007C 246E                        1364 CNTABIT  BOC    RDTIME,CNTABIT2    WAIT FOR READTIME TO RISE         00011160
00007D 607C                        1367          BU     CNTABIT                                              00011170

                                   1371 ********************************************************************** 00011200
                                   1372 * WE HAVE NOW UNBLOCKED THE DATA FLOW READ CIRCUITS,SO     WE WILL     * 00011210
                                   1373 * CYCLE LOOKING FOR IBG,DATA READY OR TIMEOUT        . DATA READY IS     00011220
                                   1374 * IS THE PROPER EXIT. ALL OTHERS WILL SET UNIT CHECK.                   * 00011230
                                   1375 ********************************************************************** 00011240
00007E A906                        1379 COUNTPRE ADD    FRU,6              BUMP TIME OUT COUNT               00011270
00007F 2181                        1382          BOC    NALCO,CKDTARDY       WHILE WAITING FOR BEG ONES      00011280
                                   1384 * TIME OUT EQUALS 40 BIT CELLS WITHOUT SEEING BEGINNING ONES         * 00011290
000080 60AC                        1386          BU     SETRDCHK           GO SET START READ CHK             00011300
000081 2FAC                        1389 CKDTARDY BOC    IBG,SETRDCHK       BR IF IBG IS ON                   00011310
000082 2D8E                        1392          BOC    DATARDY,PREAMBOK   WE WANT TO BR HERE ON DATA RDY    00011320
000083 2481                        1395          BOC    RDTIME,CKDTARDY    WAIT FOR READ TIME TI FALL        00011330
000084 247E                        1398 FORCEON  BOC    RDTIME,COUNTPRE    WAIT                              00011340
000085 2D8E                        1401          BOC    DATARDY,PREAMBOK     FOR ERADTIME                    00011350
000086 6084                        1404          BU     FORCEON                TO RISE                       00011360
```

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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   2/04/74
                                   1410 ************************************************************** 00011410
                                   1411 * WE WILL END UP HERE WHEN AN IBG IS DETECTED, IN TWO INSTANCES.    * 00011420
                                   1412 * THE FIRST IS WHILE WE ARE WAITING FOR IBG TO FALL AFTER WE START  * 00011430
                                   1413 * TAPE MOVING. IN THIS CASE WE WILL GO RIGHT BACK TO THE MAIN LOOP. * 00011440
                                   1414 * THE SECOND IS ON A SPACE OP WHEN THE ENDING IBG IS DETECTED.      * 00011450
                                   1415 ************************************************************** 00011460
000087 9800                        1417 IBGYES1  ORM   TRACER,0            GET TRACE REG TO DBUS FOR TESTING    00011470
000088 318B                        1420          BOC   BORMARK,IBGYES2     BR IF BOR TRACE IS ON                00011480
000089 338B                        1423          BOC   IBGMARK,IBGYES2     BR IF IBG TRACE IS ON                00011490
00008A 6069                        1426          BU    CLOKWAIT            GO BACK TO START LOOP                00011500
00008B 37AF                        1429 IBGYES2  BOC   SPACEOP,WAITEND     BR IF SPACE OP IS ON                 00011510
00008C C8AF                        1432          AND   TRACER,ONES-BORMARK-IBGMARK  RESET TRACERS               00011520
00008D 604D                        1435          BU    SETUXCNT            GO BACK TO START LOOP + RESET UEX CT 00011530

                                   1439 ************************************************************** 00011560
                                   1440 * TO GET HERE WE MUST BE DOING A READ OP AND HAVE SEEN DATA READY.  * 00011570
                                   1441 * THE MAIN JOB NOW  IS TO ASSURE END DATA IS FLAGGED NEXT. IBG      * 00011580
                                   1442 *                SIGNALS AN ERROR CONDITION                       * 00011590
                                   1443 ************************************************************** 00011600
00008E 2891                        1445 PREAMBOK BOC   ENDATA,READEND      BR IF END DATA COMES ON              00011610
00008F 2FAA                        1448          BOC   IBG,SETPARTL        B0 IF IBG COMES ON                   00011620
000090 608E                        1451          BU    PREAMBOK            HANG TILL RECORD ENDS                00011630

                                   1455 ************************************************************** 00011660
                                   1456 * NORMAL READ END- WE HAVE NOW SEEN END DATA. NOW WE MUST COUNT      * 00011670
                                   1457 * THE POSTAMBLE DATA READYS TO ASSSURE PROPER LENGTH .  25 BYTES INTO * 00011680
                                   1458 * THE PREAMBLE,SYNC IS RESET TO KEEP THE VFC FROM FALLING INTO THE  * 00011690
                                   1459 * IBG. FROM THAT POINT ON TIME SENSE IS USED TO MEASURE TO THE IBG   * 00011700
                                   1460 * TIME.  A SECOND CHECK IS MADE TO ASSURE AT LEAST SIX CELLS OF BURST * 00011710
                                   1461 * OCCUR AFTER ENDDATA. IF NOT,END DATA CHK IS SET ALONE.            * 00011720
                                   1462 ************************************************************** 00011730
000091 09E7                        1464 READEND  STO   FRU,ONES-24         LOAD THE COMP OF DEC 25              00011740
000092 2D9C                        1467 RDYWAIT1 BOC   DATARDY,CNTRDY1     BR TO CT ONE DATA RDY                00011750
000093 2F99                        1470          BOC   IBG,CHKPOST         BR TO EXIT                           00011760
000094 2D9C                        1473          BOC   DATARDY,CNTRDY1                                          00011770
000095 6092                        1476          BU    RDYWAIT1            WAIT FOR DATA RDY TO RISE            00011780
000096 3FB2                        1479 IBGLOOK1 BOC   DEVATTN,ABORTRD     ABEND ON TU DEV END                  00011790
000097 2D96                        1482          BOC   DATARDY,IBGLOOK1    HANG IN LOOP TILL DATA RDY FALLS     00011800
000098 6092                        1485          BU    RDYWAIT1            NOW GO WAIT FOR NEXT DATA RDY        00011810

000099 B90C                        1489 CHKPOST  ADDM  FRU,12              ASSURE AT LEAST                      00011830
00009A 21A6                        1492          BOC   NALCO,SETENDCK        6 BIT CELLS OCCUR                  00011840
00009B 60B4                        1495 READX    BU    STOPREAD              AFTER ENDING ONES                  00011850

00009C A901                        1499 CNTRDY1  ADD   FRU,1               ADD ONE TO CNT                       00011870
00009D 2196                        1502          BOC   NALCO,IBGLOOK1      STAY TILL CT 25       CTED           00011880
00009E CDCD                        1505          AND   XOUTAIM,ONES-LOGAIN-SYNC-NOLOSS                          00011890
00009F 4D42                        1508          XFR   XOUTAIM,XOUTA       RESET CONTROLS                       00011900
0000A0 09E7                        1511          STO   FRU,ONES-24         LOAD NEW CTR                         00011910
0000A1 24A1                        1514 X10X     BOC   RDTIME,X10X         WAIT FOR FALL                        00011920
0000A2 2F9B                        1517          BOC   IBG,READX           NORMAL EXIT                          00011930
0000A3 A901                        1520          ADD   FRU,1               BUMP CRT                             00011940
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  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   2/04/74
0000A4 21A8                        1523           BOC    NALCO,X11X          BR IF O K YET                00011950

                                   1526 *                ***** SET EXCESSIVE POSTAMBLE *****                00011970

0000A5 8A02                        1529           ORI    DTACHK2,EXCPOST      EXCESSIVE POST AMBLE           00011990

                                   1532 *                ***** SET END DATA CHECK *****                     00012010

0000A6 1810                        1535 SETENDCK  STO    MPGMERR,ENDATAER     SET END DATA CHK               00012030
0000A7 60AD                        1538           BU     SETLONOW             RETURN TO WAIT SOME MORE       00012040

0000A8 24A1                        1542 X11X      BOC    RDTIME,X10X          WAIT FOR RISE                  00012060
0000A9 60A8                        1545           BU     X11X                                                00012070

                                   1548 *                ***** SET PARTIAL RECORD *****                     00012090

0000AA 8A04                        1551 SETPARTL  ORI    DTACHK2,PARTREC      SET PARTIAL RECORD             00012110
0000AB 60A6                        1554           BU     SETENDCK                                            00012120

                                   1557 *                ***** SET START READ CHECK *****                   00012140

0000AC 8A08                        1560 SETRDCHK  ORI    DTACHK2,STREADCK     SET START READ CHECK           00012160
0000AD                             1562 SETLONOW  EQU    *                                                   00012170
0000AD CDCD                        1564           AND    XOUTAIM,ONES-LOGAIN-SYNC-NOLOSS                     00012180
0000AE 4D42                        1567           XFR    XOUTAIM,XOUTA        RESET LO SENSE                 00012190
0000AF 2FB4                        1570 WAITEND   BOC    IBG,STOPREAD         BR IF IBG IS ON                00012200
0000B0 3FB2                        1573           BOC    DEVATTN,ABORTRD      ERROR EXIT                     00012210
0000B1 60AF                        1576           BU     WAITEND              WAIT FOR IBG                   00012220

                                   1579 *                ***** SET NOISE ERROR *****                        00012240

0000B2 8402                        1582 ABORTRD   ORI    STATIMG,SETSTATC     FLAG UNIT CHECK                00012260
0000B3 0100                        1585           STO    WORK2,0              CLEAR NOISE BIT                00012270

0000B4                             1588 STOPREAD  EQU    *                                                   00012290
0000B4 3ABE                        1590           BOC    STATC,DIAGHOOK       TOUCHE                         00012300
0000B5 D803                        1593           ANDM   TRACER,SPACEOP+READOP  THIS A RECORD SPACE OP       00012310
0000B6 37C3                        1596           BOC    SPACEOP,CRESENS      BR IF SO                       00012320
0000B7 36BF                        1599           BOC    READOP,CRESENSX                                     00012330
0000B8 CDCD                        1602 READSTOP  AND    XOUTAIM,ONES-NOLOSS-SYNC-LOGAIN                     00012340
0000B9 4D42                        1605           XFR    XOUTAIM,XOUTA        DEACTIVATE FORCE AND NOT ALLOW 00012350
0000BA 00CD                        1608           STO    WORK1,ONES-50        SET 20 MICRO SEC. DELAY        00012360
0000BB A001                        1611 DELAY     ADD    WORK1,ONE            DO THE DELAY                   00012370
0000BC 21BB                        1614           BOC    NALCO,DELAY           FOR SERVICE TO STOP           00012380
0000BD 6635                        1617 DOTIEX    BU     STROBTIE             PAGE HOP                       00012390
0000BE 6513                        1620 DIAGHOOK  BU     MEASIBG              GO MEASURE IBG                 00012400

                                   1623 ************************************************************************ 00012420
                                   1624 ************************************************************************ 00012430
                                   1625 * NORMAL ENDING OF ANY SPACE OP IS THROUGH THIS ROUTINE.  AFTER MOVE  * 00012440
                                   1626 * IS DROPPED WE WILL MONITOR THE READ BUS UNTIL THE TACH PULSE SPREAD * 00012450
                                   1627 * SHOWS THE DRIVE TO BE STOPPED.      IF ANY READ DATA IS DETECTED,   * 00012460
                                   1628 * DURING THIS TIME, MOVE IS RAISED UNTIL IBG IS AGAIN DETECTED.       * 00012470
                                   1629 ************************************************************************ 00012480
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                                      F01MAY72    2/04/74

0000BF 5821                        1632 CRESENSX XFR    MPGMERR,AR                                                     00012500
0000C0 9A00                        1635          ORM    DTACHK2,0           TEST FOR READ ERRORS                       00012510
0000C1 20B8                        1638          BOC    DBUS,READSTOP       BR IF NONE                                 00012520
0000C2 E803                        1641          XO     TRACER,SPACEOP+READOP   INVERT FLAGS                           00012530
0000C3 8880                        1644 CRESENS  ORI    TRACER,CREASER      SET FLAG FOR TAK RTN                       00012540
0000C4 0008                        1647          STO    WORK1,DEVSEL        DROP MOVE                                  00012550
0000C5 4024                        1650          XFR    WORK1,TUTAG                                                    00012560
0000C6 38D0                        1653          BOC    6250,EXTENDIT        TAG                                       00012570
0000C7 0040                        1656 NOW      STO    WORK1,DVESNS6       SET SENSE BIT ON                           00012580
0000C8 4060                        1659          XFR    WORK1,TUBO          CALL FOR READ BUS  AND TACH                00012590
0000C9 621C                        1662          BU     ZEROCTR                                                        00012600


                                   1665 ******************************************************************** 00012620
                                   1666 * THIS CODE IS USED ON BKWD TYPE READ CMDS IN GCR MODE .. CONSTANTLY   00012630
                                   1667 * MONITOR FOR SAGC BURST   AND IF IT IS SEEN ASSURE LOAD POINT IS HIT  00012640
                                   1668 ******************************************************************** 00012650
0000CA 2958                        1670 LOOKSUM  BOC    NSAGCID,FWDRD       GO BACK IF NO SIGNAL                       00012660
0000CB A201                        1673          ADD    WORK3,1             BUMP SAGC CTR                              00012670
0000CC 2158                        1676          BOC    NALCO,FWDRD         BR ON NO CARRY                             00012680

0000CD 3FB2                        1680 LPWAIT2  BOC DEVATTN,ABORTRD        NORMAL EXIT                                00012700
0000CE 60CD                        1683          BU     LPWAIT2                                                        00012710
0000CF 6131                        1686 TOSETD2  BU     TOSETD              PAGE HOP                                   00012720
0000D0 DD40                        1689 EXTENDIT ANDM   XOUTAIM,FWDDATA                                                00012730
0000D1 31C7                        1692          BOC    FWDDATA,NOW         BR IF FWD RD                               00012740
0000D2 0384                        1695          STO    WORK4,EXTEND+RDBKWD                                            00012750
0000D3 020A                        1698          STO    WORK3,DEVSEL+COMMAND                                           00012760
0000D4 1A7A                        1701          STO    LINK3,CRERETRN                                                 00012770
0000D5 6769                        1704          BU     SETCMD3                                                        00012780
```

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  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72  2/04/74
                                    1708 *  SENSE BYTES 0 AND 1                                          00012810

0000D6 0281                         1711 EXECSNS  STO   WORK3,X'81'          PATTERN FOR MASK            00012830
0000D7 5821                         1714          XFR   MPGMERR,AR          MASK AGAINST NOT CAP + NOISE 00012840
0000D8 C200                         1717          AND   WORK3,ZERO          SET IN REG IF ON            00012850
0000D9 0100                         1720          STO   WORK2,0             CLEAR REG FOR LATER         00012860
0000DA 9600                         1723 SNS0     ORM   SENSE1,ZERO         IS A DRIVE PRESENT          00012870
0000DB 20DE                         1726          BOC   DBUS,SNS1           BR IF NOT                   00012880
0000DC 35E0                         1729          BOC   START,SNS2          BR IF START IS ON           00012890
0000DD 8220                         1732          ORI   WORK3,TUSTB         SET TU STATUS B IF NOT      00012900
0000DE 8140                         1735 SNS1     ORI   WORK2,INTREQ        SET INTERVENTION REQUIRED   00012910
0000DF 60E1                         1738          BU    SNS3                GO DO NEXT TEST             00012920

0000E0 8240                         1742 SNS2     ORI   WORK3,TUSTA         SET TU STATUS A ON          00012940
0000E1 C504                         1745 SNS3     AND   FLAGS,LWROP         RESET ALL BITS EXCEPT LWR   00012950
0000E2 5D21                         1748          XFR   EQUIPCK,AR            EQUIPMENT CHECKS          00012960
0000E3 9400                         1751          ORM   STATIMG,0           ARE ANY EQUIPMENT ERR SET   00012970
0000E4 20E6                         1754          BOC   DBUS,SNS4           BR IF NOT                   00012980
0000E5 8110                         1757          ORI   WORK2,EQCHK         SET EQUIP CHECK ON          00012990
0000E6 DAEF                         1760 SNS4     ANDM  DTACHK2,ONES-FORMATCK  DO NOT DET DC ON FORMATCK 00013000
0000E7 20E9                         1763          BOC   DBUS,SNS410         BR IF NO DTA CHK IN LSRS    00013010
0000E8 6397                         1766          BU    SNS42               GO SET DATA CHK             00013020
0000E9 6392                         1769 SNS410   BU    SNS41               PAGE HOP                    00013030

                                    1772 ************************************************************** 00013050
                                    1773 *                                                            * 00013060
                                    1774 *               INITIAL SELECTION OF TAPE UNIT               * 00013070
                                    1775 *                                                            * 00013080
                                    1776 ************************************************************** 00013090
                                    1777 ************************************************************** 00013100
                                    1778 * THIS ROUTINE WILL GET THE TAPE UNIT ADDRESS FROM THE EXTERNAL * 00013110
                                    1779 * ADDRESS REGISTER IN THE PROPER BIT POSITION AND PUT IT IN THE * 00013120
                                    1780 * PROPER REGISTER.                                            * 00013130
                                    1781 *                                                            * 00013140
                                    1782 *        TUADDR LSR LAYOUT (LOW)   TUADDR LSR LAYOUT (HIGH)  * 00013150
                                    1783 *        0 SELECT TU7              0 SELECT TU15             * 00013160
                                    1784 *         1 SELECT TU6              1 SELECT TU14            * 00013170
                                    1785 *          2 SELECT TU5              2 SELECT TU13           * 00013180
                                    1786 *           3 SELECT TU4              3 SELECT TU12          * 00013190
                                    1787 *            4 SELECT TU3              4 SELECT TU11         * 00013200
                                    1788 *             5 SELECT TU2              5 SELECT TU10        * 00013210
                                    1789 *              6 SELECT TU1              6 SELECT TU9        * 00013220
                                    1790 *               7 SELECT TU0              7 SELECT TU8       * 00013230
                                    1791 *                                                            * 00013240
                                    1792 ************************************************************** 00013250
                                    1793 * THERE ARE TWO TUADDR LSRS,ONE HIGH & THE OTHER LOW.WHICH ONE IS USED* 00013260
                                    1794 * DEPENDS ON THE ADDRESS PASSED BY AL1. THIS ALLOWS THE MPGM WITH  * 00013270
                                    1795 * THE MEANS TO KNOW WHICH DEVICE HE IS WORKING.                * 00013280

0000EA 0401                         1798 GETADR   STO   STATIMG,SETSTATD                               00013300
0000EB 4190                         1801 EXECSTS  XFR   WORK2,XINA           GET TU ADDR FROM ALU1       00013310
0000EC 34F1                         1804          BOC   SELHIGH,CLEARLO     BR IF OPERATING HI DRIVES   00013320
0000ED 1B00                         1807          STOH  TUADDR,0            CLEAR HIGH ADDR REG         00013330
```

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  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT
0000EE 4B84                        1810          XFR    TUADDR,XADDR        GET DEV ADDR                          00013340
0000EF 8408                        1813          ORI    STATIMG,SETSTATA    SET STAT A TO DENOTE LO ORDER         00013350
0000F0 60F3                        1816          BU     ADDREXIT            GO DO INITIAL SELECTION               00013360
0000F1 0B00                        1819 CLEARLO  STO    TUADDR,0            CLEAR LOW ADDR REG                    00013370
0000F2 5B84                        1822          XFRH   TUADDR,XADDR        GET DEV ADDR                          00013380
```

```
                        1827 ********************** INITIAL STATUS ROUTINE ********************** 00013420
                        1828 * THIS ROUTINE,UPON REQUEST BY ALU1,GETS TWO SENSE BYTES FROM THE     * 00013430
                        1829 * SELECTED DRIVE AND PASSES THEM TO ALU1. A CHECK IS MADE TO SEE IF   * 00013440
                        1830 * THE DRIVE IS AVAILABLE AND NOT BUSY. STATS ARE USED TO COMMUNICATE  * 00013450
                        1831 * FINDINGS TO ALU1. VARIOUS REGISTERS ARE SET TO RESET STATUS.        * 00013460
                        1832 *                                                                     * 00013470
                        1833 * CLEAN STATUS  STATD ALONE                                          * 00013480
                        1834 * BUSY STATUS   STATB AND STATD  -DRIVE IS REWINDING,SWITCHED OR DSE  * 00013490
                        1835 * UNIT CHECK STATUS  STATC AND STATD-DRIVE IS NOT THERE OR NOT READY  * 00013500
                        1836 * DEVICE END PENDING STATB AND STATC                                 * 00013510
                        1837 * UNIT CHK AND DEV END PENDING -STAT C -DSE ONLY                     * 00013520
                        1838 * IF DEVICE IS FOUND BUSY,A DEVICE END WILL BE PRIMED.              * 00013530
                        1839 ********************************************************************** 00013540

0000F3 4428             1842 ADDREXIT XFR   STATIMG,STAT       ENTRY FROM ADDR ROUTINE             00013560
0000F4 3EF9             1845 CHKSWTCH BOC   BSYTACH,GOPRIME    BR IF SWITCHED                      00013570
0000F5 1CF6             1848 EXECSTSZ STO   LINK1,SRETURN1     SET UP RETURN                       00013580
0000F6 62E1             1851          BU    FCHSTS           RETURN TO STATUS1                   00013590
0000F7 0000             1854 PRIMESET STO   WORK1,ZERO        CLEAR DEVICE SEL IF ON              00013600
0000F8 4024             1857          XFR   WORK1,TUTAG       TO ASSURE NOT LEFT OUTSTANDING      00013610
0000F9 3ACF             1860 GOPRIME  BOC   STATC,TOSETD2     BR TO GET OUT                       00013620
0000FA 6200             1863          BU    SETPRIME         GO PRIME DEVICE END                 00013630

000100                  1866          ORG   BEGIN+X'100'                                         00013650
                        1867 ********************************************************************** 00013660
                        1868 * RETURN FROM FETCH STATUS ROUTINE  -  INTERROGATE SENSE DATA       * 00013670
                        1869 ********************************************************************** 00013680

000100 60F7             1872 ISBUSY1  BU    PRIMESET                                             00013700
000101 4641             1875 STATUS1  XFR   SENSE1,XOUTB      SEND TU SNS                         00013710
000102 4742             1878          XFR SENSE2,XOUTA       SEND SECOND SENSE BYTE              00013720
000103 3E00             1881          BOC   BSYTACH,ISBUSY1   BR IF BUSY(REW,RUN OR DSE)          00013730

                        1884 ********************************************************************** 00013750
                        1885 *  INITIALIZE XOUTA IMAGE REG                                        00013760
                        1886 ********************************************************************** 00013770

000104 0D45             1889 STATUSOK STO   XOUTAIM,X'45'     SET UP TO LOAD MODEL NO.            00013790
000105 4721             1892          XFR   SENSE2,AR        GET MOD NO TO A REG                 00013800
000106 CD40             1895          AND   XOUTAIM,X'40'     AND PUT IT IN XOUTA                00013810

                        1898 ********************************************************************** 00013830
                        1899 * LOOK FOR DEVICE END PRIME ROUTINE.                                 * 00013840
                        1900 ********************************************************************** 00013850

000107 2A09             1903 HAVPRIME BOC   STATA,LOWYES      STAT A ON SAYS LOW ADDR             00013870
000108 5006             1906 MUSTBEHI XFRH  LSR               SET HIGH                        16  00013880
000109 4F21             1909 LOWYES   XFR   LODEPB,AR         MOVE PRIME LSR TO AREG,(INTRF B)    00013890
00010A 2B0D             1912          BOC   STATB,SOCKEM      TEST FOR INTERFACE B                00013900
00010B 9000             1915          NOP1                  CLEAR A REG IF NOT                  00013910
00010C 4E21             1918          XFR   LODEPA,AR         MOVE PRIME LSR TO AREG,(INTF A)     00013920
```

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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   2/04/74
00010D DB00                       1921 SOCKEM   ANDM  TUADDR,0          LOOK FOR PRIME            00013930
00010E 2012                       1924          BOC   DBUS,NOPRIME      BR IF NOT                 00013940
```

```
  LOC   OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                      F01MAY72   2/04/74
                                    1928 ********************************************************************** 00013970
                                    1929 * WE HAVE A PRIME SO LOOK FOR DRIVE PULSING. IF SO, GIVE UNIT CHK     * 00013980
                                    1930 * STATUS -  IF NOT PRESENT DEVICE END.                                 * 00013990
                                    1931 ********************************************************************** 00014000
00010F 1C2F                         1933 GOTPRIME STO   LINK1,CDSTATS        LOAD PULSING RETMAGE -              00014010
000110 1932                         1936          STO   LINK2,PRETURN3       LOAD NO PULSE RETURN                00014020
000111 6126                         1939          BU    CHKPULSE             GO CHK IF PULSING                   00014030

                                    1942 ********************************************************************** 00014050
                                    1943 * NO PRIME - CHECK FOR DRIVE PULSING.  IF SO, PRIME FOR DEVICE END AND* 00014060
                                    1944 * SIGNAL UNIT CHECK STATUS.  IF NOT , CONTINUE ON WITH TESTS           * 00014070
                                    1945 ********************************************************************** 00014080

000112 4006                         1948 NOPRIME  XFR   LSR                  SET LOW                          16 00014100
000113 3A2F                         1951          BOC   STATC,CDSTATS        GO SET C AND D                      00014110
000114 1CF9                         1954          STO   LINK1,GOPRIME2       LOAD PULSING RETURN                 00014120
000115 1917                         1957          STO   LINK2,CHKMTI         LOAD NO PULSE RETURN                00014130
000116 6126                         1960          BU    CHKPULSE              GO CHECK IF PULSING                00014140

                                    1963 ********************************************************************** 00014160
                                    1964 * STATUS AT THIS POINT IS - NO PRIME , NO PULSE. LOOK FOR NOT RDY TO  * 00014170
                                    1965 * RDY CONDITION AND SIGNAL DEVICE END IF SO.                          * 00014180
                                    1966 ********************************************************************** 00014190

000117 3F32                         1969 CHKMTI   BOC   DEVATTN,PRETURN3     GET OUT HERR IF MTI ON              00014210
000118 D6FF                         1972          ANDM  SENSE1,ONES          SEE IF START IS ON                  00014220
000119 35E9                         1975          BOC   START,SETD           ALL DONE IF IT IS                   00014230
00011A 202F                         1978          BOC   DBUS,CDSTATS         ALL DONE IF DRIVE IS NOT THERE      00014240

                                    1981 ********************************************************************** 00014260
                                    1982 * SET THE DRIVE PULSING - DEVICE WAS FOUND NOT READY. IF DRIVE        * 00014270
                                    1983 * ACCEPTS THE PULSE CMD, SIGNAL NOT RDY AND PRIME A DEVICE END. IF IT * 00014280
                                    1984 * DOES NOT- SET EQUIPMENT CHK (CMD STS REJ) AND DO NOT PRIME.         * 00014290
                                    1985 ********************************************************************** 00014300

00011B 120A                         1989 SETPULSE STOH  WORK3,DEVSEL+COMMAND                                     00014330
00011C 0910                         1992          STO   FRU,PULSE            SET THE                             00014340
00011D 4960                         1995          XFR   FRU,TUBO               DRIVE  PULSING                    00014350
00011E 5224                         1998          XFRH  WORK3,TUTAG          SEND COMMAND BIT                    00014360
00011F 03FE                         2002          STO   WORK4,ONES-1         SET UP WAIT CT                      00014380
000120 A301                         2005 AGAIN    ADD   WORK4,1              BUMP WAIT COUNT                     00014390
000121 2120                         2008          BOC   NALCO,AGAIN          GO AGAIN IF NO CARRY                00014400
000122 1008                         2011          STOH  WORK1,DEVSEL         RESET THE                           00014410
000123 5024                         2014          XFRH  WORK1,TUTAG            COMMAND TAG                       00014420
000124 1CF9                         2017          STO   LINK1,GOPRIME2       SET UP PULSING RET                  00014430
000125 192E                         2020          STO   LINK2,DIDNTGO        SET NO PULSE RETURN                 00014440

                                    2023 ********************************************************************** 00014460
                                    2024 * CHECK FOR DRIVE PULSING ROUTINE.  IF PULSING, EXIT ON LINK 1. IF    * 00014470
                                    2025 * NOT, EXIT ON LINK 2.                                                * 00014480
                                    2026 ********************************************************************** 00014490

                                    2028 * NOTE  THE FOLLOWING INSTRUCTIONS CANNOT BE SINGLE                     00014510
                                    2029 *       STEPPED AND ACHIEVE RELIABLE RESULTS.                           00014520
```

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 LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT
000126 3F2A                       2033 CHKPULSE BOC    DEVATTN,TACHON1     BR IF PULSE PRESENT              00014550
000127 3F2D                       2036 TACHOFF1 BOC    DEVATTN,ISPULSE     BR IF PULSE PRESENT              00014560
000128 3F2D                       2039 TACHOFF2 BOC    DEVATTN,ISPULSE     BR IF PULSE PRESENT              00014570
000129 5922                       2042 NOPULSE  XFR    LINK2,IC            NO PULSE EXIT                    00014580
00012A 3F2C                       2046 TACHON1  BOC    DEVATTN,TACHON2     BR IF PULSE PRESENT              00014600
00012B 612D                       2049         BU     ISPULSE                                              00014610
00012C 3F29                       2052 TACHON2  BOC    DEVATTN,NOPULSE     BR IF PULSE PRESENT              00014620
00012D 5C22                       2055 ISPULSE  XFR    LINK1,IC            PULSING EXIT                     00014630
00012E 1D80                       2058 DIDNTGO  STO    EQUIPCK,REJCMD      SET COMMAND STATUS REJ           00014640
00012F 3ABB                       2061 CDSTATS  BOC    STATC,EXECDES                                        00014650
000130 8402                       2064         ORI    STATIMG,SETSTATC    TRN ON STATC                     00014660
000131 61E9                       2067 TOSETD   BU     SETD                INITIAL STATUS EXIT              00014670
000132 2A34                       2070 PRETURN3 BOC    STATA,PRETURN1      IF STAT A IS ON -                00014680
000133 5006                       2073         XFRH   LSR                   BYPASS SET HIGH                00014690
000134 1200                       2076 PRETURN1 STOH   WORK3,0               CLEAR THIS EREG                00014700
000135 6367                       2079         BU     POLLALL                                              00014710
000136 6384                       2082 PRETURN2 BU     SKIPB               GO STEP TO NEXT DEVICE           00014720
000137 6362                       2085 PRETURN4 BU     GOGETIM                                              00014730
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 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   2/04/74
                                  2089 ***************************** TURNAROUND ****************************** 00014760
                                  2090 *   TURNAROUND WILL BE LINKED TO BY ALL FUNCTIONAL COMMANDS            * 00014770
                                  2091 * IMMEDIATELY AFTER RECEIVING CONTROL. TURNAROUND WILL RETURN VIA     * 00014780
                                  2092 * LINK REG 1 AND REQUIRES WORK4 TO BE LOADED WITH THE BUS OUT COMMAND * 00014790
                                  2093 * PRIOR TO BEING ENTERED.                                             * 00014800
                                  2094 *        TURNAROUND WILL:                                            * 00014810
                                  2095 *             1.CHECK DEVICE STATUS FOR LOADPOINT AND IF READ        * 00014820
                                  2096 *               BACKWARD OR BACKSPACE OP, EXECUTE A UNIT CHECK EXIT. * 00014830
                                  2097 *             2.CHECK DEVICE STATUS VERSUS COMMAND TO BE EXECUTED AND * 00014840
                                  2098 *               EXECUTE TURNAROUND DELAY IF IT IS REQUIRED.          * 00014850
                                  2099 *             3.CHECK DEVICE STATUS IF COMMAND IS BACKWARD AND DO    * 00014860
                                  2100 *               FORWARD WRITE HITCH IF NECESSARY                     * 00014870
                                  2101 *             4.SET DESIRED COMMAND ON BUS OUT AND RAISE THE MOVE TAG * 00014880
                                  2102 *             5.EXIT INTO THE VELOCITY ROUTINE WHICH GETS DRIVE UP TO * 00014890
                                  2103 *               SPEED     AND EXITS ON LINK1.                        * 00014900
                                  2104 *                                                                     * 00014910
                                  2105 *                                                                     * 00014920
                                  2106 ********************************************************************** 00014930

000138 00FF                       2110 TRNARND  STO   WORK1,ONES          FILL THE COUNTER                    00014960

                                  2113 ********************************************************************** 00014980
                                  2114 *  SET UP DATA FLOW MASK                                              * 00014990
                                  2115 ********************************************************************** 00015000

000139 D610                       2118         ANDM  SENSE1,BOT           MASK FOR BEGINNING OF TAPE          00015020
00013A 2040                       2121         BOC   DBUS,CHKNRZ          BRANCH IF OFF TO CHECK FOR BACKWARD  00015030
00013B D308                       2124         ANDM  WORK4,WRITE          MASK FOR WRITE COMMAND              00015040
00013C 2075                       2127         BOC   DBUS,ISBAKWD         BRANCH IF NOT TO CHECK FOR BACKWARD  00015050
00013D 9700                       2130         ORM   SENSE2,0             GET LSR FOR TEST                    00015060
00013E 3451                       2133         BOC   HIDEN,CHK1601        BR ON BIRCH                         00015070
00013F 23F1                       2136 CHKFTR  BOC   NRZFEAT,CHK7LP       BR IF FEATURE INSTALLED             00015080

000140 9700                       2140 CHKNRZ  ORM   SENSE2,0             TEST STATUS OF DRIVE                00015100
000141 3444                       2143         BOC   HIDEN,CHK1602        BR IF 6250                          00015110
000142 23E3                       2146         BOC   NRZFEAT,TURNNRZI     PAGE HOP IF NRZI PRESENT            00015120
000143 6145                       2149         BU    DO16                                                      00015130

000144 3356                       2154 CHK1602 BOC   DREG3,DO64           BR IF GCR MODE                      00015160
000145 8D80                       2157 DO16    ORI   XOUTAIM,PEBIT        SET FOR DATA FLOW                   00015170
000146 D381                       2160 CHKBKWD ANDM  WORK4,RDBKWD+REW +RUN  IS CMD A BKWD TYPE READ OR MOTION  00015180
000147 207A                       2163         BOC   DBUS,DEVFWD          NO, GO CHECK FOR DEV IN FWD STATUS  00015190
000148 CDBF                       2166         AND   XOUTAIM,ONES-FWDDATA  ASSURE FORWARD IS OFF               00015200
000149 D608                       2169         ANDM  SENSE1,WRSTAT        IS DEV IN WRITE STATUS?             00015210
00014A 2058                       2172         BOC   DBUS,DEVBKWD         NO, GO CHECK FOR BACKWARD STATUS    00015220

                                  2175 ********************************************************************** 00015240
                                  2176 *  DEVICE IS IN WRITE STATUS--SET UP AND DO FORWARD HITCH             * 00015250
                                  2177 ********************************************************************** 00015260

00014B 0109                       2180         STO   WORK2,MOVE+DEVSEL          SET CMD AND MOVE TAGS ON   00015280
00014C 5460                       2183         XFRH  STATIMG,TUBO         CLEAR BIT 6                         00015290
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                   F01MAY72   2/04/74
00014D 4124                      2186          XFR   WORK2,TUTAG          MOVE TAG IMAGE TO TAG REG          00015300
00014E 019F                      2189 TAHITCH  STO   WORK2,ONES-96        SET COUNT FOR .96 IN               00015310
00014F 1952                      2192          STO   LINK2,TRETURN3-BEGIN  TO SETLINK1 THEN DODELAY           00015320
000150 621C                      2195          BU    TAKS                 GO DO HITCH FORWARD                00015330

                                 2198 * LOAD POINR DENSITY DETERMINATION ON GCR DRIVE  ******************      00015350
000151 4290                      2200 CHK1601  XFR   WORK3,XINA            BRING IN MODE SEY                  00015360
000152 3656                      2203          BOC   DREG6,DO64           BR IF 6250                         00015370
000153 3756                      2206          BOC   DREG7,DO64           BR IF 800                          00015380
000154 9700                      2209          ORM   SENSE2,0             GET LSR TO TEST                    00015390
000155 3245                      2212          BOC   DUALDEN,DO16         BR IF DUAL DENS                    00015400
000156 8D08                      2215 DO64     ORI   XOUTAIM,HIDEN        SET 6250                           00015410
000157 6146                      2218          BU    CHKBKWD                                                 00015420

000158 D680                      2223 DEVBKWD  ANDM  SENSE1,BACKWD        IS DEV IN BACKWARD STATUS          00015450
000159 3061                      2226          BOC   DREG0,LETSGO         YES GO AROUND TURNAROUND DELAY     00015460

                                 2229 ************************************************************************ 00015480
                                 2230 *  THIS DELAY IS TO ALLOW DRIVE TO STOP IF MOVING AND ALLOW TAPE TO   * 00015490
                                 2231 *  STABILIZE IN COLUMNS.                                              * 00015500
                                 2232 ************************************************************************ 00015510

00015A D708                      2235 DODELAY  ANDM  SENSE2,HIDEN         ARE WE A 6250 UNIT                 00015530
00015B 3480                      2238          BOC   HIDEN,NODELAY        BR IF SO                           00015540
00015C 0191                      2241 DODELAY1 STO   WORK2,X'91'          LOAD TURNAROUND DELAY      11.16 MS 00015550
00015D A001                      2244 MOREYET  ADD   WORK1,1              BUMP TURNAROUND COUNT BY ONE       00015560
00015E 215D                      2247          BOC   NALCO,MOREYET        GO BACK IF NOT ALU CARRY OUT       00015570
00015F A101                      2250          ADD   WORK2,1              BUMP OTHER CTR                     00015580
000160 215D                      2253          BOC   NALCO,MOREYET        GO BACK IF NO CARRY                00015590

                                 2256 ************************************************************************ 00015610
                                 2257 *  SET CONTROLS TO DF AND ISSUE CMD TO THE DRIVE                      * 00015620
                                 2258 ************************************************************************ 00015630

000161 4360                      2261 LETSGO   XFR   WORK4,TUBO           MOVE COMMAND TO BUS OUT            00015650
000162 2A65                      2264          BOC   STATA,SETCTRL        BR IF THIS IS REW, RUN, OR DSE     00015660
000163 020A                      2267          STO   WORK3,DEVSEL+COMMAND   RAISE COMMAND TAG                00015670
000164 6166                      2270          BU    SETAG                GO SET CMD TO DRIVE                00015680
000165 020C                      2273 SETCTRL  STO   WORK3,CONTROL+DEVSEL     SET CONTROL AND SELECT TAG     00015690
000166 4224                      2276 SETAG    XFR   WORK3,TUTAG          MOVE TAG IMAGE TO TAG REG          00015700
000167 A2F5                      2279 BACKONCE ADD   WORK3,X'F5'          DELAY                              00015710
000168 2167                      2282          BOC   NALCO,BACKONCE        ONE TIME                          00015720
000169 D340                      2285          ANDM  WORK4,RDFWDD           CMD RDFWD                        00015730
00016A 206C                      2288          BOC    DBUS,MSKSTS          BR IF CMD NOT READ BKWD OP-RE-RUN 00015740

                                 2291 ************************************************************************ 00015760
                                 2292 *  TEST RESPONDING COMMAND STATUS FROM DRIVE                          * 00015770
                                 2293 ************************************************************************ 00015780

00016B C3BF                      2296 RDFMSK   AND   WORK4,ONES-RDFWDD    MODIFY COMMAND BYTE FOR READ FORWARD 00015800
00016C 4981                      2299 MSKSTS   XFR   FRU,TUBI             FETCH STATUS BYTE                  00015810
00016D 2A6F                      2302          BOC    STATA,SKIPMOD       BR IF CONTROL CMD                  00015820
00016E C9FE                      2305          AND   FRU,ONES-POSIT        TRN OFF POSIT IF ON                00015830
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   2/04/74
00016F 4921                      2308 SKIPMOD  XFR   FRU,AR              MOVE CMD BYTE TO ALU INPUT REG    00015840
000170 F300                      2311          XOM   WORK4,ZERO           COMPARE STATUS                    00015850
000171 2082                      2314          BOC   DBUS,RDYMOVE        BRANCH IF ALL ZERO                00015860

000172 2ACE                      2318          BOC   STATA,CTRLREJ       BR IF A CONTROL REJECT            00015880

                                 2321 *              ***** SET COMMAND STATUS REJECT *****               00015900

000173 1D80                      2324 SETREJ   STO   EQUIPCK,REJCMD       SET CMD STATUS REJECT   OR REG    00015920
000174 61CF                      2327          BU    CLRXOUTA            GO TO UNIT CHECK ENDUP            00015930

000175 2A45                      2331 ISBAKWD  BOC   STATA,DO16           BR IF ON A RUN AT LP              00015950
000176 D380                      2334          ANDM  WORK4,RDBKWD         IS COMMAND READ BACKWARD          00015960
000177 2045                      2337          BOC   DBUS,DO16           NO, GO CHECK FOR FORWARD STATUS   00015970
000178 8402                      2340          ORI   STATIMG,SETSTATC     FLAG UNIT CHK                     00015980
000179 61CF                      2343          BU    CLRXOUTA            GO TO ENDUP (BKWD AT LP)          00015990

00017A D688                      2347 DEVFWD   ANDM  SENSE1,BACKWD+WRSTAT  IS DRIVE IN BACKWARD OR WRT STA  00016010
00017B 2061                      2350          BOC   DBUS,LETSGO          NO, GO SKIP DELAY                 00016020
00017C 305A                      2353          BOC   BACKWD,DODELAY       BR IF BACKWARD                    00016030
00017D D340                      2356          ANDM  WORK4,RDFWDD         MASK FOR READ FORWARD             00016040
00017E 2061                      2359          BOC   DBUS,LETSGO          NO, GO SKIP DELAY                 00016050
00017F 615A                      2362          BU    DODELAY             OTHERWISE DO TURNAROUND DELAY     00016060

000180 19E6                      2366 NODELAY  STO   LINK2,CRETURN1       LOAD LINK RETURN   - LETSGO       00016080
000181 66DA                      2369          BU    CHKPOSIT                                              00016090

000182 9300                      2373 RDYMOVE  ORM   WORK4,0              IS THIS LWR                       00016110
000183 329F                      2376          BOC   SETDIAG,ASSURFWD     BR IF LWR                         00016120
000184 F0FF                      2379          XOM   WORK1,ONES           TEST THE COUNTER                  00016130
000185 208B                      2382          BOC   DBUS,GOMOVE          BR IF TURNAROUND NOT NEEDED       00016140
000186 01CE                      2385 SHORTDLY STO   WORK2,ONES-49        LOAD A NEW                        00016150

                                 2388 ************************************************************************ 00016170
                                 2389 *  USE THIS DELAY ONLY IF PREVIOUS DELAY WAS USED AT 'DO DELAY'       * 00016180
                                 2390 *  DELAY IS FOR APPROX 5 MIL SEC                                      * 00016190
                                 2391 ************************************************************************ 00016200

000187 A001                      2394 HOLDUP   ADD   WORK1,1                COUNT                           00016220
000188 2187                      2397          BOC   NALCO,HOLDUP             AND                           00016230
000189 A101                      2400          ADD   WORK2,1                  COUNT                         00016240
00018A 2187                      2403          BOC   NALCO,HOLDUP               DOWN                        00016250
00018B 2ACF                      2406 GOMOVE   BOC   STATA,CLRXOUTA       BR IF CTRL COMMAND                00016260
00018C 4D42                      2409          XFR   XOUTAIM,XOUTA        SET DATA FLOW CONTRILS            00016270
00018D 8484                      2412          ORI   STATIMG,SETSTATB+TAPEOP  SET B FOR ALU1 ALSO TAPEOP    00016280
00018E 4428                      2415          XFR   STATIMG,STAT         TRN ON TAPE OP TO DATA FLOW       00016290
00018F C4FB                      2418          AND   STATIMG,ONES-SETSTATB   RESET B STAT IN THE IMAGE       00016300
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                                F01MAY72   2/04/74

000190 9500                        2424            ORM   FLAGS,0              IS THIS LWR                         00016340
000191 3796                        2427            BOC   CHGDIR,CHKREAD       BR IF DONE - EARLY EXIT-            00016350
000192 359B                        2430            BOC   LWROP,LPNMOVE        BR IF SO                            00016360
000193 010B                        2433            STO   WORK2,DEVSEL+COMMAND+MOVE   RAISE MOVE TAG               00016370
000194 4124                        2436            XFR   WORK2,TUTAG          XFER TAG IMAGE TO TAG REG           00016380

                                   2439 ******************************************************************** 00016400
                                   2440 *  THE DRIVE IS STARTING TO MOVE---EXIT TO ASSURE THIS AND RECEIVE    * 00016410
                                   2441 *  GAP CONTROL                                                        * 00016420
                                   2442 ******************************************************************** 00016430

000195 6219                        2445            BU    EXECVEL                                                  00016450

000196 3098                        2449 CHKREAD   BOC   DREG0,READCHAN       BR IF CHANNEL BUFFER READ           00016470
000197 61CF                        2452            BU    CLRXOUTA             CHG DIR EXIT                        00016480

                                   2455 * CHANNEL BUFFER READ UDIAG -- EXITS ON STOP  **********************      00016500
000198 4011                        2457 READCHAN XFR    INDF                 START BUFFER READ OUT               00016510
000199 27CF                        2460 READWAIT BOC    STOP,CLRXOUTA        HANG TILL CMD OUT                   00016520
00019A 6199                        2463            BU    READWAIT                                                 00016530

                                   2466 ******************************************************************** 00016550
                                   2467 *  THE FOLLOWING USED FOR LWR OP                                        00016560
                                   2468 ******************************************************************** 00016570

00019B 5460                        2471 LPNMOVE   XFRH  STATIMG,TUBO         CLEAR THE BUS                       00016590
00019C 0209                        2474            STO   WORK3,DEVSEL+MOVE    DROP THE                            00016600
00019D 4224                        2477            XFR   WORK3,TUTAG            COMMAND TAG                       00016610

00019E 6600                        2481            BU    LWRDELAY                                                 00016630
00019F 8D40                        2484 ASSURFWD ORI    XOUTAIM,FWDDATA      SET FWD FOR LWR                     00016640
0001A0 6186                        2487            BU    SHORTDLY                                                 00016650

                                   2490 ********************* GENERAL AND SELECTIVE RESETS ****************** 00016670
                                   2491 *                                                                     * 00016680
                                   2492 * DEPENDING ON ENTRY POINT, A SELECTIVE OR GENERAL RESET WILL BE      * 00016690
                                   2493 * PERFORMED.  SELECTIVE BYPASSES RESET OF DEVICE END PRIMES AND       * 00016700
                                   2494 * COMMITTED LATCH. OTHERWISE THE TWO RESETS ARE THE SAME.               00016710
                                   2495 ******************************************************************** 00016720

0001A1                             2497 STEP0007 EQU    *                                                         00016740
0001A1 2BA5                        2499 EXECGRST BOC    STATB,RESTDEB        BRANCH IF RESET IS FOR INTERFACEB *M 00016750
0001A2                             2501 STEP0071 EQU    *                    THRU HERE FOR CHNL A, ODD DRIVES    00016760
0001A2 0E00                        2503            STO   LODEPA,0             CLEAR DE PRIME REGISTER A           00016770
0001A3                             2505 STEP0072 EQU    *                                                         00016780
0001A3 1E00                        2507            STOH  LODEPA,0             CLEAR DE PRIME REGISTER A HIGH   *16 00016790
0001A4                             2509 STEP0073 EQU    *                                                         00016800
0001A4 61A7                        2511            BU    EXECSRST                                                 00016810
0001A5                             2513 STEP0008 EQU    *                    THRU HERE FOR CHNL B, EVEN DRIVES   00016820
```

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  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                        F01MAY72   2/04/74
0001A5 0F00                        2515 RESTDEB  STO   LODEPB,0          CLEAR DE PRIME REGISTER B     *MIS**  00016830
0001A6                             2517 STEP0009 EQU   *                                                     00016840
0001A6 1F00                        2519          STOH  LODEPB,0          CLEAR DE PRIME REGISTER B HIGH  *16  00016850

0001A7                             2522 STEP0010 EQU   *                                                     00016870
0001A7 1CFC                        2524 EXECSRST STO   LINK1,SRETURN7      SET UP FOR RETURN               00016880
0001A8                             2526 STEP0011 EQU   *                                                     00016890
0001A8 62E1                        2528          BU    FCHSTS             AND GO SELECT DEVICE            00016900
0001A9                             2530 STEP0038 EQU   *                                                     00016910
0001A9 100A                        2532 ZAPIM    STOH  WORK1,DEVSEL+COMMAND S UP COMMAND FOR RESETG        00016920
0001AA                             2534 STEP0039 EQU   *                                                     00016930
0001AA 1102                        2536          STOH  WORK2,RESET        GET DRIVE RESET READY            00016940
0001AB                             2538 STEP0040 EQU   *                                                     00016950
0001AB 5024                        2540          XFRH  WORK1,TUTAG        RAISE COMMAND TAG TO DRIVE       00016960
0001AC                             2542 STEP0041 EQU   *                                                     00016970
0001AC 1008                        2544          STOH  WORK1,DEVSEL       CLEAR OUT COMMAND TAG            00016980
0001AD                             2546 STEP0042 EQU   *                  ISSUE SENSE RESET TO THE DRIVE   00016990
0001AD 5160                        2548          XFRH  WORK2,TUBO         AND RESET IT                     00017000
0001AE                             2550 STEP0043 EQU   *                                                     00017010
0001AE 3BB0                        2552          BOC   STATD,CLEEREM      DON'T CHECK STAT C               00017020
0001AF                             2554 STEP0044 EQU   *                                                     00017030
0001AF 3AC1                        2556          BOC   STATC,RESET1       BR IF THIS IS AN ALU ERR RESET   00017040
0001B0                             2558 STEP0045 EQU   *                                                     00017050
0001B0 0C00                        2560 CLEEREM  STO   DTACHK1,0           CLEAR                            00017060
0001B1                             2562 STEP0046 EQU   *                                                     00017070
0001B1 0A00                        2564          STO   DTACHK2,0          ERROR                            00017080
0001B2                             2566 STEP0047 EQU   *                                                     00017090
0001B2 1D00                        2568          STO   EQUIPCK,0           REGS                            00017100
0001B3                             2570 STEP0048 EQU   *                                                     00017110
0001B3 1800                        2572          STO   MPGMERR,0                                           00017120
0001B4                             2574 STEP0049 EQU   *                                                     00017130
0001B4 1700                        2576          STO   TIEBYTE,0          CLR TIE                          00017140
0001B5                             2578 STEP0050 EQU   *                                                     00017150
0001B5 0900                        2580          STO   FRU,0                                               00017160
0001B6                             2582 STEP0051 EQU   *                                                     00017170
0001B6 0800                        2584          STO   TRACER,0           CLEAR TRACE REGISTER             00017180
0001B7                             2586 STEP0052 EQU   *                                                     00017190
0001B7 3BCC                        2588          BOC   STATD,CLEARCMD     BR IF THIS IS A SENSE RESET      00017200
0001B8                             2590 STEP0053 EQU   *                                                     00017210
0001B8 0500                        2592          STO   FLAGS,0            CLEAR FLAGS REG                  00017220
0001B9                             2594 STEP0054 EQU   *                                                     00017230
0001B9 F109                        2596          XOM   WORK2,NDXSRST        IS THIS A SELECTIVE RESET      00017240
0001BA                             2598 STEP0055 EQU   *                                                     00017250
0001BA 20C1                        2600          BOC   DBUS,RESET1        BR IF SO                         00017260

                                   2603 ********** DESELECT TAPE UNIT **********************************  00017280
                                   2604 * THIS ROUTINE IS USED AFTER EACH OPERATION TO ASSURE DE-SELECT OF THE* 00017290
                                   2605 * TAPE UNIT. THE COMMITTED LATCH WILL ALSO BE RESET.                *  00017300
                                   2606 ************************************************************************  00017310

0001BB                             2608 STEP0056 EQU   *                                                     00017330
0001BB 0000                        2610 EXECDES  STO   WORK1,ZERO           CLEAR TAGS                       00017340
0001BC                             2612 STEP0057 EQU   *                                                     00017350
0001BC 4024                        2614          XFR   WORK1,TUTAG          TO THE DRIVE                   00017360
```

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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   2/04/74
0001BD                            2616 STEP0058 EQU   *                LOOP THRU HERE EIGHT TIMES          00017370
0001BD A024                       2618 DESWAIT  ADD   WORK1,36         ALLOW X POINTS                      00017380
0001BE                            2620 STEP0059 EQU   *                LOOP THRU HERE EIGHT TIMES          00017390
0001BE 21BD                       2622          BOC   NALCO,DESWAIT      TO SETTLE 3.2 USEC DELAY        00017400
0001BF                            2624 STEP0060 EQU   *                RESET THE COMMITTED LATCH           00017410
0001BF 4050                       2626          XFR   COMITD           RESET THE DEVICE COMMITTED LATCH    00017420
0001C0                            2628 STEP0061 EQU   *                THRU HERE SIXTEEN TIMES             00017430
0001C0 6011                       2630          BU    SETDLONE         GO SET STAT D AND TERMINATE         00017440

                                  2633 * CHECK FOR DEV END PRIME. IF ONE IS FOUND BYPASS RESET TO COMMITTED.  00017460

0001C1 4E21                       2636 RESET1   XFR   LODEPA,AR         SET DEV END PRIMES TO TEST A        00017480
0001C2 4F21                       2639 RESET2   XFR   LODEPB,AR         SET DEV END PRIMES TO TEST B        00017490
0001C3 DB00                       2642 RESET3   ANDM  TUADDR,ZERO       DO ADDR AND DEV PRIME COMPARE       00017500
0001C4 20C6                       2645          BOC   DBUS,CHKHI        BR IF NOT                           00017510
0001C5 61CB                       2648          BU    EXECABRT                                       *16  00017520
0001C6 5006                       2651 CHKHI    XFRH  LSR              SET HI                         *16  00017530
0001C7 4E21                       2654          XFR   LODEPA,AR          LOOK FOR                     *16  00017540
0001C8 4F21                       2657          XFR   LODEPB,AR            HIGH PRIMES                *16  00017550
0001C9 DB00                       2660          ANDM  TUADDR,0         BR OUT                         *16  00017560
0001CA 20BB                       2663          BOC   DBUS,EXECDES       IF NONE                      *16  00017570
                                  2665 ************************** ABORT ROUTINE ***************************  00017580
                                  2666 *                                                                *  00017590
                                  2667 *  USED BY ALU1 TO INSURE TAPE MOTION IS STOPPED.                *  00017600
                                  2668 *                                                                *  00017610
                                  2669 *  THIS ROUTINE MUST FOLLOW RESETS ROUTINE                       *  00017620
                                  2670 ************************************************************************  00017630

0001CB 1000                       2673 EXECABRT STOH  WORK1,ZERO         CLEAR REG                           00017650

0001CC 5024                       2677 CLEARCMD XFRH  WORK1,TUTAG          DROP ALL DRIVE TAGS               00017670
0001CD 6011                       2680          BU    SETDLONE         ALL DONE                            00017680
                                  2682 *              ***** SET CONTROL STATUS REJECT *****                 00017690

0001CE 1D20                       2685 CTRLREJ  STO   EQUIPCK,REJCTRL    SET CONTROL STATUS REJECT           00017710
0001CF 0100                       2688 CLRXOUTA STO   WORK2,0            ASSURE NOISE BIT OFF - READ OP -    00017720
```

```
 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   2/04/74
                                  2692 ************************** ENDUP ROUTINE ***************************** 00017750
                                  2693 *                                                                    * 00017760
                                  2694 * THE ENDUP ROUTINE IS ENTERED BY ALL CMD ROUTINES.                 * 00017770
                                  2695 *          ENDUP SETS THE STATUS INTO THE STAT REG AND SETS STAT D TO * 00017780
                                  2696 * INDICATE TO ALU1, ALU2 IS FINISHED. ALU2 WILL BE TRAPPED TO ADDRESS * 00017790
                                  2697 * ZERO WHEN STAT D IS SET AND WILL REMAIN DORMANT UNTIL CALLED BY     * 00017800
                                  2698 * ALU1 AGAIN,(VIA ALU1 XOUTB)                                        * 00017810
                                  2699 *    THE DEVICE STATUS IS ALWYS RETRIEVED AND CHECKED FOR UNIT CHECK  * 00017820
                                  2700 * AND UNIT EXCEPTION CONDITIONS(EOT ON WRITE). THE MPGM ERROR REG IS  * 00017830
                                  2701 * CHECKED AND IF ANY BITS ARE ON, THE UNIT CHECK STAT IS SET.         * 00017840
                                  2702 *                                                                    * 00017850
                                  2703 ********************************************************************** 00017860


0001D0 4018                       2707 ENDUP    XFR   BUFFCRC             SAMPLE CH BUFFER ERROR              00017890
0001D1 C41F                       2710 ENDUP800 AND   STATIMG,ONES-TAPEOP-PERMRDWT-WRTBURST                   00017900
0001D2 1CF7                       2713         STO   LINK1,SRETURN2       LOAD SENSE RETURN  (SNSRTN)         00017910
0001D3 4428                       2716         XFR   STATIMG,STAT         RESET TAPE IP AND CONTROLS          00017920
0001D4 4142                       2719         XFR   WORK2,XOUTA          SET BYTE FOR ALU1-READ NOISE        00017930
0001D5 62E1                       2722         BU    FCHSTS               GO FETCH DEVICE SENSE DATA          00017940
0001D6 2AEB                       2725 SNSRTN   BOC   STATA,BUSYYET        BR IF A REW,RUN,ORDSE               00017950
0001D7 9600                       2728 NEXTONE  ORM   SENSE1,0              GET SENSE BYTE FIR TEST             00017960
0001D8 34DA                       2731         BOC   WRTSTAT,CHKEOT        BR IF EOT IS ON                     00017970
0001D9 61DD                       2734         BU    ENDCHK                                                   00017980
0001DA 32DC                       2737 CHKEOT   BOC   EOT,SETUX            IS END OF TAPE BIT ON               00017990
0001DB 61DD                       2740         BU    ENDCHK   HK           OR IF NOT                           00018000
0001DC 8404                       2743 SETUX    ORI   STATIMG,SETSTATB     SET UNIT EXCEPTION IF SO            00018010
0001DD                            2745 ENDCHK   EQU   *                                                      00018020
0001DD                            2746 CKSTART  EQU   *                                                      00018030
0001DD 9600                       2748         ORM   SENSE1,0             IS DRIVE READY                      00018040
0001DE 35E0                       2751         BOC   START,TSTFOERR       BR IF START IS ON                   00018050
0001DF 1D40                       2754 REWFAIL  STO   EQUIPCK,REJTU        OTHERWISE SET ERROR ON              00018060
0001E0 DCF6                       2757 TSTFOERR ANDM  DTACHK1,ONES-TSAGC-VELTRY                           **  00018070
0001E1 20E3                       2760         BOC   DBUS,TSTFOMOR          REGS                            00018080
0001E2 61E7                       2763         BU    SETUCK               OTHERWISE GO SET UNIT CHECK         00018090
0001E3 5821                       2766 TSTFOMOR XFR   MPGMERR,AR           SET UP ERRORS                       00018100
0001E4 5D21                       2769         XFR   EQUIPCK,AR            FOR TEST                          00018110
0001E5 9A00                       2772         ORM   DTACHK2,0             ANY M-PGM ERRORS                  00018120
0001E6 20E9                       2775         BOC   DBUS,DUNAGN           BR IF NOT                         00018130
0001E7 8402                       2778 SETUCK   ORI   STATIMG,SETSTATC     SET UNIT CHECK STAT ON              00018140

0001E8 4014                       2782         XFR   REDLIGHT FLAG ALU DETECTED DATA ERROR                   00018160
0001E9                            2784 DUNAGN   EQU   *                                                      00018170
0001E9 8401                       2786 SETD     ORI   STATIMG,SETSTATD     TURN ON STATD                       00018180
0001EA 4428                       2789         XFR   STATIMG,STAT         XFER STAT IMAGE TO STAT REG         00018190
                                  2791 *************** ALU2 IS NOW TRAPPED UNTIL CALLED BY ALU1               00018200
```

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  LOC   OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                        F01MAY72   2/04/74
                                    2794 ******************************************************************** 00018230
                                    2795 * REWIND,REWIND UNLOAD AND DATA SECURITY ERASE USE THIS ROUTINE       * 00018240
                                    2796 * TO ASSURE THE DEVICE WENT BUSY. IF IT DIDNT, A CHECK IS MADE        * 00018250
                                    2797 * TO SEE IF THE OPERATION HAS BEEN COMPLETED.  CHAINING OF THESE      * 00018260
                                    2798 * COMMANDS IS SIGNALED BY ALU1 STATD BEING ON, AND ALU2 WILL         * 00018270
                                    2799 * REMAIN HERE IN ENDUP UNTIL THE TAPE UNIT IS FINISHED.              * 00018280
                                    2800 ******************************************************************** 00018290
0001EB                              2801 BUSYYET  EQU   *                                                    00018300
0001EB 4088                         2803          XFR   WORK1,XINB          GET THE CURRENT CMD INDEX       00018310
0001EC F029                         2806          XOM   WORK1,EXECRWU       IS IT A REWIND UNLOAD           00018320
0001ED 201B                         2809          BOC   DBUS,SETPULSE       BR IF SO                        00018330
0001EE D6FF                         2812          ANDM  SENSE1,ONES         GET SENSE BYTE FOR TEST         00018340
0001EF 37F2                         2815          BOC   NOTBUSY,LPLOOK      BR IF NOT BUSY                  00018350
0001F0 3BD0                         2818          BOC   STATD,ENDUP         IF CHAINED-STATD WILL BE ON-    00018360
0001F1 61DD                         2821          BU    CKSTART             IF NOT CHAINED-TAKE NORMAL EXIT 00018370
0001F2 33F5                         2824 LPLOOK   BOC   BOT,ISITREW         BR IF BOT IS ON                 00018380
0001F3 32F7                         2827          BOC   EOT,ISITDSE         BR IF EOT IS ON                 00018390
0001F4 61DF                         2830          BU    REWFAIL             NOT BUSY AND NOT AT LP OR TI    00018400
0001F5 34DF                         2833 ISITREW  BOC   WRTSTAT,REWFAIL     BR IF NOT-MUST BE REW/RUN       00018410
0001F6 61DD                         2836          BU    CKSTART             SET U.C.-WE HIT LP ON A DSE     00018420
0001F7 34DD                         2839 ISITDSE  BOC   WRTSTAT,ENDCHK      SET U.C. IF NOT-WE HIT T1 ON A REW 00018430
0001F8 61DF                         2842          BU    REWFAIL             DSE COMPLETE-GO FINISH UP       00018440
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72  2/04/74

0001F9 0403                      2848 GOPRIME2 STO   STATIMG,SETSTATD+SETSTATC  SET UP FOR LATER        00018480
0001FA 1403                      2851          STOH  STATIMG,SETSTATD+SETSTATC  SET UP FOR LATER        00018490
0001FB 6202                      2854          BU    EXECSDE              GO SET A PRIME ON             00018500
```

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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   2/04/74

000200                           2859          ORG   BEGIN+X'200'                                      00018540
                                 2860 **************SET DEVICE END PRIME ROUTINE**************************** 00018550
                                 2861 * THIS ROUTINE IS USED BY ALU1 TO PRIME THE DEVICE END STILL HELD     * 00018560
                                 2862 * BY ALU2 IN TUADDR LES. UPON PRIMING, A BRANCH WILL BE TAKEN TO      * 00018570
                                 2863 * POLLMTI WHERE A WAIT WILL BE INITIATED IN CASE ALU1 WANTS IT TURNED * 00018580
                                 2864 * OFF AGAIN.                                                         * 00018590
                                 2865 * NOTE  INITIAL STATUS DOES NOT TAKE THIS BRANCH.                    * 00018600
                                 2866 ********************************************************************** 00018610

000200 0405                      2869 SETPRIME STO   STATIMG,SETSTATB+SETSTATD  SET FOR USE LATER            00018630
000201 1405                      2872          STOH  STATIMG,SETSTATB+SETSTATD  SET FOR USE LATER IF HI      00018640
000202 9B00                      2875 EXECSDE  ORM   TUADDR,0            SEE IF LOW LSR HOLDS ADDRESS    16 00018650
000203 2005                      2878          BOC   DBUS,ISHIGH         BR IF NOT TO SET HI             16 00018660
000204 6206                      2881          BU    ISLOW               SKIP SET HIGH                   16 00018670
000205 5006                      2884 ISHIGH   XFRH  LSR                 SET HIGH                        16 00018680
000206 4B21                      2887 ISLOW    XFR   TUADDR,AR           GET PRIME BIT TO A BUS              00018690
000207 2B09                      2890          BOC   STATB,DOIT          BR IF INTERFACE B                   00018700
000208 8E00                      2893          ORI   LODEPA,0            PRIME PROPER                        00018710
000209 8F00                      2896 DOIT     ORI   LODEPB,0              DEVICE END                        00018720
00020A 4428                      2899          XFR   STATIMG,STAT        SET STAT D IF NECESSARY             00018730
00020B 8402                      2902          ORI   STATIMG,SETSTATC    SET STAT C FOR                      00018740
00020C 4428                      2905          XFR   STATIMG,STAT          ALU14                             00018750
00020D 1200                      2908          STOH  WORK3,0                                                 00018760
00020E 6370                      2911          BU    POLLMTIX            GO WAIT TO RESET THE DEVICE END     00018770
                                 2913 *                                  IF STAT D DIDN'T COME ON IN THE     00018780
                                 2914 *                                  PREVIOUS INSTRUCTION                00018790

                                 2917 ********************************************************************** 00018820
                                 2918 *  RETURN HERE AFTER GAP CONTROL IS RECEIVED FROM DRIVE AND EXIT      * 00018830
                                 2919 *  TO ASSURE DRIVE IS AT THE CORRECT VELOCITY-NORMAL RETURN TO 'WRTST'* 00018840
                                 2920 *  IF LIMITS ARE NOT MET THEN EXIT TO ENDUP.                         * 00018850
                                 2921 ********************************************************************** 00018860

00020F 9700                      2924 WRTSTR   ORM   SENSE2,0            GET LSR FOR TEST                    00018880
000210 3412                      2927          BOC   HIDEN,WRTSTR2       BR IF BIRCH                         00018890
000211 6213                      2930          BU    WRTSTR1                                                 00018900
000212 3316                      2933 WRTSTR2  BOC   DREG3,WRTSTR3       BR IF 6250 BPI                      00018910

000213 1600                      2937 WRTSTR1  STOH  SENSE1,0            CLEAR THE REG FOR VELOCITY          00018930
000214 13E7                      2940 VELSTR   STOH  WORK4,ONES-24       SET MAX CNT TO 24                   00018940
000215 6300                      2943          BU    CHKVEL              GO ASSURE VELOCITY IS CORRECT       00018950
000216 67AD                      2946 WRTSTR3  BU    SETCOUNT            6250 EXIT                           00018960
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 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   2/04/74
                                  2951 ********************** VELOCITY SUBROUTINE ************************** 00019000
                                  2952 *                                                                    * 00019010
                                  2953 *  THIS ROUTINE WILL ASSURE THE CAPSTAN STARTS MOVING BY COUNTING    * 00019020
                                  2954 *  FOR 256  BIT CELLS,  C. DURING WHICH CHECKING FOR A TACH PULSE.   * 00019030
                                  2955 *  IF IT DOES NOT APPEAR DURING THIS TIME NOTACH TU ERROR IS SET.    * 00019040
                                  2956 *                                                                    * 00019050
                                  2957 *  OTHERWISE WAIT FOR GAP CONTROL AND WHEN RECEIVED RESET COMMAND    * 00019060
                                  2958 *  TAG AND RETURN ON LINK1.                                          * 00019070
                                  2959 *                                                                    * 00019080
                                  2960 ********************************************************************** 00019090

000217 4081                       2964 VEL1     XFR   WORK1,TUBI          GET CMD STATUS BYTE                 00019120
000218 313F                       2967          BOC   GAPCTRL,GAPCTLON    BR IF GAP CONTROL IS ON             00019130
000219 1917                       2970 EXECVEL  STO   LINK2,VEL1          POINY TO RETURN                     00019140
00021A 00FF                       2973 VELGAP   STO   WORK1,ONES          SET UP                              00019150
00021B 01FF                       2976          STO   WORK2,ONES            COUNT REGISTERS1                  00019160

                                  2979 ********************** TACH COUNT SUBROUTINE ************************ 00019180
                                  2980 *                                                                    * 00019190
                                  2981 *  THE NUMBER OF TACH PULSES TO BE MEASURED MUST BE COMPLEMENTED     * 00019200
                                  2982 *  AND SET IN REGISTER WORK1 AND WORK2 BEFORE ENTRY TO ROUTINE.      * 00019210
                                  2983 *    EXAMPLE - TO COUNT 360 TACH PULSES WHICH WOULD EQUAL A DISTANCE * 00019220
                                  2984 *              OF 3.6 INCHES COMVERT 360 TO HEX = 168                * 00019230
                                  2985 *              NOW COMPLEMENT TO 2 BYTES = FE96                      * 00019240
                                  2986 *              SET 'FE' IN WORK1 AND SET '96' IN WORK2               * 00019250
                                  2987 *                                                                    * 00019260
                                  2988 ********************************************************************** 00019270

00021C                            2991 TAKS     EQU   *                                                     00019300
00021C 0200                       2993 ZEROCTR  STO   WORK3,0             CLEAR TIME OUT CTR                  00019310
00021D 9500                       2996 ROUNDUP  ORM   FLAGS,0             GET LSR TO TEST                     00019320
00021E 332A                       2999          BOC   DREG3,CHKBORRD      RD CHK SAGC BRST                    00019330
00021F 3C25                       3002 NOTLPRD  BOC   NBLOCK,TACHWAIT      SKIP NEXT TESTS IF IBG IS ACTIVE    00019340
000220 D890                       3005          ANDM  TRACER,ERGFLAG+CREASER   SET FOR TESTS                  00019350
000221 2025                       3008          BOC   DBUS,TACHWAIT        BR IF NEITHER FLAG IS ON            00019360
000222 304B                       3011          BOC   CREASER,CREMOVEX     SKIP OUT IF TAPE CREASE             00019370

                                  3014 *              ***** SET NOISE ERROR *****                           00019390

000223 1880                       3017 ERGNOISE STO   MPGMERR,NOISE         SET NOISE ERROR ON ERASE          00019410
000224 1D02                       3020          STO   EQUIPCK,PERR         SET EQUIPMENT CHK                 00019420

000225 2427                       3024 TACHWAIT BOC   RDTIME,TACHYET       WAIT FOR READ TIME                00019440
000226 6225                       3027          BU    TACHWAIT                TO RISE                       00019450
000227 3E2E                       3030 TACHYET  BOC   BSYTACH,POSITIVE      LOOK FOR TACH                     00019460
000228 8808                       3033          ORI   TRACER,TAKTR          TRN ON TACH TRACE                 00019470
000229 6230                       3036          BU    COUNTUP                                                 00019480

00022A 2E2C                       3040 CHKBORRD BOC   BOR,BORUP             SAMPLE BOR                        00019500
00022B 6225                       3043          BU    TACHWAIT                                                00019510
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00022C 8840                    3047 BORUP    ORI   TRACER,BORMARK      SET FLAG - BOR SEEN                    00019530
00022D 6225                    3050          BU    TACHWAIT                                                   00019540

00022E 9800                    3054 POSITIVE ORM   TRACER,0             LOOK FOR TACH TRACE                   00019560
00022F 3439                    3057          BOC   TAKTR,CNTATACH       BR IF ON                              00019570
000230 2430                    3060 COUNTUP  BOC   RDTIME,COUNTUP      WAIT FOR READ TIME TO FALL             00019580
000231 A201                    3063          ADD   WORK3,1              BUMP TIME OUT CT                      00019590
000232 211D                    3066          BOC   NALCO,ROUNDUP         AND GET                               00019600
000233 3F47                    3069          BOC   DEVATTN,UCKON        --- MAYBE BUMP LP                     00019610
000234 D880                    3072          ANDM  TRACER,CREASER            OUT ON                           00019620
000235 2046                    3075          BOC   DBUS,SETNTACH              OVERFLOW                        00019630
000236 0101                    3078          STO   WORK2,1                                                    00019640
000237 3849                    3081          BOC   6250,SUMMORE                                               00019650
000238 60B8                    3084 KRETURN1 BU    READSTOP                                                   00019660

000239 C8F7                    3088 CNTATACH AND   TRACER,ONES-TAKTR   RESET TACH TRACE                      00019680
00023A A101                    3091          ADD   WORK2,1              BUMP LOW                              00019690
00023B 211C                    3094          BOC   NALCO,ZEROCTR          ORDER CT                          00019700
00023C A001                    3097          ADD   WORK1,1              BUMP HIGH                             00019710
00023D 211C                    3100          BOC   NALCO,ZEROCTR          ORDER CT                          00019720
00023E                         3102 CNTNCARY EQU   *                                                        00019730
00023E 5922                    3104 GOBACK   XFR   LINK2,IC              RETURN                                00019740

                               3107 * VELOCITY SUBROUTINE EXIT POINT - WHEN GAP CONTROL COMES ON.          * 00019760
00023F 4160                    3109 GAPCTLON XFR   WORK2,TUBO           PUT ZEROS ON TU BUS OUT               00019770
000240 0009                    3112          STO   WORK1,DEVSEL+MOVE   RESET COMMAND TAG                     00019780
000241 4024                    3115          XFR   WORK1,TUTAG          TO THE DRIVE                          00019790
000242 D502                    3118          ANDM  FLAGS,TUBOMSK       IS THE SET TUBO MASK FLAG ON          00019800
000243 2045                    3121          BOC   DBUS,NOMASK         BR IF NOT                             00019810
000244 5560                    3124          XFR   WORK5,TUBO          SET MASK OUT IF SO                    00019820
000245 5C22                    3127 NOMASK   XFR   LINK1,IC             RETURN TO CALLER                      00019830

                               3130 * THIS IS THE TIME OUT FOR THE TACH ROUTINE IF A TACH PULSE DOES       * 00019850
                               3131 * NOT APPEAR WITHIN 256 BIT CELLS                                      * 00019860

                               3133 *              ***** SET NO TACH ERROR *****                           00019880

000246 1D04                    3136 SETNTACH STO   EQUIPCK,NTACH      SET NO TACH PULSE ERROR               00019900
000247 8402                    3139 UCKON    ORI   STATIMG,SETSTATC   SET UNIT CHECK ONLY ON MTI            00019910
000248 61CF                    3142 GOENDUP  BU    CLRXOUTA            GO TO END                          00019920

000249 19EA                    3146 SUMMORE  STO   LINK2,CRETURN5      LOAD LINK RETURN                      00019940
00024A 66DA                    3149          BU    CHKPOSIT                                                  00019950
00024B 2E4E                    3152 CREMOVEX BOC   BOR,CREMOVEZ       BR IF BOR UP                          00019960
00024C D820                    3155          ANDM  TRACER,X'20'       TEST FOR FWD HITCH FLAG               00019970
00024D 2025                    3158          BOC   DBUS,TACHWAIT      BR IF NOT                             00019980
00024E 6042                    3161 CREMOVEZ BU CREMOVE                                                    00019990
                               3163 ************************************************************************ 00020000
                               3164 ********************** TACH COUNT BRANCH TABLE ************************** 00020010
                               3165 ************************************************************************ 00020020
00024F 6400                    3167 TRETURN2 BU    NRZILINK           WRITE FROM LP RETURN                  00020030
000250 66D6                    3170 TRETURN5 BU    WRT2                                                     00020040
000251 66AC                    3173 WTMSTR2  BU    WTMAWAY                                                  00020050
```

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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                        F01MAY72   2/04/74
000252                             3175 TRETURN3 EQU   *                  RETURN TO TA HITCH                  00020060

                                   3177 ********************************************************************** 00020080
                                   3178 * RETURN FROM FORWARD HITCH TO DROP MOVE AND RETURN TO TURN AROUND    * 00020090
                                   3179 ********************************************************************** 00020100
000252 0208                        3181 SETLINK1 STO   WORK3,DEVSEL          RESET THE MOVE TAG               00020110
000253 4224                        3184          XFR   WORK3,TUTAG        PASS TO THE DRIVE                   00020120
000254 8820                        3187          ORI   TRACER,X'20'       SET FLAG FOR CREASE TAPE            00020130
000255 615A                        3190          BU    DODELAY             GO BACK TO TRNARND                 00020140
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                            F01MAY72   2/04/74
                                   3193 *********************************************************************** 00020160
                                   3194 * THIS IS THE RETURN POINT FROM TURNAROUND ROUTINE.  AT THIS POINT     * 00020170
                                   3195 * THE TAPE UNIT HAS ACCEPTED THE READ COMMAND AND IS UP TO SPEED.      * 00020180
                                   3196 *                                                                     * 00020190
                                   3197 *********************************************************************** 00020200

000256 9600                        3200 STARTAPE ORM   SENSE1,0             SEE IF BOT IS ON                  00020220
000257 3361                        3203          BOC   DREG3,LPBURST      - BR IF IT IS                       00020230
000258 9700                        3206          ORM   SENSE2,0            GET SNS TO DBUS FOR TEST           00020240
000259 345B                        3209          BOC   HIDEN,READSTAR      BR IF 6250 POSSIBLE                00020250
00025A 335C                        3212          BOC   NOTPE,ISNRZI2       BR IF NRZI UNIT                    00020260
00025B 6046                        3215 READSTAR BU    READTAPE            NO BOT, LOOK FOR DATA              00020270
00025C 2302                        3218 ISNRZI2  BOC   NRZFEAT,ISNRZI      BR IF NRZI FEATURE IS INSTALLED    00020280

                                   3221 *              ***** SET NOT CAPABLE *****                            00020300

00025D 1801                        3224 NOTCOMP  STO   MPGMERR,NOTCAP      SET NOT CAPABLE                    00020320
00025E 61CF                        3227 GOEND    BU    CLRXOUTA            STOP                               00020330

00025F 335B                        3231 READHIGH BOC   NOTPE,READSTAR      BR IF 1600 BPI                     00020350
000260 6046                        3234          BU    MODE6400            GO READ AT 6250                    00020360
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 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   2/04/74
                                  3238 ************************************************************** 00020390
                                  3239 *     READ  FROM  LOAD  POINT                                  * 00020400
                                  3240 ************************************************************** 00020410


000261 1965                       3243 LPBURST  STO   LINK2,READLP       SET UP RETURN (READLP¢          00020430
000262 01D4                       3246          STO   WORK2,X'D4'         THREE INCHES                  00020440
000263 00FE                       3249 LPBURST1 STO   WORK1,X'FE'        SET UP TO MOVE TAPE             00020450
000264 621C                       3252 CRETEST  BU    ZEROCTR           GO CT 300 TACH PULSES           00020460

                                  3255 ************************************************************** 00020480

                                  3257 ************************************************************** 00020500
                                  3258 * AT THIS POINT WE ARE READY TO SAMPLE THE IDENTIFICATION AREA OF THE * 00020510
                                  3259 * TAPE TO DETERMINE DENSITY.  BASICALLY THIS ROUTINE CONSISTS OF      * 00020520
                                  3260 * THREE COUNTERS (EACH SPANS TWO LSR) WHICH VIE FOR INCREMENTATION.  * 00020530
                                  3261 * THE FIRST TO OVERFLOW DETERMINES THE OPERATING MODE.  THE TCU RESET * 00020540
                                  3262 * READ MODE FROM LOAD POINT IS 1600 BPI. THUS, IF PTE IS DETECTED,NO  * 00020550
                                  3263 * FURTHER ACTION IS REQUIRED AS FAR AS INITIALIZATION. IF 1TE IS       * 00020560
                                  3264 * DETECTED, A MODE SET WILL BE ISSUED TO THE TAPE UNIT AND GCR CON-   * 00020570
                                  3265 * TROLS ACTIVATED, IF NEITHER PTE OR 1TE IS DETECTED,A CHECK IS MADE  * 00020580
                                  3266 * TO DETERMINE NRZI CAPABILITIES AND IF POSSIBLE THE OPERATION        * 00020590
                                  3267 * CONTINUES.  NOT CAPABLE CAN RESULT FROM, GCR TAPE ON AN INCAPABLE  * 00020600
                                  3268 * DEVICE. ALSO, THE REQUIRED FEATURES MUST BE RESIDENT ON THE TCU.   * 00020610
                                  3269 *                                                                   * 00020620
                                  3270 ************************************************************** 00020630

000265 9700                       3273 READLP   ORM   SENSE2,0            LOOK SEE IF                     00020650
000266 307C                       3276          BOC   SEVTRK,SETNRZI        SEVEN TRK                   00020660
000267 09FE                       3279          STO   FRU,ONES-1          CNT IS 512 BIT CELLS            00020670
000268 03FB                       3282          STO   WORK4,ONES-4        CNT IS 1280 BIT CELLS           00020680
000269 02FE                       3285          STO   WORK3,ONES-1        CLR A CTR                       00020690

00026A 246A                       3289 OKALREDY BOC   RDTIME,OKALREDY     WAIT FOR READ TIME TO FALL      00020710
00026B 3980                       3292          BOC   N1TE,COUNTLPB       BR IF NOT 1 TRK ENV             00020720
                                  3294 * ONE TRK ENV COUNT LOOP                                           00020730
00026C A101                       3296          ADD   WORK2,1             BUMP CTR BY ONE                 00020740
00026D 217E                       3299          BOC   NALCO,WAITACEL      BR IF NO CARRY                  00020750
00026E A201                       3302          ADD   WORK3,1             BUMP HI CTR BY 1                00020760
00026F 217E                       3305          BOC   NALCO,WAITACEL      BR IF NO CARRY                  00020770


000270 D708                       3309 READ6400 ANDM  SENSE2,HIDEN        ARE WE A BIRCH TAPE UNIT        00020790
000271 205D                       3312          BOC   DBUS,NOTCOMP        BR IF NOT                       00020800
000272 CD7F                       3315          AND   XOUTAIM,ONES-PEBIT  TRN OFF PE CONTROL              00020810
000273 8D08                       3318          ORI   XOUTAIM,HIDEN        TRN ON BIRCH CONTROL           00020820
000274 4D42                       3321          XFR   XOUTAIM,XOUTA       DO IT                           00020830
                                  3323 ************************************************************** 00020840
                                  3324 * GO TO TACH ROUTINE AND MOVE ENOUGH TAPE TO GET INTO THE BEGINNING   * 00020850
                                  3325 * OF THE SAGC BURST.                TAPE IS GCR                     * 00020860
                                  3326 ************************************************************** 00020870


000275 198A                       3330 OKFOR64  STO   LINK2,SETNORM       LOAD LINK RETURN                00020900
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   2/04/74
000276 0165                      3333          STO   WORK2,ONES-154      LOAD LO CTR                  00020910
000277 6263                      3336          BU    LPBURST1                                         00020920

                                 3339 * NRZI COUNT LOOP                                               00020940
000278 A001                      3341 CNTNRZI  ADD   WORK1,1              BUMP CTR BY ONE              00020950
000279 217E                      3344          BOC   NALCO,WAITACEL                                    00020960
00027A A301                      3347          ADD   WORK4,1              BUMP CTR BY ONE              00020970
00027B 217E                      3350          BOC   NALCO,WAITACEL       BR IF NO OVERFLOW            00020980
00027C 23E8                      3353 SETNRZI  BOC   NRZFEAT,SET800       GO SET NRZI                  00020990
00027D 625D                      3356          BU    NOTCOMP             NRZI NOT INSTALLED- SET NOT CAPABLE 00021000
00027E 246A                      3359 WAITACEL BOC   RDTIME,OKALREDY      WAIT FOR READTIME            00021010
00027F 627E                      3362          BU    WAITACEL              TO BECOME ACTIVE           00021020

000280 2C78                      3366 COUNTLPB BOC   NPTE,CNTNRZI        BR IF NO P BURST             00021040
                                 3368 * P TRK ENV COUNT LOOP                                          00021050
000281 A101                      3370          ADD   WORK2,1              BUMP CTR BY ONE              00021060
000282 217E                      3373          BOC   NALCO,WAITACEL       BR IF NO OVERFLOW            00021070
000283 A901                      3376          ADD   FRU,1                BUMP CTR BY ONE              00021080
000284 217E                      3379          BOC   NALCO,WAITACEL       BR IF NO OVERFLOW            00021090
000285 9700                      3382          ORM   SENSE2,0             LET SENSE FOR TEST           00021100
000286 3488                      3385          BOC   HIDEN,CHKSUMOR       BR IF BIRCH DRIVE            00021110
000287 6046                      3388          BU    READTAPE    STAR    NOT BIRCH - CONTINUE         00021120
000288 325B                      3391 CHKSUMOR BOC   DUALDEN,READSTAR    BR IF 1600 INSTALLED         00021130
000289 625D                      3394          BU    NOTCOMP             GO SET NOT CAP - NO 1600 FEATURE 00021140


                                 3398 ************************************************************** 00021170
                                 3399 * ENTERING SAGC BURST. LINK OUT TO TURN ON SAGC LOGIC-ALSO SETS 6250  * 00021180
                                 3400 ************************************************************** 00021190

00028A 1A3D                      3403 SETNORM  STO   LINK3,ZRETURN1      SET LINK RETURN              00021210
00028B 0310                      3406          STO   WORK4,SETDENS       LOAD COMMAND                 00021220
00028C 020D                      3409          STO   WORK3,DEVSEL+CONTROL+MOVE                        00021230
00028D 6530                      3412          BU    SETCTRL1                                         00021240

                                 3415 ************************************************************** 00021260
                                 3416 * GO BACK TO THE TACH ROUTINE AND CROSS MOST OF THE SAGC BURST       * 00021270
                                 3417 ************************************************************** 00021280

00028E 00FD                      3420 NORMDONE STO   WORK1,ONES-2        SET UP TO MOVE TAPE          00021300
00028F 01F3                      3423          STO   WORK2,ONES-12         6 INCHES APPROX            00021310
000290 1993                      3426          STO   LINK2,CHKATT        LOAD RETURN - CHK ATT        00021320
000291 8510                      3429          ORI   FLAGS,16            SET FLAG FOR BOR CHK         00021330
000292 621C                      3432          BU    ZEROCTR             GO COUNT 550 TACHS           00021340

                                 3435 ************************************************************** 00021360
                                 3436 * NEARING END OF SAGC - CHECK RESULTS AS FOLLOWS AND WAIT FOR END     * 00021370
                                 3437 * AS NECESSARY.                                                 * 00021380
                                 3438 *        BOR    DEVATTN                                         * 00021390
                                 3439 *         0        0      EQUIPMENT CHECK + SAGC                 * 00021400
                                 3440 *         0        1      NOT CAPABLE + SAGC                     * 00021410
                                 3441 *         1        1      READ FIRST BLOCK - FORCE SAGC ERROR  +NOISE* 00021420
                                 3442 *         1        0      NORMAL                                 * 00021430
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                              F01MAY72   2/04/74
                                   3443 ********************************************************************* 00021440

000293 9800                        3446 CHKATT   ORM    TRACER,0            TEST LSR FOR BOR SEEN                   00021460
000294 3199                        3449          BOC    BORMARK,RESETBOR    BR IF ALL OK                            00021470
000295 3F97                        3452          BOC    DEVATTN,BRSTCK1     SEE WHAT TAPE UNIT HAS TO SAY           00021480
000296 6719                        3455          BU     EQSAGC                                                      00021490

000297 8C08                        3459 BRSTCK1  ORI    DTACHK1,TSAGC       SET TEMPORARY ERROR             * UC *  00021510
000298 625D                        3462          BU     NOTCOMP                                                     00021520

000299 C8BF                        3466 RESETBOR AND    TRACER,ONES-BORMARK RESET BOR SEEN FLAG                     00021540
00029A C5EF                        3469          AND    FLAGS,X'EF'         TRN OFF BOR FLAG                        00021550
00029B 3EA5                        3472 BRSTCK2  BOC    BSYTACH,BRSTCK10    WAIT FOR TACH CHG                       00021560
00029C 299B                        3475          BOC    NSAGCID,BRSTCK2                                             00021570

00029D 3FA0                        3479 BRSTCK3  BOC    DEVATTN,BRSTCK5     SET SAGC CK IF ON                       00021590
00029E                             3481 BRSTCK4  EQU    *                                                           00021600
00029E 2FE0                        3483 BRSTCK41 BOC    IBG,MODE6401        WAIT FOR END OF SAGC                    00021610
00029F 629E                        3486          BU     BRSTCK41                                                    00021620
0002A0 8C08                        3489 BRSTCK5  ORI    DTACHK1,TSAGC       SET ERROR                        *UC*   00021630
0002A1 D802                        3492          ANDM   TRACER,READOP       ARE WE A READ OP                        00021640
0002A2 20A4                        3495          BOC    DBUS,BRSTCK6        BR IF NOT                               00021650
0002A3 1880                        3498          STO    MPGMERR,NOISE       SET ERROR FOR FIRST READ                00021660
0002A4                             3500 BRSTCK6  EQU    *                                                           00021670
0002A4 629E                        3502          BU     BRSTCK4                                                     00021680
0002A5 A0FF                        3505 BRSTCK10 ADD    WORK1,ONES          DECREMENT CTR                           00021690
0002A6 205D                        3508          BOC    DBUS,NOTCOMP         EXIT ON OVERFLOW                       00021700
0002A7 29A9                        3511 BRSTCK11 BOC    NSAGCID,BRSTCK12    BR IF STILL NO SAGC ID                  00021710
0002A8 629D                        3514          BU     BRSTCK3             GOOD EXIT                               00021720
0002A9 3EA7                        3517 BRSTCK12 BOC    BSYTACH,BRSTCK11    WAIT FOR TACH TO CHG                    00021730
0002AA 629B                        3520          BU     BRSTCK2                                                     00021740
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72  2/04/74
                                   3523 *** GCR READ OP -- LOAD CONTROL COUNTERS  *************          00021760
0002AB 02D0                        3525 NOT1600  STO   WORK3,ONES-47       LOAD RESYNC CTR           00021770
0002AC 0018                        3528          STO   WORK1,24           LOAD MARK TIME OUT CTR    00021780
0002AD 09F9                        3531          STO     FRU,ONES-6       LOAD LO GAIN CTR          00021790
0002AE 4321                        3534          XFR   WORK4,AR           PUT SKEW CTR TO A BUS     00021800
0002AF A900                        3537          ADD     FRU,0            ADD TO CTR                00021810
0002B0 21B2                        3540          BOC   NALCO,OKDOK        CHK FOR OVERFLOW          00021820
0002B1 62B4                        3543          BU    SETMIN                                       00021830

0002B2 B904                        3547 OKDOK    ADDM    FRU,4            ASSURE                    00021850
0002B3 21B5                        3550          BOC   NALCO,READ001        MINIMUM CT              00021860
0002B4 09FC                        3553 SETMIN   STO     FRU,ONES-3       FORCE MINIMUM CT          00021870

                                   3556 ************************************************************** 00021890
                                   3557 * CYCLE WAITING FOR ROC ROTATN. IF IBG COMES ACTIVE, OR TIME OUT IS   * 00021900
                                   3558 * REACHED - SET START READ CHECK.  AT APPROPRIATE POINT SET LO GAIN   * 00021910
                                   3559 ************************************************************** 00021920

0002B5 24B5                        3562 READ001  BOC   RDTIME,READ001     WAIT FOR READ TIME TO FALL  00021940

0002B6 2FC0                        3566          BOC   IBG,SETRDERR       ABEND IF IBG                00021960
0002B7 A0FF                        3569          ADD   WORK1,ONES         DECREMENT TIME OUT CTR      00021970
0002B8 20C0                        3572          BOC   DBUS,SETRDERR      EXIT ON CTR 0               00021980
0002B9 A901                        3575          ADD     FRU,1            BUMP LOW GAIN CTR           00021990
0002BA 21BD                        3578          BOC   NALCO,READ002      BR ON NO CARRY              00022000
0002BB 8D22                        3581          ORI   XOUTAIM,LOGAIN+NOLOSS AGE LOW GAIN              00022010
0002BC 4D42                        3584          XFR   XOUTAIM,XOUTA      SET LO GAIN                 00022020

0002BD 24B5                        3588 READ002  BOC   RDTIME,READ001     WAIT FOR RD TIME TO RISE    00022040
0002BE 22C1                        3591          BOC   ROCROT,READ003     NORMAL EXIT ON FR BUF DATA  00022050
0002BF 62BD                        3594          BU    READ002                                       00022060
0002C0 60AC                        3597 SETRDERR BU    SETRDCHK                                      00022070

                                   3600 ************************************************************** 00022090
                                   3601 * MARK HAS BEEN SEEN. DROP SYNC LINE TO DETECTION CIRCUITS           * 00022100
                                   3602 ************************************************************** 00022110

0002C1 CDEF                        3606 READ003  AND   XOUTAIM,ONES-SYNC  RESET SYNC IMAGE            00022140
0002C2 4D42                        3609          XFR   XOUTAIM,XOUTA      DROP SYNC LINE              00022150
0002C3 24C5                        3612 READ004  BOC     RDTIME,READ0041    WAIT FOR RD TIM  TO RISE    00022160
0002C4 62C3                        3615          BU    READ004                                       00022170

0002C5 2DCA                        3619 READ0041 BOC   DATARDY,READ0051   NORMAL EXIT                 00022190
0002C6 A0FF                        3622          ADD   WORK1,ONES          DECREMENY CTR               00022200
0002C7 20C0                        3625          BOC    DBUS,SETRDERR     BR ON CTR ZERO              00022210
0002C8 24C8                        3628 READ0042 BOC    RDTIME,READ0042    WAIT TILL RD TIME FAL      00022220
0002C9 62C3                        3631          BU    READ004                                       00022230

                                   3634 ************************************************************** 00022250
                                   3635 * DATA TIME - WAIT FOR EOD WHILE COUNTING FOR RESYNC BURST.           * 00022260
                                   3636 ************************************************************** 00022270

0002CA 28DF                        3639 READ0051 BOC   ENDATA,READ008     NORMAL EXIT                 00022290
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  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   2/04/74
0002CB 2FDE                        3642           BOC    IBG,NOENDERR        ERRRR EXIT                    00022300
0002CC 22CA                        3645           BOC    ROCROT,READ0051     WAIT FOR ROC ROTATIONS        00022310
0002CD DD40                        3648 TESTFWD   ANDM   XOUTAIM,FWDDATA     TEST FORWARD BIT              00022320
0002CE 20D9                        3651           BOC    DBUS,READ007        BR IF BKWD OP                 00022330
0002CF 28DF                        3654           BOC    ENDATA,READ008      NORMAL EXIT                   00022340
0002D0 A201                        3657           ADD    WORK3,1             BUMP RESYNC CTR               00022350
0002D1 21D9                        3660           BOC    NALCO,READ007       BR IF NOT TIME YET            00022360
0002D2 ED10                        3663           XO     XOUTAIM,SYNC        INVERT THE SYNC LINE          00022370
0002D3 4D42                        3666           XFR    XOUTAIM,XOUTA       SET OR RESET SYNC             00022380
0002D4 9D00                        3669           ORM    XOUTAIM,0           TEST LSR                      00022390
0002D5 33D8                        3672           BOC    SYNC,READ006        BR IF SYNC IS NOW ON          00022400
0002D6 02CF                        3675           STO    WORK3,ONES-48       LOAD FOR NEW RESYNC BURST     00022410
0002D7 62D9                        3678           BU     READ007                                           00022420
0002D8 02FF                        3681 READ006   STO    WORK3,ONES          LOAD COUNT FOR RESYNC ACTIVE  00022430
0002D9 22CA                        3684 READ007   BOC    ROCROT,READ0051     GO TO PROPER LOOP             00022440
0002DA 28DF                        3687 READ017   BOC    ENDATA,READ008      WATCH FO EOD                  00022450
0002DB 22CD                        3690           BOC    ROCROT,TESTFWD      WAIT FOR ROC ROTAIONS         00022460
0002DC 2FDE                        3693           BOC    IBG,NOENDERR        ERROR EXIT                    00022470
0002DD 62DA                        3696           BU     READ017                                           00022480

                                   3699 ************************************************************************ 00022500
                                   3700 * EOD DETECTED N/ POASTAMBLE CHECK                                    * 00022510
                                   3701 ************************************************************************ 00022520


0002DE 8A04                        3705 NOENDERR  ORI    DTACHK2,PARTREC     SET PARTIAL RECORD            00022550
0002DF                             3707 READ008   EQU    *                                                 00022560
0002DF 60AD                        3709 READ010   BU     SETLONOW                                          00022570

0002E0 1CFB                        3713 MODE6401  STO    LINK1,SRETURN6      LOAD LINK RETURN-SETFWD       00022590
```

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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   2/04/74
                                   3718 ****************************** FETCH STATUS SUBROUTINE ************** 00022630
                                   3719 * THIS SUBROUTINE IS USED BY ANY ROUTINE REQUIRING SENSE DATA FROM    * 00022640
                                   3720 * THE DEVICE. TWO BYTES OF SENSE DATA WILL BE RETURNED AND CONTROL    * 00022650
                                   3721 * RELINQUISHED TO THE CALLING ROUTINE VIA LINK REG 1.                 * 00022660
                                   3722 *                                                                    * 00022670
                                   3723 ********************************************************************** 00022680

0002E1                             3725 STEP0012 EQU   *                                                      00022700
0002E1 0000                        3727 FCHSTS   STO   WORK1,0            CLEAR THE TU                        00022710
0002E2                             3729 STEP0013 EQU   *                                                      00022720
0002E2 4060                        3731          XFR   WORK1,TUBO           BUS OUT                         00022730
0002E3                             3733 STEP0014 EQU   *                                                      00022740
0002E3 0008                        3735          STO   WORK1,DEVSEL       SET SELECT & RESET ALL OTHER TAGS  00022750
0002E4                             3737 TUBODOWN EQU   *                                                      00022760
0002E4                             3738 STEP0015 EQU   *                                                      00022770
0002E4 4024                        3740          XFR   WORK1,TUTAG          IF THEY ARE ON                  00022780
0002E5                             3742 STEP0016 EQU   *                                                      00022790
0002E5 0001                        3744          STO   WORK1,1            SET FOR SENSE BYTE ZERO *****     00022800
0002E6                             3746 STEP0017 EQU   *                                                      00022810
0002E6 4060                        3748 FCHSNS   XFR   WORK1,TUBO         XFER TO THE TAPE UNIT BUS OUT REG  00022820
0002E7                             3750 STEP0018 EQU   *                                                      00022830
0002E7 06FE                        3752          STO   SENSE1,ONES-1      LOAD WAIT COUNT                   00022840
0002E8                             3754 STEP0019 EQU   *                                                      00022850
0002E8                             3755 STEP0021 EQU   *                                                      00022860
0002E8 A601                        3757 HUP1     ADD   SENSE1,1             AND                             00022870
0002E9                             3759 STEP0020 EQU   *                                                      00022880
0002E9                             3760 STEP0022 EQU   *                                                      00022890
0002E9 21E8                        3762          BOC   NALCO,HUP1             WAIT                          00022900
0002EA                             3764 STEP0023 EQU   *                                                      00022910
0002EA 4021                        3766 FCHLAST  XFR   WORK1,AR           SHIFT BIT LEFT IF                 00022920
0002EB                             3768 STEP0024 EQU   *                                                      00022930
0002EB A000                        3770          ADD   WORK1,ZERO           NOT                             00022940
0002EC                             3772 STEP0025 EQU   *                                                      00022950
0002EC 4681                        3774          XFR   SENSE1,TUBI        FETCH 1ST SENSE BYTE              00022960
0002ED                             3776 STEP0026 EQU   *                                                      00022970
0002ED 5681                        3778          XFRH  SENSE1,TUBI          AND PUT IT IN HIGH REG ALSO     00022980
0002EE                             3780 STEP0027 EQU   *                                                      00022990
0002EE 4060                        3782 FCHNEXT  XFR   WORK1,TUBO         MOVE TO TAPE BUS OUT              00023000
0002EF                             3784 STEP0028 EQU   *                                                      00023010
0002EF 07FE                        3786          STO   SENSE2,ONES-1      LOAD WAIT COUNT                   00023020
0002F0                             3788 STEP0029 EQU   *                                                      00023030
0002F0                             3789 STEP0031 EQU   *                                                      00023040
0002F0 A701                        3791 HUP2     ADD SENSE2,1               AND                             00023050
0002F1                             3793 STEP0030 EQU   *                                                      00023060
0002F1                             3794 STEP0032 EQU   *                                                      00023070
0002F1 21F0                        3796          BOC   NALCO,HUP2             WAIT                          00023080
0002F2                             3798 STEP0033 EQU   *                                                      00023090
0002F2 4781                        3800          XFR   SENSE2,TUBI        FETCH 2ND SENSE BYTE              00023100
0002F3                             3802 STEP0034 EQU   *                                                      00023110
0002F3 4021                        3804          XFR   WORK1,AR             SET UP FOR                      00023120
0002F4                             3806 STEP0035 EQU   *                                                      00023130
0002F4 A000                        3808          ADD   WORK1,0              SENSE OP                        00023140
0002F5                             3810 STEP0036 EQU   *                                                      00023150
```

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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   2/04/74
0002F5 5C22                       3812          XFR   LINK1,IC          RETURN TO CALLLER              00023160



                                  3816 ********************** STATUS FETCH BRANCH TABLE ********************** 00023190
0002F6 6101                       3818 SRETURN1 BU    STATUS1             INIT STATUS RETURN             * 00023200
0002F7 61D6                       3821 SRETURN2 BU    SNSRTN              ENDVP RETURN                   * 00023210
0002F8 6365                       3824 SRETURN3 BU    POLL6               DEV END RETURN                   00023220
0002F9 63F9                       3827 SRETURN4 BU    SNSLINK             RETURN TO SENSE ROUTINE          00023230
0002FA 6014                       3830 SRETURN5 BU    SETUP                                                00023240
0002FB 6038                       3833 SRETURN6 BU    SETFWD              READ AT LP RETURN                00023250
0002FC                            3835 STEP0037 EQU   *                                                    00023260
0002FC 61A9                       3837 SRETURN7 BU    ZAPIM                                                00023270
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                   F01MAY72   2/04/74
000300                           3840          ORG   BEGIN+X'300'                                      00023290

                                 3842 ************************************************************************ 00023310
                                 3843 *  THIS IS THE ENTRY POINT FOR WRITE DELAY VELOCITY CHECK AND          * 00023320
                                 3844 *  FOR CHECKING DURING FC-3.                                           * 00023330
                                 3845 *                                                                      * 00023340
                                 3846 *  THE ERROR EXIT IN THE CASE THE DRIVE DOES NOT ACHIEVE               * 00023350
                                 3847 *  SPECIFIED VELOCITY IS SET VELOCITY ERROR AND ABORT TO               * 00023360
                                 3848 *  ENDUP.                                                              * 00023370
                                 3849 *                                                                      * 00023380
                                 3850 *  THE NORMAL EXIT FOR FC-3 CHECK IS VIA STOP.                         * 00023390
                                 3851 *  THE ERROR EXIT SETS DATA CHECK AND RETURNS TO WRITE ROUTINE         * 00023400
                                 3852 *  IF IBG COMES UP AN EXIT TO WRITE ROUTINE WILL BE TAKEN.             * 00023410
                                 3853 *                                                                      * 00023420
                                 3854 *  NOTE:  REGISTER 'SENSE1' IS USED IN THIS ROUTINE TO HOLD THE FLAGS * 00023430
                                 3855 ************************************************************************ 00023440

                                 3857 *   COUNT FOR  75 IN                                                   00023460

000300 1078                      3860 CHKVEL   STOH  WORK1,ONES-135      SET VELOCITY COMPARE               00023480
000301 1118                      3863          STOH  WORK2,24            COUNTS                             00023490
000302 9700                      3866          ORM   SENSE2,0 ERO        IS THIS 75 IN                      00023500
000303 360A                      3869          BOC   DREG6,SETHI         BR IF SO                           00023510
000304 3708                      3872          BOC   DREG7,CNT200        BR IF 200 IN.                      00023520

                                 3875 *   COUNT FOR  125 IN                                                  00023540

000305 10AF                      3878          STOH  WORK1,ONES-80       SET VELOCITY COMPARE               00023560
000306 110D                      3881          STOH  WORK2,13            COUNTS                             00023570
000307 630A                      3884          BU    SETHI               GO INITIAL COUNTS                  00023580

                                 3887 *   COUNT FOR 200 IN                                                   00023600

000308 10CD                      3890 CNT200   STOH  WORK1,ONES-50       SET VELOCITY COMPARE               00023620
000309 110A                      3893          STOH  WORK2,10            COUNTS                             00023630
00030A 5006                      3896 SETHI    XFRH  LSR                 SET TO THE HIGH REGISTERS          00023640
00030B 02FC                      3899 SET4     STO   WORK3,ONES-3        SET INITIAL GO COUNT               00023650

                                 3902 *   TRANSFER COUNT TO COUNTER REGISTER                                 00023670

00030C 1500                      3905 INITCNT  STO   WORK5,ZERO          MOVE CONTENTS OF                   00023690
00030D 4021                      3908          XFR   WORK1,AR            WORK1 TO                           00023700
00030E 8500                      3911          ORI   WORK5,0               WORK5                            00023710
```

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 LOC   OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                          F01MAY72   2/04/74
                                   3915 ******************************************************************** 00023740
                                   3916 *   THIS SUBROUTINE DOES THE COUNTING OF TIME FOR EACH LEVEL OF         00023750
                                   3917 *   TACH FLIP FLOP.                                                     00023760
                                   3918 ******************************************************************** 00023770

00030F 2619                        3921              BOC    TACHFF,TACHPRZ      BR IF ON POSITIVE PORTION       00023790
000310 273F                        3924 NTACHPRZ BOC    STOP,VELEXIT        RETURN TO WRITE IF PRESENT      00023800
000311 A501                        3927              ADD    WORK5,ONE           BUMP THE COUNTER                00023810
000312 2117                        3930              BOC    NALCO,NPRZ           AND BR IF OK                   00023820

                                   3933 *  THE DRIVE WAS TOO SLOW                                               00023840

000313 2622                        3936 WAITL        BOC    TACHFF,CHKCNTS      WAIT UNTIL TACHFF CHANGES       00023860
000314 273F                        3939              BOC    STOP,VELEXIT        CREASE TAPE EXIT                00023870
000315 3F2C                        3942              BOC    DEVATTN,UEXEND      BR IF DRIVE INTERRUPT           00023880
000316 6313                        3945              BU     WAITL               HANG IN THERE                   00023890
000317 2622                        3948 NPRZ         BOC    TACHFF,CHKCNTS      BR IF SO NORMAL EXIT FROM LOOP  00023900
000318 6310                        3951              BU     NTACHPRZ            BACK FOR NEXT COUNT             00023910

                                   3954 ******************************************************************** 00023930

000319 273F                        3957 TACHPRZ  BOC    STOP,VELEXIT        RETURN TO WRITE IF PRESENT      00023950
00031A 201B                        3960              NOP2                                                       00023960
00031B A501                        3963              ADD    WORK5,ONE           BUMP                            00023970
00031C 2121                        3966              BOC    NALCO,PRZ            COUNTER                        00023980

                                   3969 *   THE DRIVE WAS TOO SLOW (COUNT EXHAUSTED)                            00024000

00031D 3F2C                        3972 WAIT1L       BOC    DEVATTN,UEXEND      BR ON READY DROP                00024020
00031E 273F                        3975              BOC    STOP,VELEXIT        CREASE TAPE EX                  00024030
00031F 261D                        3978              BOC    TACHFF,WAIT1L       WAIT UNTIL CONDITION NOT MET    00024040
000320 6322                        3981              BU     CHKCNTS             GO CHECK THE COUNT              00024050
000321 2619                        3984 PRZ          BOC    TACHFF,TACHPRZ      BR TO REMAIN IN LOOP            00024060

                                   3987 ******************************************************************** 00024080
                                   3988 *  ENTRY TO CHECK THE COUNT.                                          * 00024090
                                   3989 ******************************************************************** 00024100

000322 9600                        3992 CHKCNTS      ORM    SENSE1,0            IS THIS INITIAL 4 COUNT         00024120
000323 342E                        3995              BOC    CNTRDY,TSTIME       BR IF NOT                       00024130
000324 A201                        3998              ADD    WORK3,ONE           ADD FOR 1ST 4 COUNT             00024140
000325 210C                        4001              BOC    NALCO,INITCNT       BR IF NOT DONE YET              00024150
000326 8608                        4004              ORI    SENSE1,CNTRDY       SET TRACE TO INDICATE 4 COMPLETE 00024160
000327 02FB                        4007 RECNT        STO    WORK3,ONES-4        RESET COUNT TO 4                00024170
000328 6332                        4010              BU     WASTET              GO CHECK THE GO COUNT           00024180
000329 A301                        4013 TST28        ADD    WORK4,ONE           ADD ONE TO 28 COUNT             00024190
00032A 210C                        4016              BOC    NALCO,INITCNT       BR IF NOT TO LIMIT              00024200
                                   4018 *            BOC    STOP,HIOEXIT        BR ON STOP TO GET OUT           00024210

                                   4020 *                   ***** SET VELOCITY ERROR *****                      00024230

00032B 1D01                        4023 SETVELCK STO    EQUIPCK,VELOCERR    SET VELOCITY ERROR IF SO        00024250
00032C 4006                        4026 UEXEND       XFR    LSR                 SET LOW REGS                    00024260
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                    F01MAY72   2/04/74
00032D 6247                      4029          BU    UCKON              GO TERMINATE WRITE OP              00024270


                                 4032 ************************************************************************ 00024290
                                 4033 *    ENTRY TO TEST TACH COUNT REG                                        00024300
                                 4034 ************************************************************************ 00024310

00032E 3239                      4037 TSTIME   BOC   FIRST,REFIRST      BR IF THIS IS 1ST PASS DURING FC-3  00024330
00032F 4121                      4040          XFR   WORK2,AR           TEST FOR THE                        00024340
000330 B500                      4043          ADDM  WORK5,ZERO          DRIVE TOO FAST                     00024350
000331 213B                      4046 WSTLOOP  BOC   NALCO,NOTGOOD      BR IF SO                            00024360
000332 D680                      4049 WASTET   ANDM  SENSE1,DATATIM     IS THIS DURING WRT DATA             00024370
000333 2048                      4052          BOC   DBUS,TSTGO         BR IF NOT                           00024380
000334 D601                      4055 CKFC3    ANDM  SENSE1,MK800       ARE WE NRZI                         00024390
000335 3738                      4058          BOC   MK800,DLYNRZ       BR IF NRZI                          00024400
000336 2F3F                      4061          BOC   IBG,VELEXIT        BR IF FC-3 AND IBG UP               00024410
000337 630A                      4064 DLYSETHI BU    SETHI              OTHERWISE GO RESET 4 COUNT          00024420
000338 6337                      4067 DLYNRZ   BU    DLYSETHI           EQUALIZE FOR NRZI LEG               00024430
000339 C6DF                      4070 REFIRST  AND   SENSE1,ONES-FIRST   RESET THE 1ST PASS FLAG           00024440
00033A 6332                      4073          BU    WASTET             GO RESET TO 4 GO COUNT              00024450
00033B D680                      4076 NOTGOOD  ANDM  SENSE1,DATATIM     IS THIS DURING DATA TIME            00024460
00033C 2045                      4079          BOC   DBUS,RETRY         BR IF NOT                           00024470
00033D 8840                      4082          ORI   MPGMERR,EXVCHG      SET ERROR                          00024480
00033E 6334                      4085          BU    CKFC3              GO BACK TO CHECK IBG                00024490

                                 4088 ************************************************************************ 00024510
                                 4089 *    NORMAL EXIT TO RETURN TO WRITE ROUTINE                              00024520
                                 4090 ************************************************************************ 00024530

00033F D680                      4093 VELEXIT  ANDM  SENSE1,DATATIM     IS THIS WRITE DELAY                 00024550
000340 204B                      4096          BOC   DBUS,WAITLOP       BR IF SO                            00024560
000341 4006                      4099          XFR   LSR                SET LOW LSR'S                       00024570
000342 3844                      4102          BOC   6250,VELEXIT1      BR IF BIRCH                         00024580
000343 2385                      4105          BOC   NRZFEAT,CKNORPE    BR TO CHECK DENSITY FOR RETURN      00024590
000344 6671                      4108 VELEXIT1 BU    WRITE28            6400 RETURN                         00024600

                                 4111 ************************************************************************ 00024620
                                 4112 *    USE DURING 28 COUNT IF VEL IS OUT OF SPEC.                          00024630
                                 4113 ************************************************************************ 00024640

000345 0401                      4116 RETRY    STO   STATIMG,VELTRY     SET ERROR ON IN REG TO SAVE         00024660
000346 02FC                      4119          STO   WORK3,ONES-3       SET COUNT AGAIN                     00024670
000347 6329                      4122          BU    TST28              GO BUMP THE 28 COUNT                00024680

                                 4125 ************************************************************************ 00024700
                                 4126 *  THIS IS THE NORMAL EXIT FOR 8 COUNT IN WRT DELAY.                   * 00024710
                                 4127 ************************************************************************ 00024720

000348 A201                      4130 TSTGO    ADD   WORK3,ONE          IS THE GO COUNT DONE                00024740
000349 2129                      4133          BOC   NALCO,TST28        BR IF NOT                           00024750
00034A 67F9                      4136          BU    VELOCOK                                                00024760

00034B 261D                      4140 WAITLOP  BOC   TACHFF,WAIT1L      RETURN TO PROPER WAIT LOOP          00024780
00034C 6313                      4143          BU    WAITL              TO COUNT ONE TACH                   00024790
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   2/04/74
                                   4146 ************************ SCAN FOR DEVICE ENDS ************************ 00024810
                                   4147 * SEARCH FOR DEV ENDS REQUIRES MAXIMUM COMMUNICATION BETWEEN THE TWO  * 00024820
                                   4148 * ALUS.  ALU2 SEARCHS HIS DEPRIME REGS FOR BITS. WHEN HE FINDS ONE,   * 00024830
                                   4149 * THE ADDRESS IS PASSED TO ALU1 VIA XOUTB AND A WAIT IS INITIATED     * 00024840
                                   4150 * WHILE ALU1 SELECTS THE DEVICE. WHEN ALU1 HAS THE DEVICE SELECTED,   * 00024850
                                   4151 * ALU2 IS KICKED OFF TO DETERMINE THE DEVICE  STATUS. IF A LIVE DEV   * 00024860
                                   4152 * END IS FOUND,ALU2 AGAIN RETURNS TO ALU1 WITH STAT C ON              * 00024870
                                   4153 *         IF NO DEV END IS FOUND FOR THAT DEVICE, A DIFFERENT ADDRESS * 00024880
                                   4154 * WILL BE PLACED IN XOUTB (NEXT POSSIBLE DE).WHEN ALU2 RETURNS TO ALU1* 00024890
                                   4155 * AFTER RUNNING  OUT OF DE PRIMES,STATD WILL BE SET.                  * 00024900
                                   4156 *                                                                    * 00024910
                                   4157 *        ALU1 STATS                    ALU2 STATS                    * 00024920
                                   4158 *        A                             A                             * 00024930
                                   4159 *         B INTERFACE B                 B DE PRIME FOUND - WAIT      * 00024940
                                   4160 *          C STEP ALU2                   C DEVICE FREE               * 00024950
                                   4161 *           D                             D FINISHED                 * 00024960
                                   4162 *                                                                    * 00024970
                                   4163 *                                                                    * 00024980
                                   4164 ********************************************************************** 00024990

00034D 0100                        4167 EXECPOLL STO   WORK2,0          CLEAR LSR TO HOLD TU ADDR              00025010
00034E 1200                        4170          STOH  WORK3,0          CLEAR FLAG                             00025020
00034F 0B01                        4173 EXECPULL STO   TUADDR,1         SET UP TUADDR LSR                      00025030
000350                             4175 POLL1    EQU   *                                                       00025040
000350 4F21                        4177          XFR   LODEPB,AR        DO WE HAVE A DEV END B          MIS*  00025050
000351 2B54                        4180          BOC   STATB,POLL3      SKIP                            MIS*  00025060
000352 9000                        4183          NOP1                   RESET AR                        MIS*  00025070
000353 4E21                        4186 POLL2    XFR   LODEPA,AR        DO WE HAVE A DEV END A                 00025080
000354 DB00                        4189 POLL3    ANDM  TUADDR,0         DREG NOT ZERO SAYS DEV END             00025090
000355 2086                        4192          BOC   DBUS,POLLNEXT    BR IF NOT                              00025100
000356 4141                        4195 POLL10   XFR   WORK2,XOUTB      SEND DEV ADDRESS RO ALU1               00025110
000357 8404                        4198          ORI   STATIMG,SETSTATB TELL ALU1                              00025120
000358 4428                        4201          XFR   STATIMG,STAT     SET STAT B                             00025130

                                   4204 ********************************************************************** 00025150
                                   4205 *  WARNING  DO NOT SINGLE STEP THROUGH NEXT INSTRUCTIONS IF MORE THAN * 00025160
                                   4206 *  ONE PRIME .                                                       * 00025170
                                   4207 ********************************************************************** 00025180
000359 3A59                        4209 WTEONC   BOC   STATC,WTEONC     WAIT FOR STATC TO GO OFF               00025190
00035A 3A5C                        4212 POLL4    BOC   STATC,POLL5      WAIT FOR ALU1                          00025200
00035B 635A                        4215          BU    POLL4              STAT C TO COME ON                   00025210
00035C C4FB                        4218 POLL5    AND   STATIMG,ONES-SETSTATB                                   00025220
00035D 4428                        4221          XFR   STATIMG,STAT     TRN OFF STAT B                         00025230
00035E 3E83                        4224          BOC   BSYTACH,POLLSTEP BR IF SWITCHED                         00025240

                                   4227 ********************************************************************** 00025260
                                   4228 * GO SEE IF DEVICE IS PULSING - IF SO DO NOT PRESENT DEV END          * 00025270
                                   4229 ********************************************************************** 00025280

00035F 1C36                        4232          STO   LINK1,PRETURN2   SET FOR PULSE RET-POLLSTEP             00025300
000360 1937                        4235          STO   LINK2,PRETURN4   SET FOR NO PULSE RET-SKIPB M           00025310
000361 6126                        4238          BU    CHKPULSE                                                00025320
000362 1CF8                        4241 GOGETIM  STO   LINK1,SRETURN3   RETURN TO POLL6                        00025330
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  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   2/04/74
000363 4006                       4244           XFR   LSR                ASSURE LOW                        00025340
000364 62E1                       4247           BU    FCHSTS             GO GET SNS BYTES                  00025350
000365 2A90                       4250 POLL6     BOC   STATA,SETHIMOD     BR IF HI ADDR                     00025360
000366 3E83                       4253 POLL66    BOC   BSYTACH,POLLSTEP                                     00025370
000367 0004                       4256 POLLALL   STO   WORK1,4            SET TO CHECK                      00025380
000368 4060                       4259           XFR   WORK1,TUBO         ASK FOR SNS BUTE  2               00025390
000369 A055                       4262 BBB       ADD   WORK1,85           USE WK1 FOR TIMER                 00025400
00036A 2169                       4265           BOC   NALCO,BBB          BACK TWICE                        00025410
00036B 4681                       4268           XFR   SENSE1,TUBI        BRING IN SENSE BYTE 2             00025420
00036C 346E                       4271           BOC   DREG4,DRVUNTCK     BR IF NOT                         00025430
00036D 8404                       4274 DEVDONE   ORI   STATIMG,SETSTATB         WE HAVE A LIVE DEV END      00025440
00036E 8402                       4277 DRVUNTCK  ORI   STATIMG,SETSTATC   SET STATC ON NOT READY COND.      00025450
00036F 4428                       4280 XFRSTAT   XFR   STATIMG,STAT       TELL ALU1                         00025460
000370                            4282 POLLMTIX  EQU   *                  GO WAIT TO RESET THE DEV END      00025470
000370 3B72                       4284           BOC   STATD,DOINDE       IS STATD ON                       00025480
000371 6370                       4287           BU    POLLMTIX           WAIT FOR IT                       00025490

                                  4290 ************************************************************************ 00025510
                                  4291 * IF THE TAPE UNIT INTERRUPT IS ON - TAPE WILL BE ISSUED A RESET      * 00025520
                                  4292 * ON GO AHEAD FROM ALU1,THE DEVICE END PRIME WILL BE RESET           * 00025530
                                  4293 ************************************************************************ 00025540

000372 00FF                       4296 DOINDE    STO   WORK1,ONES         SET MASK TO GET                   00025560
000373 4B21                       4299           XFR   TUADDR,AR           ONES COMPLEMENT                  00025570
000374 E000                       4302           XO    WORK1,0              OF THE ADDR                     00025580
000375 4021                       4305           XFR   WORK1,AR               TO RESET THE PRIME           00025590
000376 2B79                       4308           BOC   STATB,FINDTU7      BR IF INTERFACE B                 MIS* 00025600
000377 CE00                       4311           AND   LODEPA,0           TRN OFF DEV END A                 00025610
000378 637A                       4314           BU    FINDTU77           ALL DONE AND RESET ALL STATS      00025620
000379 CF00                       4317 FINDTU7   AND   LODEPB,0           TRN OFF DEV END B                 MIS* 00025630
00037A 3F7E                       4320 FINDTU77  BOC   DEVATTN,RESETTU    BR IF MTI ON                      00025640
00037B 5221                       4323 POLLSTOP  XFRH  WORK3,AR           PUT FLAG                          00025650
00037C 8400                       4326           ORI   STATIMG,0           INTO                            00025660
00037D 61E9                       4329 SNSTOP    BU    SETD                STAT REG                        00025670
00037E 100A                       4333 RESETTU   STOH  WORK1,DEVSEL+COMMAND  RESET                         00025690
00037F 1102                       4336           STOH  WORK2,RESET              OUTSTANDING                00025700
000380 5160                       4339           XFRH  WORK2,TUBO             INTERRUPT                    00025710
000381 5024                       4342           XFRH  WORK1,TUTAG            TAPE UNIT                    00025720
000382 61CB                       4345           BU    EXECABRT                                            00025730
000383 1204                       4348 POLLSTEP  STOH  WORK3,SETSTATB      SET FLAG (HOLD INTERFACE)         00025740
000384 1900                       4351 SKIPB     STO   LINK2,0            CLEAR DEVICE                      00025750
000385 5924                       4354           XFR   LINK2,TUTAG          SELECT                          00025760
000386 A101                       4358 POLLNEXT  ADD   WORK2,1            BUMP TU ADDR BY 1                 00025780
000387 4B21                       4361           XFR   TUADDR,AR           BUMP TU ADR BY 1                  00025790
000388 AB00                       4364           ADD   TUADDR,0              BY PROPAGATION                  00025800
000389 2150                       4367           BOC   NALCO,POLL1        BR TO DO NEXT DEV                 00025810
00038A 2A7B                       4370           BOC   STATA,POLLSTOP     BR OUT ON 2ND PASS                00025820
00038B 5006                       4373           XFRH  LSR                SET HI                            00025830
00038C 8408                       4376           ORI   STATIMG,SETSTATA   TRN ON STAT A ON FIRST PASS        00025840
00038D 4428                       4379           XFR   STATIMG,STAT         TO ALLOW BR ON SECOND PASS      00025850
00038E 0108                       4382           STO   WORK2,8            TRN ON HIGH ORDER SEL BIT         00025860
00038F 634F                       4385           BU    EXECPULL           GO RUN 2ND PASS                   00025870
000390 5006                       4388 SETHIMOD  XFRH  LSR                SET HI                            00025880
000391 6366                       4391           BU    POLL66                                               00025890
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   2/04/74
                                   4394 ***************************** SENSE ROUTINE ***************************** 00025910
                                   4395 *                                                                       * 00025920
                                   4396 *  THIS ROUTINE WILL ASSEMBLE AND PRESENT TO ALU1 THE SENSE BITS FROM * 00025930
                                   4397 *  ALU2 AND/OR THE DRIVE.                                               * 00025940
                                   4398 *  THE SENSE BITS WILL BE PRESENTED IN XOUTA OR XOUTB IN THE PROPER     * 00025950
                                   4399 *  POSITION TO BE OR'ED INTO THE CONTROL UNIT SENSE BYTE.               * 00025960
                                   4400 ************************************************************************* 00025970

000392 4C21                        4403 SNS41     XFR    DTACHK1,AR          LOOK FOR                          00025990
000393 5821                        4406           XFR    MPGMERR,AR            ANY                             00026000
000394 8400                        4409           ORI    STATIMG,ZERO            DATA                          00026010
000395 D4F6                        4412           ANDM   STATIMG,X'F6'             CHECKS                       00026020
000396 2098                        4415           BOC    DBUS,SNS5           BR IF NO DATA CHECKS              00026030
000397 8108                        4418 SNS42     ORI    WORK2,DATACK        SET DATA CHECK ON                 00026040
000398 299A                        4421 SNS5      BOC    NCONVCK,SNS6        BR IF NOT DATA CONVERTER CHECK    00026050
000399 8101                        4424           ORI    WORK2,CONVCK        SET THE ERROR                     00026060

00039A D780                        4428 SNS6      ANDM   SENSE2,SEVTRK       IS THIS 7 TRK DR.                 00026080
00039B 209D                        4431           BOC    DBUS,SNS7           BR IF NOT                         00026090
00039C 8210                        4434           ORI    WORK3,SEVENTRK      SET ON IF SOCU                    00026100
00039D D610                        4437 SNS7      ANDM   SENSE1,BOT          IS THIS BEGIN OF TAPE DR          00026110
00039E 20A0                        4440           BOC    DBUS,SNS8           BR IF NOT                         00026120
00039F 8208                        4443           ORI    WORK3,LDPT          SET LOAD POINT ON CU              00026130
0003A0 D608                        4446 SNS8      ANDM   SENSE1,WRSTAT       IS WRITE STATUS ON DR             00026140
0003A1 20A3                        4449           BOC    DBUS,SNS9           BR IF NOT                         00026150
0003A2 8204                        4452           ORI    WORK3,WRSTA         SET ON IF SO.  CU                 00026160
0003A3 9600                        4455 SNS9      ORM    SENSE1,ZERO         IS DRIVE FILE PROTECTED           00026170
0003A4 31A6                        4458           BOC    NFP,SNSB             BR IF NOT                        00026180
0003A5 8202                        4461           ORI    WORK3,FP            SET FILE PROTECT ON               00026190
0003A6 19A8                        4464 SNSB      STO    LINK2,SNSC          RETURN TO SNSC                    00026200
0003A7 63EF                        4467           BU     SNSWAIT             GO SEND BYTES 0 AND 1             00026210

                                   4470 *  SENSE BYTE 2 AND 3                                                  * 00026230

0003A8 0210                        4473 SNSC      STO    WORK3,ENDATAER      SET UP MASK FOR END DATA CHK      00026250
0003A9 5821                        4476           XFR    MPGMERR,AR          SET REG TO AR TO TEST AND         00026260
0003AA C200                        4479           AND    WORK3,ZERO          IF ON WILL REMAIN ON              00026270
0003AB 9700                        4482           ORM    SENSE2,ZERO         IS UNIT NOT PHASE ENCODED DR      00026280
0003AC 33AE                        4485           BOC    NOTPE,SNSD          BR IF SO (NRZI)                   00026290
0003AD 8204                        4488 SNSC2     ORI    WORK3,PE            SET PE ON CU                      00026300
0003AE D680                        4491 SNSD      ANDM   SENSE1,BACKWD       IS UNIT BACKWARD DR               00026310
0003AF 20B1                        4494           BOC    DBUS,SNSE           BR IF NOT                         00026320
0003B0 8202                        4497           ORI    WORK3,BKWD          SET ON IF SO CU                   00026330
0003B1 19B6                        4500 SNSE      STO    LINK2,SNSF          RETURN TO SNSF                    00026340
0003B2 3CB4                        4503           BOC    NENVLOS,SNSLES      BR IF NO LOSS OF ENV              00026350
0003B3 8208                        4506           ORI    WORK3,X'08'         SET ENV ERROR          * UC *     00026360
0003B4 5742                        4509 SNSLES    XFR    TIEBYTE,XOUTA       GO SEND BYTES 2 AND 3             00026370
0003B5 63F0                        4512           BU     WAIT4                                                 00026380

                                   4515 *  SENSE BYTE 4 AND 5                                                  * 00026400

0003B6 C622                        4518 SNSF      AND    SENSE1,EOT+DEVCHK   CLEAR ALL BITS BUT THESE TWO     00026420
0003B7 0140                        4521           STO    WORK2,REJTU         SET MASK IN REG                   00026430
0003B8 5D21                        4524           XFR    EQUIPCK,AR          PUT EQUIPMENT CHK ON AR           00026440
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 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT
0003B9 C100                      4527          AND   WORK2,ZERO          AND MASK AND AR          00026450
0003BA 4621                      4530          XFR   SENSE1,AR           PUT BITS                 00026460
0003BB 4521                      4533          XFR   FLAGS,AR            ON AR TO                 00026470
0003BC 8100                      4536          ORI   WORK2,ZERO            PASS TO REG            00026480
0003BD 19C2                      4539 VRCDONE  STO   LINK2,SNSG          RETURN TO SNSG           00026490
0003BE 2DC0                      4542          BOC   NRPQ,SKIPRPQ                                 00026500
0003BF 8201                      4545          ORI   WORK3,1             SET RPQ BIT              00026510
0003C0 4A21                      4548 SKIPRPQ  XFR   DTACHK2,AR          PUT REG IN AR            00026520
0003C1 63EE                      4551          BU    POSBYTE             GO SET IN WORK3          00026530

                                 4554 *  SENSE BYTES 6 AND 7                                      00026550

0003C2 4742                      4557 SNSG     XFR   SENSE2,XOUTA        PASS REG TO XOVER        00026570
0003C3 19C6                      4560          STO   LINK2,SNSH          RETURN TO SNSH           00026580
0003C4 1CF9                      4563 SCANLINK STO   LINK1,SRETURN4      RETURN TO SNSLINK        00026590
0003C5 62E6                      4566          BU    FCHSNS              GO PULL 2 BYTES OF SENSE 00026600
0003C6 19C9                      4569 SNSH     STO   LINK2,SNSJ          SET RETURN TO SNSJ       00026610
0003C7 4641                      4572 SNSI     XFR   SENSE1,XOUTB        PASS SENSE 1 TO XOVER    00026620
0003C8 63F1                      4575          BU    WAIT0               GO FINISH                00026630

                                 4578 *  SENSE BYTES 8 AND 9                                      00026650

0003C9 4C42                      4581 SNSJ     XFR   DTACHK1,XOUTA       PASS ERROR REG TO XOVER  00026670
0003CA 8240                      4584          ORI   WORK3,EXVCHG        SET MASK IN REG          00026680
0003CB 5821                      4587          XFR   MPGMERR,AR          PUT ERROR REG ON AR      00026690
0003CC C200                      4590          AND   WORK3,ZERO          AND MASK AND AR          00026700
0003CD 19CF                      4593 SKIPSDR  STO   LINK2,SNSK          SET RETURN TO SNSK       00026710
0003CE 63F0                      4596          BU    WAIT4               GO FINISH                00026720

                                 4599 *  SENSE BYTES 10 AND 11                                    00026740

0003CF 01BD                      4602 SNSK     STO   WORK2,ONES-REJTU-PERR   MASK IN REG          00026760
0003D0 5D21                      4605          XFR   EQUIPCK,AR          PUT ERROR REG ON AR      00026770
0003D1 C100                      4608          AND   WORK2,ZERO          AND MASK AND AR          00026780
0003D2 19D4                      4611          STO   LINK2,SNSL          RETURN TO SNSL           00026790
0003D3 63EF                      4614          BU    SNSWAIT             GO PASS TO X OVERS       00026800

                                 4617 *   SENSE BYTES 12 AND 13                                   00026820

0003D4 19D6                      4620 SNSL     STO   LINK2,SNSM          RETURN AFTER SENDING     00026840
0003D5 63EF                      4623          BU    SNSWAIT               2 BLANK BYTES          00026850

                                 4626 *   SENSE BYTES 14 AND 15                                   00026870

0003D6 19D9                      4629 SNSM     STO   LINK2,SNSO          RETURN TO SNSO           00026890
0003D7 4721                      4632 SNSN     XFR   SENSE2,AR           GET TU SERIAL NO-HIGH    00026900
0003D8 63EE                      4635          BU    POSBYTE             GO FINISH                00026910
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   2/04/74

                                   4639 *   SENSE BYTES 16 AND 17                                    00026940

0003D9 19DB                        4642 SNSO     STO    LINK2,SNSP          RETURN TO SNSP          00026960
0003DA 62E6                        4645          BU     FCHSNS              PULL 2 BYTES FROM DRIVE 00026970
0003DB 4642                        4648 SNSP     XFR    SENSE1,XOUTA        PASS TU SERIAL NO.-LOW  00026980
0003DC 19DE                        4651          STO    LINK2,SNSQ          RETURN TO SNSQ          00026990
0003DD 63F0                        4654          BU     WAIT4               GO FINISH               00027000

                                   4657 *   SENSE BYTES 18 AND 19                                    00027020

0003DE 19E4                        4660 SNSQ     STO    LINK2,SNSR          RETURN TO SNSS          00027040
0003DF 4742                        4663          XFR    SENSE2,XOUTA        PASS SENSE2 TO X OVER   00027050
0003E0 4F41                        4666          XFR    LODEPB,XOUTB         PASS DEV END PRIMES LOW INTF B 00027060
0003E1 2BF1                        4669          BOC    STATB,WAIT0         BE IF B INTERFACE       00027070
0003E2 4E41                        4672          XFR    LODEPA,XOUTB        PASS DEV END PRIMES LOW INTF A 00027080
0003E3 63F1                        4675          BU     WAIT0               GO FINISH               00027090

                                   4678 *   SENSE BYTES 20 AND 21                                    00027110

0003E4 19E6                        4681 SNSR     STO    LINK2,SNSS          RETURN TO SNSS          00027130
0003E5 62E6                        4684          BU     FCHSNS              GO GET THE LOAD AND THREAD BYTE 00027140
0003E6 19EC                        4687 SNSS     STO    LINK2,SNSV          RETURN TO SNSV          00027150
0003E7 4741                        4690 SNST     XFR    SENSE2,XOUTB        PASS DRIVE LOAD BYTE TO XOVER 00027160
0003E8 5F42                        4693          XFRH   LODEPB,XOUTA        PASS DEV END PRIMES HI INTF B 00027170
0003E9 2BF1                        4696          BOC    STATB,WAIT0         BR IF B INFT            00027180
0003EA 5E42                        4699          XFRH   LODEPA,XOUTA        PASS DEV END PRIMES 8-15 INTF A 00027190
0003EB 63F1                        4702          BU     WAIT0               GO FINISH               00027200

                                   4705 *   SENSE BYTES 22 AND 23                                    00027220

0003EC 19FC                        4708 SNSV     STO    LINK2,DALONE        WHEN RETURN MADE SET STAT D 00027240
0003ED 4921                        4711          XFR    FRU,AR              SET UP TO PASS EM       00027250

0003EE 8200                        4715 POSBYTE  ORI    WORK3,ZERO          PUT THE AR INTO WORK3   00027270
                                   4717 ************************************************************** 00027280
                                   4718 *  USE THIS SUBROUTINE TO SEND 2 BYTES TO ALU1                * 00027290
                                   4719 ************************************************************** 00027300

0003EF 4142                        4722 SNSWAIT  XFR    WORK2,XOUTA         PASS BYTE TO ALU1       00027320
0003F0 4241                        4725 WAIT4    XFR    WORK3,XOUTB         PASS BYTE TO ALU1       00027330
0003F1 0402                        4728 WAIT0    STO    STATIMG,SETSTATC    TURN ON STATC           00027340
0003F2 4428                        4731          XFR    STATIMG,STAT         FOR ALU2               00027350
0003F3 3BF6                        4734 WAIT1    BOC    STATD,WAIT5         WHEN D COMES ON GO      00027360
0003F4 27FC                        4737          BOC    STOP,DALONE         BR IF STOP IS ON        00027370
0003F5 63F3                        4740          BU     WAIT1                GET NEXT SENSE BYTES   00027380
0003F6 5428                        4743 WAIT5    XFRH   STATIMG,STAT        CLEAR STATS             00027390
0003F7 27FC                        4746 WAIT2    BOC    STOP,DALONE         BR IF STOP IS ON        00027400
0003F8 3BF7                        4749          BOC    STATD,WAIT2         WAIT UNTIL STATD GOES OFF. 00027410
0003F9 0100                        4752 SNSLINK  STO    WORK2,ZERO          CLEAR XOUTB INPUT REG   00027420
0003FA 0200                        4755          STO    WORK3,ZERO          CLEAR XOUTA INPUT REG   00027430
0003FB 5922                        4758          XFR    LINK2,IC             RETURN VIA LINK        00027440
0003FC 6011                        4761 DALONE   BU     SETDLONE             GO SET STAT D          00027450
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                        F01MAY72   2/04/74
000400                           4764           ORG   BEGIN+X'400'                                            00027470
000400 5A22                      4766 NRZILINK  XFR   LINK3,IC          THIS IS THE RETURN FOR ALL NRZI RTN   00027480

                                 4769 **************READ OPERATION - NRZI*********************************** 00027500
                                 4770 *                                                                    * 00027510
                                 4771 * SET                                  READ CONDITION. THEN WAIT FOR     * 00027520
                                 4772 * END DATA. FILE SEARCHES CYCLE THE READ OP UNTIL A TM IS DETECTED.   * 00027530
                                 4773 * SINGLE BIT NOISE REJECTION IS ACCOMPLISHED VIA MICRO CODE           * 00027540
                                 4774 * TWO DATA RDYS MUST BE SEEN BEFORE ENDDATA OR THE DATA IS IGNORED    * 00027550
                                 4775 ********************************************************************** 00027560


000401 625D                      4778 XXXXX     BU    NOTCOMP             OTHERWISE SET NOT CAP             00027580
000402 0100                      4781 ISNRZI    STO   WORK2,0           CLEAR NOISE BIT ALU1                  00027590

000403 D780                      4785           ANDM  SENSE2,SEVTRK      ARE WE 7 TRK                       00027610
000404 2007                      4788           BOC   DBUS,ISNRZI3         BR IF NOT                        00027620
000405 2501                      4791           BOC   NSEVEN,XXXXX                                          00027630
000406 8410                      4794           ORI   STATIMG,NRZI7      SET 7 TRK CONTROL                  00027640
000407 8440                      4797 ISNRZI3   ORI   STATIMG,PERMRDWT   SET READ CONDITION                 00027650
000408 4428                      4800 XFRFOP    XFR   STATIMG,STAT          TO DATA FLOW                   00027660
000409 2D0C                      4803 NRZILOOP  BOC   DATARDY,SEENONE1    NORMAL EXIT                        00027670
00040A 3F3B                      4806           BOC   DEVATTN,ABEND800   LOAD POINT OR RDY DROP EXIT        00027680
00040B 6409                      4809           BU    NRZILOOP           TRY AGAIN                          00027690

00040C 2D0C                      4813 SEENONE1  BOC   DATARDY,SEENONE1    WAIT FOR FALL                      00027710
00040D 2D10                      4816 SEENONE   BOC   DATARDY,ENDSOON     WATCH FOR FIRST CHAR GATE          00027720
00040E 283D                      4819           BOC   ENDATA,STRTOVER     SINGLE BYTE NOISE REJ              00027730
00040F 640D                      4822           BU    SEENONE                                                00027740

000410 2813                      4826 ENDSOON   BOC   ENDATA,CHKFOP      WATCH FOR SECOND CHAR GARE         00027760
000411 3F3B                      4829           BOC   DEVATTN,ABEND800   WATCH FOR RDY DROP                 00027770
000412 6410                      4832           BU    ENDSOON                                                00027780

000413 3D18                      4836 CHKFOP    BOC   NTM,NOMARKER       DO WE HAVE A TM                    00027800
000414 9800                      4839 ISITFOP   ORM   TRACER,0           TM DECTED --- CHK FOR FILEOP       00027810
000415 3517                      4842           BOC   DREG5,ISFOP800     SKIP NEXT INSTRUCTION IF YES       00027820
000416 8404                      4845           ORI   STATIMG,SETSTATB    SET UNIT EXCEPTION                 00027830
000417 641B                      4848 ISFOP800  BU    STOPNRZI           GO TO NORMAL END                   00027840
000418 9800                      4851 NOMARKER  ORM   TRACER,0           NO TM, ARE WE A FILE SEARCH        00027850
000419 353E                      4854           BOC   DREG5,NRZIFOP      BR IF YES TO INITIATE NEW READ     00027860


                                 4857 ********************************************************************** 00027880
                                 4858 * STOP DELAY IS SUCH THAT ON END DATA SIGNAL   MOVE IS DROPPED AND THE* 00027890
                                 4859 * READ BUS IS MONITORED FOR APPROXIMATELY 20 BIT CELLS.  IF ANY DATA IS 00027900
                                 4860 * DETECTED MOVE WILL BE RAISED AGAIN. IF DATA IS NOT DETECTED, A      * 00027910
                                 4861 * NORMAL ENDING ENSUES.  IF MOVE IS RAISED WE WILL HAVE TO GO FOR 20  * 00027920
                                 4862 * BIT CELLS WITHOUT SEEING DATA BEFORE WE WILL DROP IT AND TRY FOR    * 00027930
                                 4863 * A NORMAL ENDING AGAIN. EACH TIME DATA IS DETECTED WITH MOVE UP, THE * 00027940
                                 4864 * COUNTER IS RESET.                                                   * 00027950
                                 4865 ********************************************************************** 00027960
                                 4866 *  SET UP FOR STOP DELAY                                             00027970
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 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                                  F01MAY72   2/04/74
                                  4867 ********************************************************************** 00027980

00041A 3A2E                       4870 NRZISTOP BOC     STATC,TOIBG800      DIAG HOOK MEAS IBG                  00028000
00041B 02EC                       4873 STOPNRZI STO     WORK3,ONES-19       OTHERWISE SET UP FIR 800BPI         00028010
00041C 1540                       4876 NRZISTAR STO     WORK5,DVESNS6        ASK FOR TACH PULSES                00028020
00041D 5560                       4879          XFR     WORK5,TUBO             AND READ BUS FROM TU             00028030
00041E 1C33                       4882 MOVEDOWN STO     LINK1,ENDREAD       SET FOR RETURN                      00028040
00041F 1508                       4885          STO     WORK5,DEVSEL        DROP MOVE                           00028050
000420 5524                       4888 XFRTAGS  XFR     WORK5,TUTAG         LOAD TUTAG                          00028060

                                  4891 * INITIALIZE COUNT                                                       00028080

000421 0300                       4894          STO     WORK4,0              CLEAR CTR                          00028100
000422 4221                       4897          XFR     WORK3,AR               AND LOAD                         00028110
000423 A300                       4900          ADD WORK4,0                      TIME OUT CT                    00028120

000424 2427                       4904 CNTLOOP  BOC     RDTIME,GO           WAIT                                00028140
000425 2D2F                       4907          BOC     DATARDY,MOVEUP        RD TIME TO RISE                   00028150
000426 6424                       4910          BU      CNTLOOP                                                 00028160

000427 A301                       4914 GO       ADD     WORK4,1              BUMP CTR                           00028180
000428 212B                       4917          BOC     NALCO,GOSOMOR          & BR IF NOT DONE                 00028190
000429 3F3B                       4920          BOC     DEVATTN,ABEND800    ERROR OR LP EXIT                    00028200
00042A 5C22                       4923          XFR     LINK1,IC             EXIT                               00028210

00042B 2D2F                       4927 GOSOMOR  BOC     DATARDY,MOVEUP      WAIT FOR  READTIME                  00028230
00042C 242B                       4930          BOC     RDTIME,GOSOMOR          TO FALL                         00028240
00042D 6424                       4933          BU      CNTLOOP                                                 00028250
00042E 6544                       4936 TOIBG800 BU      NRZIIBG                                                 00028260

                                  4939 *                ***** SET NOISE ERROR *****                             00028280

00042F 0101                       4942 MOVEUP   STO     WORK2,1     SE       TRN ON NOISE ERROR                 00028300
000430 1509                       4945          STO     WORK5,DEVSEL+MOVE   SET UP TO RAISE MOVE                00028310
000431 1C1E                       4948          STO     LINK1,MOVEDOWN      SET UP RETURN                       00028320
000432 6420                       4951          BU      XFRTAGS                                                 00028330

                                  4954 * END OR READ OP - DROP TAPE OP AND READ COND , THEN EXIT TO CHK CRC ** 00028350

000433 3D35                       4957 ENDREAD  BOC     NTM,ENDREAD2        BR IF NO TM READ                    00028370
000434 6436                       4960          BU      ENDREAD3                                                00028380
000435 4018                       4963 ENDREAD2 XFR     BUFFCRC             STROBE CRC ERROR LATC  ************ 00028390
000436 C43F                       4966 ENDREAD3 AND     STATIMG,ONES-TAPEOP-PERMRDWT                            00028400
000437 4428                       4969          XFR     STATIMG,STF         RESET TAPE OP                       00028410
000438 2945                       4972 ALLDONE  BOC     NCONVCK,CHK RC      IS DATA CONV CHECK ON               00028420
000439 8402                       4975 ENDERR   ORI     STATIMG,SETSTATC    SET UNIT CHECK IF SO                00028430
00043A 61D1                       4978 ALLDONE1 BU      ENDUP800                                                00028440
00043B 0100                       4981 ABEND800 STO     WORK2,0                                                 00028450
00043C 6439                       4984          BU      ENDERR                                                  00028460

                                  4987 *                ***** SET RESTART *****                                 00028480

00043D 8C01                       4990 STRTOVER ORI     DTACHK1,RESTART     SET RETRY BIT                       00028500
00043E 3F3B                       4993 NRZIFOP  BOC     DEVATTN,ABEND800    CHK FOR RDY DROP OR BKWD AT LP      00028510
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   2/04/74
00043F 4009                      4996          XFR   RESETERR            REEET SENSE DATA                  00028520
000440 4009                      4999          XFR   RESETERR            REEET SENSE DATA                  00028530
                                 5001 ********************************************************************** 00028540
                                 5002 * READ OP COMPLETE-FILE SEARCH ACTIVE & NO TM DETECTED. RE-INITIALIZE * 00028550
                                 5003 * DATA FLOW TO READ ANOTHER RECORD.                                   * 00028560
                                 5004 ********************************************************************** 00028570
000441 C47F                      5006          AND   STATIMG,ONES-TAPEOP RESET TAPE OP                     00028580
000442 4428                      5009          XFR   STATIMG,STAT          MOMENTARILY                     00028590
000443 8480                      5012          ORI   STATIMG,TAPEOP      BRING TAPE OP                     00028600
000444 6408                      5015          BU    XFRFOP              GO READ NEXT RECORD               00028610

                                 5019 ************** FOUND TRACK - 9 TRACK NRZI ***************************** 00028640
                                 5020 *                                                                    * 00028650
                                 5021 * AFTER DROPPING TAPE OP, CHECK CRC FOR MATCH PATTERN. IF OK, EXIT.   * 00028660
                                 5022 * IF NOT, CHECK FOR CRC EQUAL TO EPR,SHIFTING CRC IF NECESSARY. IF   * 00028670
                                 5023 * TRACK IN ERROR IS FOUND, PASS TIE BYTE TO ALU1 FOR INSERTION INTO   * 00028680
                                 5024 * SENSE DATA. IF READ WAS BACKWARD, FLOP TIE BYTE BEFORE PASSING IT.  * 00028690
                                 5025 *                                                                    * 00028700
                                 5026 ********************************************************************** 00028710

000445 9400                      5029 CHKCRC   ORM   STATIMG,0           SKIP FOUND TRK                    00028730
000446 333A                      5032          BOC   NRZI7,ALLDONE1        IF 7 TRK                       00028740

000447 284D                      5036          BOC   CRCMAT,TIEEQU03     BR IF MATCH PATTERN               00028760

000448 0201                      5040          STO   WORK3,1             SET TIE FOR TRK7 (FORWARD)        00028780
000449 2253                      5043 CHKMATCH BOC   CRCNEPR,NEXTRK      BR IF CRC NOT EQUAL TO EPR        00028790
00044A 400A                      5046 LASTCHK  XFR   CRC                 CRC EQUAL EPR -STEP CRC ONCE MORE 00028800
00044B 204C                      5049          NOP2                                                        00028810
00044C 2259                      5052          BOC   CRCNEPR,SETTIE      SHD TAKE BRANCH IF CRC WASNT ZERO 00028820
00044D 0203                      5055 TIEEQU03 STO   WORK3,3             SET TIE TO 03-NO TRK FOUND        00028830
00044E 4221                      5058 XFRTIE   XFR   WORK3,AR            SEND TIE TO ALU1                  00028840
00044F 5006                      5061 XFRTIEB2 XFRH  LSR                 SET HIGH                          00028850
000450 8700                      5064          ORI   TIEBYTE,0           SET IN TIE                        00028860
000451 4006                      5067          XFR   LSR                 SET LO                            00028870
000452 61D1                      5070          BU    ENDUP800            EXIT                              00028880

000453 400A                      5074 NEXTRK   XFR   CRC                 SHIFT CRC                         00028900
000454 4221                      5077          XFR   WORK3,AR            SHIFT TIE BYTE                    00028910
000455 A200                      5080          ADD   WORK3,0               TO NEXT TRACK                   00028920
000456 2149                      5083          BOC   NALCO,CHKMATCH      CYCLE TILL TRACK FOUND OR CARRY OUT 00028930
000457 224D                      5086          BOC   CRCNEPR,TIEEQU03    CHECK P TRACK                     00028940
000458 644A                      5089          BU    LASTCHK                                                 00028950

000459 9D00                      5093 SETTIE   ORM   XOUTAIM,0           IS BACKWARD BIT ON                00028970
00045A 314E                      5096          BOC   DREG1,XFRTIE        BR IF NOT                         00028980

                                 5099 * READ WAS BACKWARD - FLOP THE TIE BYTE      **********              00029000
00045B 0001                      5101 FLOPTIE  STO   WORK1,1             SET UP FOR TRK7                   00029010
00045C 9200                      5104          ORM   WORK3,0             CHK FOR P BIT                     00029020
00045D 2063                      5107          BOC   DBUS,XFRTIEB1       BRANCH IF SO                      00029030
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  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                   F01MAY72   2/04/74
00045E 4021                        5111 DONEXTRK XFR    WORK1,AR            SHIFT LEFT                        00029050
00045F A000                        5114          ADD    WORK1,0               TO NEXT TRK                     00029060
000460 4221                        5117          XFR    WORK3,AR            SHIFT TIE                         00029070
000461 A200                        5120          ADD    WORK3,0               BYTE LEFT                       00029080
000462 215E                        5123          BOC    NALCO,DONEXTRK      EXIT ON CARRY                     00029090
000463 4021                        5126 XFRTIEB1 XFR    WORK1,AR            GET BKWD TIE TO AR                00029100
000464 644E                        5129          BU     XFRTIE                                                00029110
                                   5131 ************************ NRZI WRITE ROUTINE ************************** 00029120
                                   5132 *  ENTRY TO THIS ROUTINE IS 'WRTSTNRZ' AND IF THE WRITE IS           * 00029130
                                   5133 *       NRZI A NRZI WRITE TYPE OPERATION WILL BE PERFORMED.          * 00029140
                                   5134 *  WITH 'BOT' IN THE SENSE A 'LOAD POINT ERASE' IS PERFORMED AND THEN * 00029150
                                   5135 *  RETURN TO PERFORM THE CORRECT OPERATION - WRT (LWR),WTM (LWTM), OR * 00029160
                                   5136 *  ERG.                                                              * 00029170
                                   5137 *  WRITE OPERATION WILL PROCEED AS FOLLOWS:                          * 00029180
                                   5138 *                                                                    * 00029190
                                   5139 *  SET 'PERMRDWT' WHICH STARTS THE WRITE CLOCK THEN USE A            * 00029200
                                   5140 *  COUNTER TO CHECK FOR THE 1ST DATA READY. IF AT THIS TIME STOP     * 00029210
                                   5141 *  IS NOT ON THEN AN EXIT IS MADE TO CHECK VELOCITY VIA THE          * 00029220
                                   5142 *  'CHKVEL' SUBROUTINE.                                              * 00029230
                                   5143 *  WHEN STOP COMES ON THEN A COUNTER IS MAINTAINED UNTIL             * 00029240
                                   5144 *  'ENDATA' IS DETECTED OR THE COUNTER IS EXHAUSTED.                 * 00029250
                                   5145 ************************************************************************ 00029260

000465 DD88                        5150 WRTSTNRZ ANDM   XOUTAIM,PEBIT+HIDEN IS THIS NRZI                       00029300
000466 2068                        5153          BOC    DBUS,NRZWRT         BR IF SO                          00029310
000467 6611                        5156          BU     NOTNRZIW                                              00029320
000468 D780                        5159 NRZWRT   ANDM   SENSE2,SEVTRK       ARE WE 7 TRK                      00029330
000469 206B                        5162          BOC    DBUS,OKTOWRT          BR IF NOT                       00029340
00046A 2501                        5165          BOC    NSEVEN,XXXXX X      GO SET NOT CAP                    00029350
00046B 3A75                        5168 OKTOWRT  BOC    STATC,NOTLPNRZ      LWR--BR IF ON                     00029360
00046C 194F                        5171          STO    LINK2,TRETURN2      LOAD RETURN TO BR TABLE           00029370
00046D D610                        5174          ANDM   SENSE1,BOT          ARE WE AT BEGIN OF TAPE           00029380
00046E 2075                        5177          BOC    DBUS,NOTLPNRZ       BR IF NOT                         00029390
00046F 1A42                        5180          STO    LINK3,NRZIBOTZ      RETURN TO NRZIBOT AFTER SET 800   00029400
000470 64EB                        5183          BU     SET8001               GO SET NRZI MODE                00029410

000471 00FD                        5187 NRZIBOT  STO    WORK1,ONES-2        SET UP TO MOVE                    00029430
000472 010F                        5190          STO    WORK2,15              TAPE 7.2 IN.                    00029440
000473 1A75                        5193          STO    LINK3,NOTLPNRZ      RETURN TO NOTLPNRZ AFTER LP DELAY 00029450
000474 6027                        5196          BU     SETERGF             GO  COUNT 795 TACH PULSES         00029460

000475 0900                        5200 NOTLPNRZ STO    FRU,0               CLEAR FLAGS                       00029480
000476 9800                        5203          ORM    TRACER,0            SET UP FOR TESTING COMMAND        00029490
000477 3588                        5206          BOC    ERGOP,NRETURN1      BR IF THIS IS ERASE OP            00029500
000478 367B                        5209          BOC    WTMOP,NRZTM           BR IF SO TO DO WTM              00029510

                                   5212 ************************************************************************ 00029530
                                   5213 *  THIS IS A WRITE CMD OR LWR                                        * 00029540
                                   5214 ************************************************************************ 00029550

000479 19BB                        5217          STO    LINK2,WRITING       SET LINK RETURN                   00029570
00047A 6498                        5220          BU     VELCK800            GO WAIT FOR READ DATA             00029580
```

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                                5224 ********************** NRZI WRITE TAPE MARK ************************ 00029610
                                5225 *  THE TAPE MARK IS WRITTEN ENTIRELY WITH THE MICRO PROGRAM.          * 00029620
                                5226 *                                                                     * 00029630
                                5227 *  HOWEVER 'PERMRDWT' IS SET TO ALLOW THE WREAD CLOCK TO RUN          * 00029640
                                5228 *  AFTER IT HAS BEEN WRITTEN THE NORMAL CHECKS ARE MADE AND IN        * 00029650
                                5229 *  ADDITION THE 'TM' BR COND IS CHECKED TO ASSURE IT COMES UP         * 00029660
                                5230 *                                                                     * 00029670
                                5231 *  THE FOLLOWING ROUTINE IS SHARED BY NORMAL WTM AND LOOP WTM         * 00029680
                                5232 ********************************************************************** 00029690
00047B 1A7E                     5234 NRZTM     STO   LINK3,NRZTM1        RETURN TO NRZTM1                    00029700
00047C 3A3A                     5237           BOC   STATC,ALLDONE1      BR OUT WE ARE ALL DONE              00029710
00047D 6025                     5240           BU    ERGCTR              GO DO ERG BEFORE WTM                00029720

00047E 030F                     5244 NRZTM1    STO   WORK4,TM7TRK        SET 0F                              00029740
00047F 9700                     5247           ORM   SENSE2,ZERO         IS THIS 7 TRACK                     00029750
000480 3082                     5250           BOC   SEVTRK,SETRET3      BR IF SO TO SET 0F                  00029760
000481 0313                     5253           STO   WORK4,TM9TRK        SET 13 IN REG                       00029770

000482 1A89                     5258 SETRET3   STO   LINK3,SETUBO         POINT TO RETURN AFTER SETTING       00029800
000483 00FF                     5261           STO   WORK1,ONES          LOCK IN ON                          00029810
000484 648F                     5264           BU    RDSYNC1                 READ TIME                     00029820

                                5268 ********************************************************************** 00029850
                                5269 *  THIS IS RETURN FORM 'CHKVEL' ROUTINE TO DETERMINE (PE OR NRZI) AND * 00029860
                                5270 *  RETURN TO PROPER ROUTINE.                                          * 00029870
                                5271 ********************************************************************** 00029880
000485 DD80                     5273 CKNORPE   ANDM  XOUTAIM,PEBIT        IS THE WRITE IN NRZI                00029890
000486 20CA                     5276           BOC   DBUS,CHECKEND        BR IF SO                            00029900
000487 6671                     5279           BU    WRITE28              OTHERWISE BR TO PE WRITE            00029910
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                                  F01MAY72   2/04/74
000488 6024                        5284 NRETURN1 BU    ERGSTR             GO TO DO ERASE OP                                00029940

                                   5287 ********************************************************************* 00029960
                                   5288 *  WRITE THE DATA CHAR OF TM CONFIGURATION HERE THEN WAIT EITHER      * 00029970
                                   5289 *  4 OR 8 'RDTIMES' FOR 7 OR 9 TRACK RESPECTIVELY AND RETURN TO       * 00029980
                                   5290 *  'NRZLRC'.                                                           * 00029990
                                   5291 ********************************************************************* 00030000

000489 4360                        5294 SETUBO   XFR   WORK4,TUBO         WRITE THE DATA CHAR OF TM        00030020
00048A 00FC                        5297 SET7CNT  STO   WORK1,ONES-3       SET SPACING COUNT BETWEEN CHAR   00030030
00048B 9700                        5300 SETCNT   ORM   SENSE2,ZERO        IS THIS A 7 TRK                  00030040
00048C 308E                        5303          BOC   SEVTRK,NRZSET       BR IF SO                        00030050
00048D 00F8                        5306          STO   WORK1,ONES-7       SET COUNT TO                     00030060
00048E 1A95                        5309 NRZSET   STO   LINK3,NRZLRC       RETURN AFTER COUNTING SPACE      00030070
00048F 248F                        5312 RDSYNC1  BOC   RDTIME,RDSYNC1     HANG TILL READ TIME FALLS        00030080
000490 2492                        5315 RDSYNC2  BOC   RDTIME,RDSYNC3     WAIT FOR RD TIME TO RISE         00030090
000491 6490                        5318          BU    RDSYNC2                                             00030100

000492 A001                        5322 RDSYNC3  ADD   WORK1,1            BUMP CTR                         00030120
000493 218F                        5325          BOC   NALCO,RDSYNC1      LOOP TILL OVERFLOW               00030130
000494 5A22                        5328          XFR   LINK3,IC           EXIT                             00030140

                                   5331 ********************************************************************* 00030160
                                   5332 *  WRITE THE LRC CHAR OF TM CONFIG                                     * 00030170
                                   5333 ********************************************************************* 00030180

000495 0300                        5336 NRZLRC   STO   WORK4,ZERO         WRITE THE                        00030200
000496 4360                        5339          XFR   WORK4,TUBO          LRC CHAR                        00030210
000497 19B9                        5342          STO   LINK2,TMEND        LOAD LINK RETYRN                 00030220

                                   5345 ********************************************************************  00030240
                                   5346 ***        VELOCITY WINDOW  *** NO DATA EXPECTED                       00030250
                                   5347 ********************************************************************  00030260
000498 D410                        5349 VELCK800 ANDM  STATIMG,NRZI7      IS THIS 7 TRK                    00030270
000499 209E                        5352          BOC   DBUS,VELCK80A      BR IF NOT                        00030280
00049A 0018                        5355          STO   WORK1,24           LOAD CTR FOR 200 BPI             00030290
00049B 399F                        5358          BOC   DEN200,VELCK80B    BR IF 200 BPI                    00030300
00049C 0041                        5361          STO   WORK1,65           LOAD CTR FOR 556 BPI             00030310
00049D 2C9F                        5364          BOC   DEN556,VELCK80B    BR IF IT IS 556                  00030320
00049E 0064                        5367 VELCK80A STO   WORK1,100          LOAD VELOCITY WINDOW CTR         00030330
00049F 0169                        5370 VELCK80B STO   WORK2,ONES-150     LOAD STOP TIME OUT CTR           00030340
0004A0 8440                        5373 VELCK801 ORI   STATIMG,PERMRDWT   IMAGE WRITE CONDITION            00030350
0004A1 4428                        5376          XFR   STATIMG,STAT       SET WRITE CONDITION              00030360

0004A2 3AAE                        5380 VELCK802 BOC   STATC,VELCK805     SKIP CK IF LWR                   00030380
0004A3 2DAA                        5383 VELCK803 BOC   DATARDY,SETERR1    SHD NOT BRANCH                   00030390
0004A4 24A3                        5386 SETERR10 BOC   RDTIME,VELCK803    WAIT FOR RD TIME TO FALL         00030400

0004A5 A0FF                        5390          ADD   WORK1,ONES         DECREMENT CTR                    00030420
0004A6 20AE                        5393          BOC   DBUS,VELCK805      NORMAL EXIT                      00030430
0004A7 2DAC                        5396 VELCK804 BOC   DATARDY,SETERR2    SHD NOT BRANCH                   00030440
0004A8 24A3                        5399 SETERR20 BOC   RDTIME,VELCK803    WAIT FOR READ TIME               00030450
0004A9 64A7                        5402          BU    VELCK804                                            00030460
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                                F01MAY72   2/04/74
0004AA 8C10                      5406 SETERR1  ORI    DTACHK1,FASTBGN     SET ERROR - WRITE DELAY NOISE  *UC*  00030480
0004AB 64A4                      5409          BU     SETERR10                                                  00030490
0004AC 8C10                      5412 SETERR2  ORI    DTACHK1,FASTBGN     SET ERROR - WRITE DELAY NOISE  *UC*  00030500
0004AD 64A8                      5415          BU     SETERR20                                                  00030510

                                 5418 ************************************************************************ 00030530
                                 5419 * VELOCITY ERROR WINDOW CLOSED  - WAIT FOR READ DATA                    * 00030540
                                 5420 ************************************************************************ 00030550
0004AE 2DB5                      5422 VELCK805 BOC    DATARDY,VELCK808    NORMAL EXIT                           00030560
0004AF 24B1                      5425          BOC    RDTIME,VELCK806     WAIT FOR RDTIME                       00030570
0004B0 64AE                      5428          BU     VELCK805                                                  00030580

0004B1 27B6                      5432 VELCK806 BOC    STOP,VELCK809       RUN TIME OUT CTR IF ON                00030600
0004B2 2DB5                      5435 VELCK807 BOC    DATARDY,VELCK808    NORMAL EXIT                           00030610
0004B3 24B2                      5438          BOC    RDTIME,VELCK807     WAIT FOR RD TIME TO FALL              00030620
0004B4 64AE                      5441          BU     VELCK805                                                  00030630

0004B5 5922                      5445 VELCK808 XFR    LINK2,IC            EXIT                                  00030650

0004B6 A101                      5449 VELCK809 ADD    WORK2,1             BUMP TIME OUT CTR                     00030670
0004B7 21B2                      5452          BOC    NALCO,VELCK807      CONTINUE IF OK YET                    00030680
0004B8 6634                      5455          BU     VELBAD              GO SET NO BLOCK                       00030690

                                 5458 ************************************************************************ 00030710
                                 5459 *  THIS ROUTINE LOOKS FOR 'ENDATA' AS NORMAL EXIT ON WRT OR WTM        * 00030720
                                 5460 ************************************************************************ 00030730
0004B9 2DB9                      5462 TMEND    BOC    DATARDY,TMEND       WAIT FOR FALL                         00030740
0004BA 66EB                      5465          BU     TMLOOP1                                                   00030750


                                 5471 ************************************************************************ 00030800
                                 5472 * WRITE OP - FIRST DATARDY SEEN - CHECK FOR SINGLE BYTE NOISE AND      * 00030810
                                 5473 * THEN WAIT FOR END DATA                                              * 00030820
                                 5474 ************************************************************************ 00030830
0004BB 2DBB                      5476 WRITING  BOC    DATARDY,WRITING     WAIT FOR DATA RDY TO FALL             00030840
0004BC 2DC6                      5479 NRZI1000 BOC    DATARDY,NRZI1004     WATCH FOR 2ND OME                    00030850
0004BD 24BC                      5482          BOC    RDTIME,NRZI1000     WAIT FOR FALL                         00030860

0004BE 27C3                      5486          BOC    STOP,NRZI1003       WATCH FOR STOP                        00030880
0004BF 28CC                      5489 NRZI1001 BOC    ENDATA,INTRUBLE     SINGLE BYTE OF NOISE CREATED          00030890
0004C0 2DC6                      5492 NRZI1002 BOC    DATARDY,NRZI1004    WATCH FOR 2ND ONE                     00030900
0004C1 24BC                      5495          BOC    RDTIME,NRZI1000     WATCH FOR RISE                        00030910
0004C2 64C0                      5498          BU     NRZI1002                                                  00030920

0004C3 A001                      5502 NRZI1003 ADD    WORK1,1             BUMP TIME OUT CTR                     00030940
0004C4 21C0                      5505          BOC    NALCO,NRZI1002      BR IF OK YRT                          00030950
0004C5 6634                      5508          BU     VELBAD                                                    00030960

0004C6 27CA                      5512 NRZI1004 BOC    STOP,NRZI1005       BYPASS IF STOP IS ON                  00030980
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   2/04/74
0004C7 3ACA                       5515          BOC   STATC,NRZI1005      BYPASS IF LWR                 00030990
0004C8 16A9                       5518 WRITE888 STOH  SENSE1,FIRST+DATATIM+CNTRDY+MK800                  00031000
0004C9 6300                       5521          BU    CHKVEL                                            00031010

0004CA                            5524 CHECKEND EQU   *                                                 00031030
0004CA 28F8                       5526 NRZI1005 BOC   ENDATA,ENDWRTNZ     WAIT FOR END DATA             00031040
0004CB 64CA                       5529          BU    CHECKEND                                          00031050

0004CC 3ACA                       5533 INTRUBLE BOC   STATC,NRZI1005      DONT RETRY ON LWR             00031070
0004CD D980                       5536          ANDM  FRU,128             IS RESTART FLAG ON            00031080
0004CE 20D1                       5539          BOC   DBUS,LOADCTR        BR IF NOT                     00031090
0004CF A301                       5542          ADD   WORK4,1             BUMP RESTART CTR              00031100
0004D0 21C0                       5545          BOC   NALCO,NRZI1002      BR IF NOT TIMED OUT           00031110
0004D1 8980                       5548 LOADCTR  ORI   FRU,128             TRN ON RESTART FLAG           00031120
0004D2 03F5                       5551          STO   WORK4,ONES-10       LOAD RESTART CTR              00031130
0004D3 2DBB                       5554 NRZI1006 BOC   DATARDY,WRITING     WATCH FOR CHAR GATE           00031140
0004D4 24D6                       5557          BOC   RDTIME,NRZI1007     WATCH FOR RISE                00031150
0004D5 64D3                       5560          BU    NRZI1006                                          00031160

0004D6 27DA                       5564 NRZI1007 BOC   STOP,NRZI1009       WATCH FOR STIP                00031180
0004D7 2DBB                       5567 NRZI1008 BOC   DATARDY,WRITING     WATCH FOR DATA RDY            00031190
0004D8 24D7                       5570          BOC   RDTIME,NRZI1008     WAIT FOR FALL                 00031200
0004D9 64D3                       5573          BU    NRZI1006                                          00031210

0004DA A101                       5577 NRZI1009 ADD   WORK2,1             BUMP CTR                      00031230
0004DB 21D7                       5580          BOC   NALCO,NRZI1008      BR IF OK YET                  00031240
0004DC 6634                       5583          BU    VELBAD                                            00031250


0004DD 3AE0                       5588 END      BOC   STATC,LWREND        BR IF LWR                     00031280
0004DE 1703                       5591 GOODEND  STO   TIEBYTE,3           SET TIE BYTE TO 3             00031290
0004DF 61D0                       5594          BU    ENDUP                                             00031300
0004E0 4009                       5597 LWREND   XFR   RESETERR                                          00031310
0004E1 4009                       5600          XFR   RESETERR                                          00031320
0004E2 64DE                       5603          BU    GOODEND                                           00031330


                                  5606 ************************************************************** 00031350
                                  5607 * CONTROL INITIALIZATION FOR TURNAROUND ROUTINE IF NRZI FEATURE IS    * 00031360
                                  5608 * INSTALLED. TURNS ON NRZI CONTROLS AND TURNS OFF PE CONTROLS.       * 00031370
                                  5609 ************************************************************** 00031380
0004E3 30E6                       5611 TURNNRZI BOC   SEVTRK,DO8007       BR IF 7 TRK                   00031390
0004E4 33E7                       5614          BOC   NOTPE,DO800         BR IF NRZI MODE               00031400
0004E5 6145                       5617          BU    DO16                                              00031410
0004E6 8410                       5620 DO8007   ORI   STATIMG,NRZI7       SET 7 TRK BIR                 00031420
0004E7 6146                       5623 DO800    BU    CHKBKWD                                           00031430
                                  5625 ************************************************************** 00031440
                                  5626 * READ OP ENTRY AFTER LEAVING LOAD POINT WITH NO P BURST DETECTED.HERE* 00031450
                                  5627 * WE WILL TURN ON THE NRZI CONTROLS, TURN OFF THE PE CONTROL AND GO   * 00031460
                                  5628 * SET NRZI TO THE TAPE UNIT. NRZI WRITE OP AT LOAD POINT ENTERS AT    * 00031470
                                  5629 * SET 8001 TO INITIALIZE CONTROL LSRS.                               * 00031480
                                  5630 ************************************************************** 00031490
0004E8 CD77                       5632 SET800   AND   XOUTAIM,ONES-HIDEN-PEBIT                           00031500
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  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                   F01MAY72   2/04/74
0004E9 4D42                        5635           XFR    XOUTAIM,XOUTA       TRN OFF PE CONTROLS              00031510
0004EA 1A41                        5638           STO    LINK3,ISNRZIZ       RETURN TO RDNRZLP                00031520
0004EB 0310                        5641 SET8001   STO    WORK4,SETDENS       SET UP FOR NRZI MOS              00031530
0004EC 020D                        5644           STO    WORK3,DEVSEL+CONTROL+MOVE  REAISE CTRL & MOVE        00031540
0004ED D7A8                        5647           ANDM   SENSE2,DUALDEN+SEVTRK+HIDEN IS A NRZI DRIVE          00031550
0004EE 3401                        5650           BOC    HIDEN,XXXXX         NRZI TAPE ON GCR DR - SET NOT CAP. 00031560
0004EF 2001                        5653           BOC    DBUS,XXXXX             BR IF NOT TO SET NOT CAPABLE  00031570
0004F0 6530                        5656           BU     SETCTRL1                                             00031580

                                   5660 ** DENSITY DETERMINATION FOR  MODS 3,5 AND 7 AT LOAD POINT             00031610
0004F1 30E6                        5662 CHK7LP    BOC    SEVTRK,DO8007       IS THIS A SEVEN TRACK UNIT       00031620
0004F2 32F4                        5665           BOC    DUALDEN,CHK800       BR IF DUAL DEN                  00031630
0004F3 6145                        5668           BU     DO16                                                 00031640
0004F4 4290                        5671 CHK800    XFR    WORK3,XINA          IS THIS A 9 TRK NRZ MOS          00031650
0004F5 37E7                        5674           BOC    ALU1NRZ,DO800       BR IF SO                         00031660
0004F6 6145                        5677           BU     DO16                RETURN TO TURN AROUND            00031670
0004F7 6557                        5680 ACCESS8   BU     ACCESS80                                             00031680
0004F8 27DD                        5683 ENDWRTNZ  BOC    STOP,END                                             00031690
0004F9 64F8                        5686           BU     ENDWRTNZ            WAIT FOR STOP                    00031700
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                               F01MAY72   2/04/74
000500                             5690            ORG   BEGIN+X'500'                                             00031730
                                   5691 ***************DISPLAY LSR SUBROUTINE*********************************** 00031740
                                   5692 *                                                                      * 00031750
                                   5693 * AN INDISPENSABLE ROUTINE TO ALLOW DISPLAY OF THE ALU2 LSR'S IN       * 00031760
                                   5694 * THE TUBO INDICATORS. ON FIRST ROUND THE 16 LOW LSRS (0-15)           * 00031770
                                   5695 * ARE DISPLAYED. SECOND ROUND (DONT HIT RESET.) WILL DISPLAY HIGH      * 00031780
                                   5696 * LSRS (16-31). AN AUTOMATIC STOP IS NOT EMPLOYED IN THIS ROUTINE *      00031790
                                   5697 * AND IT WILL CONTINUE TO DISPLAY HIGH LSRS FOREVER. RESTART IS THE    * 00031800
                                   5698 * ONLY WAY TO DISPLAY LOW LSRS A SECOND TIME.                          * 00031810
                                   5699 *                                                                      * 00031820
                                   5700 * IC DISPLAY IN RELATION TO LSRS ON TUBO  ARE AS FOLLOWS:              * 00031830
                                   5701 * IC= 502      DISPLAY LSR0 -FIRST ROUND  &  LSR16-SECOND ROUND        * 00031840
                                   5702 * IC=503       DISPLAY LSR1 -FIRST ROUND  &  LSR17-SECOND ROUND        * 00031850
                                   5703 * IC= 504      DISPLAY LSR2 -FIRST ROUND  &  LSR18-SECOND ROUND        * 00031860
                                   5704 * IC= 505      DISPLAY LSR3 -FIRST ROUND  &  LSR19-SECOND ROUND        * 00031870
                                   5705 * IC= 506      DISPLAY LSR4 -FIRST ROUND  &  LSR20-SECOND ROUND        * 00031880
                                   5706 * IC= 507      DISPLAY LSR5 -FIRST ROUND  &  LSR21-SECOND ROUND        * 00031890
                                   5707 * IC= 508      DISPLAY LSR6 -FIRST ROUND  &  LSR22-SECOND ROUND        * 00031900
                                   5708 * IC= 509      DISPLAY LSR7 -FIRST ROUND  &  LSR23-SECOND ROUND        * 00031910
                                   5709 * IC= 50A      DISPLAY LSR8 -FIRST ROUND  &  LSR24-SECOND ROUND        * 00031920
                                   5710 * IC= 50B      DISPLAY LSR9 -FIRST ROUND  &  LSR25-SECOND ROUND        * 00031930
                                   5711 * IC= 50C      DISPLAY LSR10-FIRST ROUND  &  LSR26-SECOND ROUND        * 00031940
                                   5712 * IC= 50D      DISPLAY LSR11-FIRST ROUND  &  LSR27-SECOND ROUND        * 00031950
                                   5713 * IC= 50E      DISPLAY LSR12-FIRST ROUND  &  LSR28-SECOND ROUND        * 00031960
                                   5714 * IC= 50F      DISPLAY LSR10-FIRST ROUND  &  LSR29-SECOND ROUND        * 00031970
                                   5715 * IC= 510      DISPLAY LSR14-FIRST ROUND  &  LSR30-SECOND ROUND        * 00031980
                                   5716 * IC= 511      DISPLAY LSR15-FIRST ROUND  &  LSR31-SECOND ROUND        * 00031990
                                   5717 ************************************************************************ 00032000
000500 4006                        5719 TRACELSR XFR   LSR                 INSURE IN LOW SET                      00032010
000501 4060                        5722 GETHIGH  XFR   R0,TUBO             TAKE LSR TO CE PANEL                   00032020
000502 4160                        5725          XFR   R1,TUBO             TAKE LSR TO CE PANEL                   00032030
000503 4260                        5728          XFR   R2,TUBO             TAKE LSR TO CE PANEL                   00032040
000504 4360                        5731          XFR   R3,TUBO             TAKE LSR TO CE PANEL                   00032050
000505 4460                        5734          XFR   R4,TUBO             TAKE LSR TO CE PANEL                   00032060
000506 4560                        5737          XFR   R5,TUBO             TAKE LSR TO CE PANEL                   00032070
000507 4660                        5740          XFR   R6,TUBO             TAKE LSR TO CE PANEL                   00032080
000508 4760                        5743          XFR   R7,TUBO             TAKE LSR TO CE PANEL                   00032090
000509 4860                        5746          XFR   R8,TUBO             TAKE LSR TO CE PANEL                   00032100
00050A 4960                        5749          XFR   R9,TUBO             TAKE LSR TO CE PANEL                   00032110
00050B 4A60                        5752          XFR   R10,TUBO            TAKE LSR TO CE PANEL                   00032120
00050C 4B60                        5755          XFR   R11,TUBO            TAKE LSR TO CE PANEL                   00032130
00050D 4C60                        5758          XFR   R12,TUBO            TAKE LSR TO CE PANEL                   00032140
00050E 4D60                        5761          XFR   R13,TUBO            TAKE LSR TO CE PANEL                   00032150
00050F 4E60                        5764          XFR   R14,TUBO            TAKE LSR TO CE PANEL                   00032160
000510 4F60                        5767          XFR   R15,TUBO            TAKE LSR TO CE PANEL                   00032170
000511 5006                        5770          XFRH   LSR                SET HIGH                               00032180
000512 6501                        5773 TRACTRAP BU    GETHIGH                                                    00032190
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  LOC  OBJECT CODE    ADDR1 ADDR2 STMT   SOURCE STATEMENT                                              F01MAY72   2/04/74
                                  5776 ********************************************************************** 00032210
                                  5777 *                                                                    * 00032220
                                  5778 *     DIAGNOSTIC    MEASURE IBG    PE OR GCR                         * 00032230
                                  5779 *                                                                    * 00032240
                                  5780 * THIS ROUTINE CLOCKS ACROSS THE IBG, SENDING A COUNT TO CHANNEL AFTER* 00032250
                                  5781 * EVERY ACTIVE TRANSITION OF THE TACH.FIRST AND LAST COUNTS ARE       * 00032260
                                  5782 * PARTIAL                                                            * 00032270
                                  5783 ********************************************************************** 00032280

000513 3B61                       5786 MEASIBG  BOC   STATD,TAKTOSTP      BR IF CNTING STOP TAKS              00032300
000514 9500                       5789          ORM   FLAGS,0             TEST DIAG FLAGS                     00032310
000515 302B                       5792          BOC   DREGO,SETLEVEL                                          00032320
000516 8408                       5795 MEASIBGA ORI   STATIMG,SETSTATA    TRN ON STATA FOR FIRST PASS         00032330
000517 4428                       5798 SETSTATS XFR   STATIMG,STAT        SET STATSCREQUIRED                  00032340
000518 272A                       5801          BOC   STOP,ZIPOUT                                             00032350
000519 0101                       5804          STO   WORK2,1             CLEAR CTR                           00032360

00051A 2F1D                       5808 STILLOK  BOC   IBG,OKYET           ASSURE IBG IS ON                    00032380
00051B 2F29                       5811 WTFORIBG BOC   IBG,ALLDONEA        WT FOR NEXT IBG                     00032390
00051C 651B                       5814          BU    WTFORIBG            NORMAL ENDING                       00032400
00051D 3E22                       5817 OKYET    BOC   BSYTACH,TACHUP      LOOK FOR TACH                       00032410
00051E 2A23                       5820 TACHDOWN BOC   STATA,RUNCTR        IS THIS LOCK IN                     00032420
00051F 8408                       5823          ORI   STATIMG,SETSTATA    TRN ON STAT A                       00032430
000520 4428                       5826          XFR   STATIMG,STAT          LOCK IN PASS                      00032440
000521 6523                       5829          BU    RUNCTR              GO COUNT                            00032450

000522 2A26                       5833 TACHUP   BOC   STATA,SENDEM1       SEND CTR IF STAT A IS ON            00032470
000523 A101                       5836 RUNCTR   ADD   WORK2,1             BUMP                                00032480
000524 211A                       5839          BOC   NALCO,STILLOK         CTR                               00032490
000525 E408                       5842          XO    STATIMG,SETSTATA    INVERT STAT A                       00032500

000526 E40C                       5846 SENDEM1  XO    STATIMG,SETSTATA+SETSTATB INVERT B & TRN OFF A          00032520
000527 4141                       5849          XFR   WORK2,XOUTB         SEND BYTE TO ALU1                   00032530
000528 6517                       5852          BU    SETSTATS            RUN AGAIN                           00032540

000529 C4F7                       5856 ALLDONEA AND   STATIMG,ONES-SETSTATA                                   00032560
00052A 60B8                       5859 ZIPOUT   BU    READSTOP            ASSURE STAT A IS OFF - NORMAL END   00032570

00052B 0300                       5863 SETLEVEL STO WORK4,0                                                   00032590
00052C 5521                       5866          XFR   WORK5,AR             MOVE CMD TO WORK 4                 00032600
00052D 8300                       5869          ORI   WORK4,0                                                 00032610
00052E 020D                       5872          STO   WORK3,DEVSEL+CONTROL+MOVE                               00032620
00052F 1A17                       5875          STO   LINK3,SETSTATS      LOAD LINK RETURN                    00032630

                                  5878 ************************** SET MODE TO DRIVE ************************ 00032650

000530 4224                       5881 SETCTRL1 XFR   WORK3,TUTAG         BRING UP CONTROL TAG                00032670
000531 4360                       5884          XFR   WORK4,TUBO          SET CMD TO BUS OUT                  00032680
000532 01FE                       5887 SETLEV   STO   WORK2,ONES-1        SET FOR DELAY                       00032690
000533 A101                       5890 DLYTIME  ADD   WORK2,1             BUMP REGISTER FOR DELAY             00032700
000534 2133                       5893          BOC   NALCO,DLYTIME       BACK TWICE                          00032710
000535 4981                       5896          XFR   FRU,TUBI            GET CONTROLSTATUS BYTE              00032720
000536 4160                       5899          XFR   WORK2,TUBO          CLEAR CMD FROM BUS OUT              00032730
000537 C2FB                       5902          AND   WORK3,ONES-CONTROL  RESET CONTOL TAG                    00032740
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 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                   F01MAY72   2/04/74
000538 4224                      5905           XFR   WORK3,TUTAG          TO THE DRIVE                00032750
000539 4921                      5908           XFR   FRU,AR               MASK IT                     00032760
00053A F300                      5911           XOM   WORK4,0              CHK STATUS                  00032770
00053B 2043                      5914           BOC   DBUS,CTLLINK         BR IF OK                    00032780
00053C 61CE                      5917           BU    CTRLREJ              GO SET CONTROL STATUS REJECT 00032790
00053D 628E                      5920 ZRETURN1  BU    NORMDONE                                         00032800
00053E 670B                      5923 ZRETURN2  BU    WRT6                                             00032810
00053F 6744                      5926 CTLRET6   BU    ERASE6                                           00032820
000540 674E                      5929 CTLRET3   BU    ERASE1                                           00032830
000541 6402                      5932 ISNRZIZ   BU    ISNRZI                                           00032840
000542 6471                      5935 NRZIBOTZ  BU    NRZIBOT                                          00032850
000543 5A22                      5938 CTLLINK   XFR   LINK3,IC              RETURN TO CALLER            00032860

                                 5941 *                                                              * 00032880
                                 5942 *         DIAGNOSTIC          MEASURE IBG         NRZI         * 00032890
                                 5943 *                                                              * 00032900
                                 5944 * THIS ROUTINE CLOCKS ACROSS THE IBG, SENDING A COUNT TO CHANNEL AFTER* 00032910
                                 5945 * EVERY ACTIVE TRANSITION OF THE TACH.  FIRST AND LAST COUNTS ARE    * 00032920
                                 5946 * PARTIAL                                                      * 00032930
                                 5947 ********************************************************************** 00032940
000544 3B61                      5949 NRZIIBG   BOC   STATD,TAKTOSTP       BR IF CTING STOP TAKS       00032950
000545 8408                      5953 NRZIIBGA  ORI   STATIMG,SETSTATA     TRN ON STAT A FOR FIRST PASS 00032970
000546 4428                      5956 DOSTATS   XFR   STATIMG,STAT         SET STATS REQUIRED          00032980
000547 0101                      5959           STO   WORK2,1              CLR CTR                     00032990

000548 2D55                      5963 START800  BOC   DATARDY,CLEANUP      LOOK FOR DTA RDY            00033010
000549 3E4E                      5966           BOC   BSYTACH,POSITIV      LOOK FOR TACH               00033020
00054A 2A4F                      5969 NEGATIVE  BOC   STATA,STEPCTR                                     00033030
00054B 8408                      5972           ORI   STATIMG,SETSTATA     LOCK IN PASS                00033040
00054C 4428                      5975           XFR   STATIMG,STAT         TRN ON STATA                00033050
00054D 654F                      5978           BU    STEPCTR              GO CNT ONE                  00033060

00054E 2A52                      5982 POSITIV   BOC   STATA,SENDEM5        SEND CTR IF STAT A IS ON    00033080
00054F A101                      5985 STEPCTR   ADD   WORK2,1              BUMP CTR BY 1               00033090
000550 2148                      5988           BOC   NALCO,START800          & LOOK FOR OVERFLOW      00033100
000551 E408                      5991           XO    STATIMG,SETSTATA     INVERT STAT A               00033110

000552 E40C                      5995 SENDEM5   XO    STATIMG,SETSTATA+SETSTATB INVERT B & TRN OFF A   00033130
000553 4141                      5998           XFR   WORK2,XOUTB          SEND CTR YO ALU1            00033140
000554 6546                      6001           BU    DOSTATS              GO AGAIN                    00033150

000555 C4F7                      6005 CLEANUP   AND   STATIMG,ONES-SETSTATA TRN OFF STAT A              00033170
000556 641B                      6008           BU    STOPNRZI             GO TO NORMAL STOP           00033180
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                        F01MAY72   2/04/74
                                   6012 ************************************************************************ 00033210
                                   6013 *                                                                      * 00033220
                                   6014 *        DIAGNOSTIC          MEASURE ACCESS TIME     NRZI              * 00033230
                                   6015 *                                                                      * 00033240
                                   6016 * THIS ROUTINE TURNS ON DATA FLOW, RAISES MOVE AND CLOCKS UNTIL DATA  * 00033250
                                   6017 * IS DETECTED. TWO BYTES (COUNTERS) ARE THEN SET TO CHANNEL           * 00033260
                                   6018 * NRZI STOP DELAY IS DMPLOYED TO SPACE TAPE TO NEXT IBG.              * 00033270
                                   6019 ************************************************************************ 00033280

000557 9700                        6022 ACCESS80 ORM   SENSE2,0            LOOK SEE IF NRZI MODE               00033300
000558 335A                        6025          BOC   NOTPE,GOAHEAD       BR IF SO                            00033310
000559 6591                        6028          BU    ACCESS16            GO RUN PE MODE                      00033320

00055A                             6031 GOAHEAD  EQU   *                                                       00033340
00055A 1509                        6033          STO   WORK5,DEVSEL+MOVE   SET UP FOR MOVE                     00033350
00055B 5524                        6036          XFR   WORK5,TUTAG         RAISE MOVE                          00033360
00055C 4D42                        6039          XFR   XOUTAIM,XOUTA                                           00033370
00055D 8490                        6042          ORI   STATIMG,TAPEOP+NRZI7                                    00033380
00055E 4428                        6045          XFR   STATIMG,STAT        TRN ON RD CONDITION                 00033390
00055F 8440                        6048          ORI   STATIMG,PERMRDWT                                        00033400
000560 6545                        6051          BU    NRZIIBGA            GO MEASURE ACCESS TIME              00033410
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 LOC   OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                                F01MAY72   2/04/74
                                   6055 ********************************************************************** 00033440
                                   6056 *                                                                    * 00033450
                                   6057 *                 DIAGNOSTIC  MEASURE TACH ASSYMMETRY               * 00033460
                                   6058 *                                                                    * 00033470
                                   6059 * THIS ROUTINE WILL ACCUMULATE COUNTS DURING THE POSITIVE AND NEGATIVE* 00033480
                                   6060 * PORTIONS OF THE TACH PULSE.  THESE COUNTS WILL BE SENT TO CHANNEL   * 00033490
                                   6061 * IN TWO DATA BYTES ON EACH TRANSITION OF THE TACH PULSE.  THE        * 00033500
                                   6062 * NUMBER OF TACH PULSES TO COUNT IS CONTROLLED BY BY THE CHANNEL BYTE * 00033510
                                   6063 * COUNT THE FIRST TWO BYTES SENT TO CHANNEL SHOULD BE DISREGARDED     * 00033520
                                   6064 * AS THESE ARE ACCUMULATED DURING 'LOCKIN'.                          * 00033530
                                   6065 *                                                                    * 00033540
                                   6066 ********************************************************************** 00033550
                                   6067 *                                                                      00033560


000561 0408                        6070 TAKTOSTP STO   STATIMG,SETSTATA    TRN ON STAT A AND TRN OFF           00033580
000562 4428                        6073          XFR   STATIMG,STAT        READ COND AND TAPE OP               00033590
000563 0000                        6076 EXECDMR  STO   WORK1,0             CLEAR CTR                           00033600
000564 0140                        6079          STO   WORK2,DVESNS6       SET UP TO                           00033610
000565 4160                        6082          XFR   WORK2,TUBO            RECEIVE READ BUS & TACH PULSES    00033620
000566 02B4                        6085 TACHASYM STO   WORK3,X'B4'         CLEAR                               00033630
000567 03DE                        6088          STO   WORK4,X'DE'           COUNTERS                          00033640
000568 3A6B                        6091          BOC   STATC,DROPMOVE                                          00033650
000569 0109                        6094          STO   WORK2,DEVSEL+MOVE       NO STATC-RAISE MOVE             00033660
00056A 656C                        6097          BU    EDSPLACE                                                00033670
00056B 0108                        6100 DROPMOVE STO   WORK2,DEVSEL        DROP MOVE                           00033680
00056C 4124                        6103 EDSPLACE XFR   WORK2,TUTAG                                             00033690

00056D 3E74                        6107 CHKDETAC BOC   BSYTACH,POSTACH     BR ON ACTIVE TACH                   00033710
00056E 3E7A                        6111 NEGTACH  BOC   BSYTACH,SENDEM6     SEND CTRS WHEN TAK CHANGES          00033730
00056F A201                        6114          ADD   WORK3,1             BUMP LOW CTR                        00033740
000570 216E                        6117          BOC   NALCO,NEGTACH       LOOP YILL OVERFLOW                  00033750
000571 A301                        6120          ADD   WORK4,1             BUMP HI CTR                         00033760
000572 216E                        6123          BOC   NALCO,NEGTACH       LOOP TILL OVERFLOW                  00033770
000573 657B                        6126          BU    SENDEM3             OVERFLOW-SEND CTRS                  00033780
000574 3E76                        6130 POSTACH  BOC   BSYTACH,UPCOUNT1    ASSURE TAK STILL ON                 00033800
000575 657B                        6133          BU    SENDEM3             TAK CHGD - SEND CTRS                00033810
000576 A201                        6136 UPCOUNT1 ADD   WORK3,1             BUMP LOW CTR                        00033820
000577 2174                        6139          BOC   NALCO,POSTACH       LOOP TILL OVERFLOW                  00033830
000578 A301                        6142          ADD   WORK4,1             BUMP HI CTR                         00033840
000579 2174                        6145          BOC   NALCO,POSTACH       LOOP TILL OVERFLOW                  00033850
00057A 657B                        6148 SENDEM6  BU    SENDEM3             OVERFLOW-SEND CTRS                  00033860
00057B 2A82                        6152 SENDEM3  BOC   STATA,SENDEM4       IF LOCKED IN-SEND CTRS              00033880
00057C D101                        6155          ANDM  WORK2,MOVE          IF NOT LOCKED IN- SEND              00033890
00057D 2082                        6158          BOC   DBUS,SENDEM4          CTRS IF MOVE IS DOWN              00033900
00057E 3E66                        6161          BOC   BSYTACH,TACHASYM    IF TACH ON- DONT LOCK IN            00033910
00057F 8408                        6164          ORI   STATIMG,SETSTATA    MOVE IS UP- TAK IS                  00033920
000580 4428                        6167          XFR   STATIMG,STAT          DOWN- SO SET STAT A               00033930
000581 6566                        6170          BU    TACHASYM              TO MARK LOCK IN                   00033940


000582 2789                        6174 SENDEM4  BOC   STOP,STOPEXIT       BR ON STOP                          00033960
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   2/04/74
000583 4242                       6177          XFR   WORK3,XOUTA        SEND DATA                    00033970
000584 4341                       6180          XFR   WORK4,XOUTB          TO ALU1                    00033980
000585 E404                       6183          XO    STATIMG,SETSTATB   INVERT STAT B                00033990
000586 4428                       6186          XFR   STATIMG,STAT       AND THE OTHER OFF ( WILL ALTERNATE ) 00034000
000587 A001                       6189          ADD   WORK1,1            BUMPM BYTE CTR               00034010
000588 6566                       6192          BU    TACHASYM                                       00034020


000589 0100                       6196 STOPEXIT STO   WORK2,0            CLEAR                        00034040
00058A 4124                       6199          XFR   WORK2,TUTAG          TAGS TO THE              00034050
00058B 4041                       6202          XFR   WORK1,XOUTB            TAPE UNIT              00034060
00058C 6011                       6205          BU    SETDLONE               AND STOP                00034070
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  LOC  OBJECT CODE    ADDR1 ADDR2 STMT   SOURCE STATEMENT                                                  F01MAY72   2/04/74
                                  6209 ************************************************************************ 00034100
                                  6210 *                                                                      * 00034110
                                  6211 *         DIAGNOSTIC  MEASURE ACCESS TIME                              * 00034120
                                  6212 *                                                                      * 00034130
                                  6213 * THIS ROUTINE RAISES MOVE - THEN BRANCHES TO THE IBG MEASURE ROUTINE     00034140
                                  6214 ************************************************************************ 00034150

00058D 5460                       6217 ACCESS    XFRH  STATIMG,TUBO        CLR SENS LEVELS                      00034170
00058E 9700                       6220           ORM   SENSE2,0            GET LSR TO TEST                      00034180
00058F 349A                       6223           BOC   HIDEN,CHKMORE       BR IF GCR                            00034190
000590 23F7                       6226           BOC   NRZFEAT,ACCESS8     BR IF NRZI INSTALLED                 00034200
000591 8D80                       6229 ACCESS16  ORI   XOUTAIM,PEBIT       TRN ON                               00034210
000592 4D42                       6232 STROBEA   XFR   XOUTAIM,XOUTA         PE CONRROLS                        00034220
000593 8480                       6235           ORI   STATIMG,TAPEOP      IMAGE TAPE OP                        00034230
000594 4428                       6238           XFR   STATIMG,STAT                                             00034240
000595 1509                       6241           STO   WORK5,DEVSEL+MOVE   SET FOR MOVE                         00034250
000596 5524                       6244           XFR   WORK5,TUTAG           MOVE                               00034260
000597 6516                       6247           BU    MEASIBGA                                                 00034270

000598 8D08                       6251 ACCESS64  ORI   XOUTAIM,HIDEN       SET DATA FLOW CTRL                   00034290
000599 6592                       6254           BU    STROBEA                                                  00034300

00059A 3398                       6258 CHKMORE   BOC   NOTPE,ACCESS64      BR IF GCR                            00034320
00059B 6591                       6261           BU    ACCESS16                                                 00034330
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                                6269 ***************ALU CHECKOUT ROUTINE************************************ 00034400
                                6270 *                                                                      * 00034410
                                6271 * THIS ROUTINE RUNS CONTINUALLY DURING TCU IDLE TIME, CONSTANTLY      * 00034420
                                6272 * CHECKING THE CIRCUITS IT NEEDS TO FUNCTION PROPERLY. IF A FAILURE   * 00034430
                                6273 * IS DETECTED,                          A HARDWARE ERROR IS FORCED    * 00034440
                                6274 *                                                                      * 00034450
                                6275 ********************************************************************** 00034460

00059C 0900                     6278 EXECTST3 STO   FRU,X'00'          BRING IN BYTE OF ALL ONES            00034480
00059D 4090                     6281          XFR   WORK1,XINA                                              00034490
00059E B001                     6284          ADDM  WORK1,1              FROM ALU1 & CHK IT                 00034500
00059F 21F1                     6287 HERE     BOC   NALCO,ZONK2        ONE OR MORE XOUTA BITS MISSING       00034510
0005A0 4043                     6290          XFR   WORK1,XANXB        SSET UP XOUTA AND XOUTB FOR ALU 1    00034520
                                6292 * CHECK STATS TO BE OFF-THEN TUR A ON & CHECK IT                       * 00034530
0005A1 27F1                     6294          BOC   STOP,ZONK2          STOP SHD BE OFF                    00034540
0005A2 2AA9                     6297          BOC   STATA,ZONKA         SHD BR OFF                         00034550
0005A3 2BE9                     6300          BOC   STATB,ZONKB         SHD BE OFF                         00034560
0005A4 3AEB                     6303          BOC   STATC,ZONKC         SHD BE OFF                         00034570
0005A5 3BED                     6306          BOC   STATD,ZONKD         SHD BE OFF                         00034580
0005A6 840C                     6309          ORI   STATIMG,SETSTATA+SETSTATB  TRN ON STATS                00034590
0005A7 4428                     6312          XFR   STATIMG,STAT          FOR ALU1                           00034600
0005A8 2AAA                     6315          BOC   STATA,TSTHI          TEST STAT A                        00034610
0005A9 4044                     6318 ZONKA    XFR   HDWERR               STATA PROBLEM (OFF OR ON)          00034620
                                6320 * CHECK HIGH LSR OPERATION AND DREGS FOR HOT BITS OR BOC'S             * 00034630
0005AA 0200                     6322 TSTHI    STO   R2,0                 SET UP LOW                         00034640
0005AB 37D1                     6325          BOC   DREG7,TRAP4          SHD BE OFF                         00034650
0005AC 36D3                     6328          BOC   DREG6,TRAP5          SHD BE OFF                         00034660
0005AD 35D5                     6331          BOC    DREG5,TRAP6         SHD BE OFF                         00034670
0005AE 34D7                     6334          BOC   DREG4,TRAP7          SHD BE OFF                         00034680
0005AF 33D9                     6337          BOC   DREG3,TRAP8          SHD BE OFF                         00034690
0005B0 32DB                     6340          BOC   DREG2,TRAP9          SHD BE OFF                         00034700
0005B1 31DD                     6343          BOC   DREG1,TRAP10         SHD BE OFF                         00034710
0005B2 30DF                     6346          BOC   DREG0,TRAP11         SHD BE OFF                         00034720
0005B3 00FF                     6349          STO   R0,ONES               LSRS FOR TEST                      00034730
0005B4 12FF                     6352          STOH  R2,ONES              SET UP AND TEST                     00034740
0005B5 5221                     6355          XFRH  R2,AR                   FOR STO HIGH                     00034750
0005B6 E000                     6358          XO    R0,0                  AN D XFR HIGH                      00034760
0005B7 20B9                     6361          BOC   DBUS,TSTHI1OK                                           00034770
0005B8 4044                     6364          XFR   HDWERR               STOH OR XFRH WENT IN LOW LSR'S     00034780

0005B9 5006                     6368 TSTHI1OK XFRH  LSR                   SET HIGH                         00034800
0005BA 9200                     6371          ORM   R2,0                  ASSURE HI                        00034810
0005BB 20BF                     6374          BOC   DBUS,ZONK               IS SET                         00034820
0005BC 4221                     6377          XFR   R2,AR                 ASSURE                           00034830
0005BD E200                     6380          XO    R2,0                    XFR LO                         00034840
0005BE 20C0                     6383          BOC   DBUS,XFRLO                USES HI LSR                    00034850
0005BF 4044                     6386 ZONK     XFR   HDWERR                                                  00034860

0005C0 4006                     6390 XFRLO    XFR   LSR                  SET LO                             00034880
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   2/04/74

                                   6393 * CHECK ADDER OPERATION- ALSO BOC DREGS, NALCO,DBUS                 * 00034900
0005C1 0000                        6395 TESTONE  STO   R0,0              CLEAR REG 0                        00034910
0005C2 04FF                        6398          STO   R4,ONES           FILL REG 4                         00034920
0005C3 A001                        6401 TEST1    ADD   R0,1               BUMP REG 0 BY 1                   00034930
0005C4 21CA                        6404          BOC   NALCO,AA           BR IF NO OVERFLOW                 00034940
0005C5 20C7                        6407          BOC   DBUS,BB            ON OVERFLOW DBUS SHD BE 0         00034950
0005C6 4044                        6410 TRAP1    XFR   HDWERR             FALSE CARRY                       00034960
0005C7 A4FF                        6413 BB       ADD   R4,ONES            DECREMENT R4 BY ONE MORE          00034970
0005C8 21E0                        6416          BOC   NALCO,OPCODES      SHD BE NO CARRY HERE              00034980
0005C9 4044                        6419 TRAP2    XFR   HDWERR                                               00034990
0005CA A4FF                        6422 AA       ADD R4,ONES            DECREMENT R4 BY 1                  00035000
0005CB 21CF                        6425          BOC   NALCO,CCTRAP       SHD BE A CARRY                    00035010
0005CC 4421                        6428          XFR   R4,AR               R4 TO ABUS                       00035020
0005CD B000                        6431          ADDM  R0,0              MATCH AGAINST R0                   00035030
0005CE 21D0                        6434          BOC   NALCO,DD          SHD BE NO CARRY                    00035040
                                   6436 *                                 WAS A CARRY                       00035050
0005CF 4044                        6438 CCTRAP   XFR   HDWERR             NO CARRY WHEN XPECTED              00035060


0005D0 37D2                        6443 DD       BOC   DREG7,EE             BIT SHD BE ON                   00035090
0005D1 4044                        6446 TRAP4    XFR   HDWERR            BIT WAS OFF                        00035100
0005D2 36D4                        6449 EE       BOC   DREG6,FF             BIT SHD BE ON                   00035110
0005D3 4044                        6452 TRAP5    XFR   HDWERR            BIT WAS OFF                        00035120
0005D4 35D6                        6455 FF       BOC   DREG5,GG             BIT SHD BE ON                   00035130
0005D5 4044                        6458 TRAP6    XFR   HDWERR            BIT WAS OFF                        00035140
0005D6 34D8                        6461 GG       BOC   DREG4,HH             BIT SHD BE ON                   00035150
0005D7 4044                        6464 TRAP7    XFR   HDWERR            BIT WAS OFF                        00035160
0005D8 33DA                        6467 HH       BOC   DREG3,II             BIT SHD BE ON                   00035170
0005D9 4044                        6470 TRAP8    XFR   HDWERR            BIT WAS OFF                        00035180
0005DA 32DC                        6473 II       BOC   DREG2,JJ             BIT SHD BE ON                   00035190
0005DB 4044                        6476 TRAP9    XFR   HDWERR            BIT WAS OFF                        00035200
0005DC 31DE                        6479 JJ       BOC   DREG1,KK             BIT SHD BE ON                   00035210
0005DD 4044                        6482 TRAP10   XFR   HDWERR            BIT WAS OFF                        00035220
0005DE 30C3                        6485 KK       BOC   DREG0,TEST1          BIT SHD BE ON                   00035230
0005DF 4044                        6488 TRAP11   XFR   HDWERR            BIT WAS OFF                        00035240


0005E0                             6491 OPCODES  EQU   *                  SET IN DATA                        00035260
                                   6492 * CHECK DATA FLOW SIGNALS FOR INACTIVE STATE                       * 00035270
0005E0 0000                        6494 CHKDTRDY STO   WORK1,0            CLEAR WORK REG                     00035280
0005E1 4060                        6497          XFR   WORK1,TUBO         CLEAR TU BUS OUT                   00035290

0005E2                             6500 CHKBOCS  EQU   *                                                    00035310
                                   6501 * CHECK TUBI FOR POSSIBLE HOT BITS                                 * 00035320
0005E2 4981                        6503          XFR   FRU,TUBI           BRING IN TU BUS IN                 00035330
0005E3 B9FF                        6506          ADDM  FRU,ONES S         BUMP TU BUS IN BY 255              00035340
0005E4 21E6                        6509          BOC   NALCO,STOPWAIT     SHD BE NO CARRY                    00035350
0005E5 4044                        6512 ZONK10   XFR   HDWERR             HOT TUBI BITS OR BSY TACH HOT      00035360
                                   6514 * WAIT FOR STOP STAT TO COME ON, THEN CHK OTHER STATS FOR ACTIVE    * 00035370
0005E6 27E8                        6516 STOPWAIT BOC   STOP,CHKSTATS                                        00035380
0005E7 65E6                        6519          BU    STOPWAIT                                           00035390
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                   F01MAY72   2/04/74
0005E8 2BEA                      6522 CHKSTATS BOC   STATB,CHKC                                        00035400
0005E9 4044                      6525 ZONKB    XFR   HDWERR                                            00035410
0005EA 3AEC                      6528 CHKC     BOC   STATC,CHKD                                        00035420
0005EB 4044                      6531 ZONKC    XFR   HDWERR                                            00035430
0005EC 3BEE                      6534 CHKD     BOC   STATD,CHKA                                        00035440
0005ED 4044                      6537 ZONKD    XFR   HDWERR                                            00035450
0005EE                           6539 CHKA     EQU   *                                                 00035460
0005EE 4090                      6541 CHKXINA  XFR   WORK1,XINA          CHK XINA                    00035470
                                 6543 * CHECK XINA FROM ALU1 FOR NO BITS - THEN CLEAR XOUTS TO ALU1    00035480
0005EF A0FF                      6545          ADD   WORK1,ONES            FOR ALL                   00035490
0005F0 21F2                      6548          BOC   NALCO,SETUPX             ZEROES                 00035500
0005F1 4044                      6551 ZONK2    XFR   HDWERR                                            00035510
0005F2 5443                      6554 SETUPX   XFRH  STATIMG,XANXB       CLEAR XOUTA AND XOUTB       00035520
0005F3 0403                      6557 ALU2COMP STO   STATIMG,SETSTATC+SETSTATD                        00035530
0005F4 4428                      6560          XFR   STATIMG,STAT          ALL DONE                  00035540


                                 6563 ************************************************************************ 00035560


0005F5 1CFA                      6567 WRTP2    STO   LINK1,SRETURN5      SET RETURN TO SETUP         00035590
0005F6 C4DF                      6570          AND   STATIMG,ONES-WRTBURST                             00035600
0005F7 4428                      6573          XFR   STATIMG,STAT          AND WRITE P BURST           00035610
0005F8 2FFA                      6576 WAITIBG  BOC   IBG,DONE             WAIT UNTIL                  00035620
0005F9 65F8                      6579          BU    WAITIBG               IN IBG                      00035630
0005FA                           6581 DONE     EQU   *                                                 00035640
0005FA 62E1                      6583          BU    FCHSTS                BR IF NOT TO STOP DRIVE     00035650
000600                           6585          ORG   BEGIN+X'600'                                      00035660
                                 6586 ** THE FOLLOWING INSTRUCTIONS USED FOR LWR  ********             00035670
000600 3804                      6588 LWRDELAY BOC   6250,STAYFWD         BR IF GCR                   00035680
000601 DD80                      6591          ANDM  XOUTAIM,X'80'        TEST FOR PE BIT             00035690
000602 2004                      6594          BOC   DBUS,STAYFWD         BR IF NRZI                  00035700
000603 CDBF                      6597          AND   XOUTAIM,ONES-FWDDATA                              00035710
000604 8D10                      6600 STAYFWD  ORI   XOUTAIM,SYNC          SET SYNC                    00035720
000605 4D42                      6603          XFR   XOUTAIM,XOUTA           FOR LWR OP              00035730
000606 D502                      6606          ANDM  FLAGS,TUBOMSK        CHK FOR FLAG                00035740
000607 2009                      6609          BOC   DBUS,NOMASKW         BR IF OFF                   00035750
000608 5560                      6612          XFR   WORK5,TUBO           SET MASK TO TU BUS OUT      00035760
000609                           6614 NOMASKW  EQU   *                                                 00035770
000609 A202                      6616 ZEBRA    ADD   WORK3,2               DELAY FOR ALU1              00035780
00060A 2109                      6619          BOC   NALCO,ZEBRA             TO CATCH UP               00035790
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                    F01MAY72   2/04/74
                                   6622 ********************************************************************** 00035810
                                   6623 *                                                                    * 00035820
                                   6624 *        X      X XXX  X XXXXX XXXX       XX  XXX                   * 00035830
                                   6625 *        X      X X  X X X   X   X         X  X X  X                 * 00035840
                                   6626 *        X  X   X XXX  X   X   XXX       X  X XXX                   * 00035850
                                   6627 *        X X X X X X  X   X   X         X  X X                     * 00035860
                                   6628 *         X   X  X  X X   X   XXXX       XX  X                      * 00035870
                                   6629 *                                                                    * 00035880
                                   6630 *                                                                    * 00035890
                                   6631 *                                                                    * 00035900
                                   6632 *                                                                    * 00035910
                                   6633 *                                                                    * 00035920
                                   6634 ********************************************************************** 00035930

00060B                             6636 WRTAWAY   EQU   *                                                    00035950
00060B 2365                        6638           BOC   NRZFEAT,WRTSTNRZ                                    00035960
00060C D718                        6641           ANDM  SENSE2,NOTPE+HIDEN  CHECKINK FOR NRZI               00035970
00060D 2011                        6644           BOC   DBUS,ALLOK          BR IF NEITHER                   00035980
00060E 3411                        6647           BOC   HIDEN,ALLOK         BR IF BIRCH                     00035990
00060F 1801                        6650           STO   MPGMERR,NOTCAP      SET NOT CAP                     00036000
000610 61CF                        6653           BU    CLRXOUTA            TU IN NRZI AND NO NRZI FEAT     00036010
000611                             6655 NOTNRZIW  EQU   *                                                    00036020
000611 9600                        6657 ALLOK     ORM   SENSE1,0            GET LSR FOR TEST                00036030
000612 33D0                        6660           BOC   BOT,WRT1            BR IF LP IS ON                  00036040
000613 9800                        6663           ORM   TRACER,0            SEE WHAT WE ARE DOING           00036050
000614 36A9                        6666           BOC   WTMOP,DOWTM64       BR IF WRITE TAPE MARK           00036060
000615 35A8                        6669           BOC   ERGOP,ERGAWAY       BR IF ERASE GAP                 00036070

000616 1937                        6673           STO   LINK2,IBGGONE       SET UP LINK RETURN              00036090

                                   6676 ********************************************************************** 00036110
                                   6677 * WAIT FOR READ DATA- WRITE OP HAS BEEN INITIATED. IF READ DATA IS    * 00036120
                                   6678 * SEEN TOO SOON, EARLY BEGIN CHECK WILL BE SET. EXIT OCCURS WHEN BLK  * 00036130
                                   6679 * RISES. IF BLK DOES NOT RISE WITHIN A SPECIFIC TIME AFTER STOP IS    * 00036140
                                   6680 * SEEN, NO BLOCK WILL BE SET AND AN ERROR EXIT TAKEN.                 * 00036150
                                   6681 ********************************************************************** 00036160


                                   6683 ******** SEQUENCE 0 **********                                       00036180
000617 8D10                        6685 SETSYNC   ORI   XOUTAIM,SYNC      N IMAGE SYNC                       00036190
000618 4D42                        6688           XFR   XOUTAIM,XOUTA       SET SYNC TO DATA FLOW           00036200
000619 8D22                        6691           ORI   XOUTAIM,LOGAIN+NOLOSS SET LO GAIN FOR LATER      *   00036210
00061A 381C                        6694           BOC   6250,SETSYNC2                                       00036220
00061B CDFD                        6697           AND   XOUTAIM,ONES-LOGAIN RESET LOGAIN FOREPE             00036230
00061C 02FA                        6700 SETSYNC2  STO   WORK3,ONES-5        LOAD BLOCK RECOGNITION COUNT    00036240
00061D 0100                        6703           STO   WORK2,0             CLR TIME OUT CTR                00036250

00061E                             6706 VELCHK1   EQU   *                   MARK SEQ 0                      00036270
00061E 8440                        6708           ORI   STATIMG,PERMRDWT    IMAGE WRITE CONDITION           00036280
00061F 4428                        6711           XFR   STATIMG,STAT        SET WRITE CONDITION             00036290
000620 00C8                        6714           STO   WORK1,200           LOAD CTR -                      00036300
000621 3A2C                        6717           BOC   STATC,VELCHK4       LWR BR                          00036310
000622 2422                        6720 VELCHK2   BOC   RDTIME,VELCHK2       WAIT FOR RDTIME TO FALL         00036320
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   2/04/74
000623 A0FF                      6723           ADD   WORK1,ONES          DECREMENT CTR BY ONE              00036330
000624 202C                      6726           BOC   DBUS,VELCHK4        EXIT ON NO CARRY                  00036340
000625 3C2A                      6729 VELCHK10  BOC   NBLOCK,VELCHK3      IBG SHD NOT FALL HERE             00036350
000626 8C10                      6732           ORI   DTACHK1,FASTBGN     SET EARLY BEGIN          * UC *   00036360
000627 3829                      6735           BOC   6250,SETEQCK        BR IF GCR                         00036370
000628 662A                      6738           BU    VELCHK3                                                 00036380
000629 1D02                      6741 SETEQCK   STO   EQUIPCK,PERR        CANT RECOVER FROM THIS ONE        00036390
00062A 2422                      6744 VELCHK3   BOC   RDTIME,VELCHK2      WAIT FOR RDTIME TO RISE           00036400
00062B 662A                      6747           BU    VELCHK3                                                 00036410

                                 6750 ******** SEQUENCE 1 **********                                          00036430
00062C 242C                      6752 VELCHK4   BOC   RDTIME,VELCHK4      WAIT FOR RDTIME TO FALL           00036440
00062D 3C2F                      6755           BOC   NBLOCK,VELCHK5      WAIT FOR IBG TO FALL              00036450
00062E 5922                      6758           XFR   LINK2,IC            RETURN                            00036460

00062F 2732                      6762 VELCHK5   BOC   STOP,VELCHK8        IS STOP ON                        00036480
000630                           6764 VELCHK6   EQU   *                                                      00036490
000630 242C                      6766 VELCHK7   BOC   RDTIME,VELCHK4      WAIT FOR RISE OF READ TIME        00036500
000631 6630                      6769           BU    VELCHK7                                                 00036510

                                 6772 * RUN TIME OUT COUNTER IF STOP IS ON ********************************  00036530
000632 A101                      6774 VELCHK8   ADD   WORK2,1             BUMP CTR                          00036540
000633 2130                      6777           BOC   NALCO,VELCHK6       WAIT FOR OVERFLOW                 00036550
000634 1D10                      6780 VELBAD    STO   EQUIPCK,NBLOCK      SET NO BLOCK ERROR                00036560
000635                           6782 VELOUT    EQU   *                                                     00036570
000635 4012                      6784 STROBTIE  XFR   POINTERS            GET TIE TO BUS                    00036580
000636 61D0                      6787           BU    ENDUP                                                   00036590


                                 6791 ************************************************************************ 00036620
                                 6792 * BLK HAS FALLEN SO CONTINUE READ BACK CHECK WHILE WAITING FOR THE    * 00036630
                                 6793 * MARK1.                                                               * 00036640
                                 6794 ************************************************************************ 00036650


                                 6797 ******** SEQUENCE 2 **********                                          00036680
000637 00FC                      6799 IBGGONE   STO   WORK1,ONES-3        LOAD LO GAIN CTR                  00036690
000638 03E8                      6802           STO   WORK4,ONES-23       LOAD MARK TIME OUT CTR            00036700
000639 383C                      6805           BOC   6250,WRITE20        BR IF BIRCH MODE                  00036710
00063A 00F5                      6808           STO   WORK1,ONES-10       LOAD LO GAIN CTR                  00036720
00063B 03D7                      6811           STO   WORK4,ONES-40       LOAD BEG ONES TIME OUT            00036730
00063C                           6813 WRITE20   EQU   *                    ET SEQ                            00036740
00063C 243C                      6815 WRITE201  BOC   RDTIME,WRITE201     WAIT FOR RDTIME TO FALL           00036750
00063D 2F43                      6818           BOC   IBG,WRITE30         IBG SHD NOT RISE                  00036760
00063E 3C43                      6821 WRITE33   BOC   NBLOCK,WRITE30      SHD NOT TAKE BRANCH               00036770
00063F A201                      6824           ADD   WORK3,1             BUMP BLOCK CTR                    00036780
000640 2144                      6827           BOC   NALCO,WRITE22       BR ON NO CARRY                    00036790
000641 8901                      6830           ORI   FRU,1               SET BOR SEEN SEQ 7                00036800
000642 2E44                      6833           BOC   BOR,WRITE22         BOR SHD BE UP                     00036810
000643 8C80                      6836 WRITE30   ORI   DTACHK1,IBGDROP     SET ERROR                         00036820
000644 A001                      6839 WRITE22   ADD   WORK1,1             BUMP CTR                          00036830
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT    SOURCE STATEMENT                                                 F01MAY72   2/04/74
000645 214C                        6842            BOC    NALCO,WRITE220      BR ON NO CARRY                        00036840
000646 4D42                        6845            XFR    XOUTAIM,XOUTA       SET  LO GAIN                          00036850
000647 384E                        6848            BOC    6250,RESYNC         BR IF GCR                             00036860
000648 9D00                        6851            ORM    XOUTAIM,0           TEST LSR                              00036870
000649 364F                        6854            BOC    DREG6,WRT01         BR IF LOGAIN IS ON                    00036880
00064A 8D02                        6857            ORI    XOUTAIM,LOGAIN      SET LO GAIN                           00036890
00064B 00FA                        6860            STO    WORK1,ONES-5        LOAD PHASE WINDO CTR                  00036900
00064C                             6862 WRITE220 EQU    *                                                           00036910
00064C 243C                        6864 WRITE221 BOC    RDTIME,WRITE201     WAIT FOR RDTIME TO RISE               00036920
00064D 664C                        6867            BU     WRITE221                                                  00036930

                                   6871 *********************************************************************** 00036960
                                   6872 * LO GAIN HAS BEEN SET SO MONITOR FOR BEGINNNING MARK      SET START     * 00036970
                                   6873 * READ CHECK IF BEGINNING MARK IS MISSED,AND DROP LO GAIN.              * 00036980
                                   6874 *********************************************************************** 00036990

00064E CDEF                        6877 RESYNC     AND    XOUTAIM,ONES-SYNC   RESET FOR USE LATER       RLC ONLY    00037010
00064F 2451                        6880 WRT01      BOC    RDTIME,WRT02        WAIT FOR READ TIME                    00037020
000650 664F                        6883            BU     WRT01                                                     00037030

000651 226A                        6887 WRT02      BOC    ROCROT,WRITE27      WATCH FOR ROC ROTATION                00037050
000652 3C57                        6890 WRT03      BOC    NBLOCK,WRT04        TEST NO BLOCK                         00037060
000653 A201                        6893            ADD    WORK3,1             BUMP BLOCK CTR                        00037070
000654 2158                        6896            BOC    NALCO,WRT05         BR IF NO CARRY                        00037080
000655 8901                        6899            ORI    FRU,1               SET SEQ (7) BOR SEEN                  00037090
000656 2E58                        6902            BOC    BOR,WRT05           TEST BOR                              00037100
000657 8C80                        6905 WRT04      ORI    DTACHK1,IBGDROP     SET ERROR - NO BOR OR BLOCK   CREASI 00037110
000658 2458                        6908 WRT05      BOC    RDTIME,WRT05        WAIT FOR FALL                         00037120

000659 D901                        6912 WRT06      ANDM   FRU,1               HAS BOR BEEN SEEN                     00037140
00065A 205C                        6915            BOC    DBUS,WRT07          BR IF NOT                             00037150
00065B 2D6C                        6918            BOC    DATARDY,WRITE23     NORMAL EXIT ON FRAME BUFFER DATA      00037160
00065C 2767                        6921 WRT07      BOC    STOP,WRT08          LOOK FOR STOP                         00037170
00065D A301                        6924            ADD    WORK4,1             BUMP TIME OUT CTR                     00037180
00065E 214F                        6927            BOC    NALCO,WRT01                                               00037190
00065F 2261                        6930            BOC    ROCROT,SKIPSLO      SKIP SLOW BGN IF ROC ROTATION         00037200
000660 8C04                        6933            ORI    DTACHK1,SLOWBGN     SET ERROR                             00037210
000661 8A08                        6936 SKIPSLO    ORI    DTACHK2,STREADCK    SET ERROR -- START REDA CHK           00037220
000662 CDFD                        6939            AND    XOUTAIM,ONES-LOGAIN RESET IMAGE                           00037230
000663 4D42                        6942            XFR    XOUTAIM,XOUTA       RESET LOGAIN AND SYNC                 00037240
000664 D901                        6945            ANDM   FRU,1               HAVE EE SEEN BOR                      00037250
000665 204F                        6948            BOC    DBUS,WRT01          BR IF NOT                             00037260
000666 6671                        6951            BU     WRITE28                                                   00037270
000667 A101                        6954 WRT08      ADD    WORK2,1             BUMP TIME OUT CTR                     00037280
000668 214F                        6957            BOC    NALCO,WRT01         BR IF OK                              00037290
000669 667C                        6960            BU     WRITE25X            ERRROR                                00037300


                                   6965 *********************************************************************** 00037340
                                   6966 * MARK1 HAS BEEN SEEN.                         RESET SYNC BIT IN XOUTA  * 00037350
                                   6967 * AND EXIT TO CHECK VELOCITY IF STOP HAS NOT BEEN SEEN.                 * 00037360
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   2/04/74
                                   6968 ********************************************************************** 00037370


                                   6971 ******** SEQUENCE 3 **********                                          00037400
00066A 4D42                        6973 WRITE27  XFR    XOUTAIM,XOUTA       DROP SYNC LINE                     00037410
00066B 6652                        6976          BU     WRT03                                                  00037420

00066C                             6979 WRITE23  EQU    *                                                      00037440
00066C 4D42                        6981          XFR    XOUTAIM,XOUTA       ASSURE SYNC IS RESER               00037450
00066D 2771                        6984          BOC    STOP,WRITE28        DONT VELOCITY CHECK IF STOP IS ON  00037460
00066E 3A71                        6987          BOC    STATC,WRITE28       BR IF LWR                          00037470
00066F 16A8                        6990 WRITE999 STOH   SENSE1,FIRST+DATATIM+CNTRDY                            00037480
000670 6300                        6993          BU     CHKVEL                                                 00037490
000671 2F83                        6996 WRITE28  BOC    IBG,DROPGO                                             00037500


                                   6999 ********************************************************************** 00037520
                                   7000 * WAIT FOR END DATA- THEN EXIT TO POSTAMBLE CHECK.                    * 00037530
                                   7001 ********************************************************************** 00037540


                                   7003 ******** SEQUENCE 4 ***********                                         00037560
000672                             7004 WRITE28X EQU    *                        J                             00037570
000672 2474                        7006 WRITE280 BOC    RDTIME,WRITE32      WAIT FOR RDTIME TO RISE            00037580
000673 6672                        7009          BU     WRITE280                                               00037590
000674 2888                        7012 WRITE32  BOC    ENDATA,WRITE40      BR ON EOD                          00037600
000675 2474                        7015          BOC    RDTIME,WRITE32      WAIT FOR RD TIME TO FALL           00037610
000676 277A                        7018          BOC    STOP,WRITE25        GO RUN TIMEOUT CTR                 00037620
000677 2888                        7021 WRITE34  BOC    ENDATA,WRITE40      NORMAL EXIT                        00037630
000678 2474                        7024          BOC    RDTIME,WRITE32      WAIT FOR RD TIME TO RISE           00037640
000679 6677                        7027          BU     WRITE34                                                00037650

                                   7030 * RUN TIME OUT CTR IF STOP IS ON                                      00037670
00067A A101                        7032 WRITE25  ADD    WORK2,1             BUMP TIME OUT                      00037680
00067B 2177                        7035          BOC    NALCO,WRITE34       SHD NEVER CARRY                    00037690
00067C 8C02                        7038 WRITE25X ORI    DTACHK1,SLOWEND     SET ERROR                 * UC *   00037700
00067D 277F                        7041 CHKBORXX BOC    STOP,CHKBORXY       WAIT FOR STOP IF NECESSARY         00037710
00067E 667D                        7044          BU     CHKBORXX                                               00037720
00067F D901                        7047 CHKBORXY ANDM   FRU,X'01'           HAVE WE SEEN BOR                   00037730
000680 2034                        7050          BOC    DBUS,VELBAD         BR IF NOT                          00037740
000681 2F35                        7053 LOOKIBG  BOC    IBG,VELOUT          WAIT FOR IBG                       00037750
000682 6681                        7056          BU     LOOKIBG                                                00037760
000683 9500                        7059 DROPGO   ORM    FLAGS,0             TEST FOR DIAG WRITE                00037770
000684 3072                        7062          BOC    DREG0,WRITE280      GO BACK IF SO                      00037780
000685 1508                        7065          STO    WORK5,DEVSEL                                           00037790
000686 5524                        7068          XFR    WORK5,TUTAG         DROP MOVE                          00037800
000687 6672                        7071          BU     WRITE280                                               00037810


                                   7075 ********************************************************************** 00037840
                                   7076 * END OF DATA DETECTED.  CHECK POSTAMBLE                            * 00037850
                                   7077 ********************************************************************** 00037860
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LOC	OBJECT CODE	ADDR1	ADDR2	STMT	SOURCE STATEMENT			F01MAY72 2/04/74
000688				7078	WRITE40	EQU	*	00037870
000688	CDDF			7080		AND	XOUTAIM,ONES-NOLOSS RESET NOLOSS	00037880
000689	4D42			7083		XFR	XOUTAIM,XOUTA DO IT	00037890
00068A	00F4			7086		STO	WORK1,ONES-11 LOAD ONES CTR 12 GRPS	00037900
00068B	388D			7089		BOC	6250,WRITE41 BR IF HI DENS	00037910
00068C	00E2			7092		STO	WORK1,ONES-29 RELOAD CTR FOR 1600	00037920
00068D	2D91			7095	WRITE41	BOC	DATARDY,WRITE420 WAIT FOR ONES TO RISE	00037930
00068E	2FA3			7098		BOC	IBG,WRITE49 NORMAL EXIT	00037940
00068F	2D91			7101		BOC	DATARDY,WRITE420 420WATCH AGAIN FOR ONES	00037950
000690	668D			7104		BU	WRITE41	00037960
000691	A001			7108	WRITE420	ADD	WORK1,1 BUMP ONES CTR	00037980
000692	219E			7111		BOC	NALCO,WRITE43 BR ON NO CARRY	00037990
000693	38A4			7114		BOC	6250,SETENDER BR IF GCR	00038000
000694	CDCF			7117		AND	XOUTAIM,ONES-SYNC-NOLOSS	00038010
000695	4D42			7120		XFR	XOUTAIM,XOUTA LINE TO DATA FLOW	00038020
000696	00EC			7123		STO	WORK1,ONES-19 LOAD NEW CTR	00038030
000697	2497			7127	HERENOW	BOC	RDTIME,HERENOW WAIT FOE RD TIME TO FALL	00038050
000698	2FA6			7130		BOC	IBG,WRITE50 NORMAL EXIT	00038060
000699	A001			7133		ADD	WORK1,1 BUMP CTR	00038070
00069A	219C			7136		BOC	NALCO,THERE BR IF OK YET	00038080
00069B	8A02			7139		ORI	DTACHK2,EXCPOST SET ERROR	00038090
00069C	2497			7143	THERE	BOC	RDTIME,HERENOW WAIT FOE RD TIME TO RISE	00038110
00069D	669C			7146		BU	THERE	00038120
00069E	2D9E			7149	WRITE43	BOC	DATARDY,WRITE43 WAIT FOR ONES TO FALL	00038130
00069F	668D			7152		BU	WRITE41	00038140
0006A0	B001			7156	WRITE54	ADDM	WORK1,1 CK RESULTS	00038160
0006A1	21A4			7159	WRITE542	BOC	NALCO,SETENDER SHD CARRY	00038170
0006A2	667D			7162		BU	CHKBORXX	00038180
0006A3	38A0			7165	WRITE49	BOC	6250,WRITE54 BR IF GCR	00038190
0006A4	8A02			7168	SETENDER	ORI	DTACHK2,EXCPOST SET ERROR * UC *	00038200
0006A5	667D			7171		BU	CHKBORXX	00038210
0006A6	B00F			7175	WRITE50	ADDM	WORK1,15 ASSURE MORE THAN 5 BYTES	00038230
0006A7	66A1			7178		BU	WRITE542 GO CHK RESULTS	00038240

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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                        F01MAY72   2/04/74
0006A8 6024                      7183 ERGAWAY  BU    ERGSTR          GO DO ERASE GAP                      00038270

                                 7186 ************************************************************************ 00038290
                                 7187 * WRITE TAPE MARK HAS BEEN INITIATED - READ BACK CHECK TO ASSURE      * 00038300
                                 7188 * GOOD TAPE MARK. IF READ DATA IS SEEN TOO SOON, EARLY BEGIN CHECK   * 00038310
                                 7189 * WILL BE SET.  IF NO READ DATA IS SEEN, NO BLOCK ERROR IS SET.      * 00038320
                                 7190 * ONCE BLK RISES, THE TAPE MARK BRANCH CONDITION MUST STAY UP        * 00038330
                                 7191 * UNTIL BLK FALLS AGAIN. IBGDROP ERROR INDICATES THAT THIS           * 00038340
                                 7192 * DID NOT HAPPEN.                                                   * 00038350
                                 7193 ************************************************************************ 00038360

0006A9 1951                      7196 DOWTM64  STO   LINK2,WTMSTR2   LOAD LINK RETURN                     00038380
0006AA 3AAC                      7199         BOC   STATC,WTMAWAY    BR IF LWTM                           00038390
0006AB 6025                      7202         BU    ERGCTR          GO DO ERG FIRST                      00038400

0006AC 19AE                      7206 WTMAWAY  STO   LINK2,WTM20     LOAD LINK RETURN                     00038420
0006AD 661C                      7209         BU    SETSYNC2        GO WAIT FOR DATA                     00038430

0006AE 00CA                      7213 WTM20    STO   WORK1,ONES-53   LOAD TM WINDOW CTR                   00038450
0006AF 03CE                      7216         STO   WORK4,ONES-49   SET TM COUNTER                       00038460
0006B0 24B0                      7219 WTM21    BOC   RDTIME,WTM21    WAIT FOR RDTIME TO FALL              00038470
0006B1 A001                      7222         ADD   WORK1,1         BUMP WINDOW CTR                      00038480
0006B2 21BB                      7225         BOC   NALCO,WTM22     BR IF STILL OPEN                     00038490
0006B3 01E3                      7228 WTM21A   STO   WORK2,ONES-28   LOAD TIME OUY              EC736696  00038500
0006B4 24B4                      7231 WTM21B   BOC   RDTIME,WTM21B   WAIT FOR RDTIME TO FALL              00038510
0006B5 A101                      7234 WTM25    ADD   WORK2,1         BUMP TIME OUT                        00038520
0006B6 21B8                      7237         BOC   NALCO,WTM26     BR ON NO CARRY                       00038530
0006B7 8C02                      7240         ORI   DTACHK1,SLOWEND SET ERROR                  * UC *    00038540
0006B8 2FCA                      7243 WTM26    BOC   IBG,WTM30       NORMAL EXIT                          00038550
0006B9 24B4                      7246         BOC   RDTIME,WTM21B   WAIT FOR RD TIME TO RISE              00038560
0006BA 66B8                      7249         BU    WTM26                                                  00038570
0006BB 3CC8                      7252 WTM22    BOC   NBLOCK,WTM27A   SHOULD NOT BRANCH                    00038580
0006BC A201                      7255         ADD   WORK3,1         BUMP BLOCK CTR                       00038590
0006BD 21BF                      7258         BOC   NALCO,WTM23     BR ON NO CARRY                       00038600
0006BE 8901                      7261         ORI   FRU,1           SET SEQ 7 - BLOCK SEEN               00038610
0006BF 3DC5                      7264 WTM23    BOC   NTM,WTM27       BR IF NO TAPE MARK                   00038620
0006C0 A301                      7267         ADD   WORK4,1         BUMP TM COUNTER                      00038630
0006C1 21C3                      7270         BOC   NALCO,WTM24     BR ON NO CARRY                       00038640
0006C2 8902                      7273         ORI   FRU,2           SET, SEQ 6 - TM GOOD                 00038650
0006C3 24B0                      7276 WTM24    BOC   RDTIME,WTM21   WAIT FOR RD TIME                     00038660

0006C4 66C3                      7280         BU    WTM24                                                  00038680
0006C5 9900                      7283 WTM27    ORM   FRU,0                                                00038690
0006C6 37C8                      7286         BOC   DREG7,WTM27A    BR IF BLOCK OK                       00038700
0006C7 66C3                      7289         BU    WTM24                                                  00038710
0006C8 8C80                      7292 WTM27A   ORI   DTACHK1,IBGDROP SET ERROR                * UC *     00038720
0006C9 66C3                      7295         BU    WTM24                                                  00038730

0006CA 9900                      7300 WTM30    ORM   FRU,0           GET REGISTER FOR TEST                00038760
0006CB 37CD                      7303         BOC   DREG7,WTM31     BR IF BLOCK OK                       00038770
0006CC 6634                      7306         BU    VELBAD          GO SET NOBLOCK ERROR                 00038780
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   2/04/74
0006CD 36CF                      7309 WTM31    BOC   DREG6,WTM32        BR IF TM IS OK                 00038790
0006CE 8A20                      7312 SETWTMCK ORI   DTACHK2,WTMERR     SET UNIT CHECK          * UC * 00038800
0006CF 61D0                      7315 WTM32    BU    ENDUP              EXIT                           00038810

                                 7318 ***      LOAD POINT - WRITE ID BURST    ******                   00038830
0006D0 8424                      7320 WRT1     ORI   STATIMG,WRTBURST+SETSTATB                       00038840
                                 7322 ************************************************************** 00038850
                                 7323 * TURN ON WRITE CONDITION & WRITE BURST STAT - THEN MOVE FIRST TWO    * 00038860
                                 7324 * INCHES WITHOUT CHECKING.                                        * 00038870
                                 7325 ************************************************************** 00038880
0006D1 4428                      7327          XFR   STATIMG,STAT       SET WRITE BURST STAT           00038890
0006D2 1950                      7330          STO   LINK2,TRETURN5     LOAD RETURN - WRT2             00038900
0006D3 00FF                      7333          STO   WORK1,ONES         LOAD HIGH COUNTER              00038910
0006D4 0100                      7336          STO   WORK2,0            LOAD LOW COUNTER - 2 INCHES    00038920
0006D5 621C                      7339          BU    ZEROCTR                                         00038930

                                 7342 ************************************************************** 00038950
                                 7343 * TURN ON FLAG FOR TAK COUNTER (CHECK BURST), THEN MOVE NEXT FOUR     * 00038960
                                 7344 * INCHES  CHECKING BURST.                                        * 00038970
                                 7345 ************************************************************** 00038980
0006D6 1900                      7347 WRT2     STO   LINK2,WRT4         LOAD LINK RETURN               00038990
0006D7 8820                      7350 WRT21    ORI   TRACER,LPMARK      SET FLAG FOR TRK CTR           00039000
0006D8 03F0                      7353          STO   WORK4,ONES-15      CLEAR ID CTR                   00039010
0006D9 6703                      7356 WRT3     BU    WRT30                                           00039020



                                 7360 ******** CHECK POSITIONING SUBROUTINE ************************** 00039050
                                 7361 *                                                               * 00039060
                                 7362 *  CHECK FOR POSITIONING RESPONSE TO COMMAND TAG - IF ON, WAIT  * 00039070
                                 7363 *  FOR IT TO FALL.                                              * 00039080
                                 7364 *                                                               * 00039090
                                 7365 ************************************************************** 00039100
0006DA 5460                      7368 CHKPOSIT XFRH  STATIMG,TUBO       ASSURE TUBO IS CLEAR           00039120
0006DB 020A                      7371          STO   WORK3,DEVSEL+COMMAND                            00039130
0006DC 4224                      7374          XFR   WORK3,TUTAG        RAISE CMD TAG                  00039140
0006DD A278                      7377 ONEMORE  ADD   WORK3,120          BUMP WAIT COUNTER              00039150
0006DE 21DD                      7380          BOC   NALCO,ONEMORE      WAIT FOR CARRY OUT             00039160
0006DF 3FE5                      7383 WAITSOME BOC   DEVATTN,ZAP1       ABNORMAL EXIT                  00039170
0006E0 4281                      7386          XFR   WORK3,TUBI         BRING IN DEVICE RESPONSE       00039180
0006E1 37DF                      7389          BOC   DREG7,WAITSOME     WAIT FOR POSITIONING TO FALL   00039190
0006E2 0208                      7392          STO   WORK3,DEVSEL       RESET CMD TAG IMAGE            00039200
0006E3 4224                      7395          XFR   WORK3,TUTAG        DROP CMD TAG                   00039210
0006E4 5922                      7398          XFR   LINK2,IC           RETURN TO CALLER               00039220
0006E5 671D                      7401 ZAP1     BU    ENDUPEX                                         00039230

0006E6 6161                      7405 CRETURN1 BU    LETSGO             TRNARND RETURN                 00039250

0006E7 675E                      7409 CRETURN2 BU    ERASE4                                          00039270
0006E8 677C                      7412 CRETURN3 BU    BKWDINIT                                        00039280
0006E9 674C                      7415 CRETURN4 BU    DOBOTXX                                         00039290
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   2/04/74
0006EA 60B8                       7418 CRETURN5 BU    READSTOP                                        00039300

                                  7421 **       NRZI TM - READ BACK CHECK COMPLETION FRON PAGE 4       00039320
0006EB 2DFA                       7423 TMLOOP1  BOC   DATARDY,SETBOR1     WATCH FOR SECOND DATA RDY   00039330
0006EC 28F1                       7426 TM10BOR  BOC   ENDATA,TMFINIS     NORMAL EXIT                 00039340
0006ED 24EB                       7429          BOC   RDTIME,TMLOOP1     WAIT FOR FALL               00039350

0006EE A101                       7433          ADD   WORK2,1            BUMP TIME OUT CTR           00039370
0006EF 21F7                       7436          BOC   NALCO,TMLOOP2      BR IF OK YET                00039380
0006F0 8C02                       7439          ORI   DTACHK1,SLOWEND    SET ERROR                   00039390

0006F1 9900                       7443 TMFINIS  ORM   FRU,0              TEST BOR SEEN               00039410
0006F2 37F4                       7446          BOC   DREG7,TMEND2       BR IF OK                    00039420
0006F3 6634                       7449          BU    VELBAD                                          00039430

0006F4 3DCE                       7453 TMEND2   BOC   NTM,SETWTMCK       SHD NOT BR                  00039450
0006F5 61D0                       7456          BU    ENDUP                                           00039460


0006F6 8901                       7461 SETBOR2  ORI   FRU,1              SET BOR SEEN FLAG           00039490
0006F7 2DF6                       7464 TMLOOP2  BOC   DATARDY,SETBOR2    WATCH FOR DATA RDY          00039500
0006F8 24EB                       7467 TM20BOR  BOC   RDTIME,TMLOOP1     WAIT FOR RISE               00039510
0006F9 66F7                       7470          BU    TMLOOP2                                         00039520

0006FA 8901                       7474 SETBOR1  ORI   FRU,1              SET BOR SEEN FLAG           00039540
0006FB 66EC                       7477          BU    TM10BOR                                         00039550


000700                            7480           ORG   BEGIN+X'700'                                   00039570
000700 1905                       7482 WRT4     STO   LINK2,WRT5          LOAD LINK RETURN            00039580
000701 3803                       7485          BOC   6250,WRT30          BR IF HI DENS               00039590
000702 197B                       7488          STO   LINK2,ARETURN1      LOAD LINK FOR PE RETURN     00039600
000703 002B                       7491 WRT30    STO   WORK1,ONES-212                                   00039610
000704 6783                       7494          BU    CLRCTR1                                         00039620

                                  7497 ************************************************************** 00039640
                                  7498 * RESET WRITE BURST STAT AND                AND GO SET NORMALIZE     * 00039650
                                  7499 * TO THE TAPE UNIT.                                            * 00039660
                                  7500 ************************************************************** 00039670
000705 C4DB                       7502 WRT5     AND   STATIMG,ONES-WRTBURST-SETSTATB                    00039680
000706 4428                       7505          XFR   STATIMG,STAT         RESET STATS                 00039690
000707 1A3E                       7508          STO   LINK3,ZRETURN2       LOAD LINK RETURN            00039700
000708 0312                       7511          STO   WORK4,SETDENS+SETERASE D SET NORMALIZE CMD       00039710
000709 020D                       7514          STO   WORK3,DEVSEL+CONTROL+MOVE                        00039720
00070A 6530                       7517          BU    SETCTRL1                                        00039730
                                  7519 * SAGC CIRCUITS MUST WAIT WRT TO RD HEAD DISTANCE BEFORE ADJUSTING  00039740

                                  7521 ************************************************************** 00039760
                                  7522 * TURN ON WRT CONDITION AND STATB TO ALLOW ALU1 TO BEGIN WRITE OF     * 00039770
                                  7523 * SAGC BURST. THEN EXIT TO TAK COUNTER 512 TACHS WITH NO CHECKING     * 00039780
                                  7524 ************************************************************** 00039790
00070B 8444                       7526 WRT6     ORI   STATIMG,SETSTATB+PERMRDWT                         00039800
00070C 8840                       7529          ORI   TRACER,CHKBRST       SET FLAG FOR TAK COUNTER     00039810
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                       F01MAY72   2/04/74
00070D 1911                        7532            STO    LINK2,WRT7           LOAD RETURN                    00039820
00070E 0000                        7535            STO    WORK1,0              LOAD COUNT - 256 TACKS         00039830
00070F 4428                        7538            XFR    STATIMG,STAT         NOTIFY ALU 1 TO GO AHEAD       00039840
000710 6783                        7541            BU     CLRCTR1                                             00039850

000711 1913                        7545 WRT7       STO    LINK2,WRT8           SET RETURN                     00039870
000712 6783                        7548            BU     CLRCTR1              GO COUNT 256 TACHS             00039880

000713 1916                        7552 WRT8       STO    LINK2,WRT9           SET RETURN                     00039900
000714 009B                        7555            STO    WORK1,ONES-100       SET COUNT - 101 TACHS          00039910
000715 6783                        7558            BU     CLRCTR1                                             00039920
                                   7560 ********************************************************************** 00039930
                                   7561 *     BOR     INTERRUPT          WRITE             READ             * 00039940
                                   7562 *      0          0            EQUIP CK          EQUIP CK           * 00039950
                                   7563 *      1          1            ID BURST CK       READ ERROR + SAGC BIT  00039960
                                   7564 *      1          0            NORMAL            NORMAL               00039970
                                   7565 *      0          1            ID BURST CK       NOT CAP            * 00039980

000716 D820                        7568 WRT9       ANDM   TRACER,LPMARK        CHK BOR FLG /  SHD BE OFF      00040000
000717 201F                        7571            BOC    DBUS,WRT90           BR IF OK                       00040010
000718 3F1B                        7574            BOC    DEVATTN,DTASAGC      BYPASS EQUIP CHK IF TU HOLLERS 00040020
000719 1D02                        7577 EQSAGC     STO    EQUIPCK,PERR         SET EQUIPMENT CHECK     * UC * 00040030
00071A 671C                        7580            BU     ENDUPEXA                                            00040040

00071B 8A10                        7584 DTASAGC    ORI    DTACHK2,FORMATCK     SET ERROR            * UC *    00040060
00071C 8C08                        7587 ENDUPEXA   ORI    DTACHK1,TSAGC        SET ERROR                 * UC 00040070
00071D C4FB                        7590 ENDUPEX    AND    STATIMG,ONES-SETSTATB                               00040080
00071E 61CF                        7593            BU     CLRXOUTA                                            00040090


00071F 0087                        7598 WRT90      STO    WORK1,ONES-120       LOAD CTR                       00040120
000720 01FE                        7601            STO    WORK2,ONES-1         LOAD CTR                       00040130
000721 2421                        7604 ID3        BOC    RDTIME,ID3           WAIT FOR FALL                  00040140
000722 2424                        7607 ID4        BOC    RDTIME,ID5            WAIT FOR RISE                 00040150
000723 6722                        7610            BU     ID4                                                 00040160
000724 271B                        7613 ID5        BOC    STOP,DTASAGC         ERROR EXIT                     00040170
000725 291F                        7616            BOC    NSAGCID,WRT90          WAIT FOR ID                  00040180
000726 A001                        7619            ADD    WORK1,1              BUMP CTRS                      00040190
000727 2121                        7622            BOC    NALCO,ID3                                           00040200
000728 A101                        7625            ADD    WORK2,1              BUMP CTR                       00040210
000729 2121                        7628            BOC    NALCO,ID3                                           00040220
00072A 272C                        7631 ID12       BOC    STOP,ID14            NORMAL EXIT                    00040230
00072B 672A                        7634            BU     ID12                                                00040240
00072C 3F1B                        7637 ID14       BOC    DEVATTN,DTASAGC       ERROR EXIT                    00040250
00072D 2F2F                        7640 ID145      BOC    IBG,WRT95            WAIT FOR IBG                   00040260
00072E 672D                        7643            BU     ID145                                               00040270
00072F 1CFA                        7646 WRT95      STO    LINK1,SRETURN5       LOAD LINK RETURN               00040280
000730 C4BB                        7649            AND    STATIMG,ONES-SETSTATB-PERMRDWT                      00040290
000731 4428                        7652            XFR    STATIMG,STAT         RESET SOMETHING                00040300
000732 62E1                        7655            BU     FCHSTS                                              00040310


                                   7660 ********************************************************************** 00040350
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  LOC   OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                            F01MAY72   2/04/74
                                    7661 *                                                                  * 00040360
                                    7662 *  THIS SUBROUTINE IS USED BY ALL WRITE OPS TO DETERMINE IF ERASE HEAD* 00040370
                                    7663 * POSITIONING IS REQUIRED.  THREE CASES ARE CONSIDERED - 1.BACKWARD AT* 00040380
                                    7664 * LOAD POINT  2.BACKWARD READ STATUS AND NOT LOAD POINT  3.FORWARD     * 00040390
                                    7665 * READ STATUS.  REQUIRED TAPE MOTIONS ARE PERFORMED BY THIS CODE.      * 00040400
                                    7666 *                                                                  * 00040410
                                    7667 ******************************************************************** 00040420

000733 D708                         7670 NEEDERG  ANDM  SENSE2,HIDEN        IS THIS A BIRCH TAPE UNIT          00040440
000734 205B                         7673          BOC   DBUS,ERGNONE        EXIT IF NOT                        00040450

000735 9600                         7677          ORM   SENSE1,0            GET SENSE BYTE FOR TEST            00040470
000736 345B                         7680          BOC   WRTSTAT,ERGNONE     EXIT IF ALREADY IN WRT STATUS      00040480
000737 334A                         7683          BOC   BOT,DOBOT           BR IF BOT IS ON                    00040490
000738 305C                         7686          BOC   BACKWD,DOBACKWD     BR IF BKWD READ STATUS             00040500

                                    7689 ******************************************************************** 00040520
                                    7690 ******** WRITE AFTER FORWARD READ ************************************ 00040530
                                    7691 ******************************************************************** 00040540

000739 19E7                         7694          STO   LINK2,CRETURN2      LOAD LINK RETURN        ERASE4     00040560
00073A 66DA                         7697          BU    CHKPOSIT            GO CHECK FOR POSITIONING           00040570


00073B 00FF                         7702 ERASE5   STO   WORK1,ONES          LOAD CTR                           00040600
00073C 0340                         7705          STO   WORK4,RDFWDD        PRELOAD CMD                        00040610
00073D 1940                         7708          STO   LINK2,ERASE8        LOAD LINK RETURN                   00040620
00073E 1A81                         7711          STO   LINK3,TAKMOVE       LOAD LINK FOR SET CMD              00040630
00073F 6768                         7714          BU    SETCMD2                                                00040640
000740 1A3F                         7717 ERASE8   STO   LINK3,CTLRET6       PRELOAD LINK RETURN - ERASE 6      00040650
000741 0302                         7720 ERASE7   STO   WORK4,SETERASE      PRELOAD CTRL                       00040660
000742 020D                         7723          STO   WORK3,DEVSEL+CONTROL+MOVE                              00040670
000743 6530                         7726          BU    SETCTRL1            GO SET CTRL CMD                    00040680

000744 0089                         7730 ERASE6   STO   WORK1,ONES-118      LOAD FWD TAK CT                    00040700
000745 1947                         7733          STO   LINK2,ERASE9        LOAD LINK RETURN                   00040710
000746 6781                         7736          BU    TAKMOVE                                                00040720

000747 1A56                         7740 ERASE9   STO   LINK3,ERASE3        LOAD LINK RETURN                   00040740
000748 0308                         7743          STO   WORK4,WRITE         LOAD CMD                           00040750
000749 6768                         7746          BU    SETCMD2             GO SET WRITE MODE                  00040760

                                    7749 ******************************************************************** 00040780
                                    7750 ******** WRITE FROM LOAD POINT *************************************** 00040790
                                    7751 ******************************************************************** 00040800
00074A 19E9                         7753 DOBOT    STO   LINK2,CRETURN4      LOAD RETURN--- DOBOTXX             00040810
00074B 66DA                         7756          BU    CHKPOSIT                                               00040820

00074C 1A40                         7760 DOBOTXX  STO   LINK3,CTLRET3       LOAD LINK RETURN - ERASE 1         00040840
00074D 6741                         7763          BU    ERASE7                                                 00040850

00074E 0069                         7767 ERASE1   STO   WORK1,ONES-150      LOAD BKWD TAK CT                   00040870
00074F 1951                         7770          STO   LINK2,ERASE2        LOAD LINK RETURN                   00040880
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  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                        F01MAY72   2/04/74
000750 6781                       7773           BU     TAKMOVE             GO RAISE MOVE                    00040890

000751 1956                       7777 ERASE2    STO    LINK2,ERASE3        LOAD LINK RETURN                 00040910
000752 0091                       7780           STO    WORK1,145           LOAD FWD TAK CT                  00040920
000753 0308                       7783           STO    WORK4,WRITE         PRELOAD CMD                      00040930
000754 1A81                       7786           STO    LINK3,TAKMOVE       LOAD LINK FOR SET CMD            00040940
000755 6768                       7789           BU     SETCMD2             GO SET WRITE                     00040950

000756 0208                       7793 ERASE3    STO    WORK3,DEVSEL        IMAGE TUTAGS                     00040970
000757 4224                       7796           XFR    WORK3,TUTAG         DROP MOVE                        00040980
000758 C67F                       7799           AND    SENSE1,ONES-BACKWD  RESET BKWD BIT                   00040990
000759 8608                       7802           ORI    SENSE1,WRSTAT       TURN ON WRET STATUS              00041000
00075A 0308                       7805           STO    WORK4,WRITE          LOAD CMD                        00041010
00075B 6138                       7808 ERGNONE   BU     TRNARND        *  CHECK THIS  ************************ 00041020

                                  7811 ********************************************************************** 00041040
                                  7812 ******** WRITE AFTER BACKWARD READ ******************************** 00041050
                                  7813 ********************************************************************** 00041060

00075C 19E8                       7816 DOBACKWD  STO    LINK2,CRETURN3      LOAD LINK RETUEN       BKWDINIT  00041080
00075D 66DA                       7819           BU     CHKPOSIT                                         00041090

00075E 0073                       7824 ERASE4    STO    WORK1,ONES-140      LOAD BKWD TAK CT                 00041120
00075F 9700                       7827           ORM    SENSE2,0            TEST LSR                         00041130
000760 3362                       7830           BOC    DREG3,ERASE40       BR IF GCR MODE                   00041140
000761 006D                       7833           STO    WORK1,ONES-146      CHG CONSTANT FOR PE              00041150
000762 193B                       7836 ERASE40   STO    LINK2,ERASE5        LOAD LINK RETURN                 00041160
000763 0380                       7839           STO    WORK4,RDBKWD        PRELOAD CMD                      00041170
000764 1A81                       7842           STO    LINK3,TAKMOVE       LOAD LINK FOR SET CMD            00041180

                                  7845 ******** SET COMMAND SUBROUTINE ********************************** 00041200
                                  7846 *                                                                  * 00041210
                                  7847 *  RAISE MOVE TO DEVICE IF ENTRY POINT IS SETCMD1. ASSUME MOVE     * 00041220
                                  7848 * IS ON IF ENTRY POINT IS SETCMD2.  SET CMD TO TUBO & RAISE        * 00041230
                                  7849 * COMMAND TAG.  CHECK TAPE UNIT RESPONSE - IF SATISFACTORY, CLEAR  * 00041240
                                  7850 * THE TUBO AND DROP CMD TAG.  EXIT ROUTINE WITH MOVE STILL UP.     * 00041250
                                  7851 *                                                                  * 00041260
                                  7852 ********************************************************************** 00041270

000765 020A                       7855 SETCMD1   STO    WORK3,DEVSEL+COMMAND RAISE COMMAND IN IMAGE           00041290
000766 4360                       7858           XFR    WORK4,TUBO          PASS CMD                         00041300
000767 4224                       7861           XFR    WORK3,TUTAG         GIVE CMD  TO DEVICE              00041310
000768 020B                       7864 SETCMD2   STO    WORK3,DEVSEL+COMMAND+MOVE                            00041320
000769 4224                       7867 SETCMD3   XFR    WORK3,TUTAG         RAISE CMD TAG                    00041330
00076A 4360                       7870           XFR    WORK4,TUBO          SET CMD TO TUBO                  00041340
00076B A270                       7873 ONCEAGN   ADD    WORK3,112           BUMP COUNTER                     00041350
00076C 216B                       7876           BOC    NALCO,ONCEAGN       WAIT FOR OVERFLOW                00041360
00076D D340                       7879           ANDM   WORK4,RDFWDD        IS CMD READ FWD                  00041370
00076E 2070                       7882           BOC    DBUS,GETSTATS       BR IF NOT                        00041380
00076F 0300                       7885           STO    WORK4,0             MODIFY STATUS BYTE FOR READ FWD  00041390
000770                            7887 GETSTATS  EQU    *                    S CMD SET SAGC                  00041400
000770 4981                       7889 STATSNOW  XFR    FRU,TUBI            BRING IN DEVICE RESPONSE         00041410
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   2/04/74
000771 C9AE                      7892           AND   FRU,ONES-GAPCTRL-OPPDIR-POSIT  DONT CARE BITS  00041420
000772 4321                      7895           XFR   WORK4,AR             SET UP STATUS MASK        00041430
000773 F900                      7898           XOM   FRU,0                MASK STATUS               00041440
000774 2076                      7901           BOC   DBUS,CMDEXIT         NORMAL EXIT               00041450
000775 6173                      7904           BU    SETREJ               GO SET CMD STATUS REJECT  00041460

000776 C209                      7908 CMDEXIT   AND   WORK3,DEVSEL+MOVE    SET FOR,CMD DROP          00041480
000777 5460                      7911           XFRH  STATIMG,TUBO         CLEAR BU OUT              00041490
000778 4224                      7914           XFR   WORK3,TUTAG          DROP CMD TAG              00041500
000779 5A22                      7917           XFR   LINK3,IC             RETURN TO USER            00041510
00077A 60C7                      7920 CRERETRN  BU    NOW                                            00041520



                                 7925 ******** MOTION CONTROL VIA TACH LINE SUBROUTINE ********************** 00041560
                                 7926 *                                                                  * 00041570
                                 7927 * THIS CODE CAN BE ENTERED WITH MOVE UP OR DOWN. ITS MAIN           * 00041580
                                 7928 * FUNCTION IS TO HOLD MOVE UP FOR A PRE-SPECIFIED AMOUNT. EACH       * 00041590
                                 7929 * TIME A TACH PULSE IS SEEN, WORK1 IS INCREMENTED. EXIT OCCURS WHEN  * 00041600
                                 7930 * WORK1 OVERFLOWS.                                                 * 00041610
                                 7931 *              CHKBRST FLAG        LPMARK FLAG                     * 00041620
                                 7932 *              0                   0  NOT LP CHECK                * 00041630
                                 7933 *              0                   1  CHECK ID TRACK              * 00041640
                                 7934 *              1                   1  NO CHK ON ID OR SAGC BRST    * 00041650
                                 7935 *              1                   0  CHECK SAGC - ONCE BOR IS SEEN * 00041660
                                 7936 *                                                                  * 00041670
                                 7937 ********************************************************************** 00041680
00077B 65F5                      7939 ARETURN1  BU    WRTP2                                          00041690

00077C 0074                      7943 BKWDINIT  STO   WORK1,ONES-139      LOAD BKWD TAK CTS         00041710
00077D 9700                      7946           ORM   SENSE2,0            GET LSR TO TEST           00041720
00077E 3380                      7949           BOC   DREG3,ERASER        BR IF GCR MODE            00041730
00077F 0079                      7952           STO   WORK1,ONES-134      CHG CONSTANT FOR PE       00041740
000780 193B                      7955 ERASER    STO   LINK2,ERASE5        LOAD LINK RETURN          00041750

000781 020B                      7959 TAKMOVE   STO   WORK3,DEVSEL+MOVE+COMMAND MOVE TAG             00041770
000782 4224                      7962           XFR   WORK3,TUTAG         RAISE MOVE IF NECESSARY   00041780
000783 0200                      7965 CLRCTR1   STO   WORK3,0              FILL TIME OUT COUNTER     00041790
000784 01FE                      7968           STO   WORK2,X'FE'          LOAD HI CTR              00041800

000785 2487                      7972 TACH1     BOC   RDTIME,TACH2        WAIT FOR RDTIME TO RISE   00041820
000786 6785                      7975           BU    TACH1                                          00041830
000787 3E8A                      7978 TACH2     BOC   BSYTACH,YESTAK      LOOK FOR ACTIVE TACH      00041840
000788 8808                      7981           ORI   TRACER,TAKTR        TURN ON TAK TRACE         00041850
000789 678C                      7984           BU    COUNTDWN                                       00041860

00078A 9800                      7988 YESTAK    ORM   TRACER,0            LOOK AT TAK TRACE         00041880
00078B 3492                      7991           BOC   TAKTR,COUNTONE      BR IF TAK TRACE ON        00041890
00078C 248C                      7994 COUNTDWN  BOC   RDTIME,COUNTDWN     WAIT FOR RD TIME TO FALL  00041900
00078D A201                      7997           ADD   WORK3,1             BUMP TIME OUT CTR         00041910
00078E 2185                      8000           BOC   NALCO,TACH1         WAIT SOME MORE            00041920
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 LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                   F01MAY72   2/04/74
00078F A101                       8003           ADD   WORK2,1              BUMP CTR                    00041930
000790 2185                       8006           BOC   NALCO,TACH1          BR ON NO CARRY              00041940
000791 6246                       8009           BU    SETNTACH             ERROR EXIT                  00041950

000792 C8F7                       8013 COUNTONE  AND   TRACER,ONES-TAKTR    RESET TAK TRACE             00041970
000793 31A9                       8016           BOC   CHKBRST,CHKID        BR ON FLAG                  00041980
000794 32A1                       8019           BOC   LPMARK,CHK1ORP       BR ON FLAG                  00041990
000795 5381                       8022           XFRH  WORK4,TUBI           BRING IN CMD STATUS         00042000
000796 339C                       8025           BOC   OPPDIR,SUBONE       BR IF ON TO DECREMENT CTR   00042010
000797 A001                       8028 TACH3     ADD WORK1,1                BUMP CTR                    00042020
000798 2183                       8031           BOC   NALCO,CLRCTR1       KEEP COUNTING TILL OVERFLOW 00042030
000799 0209                       8034           STO   WORK3,DEVSEL+MOVE                                00042040
00079A 4224                       8037           XFR   WORK3,TUTAG          DROP CMD TAG                00042050
00079B 5922                       8040           XFR   LINK2,IC             RETURN - NORMAL EXIT        00042060

00079C A0FF                       8044 SUBONE    ADD   WORK1,ONES          SUBTRACT ONE FROM COUNTER   00042080
00079D 209F                       8047           BOC   DBUS,SETDRCK        SET DYNAMIC REVERSAL ERROR  00042090
00079E 6783                       8050           BU    CLRCTR1                                       00042100
00079F 1D08                       8053 SETDRCK   STO   EQUIPCK,DYREV       SET ERROR                   00042110
0007A0 671D                       8056           BU    ENDUPEX              EXIT                        00042120
                                  8058 * CHECK FOR CREASE IN SINGLE TRK ENVELOPE                         00042130
0007A1 39A3                       8060 CHK1ORP   BOC   N1TE,CHKPOR1                                     00042140
0007A2 6797                       8063           BU    TACH3                                           00042150

0007A3 2CA5                       8067 CHKPOR1   BOC   NPTE,CNTFORER                                   00042170
0007A4 6797                       8070           BU    TACH3                                           00042180

0007A5 A301                       8074 CNTFORER  ADD   WORK4,1                                         00042200
0007A6 2197                       8077           BOC   NALCO,TACH3                                     00042210
0007A7 8A10                       8080 IBGON     ORI   DTACHK2,FORMATCK     SET ERROR CREASE IN BURST     * UC * 00042220
0007A8 671D                       8083           BU    ENDUPEX                                         00042230

0007A9 2EAB                       8087 CHKID     BOC   BOR,CHKID2           SAMPLE BOR                  00042250
0007AA 6797                       8090           BU    TACH3                                           00042260
0007AB C8DF                       8093 CHKID2    AND   TRACER,ONES-LPMARK   REST  NO CHECK FLAG         00042270
0007AC 6797                       8096           BU    TACH3                                           00042280

                                  8099 **************  VELOCITY CHECK FOR WRITE OPS ON 6250 UNITS ************ 00042300
                                  8100 *               ***********          ***********          *          * 00042310
                                  8101 *               *  TACH   *          *         *          *          * 00042320
                                  8102 *               *  LINE   *          *         *          *          * 00042330
                                  8103 *          *******         ***********         ***********          * 00042340
                                  8104 *                    A          B          C          D              * 00042350
                                  8105 *                                                                   * 00042360
                                  8106 *  AT RISE OF GAP CONTROL,CHECK ONE FULL TACH FOR BEING IN SPEC.    * 00042370
                                  8107 *  IF TACH A+B IS OUT OF SPEC, DROP COUNT ACCUMULATED ON A AND COUNT * 00042380
                                  8108 *  ACROSS C.  NOW CHECK FOR B+C IN SPEC. IF SO,EXIT -       IF A+B IS * 00042390
                                  8109 *  NOT IN SPEC - VELOCITY RETRY WILL BE SET.                        * 00042400
                                  8110 *                                                                   * 00042410
                                  8111 *         VELOCITY LIMITS + OR - 6 PER CENT                         * 00042420
                                  8112 *         MOD 4      118.1US          131.1US                       * 00042430
                                  8113 *         MOD 6       70.8US           79.8US                       * 00042440
                                  8114 *         MOD 8       44.3US           49.9US                       * 00042450
                                  8115 *                                                                   * 00042460
```

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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                          F01MAY72   2/04/74
                                   8116 ************************************************************************ 00042470

0007AD 101F                        8119 SETCOUNT STOH   WORK1,ONES-224      LOAD BASE COUNT FOR MOD 3            00042490
0007AE 1118                        8122          STOH   WORK2,24            LOAD PEAK COUNT FOR MOD 3            00042500
0007AF 9700                        8125          ORM    SENSE2,0            SEE WHAT KIND OF DRIVE               00042510
0007B0 36B7                        8128          BOC    DREG6,ISOKNOW       BR IF MOD 3                          00042520
0007B1 37B5                        8131          BOC    DREG7,NOW200        BR IF MOD 7                          00042530
0007B2 1077                        8134          STOH   WORK1,ONES-136      LOAD BASE COUNT FOR MOD 5            00042540
0007B3 1111                        8137          STOH   WORK2,17            LOAD PEAK COUNT FOR MOD 5            00042550
0007B4 67B7                        8140          BU     ISOKNOW                                                  00042560
0007B5 10AA                        8143 NOW200   STOH   WORK1,ONES-85       LOAD BASE COUNT FOR MOD 7            00042570
0007B6 110B                        8146          STOH   WORK2,11            LOAD PEAK COUNT FOR MOD 7            00042580

                                   8149 *********************                                                    00042600
                                   8150 * CLOCK ACROSS TACHA *                                                   00042610
                                   8151 *********************                                                    00042620

0007B7 5006                        8154 ISOKNOW  XFRH   LSR                 SET HIGH MODE                        00042640
0007B8 0200                        8157          STO    WORK3,0             LOAD A CTR                           00042650
0007B9 15E1                        8160          STO    WORK5,ONES-30       LOAD RETRY CTR                       00042660
0007BA 3EBA                        8163 WAITONE  BOC    BSYTACH,WAITONE      GET IN SYNC                         00042670
0007BB 3EBD                        8166 ONEMORET BOC    BSYTACH,VELOC001    EXIT ON RISE                         00042680
0007BC 67BB                        8169          BU     ONEMORET                                                 00042690

0007BD 3EBF                        8173 VELOC001 BOC    BSYTACH,VELOC002    LOOK AT TACH                         00042710
0007BE 67C4                        8176          BU     VELOC003            NORMAL EXIT                          00042720
0007BF A201                        8179 VELOC002 ADD    WORK3,1             BUMP CTR A                           00042730
0007C0 21BD                        8182          BOC    NALCO,VELOC001      LOOK FOR CARRY                       00042740
                                   8184 * DRIVE WAS TOO SLOW                                                     00042750
0007C1 3FDB                        8186 VELOC004 BOC    DEVATTN,UNTCHK1     EXIT ON READY DROP                   00042760
0007C2 20C3                        8189          NOP2                                                            00042770
0007C3 3EC1                        8192          BOC    BSYTACH,VELOC004    HANG TILL TACH CHANGES               00042780
                                   8194 *********************                                                    00042790
                                   8195 * CLOCK ACROSS TACHB *                                                   00042800
                                   8196 *********************                                                    00042810

0007C4 0300                        8199 VELOC003 STO    WORK4,0             CLEAR CTR B                          00042830
0007C5 3ECB                        8202 VELOC005 BOC    BSYTACH,VELOC006    NORMAL EXIT                          00042840
0007C6 A301                        8205          ADD    WORK4,1             BUMP CTR B                           00042850
0007C7 21C5                        8208          BOC    NALCO,VELOC005      LOOK FOR CARRY                       00042860
                                   8210 * DRIVE TOO SLOW                                                         00042870
0007C8 3FDB                        8212 VELOC007 BOC    DEVATTN,UNTCHK1     EXIT ON READY DROP                   00042880
0007C9 3ECB                        8215          BOC    BSYTACH,VELOC006    HANG TILL TACH CHANGES               00042890
0007CA 67C8                        8218          BU     VELOC007                                                 00042900

                                   8221 * CHECK ACCUMULATED COUNTS                                               00042920
0007CB 4321                        8223 VELOC006 XFR    WORK4,AR            GET CTR A TO A REG                   00042930
0007CC A200                        8226          ADD    WORK3,0             ADD CTR A TO CTR B                   00042940
0007CD 21CF                        8229          BOC    NALCO,VELOC008      TAKE BR IF OK                        00042950
0007CE 67F4                        8232 VELOC009 BU     VELOC021                                                 00042960
0007CF 4021                        8235 VELOC008 XFR    WORK1,AR            GET BASE CT TO A REG                 00042970
0007D0 A200                        8238          ADD    WORK3,0             ADD BASE TO CTR B                    00042980
0007D1 21D3                        8241          BOC    NALCO,VELOC011      TAKE BR IF OK                        00042990
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  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                  F01MAY72   2/04/74
0007D2 67F7                      8244 VELOC010 BU     VELOC024                                        00043000
0007D3 4121                      8247 VELOC011 XFR    WORK2,AR          GET PEAKING CT TO A REG       00043010
0007D4 B200                      8250          ADDM   WORK3,0           ADD TO ACCUMULATED CTS        00043020
0007D5 21D7                      8253          BOC    NALCO,VELOCOUT    SHOULD CARRY NORMALLY         00043030
0007D6 67F9                      8256          BU     VELOCOK                                         00043040
0007D7 0401                      8259 VELOCOUT STO    STATIMG,VELTRY    SET VELOCITY RETRY            00043050
0007D8 A501                      8262          ADD    WORK5,1           BUMP RETRY CTR                00043060
0007D9 21DE                      8265          BOC    NALCO,VELOC012    GO RETRY AGAIN                00043070
0007DA 632B                      8268          BU     SETVELCK          GO ABORT                      00043080

0007DB 4006                      8272 UNTCHK1  XFR    LSR               SET LOW MODE                  00043100
0007DC 8402                      8275          ORI    STATIMG,SETSTATC  SET UNIT CHECK                00043110
0007DD 61D0                      8278          BU     ENDUP             GO SET UNIT CHECK             00043120

0007DE 3EE1                      8282 VELOC012 BOC    BSYTACH,VELOC013  SEE WHICH WAY TACH SETS       00043140
0007DF 0304                      8285          STO    WORK4,4                                         00043150
0007E0 67C5                      8288          BU     VELOC005                                        00043160
0007E1 67E2                      8291 VELOC013 BU     VELOC014                                        00043170

                                 8294 **********************                                        00043190
                                 8295 * CLOCK ACROSS TACHC *                                        00043200
                                 8296 **********************                                        00043210

0007E2 0204                      8299 VELOC014 STO    WORK3,4           CLEAR CTR A                   00043230
0007E3 3EEF                      8302 VELOC026 BOC    BSYTACH,VELOC016  WAIT FOR TACH TO FALL         00043240
                                 8304 * CHECK ACCUMULATED COUNTS                                    00043250
0007E4 4221                      8306 VELOC015 XFR    WORK3,AR          GET CTR B TO A REG            00043260
0007E5 A300                      8309          ADD    WORK4,0           ADD CTR B TO CTR A            00043270
0007E6 21E7                      8312          BOC    NALCO,VELOC017    TAKE BR IF OK                 00043280
0007E7 4021                      8315 VELOC017 XFR    WORK1,AR          GET BASE CT TO A REG          00043290
0007E8 A300                      8318          ADD    WORK4,0           ADD BASE TO A & B CTRS        00043300
0007E9 21EB                      8321          BOC    NALCO,VELOC020                                  00043310
0007EA 67F7                      8324 VELOC019 BU     VELOC024                                        00043320
0007EB 4121                      8327 VELOC020 XFR    WORK2,AR          GET PEAKING CT TO A REG       00043330
0007EC B300                      8330          ADDM   WORK4,0           ADD TO ACCUMULATED CTS        00043340
0007ED 21D7                      8333          BOC    NALCO,VELOCOUT    SHD CARRY NORMALLY            00043350
0007EE 67F9                      8336          BU     VELOCOK                                         00043360
0007EF A201                      8339 VELOC016 ADD    WORK3,1           BUMP CTR                      00043370
0007F0 21E3                      8342          BOC    NALCO,VELOC026    BR ON NO CARRY                00043380
                                 8344 * DRIVE WAS TOO SLOW                                          00043390
0007F1 3FDB                      8346 VELOC027 BOC    DEVATTN,UNTCHK1   EXIT                          00043400
0007F2 3EF1                      8349          BOC    BSYTACH,VELOC027  HANG TILL TACH CHANGES        00043410
0007F3 67E4                      8352          BU     VELOC015          EXIT                          00043420

0007F4 67F5                      8357 VELOC021 BU     VELOC022                                        00043450
0007F5 67F6                      8360 VELOC022 BU     VELOC023                                        00043460
0007F6 67F7                      8363 VELOC023 BU     VELOC024                                        00043470
0007F7 67F8                      8366 VELOC024 BU     VELOC025                                        00043480
0007F8 67D7                      8369 VELOC025 BU     VELOCOUT                                        00043490
0007F9 4421                      8372 VELOCOK  XFR    STATIMG,AR        GET VELOCITY RETRY TO AR (IF ON) 00043500
0007FA 4006                      8375          XFR    LSR               SET LOW MOD                   00043510
0007FB 8C00                      8378          ORI    DTACHK1,0         SET ERROR IF NEEDED           00043520
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  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F01MAY72   2/04/74
0007FC 660B                        8381           BU     WRTAWAY          GO WRITE                  00043530
                                   8383 *         EJECT                                             00043540
                                   8384           END                                               00043550
```

CROSS-REFERENCE

SYMBOL	LEN	VALUE	DEFN	REFERENCES														
#ALU1NRZ	00001	000017	00569	5674														
#BACKWD	00001	000010	00663	0947	2353	7686												
#BOR	00001	00000E	00321	1211	3040	3152	6833	6902	8087									
#BORMARK	00001	000011	00659	1420	3449													
#BOT	00001	000013	00546	2824	6660	7683												
#BSYTACH	00001	00001E	00342	1845	1881	3030	3472	3517	4224	4253	5817	5966	6107	6111	6130	6161	7978	8163
				8166	8173	8192	8202	8215	8282	8302	8349							
#CHGDIR	00001	000017	00671	2427														
#CHKBRST	00001	000011	00646	8016														
#CNTRDY	00001	000014	00633	3995														
#CRCMAT	00001	000008	00313	5036														
#CRCNEPR	00001	000002	00307	5043	5052	5086												
#CREASER	00001	000010	00651	3011														
#DATARDY	00001	00000D	00320	1392	1401	1467	1473	1482	3619	4803	4813	4816	4907	4927	5383	5396	5422	5435
				5462	5476	5479	5492	5554	5567	5963	6918	7095	7101	7149	7423	7464		
#DBUS	00001	000000	00303	1181	1274	1638	1726	1754	1763	1924	1978	2121	2127	2163	2172	2288	2314	2337
				2350	2359	2382	2600	2645	2663	2760	2775	2809	2878	3008	3075	3121	3158	3312
				3495	3508	3572	3625	3651	4052	4079	4096	4192	4415	4431	4440	4449	4494	4788
				5107	5153	5162	5177	5276	5352	5393	5539	5653	5914	6158	6361	6374	6383	6407
				6594	6609	6644	6726	6915	6948	7050	7571	7673	7882	7901	8047			
#DEN200	00001	000019	00333	5358														
#DEN556	00001	00000C	00318	5364														
#DEVATTN	00001	00001F	00346	1214	1479	1573	1680	1969	2033	2036	2039	2046	2052	3069	3452	3479	3942	3972
				4320	4806	4829	4920	4993	7383	7574	7637	8186	8212	8346				
#DREG0	00001	000010	00323	2226	2449	5792	6346	6485	7062									
#DREG1	00001	000011	00324	1220	5096	6343	6479											
#DREG2	00001	000012	00325	6340	6473													
#DREG3	00001	000013	00326	2154	2933	2999	3203	6337	6467	7830	7949							
#DREG4	00001	000014	00327	4271	6334	6461												
#DREG5	00001	000015	00328	1252	4842	4854	6331	6455										
#DREG6	00001	000016	00329	1335	2203	3869	6328	6449	6854	7309	8128							
#DREG7	00001	000017	00330	2206	3872	6325	6443	7286	7303	7389	7446	8131						
#DTACHK1	00001	00000C	00458	2757	3459	3489	4990	5406	5412	6732	6836	6905	6933	7038	7240	7292	7439	7587
				8378														
#DTACHK2	00001	00000A	00456	1529	1551	1560	1635	1760	2772	3705	6936	7139	7168	7312	7584	8080		
#DUALDEN	00001	000012	00558	2212	3391	5665												
#ENDATA	00001	000008	00314	1445	3639	3654	3687	4819	4826	5489	5526	7012	7021	7426				
#EOT	00001	000012	00544	2737	2827													
#ERGOP	00001	000015	00639	5206	6669													
#FIRST	00001	000012	00632	4037														
#FLAGS	00001	000005	00451	1745	2424	2996	3118	3429	3469	5789	6606	7059						
#FRU	00001	000009	00455	1278	1318	1379	1489	1499	1520	2305	3376	3537	3547	3575	5536	5548	6506	6830
				6899	6912	6945	7047	7261	7273	7283	7300	7443	7461	7474	7892	7898		
#FWDDATA	00001	000011	00516	1692														
#GAPCTRL	00001	000011	00483	2967														
#HIDEN	00001	000014	00521	2133	2143	2238	2927	3209	3385	5650	6223	6647						
#IBG	00001	00000F	00322	1262	1344	1389	1448	1470	1517	1570	3483	3566	3642	3693	4061	5808	5811	6576
				6818	6996	7053	7098	7130	7243	7640								
#IBGMARK	00001	000013	00657	1423														
#LODEPA	00001	00000E	00460	2893	4311													
#LODEPB	00001	00000F	00461	2896	4317													
#LPMARK	00001	000012	00647	8019														
#LWROP	00001	000015	00670	2430														
#MK800	00001	000017	00631	4058														

CROSS-REFERENCE

SYMBOL	LEN	VALUE	DEFN	REFERENCES
#MPGMERR	00001	000008	00463	4082
#NALCO	00001	000001	00304	1239 1281 1321 1382 1492 1502 1523 1614 1676 2008 2247 2253 2282 2397 2403 2622 3066 3094 3100 3299 3305 3344 3350 3373 3379 3540 3550 3578 3660 3762 3796 3930 3966 4001 4016 4046 4133 4265 4367 4917 5083 5123 5325 5452 5505 5545 5580 5839 5893 5988 6117 6123 6139 6145 6287 6404 6416 6425 6434 6509 6548 6619 6777 6827 6842 6896 6927 6957 7035 7111 7136 7159 7225 7237 7258 7270 7380 7436 7622 7628 7876 8000 8006 8031 8077 8182 8208 8229 8241 8253 8265 8312 8321 8333 8342
#NBLOCK	00001	00001C	00339	1268 3002 6729 6755 6821 6890 7252
#NCONVCK	00001	000009	00315	4421 4972
#NENVLOS	00001	00001C	00338	4503
#NFP	00001	000011	00542	4458
#NOTBUSY	00001	000017	00551	2815
#NOTPE	00001	000013	00560	3212 3231 4485 5614 6025 6258
#NPTE	00001	00000C	00317	3366 8067
#NRPQ	00001	00000D	00341	4542
#NRZFEAT	00001	000003	00306	2136 2146 3218 3353 4105 6226 6638
#NRZI7	00001	000013	00531	5032
#NSAGCID	00001	000009	00316	1670 3475 3511 7616
#NSEVEN	00001	000005	00319	4791 5165
#NTM	00001	00001D	00340	1226 4836 4957 7264 7453
#N1TE	00001	000019	00332	3292 8060
#OPPDIR	00001	000013	00489	8025
#RDTIME	00001	000004	00308	1205 1287 1347 1364 1395 1398 1514 1542 3024 3060 3289 3359 3562 3588 3612 3628 4904 4930 5312 5315 5386 5399 5425 5438 5482 5495 5557 5570 6720 6744 6752 6766 6815 6864 6880 6908 7006 7015 7024 7127 7143 7219 7231 7246 7276 7429 7467 7604 7607 7972 7994
#READOP	00001	000016	00654	1304 1599
#ROCROT	00001	000002	00305	3591 3645 3684 3690 6887 6930
#R0	00001	000000	00414	6358 6401 6431
#R1	00001	000001	00415	
#R10	00001	00000A	00424	
#R11	00001	00000B	00425	
#R12	00001	00000C	00426	
#R13	00001	00000D	00427	
#R14	00001	00000E	00428	
#R15	00001	00000F	00429	
#R16	00001	000000	00430	
#R17	00001	000001	00431	
#R18	00001	000002	00432	
#R19	00001	000003	00433	
#R2	00001	000002	00416	6371 6380
#R20	00001	000004	00434	
#R21	00001	000005	00435	
#R22	00001	000006	00436	
#R23	00001	000007	00437	
#R24	00001	000008	00438	
#R25	00001	000009	00439	
#R26	00001	00000A	00440	
#R27	00001	00000B	00441	
#R28	00001	00000C	00442	
#R29	00001	00000D	00443	
#R3	00001	000003	00417	
#R30	00001	00000E	00444	

ROS2 SYMBOL	LEN	VALUE	DEFN	REFERENCES
#R31	00001	00000F	00445	
#R4	00001	000004	00418	6413 6422
#R5	00001	000005	00419	
#R6	00001	000006	00420	
#R7	00001	000007	00421	
#R8	00001	000008	00422	
#R9	00001	000009	00423	
#SELHIGH	00001	000014	00572	1804
#SENSE1	00001	000006	00452	0941 1723 1972 2118 2169 2223 2347 2728 2748 2812 3200 3757 3992 4004 4049 4055 4070 4076 4093 4437 4446 4455 4491 4518 5174 6657 7677 7799 7802
#SENSE2	00001	000007	00453	2130 2140 2209 2235 2924 3206 3273 3309 3382 3791 3866 4428 4482 4785 5159 5247 5300 5647 6022 6220 6641 7670 7827 7946 8125
#SETDIAG	00001	000012	00476	2376
#SEVTRK	00001	000010	00556	3276 5250 5303 5611 5662
#SPACEOP	00001	000017	00661	1429 1596
#START	00001	000015	00549	1729 1975 2751
#STATA	00001	00000A	00334	1903 2070 2264 2302 2318 2331 2406 2725 4250 4370 5820 5833 5969 5982 6152 6297 6315
#STATB	00001	00000B	00335	1912 2499 2890 4180 4308 4669 4696 6300 6522
#STATC	00001	00001A	00336	0923 1590 1860 1951 2061 2556 4209 4212 4870 5168 5237 5380 5515 5533 5588 6091 6303 6528 6717 6987 7199
#STATD	00001	00001B	00337	2552 2588 2818 4284 4734 4749 5786 5949 6306 6534
#STATIMG	00001	000004	00450	1021 1027 1172 1256 1582 1751 1813 2064 2340 2412 2418 2710 2743 2778 2786 2902 3139 4198 4218 4274 4277 4326 4376 4409 4412 4794 4797 4845 4966 4975 5006 5012 5029 5349 5373 5620 5795 5823 5842 5846 5856 5953 5972 5991 5995 6005 6042 6048 6164 6183 6235 6309 6570 6708 7320 7502 7526 7590 7649 8275
#STOP	00001	000007	00312	2460 3924 3939 3957 3975 4737 4746 5432 5486 5512 5564 5683 5801 6174 6294 6516 6762 6921 6984 7018 7041 7613 7631
#SYNC	00001	000013	00519	3672
#TACHFF	00001	000006	00311	3921 3936 3948 3978 3984 4140
#TAKTR	00001	000014	00642	3057 7991
#TIEBYTE	00001	000007	00464	5064
#TRACER	00001	000008	00454	1004 1178 1249 1271 1284 1301 1417 1432 1593 1641 1644 3005 3033 3047 3054 3072 3088 3155 3187 3446 3466 3492 4839 4851 5203 6663 7350 7529 7568 7981 7988 8013 8093
#TUADDR	00001	00000B	00457	1921 2642 2660 2875 4189 4364
#WORK1	00001	000000	00446	1236 1611 2244 2379 2394 2618 2806 3097 3341 3505 3569 3622 3770 3808 4262 4302 5114 5322 5390 5502 6189 6284 6545 6723 6839 7108 7133 7156 7175 7222 7619 8028 8044
#WORK2	00001	000001	00447	1735 1757 2250 2400 2596 3091 3296 3370 4358 4418 4424 4527 4536 4608 5449 5577 5836 5890 5985 6155 6774 6954 7032 7234 7433 7625 8003
#WORK3	00001	000002	00448	1673 1717 1732 1742 2279 3063 3302 3657 3998 4130 4434 4443 4452 4461 4479 4488 4497 4506 4545 4584 4590 4715 5080 5104 5120 5902 6114 6136 6616 6824 6893 7255 7377 7873 7908 7997 8179 8226 8238 8250 8339
#WORK4	00001	000003	00449	1265 2005 2124 2160 2285 2296 2311 2334 2356 2373 3347 4013 4900 4914 5542 5869 5911 6120 6142 6924 7267 7879 8074 8205 8309 8318 8330
#WORK5	00001	000005	00462	3911 3927 3963 4043 8262
#WRTSTAT	00001	000014	00548	0944 2731 2833 2839 7680
#WTMOP	00001	000016	00664	5209 6666
#XOUTAIM	00001	00000D	00459	1184 1217 1242 1326 1332 1341 1505 1564 1602 1689 1895 2157 2166 2215 2484 3315 3318 3581 3606 3648 3663 3669 5093 5150 5273 5632 6229 6251 6591 6597 6600 6685 6691 6697 6851 6857 6877 6939 7080 7117
#6250	00001	000018	00331	1223 1357 1653 3081 4102 6588 6694 6735 6805 6848 7089 7114 7165 7485
AA	00001	0005CA	06422	6404

SYMBOL	LEN	VALUE	DEFN	REFERENCES
ABEND800	00001	00043B	04981	4806 4829 4920 4993
ABORTRD	00001	0000B2	01582	1214 1479 1573 1680
ACCESS	00001	00058D	06217	0884
ACCESS16	00001	000591	06229	6028 6261
ACCESS64	00001	000598	06251	6258
ACCESS8	00002	0004F7	05680	6226
ACCESS80	00001	000557	06022	5680
ADDREXIT	00001	0000F3	01842	1816
AGAIN	00001	000120	02005	2008
ALLDONE	00001	000438	04972	
ALLDONEA	00001	000529	05856	5811
ALLDONE1	00002	00043A	04978	5032 5237
ALLOK	00001	000611	06657	6644 6647
ALU2COMP	00001	0005F3	06557	
AR	00001	000021	00278	1632 1714 1748 1892 1909 1918 2308 2636 2639 2654 2657 2766 2769 2887 3534 3766 3804 3908 4040 4177 4186 4299 4305 4323 4361 4403 4406 4476 4524 4530 4533 4548 4587 4605 4632 4711 4897 5058 5077 5111 5117 5126 5866 5908 6355 6377 6428 7895 8223 8235 8247 8306 8315 8327 8372
ARETURN1	00002	00077B	07939	7488
ASSURFWD	00001	00019F	02484	2376
BACKONCE	00001	000167	02279	2282
BACKWD	00001	000080	00662	2223 2347 4491 7799
BB	00001	0005C7	06413	6407
BBB	00001	000369	04262	4265
BEGIN	00001	000000	00821	0920 0923 0944 0947 0995 1024 1141 1181 1205 1211 1214 1220 1223 1226 1239 1252 1262 1268 1274 1281 1287 1304 1321 1335 1344 1347 1357 1364 1382 1389 1392 1395 1398 1401 1420 1423 1429 1445 1448 1467 1470 1473 1479 1482 1492 1502 1514 1517 1523 1542 1570 1573 1590 1596 1599 1614 1638 1653 1670 1676 1680 1692 1701 1726 1729 1754 1763 1804 1845 1848 1860 1866 1881 1903 1912 1924 1933 1936 1951 1954 1957 1969 1975 1978 2008 2017 2020 2033 2036 2039 2046 2052 2061 2070 2121 2127 2133 2136 2143 2146 2154 2163 2172 2192 2203 2206 2212 2226 2238 2247 2253 2264 2282 2288 2302 2314 2318 2331 2337 2350 2353 2359 2366 2376 2382 2397 2403 2406 2427 2430 2449 2460 2499 2524 2552 2556 2588 2596 2600 2622 2645 2663 2713 2725 2731 2737 2751 2760 2775 2806 2809 2815 2818 2824 2827 2833 2839 2859 2878 2890 2927 2933 2967 2970 2999 3002 3008 3011 3024 3030 3040 3057 3060 3066 3069 3075 3081 3094 3100 3121 3146 3152 3158 3203 3209 3212 3218 3231 3243 3276 3289 3292 3299 3305 3312 3330 3344 3350 3353 3359 3366 3373 3379 3385 3391 3403 3426 3449 3452 3472 3475 3479 3483 3495 3508 3511 3517 3540 3550 3562 3566 3572 3578 3588 3591 3612 3619 3625 3628 3639 3642 3645 3651 3654 3660 3672 3684 3687 3690 3693 3713 3762 3796 3840 3869 3872 3921 3924 3930 3936 3939 3942 3948 3957 3960 3966 3972 3975 3978 3984 3995 4001 4016 4037 4046 4052 4058 4061 4079 4096 4102 4105 4133 4140 4180 4192 4209 4212 4224 4232 4235 4241 4250 4253 4265 4271 4284 4308 4320 4367 4370 4415 4421 4431 4440 4449 4458 4464 4485 4494 4500 4503 4539 4542 4560 4563 4569 4593 4611 4620 4629 4642 4651 4660 4669 4681 4687 4696 4708 4734 4737 4746 4749 4764 4788 4791 4803 4806 4813 4816 4819 4826 4829 4836 4842 4854 4870 4882 4904 4907 4917 4920 4927 4930 4948 4957 4972 4993 5032 5036 5043 5049 5052 5083 5086 5096 5107 5123 5153 5162 5165 5168 5171 5177 5180 5193 5206 5209 5217 5234 5237 5250 5258 5276 5303 5309 5312 5315 5325 5342 5352 5358 5364 5380 5383 5386 5393 5396 5399 5422 5425 5432 5435 5438 5452 5462 5476 5479 5482 5486 5489 5492 5495 5505 5512 5515 5526 5533 5539 5545 5554 5557 5564 5567 5570 5580 5588 5611 5614 5638 5650 5653 5662 5665 5674 5683 5690 5786 5792 5801 5808 5811 5817 5820 5833 5839 5875 5893 5914 5949 5963 5966 5969 5982 5988 6025 6091 6107 6111 6117

ROS2 SYMBOL	LEN	VALUE	DEFN	REFERENCES
				6123 6130 6139 6145 6152 6158 6161 6174 6223 6226 6258 6287 6294 6297 6300
				6303 6306 6315 6325 6328 6331 6334 6337 6340 6343 6346 6361 6374 6383 6404
				6407 6416 6425 6434 6443 6449 6455 6461 6467 6473 6479 6485 6509 6516 6522
				6528 6534 6548 6567 6576 6585 6588 6594 6609 6619 6638 6644 6647 6660 6666
				6669 6673 6694 6717 6720 6726 6729 6735 6744 6752 6755 6762 6766 6777 6805
				6815 6818 6821 6827 6833 6842 6848 6854 6864 6880 6887 6890 6896 6902 6908
				6915 6918 6921 6927 6930 6948 6957 6984 6987 6996 7006 7012 7015 7018 7021
				7024 7035 7041 7050 7053 7062 7089 7095 7098 7101 7111 7114 7127 7130 7136
				7143 7149 7159 7165 7196 7199 7206 7219 7225 7231 7237 7243 7246 7252 7258
				7264 7270 7276 7286 7303 7309 7330 7347 7380 7383 7389 7423 7426 7429 7436
				7446 7453 7464 7467 7480 7482 7485 7488 7508 7532 7545 7552 7571 7574 7604
				7607 7613 7616 7622 7628 7631 7637 7640 7646 7673 7680 7683 7686 7694 7708
				7711 7717 7733 7740 7753 7760 7770 7777 7786 7816 7830 7836 7842 7876 7882
				7901 7949 7955 7972 7978 7991 7994 8000 8006 8016 8019 8025 8031 8047 8060
				8067 8077 8087 8128 8131 8163 8166 8173 8182 8186 8189 8192 8202 8208 8212
				8215 8229 8241 8253 8265 8282 8302 8312 8321 8333 8342 8346 8349
BKWD	00001	000002	00585	4497
BKWDINIT	00001	00077C	07943	7412
BLOCKCHK	00001	000066	01278	
BORMARK	00001	000040	00658	1301 1432 3047 3466
BORUP	00001	00022C	03047	3040
BOT	00001	000010	00545	0941 2118 4437 5174
BRSTCK1	00001	000297	03459	3452
BRSTCK10	00001	0002A5	03505	3472
BRSTCK11	00001	0002A7	03511	3517
BRSTCK12	00001	0002A9	03517	3511
BRSTCK2	00001	00029B	03472	3475 3520
BRSTCK3	00001	00029D	03479	3514
BRSTCK4	00001	00029E	03481	3502
BRSTCK41	00001	00029E	03483	3486
BRSTCK5	00001	0002A0	03489	3479
BRSTCK6	00001	0002A4	03500	3495
BUFFCRC	00001	000018	00299	2707 4963
BUSYYET	00001	0001EB	02801	2725
BYPASS	00001	000000	00839	
CCTRAP	00002	0005CF	06438	6425
CDSTATS	00001	00012F	02061	1933 1951 1978
CHECKEND	00001	0004CA	05524	5276 5529
CHGDIREC	00001	000040	01141	1119
CHKA	00001	0005EE	06539	6534
CHKATT	00001	000293	03446	3426
CHKBKWD	00001	000146	02160	2218 5623
CHKBOCS	00001	0005E2	06500	
CHKBOR	00001	000053	01211	1205
CHKBORRD	00001	00022A	03040	2999
CHKBORXX	00001	00067D	07041	7044 7162 7171
CHKBORXY	00001	00067F	07047	7041
CHKBRST	00001	000040	00644	7529
CHKC	00001	0005EA	06528	6522
CHKCLOCK	00001	000051	01205	1208 1290
CHKCNTS	00001	000322	03992	3936 3948 3981
CHKCRC	00001	000445	05029	4972
CHKD	00001	0005EC	06534	6528
CHKDETAC	00001	00056D	06107	

SYMBOL	LEN	VALUE	DEFN	REFERENCES								
CHKDTRDY	00001	0005E0	06494									
CHKEOT	00001	0001DA	02737	2731								
CHKFOP	00001	000413	04836	4826								
CHKFTR	00001	00013F	02136									
CHKHI	00002	0001C6	02651	2645								
CHKIBG	00001	000061	01262	1226	1239							
CHKID	00001	0007A9	08087	8016								
CHKID2	00001	0007AB	08093	8087								
CHKINTPT	00001	000054	01214	1307								
CHKMATCH	00001	000449	05043	5083								
CHKMORE	00001	00059A	06258	6223								
CHKMTI	00001	000117	01969	1957								
CHKNRZ	00001	000140	02140	2121								
CHKPOR1	00001	0007A3	08067	8060								
CHKPOSIT	00001	0006DA	07368	2369	3149	7697	7756	7819				
CHKPOST	00001	000099	01489	1470								
CHKPULSE	00001	000126	02033	1939	1960	4238						
CHKREAD	00001	000196	02449	2427								
CHKSTATS	00001	0005E8	06522	6516								
CHKSUMOR	00001	000288	03391	3385								
CHKSWTCH	00001	0000F4	01845									
CHKUEX	00001	00005D	01247									
CHKVEL	00001	000300	03860	2943	5521	6993						
CHKXINA	00001	0005EE	06541									
CHK1ORP	00001	0007A1	08060	8019								
CHK1601	00001	000151	02200	2133								
CHK1602	00001	000144	02154	2143								
CHK7LP	00001	0004F1	05662	2136								
CHK800	00001	0004F4	05671	5665								
CKDTARDY	00001	000081	01389	1382	1395							
CKFC3	00001	000334	04055	4085								
CKNORPE	00001	000485	05273	4105								
CKSTART	00001	0001DD	02746	2821	2836							
CLEANUP	00001	000555	06005	5963								
CLEARCMD	00001	0001CC	02677	2588								
CLEARLO	00001	0000F1	01819	1804								
CLEEREM	00001	0001B0	02560	2552								
CLOKWAIT	00001	000069	01287	1268	1274	1281	1287	1426				
CLRCTR1	00001	000783	07965	7494	7541	7548	7558	8031	8050			
CLRXOUTA	00001	0001CF	02688	2327	2343	2406	2452	2460	3142	3227	6653	7593
CMDEXIT	00001	000776	07908	7901								
CNTABIT	00001	00007C	01364	1350	1367							
CNTABIT2	00001	00006E	01318	1364								
CNTATACH	00001	000239	03088	3057								
CNTFORER	00001	0007A5	08074	8067								
CNTLOOP	00001	000424	04904	4910	4933							
CNTNCARY	00001	00023E	03102									
CNTNRZI	00001	000278	03341	3366								
CNTRDY	00001	000008	00634	4004	5518	6990						
CNTRDY1	00001	00009C	01499	1467	1473							
CNT200	00001	000308	03890	3872								
COMITD	00001	000050	00287	2626								
COMMAND	00001	000002	00509	1698	1989	2267	2433	2532	4333	7371	7855	7864	7959
CONTROL	00001	000004	00508	2273	3409	5644	5872	5902	7514	7723			

SYMBOL	LEN	VALUE	DEFN	REFERENCES
CONVCK	00001	000001	00576	4424
COUNTDWN	00001	00078C	07994	7984 7994
COUNTLPB	00001	000280	03366	3292
COUNTONE	00001	000792	08013	7991
COUNTPRE	00001	00007E	01379	1398
COUNTUP	00001	000230	03060	3036 3060
COUNT16	00001	000070	01324	
CRC	00001	00000A	00276	5046 5074
CREASER	00001	000080	00652	1644 3005 3072
CREMOVE	00001	000042	01147	3161
CREMOVEX	00001	00024B	03152	3011
CREMOVEZ	00002	00024E	03161	3152
CRERETRN	00002	00077A	07920	1701
CRESENS	00001	0000C3	01644	1596
CRESENSX	00001	0000BF	01632	1599
CRETEST	00002	000264	03252	
CRETURN1	00002	0006E6	07405	2366
CRETURN2	00002	0006E7	07409	7694
CRETURN3	00002	0006E8	07412	7816
CRETURN4	00002	0006E9	07415	7753
CRETURN5	00002	0006EA	07418	3146
CTLLINK	00001	000543	05938	5914
CTLRET3	00002	000540	05929	7760
CTLRET6	00002	00053F	05926	7717
CTRLREJ	00001	0001CE	02685	2318 5917
CTRLSETA	00001	00002C	01027	
DALONE	00002	0003FC	04761	4708 4737 4746
DATACK	00001	000008	00587	4418
DATATIM	00001	000080	00636	4049 4076 4093 5518 6990
DD	00001	0005D0	06443	6434
DELAY	00001	0000BB	01611	1614
DESWAIT	00001	0001BD	02618	2622
DEVBKWD	00001	000158	02223	2172
DEVCHK	00001	000002	00550	4518
DEVDONE	00001	00036D	04274	
DEVFWD	00001	00017A	02347	2163
DEVSEL	00001	000008	00507	1147 1647 1698 1989 2011 2180 2267 2273 2433 2474 2532 2544 3112 3181 3409 3735 4333 4885 4945 5644 5872 6033 6094 6100 6241 7065 7371 7392 7514 7723 7793 7855 7864 7908 7959 8034
DIAGHOOK	00002	0000BE	01620	1590
DIAGMODE	00001	000020	00485	
DIDNTGO	00001	00012E	02058	2020
DLYNRZ	00002	000338	04067	4058
DLYSETHI	00002	000337	04064	4067
DLYTIME	00001	000533	05890	5893
DOBACKWD	00001	00075C	07816	7686
DOBOT	00001	00074A	07753	7683
DOBOTXX	00001	00074C	07760	7415
DODELAY	00001	00015A	02235	2353 2362 3190
DODELAY1	00001	00015C	02241	
DOINDE	00001	000372	04296	4284
DOIT	00001	000209	02896	2890
DONE	00001	0005FA	06581	6576
DONEXTRK	00001	00045E	05111	5123

SYMBOL	LEN	VALUE	DEFN	REFERENCES													
DOSTATS	00001	000546	05956	6001													
DOTIEX	00002	0000BD	01617														
DOWTM64	00001	0006A9	07196	6666													
DO16	00001	000145	02157	2149	2212	2331	2337	5617	5668	5677							
DO64	00001	000156	02215	2154	2203	2206											
DO800	00002	0004E7	05623	5614	5674												
DO8007	00001	0004E6	05620	5611	5662												
DROPGO	00001	000683	07059	6996													
DROPMOVE	00001	00056B	06100	6091													
DRVUNTCK	00001	00036E	04277	4271													
DTACHK1	00001	00000C	00401	2560	4403	4581											
DTACHK2	00001	00000A	00399	2564	4548												
DTASAGC	00001	00071B	07584	7574	7613	7637											
DUALDEN	00001	000020	00557	5647													
DUNAGN	00001	0001E9	02784	2775													
DVESNS6	00001	000040	00571	1656	4876	6079											
DYREV	00001	000008	00623	8053													
EDSPLACE	00001	00056C	06103	6097													
EE	00001	0005D2	06449	6443													
END	00001	0004DD	05588	5683													
ENDATAER	00001	000010	00595	1535	4473												
ENDCHK	00001	0001DD	02745	2734	2740	2839											
ENDERR	00001	000439	04975	4984													
ENDREAD	00001	000433	04957	4882													
ENDREAD2	00002	000435	04963	4957													
ENDREAD3	00001	000436	04966	4960													
ENDSOON	00001	000410	04826	4816	4832												
ENDUP	00002	0001D0	02707	1024	2818	5594	6787	7315	7456	8278							
ENDUPEX	00001	00071D	07590	7401	8056	8083											
ENDUPEXA	00001	00071C	07587	7580													
ENDUP800	00001	0001D1	02710	4978	5070												
ENDWRTNZ	00001	0004F8	05683	5526	5686												
EOT	00001	000020	00543	4518													
EQCHK	00001	000010	00586	1757													
EQSAGC	00001	000719	07577	3455													
EQUIPCK	00001	00001D	00411	1748	2058	2324	2568	2685	2754	2769	3020	3136	4023	4524	4605	6741	6780	7577
				8053														
ERASER	00001	000780	07955	7949													
ERASE1	00001	00074E	07767	5929													
ERASE2	00001	000751	07777	7770													
ERASE3	00001	000756	07793	7740	7777												
ERASE4	00001	00075E	07824	7409													
ERASE40	00001	000762	07836	7830													
ERASE5	00001	00073B	07702	7836	7955												
ERASE6	00001	000744	07730	5926													
ERASE7	00001	000741	07720	7763													
ERASE8	00001	000740	07717	7708													
ERASE9	00001	000747	07740	7733													
ERGAWAY	00002	0006A8	07183	6669													
ERGCTR	00001	000025	00998	5240	7202												
ERGFLAG	00001	000010	00643	1004	3005												
ERGNOISE	00001	000223	03017														
ERGNONE	00002	00075B	07808	7673	7680												
ERGOP	00001	000004	00637	0988													

SYMBOL	LEN	VALUE	DEFN	REFERENCES
ERGSTR	00001	000024	00995	5284 7183
ERGTOTI	00001	000004	00496	1052
EXCPOST	00001	000002	00615	1529 7139 7168
EXECABRT	00001	0001CB	02673	0878 2648 4345
EXECBSF	00001	00003C	01129	
EXECBSR	00001	00003E	01135	
EXECDES	00001	0001BB	02610	0862 2061 2663
EXECDMR	00001	000563	06076	0881
EXECDSE	00001	000031	01052	
EXECERG	00001	000022	00988	
EXECFSF	00001	000035	01100	
EXECFSR	00001	000037	01107	
EXECGRST	00001	0001A1	02499	0869
EXECPOLL	00001	00034D	04167	0865
EXECPULL	00001	00034F	04173	4385
EXECRDB	00001	00003A	01123	
EXECRDF	00001	000033	01093	
EXECRWD	00001	00002F	01037	
EXECRWU	00001	000029	01018	2806
EXECSDE	00001	000202	02875	0875 2854
EXECSNS	00001	0000D6	01711	
EXECSRST	00001	0001A7	02524	0872 2511
EXECSTS	00001	0000EB	01801	
EXECSTSZ	00001	0000F5	01848	
EXECTST3	00001	00059C	06278	0859
EXECVEL	00001	000219	02970	2445
EXECWRT	00001	000013	00914	
EXECWTM	00001	000020	00970	
EXTEND	00001	000004	00490	1695
EXTENDIT	00001	0000D0	01689	1653
EXVCHG	00001	000040	00594	4082 4584
FASTBGN	00001	000010	00602	5406 5412 6732
FCHLAST	00001	0002EA	03766	
FCHNEXT	00001	0002EE	03782	
FCHSNS	00001	0002E6	03748	4566 4645 4684
FCHSTS	00001	0002E1	03727	1851 2528 2722 4247 6583 7655
FDTHRU	00001	000040	00601	
FF	00001	0005D4	06455	6449
FILEOP	00001	000004	00655	1129
FINDTU7	00001	000379	04317	4308
FINDTU77	00001	00037A	04320	4314
FIRST	00001	000020	00635	4070 5518 6990
FLAGS	00001	000005	00394	0887 2592 4533
FLOPTIE	00001	00045B	05101	
FORCEON	00001	000084	01398	1335 1404
FORFLAG	00001	000004	00640	
FORMATCK	00001	000010	00612	1760 7584 8080
FP	00001	000002	00583	4461
FRU	00001	000009	00398	1202 1338 1360 1464 1511 1992 1995 2299 2308 2580 3279 3531 3553 4711 5200 5896 5908 6278 6503 7889
FWDDATA	00001	000040	00515	1689 2166 2484 3648 6597
FWDRD	00001	000058	01226	1220 1670 1676
GAPCTLON	00001	00023F	03109	2967
GAPCTRL	00001	000040	00484	7892

SYMBOL	LEN	VALUE	DEFN	REFERENCES
GETADR	00001	0000EA	01798	
GETHIGH	00001	000501	05722	5773
GETSTATS	00001	000770	07887	7882
GG	00001	0005D6	06461	6455
GO	00001	000427	04914	4904
GOAHEAD	00001	00055A	06031	6025
GOBACK	00001	00023E	03104	
GOEND	00002	00025E	03227	
GOENDUP	00002	000248	03142	0995
GOGETIM	00001	000362	04241	2085
GOMOVE	00001	00018B	02406	2382
GOODEND	00001	0004DE	05591	5603
GOPRIME	00001	0000F9	01860	1845
GOPRIME2	00001	0001F9	02848	1954 2017
GOSOMOR	00001	00042B	04927	4917 4930
GOTPRIME	00001	00010F	01933	
GOTURN	00002	00001D	00953	0944
HAVPRIME	00001	000107	01903	
HDWERR	00001	000044	00296	6318 6364 6386 6410 6419 6438 6446 6452 6458 6464 6470 6476 6482 6488 6512 6525 6531 6537 6551
HERE	00001	00059F	06287	
HERENOW	00001	000697	07127	7127 7143
HH	00001	0005D8	06467	6461
HIDEN	00001	000008	00520	2215 2235 3309 3318 5150 5632 5647 6251 6641 7670
HOLDUP	00001	000187	02394	2397 2403
HUP1	00001	0002E8	03757	3762
HUP2	00001	0002F0	03791	3796
IBGDROP	00001	000080	00600	6836 6905 7292
IBGGONE	00001	000637	06799	6673
IBGLOOK1	00001	000096	01479	1482 1502
IBGMARK	00001	000010	00656	1284 1432
IBGON	00001	0007A7	08080	
IBGYES1	00001	000087	01417	1262
IBGYES2	00001	00008B	01429	1420 1423
IC	00001	000022	00285	0855 2042 2055 3104 3127 3812 4758 4766 4923 5328 5445 5938 6758 7398 7917 8040
ID12	00001	00072A	07631	7634
ID14	00001	00072C	07637	7631
ID145	00001	00072D	07640	7643
ID3	00001	000721	07604	7604 7622 7628
ID4	00001	000722	07607	7610
ID5	00001	000724	07613	7607
II	00001	0005DA	06473	6467
INDF	00001	000011	00281	2457
INHP	00001	000082	00286	
INITCNT	00001	00030C	03905	4001 4016
INTREQ	00001	000040	00578	1735
INTRUBLE	00001	0004CC	05533	5489
ISBAKWD	00001	000175	02331	2127
ISBUSY1	00002	000100	01872	1881
ISFOP800	00002	000417	04848	4842
ISHIGH	00002	000205	02884	2878
ISITDSE	00001	0001F7	02839	2827
ISITFOP	00001	000414	04839	

ROS2 CROSS-REFERENCE 2/04/74

SYMBOL	LEN	VALUE	DEFN	REFERENCES
ISITREW	00001	0001F5	02833	2824
ISLOW	00001	000206	02887	2881
ISNRZI	00001	000402	04781	3218 5932
ISNRZIZ	00002	000541	05932	5638
ISNRZI2	00001	00025C	03218	3212
ISNRZI3	00001	000407	04797	4788
ISOKNOW	00002	0007B7	08154	8128 8140
ISPULSE	00001	00012D	02055	2036 2039 2049
JJ	00001	0005DC	06479	6473
KK	00001	0005DE	06485	6479
KRETURN1	00002	000238	03084	
LASTCHK	00002	00044A	05046	5089
LDPT	00001	000008	00581	4443
LETSGO	00001	000161	02261	2226 2350 2359 7405
LINK1	00001	00001C	00410	0920 1024 1141 1848 1933 1954 2017 2055 2524 2713 3127 3713 3812 4232 4241 4563 4882 4923 4948 6567 7646
LINK2	00001	000019	00408	0995 1936 1957 2020 2042 2192 2366 2970 3104 3146 3243 3330 3426 4235 4351 4354 4464 4500 4539 4560 4569 4593 4611 4620 4629 4642 4651 4660 4681 4687 4708 4758 5171 5217 5342 5445 6673 6758 7196 7206 7330 7347 7398 7482 7488 7532 7545 7552 7694 7708 7733 7753 7770 7777 7816 7836 7955 8040
LINK3	00001	00001A	00409	1701 3403 4766 5180 5193 5234 5258 5309 5328 5638 5875 5938 7508 7711 7717 7740 7760 7786 7842 7917
LKREWRUN	00001	00002B	01024	1040 1055
LOADCTR	00001	0004D1	05548	5539
LODEPA	00001	00000E	00403	1918 2503 2507 2636 2654 4186 4672 4699
LODEPB	00001	00000F	00404	1909 2515 2519 2639 2657 4177 4666 4693
LOGAIN	00001	000002	00522	1341 1505 1564 1602 3581 6691 6697 6857 6939
LOOKIBG	00001	000681	07053	7056
LOOKSUM	00001	0000CA	01670	1223
LOWYES	00001	000109	01909	1903
LPBURST	00001	000261	03243	3203
LPBURST1	00001	000263	03249	3336
LPLOOK	00001	0001F2	02824	2815
LPMARK	00001	000020	00645	7350 7568 8093
LPNMOVE	00001	00019B	02471	2430
LPWAIT2	00001	0000CD	01680	1683
LSR	00001	000006	00277	1906 1948 2073 2651 2884 3896 4026 4099 4244 4373 4388 5061 5067 5719 5770 6368 6390 8154 8272 8375
LWRDELAY	00001	000600	06588	2481
LWREND	00002	0004E0	05597	5588
LWROP	00001	000004	00669	1745
MEASIBG	00001	000513	05786	1620
MEASIBGA	00001	000516	05795	6247
MK800	00001	000001	00630	4055 5518
MODE6400	00001	000046	01170	3234
MODE6401	00001	0002E0	03713	3483
MOREYET	00001	00015D	02244	2247 2253
MOVE	00001	000001	00510	1147 2180 2433 2474 3112 3409 4945 5644 5872 6033 6094 6155 6241 7514 7723 7864 7908 7959 8034
MOVEDOWN	00001	00041E	04882	4948
MOVEUP	00001	00042F	04942	4907 4927
MPCMERR	00001	000018	00407	1535 1632 1714 2572 2766 3017 3224 3498 4406 4476 4587 6650
MSKSTS	00001	00016C	02299	2288
MUSTBEHI	00002	000108	01906	

SYMBOL	LEN	VALUE	DEFN	REFERENCES							
NBLOCK	00001	000010	00622	6780							
NDXABRT	00002	00000B	00878								
NDXAXESS	00002	00000D	00884								
NDXDES	00002	000006	00862								
NDXDMR	00002	00000C	00881								
NDXFLAGS	00001	00000E	00887								
NDXFLAG2	00001	000010	00894								
NDXGRST	00002	000008	00869								
NDXPOLL	00002	000007	00865								
NDXSDE	00002	00000A	00875								
NDXSNSR	00001	00000F	00889								
NDXSRST	00002	000009	00872	2596							
NDXTST3	00002	000005	00859								
NEEDERG	00001	000733	07670	0926							
NEGATIVE	00001	00054A	05969								
NEGTACH	00001	00056E	06111	6117	6123						
NEXTONE	00001	0001D7	02728								
NEXTRK	00002	000453	05074	5043							
NODELAY	00001	000180	02366	2238							
NOENDERR	00001	0002DE	03705	3642	3693						
NOISE	00001	000080	00593	3017	3498						
NOLOSS	00001	000020	00517	1326	1505	1564	1602	3581	6691	7080	7117
NOMARKER	00001	000418	04851	4836							
NOMASK	00001	000245	03127	3121							
NOMASKW	00001	000609	06614	6609							
NOPRIME	00002	000112	01948	1924							
NOPULSE	00001	000129	02042	2052							
NORMDONE	00001	00028E	03420	5920							
NOTCAP	00001	000001	00596	3224	6650						
NOTCOMP	00001	00025D	03224	3312	3356	3394	3462	3508	4778		
NOTGOOD	00001	00033B	04076	4046							
NOTLPNRZ	00001	000475	05200	5168	5177	5193					
NOTLPRD	00001	00021F	03002								
NOTNRZIW	00001	000611	06655	5156							
NOTPE	00001	000010	00559	6641							
NOTREAD	00001	00004C	01190	1181							
NOT1600	00001	0002AB	03525	1353							
NOT1600A	00002	000079	01353	1357							
NOW	00001	0000C7	01656	1692	7920						
NOW200	00001	0007B5	08143	8131							
NPRZ	00001	000317	03948	3930							
NRETURN1	00002	000488	05284	5206							
NRZIBOT	00001	000471	05187	5935							
NRZIBOTZ	00002	000542	05935	5180							
NRZIFOP	00001	00043E	04993	4854							
NRZIIBG	00001	000544	05949	4936							
NRZIIBGA	00001	000545	05953	6051							
NRZILINK	00001	000400	04766	3167							
NRZILOOP	00001	000409	04803	4809							
NRZISTAR	00001	00041C	04876								
NRZISTOP	00001	00041A	04870								
NRZI1000	00001	0004BC	05479	5482	5495						
NRZI1001	00001	0004BF	05489								
NRZI1002	00001	0004C0	05492	5498	5505	5545					

SYMBOL	LEN	VALUE	DEFN	REFERENCES
NRZI1003	00001	0004C3	05502	5486
NRZI1004	00001	0004C6	05512	5479 5492
NRZI1005	00001	0004CA	05526	5512 5515 5533
NRZI1006	00001	0004D3	05554	5560 5573
NRZI1007	00001	0004D6	05564	5557
NRZI1008	00001	0004D7	05567	5570 5580
NRZI1009	00001	0004DA	05577	5564
NRZI7	00001	000010	00530	4794 5349 5620 6042
NRZLRC	00001	000495	05336	5309
NRZSET	00001	00048E	05309	5303
NRZTM	00001	00047B	05234	5209
NRZTM1	00001	00047E	05244	5234
NRZWRT	00001	000468	05159	5153
NTACH	00001	000004	00624	3136
NTACHPRZ	00001	000310	03924	3951
OKALREDY	00001	00026A	03289	3289 3359
OKDOK	00001	0002B2	03547	3540
OKFOR64	00001	000275	03330	
OKTOWRT	00001	00046B	05168	5162
OKYET	00001	00051D	05817	5808
ONCEAGN	00001	00076B	07873	7876
ONE	00001	000001	00570	1611 3927 3963 3998 4013 4130
ONEMORE	00001	0006DD	07377	7380
ONEMORET	00001	0007BB	08166	8169
ONES	00001	0000FF	00567	0941 0998 1001 1193 1196 1202 1242 1338 1360 1432 1464 1505 1511 1564 1602 1608 1760 1972 2002 2110 2166 2189 2296 2305 2379 2385 2418 2710 2757 2812 2940 2973 2976 3088 3279 3282 3285 3315 3333 3420 3423 3466 3505 3525 3531 3553 3569 3606 3622 3675 3681 3752 3786 3860 3878 3890 3899 4007 4070 4119 4218 4296 4602 4873 4966 5006 5187 5261 5297 5306 5370 5390 5551 5632 5856 5887 5902 6005 6349 6352 6398 6413 6422 6506 6545 6570 6597 6697 6700 6723 6799 6802 6808 6811 6860 6877 6939 7080 7086 7092 7117 7123 7213 7216 7228 7333 7353 7491 7502 7555 7590 7598 7601 7649 7702 7730 7767 7799 7824 7833 7892 7943 7952 8013 8044 8093 8119 8134 8143 8160
OPCODES	00001	0005E0	06491	6416
OPPDIR	00001	000010	00488	7892
PARTREC	00001	000004	00614	1551 3705
PE	00001	000004	00584	4488
PEBIT	00001	000080	00514	2157 3315 5150 5273 5632 6229
PERMRDWT	00001	000040	00528	1172 2710 4797 4966 5373 6048 6708 7526 7649
PERR	00001	000002	00625	3020 4602 6741 7577
POINTERS	00001	000012	00298	6784
POLLALL	00001	000367	04256	2079
POLLMTIX	00001	000370	04282	2911 4287
POLLNEXT	00001	000386	04358	4192
POLLSTEP	00001	000383	04348	4224 4253
POLLSTOP	00001	00037B	04323	4370
POLL1	00001	000350	04175	4367
POLL10	00001	000356	04195	
POLL2	00001	000353	04186	
POLL3	00001	000354	04189	4180
POLL4	00001	00035A	04212	4215
POLL5	00001	00035C	04218	4212
POLL6	00001	000365	04250	3824
POLL66	00001	000366	04253	4391

SYMBOL	LEN	VALUE	DEFN	REFERENCES						
POSBYTE	00001	0003EE	04715	4551	4635					
POSIT	00001	000001	00487	2305	7892					
POSITIV	00001	00054E	05982	5966						
POSITIVE	00001	00022E	03054	3030						
POSTACH	00001	000574	06130	6107	6139	6145				
PREAMBOK	00001	00008E	01445	1392	1401	1451				
PRETURN1	00001	000134	02076	2070						
PRETURN2	00002	000136	02082	4232						
PRETURN3	00001	000132	02070	1936	1969					
PRETURN4	00002	000137	02085	4235						
PRIMESET	00001	0000F7	01854	1872						
PRŽ	00001	000321	03984	3966						
PULSE	00001	000010	00564	1992						
RDBKLP	00001	00001E	00956	0947						
RDBKWD	00001	000080	00473	0956	1138	1695	2160	2334	7839	
RDFMSK	00001	00016B	02296							
RDFWDD	00001	000040	00474	0950	1116	2285	2296	2356	7705	7879
RDSYNC1	00001	00048F	05312	5264	5312	5325				
RDSYNC2	00001	000490	05315	5318						
RDSYNC3	00001	000492	05322	5315						
RDYMOVE	00001	000182	02373	2314						
RDYWAIT1	00001	000092	01467	1476	1485					
READCHAN	00002	000198	02457	2449						
READEND	00001	000091	01464	1445						
READHIGH	00001	00025F	03231							
READLP	00001	000265	03273	3243						
READOP	00001	000002	00653	1093	1123	1178	1593	1641	3492	
READSTAR	00002	00025B	03215	3209	3231	3391				
READSTOP	00001	0000B8	01602	1638	3084	5859	7418			
READTAPE	00001	000046	01172	3215	3388					
READWAIT	00001	000199	02460	2463						
READX	00002	00009B	01495	1517						
READYES	00001	00007A	01357	1304						
READ001	00001	0002B5	03562	3550	3562	3588				
READ002	00001	0002BD	03588	3578	3594					
READ003	00001	0002C1	03606	3591						
READ004	00001	0002C3	03612	3615	3631					
READ0041	00001	0002C5	03619	3612						
READ0042	00001	0002C8	03628	3628						
READ0051	00001	0002CA	03639	3619	3645	3684				
READ006	00001	0002D8	03681	3672						
READ007	00001	0002D9	03684	3651	3660	3678				
READ008	00001	0002DF	03707	3639	3654	3687				
READ010	00002	0002DF	03709							
READ017	00001	0002DA	03687	3696						
READ6400	00001	000270	03309							
RECNT	00001	000327	04007							
REDLIGHT	00001	000014	00283	2782						
REFIRST	00001	000339	04070	4037						
REJCMD	00001	000080	00619	2058	2324					
REJCTRL	00001	000020	00621	2685						
REJTU	00001	000040	00620	2754	4521	4602				
RESET	00001	000002	00478	2536	4336					
RESETBOR	00001	000299	03466	3449						

SYMBOL	LEN	VALUE	DEFN	REFERENCES				
RESETERR	00001	000009	00280	4996	4999	5597	5600	
RESETTU	00001	00037E	04333	4320				
RESET1	00001	0001C1	02636	2556	2600			
RESET2	00001	0001C2	02639					
RESET3	00001	0001C3	02642					
RESTART	00001	000001	00606	4990				
RESTDEB	00001	0001A5	02515	2499				
RESYNC	00001	00064E	06877	6848				
RETRY	00001	000345	04116	4079				
REW	00001	000001	00498	2160				
REWFAIL	00001	0001DF	02754	2830	2833	2842		
REWIND	00001	000001	00497	1037				
ROUNDUP	00001	00021D	02996	3066				
RUN	00001	000080	00494	1018				
RUNCTR	00001	000523	05836	5820	5829			
R0	00001	000000	00355	5722	6349	6395		
R1	00001	000001	00356	5725				
R10	00001	00000A	00365	5752				
R11	00001	00000B	00366	5755				
R12	00001	00000C	00367	5758				
R13	00001	00000D	00368	5761				
R14	00001	00000E	00369	5764				
R15	00001	00000F	00370	5767				
R16	00001	000010	00371					
R17	00001	000011	00372					
R18	00001	000012	00373					
R19	00001	000013	00374					
R2	00001	000002	00357	5728	6322	6352	6355	6377
R20	00001	000014	00375					
R21	00001	000015	00376					
R22	00001	000016	00377					
R23	00001	000017	00378					
R24	00001	000018	00379					
R25	00001	000019	00380					
R26	00001	00001A	00381					
R27	00001	00001B	00382					
R28	00001	00001C	00383					
R29	00001	00001D	00384					
R3	00001	000003	00358	5731				
R30	00001	00001E	00385					
R31	00001	00001F	00386					
R4	00001	000004	00359	5734	6398	6428		
R5	00001	000005	00360	5737				
R6	00001	000006	00361	5740				
R7	00001	000007	00362	5743				
R8	00001	000008	00363	5746				
R9	00001	000009	00364	5749				
SCANLINK	00001	0003C4	04563					
SCOOT	00002	00002E	01033					
SEENONE	00001	00040D	04816	4822				
SEENONE1	00001	00040C	04813	4803	4813			
SENDEM1	00001	000526	05846	5833				
SENDEM3	00001	00057B	06152	6126	6133	6148		
SENDEM4	00001	000582	06174	6152	6158			

SYMBOL	LEN	VALUE	DEFN	REFERENCES
SENDEM5	00001	000552	05995	5982
SENDEM6	00002	00057A	06148	6111
SENSE1	00001	000006	00395	1875 2937 3752 3774 3778 4268 4530 4572 4648 5518 6990
SENSE2	00001	000007	00396	1878 1892 3786 3800 4557 4632 4663 4690
SETAG	00001	000166	02276	2270
SETBKWD	00001	00003F	01138	1126 1132
SETBOR1	00001	0006FA	07474	7423
SETBOR2	00001	0006F6	07461	7464
SETCMD1	00001	000765	07855	
SETCMD2	00001	000768	07864	7714 7746 7789
SETCMD3	00001	000769	07867	1704
SETCNT	00001	00048B	05300	
SETCOUNT	00001	0007AD	08119	2946
SETCTRL	00001	000165	02273	2264
SETCTRL1	00001	000530	05881	3412 5656 7517 7726
SETD	00001	0001E9	02786	1975 2067 4329
SETDENS	00001	000010	00495	3406 5641 7511
SETDIAG	00001	000020	00475	0938 0950 0956
SETDLONE	00001	000011	00899	2630 2680 4761 6205
SETDRCK	00001	00079F	08053	8047
SETENDCK	00001	0000A6	01535	1492 1554
SETENDER	00001	0006A4	07168	7114 7159
SETEQCK	00001	000629	06741	6735
SETERASE	00001	000002	00499	7511 7720
SETERGF	00001	000027	01004	5196
SETERR1	00001	0004AA	05406	5383
SETERR10	00001	0004A4	05386	5409
SETERR2	00001	0004AC	05412	5396
SETERR20	00001	0004A8	05399	5415
SETFWD	00001	000038	01116	1096 1103 3833
SETHI	00002	00030A	03896	3869 3884 4064
SETHIMOD	00002	000390	04388	4250
SETLEV	00001	000532	05887	
SETLEVEL	00001	00052B	05863	5792
SETLINK1	00001	000252	03181	
SETLONOW	00001	0000AD	01562	1538 3709
SETLPCMD	00001	000018	00936	0923
SETMIN	00001	0002B4	03553	3543
SETNORM	00001	00028A	03403	3330
SETNRZI	00001	00027C	03353	3276
SETNTACH	00001	000246	03136	3075 8009
SETPARTL	00001	0000AA	01551	1448
SETPRIME	00001	000200	02869	1863
SETPULSE	00001	00011B	01989	2809
SETRDCHK	00001	0000AC	01560	1344 1386 1389 3597
SETRDERR	00002	0002C0	03597	3566 3572 3625
SETREJ	00001	000173	02324	7904
SETRET3	00001	000482	05258	5250
SETSTATA	00001	000008	00532	1027 1813 4376 5795 5823 5842 5846 5856 5953 5972 5991 5995 6005 6070 6164 6309
SETSTATB	00001	000004	00533	1256 2412 2418 2743 2869 2872 4198 4218 4274 4348 4845 5846 5995 6183 6309 7320 7502 7526 7590 7649
SETSTATC	00001	000002	00534	1021 1582 2064 2340 2778 2848 2851 2902 3139 4277 4728 4975 6557 8275
SETSTATD	00001	000001	00535	0899 1798 2786 2848 2851 2869 2872 6557

SYMBOL	LEN	VALUE	DEFN	REFERENCES
SETSTATS	00001	000517	05798	5852 5875
SETSYNC	00001	000617	06685	
SETSYNC2	00001	00061C	06700	6694 7209
SETTIE	00001	000459	05093	5052
SETUBO	00001	000489	05294	5258
SETUCK	00001	0001E7	02778	2763
SETUP	00001	000014	00917	0973 0991 3830
SETUPX	00001	0005F2	06554	6548
SETUX	00001	0001DC	02743	2737
SETUXCNT	00001	00004D	01193	1435
SETVELCK	00001	00032B	04023	8268
SETWTMCK	00001	0006CE	07312	7453
SET4	00001	00030B	03899	
SET7CNT	00001	00048A	05297	
SET800	00001	0004E8	05632	3353
SET8001	00001	0004EB	05641	5183
SEVENTRK	00001	000010	00577	4434
SEVTRK	00001	000080	00555	4428 4785 5159 5647
SHORTDLY	00001	000186	02385	2487
SKIPB	00001	000384	04351	2082
SKIPMOD	00001	00016F	02308	2302
SKIPRPQ	00001	0003C0	04548	4542
SKIPSDR	00001	0003CD	04593	
SKIPSLO	00001	000661	06936	6930
SLOWBGN	00001	000004	00604	6933
SLOWEND	00001	000002	00605	7038 7240 7439
SNSB	00001	0003A6	04464	4458
SNSC	00001	0003A8	04473	4464
SNSC2	00001	0003AD	04488	
SNSD	00001	0003AE	04491	4485
SNSE	00001	0003B1	04500	4494
SNSF	00001	0003B6	04518	4500
SNSG	00001	0003C2	04557	4539
SNSH	00001	0003C6	04569	4560
SNSI	00001	0003C7	04572	
SNSJ	00001	0003C9	04581	4569
SNSK	00001	0003CF	04602	4593
SNSL	00001	0003D4	04620	4611
SNSLES	00001	0003B4	04509	4503
SNSLINK	00001	0003F9	04752	3827
SNSM	00001	0003D6	04629	4620
SNSN	00001	0003D7	04632	
SNSO	00001	0003D9	04642	4629
SNSP	00001	0003DB	04648	4642
SNSQ	00001	0003DE	04660	4651
SNSR	00001	0003E4	04681	4660
SNSRTN	00001	0001D6	02725	3821
SNSS	00001	0003E6	04687	4681
SNST	00001	0003E7	04690	
SNSTOP	00002	00037D	04329	
SNSV	00001	0003EC	04708	4687
SNSWAIT	00001	0003EF	04722	4467 4614 4623
SNS0	00001	0000DA	01723	
SNS1	00001	0000DE	01735	1726

SYMBOL	LEN	VALUE	DEFN	REFERENCES
SNS2	00001	0000E0	01742	1729
SNS3	00001	0000E1	01745	1738
SNS4	00001	0000E6	01760	1754
SNS41	00001	000392	04403	1769
SNS410	00002	0000E9	01769	1763
SNS42	00001	000397	04418	1766
SNS5	00001	000398	04421	4415
SNS6	00001	00039A	04428	4421
SNS7	00001	00039D	04437	4431
SNS8	00001	0003A0	04446	4440
SNS9	00001	0003A3	04455	4449
SOCKEM	00001	00010D	01921	1912
SPACEOP	00001	000001	00660	1107 1135 1593 1641
SRETURN1	00002	0002F6	03818	1848
SRETURN2	00002	0002F7	03821	2713
SRETURN3	00002	0002F8	03824	4241
SRETURN4	00002	0002F9	03827	4563
SRETURN5	00002	0002FA	03830	6567 7646
SRETURN6	00002	0002FB	03833	3713
SRETURN7	00002	0002FC	03837	2524
STARTAPE	00001	000256	03200	1141
START800	00001	000548	05963	5988
STAT	00001	000028	00295	0851 0903 1030 1175 1842 2415 2716 2789 2899 2905 4201 4221 4280 4379 4731 4743 4800 4969 5009 5376 5798 5826 5956 5975 6045 6073 6167 6186 6238 6312 6560 6573 6711 7327 7505 7538 7652
STATIMG	00001	000004	00393	0843 0847 0851 0899 0903 1030 1175 1798 1842 2183 2415 2471 2716 2789 2848 2851 2869 2872 2899 2905 4116 4201 4221 4280 4379 4728 4731 4743 4800 4969 5009 5376 5798 5826 5956 5975 6045 6070 6073 6167 6186 6217 6238 6312 6554 6557 6560 6573 6711 7327 7368 7505 7538 7652 7911 8259 8372
STATSNOW	00001	000770	07889	
STATUSOK	00001	000104	01889	
STATUS1	00001	000101	01875	3818
STAYFWD	00001	000604	06600	6588 6594
STEPCTR	00001	00054F	05985	5969 5978
STEP0001	00001	000000	00837	
STEP0002	00001	000001	00841	
STEP0003	00001	000002	00845	
STEP0004	00001	000003	00849	
STEP0005	00001	000004	00853	
STEP0006	00001	000008	00867	
STEP0007	00001	0001A1	02497	
STEP0008	00001	0001A5	02513	
STEP0009	00001	0001A6	02517	
STEP0010	00001	0001A7	02522	
STEP0011	00001	0001A8	02526	
STEP0012	00001	0002E1	03725	
STEP0013	00001	0002E2	03729	
STEP0014	00001	0002E3	03733	
STEP0015	00001	0002E4	03738	
STEP0016	00001	0002E5	03742	
STEP0017	00001	0002E6	03746	
STEP0018	00001	0002E7	03750	
STEP0019	00001	0002E8	03754	
STEP0020	00001	0002E9	03759	

SYMBOL	LEN	VALUE	DEFN	REFERENCES	
STEP0021	00001	0002E8	03755		
STEP0022	00001	0002E9	03760		
STEP0023	00001	0002EA	03764		
STEP0024	00001	0002EB	03768		
STEP0025	00001	0002EC	03772		
STEP0026	00001	0002ED	03776		
STEP0027	00001	0002EE	03780		
STEP0028	00001	0002EF	03784		
STEP0029	00001	0002F0	03788		
STEP0030	00001	0002F1	03793		
STEP0031	00001	0002F0	03789		
STEP0032	00001	0002F1	03794		
STEP0033	00001	0002F2	03798		
STEP0034	00001	0002F3	03802		
STEP0035	00001	0002F4	03806		
STEP0036	00001	0002F5	03810		
STEP0037	00001	0002FC	03835		
STEP0038	00001	0001A9	02530		
STEP0039	00001	0001AA	02534		
STEP0040	00001	0001AB	02538		
STEP0041	00001	0001AC	02542		
STEP0042	00001	0001AD	02546		
STEP0043	00001	0001AE	02550		
STEP0044	00001	0001AF	02554		
STEP0045	00001	0001B0	02558		
STEP0046	00001	0001B1	02562		
STEP0047	00001	0001B2	02566		
STEP0048	00001	0001B3	02570		
STEP0049	00001	0001B4	02574		
STEP0050	00001	0001B5	02578		
STEP0051	00001	0001B6	02582		
STEP0052	00001	0001B7	02586		
STEP0053	00001	0001B8	02590		
STEP0054	00001	0001B9	02594		
STEP0055	00001	0001BA	02598		
STEP0056	00001	0001BB	02608		
STEP0057	00001	0001BC	02612		
STEP0058	00001	0001BD	02616		
STEP0059	00001	0001BE	02620		
STEP0060	00001	0001BF	02624		
STEP0061	00001	0001C0	02628		
STEP0062	00001	000011	00897		
STEP0063	00001	000012	00901		
STEP0071	00001	0001A2	02501		
STEP0072	00001	0001A3	02505		
STEP0073	00001	0001A4	02509		
STEP0074	00001	000005	00857		
STILLOK	00001	00051A	05808	5839	
STOPEXIT	00001	000589	06196	6174	
STOPNRZI	00001	00041B	04873	4848	6008
STOPREAD	00001	0000B4	01588	1495	1570
STOPWAIT	00001	0005E6	06516	6509	6519
STREADCK	00001	000008	00613	1560	6936
STROBEA	00001	000592	06232	6254	

SYMBOL	LEN	VALUE	DEFN	REFERENCES									
STROBTIE	00002	000635	06784	1617									
STRTOVER	00001	00043D	04990	4819									
SUBONE	00001	00079C	08044	8025									
SUMMORE	00001	000249	03146	3081									
SYNC	00001	000010	00518	1184	1242	1505	1564	1602	3606	3663	6600	6685	6877	7117
TACHASYM	00001	000566	06085	6161	6170	6192								
TACHDOWN	00001	00051E	05820											
TACHOFF1	00001	000127	02036											
TACHOFF2	00001	000128	02039											
TACHON1	00001	00012A	02046	2033										
TACHON2	00001	00012C	02052	2046										
TACHPRZ	00001	000319	03957	3921	3984									
TACHUP	00001	000522	05833	5817										
TACHWAIT	00001	000225	03024	3002	3008	3027	3043	3050	3158					
TACHYET	00001	000227	03030	3024										
TACH1	00001	000785	07972	7975	8000	8006								
TACH2	00001	000787	07978	7972										
TACH3	00001	000797	08028	8063	8070	8077	8090	8096						
TAHITCH	00001	00014E	02189											
TAKMOVE	00001	000781	07959	7711	7736	7773	7786	7842						
TAKS	00001	00021C	02991	1007	2195									
TAKTOSTP	00001	000561	06070	5786	5949									
TAKTR	00001	000008	00641	3033	3088	7981	8013							
TAPEOP	00001	000080	00527	2412	2710	4966	5006	5012	6042	6235				
TESTFWD	00001	0002CD	03648	3690										
TESTLWR	00001	000016	00923											
TESTONE	00001	0005C1	06395											
TEST1	00001	0005C3	06401	6485										
THERE	00001	00069C	07143	7136	7146									
TIEBYTE	00001	000017	00406	2576	4509	5591								
TIEEQU03	00001	00044D	05055	5036	5086									
TMCONFIG	00001	000059	01236											
TMEND	00001	0004B9	05462	5342	5462									
TMEND2	00001	0006F4	07453	7446										
TMFINIS	00001	0006F1	07443	7426										
TMLOOP1	00001	0006EB	07423	5465	7429	7467								
TMLOOP2	00001	0006F7	07464	7436	7470									
TM10BOR	00001	0006EC	07426	7477										
TM20BOR	00001	0006F8	07467											
TM7TRK	00001	00000F	00566	5244										
TM9TRK	00001	000013	00565	5253										
TOIBG800	00002	00042E	04936	4870										
TOSETD	00002	000131	02067	1686										
TOSETD2	00002	0000CF	01686	1860										
TRACEBOR	00001	00006B	01301	1211										
TRACELSR	00002	000500	05719											
TRACER	00001	000008	00397	0914	0970	0988	1093	1100	1107	1123	1129	1135	2584	
TRACTRAP	00002	000512	05773											
TRAP1	00002	0005C6	06410											
TRAP10	00002	0005DD	06482	6343										
TRAP11	00002	0005DF	06488	6346										
TRAP2	00002	0005C9	06419											
TRAP4	00002	0005D1	06446	6325										
TRAP5	00002	0005D3	06452	6328										

SYMBOL	LEN	VALUE	DEFN	REFERENCES
TRAP6	00002	0005D5	06458	6331
TRAP7	00002	0005D7	06464	6334
TRAP8	00002	0005D9	06470	6337
TRAP9	00002	0005DB	06476	6340
TRETURN2	00002	00024F	03167	5171
TRETURN3	00001	000252	03175	2192
TRETURN5	00002	000250	03170	7330
TRNARND	00001	000138	02110	0953 0959 1033 1144 7808
TRYAGAIN	00001	000076	01344	1321 1347
TSAGC	00001	000008	00603	2757 3459 3489 7587
TSTFOERR	00001	0001E0	02757	2751
TSTFOMOR	00001	0001E3	02766	2760
TSTGO	00001	000348	04130	4052
TSTHI	00001	0005AA	06322	6315
TSTHI1OK	00002	0005B9	06368	6361
TSTIME	00001	00032E	04037	3995
TST28	00001	000329	04013	4122 4133
TUADDR	00001	00000B	00400	1807 1810 1819 1822 2887 4173 4299 4361
TUBI	00001	000081	00289	2299 2964 3774 3778 3800 4268 5896 6503 7386 7889 8022
TUBO	00001	000060	00279	1153 1659 1995 2183 2261 2471 2548 3109 3124 3731 3748 3782 4259 4339 4879
				5294 5339 5722 5725 5728 5731 5734 5737 5740 5743 5746 5749 5752 5755 5758
				5761 5764 5767 5884 5899 6082 6217 6497 6612 7368 7858 7870 7911
TUBODOWN	00001	0002E4	03737	
TUBOMSK	00001	000002	00672	3118 6606
TURNNRZI	00001	0004E3	05611	2146
TUSTA	00001	000040	00579	1742
TUSTB	00001	000020	00580	1732
TUTAG	00001	000024	00282	1156 1650 1857 1998 2014 2186 2276 2436 2477 2540 2614 2677 3115 3184 3740
				4342 4354 4888 5881 5905 6036 6103 6199 6244 7068 7374 7395 7796 7861 7867
				7914 7962 8037
UCKON	00001	000247	03139	3069 4029
UDETERR	00001	000008	00588	
UEXEND	00002	00032C	04026	3942 3972
UNTCHK1	00002	0007DB	08272	8186 8212 8346
UPCOUNT1	00001	000576	06136	6130
VELBAD	00001	000634	06780	5455 5508 5583 7050 7306 7449
VELCHK1	00001	00061E	06706	
VELCHK10	00001	000625	06729	
VELCHK2	00001	000622	06720	6720 6744
VELCHK3	00001	00062A	06744	6729 6738 6747
VELCHK4	00001	00062C	06752	6717 6726 6752 6766
VELCHK5	00001	00062F	06762	6755
VELCHK6	00001	000630	06764	6777
VELCHK7	00001	000630	06766	6769
VELCHK8	00001	000632	06774	6762
VELCK80A	00001	00049E	05367	5352
VELCK80B	00001	00049F	05370	5358 5364
VELCK800	00001	000498	05349	5220
VELCK801	00001	0004A0	05373	
VELCK802	00001	0004A2	05380	
VELCK803	00001	0004A3	05383	5386 5399
VELCK804	00001	0004A7	05396	5402
VELCK805	00001	0004AE	05422	5380 5393 5428 5441
VELCK806	00001	0004B1	05432	5425

SYMBOL	LEN	VALUE	DEFN	REFERENCES						
VELCK807	00001	0004B2	05435	5438	5452					
VELCK808	00001	0004B5	05445	5422	5435					
VELCK809	00001	0004B6	05449	5432						
VELEXIT	00001	00033F	04093	3924	3939	3957	3975	4061		
VELEXIT1	00002	000344	04108	4102						
VELGAP	00001	00021A	02973							
VELOCERR	00001	000001	00626	4023						
VELOCOK	00001	0007F9	08372	4136	8256	8336				
VELOCOUT	00001	0007D7	08259	8253	8333	8369				
VELOC001	00001	0007BD	08173	8166	8182					
VELOC002	00001	0007BF	08179	8173						
VELOC003	00001	0007C4	08199	8176						
VELOC004	00001	0007C1	08186	8192						
VELOC005	00001	0007C5	08202	8208	8288					
VELOC006	00001	0007CB	08223	8202	8215					
VELOC007	00001	0007C8	08212	8218						
VELOC008	00001	0007CF	08235	8229						
VELOC009	00002	0007CE	08232							
VELOC010	00002	0007D2	08244							
VELOC011	00001	0007D3	08247	8241						
VELOC012	00001	0007DE	08282	8265						
VELOC013	00002	0007E1	08291	8282						
VELOC014	00001	0007E2	08299	8291						
VELOC015	00001	0007E4	08306	8352						
VELOC016	00001	0007EF	08339	8302						
VELOC017	00001	0007E7	08315	8312						
VELOC019	00002	0007EA	08324							
VELOC020	00001	0007EB	08327	8321						
VELOC021	00002	0007F4	08357	8232						
VELOC022	00002	0007F5	08360	8357						
VELOC023	00002	0007F6	08363	8360						
VELOC024	00002	0007F7	08366	8244	8324	8363				
VELOC025	00002	0007F8	08369	8366						
VELOC026	00001	0007E3	08302	8342						
VELOC027	00001	0007F1	08346	8349						
VELOUT	00001	000635	06782	7053						
VELSTR	00001	000214	02940							
VELTRY	00001	000001	00607	2757	4116	8259				
VEL1	00001	000217	02964	2970						
VRCDONE	00001	0003BD	04539							
WAITACEL	00001	00027E	03359	3299	3305	3344	3350	3362	3373	3379
WAITEND	00001	0000AF	01570	1252	1259	1429	1576			
WAITIBG	00001	0005F8	06576	6579						
WAITL	00001	000313	03936	3945	4143					
WAITLOP	00001	00034B	04140	4096						
WAITONE	00001	0007BA	08163	8163						
WAITSOME	00001	0006DF	07383	7389						
WAIT0	00001	0003F1	04728	4575	4669	4675	4696	4702		
WAIT1	00001	0003F3	04734	4740						
WAIT1L	00001	00031D	03972	3978	4140					
WAIT2	00001	0003F7	04746	4749						
WAIT4	00001	0003F0	04725	4512	4596	4654				
WAIT5	00001	0003F6	04743	4734						
WASTET	00001	000332	04049	4010	4073					

ROS2 SYMBOL	LEN	VALUE	DEFN	REFERENCES													
WORK1	00001	000000	00389	1001	1147	1150	1153	1156	1193	1608	1647	1650	1656	1659	1854	1857	2011	2014
				2110	2532	2540	2544	2610	2614	2673	2677	2803	2964	2973	3112	3115	3249	3420
				3528	3727	3731	3735	3740	3744	3748	3766	3782	3804	3860	3878	3890	3908	4256
				4259	4296	4305	4333	4342	5101	5111	5126	5187	5261	5297	5306	5355	5361	5367
				6076	6202	6281	6290	6494	6497	6541	6714	6799	6808	6860	7086	7092	7123	7213
				7333	7491	7535	7555	7598	7702	7730	7767	7780	7824	7833	7943	7952	8119	8134
				8143	8235	8315												
WORK2	00001	000001	00390	0839	0855	0998	1190	1585	1720	1801	2180	2186	2189	2241	2385	2433	2436	2536
				2548	2688	2719	2976	3078	3109	3246	3333	3423	3863	3881	3893	4040	4167	4195
				4336	4339	4382	4521	4602	4722	4752	4781	4942	4981	5190	5370	5804	5849	5887
				5899	5959	5998	6079	6082	6094	6100	6103	6196	6199	6703	7228	7336	7601	7968
				8122	8137	8146	8247	8327										
WORK3	00001	000002	00391	1196	1698	1711	1989	1998	2076	2200	2267	2273	2276	2474	2477	2908	2993	3181
				3184	3285	3409	3525	3675	3681	3899	4007	4119	4170	4323	4348	4473	4725	4755
				4873	4897	5040	5055	5058	5077	5117	5644	5671	5872	5881	5905	6085	6177	6700
				7371	7374	7386	7392	7395	7514	7723	7793	7796	7855	7861	7864	7867	7914	7959
				7962	7965	8034	8037	8157	8299	8306								
WORK4	00001	000003	00392	0917	0938	0950	0956	1018	1037	1052	1116	1138	1199	1695	2002	2261	2940	3282
				3406	3534	4894	5244	5253	5294	5336	5339	5551	5641	5863	5884	6088	6180	6802
				6811	7216	7353	7511	7705	7720	7743	7783	7805	7839	7858	7870	7885	7895	8022
				8199	8223	8285												
WORK5	00001	000015	00405	0894	3124	3905	4876	4879	4885	4888	4945	5866	6033	6036	6241	6244	6612	7065
				7068	8160													
WRITE	00001	000008	00477	0917	0938	2124	7743	7783	7805									
WRITE20	00001	00063C	06813	6805														
WRITE201	00001	00063C	06815	6815	6864													
WRITE22	00001	000644	06839	6827	6833													
WRITE220	00001	00064C	06862	6842														
WRITE221	00001	00064C	06864	6867														
WRITE23	00001	00066C	06979	6918														
WRITE25	00001	00067A	07032	7018														
WRITE25X	00001	00067C	07038	6960														
WRITE27	00001	00066A	06973	6887														
WRITE28	00001	000671	06996	4108	5279	6951	6984	6987										
WRITE28X	00001	000672	07004															
WRITE280	00001	000672	07006	7009	7062	7071												
WRITE30	00001	000643	06836	6818	6821													
WRITE32	00001	000674	07012	7006	7015	7024												
WRITE33	00001	00063E	06821															
WRITE34	00001	000677	07021	7027	7035													
WRITE40	00001	000688	07078	7012	7021													
WRITE41	00001	00068D	07095	7089	7104	7152												
WRITE420	00001	000691	07108	7095	7101													
WRITE43	00001	00069E	07149	7111	7149													
WRITE49	00001	0006A3	07165	7098														
WRITE50	00001	0006A6	07175	7130														
WRITE54	00001	0006A0	07156	7165														
WRITE542	00001	0006A1	07159	7178														
WRITE888	00001	0004C8	05518															
WRITE999	00001	00066F	06990															
WRITING	00001	0004BB	05476	5217	5476	5554	5567											
WRSTA	00001	000004	00582	4452														
WRSTALP	00001	000018	00938															
WRSTAT	00001	000008	00547	2169	2347	4446	7802											

CROSS-REFERENCE

SYMBOL	LEN	VALUE	DEFN	REFERENCES				
WRTAWAY	00001	00060B	06636	8381				
WRTBURST	00001	000020	00529	2710	6570	7320	7502	
WRTP2	00001	0005F5	06567	7939				
WRTSTNRZ	00001	000465	05150	6638				
WRTSTR	00001	00020F	02924	0920				
WRTSTR1	00001	000213	02937	2930				
WRTSTR2	00001	000212	02933	2927				
WRTSTR3	00002	000216	02946	2933				
WRT01	00001	00064F	06880	6854	6883	6927	6948	6957
WRT02	00001	000651	06887	6880				
WRT03	00001	000652	06890	6976				
WRT04	00001	000657	06905	6890				
WRT05	00001	000658	06908	6896	6902	6908		
WRT06	00001	000659	06912					
WRT07	00001	00065C	06921	6915				
WRT08	00001	000667	06954	6921				
WRT1	00001	0006D0	07320	6660				
WRT2	00001	0006D6	07347	3170				
WRT21	00001	0006D7	07350					
WRT3	00002	0006D9	07356					
WRT30	00001	000703	07491	7356	7485			
WRT4	00001	000700	07482	7347				
WRT5	00001	000705	07502	7482				
WRT6	00001	00070B	07526	5923				
WRT7	00001	000711	07545	7532				
WRT8	00001	000713	07552	7545				
WRT9	00001	000716	07568	7552				
WRT90	00001	00071F	07598	7571	7616			
WRT95	00001	00072F	07646	7640				
WSTLOOP	00001	000331	04046					
WTEONC	00001	000359	04209	4209				
WTFORIBG	00001	00051B	05811	5814				
WTMAWAY	00001	0006AC	07206	3173	7199			
WTMERR	00001	000020	00611	7312				
WTMOP	00001	000002	00638	0970				
WTMSTR2	00002	000251	03173	7196				
WTM20	00001	0006AE	07213	7206				
WTM21	00001	0006B0	07219	7219	7276			
WTM21A	00001	0006B3	07228					
WTM21B	00001	0006B4	07231	7231	7246			
WTM22	00001	0006BB	07252	7225				
WTM23	00001	0006BF	07264	7258				
WTM24	00001	0006C3	07276	7270	7280	7289	7295	
WTM25	00001	0006B5	07234					
WTM26	00001	0006B8	07243	7237	7249			
WTM27	00001	0006C5	07283	7264				
WTM27A	00001	0006C8	07292	7252	7286			
WTM30	00001	0006CA	07300	7243				
WTM31	00001	0006CD	07309	7303				
WTM32	00002	0006CF	07315	7309				
XADDR	00001	000084	00271	1810	1822			
XANXB	00001	000043	00294	6290	6554			
XFRFOP	00001	000408	04800	5015				
XFRLO	00002	0005C0	06390	6383				

SYMBOL	LEN	VALUE	DEFN	REFERENCES													
XFRSTAT	00001	00036F	04280														
XFRTAGS	00001	000420	04888	4951													
XFRTIE	00001	00044E	05058	5096	5129												
XFRTIEB1	00001	000463	05126	5107													
XFRTIEB2	00002	00044F	05061														
XINA	00001	000090	00290	0887	0894	1801	2200	5671	6281	6541							
XINB	00001	000088	00291	0839	2803												
XOUTA	00001	000042	00292	1187	1245	1329	1508	1567	1605	1878	2409	2719	3321	3584	3609	3666	4509	4557
				4581	4648	4663	4693	4699	4722	5635	6039	6177	6232	6603	6688	6845	6942	6973
				6981	7083	7120												
XOUTAIM	00001	00000D	00402	1187	1245	1329	1508	1567	1605	1889	2409	3321	3584	3609	3666	5635	6039	6232
				6603	6688	6845	6942	6973	6981	7083	7120							
XOUTB	00001	000041	00293	1875	4195	4572	4666	4672	4690	4725	5849	5998	6180	6202				
XXXXX	00002	000401	04778	4791	5165	5650	5653											
X10X	00001	0000A1	01514	1514	1542													
X11X	00001	0000A8	01542	1523	1545													
YESTAK	00001	00078A	07988	7978														
ZAPIM	00001	0001A9	02532	0891	3837													
ZAP1	00002	0006E5	07401	7383														
ZEBRA	00001	000609	06616	6619														
ZERO	00001	000000	00568	0843	0914	1717	1723	1854	2311	2610	2642	2673	3770	3905	4043	4409	4455	4479
				4482	4527	4536	4590	4608	4715	4752	4755	5247	5300	5336				
ZEROCTR	00001	00021C	02993	1662	3094	3100	3252	3432	7339									
ZIPOUT	00002	00052A	05859	5801														
ZONK	00002	0005BF	06386	6374														
ZONKA	00002	0005A9	06318	6297														
ZONKB	00002	0005E9	06525	6300														
ZONKC	00002	0005EB	06531	6303														
ZONKD	00002	0005ED	06537	6306														
ZONK10	00002	0005E5	06512															
ZONK2	00002	0005F1	06551	6287	6294													
ZRETURN1	00002	00053D	05920	3403														
ZRETURN2	00002	00053E	05923	7508														

NUMBER OF PRINTED LINES = 6021 PRINTED LINES
ZRETURN1 00002 00053D 05920   3403
ZRETURN2 00002 00053E 05923   7508

ROS1 (ALU1)

() DESCRIPTION: THIS SUPPLEMENT PAGE PROVIDES THE MICROCODE MODIFICATIONS DONE BY CARD ASSEMBLY 8565073 OR 8565076 AT 0A1-B2J2, INSTALLED BY ECs 846627 OR 847836.

() PRE-REQUISITES: 3803 MODEL 2 WITH ECs 846627 OR 847836 INSTALLED.

() INSTRUCTION: INSERT THIS SUPPLEMENT PAGE AT THE BEGINNING OF MICROCODE LISTINGS PN 1846377 AND NOTE REFERENCE TO THIS PAGE AT ENTRY ADDRESS ON APPLICABLE MICROCODE PAGE.

PATCH STORE MICROCODE LISTINGS

INSTR ADDR	PATCH STORE CONTROL [1]	OBJECT CODE	SOURCE STATEMENT			PATCH NAME
2DC	ENTER	C400		AND	WORK 1, ZERO	ALLOCATED BUSY
2DD	RETURN	62DE		BU	2DE	
328	ENTER	4828	DEPRIM4	XFR	STATIMG, STAT	ALTERNATE PATH DEVICE BUSY
329		3B8C		BOC	STATD, DEPRIM70	
32A		6380		BU	380, FREEAREA	
380		3A82	FREEAREA	BOC	STATC, CKCONCHA	
381	RETURN	632B		BU	32B	
382		D981	CKCONCHA	ANDM	FLAGS, CONCON+CHAIN	
383		2085		BOC	DBUS, TAGO	
384	RETURN	6338	PCHKONA	BU	338	
385		0202	TAGO	STO	XOUTAIM, SETSTATIC	
386		4228		XFR	XOUTAIM, STAT	
387		A202	PA1DLY	ADD	XOUTAIM, X'02'	
388		2187		BOC	NALCO, PA1DLY	
389		0200		STO	XOUTAIM, 0	
38A		4828		XFR	STATIMG, STAT	
38B		6384		BU	PCHKONA	
38C	RETURN	633A	DEPRIM70	BU	33A	
335	ENTER	4828	DEPRIM6	XFR	STATDMG, STAT	
336		2B82		BOC	STATB, CKCONCHA	
337	RETURN	6337		BU	337	
0A3	ENTER	8520		ORI	PNDSTS, CUE	EXTRA DEVICE END
0A4		D50C		ANDM	PNDSTS, CEND+DEND	
0A5		34AA		BOC	DREG4, RTN1	
0A6		20AA		BOC	DBUS, RTN1	
0A7		4642		XFR	PNDADDR, XOUTA	
0A8		14EB		STO	XOUTBIM, NDXSTS	
0A9		5441		XFR	XOUTBIM, XOUTB	
0AA	RETURN	6296	RTN1	BU	TERMSTA2	
0F0	ENTER	1348		STO	LINK4, TERMATE	SENSE RESET
0F1	RETURN	5322		XFR	LINK4, IC	

NOTES

[1] ENTER ENABLES THE PATCH STORE FOR SUCCEEDING INSTRUCTIONS, AND RETURN DISABLES THE PATCH STORE FOR SUCCEEDING INSTRUCTIONS.

MASTER	EC	846771							
	DATE	11JUN82							

ROS2 (ALU2)

() DESCRIPTION: THIS SUPPLEMENT PAGE PROVIDES THE MICROCODE MODIFICATIONS DONE BY CARD ASSEMBLIES 8565073 OR 8565076 AT 01A-A2G2; INSTALLED BY ECs 846626 OR 847836.

() PRE-REQUISITES: 3803 MODEL 2 WITH ECs 846627 OR 847836 INSTALLED.

() INSTRUCTION: INSERT THIS SUPPLEMENT PAGE AT THE BEGINNING OF MICROCODE LISTINGS PN 1846378 AND NOTE REFERENCE TO THIS PAGE AT ENTRY ADDRESS ON APPLICABLE MICROCODE PAGE.

PATCH STORE MICROCODE LISTINGS

INSTR ADDR	PATCH STORE CONTROL [1]	OBJECT CODE	SOURCE STATEMENT			PATCH NAME
213	ENTER	1600	WRTSTR1	STOH	SENSE 1, 0	VELOCITY RETRY EXTENSION
214	RETURN	1300	VELSTR	STOH	WORK 4, ZERO	
7B8	ENTER	0200		STO	WORK 3, 0	
7B9	RETURN	1500		STOH	WORK 5, ZERO	
15A	ENTER	D708	DODELAY	ANDM	SENSE 2, HIDDEN	TURNAROUND DELAY
15B	RETURN	615C		BU	15C	
53F	ENTER	6744	CTLRET6	BU	ERASE6	TRUNCATED POSTAMBLE
744	RETURN	0083	ERASE6	STO	WORK 1, X'83'	
36E	ENTER	8402	DRUVNTCK	ORI	STATIMG, SETSTATIC	ALTERNATE PATH DEVICE BUSY
36F		63C0		BU	3C0, FREEAREA	
3C0		4428	FREEAREA	XFR	STATIMG, STAT	
3C1		3AC4	PPOLMTIX	BOC	STATC, TAG00	
3C2		3BCE		BOC	STATD, EXITPTCH	
3C3		63C1		BU	PPOLMTIX	
3C4		0002	TAG00	STO	WORK 1, RESET	
3C5		4060		XFR	WORK 1, TUBO	
3C6		000A		STO	WORK 1, DEVSEL+COMMD	
3C7		4024		XFR	WORK 1, TUTAG	
3C8		0000		STO	WORK 1, 0	
3C9		A000		ADD	WORK 1, 0	
3CA		4024		XFR	WORK 1, TUTAG	
3CB		A024	TAG002	ADD	WORK 1, 36	
3CC		21CB		BOC	NALC0, TAG002	
3CD		4050		XFR	COMITD	
3CE	RETURN	6370	EXITPTCH	BU	POLLMTIX	

NOTES

[1] ENTER ENABLES THE PATCH STORE FOR SUCCEEDING INSTRUCTIONS, AND RETURN DISABLES THE PATCH STORE FOR SUCCEEDING INSTRUCTIONS.