```
.ASSIGN,PI,19,R
.INSERT,46
.INSERT,101                MICSIM   NO SMR   01/21/75  KERNS    F
.REPLACE,118               MICSIM   NO SMR   01/21/75  KERNS    F
.REPLACE,124,125           MICSIM   NO SMR   01/21/75  KERNS    F
.DELETE,134,135            MICSIM   NO SMR   01/21/75  KERNS    F
.DELETE,155                MICSIM   NO SMR   01/21/75  KERNS    F
.INSERT,359                MICSIM   NO SMR   01/25/75  KERNS    F
.INSERT,374                MICSIM   NO SMR   01/25/75  KERNS    F
.INSERT,377                MICSIM   NO SMR   01/27/75  KERNS    F
.DELETE,384,386            MICSIM   NO SMR   01/25/75  KERNS    F
.INSERT,432                MICSIM   SMR=     01/21/75  KERNS    F
.INSERT,438                MICSIM   SMR=     01/21/75  KERNS    F
.REPLACE,500,502           MICSIM   SMR=     01/21/75  KERNS    F
.REPLACE,546               MICSIM   NO SMR   01/25/75  KERNS    F
.REPLACE,572               MICSIM   NO SMR   01/25/75  KERNS    F
.DELETE,646,653            MICISM   SMR=     01/21/75  KERNS    F
.DELETE,662,664            MICISM   SMR=     01/21/75  KERNS    F
.REPLACE,721,723           MICSIM   NO SMR   01/23/75  KERNS    F
.REPLACE,742               MICSIM   NO SMR   11/23/74  KERNS  F
.DELETE,767,770            MICSIM   NO SMR   01/21/75  KERNS    F
.REPLACE,805               MICSIM   NO SMR   12/18/74  KERNS  F
.REPLACE,830               MICSIM   NO SMR   11/23/74  KERNS  F
.REPLACE,866               MICSIM   NO SMR   11/22/74  KERNS  F
.INSERT,867                MICSIM   NO SMR   11/22/74  KERNS  F
.REPLACE,1004,1007         MICSIM   NO SMR   12/18/74  KERNS  F
.INSERT,2580               MICSIM   SMR=     11/27/74  KERNS  F
.REPLACE,2848,2849         MICSIM   SMR=     11/27/74  KERNS  F
.DELETE,3255               MICISM   SMR=     01/21/75  KERNS    F
.REPLACE,3276,3277         MICISM   SMR=     01/21/75  KERNS    F
.DELETE,3285               MICSIM   SMR=     01/21/75  KERNS    F
.REPLACE,3296              MICSIM   SMR=     01/21/75  KERNS    F
.INSERT,3375               MICSIM   SMR=     01/21/75  KERNS    F
.REPLACE,3378              MICSIM   SMR=     01/21/75  KERNS    F
.REPLACE,3381,3382         MICSIM   SMR=     01/21/75  KERNS    F
.REPLACE,3385              MICSIM   SMR=     01/21/75  KERNS    F
.REPLACE,3388,3392         MICSIM   SMR=     01/21/75  KERNS    F
.REPLACE,3399,3400         MICSIM   SMR=     01/21/75  KERNS    F
.INSERT,3432               MICSIM   SMR=     01/25/75  KERNS    F
.REPLACE,3447,3450         MICSIM   SMR=     01/28/75  KERNS    F
.INSERT,3453               MICSIM   SMR=     01/28/75  KERNS    F
.REPLACE,3477,3480         MICSIM   SMR=     01/28/75  KERNS    F
```

```
.REPLACE,3484,                  MICSIM    SMR=     01/28/75  KERNS     F
.REPLACE,3500                   MICSIM    SMR=     01/27/75  KERNS     F
.INSERT,3697                    MICSIM    SMR=     01/28/75  KERNS     F
.INSERT,3907
.INSERT,3912
.INSERT,3935
.INSERT,3992
.INSERT,4032
.INSERT,4069
.INSERT,4162
.INSERT,4211                    MICSIM    NO=SMR   01/07/75  KERNS
.REPLACE,4378                   MICSIM    NO SMR   01/21/75  KERNS     F
.DELETE,4423,4430               MICSIM    NO SMR   01/21/75  KERNS     F
.REPLACE,4431                   MICSIM    NO SMR   01/21/75  KERNS     F
.DELETE,4464                    MICSIM    SMR=     01/21/75  KERNS     F
.REPLACE,5049                   MICSIM    NO=SMR   01/07/75  KERNS
.INSERT,5051                    MICSIM    NO=SMR   01/07/75  KERNS
.INSERT,5090                    MICSIM    NO=SMR   01/10/75  KERNS     F
.INSERT,5100                    MICSIM    NO=SMR   01/10/75  KERNS     F
.REPLACE,5748                   MICSIM    NO SMR   11/27/74  KERNS     F
.COMSY,MICSIM
      .COMSY,MICSIM  ,03,03/20/73,08/08/74
```

```
  .INSERT,46
 A*       NAME    MMEM,EMEM                                          F
 A*MMEM   BSS     0200            MAIN MEMORY BLOCK                  F
 A*EMEM   BSS     0               END OF MAIN MEMORY                 F
 A*BUFR   DATA    0120240         GENERAL USAGE BUFFER               F
 A**                                                                 F
 A** NOTE--THIS SECTION WILL BE OVERLAYED BY THE BUFFER BUFR          F
 A**                                                                 F
  .INSERT,101                     MICSIM    NO SMR    01/21/75 KERNS F
 A*       BSS     121+BUFR-*      FILL OUT TO MAKE 120 WORD BUFR SPACE F
  .REPLACE,118                    MICSIM    NO SMR    01/21/75 KERNS F
 D*$DBUF  BSS     2048            CONTROL STORE PAGE                   S
 A*       EXT     $DBUF           CONTROL STORE PAGE 0               F
  .REPLACE,124,126                MICSIM    NO SMR    01/21/75 KERNS F
 D*$DRM1  BSS     16              DCS #1                               S
 D*$DRM2  BSS     16              DCS #2                               S
 D*       BSS     96              DCS FOR PAGES 1,2,3                  S
 A*       EXT     $DRM1           DECODER STORE PAGE 0 DECODE 1      F
 A*       EXT     $DRM2           DECODER STORE PAGE 0 DECODE 2      F
 A*       EXT     $DRM1B,$DRM1C,$DRM1D
  .REPLACE,134,135                MICSIM    NO SMR    01/21/75 KERNS F
 D*BUFR   DATA    0120240                                              S
 D*       BSS     120                                                  S
  .REPLACE,155                    MICSIM    NO SMR    01/21/75 KERNS F
 D*CBUF   BSS     512             BUFFER TO HOLD COUNTS FOR NUMBER OF TIMES S
  .INSERT,359                     MICSIM    NO SMR    01/25/75 KERNS F
 A*       DATA    0332            Z  ZERO TABLES                     F
  .INSERT,374                     MICSIM    NO SMR    01/25/75 KERNS F
 A*       DATA    EXCS            Z  ZERO TABLES                     F
  .INSERT,377                     MICSIM    NO SMR    01/27/75 KERNS F
 A*       NAME    EXC                                                F
  .REPLACE,384,386                MICSIM    NO SMR    01/25/75 KERNS F
 B*       JMPM    SAR             HOUSEKEEP TABLES                     S
 B*       DATA    COMM-STEP       WORD COUNT:CLEAR MEM FROM STEP TO COMM  C
 D*       DATA    STEP            START ADDRESS                        C
  .INSERT,432                     MICSIM    SMR-      01/21/75 KERNS F
 A*EXC1A  CALL    SIOUT,7,EXC5    REQUEST MEMORY TYPE                F
 A*       CALL    SIIN            GET MEMORY TYPE                    F
 A*       JMPM    FETCH                                              F
 A*       SUBI    0250                                               F
 A*       TAB                                                        F
 A*       SUBI    3                                                  F
 A*       JAN     EXC1A           LT 2 NOT VALID                     F
```

```
A*        SUBI    3                                                    F
*         JAP     EXC1A           GT 5 NOT VALID                       F
*         STB     MTYP            SAVE MEMORY TYPE                     F
*EXCS     EQU     *                                                    F
*         TZA                                                          F
*         JMPM    SAR             ZERO ALL TABLES AND FLAGS            F
*         DATA    COMM-V          WORD COUNT                           F
*         DATA    V               START ADDR                           F
 .INSERT,438                      MICSIM    SMR=      01/21/75  KERNS  F
4*EXCS    DATA    ' MEMORY TYPE?'                                      F
4*MTYP    DATA    0               MEMORY TYPE, 3=SC,4=CORE,5=SLOW CORE F
 .REPLACE,500,502                 MICSIM    SMR=      01/21/75  KERNS  F
D*        DATA    $DRM1+32        PAGE 1 DCS                             S
D*        DATA    $DRM1+64        PAGE 2 DCS                             S
D*        DATA    $DRM1+96        PAGE 3 DCS                             S
A*        DATA    $DRM1B          PAGE 1 DCS                           F
A*        DATA    $DRM1C          PAGE 2 DCS                           F
A*        DATA    $DRM1D          PAGE 3 DCS                           F
 .REPLACE,546                     MICSIM    NO SMR    01/25/75  KERNS  F
D*        CALL    SIOUT,21,PAGS   OUTPUT THE REQUEST                     S
A*        CALL    SIOUT,7,PAGS    OUTPUT REQUEST                       F
 .REPLACE,572                     MICSIM    NO SMR    01/25/75  KERNS  F
D*PAGS    DATA    ' INPUT HIGHEST NUMBER WCS PAGE DESIRED '              S
A*PAGS    DATA    ' PAGE LIMIT? '                                      F
 .REPLACE,646,653                 MICISM    SMR=      01/21/75  KERNS  F
D**   CHECK IF REQUIRED TO WAIT ON MEMORY                               S
**    YES IF S=0&IMC=0001                                              S
*S122     LDA     XS,1            S=0 ?                                S
*         JAZ     *+4                                                  S
*         JMP     S103            NO=NO WAIT                           S
*         LDA     XIMC,1                                               S
*         DAR                     IMC=0001                             S
*         JAZ     S107            YES=WAIT                             S
 .REPLACE,662,664                 MICISM    SMR=      01/21/75  KERNS  F
D*S107    CALL    MUPA            MEMORY OPERATIONS                      S
*         CALL    S300            DATA LOOP PROCESSING                   S
*         JMP     S108                                                   S
 .REPLACE,721,723                 MICSIM    NO SMR    01/25/75  KERNS  F
D*        LDA     MOPC,1                                               D.1
D*        JAZ     S205            IF NO MEM REQ                        D.1
D*        TAX                                                            S
4*        LDA     MOPC,1                                               F
A*        JAZ     S205            IF NO MEM REQ                        F
```

```
A:      TAX                                                          F
  .REPLACE,742                  MICSIM    NO SMR    11/23/74  KERNS  F
D:      CALL    LOOUT,9,5219    OUTPUT TO LO                         D,1
A:      CALL    LOOUT,9,S219    OUTPUT TO LO                         F
  .REPLACE,767,770              MICSIM    NO SMR    01/21/75  KERNS  F
D:      LDA     NROM,1          INCREMENT EXECUTION                    S
D:      ADDI    CBUF            COUNT FOR                              S
D:      TAB                     THIS                                   S
D:      INR     0,2             CONTROL ROM WORD.                      S
  .REPLACE,805                  MICSIM    NO SMR    12/18/74  KERNS  F
D:      JMP     CRA4            YES                                    S
A:      JMP     CRAX            YES                                  F
  .REPLACE,830                  MICSIM    NO SMR    11/23/74  KERNS  F
D:      JMP     CRA7            NO=                                    S
A:      JMP     CRA8            NO=                                  F
  .REPLACE,866                  MICSIM    NO SMR    11/22/74  KERNS  F
D:*   DON'T USE TS FIELD FOR 8-OFFSET IF I/O REQUEST(IMC=3)            S
A:      JMP     CRA7            IF S=1 OR 2 THEN USE TS FOR OFFSET     F
A:*   DON'T USE TS FIELD FOR 8-OFFSET IF I/O REQUEST (IM=E/F)         F
  .INSERT,867                   MICSIM    NO SMR    11/22/74  KERNS  F
A:      SUBI    14                                                     F
A:      JAZ     CRA6            IM=E                                   F
A:      DAR                     IM=F                                   F
  .REPLACE,1004,1007            MICSIM    NO SMR    12/18/74  KERNS  F
D:      STA     CPAG            BRANCH PAGE                            S
D:      LDA     PAG4            PAGE LIMIT                             S
D:      SUB     CPAG                                                   S
D:      JAP     *+4             LEGAL JMUP                             S
A:      CALL    PGOK            CHECK IF LEGAL PAGE                  F
A:      JAN     *+4             YES                                  F
  .INSERT,2580                  MICSIM    SMR=      11/27/74  KERNS  F
A:      LDA     XS,1                                                   F
A:      SUBI    2                                                      F
A:      ORA     XT,1                                                   F
A:      JAZ     X09C            IF SF=2 AND TF=0                       F
  .REPLACE,2848,2849            MICSIM    SMR=      11/27/74  KERNS  F
D:      JAZ     *+4                                                    S
D:      JMP     XS90            NO                                     S
D:      JAZ     XS64A           IF SF=1                              F
A:      DAR                                                          F
A:      ORA     XT,1                                                 F
A:      JAZ     *+4             IF SF=2 AND TF=0                     F
A:      JMP     XS90            IF SF=3 OR TF NE 0                   F
```

```
A       LDA     XG,1                                                    F
        ANAI    2                                                       F
        JAZ     XS90                                                    F
        JMP     XS65            IF SF=2, TF=0, AND GF=XX1X              F
XS64A   EQU     *                                                       F
 .REPLACE,3255                  MICISM    SMR=      01/21/75  KERNS     F
D*        (SC MEMORY)                                                   S
 .REPLACE,3276,3277             MICISM    SMR=      01/21/75  KERNS     F
D*        MCCO=1: ACTIVE BUT NOT DONE                                   S
D*        MCCO=2: ACTIVE AND DONE                                       S
A*        MCCO=1: IDLE WITH REQUEST PENDING                             F
A*        MCCO=2-N: ACTIVE  (N=MEMORY TYPE)                             F
 .REPLACE,3285                  MICSIM    SMR=      01/21/75  KERNS     F
D*   RETURN: MEM OPERATIONS COMPLETE                                    S
 .REPLACE,3296                  MICSIM    SMR=      01/21/75  KERNS     F
D       JMP     M032            0=IDLE 1=ACTIVE BUT NOT DONE 2=ACTIVE +DONS
A       JMP     M032            MEMORY IS ACTIVE                        F
 .INSERT,3375                   MICSIM    SMR=      01/21/75  KERNS     F
A       TZA                                                             F
A       STA     MLIP            CLEAR COMPLETE MEMORY FLAG              F
 .REPLACE,3377                  MICSIM    SMR=      01/21/75  KERNS     F
D*   COME HERE IF MCCO IS 1 OR 2                                         S
A*   COME HERE IF MCCO IS 1 TO N  (MEMORY ACTIVE) 01/21/75  KERNS       F
 .REPLACE,3381,3382             MICSIM    SMR=      01/21/75  KERNS     F
D       DAR                     MCCO=2                                  S
D       JAZ     M050            YES                                     S
A       JMP     M036            CHECK FOR COMPLETION                    F
 .REPLACE,3385                  MICSIM    SMR=      01/21/75  KERNS     F
D       JAZ     M050            YES                                     S
A       JAZ     M036            YES                                     F
 .REPLACE,3388,3392             MICSIM    SMR=      01/21/75  KERNS     F
D*   MCCO=1 AND NO OVERRIDE                                              S
        INCR    01              A=1                                     S
        STA     MLIP            FLAG: COMPLETE MEMORY OPERATION         S
M036    INR     MCCO,1          SET MCCO=2 (ACTIVE&DONE)                S
        JMP     M070            RTN VIA LISTING ROUTINE                 S
A       TZA                                                             F
        STA     MPLE            CLEAR MPLE FLAG                         F
        LDA     MOPC,1          CHECK IF STORE REQ                      F
        SUBI    3                                                       F
        JAN     M036            NO                                      F
        LDA     LREG,1                                                  F
        SUB     PREG,1          IF LREG=PREG, SET MPLE                  F
```

```
A        JAZ     *+4             YES                                     F
         JMP     M036            NO                                      F
         INCR    1                                                       F
         STA     MPLE                                                    F
**   MEMORY REQUESTED OR ACTIVE                                          F
M036     INR     MCCD,1          UPDATE MEMORY CONDITION CODE            F
         JMP     M040            CHECK FOR MEMORY COMPLETE OR WAIT       F
  .REPLACE,3399,3400             MICSIM    SMR=      01/21/75  KERNS     F
D**  COME HERE IF MCCD=2                                                    S
D**  PERFORM SPECIFIED MEMORY OPERATIONS                                   S
A**  ENTER HERE IF MEMORY IS REQUESTED OR ACTIVE                          F
**                                                                       F
**   MEMORY CYCLE COMPLETE?                                              F
M040     EQU     *                                                       F
         TZA                                                             F
         STA     MLIP            CLEAR COMPLETE MEMORY FLAG              F
         LDA     MCCD,1                                                  F
         SUB     MTYP                                                    F
         JAP     M050            IF MEMORY DONE                          F
**   WAIT FOR MEMORY DONE?                                               F
         LDA     XS,1                                                    F
         JAZ     *+4             IF S=0                                  F
         JMP     M041                                                    F
         LDA     XIMC,1                                                  F
         DAR                                                             F
         JAZ     M045            IF IMC=1                                F
**   PENDING MEMORY REQUEST?                                             F
M041     CALL    MREQ            ANY NEW MEMORY REQUESTS                 F
         JAZ     M070            NO, RETURN VIA LISTING ROUTINE          F
         JMP     M045            COMPLETE CURRENT REQUEST                F
M045     EQU     *                                                       F
         LDA     MTYP            MEMORY COMPLETION COUNT                 F
         STA     MCCD,1          SET COMPLETION CODE TO COMPLETE         F
         INCR    1                                                       F
         STA     MLIP            SET COMPLETE MEMORY FLAG                F
         JMP     M070            RETURN VIA LISTING ROUTINE              F
  .INSERT,3432                   MICSIM    SMR=      01/25/75  KERNS     F
A        STA     MLIP            CLEAR COMPLETE MEMORY FLAG              F
  .REPLACE,3447,3450             MICSIM    SMR=      01/28/75  KERNS     F
B**  IF PREG=LREG, WRITE OUTPUT INTO IRG1(FOR PIPELINE PURPOSES)             S
         LDA     LREG,1                                                    S
         SUB     PREG,1                                                    S
         JAZ     *+4                                                       S
```

```
: GE    8  01/30/75  MICSIM    VORTEX  COMSY            MICSIM      03          811 HOURS

A**   IF MPLE SET, WRITE OUTPUT INTO IRG1 (FOR PIPELINE PURPOSES)
A*        LDA     MPLE                                                    F
A*        DAR                                                             F
A*        JAP     *+4             IF MPLE SET                             F
  .INSERT,3453                    MICSIM    SMR=      01/28/75  KERNS     F
A*M059    TZA                                                             F
A*        STA     MPLE            CLEAR MPLE                              F
  .REPLACE,3477,3480              MICSIM    SMR=      01/28/75  KERNS     F
D **   IF PREG>LREG, PUT NEW MEMORY WORD INTO IRG1,FOR PIPELINE PURPOSES) S
D*M062    LDA     LREG,1                                                  S
D*        SUB     PREG,1                                                  S
D*        JAZ     *+4                                                     S
A**   IF MPLE SET, PUT NEW MEMORY WORD INTO IRG1(FOR PIPELINE PURPOSES)F
A*M062    LDA     MPLE                                                    F
A*        DAR                                                             F
A*        JAP     *+4             IF MPLE SET                             F
  .REPLACE,3484                   MICSIM    SMR=      01/28/75  KERNS     F
D*        JMP     M053                                                    S
A*        JMP     M059                                                    F
  .REPLACE,3500                   MICSIM    SMR=      01/27/75  KERNS     F
D*        SUBI    01000                                                   S
A*        SUBI    MMEM            START OF MAIN MEMORY                    F
  .INSERT,3697                    MICSIM    SMR=      01/28/75  KERNS     F
A*MPLE    DATA    0               PIPELINE FLAG                           F
  .INSERT,3907
A*        STA     LDCTL           SAVE LOAD TYPE
  .INSERT,3912
A*        SUBI    'M'-'D'         LOADING MAIN MEMORY
A*        JAZ     LDMM
  .INSERT,3935
A*LDMM    EQU     *
  .INSERT,3992
A*        LDA     LDCTL           LOAD TYPE
A*        SUBI    'M'
A*        JAZ     LDMEM           JUMP IF LOAD MAIN MEMORY
  .INSERT,4032
A*LDMEM   EQU     *               LOAD MAIN MEMORY
A*        LDA     0,1             GET WORD
A*        LSRA    13              FETCH LOAD ADDR
A*        TAB
A*        LDAE    CODE,2          CODE SERVICE ADDR
A*        JAZ     LDCDE           ERROR IF UNSERVICED CODE
A*        STA     LDSRV+2         SET SERVICE ADDR
```

```
 A*         JMPM    LDSRV           PERFORM SERVICE
 A*         LDA     0,1
 A*         LSRA    9               FETCH SUBCODE
 A*         ANAI    017
 A*         TAB
 A*         LDAE    SCOD,2          SUBCODE SERVICE ADDR
 A*         JAZ     LDCDE           ERROR IF UNSERVICED SUBCODE
 A*         STA     LDSRV+2
 A*         JMPM    LDSRV           PERFORM SERVICE
 A*         LDA     0,1
 A*         LSRA    4               FETCH POINTER
 A*         ANAI    037
 A*         SUBI    037
 A*         JAZ     LDPTR           ONLY ABSOLUTE IS VALID POINTER
 A*         JMP     LDCDE           ERROR
 A**
 A*LDPTR    JMP     0               ADDRESS SET BY SERVICE ROUTINES
 A*         EJEC
 A*LDLDR    ENTR                    CODE+4, LOAD DATA WORDS
 A*         INR     BUFPTR
 A*         LDA     0,1
 A*         ANA     LS813           ISOLATE WORD
 A*         IAR
 A*         STA     LDMV+2          SET MOVE COUNT
 A*         LDA     BUFPTR
 A*         STA     LDMV+3          SET FROM  ADDR
 A*         ADD     LDMV+2
 A*         STA     BUFPTR          UPDATE BUFFER POINTER
 A*         LDA     LDADR
 A*         STA     LDMV+4          SET TO ADDR
 A*         ADD     LDMV+2          CALCULATE RANGE
 A*         STA     LDADR           UPDATE LOAD ADDR
 A*         SUBI    EMEM
 A*         JAP     LDSIZ           ERROR IF MAIN MEMORY EXCEEDED
 A*LDMV     CALL    MOVW,0,0,0      MOVE DATA WORDS TO MEMORY
 A*         JMP     LDR0            CONTINUE WITH OBJECT RECORDS
 A**
 A*LDMOR    ENTR                    SET LOAD ADDR
 A*         LDAI    LDADD
 A*         STA     LDPTR+1         SET FOR ORG ADDR ROUTINE
 A*         RETU*   LDMOR
 A**
 A*LDMEX    ENTR                    SET EXECUTION ADDR
```

```
*A*         JMP     LCOM            EXECTION ADDR IS END OF LOAD
*A**
*A*LOADD    EQU     *
*A*         INR     BUFPTR
*A*         LDB     BUFPTR
*A*         LDA     0,2             LOAD ADDR
*A*         STA     LOADR           SET LOAD ADDR
*A*         SUBI    MMEM
*A*         JAN     LDSIZ           IF BELOW MAIN MEMORY
*A*         SUBI    EMEM-MMEM+1                                     F
*A*         JAP     LDSIZ           IF ABOVE MAIN MEMORY            F
*A*         INR     BUFPTR
*A*         JMP     LDWD            CONTINUE LOAD
*A**
*A*LDSRV    ENTR
*A*         JMPM    0               SERVICE LOADER CODE (ADDR SET UPON CALL)
*A*         RETU*   LDSRV
*A**
*A*LDSCD    ENTR                    USE SUBCODE, CODE NOT USED
*A*         RETU*   LDSCD
*A**
*A*LDIGN    ENTR                    IGNORE ENTRY
*A*         INR     BUFPTR          BYPASS WORD
*A*         JMP     LDWD            CONTINUE LOAD
   .INSERT,4069
*A*LDSIZ    CALL    SIOUT,3,LSIZ    OUTPUT ERROR
*A*         JMP     EXC10
*A**
*A** CODE SERVICE ADDR TABLE
*A*CODE     DATA    LDSCD,0,0,0,LDLDR
*A** SUBCODE SERVICE ADDR TABLE
*A*SCOD     DATA    LDIGN,LDMOR,0,0,0,0,0,LDMEX
*A*         DATA    0,0,0,0,0,0,0,0
*A**
*A*LDCTL    DATA    0               LOAD TYPE FLAG
*A**
   .INSERT,4162
*A*LSIZ     DATA    ' MS15'         MAIN MEMORY SIZE VIOLATED
   .INSERT,4211                     MICSIM    NO-SMR    01/07/75  KERNS
*A*E114A    EQU     *
   .REPLACE,4378                    MICSIM    NO SMR    01/21/75  KERNS    F
*D*         CALL    LDOUT,37,E158   OUTPUT HEADER                         S
*A*         CALL    LDOUT,26,E158   OUTPUT HEADER                         F
```

```
    .REPLACE,4423,4430          MICSIM    NO SMR    01/21/75  KERNS    F
*D*         IXR                 SET-UP TO LIST                          S
*D*         IXR                 EXECUTION COUNT NUMBER.                 S
*D*         IXR                                                         S
*D*         LDA     E158        ROM ADDR(0-512HEX)                      S
*D*         ADDI    CBUF        ADDR OF COUNT TABLE                     S
*D*         TAB                                                         S
*D*         LDB     0,2                                                 S
*D*         CALL    OH          CONVERT TO ASCII                        S
    .REPLACE,4431               MICSIM    NO SMR    01/21/75  KERNS    F
*D*         CALL    LOOUT,36,BUFR  OUTPUT LINE                          S
*A*         CALL    LOOUT,31,BUFR  OUTPUT LINE                          F
    .REPLACE,4464               MICSIM    SMR-      01/21/75  KERNS    F
*D*         DATA    !           EXECUTED!                               S
    .REPLACE,5049               MICSIM    NO-SMR    01/07/75  KERNS
*D*         JMP     *+4                                                 S
*A*         STA     INHA
*A*         SUBI    !=!
*A*         JAZ     INH6        IF ZERO BEFORE STORE FIELD VALUE
*A*         SUBI    !+!-!=!
*A*         JAZ     INH7        IF DO NOT ZERO BEFORE STORE FIELD VALUE
*A*         LDA     INHA
*A*         JMP     INH4        CONTINUE PROCESSING
    .INSERT,5051                MICSIM    NO-SMR    01/07/75  KERNS
*A*INH4     EQU     *
    .INSERT,5090                MICSIM    NO-SMR    01/10/75  KERNS    F
*A*INH6     LDB     E113        ROM WORD ADDR
*A*         TZA
*A*         STA     0,2         ZERO
*A*         STA     1,2         ENTIRE
*A*         STA     2,2         ROM
*A*         STA     3,2         WORD
*A*INH7     JMP     FLDCG       PROCESS FIELD CHANGE DIRECTIVE
    .INSERT,5100                MICSIM    NO-SMR    01/10/75  KERNS    F
*A*         EJEC
*A**        THIS IS A SUBROUTINE TO HANDLE THE CHANGE CENTRAL CONTROL
*A**        STORE BY FIELD SPECIFICATION
*A**
*A**        CALLING SEQUENCE
*A**        JMP     FLDCG
*A**
*A**        RETURNS TO SIMULATOR EXEC FOR PROCESSING OF NEXT DIRECTIVE
*A**
```

```
*A*FLDCG  EQU   *
*A*       JMPM  FETCHA
*A*FLD05  LRLA  8
*A*       STA   FLD90          SAVE LEFT BYTE
*A*       JMPM  FETCHA
*A*       ERA   FLD90          FORM 2 CHAR NAME
*A*       STA   FLD90
*A*       LDXI  FLNAM          FIELD NAME TABLE
*A*FLD10  LDA   0,1            FIELD NAME
*A*       JAZ   FLD60          IF END OF TABLE
*A*       ERA   FLD90
*A*       JAZ   FLD20          IF MATCH FOUND
*A*       IXR
*A*       IXR
*A*       IXR
*A*       JMP   FLD10          CONTINUE SCAN THROUGH TABLE
*A*FLD20  EQU   *
*A*       STX   FLD92          SAVE TABLE PTR
*A*       JMPM  INA            FETCH CHANGE VALUE
*A*       DATA  'N'
*A*       STX   FLD93          SAVE TERM CHAR
*A*       STA   FLD91          SAVE VALUE
*A*       LDX   FLD92          FIELD TABLE PTR
*A*       LDB   1,X            FIELD SIZE
*A*       LDA   FLD25
*A*       ANAI  07740
*A*       MERGE 031            FORM RIGHT SHIFT
*A*       STA   FLD25
*A*       LDA   FLD91          VALUE
*A*FLD25  LSRA  0
*A*       JAZ   FLD30          IF VALUE WITHIN BOUNDS
*A*       JMP   FLD65          RANGE ERROR
*A*FLD30  LDA   2,X            LOW ORDER BIT POSITION
*A*       LSRA  4
*A*       CPA
*A*       ANAI  3
*A*       ADD   E113           FETCH 16 BIT WORD ADDR
*A*       STA   FLD95
*A*       LDA   2,X
*A*       TAB                                          F
*A*       SUBI  31             CHECK IF IM FIELD       F
*A*       JAZ   FLD50          YES, SPECIAL PROCESSING F
*A*       SUBI  15             CHECK IF FS FIELD       F
```

```
*A*         JAZ     FLD50A          YES, SPECIAL PROCESSING                 F
*A*         TBA                     NEITHER IM NOR FD, RESTORE VALUE        F
*A*         ANAI    017             WORD DISPLACEMENT
*A*         TAB
*A*         LDA     FLD35
*A*         ANAI    07740
*A*         MERGE   031
*A*         STA     FLD35           FORM LEFT ROTATE
*A*         LDB     1,X             FIELD SIZE
*A*         LDAE    FLMSK,B         BIT MASK FOR FIELD SIZE
*A*FLD35    LRLA    0               MOVE MASK INTO POSITION
*A*         CPA
*A*         LDB     FLD95
*A*         ANA     0,B             MASK OFF BITS FROM WORD
*A*         TAB
*A*         LDA     FLD91           NEW FIELD VALUE
*A*         XEC     FLD35           MOVE VALUE INTO POSITION
*A*         MERGE   031             UPDATE WORD
*A*         LDB     FLD95           ROM WORD ADDR
*A*         STA     0,B
*A*FLD39    EQU     *                                                       F
*A*         LDA     FLD93           TERMINATING CHAR
*A*         SUBI    ',
*A*         JAZ     FLD40           IF MORE CHARS IN RECORD
*A*         JMP     EXC10           GET NEW DIRECTIVE
*A*FLD40    EQU     *
*A*         JMPM    FETCHA          FETCH NEXT CHAR
*A*         TAB
*A*         SUBI    ' '
*A*         JAZ     E114A           IF DISPLAY NEXT WORD
*A*         TBA
*A*         JMP     FLD05           CONTINUE DIRECTIVE PROCESSING
*A*FLD50A   EQU     *               SPECIAL PROCESSING FOR FS FIELD         F
*A*         LDBI    2               SET FOR FS FIELD ROTATE                 F
*A*         JMP     FLD50B                                                  F
*A*FLD50    EQU     *               SPECIAL PROCESSING FOR IM FIELD         F
*A*         INCR    02              SET FOR IM FIELD ROTATE                 F
*A*FLD50B   EQU     *                                                       F
*A*         STB     FLD51           FIELD FLAG                              F
*A*         TBA                                                             F
*A*         ADDI    16              SET UP LLRL INST                        F
*A*         ADD     FLLRL                                                   F
*A*         STA     FLD56           ROTATE INTO A REG LSBS                  F
```

```
*A*         LDAI    16                                                  F
*A*         SUBI    0               SET UP RESTORE ROTATE               F
*A*FLD51    BES     0                                                   F
*A*         ADD     FLLRL           LLRL INST                           F
*A*         STA     FLD57                                               F
*A*         LDX     FLD95           CCS WORD SUB ADDR                   F
*A*         LDA     0,X             LSB PORTION                         F
*A*         DXR                     POINT TO NEXT HIGH ORDER BITS       F
*A*         LDB     0,X             MSB PORTION                         F
*A*FLD56    LLRL    0               POSITION FIELD INTO A REG LSBS      F
*A*         ANAI    0177760         MASK OUT FIELD                      F
*A*         ADD     FLD91           CHANGE VALUE                        F
*A*FLD57    LLRL    0               RETURN FIELDS TO PROPER POSITION    F
*A*         STB     0,X                                                 F
*A*         STA     1,X                                                 F
*A*         JMP     FLD39           CONTINUE FIELD PROCESSING           F
*A**
*A*FLLRL    LLRL    0               LLRL INSTRUCTION BASE VALUE         F
*A*FLD90    DATA    0               FIELD NAME
*A*FLD91    DATA    0               NEW FIELD VALUE
*A*FLD92    DATA    0               NAME TABLE POINTER
*A*FLD93    DATA    0               TERM CHAR
*A*FLD94    DATA    0
*A*FLD95    DATA    0               ROM WORD SUBCOMP ADDR
*A**
*A*FLD60    CALL    SIOUT,3,FLER1   OUTPUT FIELD NAME ERROR
*A*         JMP     EXC10           TRY AGAIN
*A*FLD65    CALL    SIOUT,3,FLER2   OUTPUT FIELD RANGE ERROR
*A*         JMP     EXC10           TRY AGAIN
*A*FLER1    DATA    '  MS16'                                            F
*A*FLER2    DATA    '  MS17'                                            F
*A**
*A**  FIELD NAME TABLE
*A**       3 WORD ENTRY
*A**              1=2 CHAR NAME
*A**              2=FIELD SIZE
*A**              3=LOW ORDER BIT POSITION
*A**
*A*FLNAM    EQU     *
*A*         DATA    'AA',4,0
*A*         DATA    'BB',4,4
*A*         DATA    'SH',3,8
*A*         DATA    'XF',2,11
```

```
*A*         DATA    !WF!,1,13
*A*         DATA    !VF!,1,14
*A*         DATA    !SC!,1,15
*A*         DATA    !WR!,1,16
*A*         DATA    !CF!,2,17
*A*         DATA    !MF!,1,19                                        F
*A*         DATA    !FF!,4,20
*A*         DATA    !RF!,3,24
*A*         DATA    !LA!,2,27
*A*         DATA    !LB!,2,29
*A*         DATA    !IM!,4,31
*A*         DATA    !AB!,2,35
*A*         DATA    !MR!,1,37
*A*         DATA    !GF!,4,38
*A*         DATA    !SF!,2,42
*A*         DATA    !TF!,2,44
*A*         DATA    !FS!,4,46
*A*         DATA    !MT!,1,50
*A*         DATA    !MS!,4,51
*A*         DATA    !AF!,5,55
*A*         DATA    !TS!,4,60
*A*         DATA    0               END OF TABLE
*A**
*A*FLMSK    EQU     *               BIT MASK TABLE
*A*         DATA    0
*A*         DATA    01
*A*         DATA    03
*A*         DATA    07
*A*         DATA    017
*A*         DATA    037
   ,REPLACE,5748                    MICSIM    NO SMR    11/27/74  KERNS   F
*D*         LDX     3,X             SO ASSIGNMENT                        C
*A*         LDA     3,X             SO ASSIGNMENT                        F
```

```
 .END,MEM,10
/MEM,10
/DASMR
```

```
000001 A,    1 VORTEX SET     1              PUT LAST FOR VORTEX                    V2  03 00001
             2 *THIS IS A COPYRIGHTED PROGRAM,COPYRIGHT 1973 BY VARIAN DATA MACHINEV2  03 00002
             3 *                                                                       03 00003
             4 *     V.D.M.  PART  NO.        92L1406-001B                             03 00004
             5 *                                                                       03 00005
             6 *                                                RELEASED    03/01/74   03 00006
             7 *                                                                       03 00007
             8 *                 MICSIM                                                03 00008
             9 *                                                                       03 00009
            10 ************************************************************************ 03 00010
            11 *                                                                       03 00011
            12 *       THE FOLLOWING ARE THE MICRO REDEFINITIONS NECESSARY TO RUN      03 00012
            13 *       THIS PROGRAM USING THE INTERFACE SUBPROGRAM                     03 00013
            14 *                 THEIR EFFECT IS TO CHANGE VORTEX CALLS TO V$IOC, V$IOST, 03 00014
            15 *                 AND V$EXEC TO CALLS TO THE INTERFACE SUBPROGRAM      03 00015
            16          TITLE   MICSIM                                                03 00016
            17 M1       MAC                                                           03 00017
            18          EXT     INTR                                                 S03 00018
            19          JMPM    INTR                                                 S03 00019
            20          DATA    0100000                                              S03 00020
            21 F        FORM    1,3,4,8                                              S03 00021
            22          F       P(1),P(2),P(3),P(4)                                  S03 00022
            23          DATA    P(5),0,0                                             S03 00023
            24          EMAC                                                         S03 00024
            25 STAT     MAC                                                          S03 00025
            26          EXT     INTRST                                               S03 00026
            27          JMPM    INTRST                                               S03 00027
            28          DATA    P(1),P(2),P(3),P(4),P(5)                             S03 00028
            29          EMAC                                                         S03 00029
            30 IOLINK   MAC                                                          S03 00030
            31          EXT     INLINK                                               S03 00031
            32          JMPM    INLINK                                               S03 00032
            33 F        FORM    4,6,6                                                S03 00033
            34          F       0,014,P(1)                                           S03 00034
            35          DATA    P(2),P(3)                                            S03 00035
            36          EMAC                                                         S03 00036
```

```
                    37          EJEC                                                    S03 00037
                    38          NAME    SMLTR                                           S03 00038
                    39 *        THIS IS SOME INITIALIZATION NEEDED AFTER LOADING IN ORDER TO  * S03 00039
                    40 *        SET UP FCBS AND DCBS FOR THE LOGICAL UNITS ST,PI,LO,AND BI    * S03 00040
                    41 *        DEPENDING UPON WHETHER THEY ARE ON A RMD OR NON-RMD DEVICE.   * S03 00041
                    42 *                                                                  * S03 00042
                    43 *              IF ON A RMD THE GLOBAL FCB WILL BE USED             * S03 00043
                    44 *              IF ON A NON-RMD A LOCAL DCB WILL BE USED            * S03 00044
                    45 *                                                                  * S03 00045

                    47          NAME    MMEM,EMEM                                   F   ********
000000              48 MMEM     BSS     0200            MAIN MEMORY BLOCK               ********
000177              49 EMEM     BES     0               END OF MAIN MEMORY          F   ********
000200 120240 A     50 BUFR     DATA    0120240         GENERAL USAGE BUFFER        F   ********
                    51 *                                                            F   ********
                    52 * NOTE--THIS SECTION WILL BE OVERLAYED BY THE BUFFER BUFR       F   ********
                    53 *                                                            F   ********
000201 002000 A     54 SMLTR    CALL    RMD,2           CHECK IF SI IS ON A RMD         S03 00047
000202 011501 R
000203 000002 A
000204 001010 A     55          JAZ     SIRMD           YES                             S03 00048
000205 000227 R
000206 002000 A     56 SMPI     CALL    RMD,4           CHECK IF PI IS ON A RMD         S03 00049
000207 011501 R
000210 000004 A
000211 001010 A     57          JAZ     PIRMD           YES                             S03 00050
000212 000236 R
000213 002000 A     58 SMLO     CALL    RMD,5           CHECK IF LO IS ON A RMD         S03 00051
000214 011501 R
000215 000005 A
000216 001010 A     59          JAZ     LORMD           YES                             S03 00052
000217 000261 R
000220 002000 A     60 SMBI     CALL    RMD,6           CHECK IF BI IS ON A RMD         S03 00053
000221 011501 R
000222 000006 A
000223 001010 A     61          JAZ     BIRMD           YES                             S03 00054
000224 000304 R
000225 001000 A     62          JMP     EXC             BEGIN SIMULATOR EXEC            S03 00055
000226 000715 R
                    63          EXT     SIFCB                                           S03 00056
                    64          EXT     PIFCB                                           S03 00057
                    65          EXT     LOFCB                                           S03 00058
```

```
                        66          EXT     BIFCB                                       S03 00059
                        67 *                                                            S03 00060
000227 014102 A         68 SIRMD    LDA     FCBSI                                       S03 00061
000230 057000 I         69          STA     SIIN1+4     STORE GLOBAL FCB IN READ REQUEST S03 00062
000231 005301 A         70          DECR    01                                          S03 00063
000232 006057 A         71          STAE    SIFLG       SET SI ON RMD FLAG              S03 00064
000233 015316 R
000234 001000 A         72          JMP     SMPI                                        S03 00065
000235 000206 R
000236 034074 A         73 PIRMD    LDX     FCBPI                                       S03 00066
000237 015003 A         74          LDA     3,1         CURRENT POSITION OF FILE        D.103 00067
000240 005311 A         75          DAR                                                 S03 00068
000241 001002 A         76          JAP     PIOPN+7     JUMP IF ALREADY OPEN            S03 00069
000242 000252 R
                        77 PIOPN    OPEN    PIFCB,4,0,0 OPEN AND REWIND PIFCB           S03 00070
000243 002000 A
000244 000000 E
000245 100000 A
000246 003004 A
000247 000000 E
000250 000000 A
000251 000000 A
000252 014060 A         78          LDA     FCBPI                                       S03 00071
000253 057000 I         79          STA     PIIN2+4     STORE GLOBAL FCB IN READ REQUEST S03 00072
000254 005301 A         80          DECR    01                                          S03 00073
000255 006057 A         81          STAE    PIFLG       SET PI ON RMD FLAG              S03 00074
000256 015402 R
000257 001000 A         82          JMP     SMLO                                        S03 00075
000260 000213 R
000261 034052 A         83 LORMD    LDX     FCBLO                                       S03 00076
000262 015003 A         84          LDA     3,1         CURRENT POSITION OF FILE        D.103 00077
000263 005311 A         85          DAR                                                 S03 00078
000264 001002 A         86          JAP     LOOPN+7     JUMP IF ALREADY OPEN            S03 00079
000265 000275 R
                        87 LOOPN    OPEN    LOFCB,5,0,0 OPEN AND REWIND LOFCB           S03 00080
000266 002000 A
000267 000244 E
000270 100000 A
000271 003005 A
000272 000000 E
000273 000000 A
000274 000000 A
```

```
000275 014036 A   88          LDA     FCBLO                                          S03 00081
000276 057000 I   89          STA     LO1+4       STORE GLOBAL FCB IN READ REQUEST   S03 00082
000277 005301 A   90          DECR    01                                             S03 00083
000300 006057 A   91          STAE    LOFLG       SET LO ON RMD FLAG                 S03 00084
000301 015603 R
000302 001000 A   92          JMP     SMBI                                           S03 00085
000303 000220 R
000304 034030 A   93 BIRMD    LDX     FCBBI                                          S03 00086
000305 015003 A   94          LDA     3,1         CURRENT POSITION OF FILE         D.103 00087
000306 005311 A   95          DAR                                                    S03 00088
000307 001002 A   96          JAP     BIOPN+7     JUMP IF ALREADY OPEN               S03 00089
000310 000320 R
                  97 BIOPN    OPEN    BIFCB,6,0,0 OPEN AND REWIND                    S03 00090
000311 002000 A
000312 000267 E
000313 100000 A
000314 003006 A
000315 000000 E
000316 000000 A
000317 000000 A
000320 014014 A   98          LDA     FCBBI                                          S03 00091
000321 057000 I   99          STA     LREAD+4     STORE GLOBAL FCB IN READ REQUEST   S03 00092
000322 006010 A  100          LDAI    120                                            S03 00093
000323 000170 A
000324 057000 I  101          STA     BIBLK+1     SET WORD COUNT TO 120              S03 00094
000325 005301 A  102          DECR    01                                             S03 00095
000326 006057 A  103          STAE    BIFLG       SET BI ON RMD FLAG                 S03 00096
000327 011543 R
000330 001000 A  104          JMP     EXC         BEGIN STMULATOR EXEC               S03 00097
000331 000715 R
000332 000000 E  105 FCBSI    DATA    SIFCB                                          S03 00098
000333 000247 E  106 FCBPI    DATA    PIFCB                                          S03 00099
000334 000272 E  107 FCBLO    DATA    LOFCB                                          S03 00100
000335 000315 E  108 FCBBI    DATA    BIFCB                                          S03 00101
000336           109          BSS     121+BUFR-**  FILL OUT TO MAKE 120 WORD BUFR SPACE  F ********

                 111 ********************************************************************************** S03 00103
```

```
                    112          EJEC                                                    S03 00104
                    113          EXT     EXIT                                            S03 00105
          000001 A  114 X        EQU     1                                               S03 00106
          000002 A  115 B        EQU     2                                               S03 00107
          000002 A  116 SI       EQU     2               SYSTEM INPUT                    S03 00108
          000003 A  117 SO       EQU     3               SYSTEM OUTPUT                   S03 00109
          000004 A  118 PI       EQU     4               PROCESSOR INPUT                 S03 00110
          000005 A  119 LO       EQU     5               LIST OUTPUT                     S03 00111
          000010 A  120 AZ       EQU     010             A ZERO                          S03 00112
          000020 A  121 BZ       EQU     020             B ZERO                          S03 00113
          000040 A  122 XZ       EQU     040             X ZERO                          S03 00114
                    123 *                                                                S03 00115
                    124 *        ROM CONTROL BUFFER                                      S03 00116
                    125 *                                                                S03 00117
                    126          EXT     $DBUF           CONTROL STORE PAGE 0          F  ********
000371 000000 E     127 DBUF     DATA    $DBUF                                           S03 00119
                    128 *                                                                S03 00120
                    129 *    THE FOLLOWING TWO TABLES ARE FOR THE                        S03 00121
                    130 *    DECODE ROM'S.                                               S03 00122
                    131 *                                                                S03 00123
                    132          EXT     $DRM1           DECODER STORE PAGE 0 DECODE 1 F  ********
                    133          EXT     $DRM2           DECODER STORE PAGE 0 DECODE 2 F  ********
                    134          EXT     $DRM1B,$DRM1C,$DRM1D                           ********
000372 000000 E     135 DRM1     DATA    $DRM1                                           S03 00127
000373 000000 E     136 DRM2     DATA    $DRM2                                           S03 00128
                    137 *                                                                S03 00129
                    138 *                                                                S03 00130
                    139 *        PRINT OUTPUT BUFFER                                     S03 00131
000374 120240 A     140          DATA    0120240                                         S03 00132
000375              141 BUFI     BSS     36              INPUT BUFFER                    S03 00133
                    142 *                                                                S03 00136
000441 000445 R     143 RHLT     DATA    RHLT0           HALT TABLE FOR PAGE 0         C 03 00137
000442 000452 R     144          DATA    RHLT1           HALT TABLE FOR PAGE 1         C 03 00138
000443 000457 R     145          DATA    RHLT2           HALT TABLE FOR PAGE 2         C 03 00139
000444 000464 R     146          DATA    RHLT3           HALT TABLE FOR PAGE 3         C 03 00140
000445 001000 A     147 RHLT0    DATA    512,512,512,512,512                           C 03 00141
000446 001000 A
000447 001000 A
000450 001000 A
000451 001000 A
000452 001000 A     148 RHLT1    DATA    512,512,512,512,512                           C 03 00142
000453 001000 A
```

```
000454 001000 A
000455 001000 A
000456 001000 A
000457 001000 A  149 RHLT2  DATA    512,512,512,512,512                                  C 03 00143
000460 001000 A
000461 001000 A
000462 001000 A
000463 001000 A
000464 001000 A  150 RHLT3  DATA    512,512,512,512,512                                  C 03 00144
000465 001000 A
000466 001000 A
000467 001000 A
000470 001000 A
000471 000000 A  151 STEP   DATA    0             SINGLE STEP FLAG                         S03 00145
000472 000000 A  152 TRACE  DATA    0,0,0,0       TRACE FLAGS                        D     03 00146
000473 000000 A
000474 000000 A
000475 000000 A
                 153 *                                                                    S03 00147
                 154 *      INPUT HEX DIGIT STRING                                        S03 00148
000476 000000 A  155 V      DATA    0             DIGITS 1-4                               S03 00149
000477 000000 A  156        DATA    0             DIGITS 5-8                               S03 00150
000500 000000 A  157        DATA    0             DIGITS 9-12                              S03 00151
000501 000000 A  158        DATA    0             DIGITS 13-16                             S03 00152
                 159 *                                                                    S03 00153
                 160 *                                                                    S03 00154
                 161 *                           EACH CONTROL ROM WORD(DBUF) EXECUTED     S03 00156
                 162 *                                                                    S03 00157
                 163 *                                                                    S03 00158
000502 000000 A  164 JSPT   DATA    0                                                      S03 00159
000503 000000 A  165 CPAG   DATA    0                                                      S03 00160
000504 000000 A  166 IMD    DATA    0                                                      S03 00161
000505           167 STACK  BSS     16            PUSH-POP STACK                           S03 00162
                 168 *                                                                    S03 00163
                 169 *      MICRO DATA PSEUDO REGISTERS                                   S03 00164
                 170 *                                                                    S03 00165
000525 000000 A  171 R0     DATA    0                                                      S03 00166
000526 000000 A  172 R1     DATA    0                                                      S03 00167
000527 000000 A  173 R2     DATA    0                                                      S03 00168
000530 000000 A  174 R3     DATA    0                                                      S03 00169
000531 000000 A  175 R4     DATA    0                                                      S03 00170
000532 000000 A  176 R5     DATA    0                                                      S03 00171
```

```
000533 000000 A  177 R6    DATA   0                                    S03 00172
000534 000000 A  178 R7    DATA   0                                    S03 00173
000535 000000 A  179 R8    DATA   0                                    S03 00174
000536 000000 A  180 R9    DATA   0                                    S03 00175
000537 000000 A  181 RA    DATA   0                                    S03 00176
000540 000000 A  182 RB    DATA   0                                    S03 00177
000541 000000 A  183 RC    DATA   0                                    S03 00178
000542 000000 A  184 RD    DATA   0                                    S03 00179
000543 000000 A  185 RE    DATA   0                                    S03 00180
000544 000000 A  186 RF    DATA   0                                    S03 00181
```

```
                    187          EJEC                                                    S03 00182
                    188 *                                                                S03 00183
                    189 *        OUTPUT SIGNALS FROM DATA ROM BUFFER                     S03 00184
                    190 *                                                                S03 00185
000545 000000 A     191 DROM     DATA   0        TS     4 BITS/TEST ADDR&OFFSET          S03 00186
000546 000000 A     192          DATA   0        AF     5 BITS/CONTROL STORE ADDR        S03 00187
000547 000000 A     193          DATA   0        MS     4 BITS/CONTROL ADDR MASK         S03 00188
000550 000000 A     194          DATA   0        MT     1 BITS/                          S03 00189
000551 000000 A     195          DATA   0        FS     4 BITS/CONTROL FIELD SELECT GATING S03 00190
000552 000000 A     196          DATA   0        T      2 BITS/TEST CONTROL              S03 00191
000553 000000 A     197          DATA   0        S      2 BITS/SPECIAL CONTROL           S03 00192
000554 000000 A     198          DATA   0        G      4 BITS/GENERAL CONTROL           S03 00193
000555 000000 A     199          DATA   0        M      1 BITS/FILE ADDR FIELD EXTR MASK S03 00194
000556 000000 A     200          DATA   0        AB     2 BITS/FILE ADDR LOAD CONTROL    S03 00195
000557 000000 A     201          DATA   0        IMC    4 BITS/I/O AND MEMORY CONTROL    S03 00196
000560 000000 A     202          DATA   0        LB     2 BITS/FILE B CONTROL            S03 00197
000561 000000 A     203          DATA   0        LA     2 BITS/FILE A CONTROL            S03 00198
000562 000000 A     204          DATA   0        R      3 BITS/REGISTER CONTROL          S03 00199
000563 000000 A     205          DATA   0        F      4 BITS/FUNCTION                  S03 00200
000564 000000 A     206          DATA   0        MD     1 BITS/ARITHMETIC-LOGICAL        S03 00201
000565 000000 A     207          DATA   0        C      2 BITS/CARRY CONTROL             S03 00202
000566 000000 A     208          DATA   0        W      1 BITS/WRITE FILE CONTROL        S03 00203
000567 000000 A     209          DATA   0        OS     1 BIT/OP REG SHIFT/NO-SHIFT CONTROL S03 00204
000570 000000 A     210          DATA   0        V      1 BIT/OP REG GATING CONTROL      S03 00205
000571 000000 A     211          DATA   0        Y      1 BIT/CONTROL FOR OS(MUL/DIV OPS) S03 00206
000572 000000 A     212          DATA   0        X      2 BITS/OP REG LONG-SHIFTING CONTROL S03 00207
000573 000000 A     213          DATA   0        TC     3 BITS/OVERFLOW CONTROL          S03 00208
000574 000000 A     214          DATA   0        B      4 BITS/FILE B SOURCE ADDR SELECT/B-MUX S03 00209
                    215 *                                SELECT INPUT TO LATCH B         S03 00210
000575 000000 A     216          DATA   0        A      4 BITS/FILE A SOURCE/FILE A,B DESTINATION S03 00211
                    217 *                                                                S03 00212
                    218 *        THE FOLLOWING ARE OTHER REGISTERS IN THE V73            S03 00213
                    219 *                                                                S03 00214
000576 000000 A     220          DATA   0                MASK/16-BIT FIELDS MD,C,W,OS,V,Y,X,TC,B S03 00215
000577 000000 A     221          DATA   0                LATCH A                         S03 00216
000600 000000 A     222          DATA   0                LATCH B                         S03 00217
000601 000000 A     223          DATA   0                ALU OUTPUT                      S03 00218
000602 000000 A     224          DATA   0                XCIN = CARRY IN                 S03 00219
000603 000000 A     225          DATA   0                STORED CARRY = CARRY            S03 00220
000604 000000 A     226          DATA   0                OVERFLOW = OVRFL                S03 00221
000605 000000 A     227          DATA   0                IOD==I/O DATA REGISTER          S03 00222
000606 000000 A     228          DATA   0                STUS==STATUS REGISTER           S03 00223
```

```
                    229 *   THE NEXT SEVEN MUST STAY IN THIS SEQ,FOR PROPER INDEX CONTROL      S03 00224
000607 000000 A     230         DATA    0               PROGRAM COUNTER                        S03 00225
000610 000000 A     231         DATA    0               SHIFT COUNTER                          S03 00226
000611 000000 A     232         DATA    0               OPERAND(0) REGISTER                    S03 00227
000612 000000 A     233         DATA    0               NOT USED- FILLER FOR INDEXING PURPOSES S03 00228
000613 000000 A     234         DATA    0               NOT USED- FILLER FOR INDEXING PURPOSES S03 00229
000614 000000 A     235         DATA    0               KEY REGISTER                           S03 00230
000615 000000 A     236         DATA    0               I/O KEY REGISTER                       S03 00231
                    237 *                                                                      S03 00232
000616 000000 A     238         DATA    0               INSTRUCTION REG #1                     S03 00233
000617 000000 A     239         DATA    0               INSTRUCTION REG #2                     S03 00234
000620 000000 A     240         DATA    0               MADS: MEM ADDR SOURCE CODE             S03 00235
000621 000000 A     241         DATA    0               MOPC: MEM OPERATION CODE               S03 00236
000622 000000 A     242         DATA    0               MCCO: MEM CONDITION CODE               S03 00237
000623 000000 A     243         DATA    0               MIL : MEMORY INTERFACE LATCH           S03 00238
000624 000000 A     244         DATA    0               NEXT ROM ADDR                          S03 00239
000625 000000 A     245         DATA    0               BYTE DESIGNATOR FOR MEMORY OPERATIONS  S03 00240
                    246 *                               1=RIGHT BYTE  0=LEFT BYTE          C,1 03 00241
000626 000000 A     247         DATA    0               INTERRUPT PENDING FLAG                 S03 00242
000627 000000 A     248         DATA    0               INTERRUPT ADDR FROM I/O                S03 00243
000630 000000 A     249         DATA    0               QS: SAVES ALU15/QR01 FOR MUL/DIV OPS   S03 00244
000631 000000 A     250         DATA    0               DS: SIGN STORAGE FOR QREG SHIFTING     S03 00245
000632 000000 A     251         DATA    0               SUPK: SUPERVISOR KEY                   S03 00246
000633 000000 A     252         DATA    0               IORF: I/O REQUEST * NOT SIMULATED *    S03 00247
000634 000000 A     253         DATA    0               INPF=INTERRUPY BEING PROCESSED FLAG    S03 00248
000635 000000 A     254         DATA    0               LREG: MEMORY ADDRESS SELECT REGISTER   S03 00249
000636 000000 A     255         DATA    0               MULS: MULTIPLY SIGN BIT                S03 00250
000637 000000 A     256         DATA    0               NSTP: STEP F/F (NO LOGIC HERE-IN SETS IT) S03 00251
                    257 *                                                                      S03 00252
                    258 *                                                                      S03 00253
                    259 *   SEE DATA ITEMS ABOVE FOR NAMES/DESCRIPTIONS                        S03 00254
        000000 A    260 XTS     EQU     0                                                      S03 00255
        000001 A    261 XAF     EQU     1                                                      S03 00256
        000002 A    262 XMS     EQU     2                                                      S03 00257
        000003 A    263 XMT     EQU     3                                                      S03 00258
        000004 A    264 XFS     EQU     4                                                      S03 00259
        000005 A    265 XT      EQU     5                                                      S03 00260
        000006 A    266 XS      EQU     6                                                      S03 00261
        000007 A    267 XG      EQU     7                                                      S03 00262
        000010 A    268 XM      EQU     8                                                      S03 00263
        000011 A    269 XAB     EQU     9                                                      S03 00264
        000012 A    270 XIMC    EQU     10                                                     S03 00265
```

```
000013 A  271 XLB     EQU     11                                    S03 00266
000014 A  272 XLA     EQU     12                                    S03 00267
000015 A  273 XR      EQU     13                                    S03 00268
000016 A  274 XF      EQU     14                                    S03 00269
000017 A  275 XMD     EQU     15                                    S03 00270
000020 A  276 XC      EQU     16                                    S03 00271
000021 A  277 XW      EQU     17                                    S03 00272
000022 A  278 XOS     EQU     18                                    S03 00273
000023 A  279 XV      EQU     19                                    S03 00274
000024 A  280 XY      EQU     20                                    S03 00275
000025 A  281 XX      EQU     21                                    S03 00276
000026 A  282 XTC     EQU     22                                    S03 00277
000027 A  283 XB      EQU     23                                    S03 00278
000030 A  284 XA      EQU     24                                    S03 00279
          285 *                                                     S03 00280
000031 A  286 MASK    EQU     25                                    S03 00281
          287 *                                                     S03 00282
000032 A  288 LTCHA   EQU     26                                    S03 00283
000033 A  289 LTCHB   EQU     27                                    S03 00284
000034 A  290 XALU    EQU     28                                    S03 00285
000035 A  291 XCIN    EQU     29                                    S03 00286
000036 A  292 CARRY   EQU     30                                    S03 00287
000037 A  293 OVRFL   EQU     31                                    S03 00288
          294 *                                                     S03 00289
000040 A  295 IOD     EQU     32                                    S03 00290
000041 A  296 STUS    EQU     33                                    S03 00291
000042 A  297 PREG    EQU     34                                    S03 00292
000043 A  298 SREG    EQU     35                                    S03 00293
000044 A  299 OREG    EQU     36                                    S03 00294
000045 A  300 FIL1    EQU     37                                    S03 00295
000046 A  301 FIL2    EQU     38                                    S03 00296
000047 A  302 KREG    EQU     39                                    S03 00297
000050 A  303 IOKR    EQU     40                                    S03 00298
000051 A  304 IRG1    EQU     41                                    S03 00299
000052 A  305 IRG2    EQU     42                                    S03 00300
          306 *                                                     S03 00301
000053 A  307 MADS    EQU     43                                    S03 00302
000054 A  308 MOPC    EQU     44                                    S03 00303
000055 A  309 MCCO    EQU     45                                    S03 00304
000056 A  310 MIL     EQU     46                                    S03 00305
000057 A  311 NROM    EQU     47        NEXT ROM ADDR               S03 00306
000060 A  312 MBYC    EQU     48                                    S03 00307
```

```
                    313 *                                                                   S03 00308
000061 A            314 INTF    EQU     49          INTERRUPT PENDING FLAG                  S03 00309
000062 A            315 INTA    EQU     50          INTERRUPT ADDR FROM I/O                 S03 00310
000063 A            316 QS      EQU     51          SAVE ALU15/QR01 FOR MUL/DIV OPS.        S03 00311
000064 A            317 DS      EQU     52          SIGN STORAGE FOR QREG SHIFTING          S03 00312
000065 A            318 SUPK    EQU     53          SUPERVISOR KEY                          S03 00313
000066 A            319 IORF    EQU     54          I/O REQUEST ** NOT SIMULATED **         S03 00314
000067 A            320 INPF    EQU     55          INTERRUPT BEING PROCESSED FLAG          S03 00315
000070 A            321 LREG    EQU     56          MEM ADDR SELECT REG.                    S03 00316
000071 A            322 MULS    EQU     57          MULTIPLY SIGN BIT                       S03 00317
000072 A            323 NSTP    EQU     58          STEP F/F. (NO LOGIC HERE-IN SETS IT)    S03 00318
                    324 *                                                                   S03 00319
                    325 *                                                                   S03 00320
                    326 *   TABLE OF TEST CONDITION FLAGS/F/F'S                             S03 00321
                    327 *   THE G FIELD SELECTS ONE OF THESE AS THE OUTPUT                  S03 00322
                    328 *   FROM THE TEST MUX.                                              S03 00323
                    329 *   1=TRUE CONDITION/SSW SET   0=FALSE/RESET CONDITION              S03 00324
                    330 *                                                                   S03 00325
                    331 *                           TEST CONDITION                          S03 00326
000640 000000 A     332 TMUX    DATA    0           G=0  ALU OVERFLOW                       S03 00327
000641 000000 A     333         DATA    0           G=1   I/O SENSE                         S03 00328
000642 000000 A     334         DATA    0           G=2   SSW3                              S03 00329
000643 000000 A     335         DATA    0           G=3   SSW2                              S03 00330
000644 000000 A     336         DATA    0           G=4   SSW1                              S03 00331
000645 000000 A     337         DATA    0           G=5   620/F TEST(JMP, JMPM, XEC GROUPS) S03 00332
000646 000000 A     338         DATA    0           G=6   EQUALS F/F                        S03 00333
000647 000000 A     339         DATA    0           G=7   SIGN F/F                          S03 00334
000650 000000 A     340         DATA    0           G=8   CARRY F/F                        S03 00335
000651 000000 A     341         DATA    0           G=9   ZERO                              S03 00336
000652 000000 A     342         DATA    0           G=10  DS  F/F                          S03 00337
000653 000000 A     343         DATA    0           G=11  MIL15--SIGN BIT OF MEMORY LATCH  S03 00338
000654 000000 A     344         DATA    0           G=12  SHIFT COUNT = -1                 S03 00339
000655 000000 A     345         DATA    0           G=13  A15 (SIGN OF A REG)FOR MUL OPERATIONS03 00340
000656 000000 A     346         DATA    0           G=14  DAL15 NOT EQUAL TO DAL14(ALU BITS) S03 00341
000657 000000 A     347         DATA    0           G=15  QS F/F                           S03 00342
```

```
                    348          EJEC                                                    S03 00343
                    349 *                                                                S03 00344
                    350 *        INPUT PROCESSING COMMAND TABLE                          S03 00345
                    351 *                                                                S03 00346
000660 000301 A     352 COMM     DATA    0301        A  ALTER/DISPLAY ROM REGISTERS      S03 00347
000661 000302 A     353          DATA    0302        B  BEGIN SIMULATED EXECUTION       S03 00348
000662 000303 A     354          DATA    0303        C  CHANGE/DISPLAY MEMORY           S03 00349
000663 000304 A     355          DATA    0304        D  DUMP ROM BUFFER TO LO           S03 00350
000664 000305 A     356          DATA    0305        E  CHANGE/DISPLAY DECODE ROM(S) WORDS S03 00351
000665 000310 A     357          DATA    0310        H  SET ROM HALT ADDRESS            S03 00352
000666 000311 A     358          DATA    0311        I  INITIALIZE                      S03 00353
000667 000314 A     359          DATA    0314        L  LOAD CONTROL STORE             S03 00354
000670 000315 A     360          DATA    0315        M  SELECT INPUT MEDIA             S03 00355
000671 000320 A     361          DATA    0320        P  PAGE SELECT                    S03 00356
000672 000322 A     362          DATA    0322        R  RETURN TO OPERATING SYSTEM     S03 00357
000673 000323 A     363          DATA    0323        S  SINGLE STEP ROM INSTRUCTION    S03 00358
000674 000324 A     364          DATA    0324        T  TRACE                          S03 00359
000675 000332 A     365          DATA    0332        Z  ZERO TABLES                 F  ********
000676 177777 A     366          DATA    -1          END OF COMM BUFFER               S03 00360
                    367 *                                                                S03 00361
000677 010250 R     368 COMM1    DATA    E100        A  ALTER/DISPLAY ROM REGISTERS      S03 00362
000700 001434 R     369          DATA    S100        B  BEGIN SIMULATED EXECUTION       S03 00363
000701 010621 R     370          DATA    CMEM        C  CHANGE/DISPLAY MEMORY           S03 00364
000702 012224 R     371          DATA    E150        D  DUMP ROM BUFFER                 S03 00365
000703 012537 R     372          DATA    EDRM        E  CHANGE/DISPLAY DECODE ROM(S) WORDS S03 00366
000704 011771 R     373          DATA    E120        H  SET ROM HALT ADDR              S03 00367
000705 000715 R     374          DATA    EXC         I  INITIALIZE                      S03 00368
000706 010676 R     375          DATA    LDRM        L  LOAD CONTROL STORE             S03 00369
000707 012511 R     376          DATA    CHME        M  SELECT INPUT MEDIA             S03 00370
000710 001160 R     377          DATA    PSEL        P  PAGE SELECT                    S03 00371
000711 012460 R     378          DATA    E170        R  RETURN TO OPERATING SYSTEM     S03 00372
000712 012031 R     379          DATA    E130        S  SINGLE MICRO INST STEP         S03 00373
000713 012071 R     380          DATA    E140        T  TRACE                          S03 00374
000714 001046 R     381          DATA    EXCS        Z  ZERO TABLES                 F  ********
```

```
                    382          EJEC                                                    S03 00375
                    383 *                                                                S03 00376
                    384 *        SIMULATOR EXECUTIVE                                     S03 00377
                    385          NAME    EXC                                          F  ********
                    386 *                                                                S03 00378
000715              387 EXC      BSS     0                                               S03 00379
000715 005001 A     388          TZA                                                     S03 00380
000716 006057 A     389          STAE    PAGE        DEFAULT TO PAGE 0                   S03 00381
000717 001206 R
000720 006057 A     390          STAE    STEP        SET RUN MODE                        S03 00382
000721 000471 R
000722 006057 A     391          STAE    LOLINE      SET LOLINE COUNT                    S03 00383
000723 015613 R
                    392 *                                                                S03 00387
000724 005001 A     393          TZA                                                     S03 00388
000725 002000 A     394          JMPM    SAR         INITIALIZE                       D  03 00389
000726 014711 R
000727 000004 A     395          DATA    4           START                            D  03 00390
000730 012135 R     396          DATA    STRTRC      TRACE                            D  03 00391
000731 006010 A     397          LDAI    0777                                            S03 00392
000732 000777 A
000733 002000 A     398          JMPM    SAR         INITIALIZE                       D  03 00393
000734 014711 R
000735 000004 A     399          DATA    4           END                              D  03 00394
000736 012141 R     400          DATA    ENDTRC      TRACE                            D  03 00395
000737 024133 A     401          LDB     EXC3        RSLT ADDR                           S03 00396
000740 006010 A     402          LDAI    512         ADDRESS OF LAST WORD IN PAGE + 1    S03 00397
000741 001000 A
000742 006030 A     403          LDXI    -20                                          C  03 00398
000743 177754 A
000744 001040 A     404 EXC0     JXZ     EXC1        IF HALT TABLES DONE              C  03 00399
000745 000753 R
000746 056000 A     405          STA     0,2                                          C  03 00400
000747 005122 A     406          IBR                 ADVANCE POINTER                  C  03 00401
000750 005144 A     407          IXR                                                  C  03 00402
000751 001000 A     408          JMP     EXC0        GO BACK FOR MORE                 C  03 00403
000752 000744 R
000753 024120 A     409 EXC1     LDB     EXC3+1      ADDR OF TRACE FLAG               C  03 00404
000754 005301 A     410          DECR    01                                              S03 00405
000755 056000 A     411          STA     0,2         SET TRACE ON                        S03 00406
000756 056001 A     412          STA     1,2         FOR                              D  03 00407
000757 056002 A     413          STA     2,2         ALL                              D  03 00408
```

```
000760 056003 A  414          STA     3,2             PAGES                                   D   03 00409
000761 024113 A  415          LDB     EXC3+2                                                  D   03 00410
000762 056000 A  416          STA     0,2             CLEAR RUN COUNT                         D   03 00411
000763 001001 A  417          JOF     *+2             RESET OVERFLOW F/F                          S03 00412
000764 000765 R
000765 024404 A  418          LDB     ELOC                                                        S03 00413
000766 026000 A  419          LDB     0,2                                                         S03 00414
000767 016000 A  420          LDA     0,2             LAST LOADED LOCATION                        S03 00415
000770 005111 A  421          IAR                     FIRST AVAILABLE LOCATION                    S03 00416
000771 054216 A  422          STA     PSTBL+1         BOUNDARY OF PAGE 1                          S03 00417
000772 124440 A  423          ADD     D2048           =2048                                       S03 00418
000773 054215 A  424          STA     PSTBL+2         BOUNDARY OF PAGE 2                          S03 00419
000774 124436 A  425          ADD     D2048                                                       S03 00420
000775 054214 A  426          STA     PSTBL+3         BOUNDARY OF PAGE 3                          S03 00421
000776 006010 A  427          LDAI    $DBUF                                                       S03 00422
000777 000371 E
001000 057000 I  428          STA     DBUF            INITIALIZE CCS TO PAGE 0                    S03 00423
001001 006010 A  429          LDAI    $DRM1                                                       S03 00424
001002 000372 E
001003 057000 I  430          STA     DRM1            INITIALIZE DCSA TO PAGE 0                   S03 00425
001004 006010 A  431          LDAI    $DRM2                                                       S03 00426
001005 000373 E
001006 057000 I  432          STA     DRM2            INITIALIZE DCSB TO PAGE 0                   S03 00427
001007 005001 A  433          TZA                                                                 S03 00428
001010 006057 A  434          STAE    PGND            SET PAGE NUMBER TO ZERO                     S03 00429
001011 015112 R
001012 002000 A  435          CALL    TPFRM           TOP OF FORM                                 S03 00430
001013 014760 R
001014 002000 A  436          CALL    SIOUT,14,EXC2   OUTPUT PROGRAM HEADER MESSAGE               S03 00431
001015 015406 R
001016 000016 A
001017 001055 R
001020 002000 A  437          JMPM    PAG             GET PAGE LIMIT DECLARATION                  S03 00432
001021 001255 R
001022 002000 A  438 EXC1A    CALL    SIOUT,7,EXC5    REQUEST MEMORY TYPE                     F   ********
001023 015406 R
001024 000007 A
001025 001076 R
001026 002000 A  439          CALL    SIIN            GET MEMORY TYPE                         F   ********
001027 015220 R
001030 002000 A  440          JMPM    FETCH                                                   F   ********
001031 015635 R
```

```
001032 006140 A  441          SUBI    0260                                          F ********
001033 000260 A
001034 005012 A  442          TAB                                                   F ********
001035 006140 A  443          SUBI    3                                             F ********
001036 000003 A
001037 001004 A  444          JAN     EXC1A           LT 2 NOT VALID                F ********
001040 001022 R
001041 006140 A  445          SUBI    3                                             F ********
001042 000003 A
001043 001002 A  446          JAP     EXC1A           GT 5 NOT VALID                F ********
001044 001022 R
001045 064037 A  447          STB     MTYP            SAVE MEMORY TYPE              F ********
       001046 R  448 EXCS     EQU     *                                             F ********
001046 005001 A  449          TZA                                                   F ********
001047 002000 A  450          JMPM    SAR             ZERO ALL TABLES AND FLAGS     F ********
001050 014711 R
001051 000162 A  451          DATA    COMM-V          WORD COUNT                    F ********
001052 000476 R  452          DATA    V               START ADDR                    F ********
001053 001000 A  453          JMP     EXC10           PROCESS OPERATOR INPUT          S03 00433
001054 001106 R
                 454 *                                                               S03 00434
001055 120240 A  455 EXC2     DATA    '  VARIAN 73 MICRO SIMULATOR '                  S03 00435
001056 153301 A
001057 151311 A
001060 140716 A
001061 120267 A
001062 131640 A
001063 146711 A
001064 141722 A
001065 147540 A
001066 151711 A
001067 146725 A
001070 146301 A
001071 152317 A
001072 151240 A
001073 000445 R  456 EXC3     DATA    RHLTO           CCS HALT TABLES               C 03 00436
001074 000472 R  457          DATA    TRACE           ADDR OF TRACE ON/OFF FLAG       S03 00437
001075 012070 R  458          DATA    RCNT                                            S03 00438
001076 120240 A  459 EXC5     DATA    '  MEMORY TYPE?'                              F ********
001077 146705 A
001100 146717 A
001101 151331 A
```

```
001102 120324 A
001103 154720 A
001104 142677 A
001105 000000 A  460 MTYP   DATA    0              MEMORY TYPE, 3=SC,4=CORE,5=SLOW CORE  F  ********
```

```
                    461          EJEC                                                    S03 00439
                    462 *                                                                S03 00440
                    463 *        PROCESS OPERATOR INPUT                                  S03 00441
                    464 *                                                                S03 00442
001106 002000 A     465 EXC10    CALL    SIOUT,3,EXC4    OUTPUT EXECUTIVE INPUT SIGNAL   S03 00443
001107 015406 R
001110 000003 A
001111 001152 R
001112 002000 A     466          CALL    SIIN            INPUT EXECUTIVE COMMAND         S03 00444
001113 015220 R
001114 002000 A     467 EX10E    JMPM    FETCH           FETCH FIRST CHAR FROM INPUT BUFFER S03 00445
001115 015635 R
001116 001010 A     468          JAZ     EXC90                                           S03 00446
001117 001144 R
001120 054022 A     469          STA     EXC19           SAVE CHAR                       S03 00447
001121 024017 A     470          LDB     EXC17           ADDR OF INPUT CHAR LIST         S03 00448
001122 034017 A     471          LDX     EXC18           CORRESPONDING ROUTINE ADDRESSES S03 00449
                    472 *                                                                S03 00450
001123 016000 A     473 EXC12    LDA     0,2             LEGAL INPUT CHAR                S03 00451
001124 001004 A     474          JAN     EXC90           JUMP IF AT END OF TABLE         S03 00452
001125 001144 R
001126 144014 A     475          SUB     EXC19           LESS INPUT CHAR                 S03 00453
001127 001010 A     476          JAZ     EXC14           JUMP IF FOUND INPUT             S03 00454
001130 001135 R
001131 005144 A     477          IXR                                                     S03 00455
001132 005122 A     478          IBR                                                     S03 00456
001133 001000 A     479          JMP     EXC12           CHECK NEXT CHAR                 S03 00457
001134 001123 R
                    480 *                                                                S03 00458
001135 015000 A     481 EXC14    LDA     0,1             ROUTINE ADDR                    S03 00459
001136 054001 A     482          STA     EXC16           SAVE FOR JUMP                   S03 00460
001137 001000 A     483          JMP     *               CALL ROUTINE                    S03 00461
001140 001137 R
001140              484 EXC16    BES     0               ROUTINE ADDR                    S03 00462
                    485 *                                                                S03 00463
001141 000660 R     486 EXC17    DATA    COMM            ADDR OF LEGAL INPUT CHAR LIST   S03 00464
001142 000677 R     487 EXC18    DATA    COMM1           ROUTINE ADDRESSES               S03 00465
001143 000000 A     488 EXC19    DATA    0               INPUT CHAR                      S03 00466
                    489 *                                                                S03 00467
                    490 *        INVALID INPUT                                           S03 00468
                    491 *                                                                S03 00469
001144 002000 A     492 EXC90    CALL    SIOUT,3,EXC92   OUTPUT ERROR MESSAGE            S03 00470
```

```
001145 015406 R
001146 000003 A
001147 001155 R
001150 001000 A  493          JMP     EXC10          GET NEXT INPUT                S03 00471
001151 001106 R
                 494 *                                                              S03 00472
001152 120240 A  495 EXC4     DATA    ' MS**'                                       S03 00473
001153 146723 A
001154 125252 A
001155 120240 A  496 EXC92    DATA    ' MS01'        INVALID INPUT                  S03 00474
001156 146723 A
001157 130261 A
```

```
                    497          EJEC                                                    S03 00475
                    498 *                                                                S03 00476
                    499 *        THIS ROUTINE HANDLES THE PAGE SELECT COMMAND (P)        S03 00477
                    500 *                                                                S03 00478
                    501 *             AVAILABLE MEMORY IS TESTED TO DETERMINE IF THERE IS ROOMS03 00479
                    502 *             FOR THE PAGE AND IN NOT THEN ERROR MESSAGE IS GIVEN S03 00480
                    503 *                                                                S03 00481
001160 002000 A     504 PSEL     JMPM    FETCHA          GET PAGE NUMBER                 S03 00482
001161 015644 R
001162 001010 A     505          JAZ     EXC90                                           S03 00483
001163 001144 R
001164 006140 A     506          SUBI    0260                                            S03 00484
001165 000260 A
001166 002000 A     507          CALL    PGOK            CHECK IF PAGE AVAILABEL         S03 00485
001167 001222 R
001170 001002 A     508          JAP     PSELB           NO ROOM                         S03 00486
001171 001174 R
001172 001000 A     509          JMP     EXC10                                           S03 00487
001173 001106 R
001174 002000 A     510 PSELB    CALL    SIOUT,3,NRM       OUTPUT ERROR                  S03 00488
001175 015406 R
001176 000003 A
001177 001217 R
001200 005001 A     511          TZA                                                     S03 00489
001201 054004 A     512          STA     PAGE            DEFAULT PAGE                    S03 00490
001202 006057 A     513          STAE    CPAG                                            S03 00491
001203 000503 R
001204 001000 A     514          JMP     EXC10                                           S03 00492
001205 001106 R
001206 000000 A     515 PAGE     DATA    0                                               S03 00493
001207 000777 E     516 PSTBL    DATA    $DBUF           PAGE 0 BOUNDARY                 S03 00494
001210 000000 A     517          DATA    0               PAGE 1 BOUNDARY                 S03 00495
001211 004000 A     518          DATA    2048            PAGE 2 BOUNDARY                 S03 00496
001212 010000 A     519          DATA    4096            PAGE 3 BOUNDARY                 S03 00497
                    520 *                                                                S03 00498
001213 001002 E     521 DCTBL    DATA    $DRM1           PAGE 0 DCS                      S03 00499
001214 000000 E     522          DATA    $DRM1B          PAGE 1 DCS                    F ********
001215 000000 E     523          DATA    $DRM1C          PAGE 2 DCS                    F ********
001216 000000 E     524          DATA    $DRM1D          PAGE 3 DCS                    F ********
                    525 *                                                                S03 00503
001217 120240 A     526 NRM      DATA    '  MS03'        NO ROOM IN CORE                 S03 00504
001220 146723 A
```

001221 130263 A,

```
                    527          EJEC                                                    S03 00505
                    528 *                                                                S03 00506
                    529 *        THIS ROUTINE CHECKS IF THERE IS SUFFICIENT CORE FOR THE S03 00507
                    530 *        DESIRED PAGE                                            S03 00508
                    531 *                                                                S03 00509
                    532 *        CALLING SEQUENCE                                        S03 00510
                    533 *        LDA     PAGE NUMBER                                     S03 00511
                    534 *        CALL    PGOK                                            S03 00512
                    535 *        RETURN A REG POS=NOT ROOM, A REG NEG=ENOUGH ROOM        S03 00513
                    536 *        PAGE TABLE POINTERS UPDATED                             S03 00514
                    537 *                                                                S03 00515
001222 000000 A     538 PGOK     ENTR                                                    S03 00516
001223 057000 I     539          STA     PAGE                                            S03 00517
001224 006057 A     540          STAE    CPAG                                            S03 00518
001225 000503 R
001226 144113 A     541          SUB     PAG4            PAGE LIMIT                      S03 00519
001227 001010 A     542          JAZ     *+4                                             S03 00520
001230 001233 R
001231 001002 A     543          JAP*    PGOK            EXCEED PAGE LIMIT               S03 00521
001232 101222 R
001233 006010 A     544          LDAI    PSTBL           PAGE BOUNDARY TABLE             S03 00522
001234 001207 R
001235 127000 I     545          ADD     PAGE            INDEX INTO TABLE                S03 00523
001236 005012 A     546          TAB                                                     S03 00524
001237 016000 A     547          LDA     0,2             GET TABLE ADDR                  S03 00525
001240 057000 I     548          STA     DBUF            POINTER INTO TABLE              S03 00526
001241 006010 A     549          LDAI    DCTBL           DCS BOUNDARY TABLE              S03 00527
001242 001213 R
001243 127000 I     550          ADD     PAGE            INDEX INTO TABLE                S03 00528
001244 005012 A     551          TAB                                                     S03 00529
001245 016000 A     552          LDA     0,2             GET TABLE ADDR                  S03 00530
001246 057000 I     553          STA     DRM1            SET DCSA ADDR                   S03 00531
001247 006120 A     554          ADDI    16                                              S03 00532
001250 000020 A
001251 057000 I     555          STA     DRM2            SET DCSB ADDR                   S03 00533
001252 005301 A     556          DECR    01              SET A NEG                       S03 00534
001253 001000 A     557          JMP*    PGOK                                            S03 00535
001254 101222 R
```

```
                    558          EJEC                                                    S03 00536
                    559 *                                                                S03 00537
                    560 *        THIS ROUTINE GETS THE PAGE LIMIT DECLARATION UPON INITIALIZATIONS03 00538
                    561 *        SO THAT MAIN MEMORY CAN BE DETERMINED                   S03 00539
                    562 *                                                                S03 00540
                    563 *        CALLING SEQUENCE                                        S03 00541
                    564 *        JMPM    PAG                                             S03 00542
                    565 *        RETURN                                                  S03 00543
                    566 *                                                                S03 00544
001255 000000 A     567 PAG      ENTR                                                    S03 00545
001256 002000 A     568          CALL    SIOUT,7,PAG5    OUTPUT REQUEST              F  ********
001257 015406 R
001260 000007 A
001261 001343 R
001262 002000 A     569          CALL    SIIN            GET PAGE NUMBER                 S03 00547
001263 015220 R
001264 002000 A     570          JMPM    FETCH           GET FIRST CHAR                  S03 00548
001265 015635 R
001266 006140 A     571          SUBI    0260            ASCII ZERO                      S03 00549
001267 000260 A
001270 005012 A     572          TAB                                                     S03 00550
001271 001004 A     573          JAN     PAG2            LESS THAN ZERO                  S03 00551
001272 001326 R
001273 006140 A     574          SUBI    04              ASCII FOUR                      S03 00552
001274 000004 A
001275 001002 A     575          JAP     PAG2            GREATER THAN THREE              S03 00553
001276 001326 R
001277 005021 A     576          TBA                                                     S03 00554
001300 054041 A     577          STA     PAG4                                            S03 00555
001301 002000 A     578          JMPM    FETCHA          CHECK IF MORE INPUT             S03 00556
001302 015644 R
001303 001010 A     579          JAZ     PAG1                                            S03 00557
001304 001313 R
001305 006140 A     580          SUBI    0240            BLANK                           S03 00558
001306 000240 A
001307 001010 A     581          JAZ     PAG1                                            S03 00559
001310 001313 R
001311 001000 A     582          JMP     PAG2            ERROR--INVALID INPUT            S03 00560
001312 001326 R
001313 014025 A     583 PAG1     LDA     PAG4                                            S03 00561
001314 001010 A     584          JAZ*    PAG             RETURN, PAGE WITHIN SIMULATOR   S03 00562
001315 101255 R
```

```
001316 002000 A  585        JMPM    PAVL          CHECK IF ROOM FOR PAGES                  S03 00563
001317 001355 R
001320 001004 A  586        JAN     PAG2          NO ROOM                                  S03 00564
001321 001326 R
001322 006010 A  587        LDAI    PSTBL         PAGE BOUNDARY TABLE                      S03 00565
001323 001207 R
001324 001000 A  588        JMP*    PAG                                                    S03 00566
001325 101255 R
001326 002000 A  589 PAG2   CALL    SIOUT,3,PAG6    OUTPUT ERROR                           S03 00567
001327 015406 R
001330 000003 A
001331 001352 R
001332 001000 A  590        JMP     PAG+1         TRY AGAIN                                S03 00568
001333 001256 R
001334 002000 A  591 PAG3   CALL    SIOUT,3,NRM     OUTPUT ERROR                           S03 00569
001335 015406 R
001336 000003 A
001337 001217 R
001340 001000 A  592        JMP     PAG+1         TRY AGAIN                                S03 00570
001341 001256 R
001342 000000 A  593 PAG4   DATA    0             SELECTED LIMIT                           S03 00571
001343 120240 A  594 PAG5   DATA    '  PAGE LIMIT? '                                      F  ********
001344 150301 A
001345 143705 A
001346 120314 A
001347 144715 A
001350 144724 A
001351 137640 A
001352 120240 A  595 PAG6   DATA    '  MS04'        INVALID PAGE                          S03 00573
001353 146723 A
001354 130264 A
```

```
                    596          EJEC                                                    S03 00574
                    597 *                                                                S03 00575
                    598 *        THIS IS A SUBROUTINE TO DETERMINE IF THERE IS ENOUGH MEMORY S03 00576
                    599 *        AVAILABLE FOR THE DESIRED PAGE                          S03 00577
                    600 *                                                                S03 00578
                    601 *        ENTER:  A REG CONTAINS PAGE NUMBER                      S03 00579
                    602 *                                                                S03 00580
                    603 *        CALLING SEQUENCE                                        S03 00581
                    604 *        JMPM    PAVL                                            S03 00582
                    605 *        RETURN                                                  S03 00583
                    606 *                                                                S03 00584
                    607 *        EXIT:   A REG NEG=NO ROOM; A REG POS=PAGE AVAILABLE     S03 00585
                    608 *                                                                S03 00586
001355 000000 A     609 PAVL     ENTR                                                    S03 00587
001356 054052 A     610          STA     PA8             SAVE PAGE NUMBER                S03 00588
001357 024012 A     611          LDB     ELOC                                            S03 00589
001360 026000 A     612          LDB     0,2                                             S03 00590
001361 016000 A     613          LDA     0,2             LAST LOADED LOCATION            S03 00591
001362 054004 A     614          STA     PAV1            STUFF INTO SUBTRACTION OPERAND  S03 00592
001363 024007 A     615          LDB     LLUP                                            S03 00593
001364 026000 A     616          LDB     0,2                                             S03 00594
001365 016000 A     617          LDA     0,2             LAST AVAIL LOCATION             S03 00595
001366 006140 A     618          SUBI    0               OPPERAND OVERLAYED BY ABOVE-AREA FOR PAGE S03 00596
001367 000000 A
001367              619 PAV1     BES     0                                               S03 00597
001370 001000 A     620          JMP     PA1             CHECK IF ENOUGH ROOM            S03 00598
001371 001375 R
                    621 *                                                                S03 00599
                    622          EXT     $ELOC                                           S03 00600
                    623          EXT     V$LLUP                                          S03 00601
001372 000000 E     624 ELOC     DATA    $ELOC           FIRST AVAILABLE LOCATION POINTER S03 00602
001373 000000 E     625 LLUP     DATA    V$LLUP          LAST AVAILABLE LOCATION POINTER  S03 00603
                    626          EXT     $SYST                                           S03 00604
001374 000000 E     627 SYST     DATA    $SYST           POINTER TO SYSTEM FLAG           S03 00605
                    628 *                                                                S03 00606
001375 054034 A     629 PA1      STA     PA9                                             S03 00607
001376 144034 A     630          SUB     D2048           PAGE 1                          S03 00608
001377 001002 A     631          JAP     PA2             CHECK FOR NEXT PAGE             S03 00609
001400 001405 R
001401 006030 A     632          LDXT    0                                               S03 00610
001402 000000 A
001403 001000 A     633          JMP     PA5             COMPARE PAGE NUMBER             S03 00611
```

```
001404 001425 R,
001405 144025 A  634 PA2    SUB     D2048          PAGE 2                                  S03 00612
001406 001002 A  635        JAP     PA3            CHECK FOR NEXT PAGE                     S03 00613
001407 001414 R
001410 006030 A  636        LDXI    1                                                      S03 00614
001411 000001 A
001412 001000 A  637        JMP     PA5            COMPARE PAGE NUMBER                     S03 00615
001413 001425 R
001414 144016 A  638 PA3    SUB     D2048          PAGE 3                                  S03 00616
001415 001002 A  639        JAP     PA4            CHECK FOR NEXT PAGE                     S03 00617
001416 001423 R
001417 006030 A  640        LDXI    2                                                      S03 00618
001420 000002 A
001421 001000 A  641        JMP     PA5            COMPARE PAGE NUMBER                     S03 00619
001422 001425 R
001423 006030 A  642 PA4    LDXI    3                                                      S03 00620
001424 000003 A
001425 005041 A  643 PA5    TXA                                                            S03 00621
001426 144002 A  644        SUB     PA8            DESIRED PAGE                            S03 00622
001427 001000 A  645        JMP*    PAVL           RETURN--A REG SET                       S03 00623
001430 101355 R
001431 000000 A  646 PA8    DATA    0                                                      S03 00624
001432 000000 A  647 PA9    DATA    0                                                      S03 00625
001433 004000 A  648 D2048  DATA    2048           WCS PAGE SIZE (512 64 BIT WORDS)        S03 00626
```

```
                        649          EJEC                                                    S03 00627
                        650 *                                                                S03 00628
                        651 *        THIS ROUTINE WILL CONTROL THE SIMULATED OPERATION       S03 00629
                        652 *        OF THE COMPUTER                                         S03 00630
                        653 *                                                                S03 00631
                        654 *        ENTER VIA THE BEGIN COMMAND                             S03 00632
                        655 *                                                                S03 00633
001434                  656 S100     BSS     0                                               S03 00634
001434 002000 A         657          JMPM    INA          GET START SIMULATION ADDRESS       03 00635
001435 013373 R
001436 147240 A         658          DATA    INT                                             03 00636
001437 006030 A         659          LDXI    DROM                                            S03 00637
001440 000545 R
001441 001020 A         660          JBZ     S101         NO ADDR GIVEN--CONTINUE FROM LAST ADDR  S03 00638
001442 001444 R
001443 055057 A         661          STA     NROM,1                                          S03 00639
001444 002000 A         662 S101     CALL    FELD         BREAK ROM WORD INTO FIELDS         S03 00640
001445 012775 R
001446 002000 A         663 S102     CALL    LIST         PRINT ROM LOC,AND DECODED FIELDS   S03 00641
001447 014204 R
001450 002000 A         664          CALL    S120         CHECK FOR ROM HALT ADDRESS         S03 00642
001451 001543 R
001452 002000 A         665          CALL    CRAS         DETERMINE NEXT ROM ADDR            S03 00643
001453 001653 R
001454 002000 A         666          CALL    CRXA         OUTPUT NEXT ROM ADDR TO LINE PRINTER  S03 00644
001455 003337 R
001456 006030 A         667          LDXI    DROM                                            S03 00645
001457 000545 R
001460 002000 A         668 S103     CALL    S300         DATA LOOP PROCESSING               S03 00654
001461 003422 R
001462 002000 A         669 S104     CALL    MOPA         MEMORY OPERATIONS                  S03 00655
001463 007210 R
001464 006030 A         670          LDXI    DROM                                            S03 00656
001465 000545 R
001466 002000 A         671 S105     CALL    X100         DETERMINE STATUS REGISTER SETTINGS  S03 00657
001467 006114 R
001470 002000 A         672          CALL    LTMX         LIST TEST MUX STATUS               S03 00658
001471 004072 R
001472 002000 A         673 S105     CALL    S106                                            S03 00659
001473 001476 R
001474 001000 A         674          JMP     S101         GO UPDATE ROM CONTROL BUFFER       S03 00660
001475 001444 R
```

```
                    675 *                                                                   S03 00661
                    676 *       CHECK FOR RETURN TO EXEC (STEP MODE OR RUN COUNT SATISFIED) S03 00665
001476 000000 A     677 S106    ENTR                                                        S03 00666
001477 006020 A     678         LDBI    STEP                                                S03 00667
001500 000471 R
001501 016000 A     679         LDA     0,2             STEP/RUN FLAG                       S03 00668
001502 001010 A     680         JAZ     *+4                                                 S03 00669
001503 001506 R
001504 001000 A     681         JMP     EXC10           RETURN TO EXEC (STEP MODE)          S03 00670
001505 001106 R
001506 017000 I     682         LDA     RCNT            MICRO COUNT                         S03 00671
001507 001004 A     683         JAN*    S106            RETURN IF NOT SET                   S03 00672
001510 101476 R
001511 001010 A     684         JAZ     S106A           COUNT SATISFIED                     S03 00673
001512 001517 R
001513 005311 A     685         DAR                                                         S03 00674
001514 057000 I     686         STA     RCNT            DECR RUN COUNT                      S03 00675
001515 001000 A     687         JMP*    S106                                                S03 00676
001516 101476 R
001517 002000 A     688 S106A   CALL    SIOUT,14,S106B  OUTPUT MESSAGE                     S03 00677
001520 015406 R
001521 000016 A
001522 001525 R
001523 001000 A     689         JMP     EXC10           RETURN TO EXEC                      S03 00678
001524 001106 R
001525 120240 A     690 S106B   DATA    '  EXECUTION LIMIT SATISFIED '                      S03 00679
001526 142730 A
001527 142703 A
001530 152724 A
001531 144717 A
001532 147240 A
001533 146311 A
001534 146711 A
001535 152240 A
001536 151701 A
001537 152311 A
001540 151706 A
001541 144705 A
001542 142240 A
                    691 *                                                                   S03 00680
                    692 *   CHECK FO ROM HALT ADDR                                          S03 00681
                    693 *   YES=EXIT TO EXEC  NO=NORMAL RETURN                              S03 00682
```

```
001543 000000 A  694 S120   ENTR                                              S03 00683
001544 006030 A  695        LDXI    DROM          ADDR OF ROM FIELDS/DATA     S03 00684
001545 000545 R
001546 006010 A  696        LDAT    RHLT          ROM HALT ADDR               C 03 00685
001547 000441 R
001550 006127 A  697        ADDE    CPAG          SELECTED PAGE               C 03 00686
001551 000503 R
001552 005012 A  698        TAB                                               C 03 00687
001553 026000 A  699        LDB     0,2           PAGE HALT TABLE             C 03 00688
001554 064007 A  700        STB     S120B         SAVE IT                     C 03 00689
001555 016000 A  701 S120A  LDA     0,2                                       C 03 00690
001556 145057 A  702        SUB     NROM,1                                    S03 00691
001557 001010 A  703        JAZ     S123                                      S03 00692
001560 001573 R
001561 005122 A  704        IBR                   ADVANCE POINTER             S03 00693
001562 005021 A  705        TBA                                               S03 00694
001563 006140 A  706        SUBI    RHLT                                      S03 00695
001564 000441 R
001564           707 S120B  BES     0                                         C 03 00696
001565 006140 A  708        SUBI    5             FIVE ALREADY CHECKED ?      S03 00697
001566 000005 A
001567 001004 A  709        JAN     S120A         NO=CHECK NEXT HALT ADDRESS  C 03 00698
001570 001555 R
001571 001000 A  710        RETU*   S120          YES=RETURN                  S03 00699
001572 101543 R
001573 002000 A  711 S123   CALL    SIOUT,5,S111    OUTPUT CC3 HALT           S03 00700
001574 015406 R
001575 000005 A
001576 001601 R
001577 001000 A  712 S121   JMP     EXC10         GO TO EXEC                  S03 00701
001600 001105 R
                 713 *                                                       S03 00702
001601 120240 A  714 S111   DATA    ' CC3 HALT'                               S03 00703
001602 141703 A
001603 151640 A
001604 144301 A
001605 146324 A
                 715 *                                                       S03 00704
```

```
                    716          EJEC                                                    S03 00705
                    717 *                                                                S03 00706
                    718 *        GET THE NEXT MAIN MEMORY WORD AND OUTPUT IT TO          S03 00707
                    719 *        THE LO IF IN THE TRACE MODE                             S03 00708
                    720 *                                                                S03 00709
                    721 *        CALLED BY THE MEMORY OPERATIONS COMPONENT - MOPA        S03 00710
                    722 *                                                                S03 00711
                    723 *                                                                S03 00712
                    724 *        CALLING SEQUENCE                                        S03 00713
                    725 *        LDA      ADDR OF V73 MAIN MEMORY WORD                   S03 00714
                    726 *        JMPM     S200                                           S03 00715
                    727 *                                                                S03 00716
                    728 *        RETURN   WORD IN A REGISTER                             S03 00717
                    729 *                                                                S03 00718
001606 000000 A     730 S200     ENTR                                                    S03 00719
001607 054040 A     731          STA      S210           SAVE WORD LOC                   S03 00720
001610 025054 A     732          LDB      MOPC,1                                  F  ********
001611 001020 A     733          JBZ      S205           IF NO MEM REQ            F  ********
001612 001616 R
001613 005014 A     734          TAX                                              F  ********
001614 015000 A     735          LDA      0,1            GET WORD                        S03 00724
001615 054033 A     736          STA      S211           SAVE WORD                       S03 00725
       001616 R     737 S205     EQJ      *                                       D,103 00726
001616 037000 I     738          LDX      CPAG                                    D   03 00727
001617 006015 A     739          LDAE     TRACE,1        TRACE FLAG FOR PAGE      D   03 00728
001620 000472 R
001621 001010 A     740          JAZ      S201           JUMP IF NOT TRACE MODE          S03 00729
001622 001645 R
001623 002000 A     741          JMPM     TRSETA         CHECK IF WITHIN BOUNDS          S03 00730
001624 014724 R
001625 001004 A     742          JAN      S201           NOT IN TRACE BOUNDARIES         S03 00731
001626 001645 R
                    743 *                                                                S03 00732
                    744 *        OUTPUT ADDR AND WORD TO LO                              S03 00733
                    745 *                                                                S03 00734
                    746 *                                                                S03 00735
001627 006030 A     747          LDXI     S219+4                                         S03 00736
001630 001656 R
001631 024016 A     748          LDB      S210           WORD LOCATION                   S03 00737
001632 002000 A     749          JMPM     OH             CONVERT ADDR TO ASCII           S03 00738
001633 014523 R
001634 006030 A     750          LDXI     S219+7                                  D,103 00739
```

```
001635 001661 R
001636 024012 A  751          LDB     S211                                    D,103 00740
001637 002000 A  752          JMPM    OH                                      D,103 00741
001640 014523 R
001641 002000 A  753          CALL    LOOUT,9,S219  OUTPUT TO LO             F   ********
001642 015470 R
001643 000011 A
001644 001652 R
                 754 *                                                        S03 00743
001645 014003 A  755 S201     LDA     S211          WORD                      S03 00744
001646 001000 A  756          JMP*    S200          RETURN                    S03 00745
001647 101606 R
                 757 *                                                        S03 00746
001650 000000 A  758 S210     DATA    0             SAVED LOCATION OF WORD    S03 00747
001651 000000 A  759 S211     DATA    0             SAVED WORD                S03 00748
001652 120240 A  760 S219     DATA    ' MMAD  DDDD  CCCC'                     D,103 00749
001653 146715 A
001654 140704 A
001655 120240 A
001656 142304 A
001657 142304 A
001660 120240 A
001661 141703 A
001662 141703 A
```

```
                    761         EJEC                                                    S03 00750
                    762 *                                                               S03 00751
                    763 *     ROUTINE TO DETERMINE NEXT ROM ADDRESS                     S03 00752
                    764 *                                                               S03 00753
                    765 *     CALLING SEQUENCE                                          S03 00754
                    766 *       CALL    CRAS                                            S03 00755
                    767 *                                                               S03 00756
                    768 *       RETU    NEXT ROM ADDR IS STORED IN "NROM", ROM ADDR SELECT IS  S03 00757
                    769 *               A 12 BIT WORD WHERE THE UPPER 4 BITS DESIGNATE A       S03 00758
                    770 *               SPECIFIC 512 CONTROL STORE PAGE.                      S03 00759
                    771 *                                                               S03 00760
                    772 *     THIS ROUTINE USES THE FOLLOWING FIELDS OF THE CURRENT     S03 00761
                    773 *     CONTROL ROM WORD: T,S,G,TS,AF,FS,MS,MT,&IMC               S03 00762
                    774 *           ALSO USED: IRG2,INTF,INTA,INPF,&TMUX                S03 00763
                    775 *                                                               S03 00764
001663 000000 A     776 CRAS    ENTR                    **                              S03 00765
001664 006030 A     777         LDXI    DROM            ADDR OF ROM FIELD TABLE         S03 00766
001665 000545 R
001666 015005 A     778         LDA     XT,1            GET TEST CONTROL FIELD          S03 00771
001667 001010 A     779         JAZ     *+4                                             S03 00772
001670 001673 R
001671 001000 A     780         JMP     CR50            TEST STATUS LOGIC? T=0=DISABLE TEST LOGIC S03 00773
001672 002374 R
001673 015006 A     781         LDA     XS,1                                            S03 00774
001674 006140 A     782         SUBI    2               S=10 ?                          S03 00775
001675 000002 A
001676 001010 A     783         JAZ     CRA4            YES=                            S03 00776
001677 002054 R
001700 006120 A     784         ADDI    2               S=0 ?                           S03 00777
001701 000002 A
001702 001010 A     785         JAZ     *+4                                             S03 00778
001703 001706 R
001704 001000 A     786         JMP     CRA5            NO=                             S03 00779
001705 002063 R
001706 015012 A     787         LDA     XIMC,1          IM FIELD                        S03 00780
001707 006140 A     788         SUBI    13              IM=D ?                          S03 00781
001710 000015 A
001711 001010 A     789         JAZ     *+4             YES                             S03 00782
001712 001715 R
001713 001000 A     790         JMP     CRA0            NO                              S03 00783
001714 001757 R
001715 005311 A     791         DAR                                                     S03 00784
```

```
001716 057000 I  792        STA     IMD          SET BRANCH/PUSH=POP FLAG                  S03 00785
001717 015030 A  793        LDA     XA,1         A FIELD                                   S03 00786
001720 005012 A  794        TAB                                                           S03 00787
001721 006150 A  795        ANAI    4            POP ?                                     S03 00788
001722 000004 A
001723 001010 A  796        JAZ     CRAS1        NO                                        S03 00789
001724 001750 R
001725 015027 A  797        LDA     XB,1         CHECK IF POP WITHOUT JUMP                 S03 00790
001726 006150 A  798        ANAI    1            B0 SET ?                                  S03 00791
001727 000001 A
001730 001010 A  799        JAZ     CR34         NO                                        S03 00792
001731 002314 R
001732 006017 A  800        LDAE    JSPT         STACK POINTER                             S03 00793
001733 000502 R
001734 001010 A  801        JAZ     CRAX         STACK EMPTY= DO STANDARD PAGE BRANCH       S03 00794
001735 002353 R
001736 005311 A  802        DAR                  REMOVE TOP ITEM OF STACK                  S03 00795
001737 006057 A  803        STAE    JSPT                                                   S03 00796
001740 000502 R
001741 005012 A  804        TAB                                                       D    03 00797
001742 005001 A  805        TZA                                                       D    03 00798
001743 006056 A  806        STAE    STACK,2      CLEAR ENTRY                          D    03 00799
001744 000505 R
001745 057000 I  807        STA     IMD          CLEAR POP FLAG                       D    03 00800
001746 001000 A  808        JMP     CRAX         PERFORM STANDARD PAGE BRANCH              S03 00801
001747 002353 R
001750 005021 A  809 CRAS1  TBA                                                           S03 00802
001751 006150 A  810        ANAI    2            PUSH ?                                    S03 00803
001752 000002 A
001753 001010 A  811        JAZ     CRA0         NO                                        S03 00804
001754 001757 R
001755 001000 A  812        JMP     CRAX         YES                                  F    ********
001756 002353 R
001757 005001 A  813 CRA0   TZA                                                           S03 00806
001760 057000 I  814        STA     IMD          RESET BRANCH/PUSH=POP FLAG                S03 00807
001761 015007 A  815        LDA     XG,1                                                   S03 00808
001762 006150 A  816        ANAI    04           G=X1XX ?                                  S03 00809
001763 000004 A
001764 001010 A  817        JAZ     CRA2         NO=                                       S03 00810
001765 001777 R
                 818 *    T=0 & S=0 & G=X1XX                                              S03 00811
001766 015061 A  819        LDA     INTF,1       ANY INTERRUPT PENDING ?                   S03 00812
```

```
001767 001010 A  820          JAZ     CRA2          NO                                        S03 00813
001770 001777 R
001771 015062 A  821          LDA     INTA,1        GET INTERRUPT ADDRESS FROM I/O ,MASK WITH S03 00814
001772 155000 A  822          ANA     XTS,1         TS FIELD AND USE FOR NEXT ROM ADDR        S03 00815
                 823 ******************************                                          S03 00816
001773 006010 A  824          LDAI    0777          * COMPLETE INTERRUPT SIMULATION WILL NOT  S03 00817
001774 000777 A
001775 001000 A  825          RETU*   CRAS          * BE DONE NOW, USE LAST CONTROL ROM       S03 00818
001776 101663 R
                 826 ****************************** ADDR AS DEFAULT,                          S03 00819
                 827 *   DETERMINE IF NEXT ADDRESS COMES FROM DECODE ROM,                    S03 00820
                 828 *   YES IF: NO INTERRUPT PENDING, AND G=X1XX & IMC=0110 , AND AN        S03 00821
                 829 *           INTERRUPT IS NOT BEING PROCESSED(INPF=0),.                  S03 00822
001777 015007 A  830 CRA2     LDA     XG,1                                                    S03 00823
002000 006150 A  831          ANAI    04            G=X1XX ?                                  S03 00824
002001 000004 A
002002 001010 A  832          JAZ     *+4                                                     S03 00825
002003 002006 R
002004 001000 A  833          JMP     CRA2A         CHECK IF BRANCH TO DCS                    S03 00826
002005 002023 R
002006 015012 A  834          LDA     XIMC,1                                                  S03 00827
002007 006140 A  835          SUBI    3             IM = 0011                                 S03 00828
002010 000003 A
002011 001010 A  836          JAZ     CRAX          PAGE BRANCH                               S03 00829
002012 002353 R
002013 001000 A  837          JMP     CRA3          NO=                                   F   ********
002014 002074 R
002015 015067 A  838 CRA2B    LDA     INPF,1        INT BEING PROCESSED FLAG SET ?            S03 00831
002016 001010 A  839          JAZ     CRA3                                                    S03 00832
002017 002034 R
002020 005001 A  840          TZA                                                             S03 00833
002021 001000 A  841          JMP     CRA6          ZERO B-OFFSET AND FORM BASE ADDR          S03 00834
002022 002132 R
002023 015012 A  842 CRA2A    LDA     XIMC,1                                                  S03 00835
002024 006140 A  843          SUBI    3             IM=3                                      S03 00836
002025 000003 A
002026 001010 A  844          JAZ     CRA2C                                                   S03 00837
002027 002047 R
002030 006140 A  845          SUBI    3             IM = 0110                                 S03 00838
002031 000003 A
002032 001010 A  846          JAZ     CRA2B         YES                                       S03 00839
002033 002015 R
```

```
002034 015012 A  847 CRA3   LDA     XIMC,1          DISABLE D=ROM                                    S03 00840
002035 006140 A  848        SUBI    014             ADDR SELECT                                      S03 00841
002036 000014 A
002037 001010 A  849        JAZ     CRA6            IF S=0 AND IMC=1100,                             S03 00842
002040 002132 R
002041 006140 A  850        SUBI    2                                                          D     03 00843
002042 000002 A
002043 001010 A  851        JAZ     CRA5            IF REQ I/O & DISABLE D=ROM  IMC=1110       D     03 00844
002044 001663 R
002045 001000 A  852        JMP     CR70A           GET NEXT ADDR FROM DECODE                        C 03 00845
002046 003067 R
002047 015000 A  853 CRA2C  LDA     XTS,1           GET PAGE                                   D     03 00845
002050 002000 A  854        CALL    PGOK            SELECT OCS AND DCS FOR PAGE                D     03 00847
002051 001222 R
002052 001000 A  855        JMP     CR70A           GO TO DCS FOR NEXT ADDRESS                 D     03 00848
002053 003067 R
                 856 *                                                                                S03 00849
                 857 *                                                                                S03 00850
                 858 *   CHECK FOR PAGE ADDRESS JUMP: YES IF G FIELD NOT=X0XX                         S03 00851
                 859 *   IF YES, TS FIELD SPECIFIES A PARTICULAR 512 WORD CONTROL                     S03 00852
                 860 *   STORE PAGE.                                                                  S03 00853
002054 015007 A  861 CRA4   LDA     XG,1                                                             S03 00854
002055 006150 A  862        ANAI    04              G=X0XX ?                                         S03 00855
002056 000004 A
002057 001010 A  863        JAZ     *+4                                                              S03 00856
002060 002063 R
002061 001000 A  864        JMP     CRAX            NO=FORM PAGE JUMP ADDRESS                        S03 00857
002062 002353 R
                 865 *                                                                                S03 00858
                 866 *   IF S=3, GO TEST STATUS CONDITION                                             S03 00859
                 867 *   FORM B=OFFSET PART OF ADDR IF AB FIELD IS NOT 1=OR=2,                        S03 00860
                 868 *   OTHERWISE B=OFFSET IS ZERO                                                   S03 00861
002063 015006 A  869 CRA5   LDA     XS,1                                                             S03 00862
002064 001010 A  870        JAZ     CRA8                                                             S03 00863
002065 002074 R
002066 006140 A  871        SUBI    3               S=1 OR 2 ?                                       S03 00864
002067 000003 A
002070 001010 A  872        JAZ     CR50            S=3: GO TEST STATUS CONDITION                    S03 00865
002071 002374 R
002072 001000 A  873        JMP     CRA7            IF S=1 OR 2 THEN USE TS FOR OFFSET         F     ********
002073 002116 R
                 874 *   DON'T USE TS FIELD FOR B=OFFSET IF I/O REQUEST (IM=E/F)                      ********
```

```
002074 015012 A  875 CRA8   LDA     XIMC,1                                          S03 00867
002075 006140 A  876        SUBI    14                                          F   ********
002076 000016 A
002077 001010 A  877        JAZ     CRA6            IM=E                        F   ********
002100 002132 R
002101 005311 A  878        DAR                     IM=F                        F   ********
002102 001010 A  879        JAZ     CRA6                                            S03 00868
002103 002132 R
002104 015011 A  880        LDA     XAB,1                                           S03 00869
002105 001010 A  881        JAZ     CRA7            AB FIELD=0                      S03 00870
002106 002116 R
002107 006140 A  882        SUBI    3                                               S03 00871
002110 000003 A
002111 001002 A  883        JAP     CRA7            AB=3                            S03 00872
002112 002116 R
002113 005001 A  884        TZA                                                     S03 00873
002114 001000 A  885        JMP     CRA6                                            S03 00874
002115 002132 R
                 886 *   FORM B-OFFSET                                              S03 00875
002116 015011 A  887 CRA7   LDA     XAB,1           AB FIELD                    C   03 00876
002117 006140 A  888        SUBI    2                                           C   03 00877
002120 000002 A
002121 001010 A  889        JAZ     CRA6            JUMP IF BIT 1 NOT SET       C   03 00878
002122 002132 R
002123 015012 A  890        LDA     XIMC,1                                      D   03 00879
002124 006140 A  891        SUBI    13              IM=0                        D   03 00880
002125 000015 A
002126 001010 A  892        JAZ     CRA6            DO NOT USE TS               D   03 00881
002127 002132 R
002130 015000 A  893        LDA     XTS,1           PUT TS FIELD INTO BITS 4-1,     S03 00882
002131 004241 A  894        LRLA    1               BITS 0 &5-8=0,                  S03 00883
002132 006057 A  895 CRA8   STAE    CRB0            STORAGE FOR B OFFSET,           S03 00884
002133 003420 R
                 896 *                                                              S03 00885
                 897 *  FORM BASE ADDRESS: AF FIELD INTO BITS 8-4, BITS3-0 ARE ZERO S03 00886
002134 015001 A  898 CR10   LDA     XAF,1           GET AF FIELD                    S03 00887
002135 004244 A  899        LRLA    4               POSITION FOR UPPER 5 BITS OF BASE ADDR S03 00888
002136 057000 I  900        STA     CRBA            STORAGE FOR BASE ADDR           S03 00889
                 901 *                                                              S03 00890
                 902 *   FORM A OFFSET: THE UPPER FOUR BITS ARE ZERO, THE LOWER 5 BITS ARE  S03 00891
                 903 *                  SET BY SELECTING 5 CONTIGUOUS BITS OF INST REG2(IRG2S03 00892
                 904 *                  VIA THE FS FIELD, AND MASKING THEM WITH 5 BITS     S03 00893
```

```
                    905 *                   OF THE MT/MS FIELDS, OPEN BIT POSITIONS ARE FORCED  S03 00894
                    906 *                   TO "1"(EX,FOR FS=0: SELECTED IRG2 BITS=0XXXX)       S03 00895
002137 015004 A     907 CR15    LDA     XFS,1                                                   S03 00896
002140 006140 A     908         SUBI    4           FOR FS<4, FORCE UNUSED POSITIONS TO "1"     S03 00897
002141 000004 A
002142 001004 A     909         JAN     CR17        GO PERFORM SPECIAL PROCESSING               S03 00898
002143 002155 R
002144 006130 A     910         ERAI    04340       FORM LSRA TO SELECT THE SPECIFIED 5         S03 00899
002145 004340 A
002146 054713 A     911         STA     CRTS+2      BITS OF IRG2                                S03 00900
002147 015052 A     912         LDA     IRG2,1                                                  S03 00901
002150 003000 A     913         XEC     CRTS+2      RIGHT JUSTIFY SELECTED BITS                 S03 00902
002151 003062 R
002152 154710 A     914         ANA     CRM1        USE ONLY 5LSB'S                             S03 00903
002153 001000 A     915         JMP     CR30        GO MASK SELECTED IRG2 BITS                  S03 00904
002154 002221 R
                    916 *                                                                       S03 00905
                    917 *   SPECIAL PROCESSING FOR FS<4.                                        S03 00906
002155 015004 A     918 CR17    LDA     XFS,1       FS=0 ?                                      S03 00907
002156 001010 A     919         JAZ     CR23        YES-                                        S03 00908
002157 002217 R
002160 005311 A     920         DAR                 FS=0001 ?                                   S03 00909
002161 001010 A     921         JAZ     CR21        YES-                                        S03 00910
002162 002213 R
002163 005311 A     922         DAR                 FS=0010 ?                                   S03 00911
002164 001010 A     923         JAZ     CR19        YES-                                        S03 00912
002165 002173 R
                    924 *   FS=0011                                                             S03 00913
002166 015072 A     925         LDA     NSTP,1      STEM F/F                                    S03 00914
002167 006130 A     926         ERAI    036         FORCE THE 4 MSB'S TO "1"                    S03 00915
002170 000036 A
002171 001000 A     927         JMP     CR30        GO MASK BITS                                S03 00916
002172 002221 R
                    928 *   FS=0010                                                             S03 00917
002173 015060 A     929 CR19    LDA     MBYC,1      MEMORY BYTE DESIGNATOR                      S03 00918
002174 054665 A     930         STA     CRTS+2      TEMP STORE                                  S03 00919
002175 015064 A     931         LDA     DS,1        PUT STATUS OF DS F/F                        S03 00920
002176 004241 A     932         LRLA    1           INTO BIT POSITION 1.                        S03 00921
002177 134662 A     933         ERA     CRTS+2                                                  S03 00922
002200 054661 A     934         STA     CRTS+2                                                  S03 00923
002201 015052 A     935         LDA     IRG2,1      PUT BIT ONE                                 S03 00924
002202 004242 A     936         LRLA    2           IRG2 WORD                                   S03 00925
```

```
002203 006150 A  937          ANAI    010           MASK OFF BIT POSITION                  C 03 00926
002204 000010 A
002205 134654 A  938          ERA     CRTS+2        INTO BIT POSITION 3,                     S03 00927
002206 054653 A  939          STA     CRTS+2                                                 S03 00928
002207 006110 A  940          ORAI    024           FORCE BITS 4 + 2 TO "1"                  S03 00929
002210 000024 A
002211 001000 A  941          JMP     CR30          GO MASK BITS                             S03 00930
002212 002221 R
                 942 *   FS=0001                                                             S03 00931
002213 006010 A  943 CR21     LDAI    037           FORCE ALL 5 BITS TO "1"                  S03 00932
002214 000037 A
002215 001000 A  944          JMP     CR30          GO MASK BITS                             S03 00933
002216 002221 R
                 945 *   FS=0000                                                             S03 00934
002217 006010 A  946 CR23     LDAI    037           FORCE ALL 5 BITS TO "1"                  S03 00935
002220 000037 A
                 947 *   COME HERE FOR MASKING OF SELECTED IRG2 BITS,                        S03 00936
                 948 *   FIELD MT MASKS MSB OF SELECTED 5 BITS, THE MS FIELD                 S03 00937
                 949 *   MASKS THE OTHER 4 BITS,                                             S03 00938
002221 057000 I  950 CR30     STA     CRA0          TEMP STORE OF SELECTED IRG2 BITS         S03 00939
002222 015003 A  951          LDA     XMT,1         MAKE 5 BIT MASK OUT                      S03 00940
002223 004244 A  952          LRLA    4             OF THE ONE BIT MT FIELD                  S03 00941
002224 135002 A  953          ERA     XMS,1         AND THE 4 BIT MS FIELD,                  S03 00942
002225 157000 I  954          ANA     CRA0          MASK IRG2 BITS,                          S03 00943
002226 057000 I  955          STA     CRA0          STORAGE FOR A-OFFSET                     S03 00944
                 956 *   FORM EFFECTIVE NEXT ROM ADDRESS BY INCLUSIVE ORING                  S03 00945
                 957 *   BASE ADDR & A-OFFSET & B-OFFSET,                                    S03 00946
002227 117000 I  958          ORA     CRBA          BASE ADDR & A-OFFSET                     S03 00947
002230 117000 I  959          ORA     CRB0          & B-OFFSET                               S03 00948
002231           960 CR32     BSS     0                                                      S03 00949
002231 055057 A  961          STA     NROM,1        THIS IS THE NEXT ROM ADDR                S03 00950
002232 017000 I  962          LDA     IMD           BRANCH PUSH ?                            S03 00951
002233 001002 A  963          JAP*    CRAS          NO-RETURN                                S03 00952
002234 101663 R
002235 015021 A  964          LDA     XW,1                                                   S03 00953
002236 004254 A  965          LRLA    12            POSITION BIT 12                          S03 00954
002237 054047 A  966          STA     CR33          MASK IN                                  S03 00955
002240 015022 A  967          LDA     XMS,1                                                  S03 00956
002241 004253 A  968          LRLA    11            POSITION BIT 11                          S03 00957
002242 114044 A  969          ORA     CR33          MASK IN                                  S03 00958
002243 054043 A  970          STA     CR33                                                   S03 00959
002244 015023 A  971          LDA     XV,1                                                   S03 00960
```

```
002245 004252 A  972          LRLA    10              POSITION BIT 10                 S03 00961
002246 114040 A  973          ORA     CR33            MASK IN                         S03 00962
002247 054037 A  974          STA     CR33                                            S03 00963
002250 015024 A  975          LDA     XY,1                                            S03 00964
002251 004251 A  976          LRLA    9               POSITION BIT 9                  S03 00965
002252 114034 A  977          ORA     CR33            MASK IN                         S03 00966
002253 054033 A  978          STA     CR33                                            S03 00967
002254 015025 A  979          LDA     XX,1                                            S03 00968
002255 004247 A  980          LRLA    7               POSITION BIT 7                  S03 00969
002256 114030 A  981          ORA     CR33            MASK IN                         S03 00970
002257 054027 A  982          STA     CR33                                            S03 00971
002260 015026 A  983          LDA     XTC,1                                           S03 00972
002261 004244 A  984          LRLA    4               POSITION BIT 4                  S03 00973
002262 114024 A  985          ORA     CR33            MASK IN                         S03 00974
002263 054023 A  986          STA     CR33                                            S03 00975
002264 015027 A  987          LDA     XB,1                                            S03 00976
002265 114021 A  988          ORA     CR33            MASK IN                         S03 00977
002266 005012 A  989          TAB                                                     S03 00978
002267 017000 I  990          LDA     JSPT            STACK COUNT                     S03 00979
002270 006140 A  991          SUBI    16              STACK LIMIT                     S03 00980
002271 000020 A
002272 001002 A  992          JAP     CR34=4          STACK OVERFLOW--GET ENTRY 0     S03 00981
002273 002310 R
002274 006010 A  993          LDAI    STACK           LOCATION OF STACK               S03 00982
002275 000505 R
002276 127000 I  994          ADD     JSPT            POINTER INTO STACK              S03 00983
002277 005014 A  995          TAX                                                     S03 00984
002300 065000 A  996          STB     0,1             'PUSH ON STACK'                 S03 00985
002301 047000 I  997          INR     JSPT            UPDATE POINTER                  S03 00986
002302 005001 A  998          TZA                                                     S03 00987
002303 057000 I  999          STA     IMD             CLEAR BRANCH PUSH/POP FLAG      S03 00988
002304 054002 A 1000          STA     CR33            CLEAR ADDR WORD                 S03 00989
002305 001000 A 1001          RETU*   CRAS                                            S03 00990
002306 101563 R
002307 000000 A 1002 CR33     DATA    0                                               S03 00991
                1003 *                                                                S03 00992
                1004 *                                                                S03 00993
002310 006010 A 1005          LDAI    STACK                                           S03 00994
002311 000505 R
002312 001000 A 1006          JMP     *+5             GET ENTRY ZERO                  S03 00995
002313 002317 R
002314 006010 A 1007 CR34     LDAI    STACK           STACK ADDRESS                   S03 00996
```

```
002315 000505 R
002316 127000 I 1008          ADD     JSPT            POINTER INTO STACK                          S03 00997
002317 005311 A 1009          DAR                     POINT TO LAST ENTRY                       C 03 00998
002320 005012 A 1010          TAB                                                                 S03 00999
002321 016000 A 1011          LDA     0,2             RETURN ADDRESS                              S03 01000
002322 054027 A 1012          STA     CR35                                                        S03 01001
002323 004351 A 1013          LSRA    9               GET PAGE                                    S03 01002
002324 006150 A 1014          ANAI    15                                                          S03 01003
002325 000017 A
002326 002000 A 1015          CALL    PGOK            CHECK IF LEGAL PAGE                     F   ********
002327 001222 R
002330 001004 A 1016          JAN     **4             YES                                     F   ********
002331 002334 R
002332 001000 A 1017          JMP     CRPE            ILLEGAL PAGE JUMP                           S03 01008
002333 002363 R
002334 014015 A 1018          LDA     CR35            RETURN ADDR                                 S03 01009
002335 006150 A 1019          ANAI    0777            MASK OFF ADDR, LES PAGE NO,                 S03 01010
002336 000777 A
002337 055057 A 1020          STA     NROM,1          SET NEXT CCS ADDR                           S03 01011
002340 017000 I 1021          LDA     JSPT            JUMP STACK POINTER                        C 03 01012
002341 005311 A 1022          DAR                                                               C 03 01013
002342 057000 I 1023          STA     JSPT            BUMP STACK POINTER                        C 03 01014
002343 005012 A 1024          TAB                                                             D   03 01015
002344 005001 A 1025          TZA                                                             D   03 01016
002345 006056 A 1026          STAE    STACK,2         CLEAR ENTRY                             D   03 01017
002346 000505 R
002347 057000 I 1027          STA     IMD             CLEAR POP FLAG                          D   03 01018
002350 001000 A 1028          JMP*    CRAS            RETURN                                      S03 01019
002351 101663 R
002352 000000 A 1029 CR35     DATA    0                                                           S03 01020
                    1030 *                                                                        S03 01021
                    1031 *                                                                        S03 01022
                    1032 *                                                                        S03 01023
                    1033 *    COME HERE (SEE CRA4) IF G NOT=XOXX TO SELECT ROM PAGE ADDR,       S03 01024
                    1034 *    IF YES :   PUT TS FIELD BITS INTO CRAZ (BITS 12-9) FOR LATER ORING S03 01025
                    1035 *    WITH THE 9 BIT ADDR,                                              S03 01026
002353 015000 A 1036 CRAX     LDA     XTS,1           GET TS FIELD                                S03 01027
002354 002000 A 1037          CALL    PGOK            CHECK IF PAGE AVAILABLE                     S03 01028
002355 001222 R
002356 001002 A 1038          JAP     CRPE            ILLEGAL PAGE                                S03 01029
002357 002363 R
002360 005001 A 1039          TZA                                                                 S03 01030
```

```
002361 001000 A 1040          JMP     CRA6            GO FORM 9-BIT ADDR(512-WORD ROM)        S03 01031
002362 002132 R
                1041 *                                                                        S03 01032
                1042 *                                                                        S03 01033
002363 002000 A 1043 CRPE     CALL    SIOUT,3,CRP     OUTPUT ERROR                            S03 01034
002364 015406 R
002365 000003 A
002366 002371 R
002367 001000 A 1044          JMP     EXC10                                                   S03 01035
002370 001106 R
002371 120240 A 1045 CRP      DATA    ' MS05'         PAGE JUMP TO UNAVAILABLE PAGE           S03 01036
002372 146723 A
002373 130265 A
                1046 *                                                                        S03 01037
                1047 *                                                                        S03 01038
                1048 *    COME HERE IF T FIELD IS 01,10,OR 11                                 S03 01039
                1049 *     T=01 TEST STATUS CONDITION WITH PREVIOUSLY ESTABLISHED MODE        S03 01040
                1050 *     T=10 SET TEST MODE AND TEST SELECTED TEST CONDITION.               S03 01041
                1051 *     T=11 RESET TEST MODE AND TEST SELECTED TEST CONDITION.             S03 01042
                1052 *                                                                        S03 01043
                1053 *                                                                        S03 01044
002374 006140 A 1054 CR50     SUBI    1               T=01 ?                                  S03 01045
002375 000001 A
002376 001010 A 1055          JAZ     CR54            YES-                                    S03 01046
002377 002412 R
002400 006140 A 1056          SUBI    1               T=10 ?                                  S03 01047
002401 000001 A
002402 001010 A 1057          JAZ     CR52            YES-                                    S03 01048
002403 002410 R
                1058 *    T=11: RESET TEST MODE                                               S03 01049
002404 005001 A 1059          TZA                                                             S03 01050
002405 054457 A 1060          STA     TMOT            RESET TEST MODE FLAG                    S03 01051
002406 001000 A 1061          JMP     CR54                                                    S03 01052
002407 002412 R
                1062 *    T=10:SET TEST MODE                                                  S03 01053
002410 005301 A 1063 CR52     DECR    01              SET A=-1                                S03 01054
002411 054453 A 1064          STA     TMOT            SET TEST-MODE-TRUE FLAG                 S03 01055
                1065 *                                                                        S03 01056
                1066 *    SELECT TEST CONDITION SPECIFIED BY THE G FIELD                      S03 01057
                1067 *                                                                        S03 01058
002412 015007 A 1068 CR54     LDA     XG,1            GET G FIELD                             S03 01059
002413 006120 A 1069          ADDI    TMUX            ADDR OF TEST CONDITIONS TABLE           S03 01060
```

```
002414 000640 R
002415 005012 A 1070          TAB                     IS STATUS CONDITION SELECTED BY          S03 01061
002416 016000 A 1071          LDA     0,2             G FIELD TRUE ?                           S03 01062
002417 001010 A 1072          JAZ     CR56            NO=                                      S03 01063
002420 002455 R
002421 015007 A 1073          LDA     XG,1                                                     S03 01064
002422 006140 A 1074          SUBI    5               620/F TEST ?                             S03 01065
002423 000005 A
002424 001010 A 1075          JAZ     CR60            YES=GO PROCESS                           S03 01066
002425 002504 R
002426 001000 A 1076          JMP     CR58                                                     S03 01067
002427 002447 R
                    1077 *    COME HERE IF TESTED CONDITION(S) TRUE,                         S03 01068
                    1078 *                                                                   S03 01069
                    1079 *    RESET OVERFLOW F/F IF :   T=NOT ZERO AND G=5 AND TEST COND,TRUE ANDS03 01070
                    1080 *                              BIT 0 OF IRG2=1                      S03 01071
                    1081 *                              THIS MEANS: RESET OVFL IF DOING JOF,JOFM,S03 01072
                    1082 *                              XOF, OR THE "NOT" EQUIVALENTS        S03 01073
                    1083 *                                                                   S03 01074
002430 015052 A 1084 CR55     LDA     IRG2,1          IS OVFL BIT OF                           S03 01075
002431 006150 A 1085          ANAI    1               INST. WORD SET ?                         S03 01076
002432 000001 A
002433 001010 A 1086          JAZ     CR58            NO=                                      S03 01077
002434 002447 R
002435 005001 A 1087          TZA                                                              S03 01078
002436 055037 A 1088          STA     OVRFL,1         RESET STORED OVERFLOW                    S03 01079
002437 006057 A 1089          STAE    TMUX+0          RESET OVFL OF TMUX                       S03 01080
002440 000640 R
002441 015041 A 1090          LDA     STUS,1          RESET                                    S03 01081
002442 006150 A 1091          ANAI    0177377         OVERFLOW(BIT 8)                          S03 01082
002443 177377 A
002444 055041 A 1092          STA     STUS,1          OF STATUS REGISTER                       S03 01083
002445 001001 A 1093          JOF     *+2             RESET 620/F HARDWARE OVFL F/F            S03 01084
002446 002447 R
002447 014415 A 1094 CR58     LDA     TMOT            TEST MODE FLAG TRUE ?                    S03 01085
002450 001010 A 1095          JAZ     CR57            NO                                       S03 01086
002451 002465 R
002452 005001 A 1096          TZA                     YES= SET B-OFFSET TO ZERO AND PERFORM    S03 01087
002453 001000 A 1097          JMP     CRA6            STANDARD BASE ADDR/A-OFFSET PROCESSING   S03 01088
002454 002132 R
                    1098 *                                                                   S03 01089
002455 014407 A 1099 CR56     LDA     TMOT            TEST MODE FLAG FALSE ?                   S03 01090
```

```
002456 001010 A 1100          JAZ     *+4                                          S03 01091
002457 002462 R
002460 001000 A 1101          JMP     CR57        NO                               S03 01092
002461 002465 R
002462 005001 A 1102          TZA                 YES= SET B=OFFSET TO ZERO AND PERFORM  S03 01093
002463 001000 A 1103          JMP     CRA6        STANDARD NEXT ADDR PROCESSING    S03 01094
002464 002132 R
               1104 *   FORM ROM ADDR FOR TEST CONDITION NOT MET                  S03 01095
               1105 *   BITS 8-5=AF FIELD, BITS 3-1=TS FIELD BITS 2-0, BIT 0= ZERO  S03 01096
               1106 *   BIT 4=AF BIT 0-INCLUSIVE OREO-WITH TS FIELD BIT 3,        S03 01097
002465 015001 A 1107 CR57     LDA     XAF,1       GET AF FIELD                     S03 01098
002466 004244 A 1108          LRLA    4                                            S03 01099
002467 054370 A 1109          STA     CRTS        TEMP STORE                       S03 01100
002470 015000 A 1110          LDA     XTS,1                                        S03 01101
002471 004241 A 1111          LRLA    1                                            S03 01102
002472 114365 A 1112          ORA     CRTS                                         S03 01103
002473 055057 A 1113          STA     NROM,1      NEXT CCS ADDR                    S03 01104
002474 006017 A 1114          LDAE    CPAG        PAGE NUMBER                    C 03 01105
002475 000503 R
002476 002000 A 1115          CALL    PGOK        CHEC IF PAGE AVAILABLE           S03 01106
002477 001222 R
002500 001002 A 1116          JAP     CRPE        NO--OUTPUT ERROR                 S03 01107
002501 002363 R
               1117 *                             TEST CONDITION IS MET,           S03 01108
002502 001000 A 1118          RETU*   CRA5        EXIT                             S03 01109
002503 101663 R
               1119 *                                                              S03 01110
               1120 *                                                              S03 01111
               1121 *   520/F JMP/JMPM/XEC TESTING                                 S03 01112
002504 015052 A 1122 CR60     LDA     IRG2,1      GET INST--S/B JMP,JMPM, OR XEC   S03 01113
002505 006150 A 1123          ANAI    0777        LOOK AT 9 LSBS                   S03 01114
002506 000777 A
002507 001010 A 1124          JAZ     CR55        UNCONDITIONAL INST               S03 01115
002510 002430 R
002511 005012 A 1125          TAB                 SAVE 9 LSB'S                     S03 01116
002512 006150 A 1126          ANAI    06                                           S03 01117
002513 000006 A
002514 006140 A 1127          SUBI    06          "NOT" INST ?                     S03 01118
002515 000006 A
002516 001010 A 1128          JAZ     CR6J        YES=                             S03 01119
002517 002523 R
002520 005001 A 1129          TZA                 NO=                              S03 01120
```

```
002521 001000 A 1130        JMP     *+3                                  S03 01121
002522 002524 R
002523 005101 A 1131 CR6J   INCR    01                                   S03 01122
002524 054341 A 1132        STA     CNOT        "NOT" INST FLAG          S03 01123
002525 005021 A 1133        TBA                                          S03 01124
002526 005002 A 1134 CR6A   TZB                                          S03 01125
002527 004541 A 1135        LLSR    1                                    S03 01126
002530 054327 A 1136        STA     CRTS                                 S03 01127
002531 001020 A 1137        JBZ     *+4                                  S03 01128
002532 002535 R
002533 001000 A 1138        JMP     CR6Z        001: CHECK OVFL          S03 01129
002534 002540 R
002535 024330 A 1139 CR6B   LDB     CNOT        "NOT" TYPE INST ?        S03 01130
002536 001020 A 1140        JBZ     CR6K        NO=                      S03 01131
002537 002544 R
002540 005002 A 1141        TZB                 YES=                     S03 01132
002541 004342 A 1142        LSRA    2           SKIP NEXT 2 BITS WHICH   S03 01133
002542 001000 A 1143        JMP     CR6D        REPRESENT "NOT" TYPES.   S03 01134
002543 002560 R
002544 004541 A 1144 CR6K   LLSR    1                                    S03 01135
002545 054312 A 1145        STA     CRTS                                 S03 01136
002546 001020 A 1146        JBZ     *+4                                  S03 01137
002547 002552 R
002550 001000 A 1147        JMP     CR6Y        002: CHECK A EQUAL/GREATER THAN ZERO  S03 01138
002551 002663 R
002552 004541 A 1148 CR6C   LLSR    1                                    S03 01139
002553 054304 A 1149        STA     CRTS                                 S03 01140
002554 001020 A 1150        JBZ     *+4                                  S03 01141
002555 002560 R
002556 001000 A 1151        JMP     CR6X        004: CHECK A NEGATIVE    S03 01142
002557 002704 R
002560 004541 A 1152 CR6D   LLSR    1                                    S03 01143
002561 054276 A 1153        STA     CRTS                                 S03 01144
002562 001020 A 1154        JBZ     *+4                                  S03 01145
002563 002566 R
002564 001000 A 1155        JMP     CR6W        010: CHECK A=0           S03 01146
002565 002725 R
002566 004541 A 1156 CR6E   LLSR    1                                    S03 01147
002567 054270 A 1157        STA     CRTS                                 S03 01148
002570 001020 A 1158        JBZ     *+4                                  S03 01149
002571 002574 R
002572 001000 A 1159        JMP     CR6V        020: CHECK B=0           S03 01150
```

```
002573 002750 R
002574 004541 A 1160 CR6F   LLSR    1                                                  S03 01151
002575 054262 A 1161        STA     CRTS                                               S03 01152
002576 001020 A 1162        JBZ     *+4                                                S03 01153
002577 002602 R
002600 001000 A 1163        JMP     CR6U        040: CHECK X=0                         S03 01154
002601 002773 R
002602 004541 A 1164 CR6G   LLSR    1                                                  S03 01155
002603 054254 A 1165        STA     CRTS                                               S03 01156
002604 001020 A 1166        JBZ     *+4                                                S03 01157
002605 002610 R
002606 001000 A 1167        JMP     CR6T        100: CHECK IF SS1 SET                  S03 01158
002607 003016 R
002610 004541 A 1168 CR6H   LLSR    1                                                  S03 01159
002611 054246 A 1169        STA     CRTS                                               S03 01160
002612 001020 A 1170        JBZ     *+4                                                S03 01161
002613 002616 R
002614 001000 A 1171        JMP     CR6S        200: CHECK IF SS2 SET                  S03 01162
002615 003037 R
002616 004541 A 1172 CR6I   LLSR    1                                                  S03 01163
002617 001020 A 1173        JBZ     CR55        NO=BUT PREV COND WAS TRUE TO GET HERE  S03 01164
002620 002430 R
002621 014244 A 1174        LDA     CNOT        IS INST A NOT TYPE                     S03 01165
002622 001010 A 1175        JAZ     CR6L        NO=                                    S03 01166
002623 002632 R
002624 006017 A 1176        LDAE    TMUX+2      SS3 SET?                               S03 01167
002625 000642 R
002626 001010 A 1177        JAZ     CR55        NO=COND, YES=GO CHECK TEST MODE FLAG   S03 01168
002627 002430 R
002630 001000 A 1178        JMP     CR56        GO CHECK TEST MODE FLAG                S03 01169
002631 002455 R
002632 006017 A 1179 CR6L   LDAE    TMUX+2        SS3 SET ?                             03 01170
002633 000642 R
002634 001010 A 1180        JAZ     CR56        NO=GO TEST MODE=FALSE FLAG             S03 01171
002635 002455 R
002636 001000 A 1181        JMP     CR55        YES=GO TEST MODE=TRUE FLAG             S03 01172
002637 002430 R
               1182 *                                                                 S03 01173
               1183 *   CHECK OVFL                                                    S03 01174
002640 014225 A 1184 CR6Z   LDA     CNOT        IS INST, A "NOT" TYPE ?                S03 01175
002641 001010 A 1185        JAZ     CRZ1        NO=                                    S03 01176
002642 002653 R
```

```
002643 006017 A 1186        LDAE    TMUX+0          YES=OVERFLOW ON ?                    S03 01177
002644 000640 R
002645 001010 A 1187        JAZ     *+4                                                  S03 01178
002646 002651 R
002647 001000 A 1188        JMP     CR56            YES=COND,NOT MET                     S03 01179
002650 002455 R
002651 001000 A 1189        JMP     CRZ2            NO=                                  S03 01180
002652 002657 R
002653 006017 A 1190 CRZ1   LDAE    TMUX+0          OVFL ON ?                            S03 01181
002654 000640 R
002655 001010 A 1191        JAZ     CR56            NO=-CONDITION NOT MET                S03 01182
002656 002455 R
002657 005002 A 1192 CRZ2   TZB                                                          S03 01183
002660 014177 A 1193        LDA     CRTS            GET SHIFTED 9 BITS OF INST, WORD     S03 01184
002661 001000 A 1194        JMP     CR6B            YES                                  S03 01185
002662 002535 R
                    1195 *   CHECK IF A REGISTER(R0) IS POSITIVE                         S03 01186
002663 014202 A 1196 CR6Y   LDA     CNOT            "NOT" INST ?                         S03 01187
002664 001010 A 1197        JAZ     CRY1            NO=                                  S03 01188
002665 002674 R
002666 006017 A 1198        LDAE    R0              YES= A=POS?                          S03 01189
002667 000525 R
002670 001004 A 1199        JAN     CRY2            NO=COND MET                          S03 01190
002671 002700 R
002672 001000 A 1200        JMP     CR56                                                 S03 01191
002673 002455 R
002674 006017 A 1201 CRY1   LDAE    R0              A=POSITIVE ?                         S03 01192
002675 000525 R
002676 001004 A 1202        JAN     CR56            NO=COND,NOT MET                      S03 01193
002677 002455 R
002700 005002 A 1203 CRY2   TZB                                                          S03 01194
002701 014156 A 1204        LDA     CRTS            GET SHIFTED 9 BITS OF INST, WORD     S03 01195
002702 001000 A 1205        JMP     CR6C            YES                                  S03 01196
002703 002552 R
                    1206 *   CHECK IF A REGISTER(R0) IS NEGATIVE                         S03 01197
002704 014161 A 1207 CR6X   LDA     CNOT            "NOT" INST ?                         S03 01198
002705 001010 A 1208        JAZ     CRX1            NO=                                  S03 01199
002706 002715 R
002707 006017 A 1209        LDAE    R0                                                   S03 01200
002710 000525 R
002711 001004 A 1210        JAN     CR56            YES=COND NOT MET                     S03 01201
002712 002455 R
```

```
002713 001000 A 1211         JMP     CRX2                                    S03 01202
002714 002721 R
002715 006017 A 1212 CRX1    LDAE    R0                                      S03 01203
002716 000525 R
002717 001002 A 1213         JAP     CR56        NO=COND NOT MET             S03 01204
002720 002455 R
002721 005002 A 1214 CRX2    TZB                                             S03 01205
002722 014135 A 1215         LDA     CRTS        GET SHIFTED 9 BITS OF INST. WORD S03 01206
002723 001000 A 1216         JMP     CR6D        YES                         S03 01207
002724 002560 R
                   1217 *    CHECK IF A REGISTER(R0) IS ZERO                 S03 01208
002725 014140 A 1218 CR6W    LDA     CNOT                                    S03 01209
002726 001010 A 1219         JAZ     CRW1                                    S03 01210
002727 002736 R
002730 006017 A 1220         LDAE    R0          A=0?                        S03 01211
002731 000525 R
002732 001010 A 1221         JAZ     CR56        YES=COND NOT MET            S03 01212
002733 002455 R
002734 001000 A 1222         JMP     CRW2                                    S03 01213
002735 002744 R
002736 006017 A 1223 CRW1    LDAE    R0          A=0 ?                       S03 01214
002737 000525 R
002740 001010 A 1224         JAZ     **4                                     S03 01215
002741 002744 R
002742 001000 A 1225         JMP     CR56        NO=COND NOT MET             S03 01216
002743 002455 R
002744 005002 A 1226 CRW2    TZB                                             S03 01217
002745 014112 A 1227         LDA     CRTS        GET SHIFTED 9 BITS OF INST. WORD S03 01218
002746 001000 A 1228         JMP     CR6E        YES                         S03 01219
002747 002566 R
                   1229 *    CHECK IF B REGISTER(R1) IS ZERO                 S03 01220
002750 014115 A 1230 CR6V    LDA     CNOT        "NOT" INST ?                S03 01221
002751 001010 A 1231         JAZ     CRV1        NO=                         S03 01222
002752 002761 R
002753 006017 A 1232         LDAE    R1          B=0 ?                       S03 01223
002754 000526 R
002755 001010 A 1233         JAZ     CR56        YES=COND NOT MET            S03 01224
002756 002455 R
002757 001000 A 1234         JMP     CRV2                                    S03 01225
002760 002767 R
002761 006017 A 1235 CRV1    LDAE    R1          B=0 ?                       S03 01226
002762 000526 R
```

```
002763 001010 A 1236          JAZ     *+4                                          S03 01227
002764 002767 R
002765 001000 A 1237          JMP     CR56          NO=COND NOT MET                S03 01228
002766 002455 R
002767 005002 A 1238 CRV2     TZB                                                  S03 01229
002770 014067 A 1239          LDA     CRTS          GET SHIFTED 9 BITS OF INST. WORD S03 01230
002771 001000 A 1240          JMP     CR6F          YES                            S03 01231
002772 002574 R
                    1241 *    CHECK IF X REGISTER(R2) IS ZERO                      S03 01232
002773 014072 A 1242 CR6U     LDA     CNOT          "NOT" INST ?                   S03 01233
002774 001010 A 1243          JAZ     CRU1          NO=                            S03 01234
002775 003004 R
002776 006017 A 1244          LDAE    R2            X=0 ?                          S03 01235
002777 000527 R
003000 001010 A 1245          JAZ     CR56          YES=COND NOT MET               S03 01236
003001 002455 R
003002 001000 A 1246          JMP     CRU2                                         S03 01237
003003 003012 R
003004 006017 A 1247 CRU1     LDAE    R2            X=0 ?                          S03 01238
003005 000527 R
003006 001010 A 1248          JAZ     *+4                                          S03 01239
003007 003012 R
003010 001000 A 1249          JMP     CR56          NO=COND NOT MET                S03 01240
003011 002455 R
003012 005002 A 1250 CRU2     TZB                                                  S03 01241
003013 014044 A 1251          LDA     CRTS          GET SHIFTED 9 BITS OF INST. WORD S03 01242
003014 001000 A 1252          JMP     CR6G          YES                            S03 01243
003015 002602 R
                    1253 *    CHECK IF SS1 IS SET                                  S03 01244
003016 014047 A 1254 CR6T     LDA     CNOT          "NOT" INST ?                   S03 01245
003017 001010 A 1255          JAZ     CRT1          NO=                            S03 01246
003020 003027 R
003021 006017 A 1256          LDAE    TMUX+4        SS1 SET ?                      S03 01247
003022 000644 R
003023 001010 A 1257          JAZ     CRT2          NO=COND MET                    S03 01248
003024 003033 R
003025 001000 A 1258          JMP     CR56          YES=COND NOT MET               S03 01249
003026 002455 R
003027 006017 A 1259 CRT1     LDAE    TMUX+4        SS1 SET?                       S03 01250
003030 000644 R
003031 001010 A 1260          JAZ     CR56          NO=COND NOT MET                S03 01251
003032 002455 R
```

```
003033 005002 A 1261 CRT2   TZB                                                  S03 01252
003034 014023 A 1262        LDA     CRTS        GET SHIFTED 9 BITS OF INST. WORD S03 01253
003035 001000 A 1263        JMP     CR6H        YES                              S03 01254
003036 002610 R
                1264 *   CHECK IF SS2 IS SET                                     S03 01255
003037 014026 A 1265 CR6S   LDA     CNOT        "NOT" INST ?                     S03 01256
003040 001010 A 1266        JAZ     CRS1        NO-                              S03 01257
003041 003050 R
003042 006017 A 1267        LDAE    TMUX+3      SS2 SET ?                        S03 01258
003043 000643 R
003044 001010 A 1268        JAZ     CR52        NO-COND. MET                     S03 01259
003045 003054 R
003046 001000 A 1269        JMP     CR56        YES                              S03 01260
003047 002455 R
003050 006017 A 1270 CRS1   LDAE    TMUX+3      SS2 SET ?                        S03 01261
003051 000643 R
003052 001010 A 1271        JAZ     CR56        NO-COND NOT MET                  S03 01262
003053 002455 R
003054 005002 A 1272 CRS2   TZB                                                  S03 01263
003055 014002 A 1273        LDA     CRTS        GET SHIFTED 9 BITS OF INST. WORD S03 01264
003056 001000 A 1274        JMP     CR6I        YES                              S03 01265
003057 002616 R
                1275 *                                                           S03 01266
003060          1276 CRTS   BSS     3           TEMP STORAGE                     S03 01267
003063 000037 A 1277 CRM1   DATA    037         MASK                             S03 01268
003064 000020 A 1278 CRM2   DATA    020         MASK                             S03 01269
003065 000000 A 1279 TMOT   DATA    0           TEST-MODE-TRUE FLAG              S03 01270
003066 000000 A 1280 CNOT   DATA    0           FLAG FOR "NOT" TYPES OF INSTRUCTIONS S03 01271
```

```
                    1281          EJEC                                                    S03 01272
                    1282 *                                                                S03 01273
                    1283 *                                                                S03 01274
                    1284 *                        -DECODE ROM ADDRESS GENERATION-         S03 01275
                    1285 *    ROUTINE TO SELECT THE NEXT CONTROL ROM ADDRESS FROM THE OUTPUT S03 01276
                    1286 *    OF THE DECODE ROM                                           S03 01277
003067 015051 A     1287 CR70A  LDA     IRG1,1          GET IBR                           S03 01278
003070 005012 A     1288        TAB                                                       S03 01279
003071 004350 A     1289        LSRA    8               GET 8 MSBS                        S03 01280
003072 006140 A     1290        SUBI    0212            BCS OPCODE                      C 03 01281
003073 000212 A
003074 001010 A     1291        JAZ     BCS                                               S03 01282
003075 003275 R
003076 015051 A     1292 CR70   LDA     IRG1,1          GET IBR                           S03 01283
003077 004354 A     1293        LSRA    12              USE BITS 15,14,13,&12             S03 01284
003100 127000 I     1294        ADD     DRM1            ADDR OF DCSB                      S03 01285
003101 005012 A     1295        TAB                                                       S03 01286
003102 016000 A     1296        LDA     0,2                                               S03 01287
003103 005002 A     1297        TZB                                                       S03 01288
003104 004444 A     1298        LLRL    4               PUT 4 MSBS IN B REG               S03 01289
003105 005222 A     1299        CPB                     COMPLEMENT FOR SIMULATOR LOGIC    S03 01290
003106 004474 A     1300        LLRL    28              SHIFT BACK INTO A REG             S03 01291
003107 054301 A     1301        STA     CR7A            TEMP STORE OF SELECTED DRM1 WORD  S03 01292
                    1302 *                                                                S03 01293
003110 015051 A     1303        LDA     IRG1,1                                            S03 01294
003111 006150 A     1304        ANAI    07400           SELECT I1 BITS 11-8               S03 01295
003112 007400 A
003113 004350 A     1305        LSRA    8               RIGHT JUSTIFY                     S03 01296
003114 127000 I     1306        ADD     DRM2            ADDR OF DCSA                      S03 01297
003115 005012 A     1307        TAB                                                       S03 01298
003116 016000 A     1308        LDA     0,2                                               S03 01299
003117 054272 A     1309        STA     CR7B            TEMP STORE                        S03 01300
                    1310 *                                                                S03 01301
003120 014270 A     1311        LDA     CR7A            TEMP SAVE OF DRM1 WORD            S03 01302
003121 005002 A     1312        TZB                                                       S03 01303
003122 004441 A     1313        LLRL    1               GET BIT 15                        S03 01304
003123 064267 A     1314        STB     CR7C            TEMP STORE                        S03 01305
003124 006150 A     1315        ANAI    020000          GET BIT 12 OF DRM1 WORD           S03 01306
003125 020000 A
003126 114264 A     1316        ORA     CR7C            INCL-OR BITS 15&12                S03 01307
003127 001010 A     1317        JAZ     CR71                                              S03 01308
003130 003150 R
```

```
003131 014257 A 1318        LDA     CR7A        TEMP 1                          S03 01309
003132 004245 A 1319        LRLA    5           BIT "00"=1 ?                    S03 01310
003133 001004 A 1320        JAN     CR73        YES=                            S03 01311
003134 003141 R
003135 014254 A 1321        LDA     CR7B        TEMP 2                          S03 01312
003136 006150 A 1322        ANAI    0177760     MASK OUT                        S03 01313
003137 177760 A
003140 054251 A 1323        STA     CR7B        4 LSB'S OF TEMP 2               S03 01314
                    1324 *   "OR" 9 LSB'S OF TEMP 1 & TEMP 2 : RESULT INTO TEMP 3   S03 01315
003141 014247 A 1325 CR73   LDA     CR7A        TEMP 1                          S03 01316
003142 114247 A 1326        ORA     CR7B                                        S03 01317
003143 006150 A 1327        ANAI    0777                                        S03 01318
003144 000777 A
003145 054245 A 1328        STA     CR7C        TEMP 3                          S03 01319
003146 001000 A 1329        JMP     CR72                                        S03 01320
003147 003154 R
003150 014240 A 1330 CR71   LDA     CR7A        DRM1 WORD                       S03 01321
003151 006150 A 1331        ANAI    0777                                        S03 01322
003152 000777 A
003153 054237 A 1332        STA     CR7C        TEMP STORE                      S03 01323
003154 014234 A 1333 CR72   LDA     CR7A                                        S03 01324
003155 006150 A 1334        ANAI    040000      IS BIT 14 OF DRM1 "1"           S03 01325
003156 040000 A
003157 001010 A 1335        JAZ     CR80        NO=                             S03 01326
003160 003206 R
003161 015051 A 1336 CR74   LDA     IRG1,1      GET I REG #1                    S03 01327
003162 006150 A 1337        ANAI    0360        SELECT BITS 7,6,5,&4            S03 01328
003163 000360 A
003164 004344 A 1338        LSRA    4           RIGHT JUSTIFY                   S03 01329
003165 054226 A 1339        STA     CR7D        TEMP STORE                      S03 01330
003166 114224 A 1340        ORA     CR7C                                        S03 01331
003167 054223 A 1341        STA     CR7C                                        S03 01332
003170 001000 A 1342        JMP     CR86        CHECK FOR OVERRRIDE             S03 01333
003171 003243 R
003172 014216 A 1343 CR76   LDA     CR7A        GET DRM1 WORD                   S03 01334
003173 006150 A 1344        ANAI    020000      IS BIT 13 TRUE                  S03 01335
003174 020000 A
003175 001010 A 1345        JAZ     CR84        NO=                             S03 01336
003176 003223 R
003177 015051 A 1346 CR77   LDA     IRG1,1      GET IREG #1 WORD                S03 01337
003200 006150 A 1347        ANAI    017         SELECT BITS 3,2,1,0             S03 01338
003201 000017 A
```

```
003202 054211 A 1348          STA     CR7D            TEMP STORE                              S03 01339
003203 114207 A 1349          ORA     CR7C                                                    S03 01340
003204 001000 A 1350          JMP     CR86                                                    S03 01341
003205 003243 R
                1351 *                                                                        S03 01342
                1352 *    COME HERE IF S31=0 (BIT 14 OF DRM1)                                 S03 01343
003206 005002 A 1353 CR80     TZB                                                             S03 01344
003207 014201 A 1354          LDA     CR7A            SELECT BIT 15                           S03 01345
003210 004441 A 1355          LLRL    1               OF DRM1 WORD                            S03 01346
003211 064203 A 1356          STB     CR7E            TEMP STORE                              S03 01347
003212 014177 A 1357          LDA     CR7B            SELECT BIT 14                           S03 01348
003213 006150 A 1358          ANAI    040000          OF DRM2 WORD                            S03 01349
003214 040000 A
003215 004242 A 1359          LRLA    2               MOVE TO LSB POSITION                    S03 01350
003216 154176 A 1360          ANA     CR7E            "AND" THE TWO BITS                      S03 01351
003217 001010 A 1361          JAZ     CR76                                                    S03 01352
003220 003172 R
003221 001000 A 1362          JMP     CR74                                                    S03 01353
003222 003161 R
                1363 *                                                                        S03 01354
                1364 *                                                                        S03 01355
                1365 *    COME HERE IF S30=0 (BIT 13 OF DRM1)                                 S03 01356
003223 005002 A 1366 CR84     TZB                                                             S03 01357
003224 014164 A 1367          LDA     CR7A            SELECT BIT 15                           S03 01358
003225 004441 A 1368          LLRL    1               OF DRM1                                 S03 01359
003226 064166 A 1369          STB     CR7E            TEMP STORE                              S03 01360
003227 014162 A 1370          LDA     CR7B            SELECT BIT 13                           S03 01361
003230 006150 A 1371          ANAI    020000          OF DRM2                                 S03 01362
003231 020000 A
003232 004243 A 1372          LRLA    3               MOVE TO LSB POSITION                    S03 01363
003233 154161 A 1373          ANA     CR7E            "AND" THE TWO BITS                      S03 01364
003234 001010 A 1374          JAZ     *+4                                                     S03 01365
003235 003240 R
003236 001000 A 1375          JMP     CR77            "AND" THE TWO BITS                      S03 01366
003237 003177 R
003240 014152 A 1376          LDA     CR7C            GENERATED ADDR,                         S03 01367
003241 001000 A 1377          JMP     CR32                                                    S03 01368
003242 002231 R
                1378 *                                                                        S03 01369
                1379 *                                                                        S03 01370
                1380 *    IF REGISTER-REGISTER INSTRUCTION, MODIFY THE CONTROL STORE          S03 01371
                1381 *    ADDRESS GENERATED.                                                  S03 01372
```

```
                    1382 *     IF BIT "00" OF TEMP 1(CR7A) AND BIT XX5 OF TEMP 2(CR7B) ARE      S03 01373
                    1383 *     BOTH TRUE: PUT BIT 3 OF IRG2 INTO BIT 2 OF GENERATED ADDRESS.    S03 01374
                    1384 *                                                                       S03 01375
003243 054147 A 1385 CR86   STA     CR7C            SAVE ADDRESS GENERATED                      S03 01376
003244 014144 A 1386        LDA     CR7A            ORM1 WORD                                   S03 01377
003245 006150 A 1387        ANAI    02000           IS "00" BIT TRUE ?                          S03 01378
003246 002000 A
003247 001010 A 1388        JAZ     CR87            NO=                                         S03 01379
003250 003272 R
003251 014140 A 1389        LDA     CR7B                                                        S03 01380
003252 006150 A 1390        ANAI    01000           IS BIT "XX5" TRUE ?                         S03 01381
003253 001000 A
003254 001010 A 1391        JAZ     CR87                                                        S03 01382
003255 003272 R
003256 014134 A 1392        LDA     CR7C                                                        S03 01383
003257 006150 A 1393        ANAI    0177773         CLEAR BIT 2 OF GENERATED ADDR               S03 01384
003260 177773 A
003261 054131 A 1394        STA     CR7C                                                        S03 01385
003262 015051 A 1395        LDA     IRG1,1                                                      S03 01386
003263 006150 A 1396        ANAI    010             GET BIT 3 OF  IRG1,                         S03 01387
003264 000010 A
003265 004341 A 1397        LSRA    1               MAKE IT BIT 2                               S03 01388
003266 134124 A 1398        ERA     CR7C            OF THE GENERATED ADDR.                      S03 01389
003267 054123 A 1399        STA     CR7C                                                        S03 01390
003270 001000 A 1400        JMP     CR76                                                        S03 01391
003271 003172 R
                    1401 *                                                                      S03 01392
003272 014120 A 1402 CR87   LDA     CR7C                                                        S03 01393
003273 001000 A 1403        JMP     CR32                                                        S03 01394
003274 002231 R
                    1404 *                                                                      S03 01395
                    1405 *     COME HERE FOR BCS INSTRUCTION                                    S03 01396
003275 005021 A 1406 BCS    TRA                                                                 S03 01397
003276 006150 A 1407        ANAI    037             GET 5 LSBS                                  S03 01398
003277 000037 A
003300 054035 A 1408        STA     BCSA                                                        S03 01399
003301 006010 A 1409        LDAI    1               SELECT PAGE 1                               S03 01400
003302 000001 A
003303 002000 A 1410        CALL    PGOK            CHECK IF PAGE AVAIL AND SET POINTERS        S03 01401
003304 001222 R
003305 001002 A 1411        JAP     BCSB                                                        S03 01402
003306 003325 R
```

```
000307 014026 A 1412          LDA     BCSA            ADDRESS                                  S03 01403
000310 006030 A 1413          LDXI    DROM                                                     S03 01404
000311 000545 R
000312 055057 A 1414          STA     NROM,1          SET NEXT CCS ADDRESS                     S03 01405
000313 006010 A 1415          LDAI    $DRM1                                                    S03 01406
000314 001213 E
000315 006057 A 1416          STAE    DRM1            SET DCSA BACK TO PAGE 0                  S03 01407
000316 000372 R
000317 006120 A 1417          ADDI    16                                                       S03 01408
000320 000020 A
000321 006057 A 1418          STAE    DRM2            SET DCSB BACK TO PAGE 0                  S03 01409
000322 000373 R
000323 001000 A 1419          JMP*    CRAS            RETURN                                   S03 01410
000324 101663 R
000325 002000 A 1420 BCSB     CALL    SIOUT,3,BCSC      OUTPUT ERROR                           S03 01411
000326 015406 R
000327 000003 A
000330 000333 R
000331 001000 A 1421          JMP     EXC10           RETURN, ABORT SIMULATION                 S03 01412
000332 001105 R
000333 120240 A 1422 BCSC     DATA    ' MS06'         BCS-NO PAGE 1                            S03 01413
000334 146723 A
000335 130266 A
000336 000000 A 1423 BCSA     DATA    0               TEMP STORAGE                             S03 01414
                1424 *      PRINT NEXT ROM ADDRESS ON LINE PRINTER                           S03 01415
                1425 *                                                                       S03 01416
000337 000000 A 1426 CRXA     ENTR                                                             S03 01417
000340 006020 A 1427          LDBI    TRACE                                                    S03 01418
000341 000472 R
000342 016000 A 1428          LDA     0,2             TRACE FLAG ON ?                          S03 01419
000343 001010 A 1429          JAZ*    CRXA            NO-EXIT                                  S03 01420
000344 103337 R
000345 002000 A 1430          CALL    SPAC            SPACE LO                                 S03 01421
000346 014747 R
000347 006030 A 1431          LDXI    CRXZ+10                                                  S03 01422
000350 003402 R
000351 006020 A 1432          LDBI    DROM                                                     S03 01423
000352 000545 R
000353 026057 A 1433          LDB     NROM,2                                                   S03 01424
000354 002000 A 1434          CALL    DH                                                       S03 01425
000355 014523 R
000356 017000 I 1435          LDA     CPAG            PAGE NUMBER                              S03 01426
```

```
003357 006120 A 1436          ADDI    0260            ASCII                                   S03 01427
003360 000260 A
003361 054026 A 1437          STA     CRXZ+16         STORE IN MESSAGE                        S03 01428
003362 002000 A 1438          CALL    LODUT,17,CRXZ                                           S03 01429
003363 015470 R
003364 000021 A
003365 003370 R
003366 001000 A 1439          RETU*   CRXA                                                    S03 01430
003367 103337 R
                1440 *    DATA ITEMS                                                          S03 01431
003370 120240 A 1441 CRXZ     DATA    '  NEXT CCS ADDRESS   XXX   PAGE DD'                     S03 01432
003371 147305 A
003372 154324 A
003373 120303 A
003374 141723 A
003375 120301 A
003376 142304 A
003377 151305 A
003400 151723 A
003401 120240 A
003402 120330 A
003403 154330 A
003404 120240 A
003405 120320 A
003406 140707 A
003407 142640 A
003410 142304 A
003411 000000 A 1442 CR7A     DATA    0               TEMP STORE                              S03 01433
003412 000000 A 1443 CR7B     DATA    0               TEMP STORE                              S03 01434
003413 000000 A 1444 CR7C     DATA    0               TEMP STORE                              S03 01435
003414 000000 A 1445 CR7D     DATA    0               TEMP STORE                              S03 01436
003415 000000 A 1446 CR7E     DATA    0               TEMP STORE                              S03 01437
003416 000000 A 1447 CRBA     DATA    0               STORAGE FOR BASE ADDRESS                S03 01438
003417 000000 A 1448 CRAO     DATA    0               STORAGE FOR A OFFSET                    S03 01439
003420 000000 A 1449 CRBO     DATA    0               STORAGE FOR B OFFSET                    S03 01440
003421 000000 A 1450 CRAZ     DATA    0               STORAGE FOR ROM PAGE ADDR               S03 01441
```

```
                    1451          EJEC                                                    S03 01442
                    1452 *                                                                S03 01443
                    1453 *        DATA LOOP PROCESSING                                    S03 01444
                    1454 *                                                                S03 01445
                    1455 *        CALLING SEQUENCE                                        S03 01446
                    1456 *        JMPM    S300                                            S03 01447
                    1457 *                                                                S03 01448
                    1458 *        RETURN  ROM PROCESSING WILL BE COMPLETE                 S03 01449
                    1459 *                                                                S03 01450
003422 000000 A     1460 S300     ENTR                                                    S03 01451
                    1461 *                                                                S03 01452
003423 034231 A     1462          LDX     S316            ADDR OF ROM FIELDS              S03 01453
003424 002000 A     1463 S302     CALL    DLMS            DETERMINE STATE OF MULTIPLY SIGN S03 01454
003425 006061 R
                    1464 *    IF V FIELD =1--PUT FILE A BIT 15 INTO OS F/F                S03 01455
003426 015023 A     1465          LDA     XV,1            V=1 ?                           S03 01456
003427 001010 A     1466          JAZ     S304                                            S03 01457
003430 003441 R
                    1467 *    PUT FILE A BIT 15 INTO OS                                   S03 01458
003431 015030 A     1468          LDA     XA,1            FILE A SOURCE ADDR              S03 01459
003432 006120 A     1469          ADDI    R0              ADDR OF FILE A REGISTERS        S03 01460
003433 000525 R
003434 005012 A     1470          TAB                                                     S03 01461
003435 016000 A     1471          LDA     0,2                                             S03 01462
003436 005002 A     1472          TZB                                                     S03 01463
003437 004441 A     1473          LLRL    1                                               S03 01464
003440 065064 A     1474          STB     OS,1            OS IS F/F FOR SIGN STORAGE      S03 01465
003441 002000 A     1475 S304     CALL    X000            DETERMINE LATCH A INPUT         S03 01466
003442 004405 R
003443 055032 A     1476          STA     LTCHA,1         SAVE LATCH A INPUT              S03 01467
                    1477 *                                                                S03 01468
003444 002000 A     1478          JMPM    X010            DETERMINE LATCH B INPUT TO ALU  S03 01469
003445 005062 R
003446 055033 A     1479          STA     LTCHB,1         SAVE LATCH B INPUT              S03 01470
                    1480 *                                                                S03 01471
003447 002000 A     1481          JMPM    X020            FORM ALU OUTPUT                 S03 01472
003450 005166 R
003451 055034 A     1482          STA     XALU,1          SAVE ALU OUTPUT                 S03 01473
                    1483 *                                                                S03 01474
003452 002000 A     1484          CALL    DORG            PERFORM OP REGISTER SHIFTING    S03 01475
003453 006642 R
003454 002000 A     1485          CALL    X200            * TRANSFER ALU OUTPUT TO DESIGNATED REGS. S03 01476
```

```
003455 007077 R
                    1486 *                                                          S03 01477
                    1487 *   TRANSFER INST REG #1(IRG1) TO INST REG #2(IRG2) IF      S03 01478
                    1488 *   T=0 & S=0 & G=XXX1                                     S03 01479
003456 015005 A 1489         LDA     XT,1          T FIELD=00                       S03 01480
003457 001010 A 1490         JAZ     *+4                                            S03 01481
003460 003463 R
003461 001000 A 1491         JMP     S305                                           S03 01482
003462 003502 R
003463 015007 A 1492         LDA     XG,1          YES=                             S03 01483
003464 006150 A 1493         ANAI    1             G FIELD=XXX1                     S03 01484
003465 000001 A
003466 001010 A 1494         JAZ     S305                                           S03 01485
003467 003502 R
003470 015006 A 1495         LDA     XS,1          S=0 ?                            S03 01486
003471 001010 A 1496         JAZ     *+4                                            S03 01487
003472 003475 R
003473 001000 A 1497         JMP     S305                                           S03 01488
003474 003502 R
003475 015052 A 1498         LDA     IRG2,1        SAVE CONTENTS OF IRG2 AT LAST CLOCK,  S03 01489
003476 006050 A 1499         STAI                  USED FOR OVFL SAMPLE FOR         S03 01490
003477 000000 A
003477              1500 XIRG2  BES     0             FAST REG LOGIC, SEE X108,      S03 01491
003500 015051 A 1501         LDA     IRG1,1        YES=MOVE IRG1                    S03 01492
003501 055052 A 1502         STA     IRG2,1        TO IRG2,                         S03 01493
003502 027000 I 1503 S305    LDB     CPAG          CURRENT PAGE                   C,1 03 01494
003503 006016 A 1504         LDAE    TRACE,2       TRACE FLAG FOR PAGE            C,1 03 01495
003504 000472 R
003505 001010 A 1505         JAZ*    S300          JUMP IF NOT TRACE MODE           S03 01495
003506 103422 R
003507 002000 A 1506         JMPM    TRSETA        CHECK IF WITHIN BOUNDS           S03 01497
003510 014724 R
003511 001004 A 1507         JAN*    S300          NO=RETURN                        S03 01498
003512 103422 R
                    1508 *                                                          S03 01499
                    1509 *   OUTPUT TOP OF JUMP STACK TO LO                         S03 01500
                    1510 *                                                          S03 01501
003513 002000 A 1511         JMPM    SPAC                                           S03 01502
003514 014747 R
003515 006030 A 1512         LDXI    S320+12                                        S03 01503
003516 003705 R
003517 017000 I 1513         LDA     JSPT          JUMP STACK POINTER               S03 01504
```

```
003520 001010 A 1514          JAZ     *+3                                          S03 01505
003521 003523 R
003522 005311 A 1515          DAR                     SET BACK TO LAST ITEM ON STACK S03 01506
003523 006120 A 1516          ADDI    STACK           INDEX INTO STACK             S03 01507
003524 000505 R
003525 005012 A 1517          TAB                                                  S03 01508
003526 026000 A 1518          LDB     0,2             STACK CONTENTS               S03 01509
003527 002000 A 1519          JMPM    OH              CONVERT TO ASCII             S03 01510
003530 014523 R
003531 002000 A 1520          CALL    LOOUT,14,S320                                S03 01511
003532 015470 R
003533 000016 A
003534 003671 R
003535 017000 I 1521          LDA     JSPT            STACK COUNT                  S03 01512
003536 005012 A 1522          TAB                                                  S03 01513
003537 006140 A 1523          SUBI    012                                          S03 01514
003540 000012 A
003541 001004 A 1524          JAN     *+5             TWO DIGITS ?                 S03 01515
003542 003545 R
003543 006120 A 1525          ADDI    0130400         YES--PUT 1 IN TENS DIGIT     S03 01516
003544 130400 A
003545 001006 A 1526          DATA    01006           SKIP NEXT INST               S03 01517
003546 005021 A 1527          TBA                     NO                           S03 01518
003547 006120 A 1528          ADDI    0260                                         S03 01519
003550 000260 A
003551 054153 A 1529          STA     S322+14                                      S03 01520
003552 002000 A 1530          CALL    LOOUT,15,S322                                S03 01521
003553 015470 R
003554 000017 A
003555 003707 R
               1531 *                                                              S03 01522
               1532 *                                                              S03 01523
               1533 *         OUTPUT LATCH A TO LO                                 S03 01524
               1534 *                                                              S03 01525
003556 002000 A 1535          JMPM    SPAC            SPACE LO                     S03 01526
003557 014747 R
003560 006010 A 1536          LDAI    0140640         A SPACE                      S03 01527
003561 140640 A
003562 054103 A 1537          STA     S318+7          PLACE IN MESSAGE             S03 01528
003563 034072 A 1538          LDX     S317                                         S03 01529
003564 024070 A 1539          LDB     S316            ADDR OF ROM FIELDS/DATA      S03 01530
003565 026032 A 1540          LDB     LTCHA,2         LATCH A INPUT TO ALU         S03 01531
```

```
003566 002000 A 1541        JMPM    OH              CONVERT TO ASCII                    S03 01532
003567 014523 R
003570 002000 A 1542        CALL    LOOUT,10,S318   OUTPUT LINE                         S03 01533
003571 015470 R
003572 000012 A
003573 003657 R
                1543 *                                                                  S03 01534
                1544 *      OUTPUT LATCH B TO LO                                        S03 01535
                1545 *                                                                  S03 01536
003574 006010 A 1546        LDAI    0141240         B SPACE                             S03 01537
003575 141240 A
003576 054067 A 1547        STA     S318+7          PLACE IN MESSAGE                    S03 01538
003577 034056 A 1548        LDX     S317                                                S03 01539
003600 024054 A 1549        LDB     S316            ADDR OF ROM FIELDS/DATA             S03 01540
003601 026033 A 1550        LDB     LTCHB,2         LATCH B INPUT TO ALU                S03 01541
003602 002000 A 1551        JMPM    OH              CONVERT TO ASCII                    S03 01542
003603 014523 R
003604 002000 A 1552        CALL    LOOUT,10,S318   OUTPUT LINE                         S03 01543
003605 015470 R
003606 000012 A
003607 003657 R
                1553 *                                                                  S03 01544
                1554 *      OUTPUT ALU OUTPUT TO LO                                     S03 01545
                1555 *                                                                  S03 01546
003610 002000 A 1556        JMPM    SPAC            SPACE LO                            S03 01547
003611 014747 R
003612 034113 A 1557        LDX     S319                                                S03 01548
003613 024041 A 1558        LDB     S316            ADDR OF ROM FIELDS/DATA             S03 01549
003614 026034 A 1559        LDB     XALU,2          ALU OUTPUT                          S03 01550
003615 002000 A 1560        JMPM    OH              CONVERT TO ASCII                    S03 01551
003616 014523 R
003617 002000 A 1561        CALL    LOOUT,10,S31A   OUTPUT LINE TO LO                   S03 01552
003620 015470 R
003621 000012 A
003622 003727 R
                1562 *                                                                  S03 01553
                1563 *      OUTPUT CARRY IN TO LO                                       S03 01554
                1564 *                                                                  S03 01555
003623 002000 A 1565        JMPM    SPAC            SPACE LO                            S03 01556
003624 014747 R
003625 034027 A 1566        LDX     S316            ADDR OF ROM FIELDS                  S03 01557
003626 015035 A 1567        LDA     XCIN,1          CARRY IN                            S03 01558
```

```
003627 006120 A 1568          ADDI    0120260       SPACE ZERO                          S03 01559
003630 120260 A
003631 054114 A 1569          STA     S31D+4                                            S03 01560
003632 002000 A 1570          CALL    LOOUT,5,S31D    OUTPUT MESSAGE                    S03 01561
003633 015470 R
003634 000005 A
003635 003742 R
                1571 *                                                                  S03 01562
                1572 *        OUTPUT CARRY OUT TO LO                                    S03 01563
                1573 *                                                                  S03 01564
003636 034016 A 1574          LDX     S316          ADDR OF ROM FIELDS                  S03 01565
003637 015036 A 1575          LDA     CARRY,1       CARRY                               S03 01566
003640 006120 A 1576          ADDI    0120260       SPACE ZERO                          S03 01567
003641 120260 A
003642 054110 A 1577          STA     S31E+4                                            S03 01568
003643 002000 A 1578          CALL    LOOUT,5,S31E    OUTPUT MESSAGE                    S03 01569
003644 015470 R
003645 000005 A
003646 003747 R
003647 002000 A 1579          JMPM    REGS          DUMP CONTENTS OF REGISTERS          S03 01570
003650 014615 R
                1580 *                                                                  S03 01571
003651 002000 A 1581          CALL    LTAA          LIST V73 REGISTERS                  S03 01572
003652 003754 R
003653 001000 A 1582          JMP*    S300          RETURN                              S03 01573
003654 103422 R
                1583 *                                                                  S03 01574
                1584 *                                                                  S03 01575
003655 000545 R 1585 S316     DATA    DROM          ADDR OF FIRST ROM FIELD             S03 01576
003656 003667 R 1586 S317     DATA    S318+8                                            S03 01577
003657 120240 A 1587 S318     DATA    '    ALU INPUT A DDDD'                            S03 01578
003660 120240 A
003661 140714 A
003662 152640 A
003663 144716 A
003664 150325 A
003665 152240 A
003666 140540 A
003667 142304 A
003670 142304 A
003671 120240 A 1588 S320     DATA    '  CURRENT TOP OF STACK  DDDD'                    S03 01579
003672 141725 A
```

```
003673 151322 A
003674 142716 A
003675 152240 A
003676 152317 A
003677 150240 A
003700 147706 A
003701 120323 A
003702 152301 A
003703 141713 A
003704 120240 A
003705 142304 A
003706 142304 A
003707 120240 A 1589 S322   DATA    '  NUMBER OF ITEMS ON STACK  DD'                S03 01580
003710 147325 A
003711 146702 A
003712 142722 A
003713 120317 A
003714 143240 A
003715 144724 A
003716 142715 A
003717 151640 A
003720 147716 A
003721 120323 A
003722 152301 A
003723 141713 A
003724 120240 A
003725 142304 A
003726 003737 R 1590 S319   DATA    S31A+8                                         S03 01581
003727 120240 A 1591 S31A   DATA    '     ALU OUTPUT  DDDD'                       S03 01582
003730 120240 A
003731 140714 A
003732 152640 A
003733 147725 A
003734 152320 A
003735 152724 A
003736 120240 A
003737 142304 A
003740 142304 A
003741 000441 R 1592 S318   DATA    RHLT          CCS HALT ADDRESS                 S03 01583
003742 120240 A 1593 S310   DATA    '    CIN    '                                  S03 01584
003743 120240 A
003744 141711 A
```

```
003745 147240 A
003746 120240 A
003747 120240 A 1594 S31E   DATA    '    COUT  '                                  S03 01585
003750 120240 A
003751 141717 A
003752 152724 A
003753 120240 A
                1595 *                                                          S03 01586
                1596 *                                                          S03 01587
                1597 *      ROUTINE TO LIST V73 REGISTERS TO LINE PRINTER        S03 01588
                1598 *    LISTED:PREG,SREG,OREG,KREG,IOKR,IRG1,IRG2,STUS,IODR   S03 01589
003754 000000 A 1599 LTAA   ENTR                                                S03 01590
003755 002000 A 1600        JMPM    SPAC            SPACE LO                    S03 01591
003756 014747 R
003757 002000 A 1601        CALL    LOOUT,33,LTAZ   PRINT HEADER                S03 01592
003760 015470 R
003761 000041 A
003762 004212 R
003763 002000 A 1602        JMPM    PBUF            CLEAR LO BUFFER             S03 01593
003764 014604 R
003765 006010 A 1603        LDAI    3               REGISTER COUNT              S03 01594
003766 000003 A
003767 054220 A 1604        STA     LTAX            TEMP STORE                  S03 01595
003770 006010 A 1605        LDAI    DROM+PREG       ADDR OF PREG                S03 01596
003771 000607 R
003772 054216 A 1606        STA     LTAY                                        S03 01597
003773 006030 A 1607        LDXI    BUFR+1          ADDR OF LO BUFFER           S03 01598
003774 000201 R
003775 024213 A 1608 LTA1   LDB     LTAY            ADDR OF REGISTER FOR LISTING S03 01599
003776 026000 A 1609        LDB     0,2                                         S03 01600
003777 002000 A 1610        CALL    OH              CONVER 16-BIT WORD TO ASC11 S03 01601
004000 014523 R
004001 005144 A 1611        IXR                     SPACE AFTER DATA            S03 01602
004002 044206 A 1612        INR     LTAY            STEP TO NEXT REG            S03 01603
004003 014204 A 1613        LDA     LTAX                                        S03 01604
004004 005311 A 1614        DAR                                                 S03 01605
004005 054202 A 1615        STA     LTAX                                        S03 01606
004006 001010 A 1616        JAZ     *+4                                         S03 01607
004007 004012 R
004010 001000 A 1617        JMP     LTA1            LOOP IF NOT COMPLETE        S03 01608
004011 003775 R
                1618 *   OUTPUT KREG,IOKR,IRG1,+IRG2                            S03 01609
```

```
004012 006010 A 1619        LDAI    4                                   S03 01610
004013 000004 A
004014 054173 A 1620        STA     LTAX                                S03 01611
004015 006010 A 1621        LDAI    DROM+KREG       ADDR OF KREG        S03 01612
004016 000614 R
004017 054171 A 1622        STA     LTAY                                S03 01613
004020 024170 A 1623 LTA2   LDB     LTAY            ADDR OF REGISTER FOR LISTING S03 01614
004021 026000 A 1624        LDB     0,2                                 S03 01615
004022 002000 A 1625        CALL    OH                                  S03 01616
004023 014523 R
004024 005144 A 1626        IXR                                         S03 01617
004025 044163 A 1627        INR     LTAY                                S03 01618
004026 014161 A 1628        LDA     LTAX                                S03 01619
004027 005311 A 1629        DAR                                         S03 01620
004030 054157 A 1630        STA     LTAX                                S03 01621
004031 001010 A 1631        JAZ     *+4                                 S03 01622
004032 004035 R
004033 001000 A 1632        JMP     LTA2            LOOP IF NOT COMPLETE S03 01623
004034 004020 R
                1633 *                                                  S03 01624
004035 006020 A 1634        LDBI    DROM+STUS       ADDR OF STATUS REG  S03 01625
004036 000606 R
004037 026000 A 1635        LDB     0,2                                 S03 01626
004040 002000 A 1636        CALL    OH                                  S03 01627
004041 014523 R
004042 005144 A 1637        IXR                                         S03 01628
004043 006020 A 1638        LDBI    DROM+IOD        ADDR OF I/O DATA REG S03 01629
004044 000605 R
004045 026000 A 1639        LDB     0,2                                 S03 01630
004046 002000 A 1640        CALL    OH                                  S03 01631
004047 014523 R
                1641 *                                                  S03 01632
004050 005144 A 1642        IXR                                         S03 01633
004051 006020 A 1643        LDBI    DROM+DS         ADDR OF DS          S03 01634
004052 000631 R
004053 026000 A 1644        LDB     0,2                                 S03 01635
004054 002000 A 1645        CALL    OH                                  S03 01636
004055 014523 R
004056 005144 A 1646        IXR                                         S03 01637
004057 006020 A 1647        LDBI    DROM+QS         ADDR OF QS          S03 01638
004060 000630 R
004061 026000 A 1648        LDB     0,2                                 S03 01639
```

```
004062 002000 A 1649          CALL    OH                                                    S03 01640
004063 014523 R
004064 002000 A 1650          CALL    LOOUT,36,BUFR                                         S03 01641
004065 015470 R
004066 000044 A
004067 000200 R
004070 001000 A 1651          RETU*   LTAA                                                  S03 01642
004071 103754 R
               1652 *                                                                       S03 01643
               1653 *                                                                       S03 01644
               1654 *                                                                       S03 01645
               1655 *                                                                       S03 01646
               1656 *   THE FULL 16 BITS OF EACH STORAGE CELL IS LISTED, EXCEPT FOR THE     S03 01647
               1657 *   620/F CONDITION, ZERO OR 1 IS ALL THATS IMPORTANT                   S03 01648
               1658 *   LIST TEST CONDITIONS(TMUX TABLE)                                    S03 01649
               1659 *   IDENTIFY ON PRINTOUT AS TSMX.                                       S03 01650
               1660 *                                                                       S03 01651
004072 000000 A 1661 LTMX     ENTR                                                         S03 01652
004073 027000 I 1662          LDB     CPAG                                              D  03 01653
004074 006016 A 1663          LDAE    TRACE,2         TRACE FLAG FOR PAGE ON ?          D  03 01654
004075 000472 R
004076 001010 A 1664          JAZ*    LTMX            NO=EXIT                              S03 01655
004077 104072 R
004100 002000 A 1665          JMPM    TRSETA          CHECK IF WITHIN BOUNDS               S03 01656
004101 014724 R
004102 001004 A 1666          JAN*    LTMX            NO=EXIT                              S03 01657
004103 104072 R
004104 002000 A 1667          JMPM    SPAC            SPACE LO                             S03 01658
004105 014747 R
004106 002000 A 1668          CALL    LOOUT,18,LTAS   OUTPUT HEADER                        S03 01659
004107 015470 R
004110 000022 A
004111 004253 R
004112 002000 A 1669          CALL    LOOUT,24,LTAT   OUTPUT HEADER                        S03 01660
004113 015470 R
004114 000030 A
004115 004275 R
004116 002000 A 1670          JMPM    PBUF            CLEAR LO BUFFER                      S03 01661
004117 014604 R
               1671 *                                                                       S03 01662
004120 006010 A 1672          LDAI    8                                                    S03 01663
004121 000010 A
```

```
004122 054065 A 1673        STA     LTAX            WORDS PER LINE                  S03 01664
004123 054060 A 1674        STA     LTAW            FLAG FOR OUTPUTTING 2 LINES     S03 01665
004124 006010 A 1675        LDAI    TMUX                                            S03 01666
004125 000640 R
004126 054062 A 1676        STA     LTAY                                            S03 01667
004127 006030 A 1677 LTA3   LDXI    BUFR+1                                          S03 01668
004130 000201 R
004131 024057 A 1678 LTA4   LDB     LTAY                                            S03 01669
004132 026000 A 1679        LDB     0,2                                             S03 01670
004133 002000 A 1680        CALL    OH                                              S03 01671
004134 014523 R
004135 005144 A 1681        IXR                                                     S03 01672
004136 044052 A 1682        INR     LTAY                                            S03 01673
004137 014050 A 1683        LDA     LTAX                                            S03 01674
004140 005311 A 1684        DAR                                                     S03 01675
004141 054046 A 1685        STA     LTAX                                            S03 01676
004142 001010 A 1686        JAZ     *+4                                             S03 01677
004143 004146 R
004144 001000 A 1687        JMP     LTA4            LOOP IF NOT COMPLETE            S03 01678
004145 004131 R
004146 014035 A 1688        LDA     LTAW                                            S03 01679
004147 001010 A 1689        JAZ     *+4                                             S03 01680
004150 004153 R
004151 001000 A 1690        JMP     LTA5                                            S03 01681
004152 004165 R
004153 002000 A 1691        CALL    LOOUT,24,LTAP   OUTPUT HEADER                   S03 01682
004154 015470 R
004155 000030 A
004156 004325 R
004157 002000 A 1692        CALL    LOOUT,36,BUFR   PRINT LINE                      S03 01683
004160 015470 R
004161 000044 A
004162 000200 R
004163 001000 A 1693        RETU*   LTMX                                            S03 01684
004164 104072 R
004165 005001 A 1694 LTA5   TZA                                                     S03 01685
004166 054015 A 1695        STA     LTAW            SET FLAG                        S03 01686
004167 002000 A 1696        CALL    LOOUT,36,BUFR   PRINT LINE                      S03 01687
004170 015470 R
004171 000044 A
004172 000200 R
004173 002000 A 1697        CALL    SPAC            SPACE LO                        S03 01688
```

```
004174 014747 R
004175 002000 A 1698          CALL    PBUF            FILL BUFR WITH BLANKS                    S03 01689
004176 014604 R
004177 006010 A 1699          LDAI    8                                                        S03 01690
004200 000010 A
004201 054006 A 1700          STA     LTAX                                                     S03 01691
004202 001000 A 1701          JMP     LTA3            PUT 2ND 8 WORD INTO BUFR                 S03 01692
004203 004127 R
004204          1702 LTAW     BSS     4               TEMP STORAGE                             S03 01693
004210 000000 A 1703 LTAX     DATA    0               TEMP STORE OF CONVERSION COUNT           S03 01694
004211 000000 A 1704 LTAY     DATA    0               ADDR OF REG TO LIST                      S03 01695
004212 120240 A 1705 LTAZ     DATA    '  P     SC     OPR   KREG  IOKR  IBR  ,I     STAT'     S03 01696
004213 150240 A
004214 120240 A
004215 120240 A
004216 151703 A
004217 120240 A
004220 120240 A
004221 147720 A
004222 151240 A
004223 120240 A
004224 145722 A
004225 142707 A
004226 120240 A
004227 144717 A
004230 145722 A
004231 120240 A
004232 144702 A
004233 151240 A
004234 120240 A
004235 144640 A
004236 120240 A
004237 120240 A
004240 151724 A
004241 140724 A
004242 120240 A 1706          DATA    '  IOR   SHFT  QUOS'                                     S03 01697
004243 144717 A
004244 151240 A
004245 120240 A
004246 151710 A
004247 143324 A
004250 120240 A
```

```
004251 150725 A,
004252 147723 A
004253 120240 A 1707 LTAS   DATA    '              TEST CONDITION STATES'              S03 01698
004254 120240 A
004255 120240 A
004256 120240 A
004257 120240 A
004260 120240 A
004261 120240 A
004262 120324 A
004263 142723 A
004264 152240 A
004265 141717 A
004266 147304 A
004267 144724 A
004270 144717 A
004271 147240 A
004272 151724 A
004273 140724 A
004274 142723 A
004275 120240 A 1708 LTAT   DATA    ' OVFL  SENS  SSW3  SSW2  SSW1  EMUL  ALUO  ALUS'      S03 01699
004276 147726 A
004277 143314 A
004300 120240 A
004301 151705 A
004302 147323 A
004303 120240 A
004304 151723 A
004305 153663 A
004306 120240 A
004307 151723 A
004310 153662 A
004311 120240 A
004312 151723 A
004313 153661 A
004314 120240 A
004315 142715 A
004316 152714 A
004317 120240 A
004320 140714 A
004321 152717 A
004322 120240 A
```

```
004323 140714 A
004324 152723 A
004325 120240 A 1709 LTAP   DATA    ! ALUC  ALUZ  SHFT  MIRS  SFTC  ROAD  NORM  QUOS' !      S03 01700
004326 140714 A
004327 152703 A
004330 120240 A
004331 140714 A
004332 152732 A
004333 120240 A
004334 151710 A
004335 143324 A
004336 120240 A
004337 146711 A
004340 151323 A
004341 120240 A
004342 151706 A
004343 152303 A
004344 120240 A
004345 151260 A
004346 140717 A
004347 120240 A
004350 147317 A
004351 151315 A
004352 120240 A
004353 150725 A
004354 147723 A
                1710 *                                                                  S03 01701
                1711 *                                                                  S03 01702
                1712 *                                                                  S03 01703
                1713 *                                                                  S03 01704
                1714 *                                                                  S03 01705
                1715 *   DETERMINE IF SPECIAL ALU MODE: LA=0&LB=0/1&SH=1XX .            S03 01706
                1716 *   IF NOT: INCR RETURN BY 2.                                      S03 01707
004355 000000 A 1717 SALU   ENTR                                                        S03 01708
004356 015014 A 1718        LDA     XLA,1       LA FIELD                            S03 01709
004357 001010 A 1719        JAZ     *+4                                             S03 01710
004360 004363 R
004361 001000 A 1720        JMP     SAL2                                            S03 01711
004362 004377 R
004363 015013 A 1721        LDA     XLB,1       LB FIELD                            S03 01712
004364 006140 A 1722        SUBI    2                                               S03 01713
004365 000002 A
```

```
004366 001002 A 1723         JAP      SAL2                                  S03 01714
004367 004377 R
004370 015026 A 1724         LDA      XTC,1       SH(MY TC FIELD)           S03 01715
004371 006150 A 1725         ANAI     4                                     S03 01716
004372 000004 A
004373 001010 A 1726         JAZ      SAL2                                  S03 01717
004374 004377 R
004375 001000 A 1727         RETU*    SALU                                  S03 01718
004376 104355 R
004377 006047 A 1728 SAL2    INRE     SALU                                  S03 01719
004400 004355 R
004401 006047 A 1729         INRE     SALU                                  S03 01720
004402 004355 R
004403 001000 A 1730         RETU*    SALU                                  S03 01721
004404 104355 R
```

```
                    1731          EJEC                                                    S03 01722
                    1732 *                                                                S03 01723
                    1733 *        DETERMINE LATCH A INPUT TO ALU                          S03 01724
                    1734 *                                                                S03 01725
                    1735 *        CALLING SEQUENCE                                        S03 01726
                    1736 *        LDX     ADDR OF ROM DATA FIELDS                         S03 01727
                    1737 *        JMPM    X000                                            S03 01728
                    1738 *                                                                S03 01729
                    1739 *        RETURN  LATCH A INPUT IN A REGISTER                     S03 01730
                    1740 *                                                                S03 01731
004405 000000 A     1741 X000     ENTR                                                    S03 01732
004406 014447 A     1742          LDA     X009            ADDR OF PSEUDO-REGS             S03 01733
004407 125030 A     1743          ADD     XA,1            PLUS FILE A SOURCE ADDR         S03 01734
004410 005012 A     1744          TAB                                                     S03 01735
004411 016000 A     1745          LDA     0,2             GET REGISTER CONTENTS           S03 01736
                    1746 *                                                                S03 01737
004412 025014 A     1747          LDB     XLA,1           LATCH A CONTROL                 S03 01738
004413 001020 A     1748          JBZ     XA30            LA=00                           S03 01739
004414 004425 R
004415 005322 A     1749          DBR                                                     S03 01740
004416 001020 A     1750          JBZ     X004            JUMP IF PGM COUNTER IS INPUT    S03 01741
004417 005052 R
004420 005322 A     1751          DBR                                                     S03 01742
004421 001020 A     1752          JBZ     X002            JUMP IF A LEFT SHIFT            S03 01743
004422 004621 R
004423 001000 A     1753          JMP     XA40            LA=11: RIGHT SHIFT              S03 01744
004424 004503 R
                    1754 *                                                                S03 01745
                    1755 *                                                                S03 01746
                    1756 *                                                                S03 01747
                    1757 *    IF LB=0-/R-1 AND TC=001: FORCE LATCH A TO ZERO              S03 01748
                    1758 *    IF LB=0-/R-1 AND TC=010: FORCE LATCH A TO ALL 1'S           S03 01749
                    1759 *    IF LB=0/1 AND TC=101, SET LATCH A=0 IF IRG2 BIT 7+6=01,10,00, IF  S03 01750
                    1760 *    IRG2 BITS 7+6=11(DECR),SET LATCH A=-1                       S03 01751
                    1761 *    OTHERWISE, SELECT CONTENTS OF REGISTER DESIGNATED BY A FIELD  S03 01752
004425 005012 A     1762 XA30     TAB                     SAVE FILE CONTENTS              S03 01753
004426 015013 A     1763          LDA     XLB,1                                           S03 01754
004427 006140 A     1764          SUBI    2               LB =0-OR-1 ?                    S03 01755
004430 000002 A
004431 001004 A     1765          JAN     *+5             YES                             S03 01756
004432 004436 R
004433 005021 A     1766 XA32     TRA                     GET FILE REG, CONTENTS          S03 01757
```

```
004434 001000 A 1767          RETU*   X000          EXIT                                          S03 01758
004435 104405 R
004436 015026 A 1768          LDA     XTC,1                                                       S03 01759
004437 006150 A 1769          ANAI    4             TC=1XX ?                                      S03 01760
004440 000004 A
004441 001010 A 1770          JAZ     *+4                                                         S03 01761
004442 004445 R
004443 001000 A 1771          JMP     XS33          YES                                           S03 01762
004444 004463 R
004445 015026 A 1772          LDA     XTC,1                                                       S03 01763
004446 006150 A 1773          ANAI    2             TC=X1X ?                                      S03 01764
004447 000002 A
004450 001010 A 1774          JAZ     *+4                                                         S03 01765
004451 004454 R
004452 001000 A 1775          JMP     XS36          YES                                           S03 01766
004453 004500 R
004454 015026 A 1776          LDA     XTC,1                                                       S03 01767
004455 006150 A 1777          ANAI    1             TC=XX1 ?                                      S03 01768
004456 000001 A
004457 001010 A 1778          JAZ     XA32          NO=GO GET FILE REG CONTENTS AND EXIT          S03 01769
004460 004433 R
004461 001000 A 1779          JMP     XS34          YES                                           S03 01770
004462 004475 R
004463 015052 A 1780 XS33     LDA     IRG2,1                                                      S03 01771
004464 006150 A 1781          ANAI    0300          IF BITS 7&6 OF IRG2 =11,                      S03 01772
004465 000300 A
004466 004346 A 1782          LSRA    6             SET LATCH A TO =1,                            S03 01773
004467 006140 A 1783          SUBI    3             IF BITS 7&6 ARE 00,01,10,                     S03 01774
004470 000003 A
004471 001010 A 1784          JAZ     XS36          SET LATCH A TO ZERO,                          S03 01775
004472 004500 R
004473 001000 A 1785          JMP     XS34                                                        S03 01776
004474 004475 R
004475 005001 A 1786 XS34     TZA                   SET LATCH A=0                                 S03 01777
004476 001000 A 1787          RETU*   X000                                                        S03 01778
004477 104405 R
                 1788 *                                                                           S03 01779
004500 005301 A 1789 XS36     DECR    01                                                          S03 01780
004501 001000 A 1790          RETU*   X000          SET LATCH A=-1                                S03 01781
004502 104405 R
                 1791 *                                                                           S03 01782
                 1792 *                                                                           S03 01783
```

```
                    1793 *                                                                  S03 01784
                    1794 *                                                                  S03 01785
                    1795 *   FORM RIGHT SHIFTED LATCH A INPUT                               S03 01786
                    1796 *                                                                  S03 01787
004503 054351 A 1797 XA49   STA     X008            SAVE FILE A CONTENTS                    S03 01788
004504 006150 A 1798        ANAI    1                                                       S03 01789
004505 000001 A
004506 055060 A 1799        STA     MBYC,1          BYTE DESIGNATOR FOR MEMORY OPERATIONS   S03 01790
004507 014345 A 1800        LDA     X008                                                    S03 01791
004510 004341 A 1801        LSRA    1                                                       S03 01792
004511 054345 A 1802        STA     X00A            TEMP STORE OF SHIFED FILE A             S03 01793
004512 015026 A 1803        LDA     XTC,1           TC FIELD LESS THAN OR                   S03 01794
004513 006140 A 1804        SUBI    4               GREATER THAN 100 ?                      S03 01795
004514 000004 A
004515 001004 A 1805        JAN     XA40            TC<100                                  S03 01796
004516 004525 R
004517 001010 A 1806        JAZ     *+4                                                     S03 01797
004520 004523 R
004521 001000 A 1807        JMP     XA48            TC>100                                  S03 01798
004522 004576 R
004523 001000 A 1808        JMP     XA46            TC=100                                  S03 01799
004524 004572 R
004525 015026 A 1809 XA40   LDA     XTC,1           GET TC FIELD                            S03 01800
004526 001010 A 1810        JAZ     *+4             TC = 0 ?                                S03 01801
004527 004532 R
004530 001000 A 1811        JMP     XA41            NO                                      S03 01802
004531 004541 R
                    1812 *   TC=000: FA01 INTO LA00 AND MUL SIGN INTO LA15                  S03 01803
004532 002000 A 1813        CALL    XA90            PUT FA01 INTO LA00                      S03 01804
004533 005007 R
004534 015071 A 1814        LDA     MULS,1          MUL SIGN F/F                            S03 01805
004535 004257 A 1815        LRLA    15                                                      S03 01806
004536 114322 A 1816        ORA     X000                                                    S03 01807
004537 001000 A 1817        RETU*   X000                                                    S03 01808
004540 104405 R
                    1818 *                                                                  S03 01809
004541 006140 A 1819 XA41   SUBI    2               TC= 010 ?                               S03 01810
004542 000002 A
004543 001010 A 1820        JAZ     XA42            YES=                                    S03 01811
004544 004555 R
004545 001002 A 1821        JAP     XA44            NO: TC=011                              S03 01812
004546 004564 R
```

```
                    1822 *   TC=001: FA01 INTO LA00 AND FA00 INTO FA15                    S03 01813
004547 002000 A     1823         CALL     XA90           PUT FA01 INTO LA00               S03 01814
004550 005007 R
004551 002000 A     1824         CALL     XA92           PUT FA00 INTO LA15               S03 01815
004552 005024 R
004553 001000 A     1825         RETU*    X000                                            S03 01816
004554 104405 R
                    1826 *                                                                S03 01817
                    1827 *   TC=010: FA01 INTO LA00 AND FA15 INTO LA15                    S03 01818
004555 002000 A     1828 XA42    CALL     XA90           PUT FA01 INTO LA00               S03 01819
004556 005007 R
004557 014275 A     1829         LDA      X008           OR                               S03 01820
004560 154277 A     1830         ANA      X00C           FA15 BIT                         S03 01821
004561 114277 A     1831         ORA      X00D           INTO LA15                        S03 01822
004562 001000 A     1832         RETU*    X000                                            S03 01823
004563 104405 R
                    1833 *                                                                S03 01824
                    1834 *   TC=011: FA01 INTO LA00 AND OR00 INTO LA15                    S03 01825
004564 002000 A     1835 XA44    CALL     XA90           PUT FA01 INTO LA00               S03 01826
004565 005007 R
004566 002000 A     1836         CALL     XA96           PUT OR00 INTO LA15               S03 01827
004567 005042 R
004570 001000 A     1837         RETU*    X000                                            S03 01828
004571 104405 R
                    1838 *                                                                S03 01829
                    1839 *                                                                S03 01830
                    1840 *   TC=100: FA01 INTO LA00 AND "ZERO" INTO LA15                  S03 01831
004572 002000 A     1841 XA46    CALL     XA90                                            S03 01832
004573 005007 R
                    1842 *   LA15 IS ZERO FROM PREVIOUS LSRA SHIFT                        S03 01833
004574 001000 A     1843         RETU*    X000           RETURN                           S03 01834
004575 104405 R
                    1844 *                                                                S03 01835
                    1845 *                                                                S03 01836
004576 015026 A     1846 XA48    LDA      XTC,1                                           S03 01837
004577 006140 A     1847         SUBI     6              TC=110                           S03 01838
004600 000006 A
004601 001010 A     1848         JAZ      XA50           YES-                             S03 01839
004602 004611 R
004603 001002 A     1849         JAP      XA52           NO: TC=111                       S03 01840
004604 004615 R
                    1850 *                                                                S03 01841
```

```
                    1851 *   TC=101: FA01 INTO LA00 AND "ZERO" INTO LA15                    S03 01842
004605 002000 A     1852         CALL    XA90            PUT FA01 INTO LA00                 S03 01843
004606 005007 R
                    1853 *   LA15 IS ZERO FROM PREVIOUS LSRA SHIFT                          S03 01844
004607 001000 A     1854         RETU*   X000                                               S03 01845
004610 104405 R
                    1855 *                                                                  S03 01846
                    1856 *   TC=110: FA01 INTO LA00 AND "ZERO" INTO LA15                    S03 01847
004611 002000 A     1857 XA50    CALL    XA90            PUT FA01 INTO LA00                 S03 01848
004612 005007 R
                    1858 *   LA15 IS ZERO FROM PREVIOUS LSRA SHIFT                          S03 01849
004613 001000 A     1859         RETU*   X000                                               S03 01850
004614 104405 R
                    1860 *                                                                  S03 01851
                    1861 *   TC=111: FA01 INTO LA00 AND "ZERO" INTO LA15                    S03 01852
004615 002000 A     1862 XA52    CALL    XA90            PUT FA01 INTO LA00                 S03 01853
004616 005007 R
                    1863 *   LA15 IS ZERO FROM PREVIOUS LSRA SHIFT                          S03 01854
004617 001000 A     1864         RETU*   X000                                               S03 01855
004620 104405 R
                    1865 *                                                                  S03 01856
                    1866 *                                                                  S03 01857
                    1867 *                                                                  S03 01858
                    1868 *                                                                  S03 01859
                    1869 *                                                                  S03 01860
                    1870 *   COME HERE IF LA=10: FORM LEFT SHIFTED LATCH A INPUT             S03 01861
                    1871 *                                                                  S03 01862
004621 054233 A     1872 X002    STA     X008            SAVE FILE A CONTENTS               S03 01863
004622 005002 A     1873         TZB                                                        S03 01864
004623 004441 A     1874         LLRL    1                                                  S03 01865
004624 054232 A     1875         STA     X00A            TEMP STORE OF SHIFTED FILE A       S03 01866
004625 015026 A     1876         LDA     XTC,1           GET TC FIELD                       S03 01867
004626 006140 A     1877         SUBI    4               TC LESS THAN OR GREATER THAN 100 ? S03 01868
004627 000004 A
004630 001004 A     1878         JAN     XA20            TC<100                             S03 01869
004631 004670 R
004632 001010 A     1879         JAZ     **4                                                S03 01870
004633 004636 R
004634 001000 A     1880         JMP     XA10            TC>100                             S03 01871
004635 004642 R
                    1881 *   TC=100: FA15 INTO LA15 AND "ZERO" INTO LA00                    S03 01872
004636 002000 A     1882         CALL    XA80            PUT FA15 INTO LA15                 S03 01873
```

```
004637 004731 R
                    1883 *   LA00 IS ZERO FROM ABOVE LLRL OPERATION                    S03 01874
004640 001000 A     1884         RETU*   X000          RETURN                         S03 01875
004641 104405 R
                    1885 *                                                             S03 01876
                    1886 *                                                             S03 01877
                    1887 *                                                             S03 01878
004642 006140 A     1888 XA10    SUBI    2             TC=110 ?                       S03 01879
004643 000002 A
004644 001010 A     1889         JAZ     XA12          YES=                           S03 01880
004645 004656 R
004646 001002 A     1890         JAP     XA14          NO= TC=111                     S03 01881
004647 004664 R
                    1891 *   TC=101: FA15 INTO LA15 AND FA15 INTO LA00                 S03 01882
004650 002000 A     1892         CALL    XA80          PUT FA15 INTO LA15             S03 01883
004651 004731 R
004652 002000 A     1893         CALL    XA82          PUT FA15 INTO LA00             S03 01884
004653 004744 R
004654 001000 A     1894         RETU*   X000          RETURN                         S03 01885
004655 104405 R
                    1895 *                                                             S03 01886
                    1896 *                                                             S03 01887
                    1897 *                                                             S03 01888
                    1898 *   TC=110: FA15 INTO LA15 AND OR15 INTO LA00                 S03 01889
004656 002000 A     1899 XA12    CALL    XA80          PUT FA15 INTO LA15             S03 01890
004657 004731 R
004660 002000 A     1900         CALL    XA84          PUT OR15 INTO LA00             S03 01891
004661 004753 R
004662 001000 A     1901         RETU*   X000                                         S03 01892
004663 104405 R
                    1902 *                                                             S03 01893
                    1903 *                                                             S03 01894
                    1904 *   TC=111: *** SPARE ***                                     S03 01895
004664 006010 A     1905 XA14    LDAI    0177777       * FLAG= MICROWORD ERROR        S03 01896
004665 177777 A
004666 001000 A     1906         RETU*   X000                                         S03 01897
004667 104405 R
                    1907 *                                                             S03 01898
                    1908 *   COME HERE IF TC FIELD IS LESS THAN 100.                   S03 01899
                    1909 *                                                             S03 01900
004670 015026 A     1910 XA20    LDA     XTC,1                                        S03 01901
004671 001010 A     1911         JAZ     *+4                                          S03 01902
```

```
004672 004675 R
004673 001000 A 1912          JMP     XA22                                          S03 01903
004674 004701 R
                1913 *   TC=000: FA14 INTO LA15 AND "ZERO" INTO LA00                 S03 01904
004675 002000 A 1914          CALL    XA88          PUT FA14 INTO LA15              S03 01905
004676 004772 R
                1915 *    LA00 IS ZERO FROM PREVIOUS LLRL OPERATION                  S03 01906
004677 001000 A 1916          RETU*   X000                                          S03 01907
004700 104405 R
                1917 *                                                               S03 01908
                1918 *                                                               S03 01909
004701 006140 A 1919 XA22     SUBI    2             TC=010 ?                        S03 01910
004702 000002 A
004703 001010 A 1920          JAZ     XA24          YES=                            S03 01911
004704 004715 R
004705 001002 A 1921          JAP     XA26          NO: TC=011                      S03 01912
004706 004723 R
                1922 *   TC=001: FA14 INTO LA15 AND FA15 INTO LA00                   S03 01913
004707 002000 A 1923          CALL    XA88          PUT FA14 INTO LA15              S03 01914
004710 004772 R
004711 002000 A 1924          CALL    XA82          PUT FA15 INTO LA00              S03 01915
004712 004744 R
004713 001000 A 1925          RETU*   X000                                          S03 01916
004714 104405 R
                1926 *                                                               S03 01917
                1927 *   TC=010: FA14 INTO LA15 AND OR15 INTO LA00                   S03 01918
004715 002000 A 1928 XA24     CALL    XA88          PUT FA14 INTO LA15              S03 01919
004716 004772 R
004717 002000 A 1929          CALL    XA84          PUT OR15 INTO LA00              S03 01920
004720 004753 R
004721 001000 A 1930          RETU*   X000                                          S03 01921
004722 104405 R
                1931 *                                                               S03 01922
                1932 *   TC=011: SELECTED REG SHIFTED LEFT ONE  LA 1-15  1 INTO LA00   D  03 01923
004723 014131 A 1933 XA26     LDA     X008          REG CONTENTS                    D  03 01924
004724 004241 A 1934          LRLA    1                                             D  03 01925
004725 006110 A 1935          ORAI    1             1 INTO LA00                     D  03 01926
004726 000001 A
004727 001000 A 1936          RETU*   X000                                          S03 01927
004730 104405 R
                1937 *                                                               S03 01928
                1938 *   STORE BIT 15 OF FILE A INTO BIT 15 OF LATCH A WORD(LEFT SHIFTS)  S03 01929
```

```
                    1939 *     PUT RESULTS IN X00D                                    S03 01930
004731 000000 A     1940 XA80  ENTR                                                   S03 01931
004732 014124 A     1941       LDA     X00A          GET 15 LSBS                      S03 01932
004733 006150 A     1942       ANAI    077777        OF SHIFTED                       S03 01933
004734 077777 A
004735 054123 A     1943       STA     X00D          WORD WITH NEW LSB                S03 01934
004736 014116 A     1944       LDA     X008          MERGE IN                         S03 01935
004737 154120 A     1945       ANA     X00C          BIT 15 OF "OLD"                  S03 01936
004740 134120 A     1946       ERA     X00D          FILE A WORD                      S03 01937
004741 054117 A     1947       STA     X00D          TEMP STORE                       S03 01938
004742 001000 A     1948       JMP*    XA80                                           S03 01939
004743 104731 R
                    1949 *                                                            S03 01940
                    1950 *                                                            S03 01941
                    1951 *   STORE BIT 15 OF FILE A INTO BIT 00 OF LATCH A WORD       S03 01942
004744 000000 A     1952 XA82  ENTR                                                   S03 01943
004745 014107 A     1953       LDA     X008          GET BIT 15                       S03 01944
004746 154111 A     1954       ANA     X00C          OF FILE A.                       S03 01945
004747 004241 A     1955       LRLA    1             MERGE INT.                       S03 01946
004750 134110 A     1956       ERA     X00D          SHIFTED WORD                     S03 01947
004751 001000 A     1957       JMP*    XA82                                           S03 01948
004752 104744 R
                    1958 *                                                            S03 01949
                    1959 *     STORE BIT 15 OF OP REG, INTO BIT 00 OF LATCH A WORD    S03 01950
004753 000000 A     1960 XA84  ENTR                                                   S03 01951
004754 015044 A     1961       LDA     OREG,1                                         S03 01952
004755 154102 A     1962       ANA     X00C                                           S03 01953
004756 004241 A     1963       LRLA    1                                              S03 01954
004757 134101 A     1964       ERA     X00D          SHIFTED FILE A WITH NEW BIT 15   S03 01955
004760 001000 A     1965       JMP*    XA84                                           S03 01956
004761 104753 R
                    1966 *                                                            S03 01957
                    1967 *     STORE BIT 14 OF OP REG, INTO BIT 00 OF LATCH A WORD    S03 01958
004762 000000 A     1968 XA86  ENTR                                                   S03 01959
004763 015044 A     1969       LDA     OREG,1                                         S03 01960
004764 006150 A     1970       ANAI    040000                                         S03 01961
004765 040000 A
004766 004242 A     1971       LRLA    2                                              S03 01962
004767 134071 A     1972       ERA     X00D                                           S03 01963
004770 001000 A     1973       JMP*    XA86                                           S03 01964
004771 104762 R
                    1974 *                                                            S03 01965
```

```
                    1975 *   STORE BIT 14 OF FILE A INTO BIT 15 OF LATCH A WORD                S03 01966
                    1976 *    PUT RESULTS IN X00D                                              S03 01967
004772 000000 A     1977 XA88   ENTR                                                           S03 01968
004773 014063 A     1978        LDA     X00A          SELECT 15 LSB'S                          S03 01969
004774 006150 A     1979        ANAI    077777        OF SHIFTED                               S03 01970
004775 077777 A
004776 054060 A     1980        STA     X00A          FILE A(NEW LATCH A WORD).                S03 01971
004777 014055 A     1981        LDA     X008          MERGE IN                                 S03 01972
005000 006150 A     1982        ANAI    040000        BIT 14 OF                                S03 01973
005001 040000 A
005002 004241 A     1983        LRLA    1             OLD WORD.                                S03 01974
005003 134053 A     1984        ERA     X00A                                                   S03 01975
005004 054054 A     1985        STA     X00D          TEMP STORE OF RESULTS                    S03 01976
005005 001000 A     1986        JMP*    XA88                                                   S03 01977
005006 104772 R
                    1987 *                                                                     S03 01978
                    1988 *   STORE BIT 01 OF FILE A INTO BIT 00 OF LATCH A WORD                S03 01979
                    1989 *    PUT RESULTS IN X00D                                              S03 01980
005007 000000 A     1990 XA90   ENTR                                                           S03 01981
005010 014046 A     1991        LDA     X00A          SELECT 15 MSB'S                          S03 01982
005011 006150 A     1992        ANAI    0177776       OF SHIFTED                               S03 01983
005012 177776 A
005013 054043 A     1993        STA     X00A          FILE A WORD.                             S03 01984
005014 014040 A     1994        LDA     X008          MERGE IN                                 S03 01985
005015 006150 A     1995        ANAI    02            BIT 01                                   S03 01986
005016 000002 A
005017 004341 A     1996        LSRA    1             OF  FILE                                 S03 01987
005020 134036 A     1997        ERA     X00A          A WORD                                   S03 01988
005021 054037 A     1998        STA     X00D          TEMP STORE OF RESULTS                    S03 01989
005022 001000 A     1999        JMP*    XA90                                                   S03 01990
005023 105007 R
                    2000 *                                                                     S03 01991
                    2001 *   STORE BIT 00 OF FILE A INTO BIT 15 OF LATCH A WORD                S03 01992
005024 000000 A     2002 XA92   ENTR                                                           S03 01993
005025 014027 A     2003        LDA     X008          SELECT BIT 00                            S03 01994
005026 006150 A     2004        ANAI    1             OF FILE A WORD                           S03 01995
005027 000001 A
005030 004257 A     2005        LRLA    15            AND MOVE TO POSITION 15.                 S03 01996
005031 134027 A     2006        ERA     X00D          MERGE INTO NEW WORD                      S03 01997
005032 001000 A     2007        JMP*    XA92                                                   S03 01998
005033 105024 R
                    2008 *                                                                     S03 01999
```

```
                    2009 *   STORE BIT 15 OF FILE A INTO BIT 15 OF LATCH A (RIGHT SHIFTS)      S03 02000
005034 000000 A     2010 XA94   ENTR                                                           S03 02001
005035 014017 A     2011        LDA     X008          SELECT BIT 15                          S03 02002
005036 154021 A     2012        ANA     X00C          OF FILE A WORD,                        S03 02003
005037 134021 A     2013        ERA     X00D          MERGE INTO NEW WORD                    S03 02004
005040 001000 A     2014        JMP*    XA94                                                 S03 02005
005041 105034 R
                    2015 *                                                                     S03 02006
                    2016 *   STORE BIT 00 OF OP REG. INTO BIT 15 OF LATCH A WORD               S03 02007
005042 000000 A     2017 XA96   ENTR                                                           S03 02008
005043 015044 A     2018        LDA     OREG,1        SELECT BIT 00                          S03 02009
005044 006150 A     2019        ANAI    1             OF OREG AND                            S03 02010
005045 000001 A
005046 004257 A     2020        LRLA    15            MOVE TO BIT 15 POSITION,               S03 02011
005047 134011 A     2021        ERA     X00D          MERGE INTO LATCH A WORD,               S03 02012
005050 001000 A     2022        JMP*    XA96                                                 S03 02013
005051 105042 R
                    2023 *                                                                     S03 02014
                    2024 *      PROGRAM COUNTER IS INPUT                                       S03 02015
                    2025 *                                                                     S03 02016
005052 015042 A     2026 X004   LDA     PREG,1        GET PROGRAM COUNTER                    S03 02017
005053 001000 A     2027        JMP*    X000                                                 S03 02018
005054 104405 R
                    2028 *                                                                     S03 02019
005055 000000 A     2029 X008   DATA    0             TEMP STORAGE                           S03 02020
005056 000525 R     2030 X009   DATA    R0            ADDR OF PSEUDO-REGS                    S03 02021
005057 000000 A     2031 X00A   DATA    0             TEMP STORE FOR SHIFTED FILE A          S03 02022
005060 100000 A     2032 X00C   DATA    0100000       MASK                                   S03 02023
005061 000000 A     2033 X00D   DATA    0             TEMP STORE OF SHIFTED WORD WITH NEW BIT 15S03 02024
```

```
                    2034          EJEC                                                    S03 02025
                    2035 *                                                                S03 02026
                    2036 *        DETERMINE LATCH B INPUT TO ALU                          S03 02027
                    2037 *                                                                S03 02028
                    2038 *        CALLING SEQUENCE                                        S03 02029
                    2039 *        LDX     ADDR OF DATA ROM FIELDS                         S03 02030
                    2040 *        JMPM    X010                                            S03 02031
                    2041 *                                                                S03 02032
                    2042 *        RETURN  LATCH B INPUT TO ALU IN A REGISTER              S03 02033
                    2043 *                                                                S03 02034
005062 000000 A     2044 X010     ENTR                                                    S03 02035
005063 015027 A     2045          LDA     XB,1            FILE B SOURCE ADDR              S03 02036
005064 124100 A     2046          ADD     X019            PLUS ADDR OF PSEUDO REGS        S03 02037
005065 005012 A     2047          TAB                                                     S03 02038
005066 016000 A     2048          LDA     0,2             REGISTER CONTENTS               S03 02039
                    2049 *                                                                S03 02040
005067 025013 A     2050          LDB     XLB,1           LATCH B CONTROL                 S03 02041
005070 001020 A     2051          JBZ*    X010            RETURN IF REG CONTENTS IS INPUT S03 02042
005071 105062 R
005072 005322 A     2052          DBR                                                     S03 02043
005073 001020 A     2053          JBZ     X012            B MUX INPUT                     S03 02044
005074 005106 R
005075 015031 A     2054          LDA     MASK,1          16-BIT MASK                     S03 02045
005076 005322 A     2055          DBR                                                     S03 02046
005077 001020 A     2056          JBZ     *+4             JUMP IF I1 AND MASK             S03 02047
005100 005103 R
005101 001000 A     2057          JMP*    X010            MASK IS INPUT                   S03 02048
005102 105062 R
005103 155052 A     2058          ANA     IRG2,1          MASK INSTRUCTION WORD           S03 02049
005104 001000 A     2059          JMP*    X010            RETURN WITH MASK RESULT         S03 02050
005105 105062 R
                    2060 *                                                                S03 02051
                    2061 *                                                                S03 02052
                    2062 *    COME HERE IF LB FIELD=01: SELECT B MUX FOR INPUT TO LATCH B S03 02053
                    2063 *       INPUTS ARE DP REG, MAIN MEM, DATA REG, I/O DATA REG, STATUS S03 02054
                    2064 *       REG, AND 4 CONFIGURATIONS OF BYTES FROM THE DP REG.      S03 02055
                    2065 *                                                                S03 02056
                    2066 *                                                                S03 02057
005106 015027 A     2067 X012     LDA     XB,1            FILE B SOURCE ADDR              S03 02058
005107 006150 A     2068          ANAI    7               3 LSB OF ADDR                   S03 02059
005110 000007 A
005111 005012 A     2069          TAB                     SAVE FOR DATA SELECTION         S03 02060
```

```
                    2070 *                                                          S03 02061
005112 015044 A     2071        LDA     OREG,1                                      S03 02062
005113 001020 A     2072        JBZ*    X010        RETURN: INPUT IS OREG           S03 02063
005114 105062 R
                    2073 *                                                          S03 02064
005115 015056 A     2074        LDA     MIL,1       MEMORY INTERFACE LATCH          S03 02065
005116 005322 A     2075        DBR                 B=X001                          S03 02066
005117 001020 A     2076        JBZ*    X010        RETURN                          S03 02067
005120 105062 R
                    2077 *                                                          S03 02068
005121 015040 A     2078        LDA     IOD,1       IOD                             S03 02069
005122 005322 A     2079        DBR                 B=X010                          S03 02070
005123 001020 A     2080        JBZ*    X010        RETURN IF IOD INPUT             S03 02071
005124 105062 R
005125 015041 A     2081        LDA     STUS,1      STATUS                          S03 02072
005126 005322 A     2082        DBR                 B=X011                          S03 02073
005127 001020 A     2083        JBZ*    X010        RETURN IF STUS INPUT            S03 02074
005130 105062 R
005131 005322 A     2084        DBR                 B=X100                          S03 02075
005132 001020 A     2085        JBZ     X013        OP1 RIGHT BYTE/SIGN EXTENDED    S03 02076
005133 005150 R
                    2086 *                                                          S03 02077
005134 005322 A     2087        DBR                 B=X101                          S03 02078
005135 001020 A     2088        JBZ     X014        OP1 LEFT BYTE/SIGN EXTENDED     S03 02079
005136 005155 R
                    2089 *                                                          S03 02080
005137 005322 A     2090        DBR                 B=X110                          S03 02081
005140 001020 A     2091        JBZ     X015        OP1 RIGHT BYTE TO RIGHT BYTE    S03 02082
005141 005160 R
                    2092 *                                                          S03 02083
                    2093 *      B=X111  OP1 RIGHT BYTE TO LEFT BYTE                 S03 02084
                    2094 *                                                          S03 02085
005142 015044 A     2095        LDA     OREG,1      GET OPERAND REG                 S03 02086
005143 006150 A     2096        ANAI    0377        MASK OUT RIGHT BYTE             S03 02087
005144 000377 A
005145 004250 A     2097        LRLA    8           LEFT JUSTIFY BYTE               S03 02088
005146 001000 A     2098        JMP*    X010        RETURN                          S03 02089
005147 105062 R
                    2099 *                                                          S03 02090
                    2100 *      B=X100  OP1 RIGHT BYTE/SIGN EXTENDED                S03 02091
                    2101 *                                                          S03 02092
005150 015044 A     2102 X013   LDA     OREG,1      GET OPERAND REG                 S03 02093
```

```
009151 004250 A 2103         LRLA    8             LEFT JUSTIFY BYTE                S03 02094
009152 004310 A 2104         ASRA    8             EXTEND SIGN                      S03 02095
009153 001000 A 2105         JMP*    X010          RETURN                           S03 02096
009154 105062 R
                2106 *                                                              S03 02097
                2107 *       B=X101  OP1 LEFT BYTE/SIGN EXTENDED                    S03 02098
                2108 *                                                              S03 02099
009155 015044 A 2109 X014    LDA     OREG,1        GET OPERAND REG                  S03 02100
009156 001000 A 2110         JMP     X013+2        EXTEND SIGN                      S03 02101
009157 005152 R
                2111 *                                                              S03 02102
                2112 *       B=X110  OP1 RIGHT BYTE                                 S03 02103
                2113 *                                                              S03 02104
009160 015044 A 2114 X015    LDA     OREG,1        GET OPERAND REG                  S03 02105
009161 006150 A 2115         ANAI    0377          MASK OUT BYTE                    S03 02106
009162 000377 A
009163 001000 A 2116         JMP*    X010          RETURN                           S03 02107
009164 105062 R
                2117 *                                                              S03 02108
009165 000525 R 2118 X019    DATA    R0            ADDR OF PSEUDO REGS              S03 02109
```

```
                    2119          EJEC                                                          S03 02110
                    2120 *                                                                      S03 02111
                    2121 *        FORM ALU OUTPUT                                               S03 02112
                    2122 *                                                                      S03 02113
                    2123 *        CALLING SEQUENCE                                              S03 02114
                    2124 *        LDX     ADDR OF ROM FIELDS/DATA                               S03 02115
                    2125 *        JMPM    X020                                                  S03 02116
                    2126 *                                                                      S03 02117
                    2127 *        RETURN  OUTPUT IN A REGISTER                                  S03 02118
                    2128 *                                                                      S03 02119
005166 000000 A     2129 X020     ENTR                                                          S03 02120
                    2130 *    ARITHMETIC MODE:(M=0-AND-LB=00R1)OR(LB=20R3-AND-F=XX0X            S03 02121
                    2131 *    LOGICAL MODE:(M=1-AND-LB=00R1)OR(LB=20R3-AND-F=XX1X               S03 02122
                    2132 *                                                                      S03 02123
005167 015017 A     2133          LDA     XMD,1         ALU FUNCTION MODE IS "LOGICAL" ?        S03 02124
005170 001010 A     2134          JAZ     *+4                                                   S03 02125
005171 005174 R
005172 001000 A     2135          JMP     XAL1          1=YES 0=NO                              S03 02126
005173 005210 R
005174 015013 A     2136          LDA     XLB,1                                                 S03 02127
005175 006140 A     2137          SUBI    2             LB=3OR4 ?                               S03 02128
005176 000002 A
005177 001002 A     2138          JAP     *+4           YES-                                    S03 02129
005200 005203 R
005201 001000 A     2139          JMP     AR10          NO-GO TO ARITHMETIC MODE                S03 02130
005202 005226 R
005203 015016 A     2140          LDA     XF,1                                                  S03 02131
005204 006150 A     2141          ANAI    2             F CODE=XX0X                             S03 02132
005205 000002 A
005206 001010 A     2142          JAZ     AR10          YES-GO TO ARITH, MODE                   S03 02133
005207 005226 R
                    2143 *   MO=1                                                               S03 02134
005210 015013 A     2144 XAL1     LDA     XLB,1                                                 S03 02135
005211 006140 A     2145          SUBI    2             LB=3OR4 ?                               S03 02136
005212 000002 A
005213 001002 A     2146          JAP     *+4           YES                                     S03 02137
005214 005217 R
005215 001000 A     2147          JMP     X023          GO TO LOGICAL FUNCTIONS                 S03 02138
005216 005333 R
005217 015016 A     2148          LDA     XF,1                                                  S03 02139
005220 006150 A     2149          ANAI    2             F CODE=XX1X ?                           S03 02140
005221 000002 A
```

```
009222 001010 A 2150        JAZ     *+4                                          S03 02141
009223 005226 R
009224 001000 A 2151        JMP     X023        GO TO LOGICAL FUNCTIONS          S03 02142
009225 005333 R
               2152 *                                                           S03 02143
               2153 *   DETERMINE CARRY IN FOR ARITHMETIC MODE OR SPECIAL ALU MODE S03 02144
               2154 *                                                           S03 02145
009226 015013 A 2155 AR10   LDA     XLB,1       GET LB FIELD                     S03 02146
009227 006140 A 2156        SUBI    02                                           S03 02147
009230 000002 A
009231 001002 A 2157        JAP     AR12        LB=3 OR 4                        S03 02148
009232 005261 R
009233 002000 A 2158        CALL    SALU        DETERMINE IF SPECIAL ALU MODE    S03 02149
009234 004355 R
009235 001000 A 2159        JMP     AR20        YES-                             S03 02150
009236 005271 R
009237 025020 A 2160        LDB     XC,1        CARRY CONTROL                    S03 02151
009240 005001 A 2161        TZA                                                  S03 02152
009241 001020 A 2162        JBZ     X025        JUMP IF ZERO CARRY IN            S03 02153
009242 005256 R
009243 015036 A 2163        LDA     CARRY,1     STORED CARRY                     S03 02154
009244 005322 A 2164        OBR                                                  S03 02155
009245 001020 A 2165        JBZ     X026        JUMP IF USE STORED CARRY         S03 02156
009246 005256 R
009247 005211 A 2166        COMPL   011         COMPLEMENT CARRY                 S03 02157
009250 006150 A 2167        ANAI    01          USE COMPLEMENTED CARRY           S03 02158
009251 000001 A
009252 005322 A 2168        OBR                                                  S03 02159
009253 001020 A 2169        JBZ     X026                                         S03 02160
009254 005256 R
009255 005101 A 2170        INCR    01          XCIN=1                           S03 02161
009256 055035 A 2171 X026   STA     XCIN,1      CARRY IN FOR OPERATION           S03 02162
009257 001000 A 2172        JMP     AR13                                         S03 02163
009260 005303 R
009261 015016 A 2173 AR12   LDA     XF,1                                         S03 02164
009262 006150 A 2174        ANAI    2                                            S03 02165
009263 000002 A
009264 001010 A 2175        JAZ     X026                                         S03 02166
009265 005256 R
009266 004341 A 2176        LSRA    1                                            S03 02167
009267 001000 A 2177        JMP     X026                                         S03 02168
009270 005256 R
```

```
                    2178 *                                                                  S03 02169
                    2179 *    IF IRG2 BITS 7&6=01: SET CARRY-IN                             S03 02170
                    2180 *    IF IRG2 BITS 7&6=00,10,11: RESET CARRY-IN                     S03 02171
005271 015052 A     2181 AR20   LDA     IRG2,1          NO RETURN POINT FROM SALU          S03 02172
005272 006150 A     2182        ANAI    0300                                               S03 02173
005273 000300 A
005274 004346 A     2183        LSRA    6                                                  S03 02174
005275 005311 A     2184        DAR                                                        S03 02175
005276 001010 A     2185        JAZ     X026-1          GO SET CARRY-IN                    S03 02176
005277 005255 R
005300 005001 A     2186        TZA                                                        S03 02177
005301 001000 A     2187        JMP     X026            GO RESET CARRY-IN                  S03 02178
005302 005256 R
                    2188 *                                                                  S03 02179
                    2189 *      DO ARITHMETIC OPERATION                                     S03 02180
                    2190 *                                                                  S03 02181
005303 015016 A     2191 AR13   LDA     XF,1            ADDER FUNCTION                     S03 02182
005304 124005 A     2192        ADD     X022            LOOP UP LIST                       S03 02183
005305 005012 A     2193        TAB                                                        S03 02184
005306 016000 A     2194        LDA     0,2             ADDR OF FUNCTION ROUTINE           S03 02185
005307 054001 A     2195        STA     X021            SAVE FOR JUMP                      S03 02186
005310 001000 A     2196        JMP     *               DO FUNCTION REQUESTED              S03 02187
005311 005310 R
005311              2197 X021   BES     0               SAVED JUMP ADDRESS                 S03 02188
                    2198 *                                                                  S03 02189
005312 005313 R     2199 X022   DATA    *+1             ARITHMETIC FUNCTIONS               S03 02190
005313 005460 R     2200        DATA    X062            0000 ADD A AND CIN                 S03 02191
005314 005474 R     2201        DATA    X064            0001 OR A AND B, ADD CIN           S03 02192
005315 005500 R     2202        DATA    X066            0010 COMPLEMENT B, OR WITH A,      S03 02193
                    2203 *                                   ADD CIN                    S03 02194
005316 005505 R     2204        DATA    X068            0011 GENERATE ALL ONES, ADD CIN    S03 02195
005317 005510 R     2205        DATA    X070            0100 COMPLEMENT B, AND WITH A,     S03 02196
                    2206 *                                   ADD A, ADD CIN             S03 02197
005320 005532 R     2207        DATA    X072            0101 OR A AND B,                   S03 02198
                    2208 *                                   COMPLEMENT B, AND WITH A,  S03 02199
                    2209 *                                   ADD RESULT, ADD CIN        S03 02200
005321 005547 R     2210        DATA    X074            0110 ADD A AND CIN, SUBTRACT B     S03 02201
                    2211 *                                   SUBTRACT 1                 S03 02202
005322 005605 R     2212        DATA    X076            0111 COMPLEMENT B, AND WITH A,     S03 02203
                    2213 *                                   SUBTRACT 1, ADD CIN        S03 02204
005323 005621 R     2214        DATA    X078            1000 AND A AND B, ADD A, ADD CIN   S03 02205
005324 005633 R     2215        DATA    X080            1001 ADD A AND B, ADD CIN          S03 02206
```

```
009325 005645 R 2216          DATA    X082        1010 COMPLEMENT B, OR WITH A                  S03 02207
                2217 *                                 AND A AND B,                             S03 02208
                2218 *                                 ADD RESULT, ADD CIN                      S03 02209
009326 005662 R 2219          DATA    X084        1011 AND A AND B, SUBTRACT 1, ADD CIN         S03 02210
009327 005703 R 2220          DATA    X086        1100 ADD A AND A, ADD CIN                     S03 02211
009330 005715 R 2221          DATA    X088        1101 OR A AND B, ADD A, ADD CIN               S03 02212
009331 005726 R 2222          DATA    X090        1110 COMPLEMENT B, OR WITH A,                 S03 02213
                2223 *                                 ADD A, ADD CIN                           S03 02214
009332 005735 R 2224          DATA    X092        1111 ADD A, ADD CIN, SUBTRACT 1               S03 02215
```

```
                    2225          EJEC                                                    S03 02216
                    2226 *                                                                S03 02217
                    2227 *        OD LOGICAL FUNCTION                                     S03 02218
                    2228 *                                                                S03 02219
005333 015016 A     2229 X023     LDA     XF,1          ADDER FUNCTION                    S03 02220
005334 124005 A     2230          ADD     X025          LOOK UP LIST                      S03 02221
005335 005012 A     2231          TAB                                                     S03 02222
005336 016000 A     2232          LDA     0,2           ADDR OF FUNCTION ROUTINE          S03 02223
005337 054001 A     2233          STA     X024          SAVE FOR JUMP                     S03 02224
005340 001000 A     2234          JMP     *             OD FUNCTION                       S03 02225
005341 005340 R
005341              2235 X024     BES     0             JUMP ADDRESS                      S03 02226
                    2236 *                                                                S03 02227
005342 005343 R     2237 X025     DATA    *+1           LOGICAL FUNCTIONS                 S03 02228
005343 005363 R     2238          DATA    X030          0000 COMPLEMENT A                 S03 02229
005344 005367 R     2239          DATA    X032          0001 OR A AND B, COMPLEMENT       S03 02230
005345 005373 R     2240          DATA    X034          0010 COMPLEMENT A, AND WITH B     S03 02231
005346 005400 R     2241          DATA    X036          0011 GENERATE ALL ZEROS           S03 02232
005347 005403 R     2242          DATA    X038          0100 AND A AND B, COMPLEMENT      S03 02233
005350 005407 R     2243          DATA    X040          0101 COMPLEMENT B                 S03 02234
005351 005412 R     2244          DATA    X042          0110 EXCLUSIVE OR A AND B         S03 02235
005352 005416 R     2245          DATA    X044          0111 COMPLEMENT B, AND WITH A     S03 02236
005353 005423 R     2246          DATA    X046          1000 COMPLEMENT A, OR WITH B      S03 02237
005354 005430 R     2247          DATA    X048          1001 EXCLUSIVE OR A AND B, COMPLEMENT S03 02238
005355 005434 R     2248          DATA    X050          1010 B                            S03 02239
005356 005437 R     2249          DATA    X052          1011 AND A AND B                  S03 02240
005357 005442 R     2250          DATA    X054          1100 GENERATE ALL ONES            S03 02241
005360 005445 R     2251          DATA    X056          1101 COMPLEMENT B, OR WITH A      S03 02242
005361 005452 R     2252          DATA    X058          1110 OR A AND B                   S03 02243
005362 005455 R     2253          DATA    X060          1111 A                            S03 02244
                    2254 *                                                                S03 02245
                    2255 *                                                                S03 02246
                    2256 *                                                                S03 02247
                    2257 *                                                                S03 02248
                    2258 *                                                                S03 02249
                    2259 *        NOTE - IN THE FOLLOWING ROUTINES A REFERS TO THE LATCH A S03 02250
                    2260 *        INPUT TO THE ALU AND B REFERS TO THE LATCH B INPUT      S03 02251
                    2261 *                                                                S03 02252
                    2262 *                                                                S03 02253
                    2263 *                                                                S03 02254
                    2264 *                                                                S03 02255
                    2265 *                                                                S03 02256
```

```
                    2266 *      COMPLEMENT A            (0000)                  S03 02257
                    2267 *                                                      S03 02258
005363 015032 A     2268 X030   LDA     LTCHA,1         A                       S03 02259
005364 005211 A     2269        COMPL   011             COMPLEMENT              S03 02260
005365 001000 A     2270        JMP*    X020            RETURN                  S03 02261
005366 105166 R
                    2271 *                                                      S03 02262
                    2272 *      OR A AND B, COMPLEMENT  (0001)                  S03 02263
                    2273 *                                                      S03 02264
005367 015032 A     2274 X032   LDA     LTCHA,1         A                       S03 02265
005370 115033 A     2275        ORA     LTCHB,1         OR WITH B               S03 02266
005371 001000 A     2276        JMP     X030+1          COMPLEMENT              S03 02267
005372 005364 R
                    2277 *                                                      S03 02268
                    2278 *      COMPLEMENT A, AND WITH B  (0010)                S03 02269
                    2279 *                                                      S03 02270
005373 015032 A     2280 X034   LDA     LTCHA,1         A                       S03 02271
005374 005211 A     2281        COMPL   011             COMPLEMENT              S03 02272
005375 155033 A     2282        ANA     LTCHB,1         AND WITH B              S03 02273
005376 001000 A     2283        JMP*    X020            RETURN                  S03 02274
005377 105166 R
                    2284 *                                                      S03 02275
                    2285 *      GENERATE ALL ZEROS      (0011)                  S03 02276
                    2286 *                                                      S03 02277
005400 005001 A     2287 X036   TZA                                             S03 02278
005401 001000 A     2288        JMP*    X020            RETURN                  S03 02279
005402 105166 R
                    2289 *                                                      S03 02280
                    2290 *      AND A AND B, COMPLEMENT  (0100)                 S03 02281
                    2291 *                                                      S03 02282
005403 015032 A     2292 X038   LDA     LTCHA,1         A                       S03 02283
005404 155033 A     2293        ANA     LTCHB,1         AND WITH B              S03 02284
005405 001000 A     2294        JMP     X030+1          COMPLEMENT              S03 02285
005406 005364 R
                    2295 *                                                      S03 02286
                    2296 *      COMPLEMENT B            (0101)                  S03 02287
                    2297 *                                                      S03 02288
005407 015033 A     2298 X040   LDA     LTCHB,1         B                       S03 02289
005410 001000 A     2299        JMP     X030+1          COMPLEMENT              S03 02290
005411 005364 R
                    2300 *                                                      S03 02291
                    2301 *      EXCLUSIVE OR A AND B    (0110)                  S03 02292
```

```
                    2302 *                                                                  S03 02293
005412 015032 A     2303 X042   LDA     LTCHA,1         A                                   S03 02294
005413 135033 A     2304        ERA     LTCHB,1         EXCLUSIVE OR WITH B                 S03 02295
005414 001000 A     2305        JMP*    X020            RETURN                              S03 02296
005415 105166 R
                    2306 *                                                                  S03 02297
                    2307 *      COMPLEMENT B, AND WITH A  (0111)                            S03 02298
                    2308 *                                                                  S03 02299
005416 015033 A     2309 X044   LDA     LTCHB,1         B                                   S03 02300
005417 005211 A     2310        COMPL   011             COMPLEMENT                          S03 02301
005420 155032 A     2311        ANA     LTCHA,1         AND WITH A                          S03 02302
005421 001000 A     2312        JMP*    X020            RETURN                              S03 02303
005422 105166 R
                    2313 *                                                                  S03 02304
                    2314 *      COMPLEMENT A, OR WITH B  (1000)                             S03 02305
                    2315 *                                                                  S03 02306
005423 015032 A     2316 X046   LDA     LTCHA,1         A                                   S03 02307
005424 005211 A     2317        COMPL   011             COMPLEMENT                          S03 02308
005425 115033 A     2318        ORA     LTCHB,1         OR WITH B                           S03 02309
005426 001000 A     2319        JMP*    X020            RETURN                              S03 02310
005427 105166 R
                    2320 *                                                                  S03 02311
                    2321 *      EXCLUSIVE OR A AND B, COMPLEMENT  (1001)                    S03 02312
                    2322 *                                                                  S03 02313
005430 015032 A     2323 X048   LDA     LTCHA,1         A                                   S03 02314
005431 135033 A     2324        ERA     LTCHB,1         EXCLUSIVE OR WITH B                 S03 02315
005432 001000 A     2325        JMP     X030+1          COMPLEMENT                          S03 02316
005433 005364 R
                    2326 *                                                                  S03 02317
                    2327 *      B                       (1010)                              S03 02318
                    2328 *                                                                  S03 02319
005434 015033 A     2329 X050   LDA     LTCHB,1         B                                   S03 02320
005435 001000 A     2330        JMP*    X020            RETURN                              S03 02321
005436 105166 R
                    2331 *                                                                  S03 02322
                    2332 *      AND A AND B             (1011)                              S03 02323
                    2333 *                                                                  S03 02324
005437 015032 A     2334 X052   LDA     LTCHA,1         A                                   S03 02325
005440 001000 A     2335        JMP     X034+2          AND WITH B                          S03 02326
005441 005375 R
                    2336 *                                                                  S03 02327
                    2337 *      GENERATE ALL ONES       (1100)                              S03 02328
```

```
                    2338 *                                                          S03 02329
005442 005301 A     2339 X054   DECR    01              ALL ONES                    S03 02330
005443 001000 A     2340        JMP*    X020            RETURN                      S03 02331
005444 105166 R
                    2341 *                                                          S03 02332
                    2342 *      COMPLEMENT B, OR WITH A  (1101)                     S03 02333
                    2343 *                                                          S03 02334
005445 015033 A     2344 X055   LDA     LTCHB,1         B                           S03 02335
005446 005211 A     2345        COMPL   011             COMPLEMENT                  S03 02336
005447 115032 A     2346        ORA     LTCHA,1         OR WITH A                   S03 02337
005450 001000 A     2347        JMP*    X020            RETURN                      S03 02338
005451 105166 R
                    2348 *                                                          S03 02339
                    2349 *      OR A AND B              (1110)                      S03 02340
                    2350 *                                                          S03 02341
005452 015033 A     2351 X058   LDA     LTCHB,1         B                           S03 02342
005453 001000 A     2352        JMP     X056+2          OR WITH A                   S03 02343
005454 005447 R
                    2353 *                                                          S03 02344
                    2354 *      A                       (1111)                      S03 02345
                    2355 *                                                          S03 02346
005455 015032 A     2356 X060   LDA     LTCHA,1         A                           S03 02347
005456 001000 A     2357        JMP*    X020            RETURN                      S03 02348
005457 105166 R
```

```
                    2358          EJEC                                                    S03 02349
                    2359 *                                                                S03 02350
                    2360 *        0000    ADD A AND CIN                                   S03 02351
                    2361 *                                                                S03 02352
005460 015032 A     2362 X062     LDA     LTCHA,1         A                               S03 02353
005461 125035 A     2363 X063     ADD     XCIN,1          ADD CIN                         S03 02354
005462 002000 A     2364          JMPM    X094            SAVE OVERFLOW                   S03 02355
005463 005754 R
005464 015035 A     2365          LDA     XCIN,1          CIN                             S03 02356
005465 001010 A     2366          JAZ     X095            NO CARRY OUT IF NO CARRY IN     S03 02357
005466 005764 R
005467 014337 A     2367          LDA     X099            ALU RESULT                      S03 02358
005470 001010 A     2368          JAZ     X097            SET CARRY ON ZERO RESULT,       S03 02359
005471 005773 R
005472 001000 A     2369          JMP     X095            NO CARRY OUT                    S03 02360
005473 005764 R
                    2370 *                                                                S03 02361
                    2371 *        0001    OR A AND B, ADD CIN                             S03 02362
                    2372 *                                                                S03 02363
005474 015032 A     2373 X064     LDA     LTCHA,1         A                               S03 02364
005475 115033 A     2374          ORA     LTCHB,1         OR WITH B                       S03 02365
005476 001000 A     2375          JMP     X063            ADD CIN                         S03 02366
005477 005461 R
                    2376 *                                                                S03 02367
                    2377 *        0010    COMPLEMENT B, OR WITH A, ADD CIN                S03 02368
                    2378 *                                                                S03 02369
005500 015033 A     2379 X066     LDA     LTCHB,1         B                               S03 02370
005501 005211 A     2380          COMPL   011             COMPLEMENT                      S03 02371
005502 115032 A     2381          ORA     LTCHA,1         OR WITH A                       S03 02372
005503 001000 A     2382          JMP     X063            ADD CIN                         S03 02373
005504 005461 R
                    2383 *                                                                S03 02374
                    2384 *        0011    GENERATE ALL ONES, ADD CIN                      S03 02375
                    2385 *                                                                S03 02376
005505 005301 A     2386 X068     DECR    01              ALL ONES                        S03 02377
005506 001000 A     2387          JMP     X063            ADD CIN                         S03 02378
005507 005461 R
                    2388 *                                                                S03 02379
                    2389 *        0100    COMPLEMENT B, AND WITH A, ADD A, ADD CIN        S03 02380
                    2390 *                                                                S03 02381
005510 015033 A     2391 X070     LDA     LTCHB,1         B                               S03 02382
005511 005211 A     2392          COMPL   011             COMPLEMENT                      S03 02383
```

```
009512 155032 A 2393          ANA     LTCHA,1         AND WITH A                              S03 02384
009513 054344 A 2394          STA     X0AB            SECOND RESULT                           S03 02385
009514 125032 A 2395          ADD     LTCHA,1         ADD A                                   S03 02386
009515 125035 A 2396          ADD     XCIN,1          ADD CIN                                 S03 02387
009516 002000 A 2397          JMPM    X094            SAVE OVERFLOW                           S03 02388
009517 005754 R
009520 015032 A 2398          LDA     LTCHA,1         A                                       S03 02389
009521 054335 A 2399          STA     X0AA            FIRST RESULT                            S03 02390
                 2400 *                                                                        S03 02391
009522 015035 A 2401 X071     LDA     XCIN,1          CIN                                     S03 02392
009523 001010 A 2402          JAZ     X0A0            DO CARRY CALCULATION                    S03 02393
009524 006030 R
009525 014301 A 2403          LDA     X099            ALU RESULT                              S03 02394
009526 001010 A 2404          JAZ     X097            SET CARRY ON ZERO RESULT                S03 02395
009527 005773 R
009530 001000 A 2405          JMP     X0A0            DO CARRY CALCULATION                    S03 02396
009531 006030 R
                 2406 *                                                                        S03 02397
                 2407 *       0101    ADD (OR A AND B) WITH (COMPLEMENT B, AND WITH A),       S03 02398
                 2408 *               ADD CIN                                                 S03 02399
                 2409 *                                                                        S03 02400
009532 015032 A 2410 X072     LDA     LTCHA,1         A                                       S03 02401
009533 115033 A 2411          ORA     LTCHB,1         OR WITH B                               S03 02402
009534 054322 A 2412          STA     X0AA            FIRST RESULT                            S03 02403
009535 015033 A 2413          LDA     LTCHB,1         B                                       S03 02404
009536 005211 A 2414          COMPL   011             COMPLEMENT                              S03 02405
009537 155032 A 2415          ANA     LTCHA,1         AND WITH A                              S03 02406
009540 054317 A 2416          STA     X0AB            SECOND RESULT                           S03 02407
009541 124315 A 2417          ADD     X0AA            ADD FIRST RESULT                        S03 02408
009542 125035 A 2418          ADD     XCIN,1          ADD CIN                                 S03 02409
009543 002000 A 2419          JMPM    X094            SAVE OVERFLOW                           S03 02410
009544 005754 R
009545 001000 A 2420          JMP     X071            DO CARRY CALCULATION                    S03 02411
009546 005522 R
                 2421 *                                                                        S03 02412
                 2422 *       0110    ADD A AND CIN, SUBTRACT B, SUBTRACT 1                   S03 02413
                 2423 *                                                                        S03 02414
009547 015032 A 2424 X074     LDA     LTCHA,1         A                                       S03 02415
009550 145033 A 2425          SUB     LTCHB,1         SUBTRACT B                              S03 02416
009551 005311 A 2426          DAR                     SUBTRACT 1                              S03 02417
009552 125035 A 2427          ADD     XCIN,1          ADD CIN                                 S03 02418
009553 002000 A 2428          JMPM    X094            SAVE OVERFLOW                           S03 02419
```

```
000554 005754 R
000555 015035 A 2429        LDA     XCIN,1          CIN                                  S03 02420
000556 001010 A 2430        JAZ     X075            JUMP IF NO CARRY IN                  S03 02421
000557 005577 R
                2431 *                                                                   S03 02422
000560 015032 A 2432        LDA     LTCHA,1         A                                    S03 02423
000561 135033 A 2433        ERA     LTCHB,1         B                                    S03 02424
000562 001002 A 2434        JAP     *+7             JUMP IF SIGNS THE SAME               S03 02425
000563 005571 R
000564 015032 A 2435        LDA     LTCHA,1         A                                    S03 02426
000565 001004 A 2436        JAN     X097            SET CARRY IF A NEGATIVE              S03 02427
000566 005773 R
000567 001000 A 2437        JMP     X096            NO CARRY                             S03 02428
000570 005770 R
                2438 *                                                                   S03 02429
000571 015032 A 2439        LDA     LTCHA,1         A                                    S03 02430
000572 145033 A 2440        SUB     LTCHB,1         LESS B                               S03 02431
000573 001002 A 2441        JAP     X097            SET CARRY IF A GREATER               S03 02432
000574 005773 R
000575 001000 A 2442        JMP     X096            NO CARRY                             S03 02433
000576 005770 R
                2443 *                                                                   S03 02434
000577 014227 A 2444 X075   LDA     X099            RESULT                               S03 02435
000600 005211 A 2445        CPA                                                          S03 02436
000601 001010 A 2446        JAZ     X096            NO CARRY ON -1 RESULT                S03 02437
000602 005770 R
000603 001000 A 2447        JMP     X097            SET CARRY                            S03 02438
000604 005773 R
                2448 *                                                                   S03 02439
                2449 *      0111    COMPLEMENT B, AND WITH A, SUBTRACT 1, ADD CIN        S03 02440
                2450 *                                                                   S03 02441
000605 015033 A 2451 X076   LDA     LTCHB,1         B                                    S03 02442
000606 005211 A 2452        COMPL   011             COMPLEMENT                           S03 02443
000607 155032 A 2453        ANA     LTCHA,1         AND WITH A                           S03 02444
000610 005311 A 2454        DAR                     SUBTRACT 1                           S03 02445
000611 125035 A 2455        ADD     XCIN,1          ADD CIN                              S03 02446
000612 002000 A 2456        JMPM    X094            SAVE OVERFLOW                        S03 02447
000613 005754 R
000614 015035 A 2457        LDA     XCIN,1          CIN                                  S03 02448
000615 001010 A 2458        JAZ     X075            JUMP IF NO CARRY IN                  S03 02449
000616 005577 R
000617 001000 A 2459        JMP     X096            NO CARRY OUT                         S03 02450
```

```
009620 005770 R
                    2460 *                                                                  S03 02451
                    2461 *      1000    AND A AND B, ADD A, ADD CIN                         S03 02452
                    2462 *                                                                  S03 02453
009621 015032 A     2463 X078   LDA     LTCHA,1         A                                   S03 02454
009622 054234 A     2464        STA     X0AA            FIRST RESULT                        S03 02455
009623 155033 A     2465        ANA     LTCHB,1         AND WITH B                          S03 02456
009624 054233 A     2466        STA     X0AB            SECOND RESULT                       S03 02457
009625 125032 A     2467        ADD     LTCHA,1         ADD A                               S03 02458
009626 125035 A     2468        ADD     XCIN,1          ADD CIN                             S03 02459
009627 002000 A     2469        JMPM    X094            SAVE OVERFLOW                       S03 02460
009630 005754 R
009631 001000 A     2470        JMP     X071            DO CARRY CALCULATION                S03 02461
009632 005522 R
                    2471 *                                                                  S03 02462
                    2472 *      1001    ADD A AND B, ADD CIN                                S03 02463
                    2473 *                                                                  S03 02464
009633 015032 A     2474 X080   LDA     LTCHA,1         A                                   S03 02465
009634 054222 A     2475        STA     X0AA            FIRST RESULT                        S03 02466
009635 125033 A     2476        ADD     LTCHB,1         ADD B                               S03 02467
009636 125035 A     2477        ADD     XCIN,1          ADD CIN                             S03 02468
009637 002000 A     2478        JMPM    X094            SAVE OVERFLOW                       S03 02469
009640 005754 R
009641 015033 A     2479        LDA     LTCHB,1         B                                   S03 02470
009642 054215 A     2480        STA     X0AB            SECOND RESULT                       S03 02471
009643 001000 A     2481        JMP     X071            DO CARRY CALCULATION                S03 02472
009644 005522 R
                    2482 *                                                                  S03 02473
                    2483 *      1010    ADD (COMPLEMENT B, OR WITH A) WITH (AND A AND B),   S03 02474
                    2484 *              ADD CIN                                             S03 02475
                    2485 *                                                                  S03 02476
009645 015033 A     2486 X082   LDA     LTCHB,1         B                                   S03 02477
009646 005211 A     2487        COMPL   011             COMPLEMENT                          S03 02478
009647 115032 A     2488        ORA     LTCHA,1         OR WITH A                           S03 02479
009650 054206 A     2489        STA     X0AA            FIRST RESULT                        S03 02480
009651 015032 A     2490        LDA     LTCHA,1         A                                   S03 02481
009652 155033 A     2491        ANA     LTCHB,1         AND WITH B                          S03 02482
009653 054204 A     2492        STA     X0AB            SECOND RESULT                       S03 02483
009654 124202 A     2493        ADD     X0AA            ADD FIRST RESULT                    S03 02484
009655 125035 A     2494        ADD     XCIN,1          ADD CIN                             S03 02485
009656 002000 A     2495        JMPM    X094            SAVE OVERFLOW                       S03 02486
009657 005754 R
```

```
005660 001000 A 2496          JMP     X071            DO CARRY CALCULATION                    S03 02487
005661 005522 R
                2497 *                                                                        S03 02488
                2498 *        1011    AND A AND B, SUBTRACT 1, ADD CIN                        S03 02489
                2499 *                                                                        S03 02490
005662 015032 A 2500 X084     LDA     LTCHA,1         A                                       S03 02491
005663 155033 A 2501          ANA     LTCHB,1         AND WITH B                              S03 02492
005664 005311 A 2502          DAR                     SUBTRACT 1                              S03 02493
005665 125035 A 2503          ADD     XCIN,1          ADD CIN                                 S03 02494
005666 002000 A 2504          JMPM    X094            SAVE OVERFLOW                           S03 02495
005667 005754 R
005670 015035 A 2505          LDA     XCIN,1          CIN                                     S03 02496
005671 001010 A 2506          JAZ     *+4             JUMP IF NO CARRY IN                     S03 02497
005672 005675 R
005673 001000 A 2507          JMP     X096            NO CARRY OUT                            S03 02498
005674 005770 R
005675 014131 A 2508          LDA     X099            ALU RESULT                              S03 02499
005676 005211 A 2509          CPA                     COMPLEMENT                              S03 02500
005677 001010 A 2510          JAZ     X096            NO CARRY OUT ON -1 RESULT               S03 02501
005700 005770 R
005701 001000 A 2511          JMP     X097            SET CARRY OUT                           S03 02502
005702 005773 R
                2512 *                                                                        S03 02503
                2513 *        1100    ADD A AND A, ADD CIN                                    S03 02504
                2514 *                                                                        S03 02505
005703 015032 A 2515 X086     LDA     LTCHA,1         A                                       S03 02506
005704 125032 A 2516          ADD     LTCHA,1         ADD A                                   S03 02507
005705 125035 A 2517          ADD     XCIN,1          ADD CIN                                 S03 02508
005706 002000 A 2518          JMPM    X094            SAVE OVERFLOW                           S03 02509
005707 005754 R
005710 015032 A 2519          LDA     LTCHA,1         A                                       S03 02510
005711 001004 A 2520          JAN     X097            SET CARRY IF A NEGATIVE                 S03 02511
005712 005773 R
005713 001000 A 2521          JMP     X096            NO CARRY OUT                            S03 02512
005714 005770 R
                2522 *                                                                        S03 02513
                2523 *        1101    OR A AND B, ADD A, ADD CIN                              S03 02514
                2524 *                                                                        S03 02515
005715 015032 A 2525 X088     LDA     LTCHA,1         A                                       S03 02516
005716 115033 A 2526          ORA     LTCHB,1         OR WITH B                               S03 02517
005717 054140 A 2527          STA     X0A8            SECOND RESULT                           S03 02518
005720 125032 A 2528          ADD     LTCHA,1         ADD A                                   S03 02519
```

```
                    2529 *                                                                  S03 02520
000721 125035 A     2530 X089   ADD     XCIN,1          ADD CIN                             S03 02521
000722 002000 A     2531        JMPM    X094            SAVE OVERFLOW                       S03 02522
000723 005754 R
000724 001000 A     2532        JMP     X071-2          DO CARRY CALCULATION                S03 02523
000725 005520 R
                    2533 *                                                                  S03 02524
                    2534 *      1110    COMPLEMENT B, OR WITH A, ADD A, ADD CIN             S03 02525
                    2535 *                                                                  S03 02526
000726 015033 A     2536 X090   LDA     LTCHB,1         B                                   S03 02527
000727 005211 A     2537        COMPL   011             COMPLEMENT                          S03 02528
000730 115032 A     2538        ORA     LTCHA,1         OR WITH A                           S03 02529
000731 054126 A     2539        STA     X0AB            SECOND RESULT                       S03 02530
000732 125032 A     2540        ADD     LTCHA,1         ADD A                               S03 02531
000733 001000 A     2541        JMP     X089            DO CARRY CALCULATION                S03 02532
000734 005721 R
                    2542 *                                                                  S03 02533
                    2543 *      1111    ADD A AND CIN, SUBTRACT 1                           S03 02534
                    2544 *                                                                  S03 02535
000735 015032 A     2545 X092   LDA     LTCHA,1         A                                   S03 02536
000736 005311 A     2546        DAR                     SUBTRACT 1                          S03 02537
000737 125035 A     2547        ADD     XCIN,1          ADD CIN                             S03 02538
000740 002000 A     2548        JMPM    X094            SAVE OVERFLOW                       S03 02539
000741 005754 R
000742 015035 A     2549        LDA     XCIN,1          CIN                                 S03 02540
000743 001010 A     2550        JAZ     *+4             JUMP IF NO CARRY IN                 S03 02541
000744 005747 R
000745 001000 A     2551        JMP     X096            NO CARRY OUT                        S03 02542
000746 005770 R
000747 015032 A     2552        LDA     LTCHA,1         A                                   S03 02543
000750 001010 A     2553        JAZ     X096            NO CARRY OUT IF A ZERO              S03 02544
000751 005770 R
000752 001000 A     2554        JMP     X097            SET CARRY OUT                       S03 02545
000753 005773 R
                    2555 *                                                                  S03 02546
```

```
                    2556          EJEC                                                    S03 02547
                    2557 *                                                                S03 02548
                    2558 *        SAVE OVERFLOW FROM ARITHMETIC OPERATION                 S03 02549
                    2559 *                                                                S03 02550
000754 000000 A     2560 X094     ENTR                                                    S03 02551
000755 054051 A     2561          STA     X099          SAVE RESULT                       S03 02552
000756 005001 A     2562          TZA                                                     S03 02553
000757 005511 A     2563          ADFA                  PUT OVERFLOW IN A                 S03 02554
000760 055037 A     2564          STA     OVRFL,1       SAVE OVERFLOW                     S03 02555
000761 014045 A     2565          LDA     X099          GET RESULT                        S03 02556
000762 001000 A     2566          JMP*    X094          RETURN                            S03 02557
000763 105754 R
                    2567 *                                                                S03 02558
                    2568 *        SET ZERO CARRY                                          S03 02559
                    2569 *                                                                S03 02560
000764 002000 A     2570 X095     JMPM    X09A          CHECK IF SAMPLING                 C 03 02561
000765 006001 R
000766 005001 A     2571          TZA                                                     C 03 02562
000767 055036 A     2572          STA     CARRY,1       SET CARRY                         S03 02563
000770 014036 A     2573 X096     LDA     X099          ALU RESULT                        S03 02564
000771 001000 A     2574          JMP*    X020          RETURN                            S03 02565
000772 105166 R
                    2575 *                                                                S03 02566
                    2576 *        SET CARRY OF ONE                                        S03 02567
                    2577 *                                                                S03 02568
000773 002000 A     2578 X097     JMPM    X09A          CHECK IF SAMPLING                 C 03 02569
000774 006001 R
000775 005101 A     2579          INCR    01                                              C 03 02570
000776 055036 A     2580          STA     CARRY,1       SET CARRY                         S03 02571
000777 001000 A     2581          JMP     X096          GET ALU RESULT AND EX             S03 02572
001000 005770 R
                    2582 *                                                                C 03 02573
                    2583 *        SUBROUTINE TO CHECK IF SAMPLING  (S=0,T=0, AND G=XX1X)  C 03 02574
                    2584 *              RETURN INCR BY TWO IF NOT SAMPLING                C 03 02575
                    2585 *                                                                C 03 02576
001001 000000 A     2586 X09A     ENTR                                                    C 03 02577
001002 015006 A     2587          LDA     XS,1          S FIELD                           C 03 02578
001003 115005 A     2588          ORA     XT,1          T FIELD                           C 03 02579
001004 001010 A     2589          JAZ     X09C          IF S=0 + T=0                      C 03 02580
001005 006020 R
001006 015006 A     2590          LDA     XS,1                                            F ********
001007 006140 A     2591          SUBI    2                                               F ********
```

```
009010 000002 A
009011 115005 A 2592          ORA     XT,1                                    F  ********
009012 001010 A 2593          JAZ     X09C        IF SF=2 AND TF=0            F  ********
009013 006020 R
009014 047000 I 2594 X09B     INR     X09A        ADVANCE                        C 03 02581
009015 047000 I 2595          INR     X09A        RETURN                         C 03 02582
009016 001000 A 2596          JMP*    X09A        ADDRESS                        C 03 02583
009017 106001 R
009020 015007 A 2597 X09C     LDA     XG,1        G FIELD                        C 03 02584
009021 006150 A 2598          ANAI    02          BIT 1                          C 03 02585
009022 000002 A
009023 001010 A 2599          JAZ     X09B        JUMP IF NOT SET                C 03 02586
009024 006014 R
009025 001000 A 2600          JMP*    X09A        SAMPLING                       C 03 02587
009026 106001 R
                 2601 *                                                          S03 02588
009027 000000 A 2602 X099     DATA    0           TEMP STORAGE                   S03 02589
                 2603 *                                                          S03 02590
                 2604 *                                                          S03 02591
                 2605 *                                                          S03 02592
                 2606 *       CARRY CALCULATION ROUTINE                          S03 02593
                 2607 *                                                          S03 02594
009030 014026 A 2608 X0A0     LDA     X0AA        FIRST RESULT                   S03 02595
009031 154026 A 2609          ANA     X0AB        SECOND RESULT                  S03 02596
009032 001004 A 2610          JAN     X097        SET CARRY IF BOTH NEGATIVE     S03 02597
009033 005773 R
009034 014022 A 2611          LDA     X0AA        FIRST RESULT                   S03 02598
009035 001004 A 2612          JAN     X0A1        JUMP IF NEGATIVE               S03 02599
009036 006047 R
009037 014020 A 2613          LDA     X0AB        SECOND RESULT                  S03 02600
009040 001002 A 2614          JAP     X095        NO CARRY IF RESULT POSITIVE    D  03 02601
009041 005764 R
009042 124014 A 2615          ADD     X0AA        PLUS FIRST RESULT              S03 02602
009043 001002 A 2616          JAP     X097        SET CARRY IF FIRST RESULT LARGER S03 02603
009044 005773 R
009045 001000 A 2617          JMP     X095        NO CARRY                       D  03 02604
009046 005764 R
                 2618 *                                                          S03 02605
                 2619 *                                                          S03 02606
009047 014010 A 2620 X0A1     LDA     X0AB        SECOND RESULT                  S03 02607
009050 001004 A 2621          JAN     X095        NO CARRY IF RESULT POSITIVE    S03 02608
009051 005764 R
```

```
009052 124004 A 2622          ADD     X0AA        PLUS FIRST RESULT                    S03 02609
009053 001004 A 2623          JAN     X095        NO CARRY IF FIRST RESULT LARGER      S03 02610
009054 005764 R
009055 001000 A 2624          JMP     X097        SET CARRY                            S03 02611
009056 005773 R
                2625 *                                                                 S03 02612
009057 000000 A 2626 X0AA     DATA    0           FIRST RESULT                         S03 02613
009060 000000 A 2627 X0AB     DATA    0           SECOND RESULT                        S03 02614
```

```
                    2628          EJEC                                                    S03 02615
                    2629 *                                                                S03 02616
                    2630 *   DETERMINE STATE OF MULTIPLY SIGN(MULS).                      S03 02617
                    2631 *       MULS=(LA15-AND-LB15)-OR-(LB15-AND-AL15)-OR-(LA15-AND-AL15)  S03 02618
                    2632 *                                                                S03 02619
000061 000000 A     2633 DLMS     ENTR                                                    S03 02620
000062 015032 A     2634          LDA     LTCHA,1         LATCH A SIGN BIT ON             S03 02621
000063 001004 A     2635          JAN     DLM1            YES-                            S03 02622
000064 006074 R
000065 015033 A     2636          LDA     LTCHB,1         LATCH B SIGN BIT ON ?           S03 02623
000066 001004 A     2637          JAN     DLM4            YES-                            S03 02624
000067 006104 R
000070 005001 A     2638 DLM3     IZA                     RESET MULS.                     S03 02625
000071 055071 A     2639 DLM2     STA     MULS,1                                          S03 02626
000072 001000 A     2640          RETU*   DLMS            EXIT                            S03 02627
000073 106061 R
000074 015033 A     2641 DLM1     LDA     LTCHB,1                                         S03 02628
000075 001004 A     2642          JAN     DLM7            SET MULS                        S03 02629
000076 006111 R
000077 015034 A     2643          LDA     XALU,1                                          S03 02630
000100 001004 A     2644          JAN     DLM7            SET MULS                        S03 02631
000101 006111 R
000102 001000 A     2645          JMP     DLM3            RESET MULS                      S03 02632
000103 006070 R
000104 015034 A     2646 DLM4     LDA     XALU,1          ALU RESULT NEGATIVE ?           S03 02633
000105 001004 A     2647          JAN     DLM7            YES-SET MULS                    S03 02634
000106 006111 R
000107 001000 A     2648          JMP     DLM3            RESET MULS                      S03 02635
000110 006070 R
000111 005101 A     2649 DLM7     INCR    01              A=1                             S03 02636
000112 001000 A     2650          JMP     DLM2            SET MULS                        S03 02637
000113 006071 R
```

```
2651          EJEC                                                    S03 02638
2652  *                                                               S03 02639
2653  *                                                               S03 02640
2654  *                                                               S03 02641
2655  *                                                               S03 02642
2656  *                                                               S03 02643
2657  *    FORM MACHINE STATUS REGISTER SETTING(STUS)                  S03 02644
2658  *    TEST CONDITION SETTINGS FOR TEST MUX(TMUX)                  S03 02645
2659  *    AND MISC SETTINGS: SUPERVISOR KEY, I/O KEY REG, INTERRUPT FLAG,  S03 02646
2660  *                       MUL SIGN                                 S03 02647
2661  *                                                               S03 02648
2662  *    THE MACHINE STATUS REGISTER(STUS) IS AN INPUT TO THE LATCH B MUX  S03 02649
2663  *                                                               S03 02650
2664  *    THE TEST CONDITIONS(SEE TMUX TABLE UP FRONT) ARE SELECTED BY THE  S03 02651
2665  *    G FIELD(WHEN T FIELD IS NOT=00) IN DETERMINING THE NEXT ROM  S03 02652
2666  *    ADDRESS.THIS IS DONE IN COMPONENT CRAS.                     S03 02653
2667  *                                                               S03 02654
2668  *    A PSEUDO 16-BIT STATUS REGISTER(STUS) IS USED IN THE PROGRAM. IN  S03 02655
2669  *    THE HARDWARE THERE IS NO "REGISTER, ITS JUST GATING OF F/F'S,ETC.  S03 02656
2670  *    INTO THE BMUX.                                              S03 02657
2671  *    SIMILARLY, A TEST CONDITION TABLE(TMUX) IS USED HERE-IN.     S03 02658
2672  *                                                               S03 02659
2673  *                                                               S03 02660
2674  *    MACHINE STATUS "REGISTER" (STUS)                            S03 02661
2675  *       BIT                                                     S03 02662
2676  *        0    NOT USED                                          S03 02663
2677  *        1    NOT USED                                          S03 02664
2678  *        2     ALU ZERO                                         S03 02665
2679  *        3    SHIFT COUNTER BIT 0                               S03 02666
2680  *        4    SHIFT COUNTER BIT 1                               S03 02667
2681  *        5    SHIFT COUNTER BIT 2                               S03 02668
2682  *        6    SHIFT COUNTER BIT 3                               S03 02669
2683  *        7    SHIFT COUNTER BIT 4                               S03 02670
2684  *        8    ALU OVERFLOW                                      S03 02671
2685  *        9    ALU EQUALS                                        S03 02672
2686  *       10    ALU SIGN                                          S03 02673
2687  *       11    ALU CARRY                                         S03 02674
2688  *       12     KEY REG BIT 0,DK12    THE DAT LOOP KEY REGISTER IS  S03 02675
2689  *       13     KEY REG BIT 1,DK13    A 4-BIT REGISTER THAT     S03 02676
2690  *       14     KEY REG BIT 2,DK14    STORES THE STATE OF       S03 02677
2691  *       15     KEY REG BIT 3,DK15    ALU-OUT BITS 12-15        S03 02678
2692  *                                                               S03 02679
```

```
                    2693 *                                                                  S03 02680
                    2694 *                                                                  S03 02681
                    2695 *   TEST MUX INPUTS                                                S03 02682
                    2696 *                                                                  S03 02683
                    2697 *       0   ALU OVERFLOW                                         S03 02684
                    2698 *       1   I/O SENSE                                            S03 02685
                    2699 *       2   SSW3                                                 S03 02686
                    2700 *       3   SSW2                                                 S03 02687
                    2701 *       4   SSW1                                                 S03 02688
                    2702 *       5   620/F TEST (FOR JMP, JMPM, $XEC GROUPS)              S03 02689
                    2703 *       6   ALU EQUALS                                           S03 02690
                    2704 *       7   ALU SIGN                                             S03 02691
                    2705 *       8   ALU CARRY                                            S03 02692
                    2706 *       9   ALU ZERO                                             S03 02693
                    2707 *       10      OS  FLIP/FLOP  (SIGN STORAGE FOR OREG SHIFTING   S03 02694
                    2708 *       11  MIL15  SIGN BIT OF MEMORY LATCH                      S03 02695
                    2709 *       12      SHIFT COUNT = -1                                 S03 02696
                    2710 *       13  A15-SIGN OF A REG FOR MUL, OPERATIONS               S03 02697
                    2711 *       14 DAL15 NOT EQUAL TO DAL14  NALU OUTPUT BITS 14 & 15)   S03 02698
                    2712 *       15      QS FLIP/FLOP   (SAVES ALU15/OR01 FOR MUL/DIV OPS) S03 02699
                    2713 *                                                                  S03 02700
                    2714 ************************************************************************ S03 02701
                    2715 *  BIT 11 (MIL15) IS ESTABLISHED IN MEM, OPERATIONS  COMPONENT.   * S03 02702
                    2716 *                                                                  S03 02703
                    2717 *                                                                  S03 02704
                    2718 *                                                                  S03 02705
                    2719 *    CALLING SEQUENCE                                              S03 02706
                    2720 *      LDX     ADDR OF ROM FILEDS/DATA                             S03 02707
                    2721 *      CALL    X100                                                S03 02708
                    2722 *                                                                  S03 02709
                    2723 *                                                                  S03 02710
000114 000000 A     2724 X100   ENTR                                                        S03 02711
                    2725 *                                                                  S03 02712
                    2726 *   STORE 3-BIT D.L. KEY REGISTER INTO BITS 13-15 OF STATUS REGISTER S03 02713
000115 015041 A     2727        LDA     STUS,1                                              S03 02714
000116 006150 A     2728        ANAI    07777          CLEAR BITS 12-15                     S03 02715
000117 007777 A
000120 055041 A     2729        STA     STUS,1         OF STATUS REGISTER                   S03 02716
000121 015047 A     2730        LDA     KREG,1         KEY REG IS 4 BITS, RIGHT JUSTIFIED   S03 02717
000122 004254 A     2731        LRLA    12                                                  S03 02718
000123 135041 A     2732        ERA     STUS,1         INSERT CURRENT CONTENTS OF KREG      S03 02719
000124 055041 A     2733        STA     STUS,1         INTO STATUS REG                      S03 02720
```

```
                    2734 *   STORE SHIFT COUNTER INTO BITS 3-7 OF STATUS REGISTER                S03 02721
000125 015041 A     2735         LDA     STUS,1                                                  S03 02722
000126 006150 A     2736         ANAI    0177407         RESET BITS 3-7                          S03 02723
000127 177407 A
000130 055041 A     2737         STA     STUS,1          OF STATUS REGISTER,                     S03 02724
000131 015043 A     2738         LDA     SREG,1          SHIFT COUNTER                           S03 02725
000132 006150 A     2739         ANAI    037             GET 5 LSB'S                             S03 02726
000133 000037 A
000134 004243 A     2740         LRLA    3               POSITION IT                             S03 02727
000135 135041 A     2741         ERA     STUS,1                                                  S03 02728
000136 055041 A     2742         STA     STUS,1                                                  S03 02729
                    2743 *                                                                       S03 02730
                    2744 *                                                                       S03 02731
                    2745 *   THIS SEQUENCE CONTROLS TEST CONDITION BITS 1-5,10,AND 12-15         S03 02732
                    2746 *   THE ALU RELATED BITS: 0 & 6-9 FOLLOW.                               S03 02733
                    2747 *                                                                       S03 02734
                    2748 *                                                                       S03 02735
                    2749 *                                                                       S03 02736
                    2750 *   TEST BIT 1: I/O SENSE                                               S03 02737
000137 005000 A     2751 XS10    NOP                     * NOT SIMULATED                         S03 02738
                    2752 *                               *                                       S03 02739
                    2753 *                                                                       S03 02740
                    2754 *                                                                       S03 02741
                    2755 *   TEST BITS 2,3,4: SENSE SWITCHES 3,2,1                               S03 02742
                    2756 *                                                                       S03 02743
000140 006030 A     2757         LDXI    TMUX                                                    S03 02744
000141 000640 R
000142 005101 A     2758 XS15    INCR    01              A=01                                    S03 02745
000143 005002 A     2759         TZB                     B=0                                     S03 02746
000144 001100 A     2760         JSB1    *+5                                                     S03 02747
000145 006151 R
000146 055004 A     2761         STB     4,1             SS1=0                                   S03 02748
000147 001000 A     2762         JMP     *+3                                                     S03 02749
000150 006152 R
000151 055004 A     2763         STA     4,1             SS1=1                                   S03 02750
000152 001200 A     2764         JSB2    *+5                                                     S03 02751
000153 006157 R
000154 055003 A     2765         STB     3,1             SS2=0                                   S03 02752
000155 001000 A     2766         JMP     *+3                                                     S03 02753
000156 006160 R
000157 055003 A     2767         STA     3,1             SS2=1                                   S03 02754
000160 001400 A     2768         JSB3    *+5                                                     S03 02755
```

```
000161 006165 R
000162 065002 A 2769          STB     2,1             SS3=0                                   S03 02756
000163 001000 A 2770          JMP     *+3                                                     S03 02757
000164 006165 R
000165 055002 A 2771          STA     2,1             SS3=1                                   S03 02758
000166 006030 A 2772          LDXI    DROM                                                    S03 02759
000167 000545 R
000170 006020 A 2773          LDBI    TMUX            ADDR OF TEST CONDITIONS TABLE           S03 02760
000171 000640 R
                2774 *                                                                        S03 02761
                2775 *                                                                        S03 02762
                2776 *    SET 620/F TEST BIT=5= IF INST, IS                                   S03 02763
                2777 *    JMP,JMPM,OR XEC                                                     S03 02764
000172 015052 A 2778 XS20     LDA     IRG2,1          GET INST,REG#2                          S03 02765
000173 005012 A 2779          TAB                     TEMP SAVE                               S03 02766
000174 006150 A 2780          ANAI    0177000                                                 S03 02767
000175 177000 A
000176 004351 A 2781          LSRA    9                                                       S03 02768
000177 001010 A 2782          JAZ     XS23            NOT CORRECT TYPE OF INST                S03 02769
000200 005216 R
000201 005311 A 2783          DAR                                                             S03 02770
000202 001010 A 2784          JAZ     XS21            JUMP INST'S                             S03 02771
000203 006215 R
000204 005311 A 2785          DAR                                                             S03 02772
000205 001010 A 2786          JAZ     XS21            JMPM INSTRUCTIONS                       S03 02773
000206 006215 R
000207 005311 A 2787          DAR                                                             S03 02774
000210 001010 A 2788          JAZ     XS21            XEC INSTRUCTIONS                        S03 02775
000211 006215 R
000212 005001 A 2789 XS24     TZA                                                             S03 02776
000213 001000 A 2790          JMP     XS23            RESET BIT 5                             S03 02777
000214 006216 R
                2791 *                                                                        S03 02778
000215 005101 A 2792 XS21     INCR    01              A=1                                     S03 02779
000216 006020 A 2793 XS23     LDBI    TMUX                                                    S03 02780
000217 000640 R
000220 056005 A 2794          STA     5,2             SET 620/F TEST CONDITIONS INTO          S03 02781
                2795 *                                POSITION 5 OF TMUX TABLE                S03 02782
                2796 *    TEST BIT 13: STORES SIGN BIT(DAL15) OF ALU OUTPUT WHENEVER          S03 02783
                2797 *                 FILE REG,0(A REG) IS WRITTEN INTO,                     S03 02784
000221 015021 A 2798          LDA     XW,1            DON'T UPDATE                            S03 02785
000222 001010 A 2799          JAZ     XS30            A15 F/F IF NOT                          S03 02786
```

```
000223 006243 R
000224 015013 A 2800          LDA     XLB,1           LB IS SPECIFYING                    S03 02787
000225 006140 A 2801          SUBI    2               MASK FIELD                          S03 02788
000226 000002 A
000227 001002 A 2802          JAP     XS30            DO NOT SET A15 F/F,                 S03 02789
000230 006243 R
000231 015030 A 2803          LDA     XA,1            WRITING INTO                        S03 02790
000232 001010 A 2804          JAZ     *+4                                                 S03 02791
000233 006236 R
000234 001000 A 2805          JMP     XS30                                                S03 02792
000235 006243 R
000236 015034 A 2806          LDA     XALU,1                                              S03 02793
000237 004241 A 2807          LRLA    1                                                   S03 02794
000240 006150 A 2808          ANAI    1                                                   S03 02795
000241 000001 A
000242 056015 A 2809          STA     13,2                                                S03 02796
                2810 *    TEST BIT 10: STATUS OF DS F/F  1=SET  0=RESET                   S03 02797
000243 015064 A 2811 XS30     LDA     DS,1                                                S03 02798
000244 001010 A 2812          JAZ     XS32                                                S03 02799
000245 006247 R
000246 005101 A 2813          INCR    01                                                  S03 02800
000247 056012 A 2814 XS32     STA     10,2                                                S03 02801
                2815 *    TEST BIT 12: SHIFT COUNT=-1                                     S03 02802
000250 015043 A 2816 XS45     LDA     SREG,1                                              S03 02803
000251 006130 A 2817          ERAI    0177777                                             S03 02804
000252 177777 A
000253 001010 A 2818          JAZ     XS46                                                S03 02805
000254 006260 R
000255 005001 A 2819          TZA                                                         S03 02806
000256 001000 A 2820          JMP     *+3                                                 S03 02807
000257 006261 R
000260 005101 A 2821 XS46     INCR    01                                                  S03 02808
000261 056014 A 2822          STA     12,2                                                S03 02809
                2823 *    TEST BIT 14: DAL15 NOT EQUAL TO DAL14,                          S03 02810
000262 015034 A 2824 XS50     LDA     XALU,1            ALU OUTPUT                      C 03 02811
000263 004341 A 2825          LSRA    1                 POSITION BIT 15 TO 14           C 03 02812
000264 135034 A 2826          ERA     XALU,1            COMPARE BITS                    C 03 02813
000265 004356 A 2827          LSRA    14                POSITION RESULT                 C 03 02814
000266 056016 A 2828          STA     14,2              SET NORMALIZE FLAG              C 03 02815
                2829 *    TEST BIT 15: STATUS OF QS F/F  1=SET  0=RESET                   S03 02816
000267 015063 A 2830 XS60     LDA     QS,1                                                S03 02817
000270 001010 A 2831          JAZ     *+4                                                 S03 02818
```

```
000271 006274 R,
000272 001000 A 2832          JMP     XS61                                    S03 02819
000273 006276 R
000274 001000 A 2833          JMP     **3                                     S03 02820
000275 006277 R
000276 005101 A 2834 XS61     INCR    01                                      S03 02821
000277 056017 A 2835          STA     15,2                                    S03 02822
                2836 *                                                        S03 02823
                2837 *                                                        S03 02824
                2838 *                                                        S03 02825
                2839 *    THE FOLLOWING STATUS REGISTER AND TEST CONDITIONS ARE S03 02826
                2840 *    CONDITIONALLY CONTROLLED BY FIELDS S,T,&G,          S03 02827
                2841 *                                                        S03 02828
                2842 *                                                        S03 02829
                2843 *    SET/RESET "EQUALS","STORED=CARRY","ZEROS","OVERFLOW" & "ALU SIGN"IFS03 02830
                2844 *     (S=0&T=0&G=XX1X)-OR-(S=1&T=0&GX11X)                S03 02831
                2845 *     OTHERWISE,SKIP TO X104                             S03 02832
                2846 *                                                        S03 02833
000300 015006 A 2847          LDA     XS,1          S FIELD=0 ?               S03 02834
000301 001010 A 2848          JAZ     **4                                     S03 02835
000302 006305 R
000303 001000 A 2849          JMP     XS64          NO                        S03 02836
000304 006323 R
000305 015005 A 2850          LDA     XT,1          T FIELD=0 ?               S03 02837
000306 001010 A 2851          JAZ     **4                                     S03 02838
000307 006312 R
000310 001000 A 2852          JMP     XS90          NO                        S03 02839
000311 006561 R
000312 015007 A 2853          LDA     XG,1                                    S03 02840
000313 006150 A 2854          ANAI    02            G FIELD=XX1X ?            S03 02841
000314 000002 A
000315 001010 A 2855          JAZ     **4                                     S03 02842
000316 006321 R
000317 001000 A 2856          JMP     XS65          YES=GO SAMPLE CONDITION CODES S03 02843
000320 006363 R
000321 001000 A 2857          JMP     X120          GO CHECK IF OVFL SHOULD BE SAMPLED S03 02844
000322 006466 R
                2858 *                                                        S03 02845
000323 015006 A 2859 XS64     LDA     XS,1                                    S03 02846
000324 006140 A 2860          SUBI    1             S FIELD=01 ?              S03 02847
000325 000001 A
000326 001010 A 2861          JAZ     XS64A         IF SF=1                   ********
```

```
000327 006345 R
000330 005311 A 2862          DAR                                              F  ********
000331 115005 A 2863          ORA     XT,1                                     F  ********
000332 001010 A 2864          JAZ     *+4             IF SF=2 AND TF=0         F  ********
000333 006336 R
000334 001000 A 2865          JMP     XS90            IF SF=3 OR TF NE 0       F  ********
000335 006561 R
000336 015007 A 2866          LDA     XG,1                                     F  ********
000337 006150 A 2867          ANAI    2                                        F  ********
000340 000002 A
000341 001010 A 2868          JAZ     XS90                                     F  ********
000342 006561 R
000343 001000 A 2869          JMP     XS65            IF SF=2, TF=0, AND GF=XX1X  F  ********
000344 006363 R
       006345 R 2870 XS64A    EQU     *                                        F  ********
000345 015005 A 2871          LDA     XT,1            T FIELD=0 ?                 S03 02850
000346 001010 A 2872          JAZ     *+4                                         S03 02851
000347 006352 R
000350 001000 A 2873          JMP     XS90            NO                          S03 02852
000351 006561 R
000352 015007 A 2874          LDA     XG,1                                        S03 02853
000353 006150 A 2875          ANAI    06                                          S03 02854
000354 000006 A
000355 006140 A 2876          SUBI    06              G FIELD=X11X ?              S03 02855
000356 000006 A
000357 001010 A 2877          JAZ     X103            GO SAMPLE OVFL              S03 02856
000360 006473 R
000361 001000 A 2878          JMP     X104                                        S03 02857
000362 006524 R
               2879 *    SET "EQUALS" F/F IF ALU RESULT=ALL ONES                 S03 02858
000363 015034 A 2880 XS65     LDA     XALU,1          IS ALU OUTPUT               S03 02859
000364 005111 A 2881          IAR                     EQUAL TO ALL ONES ?         S03 02860
000365 001016 A 2882          JANZ    XS70            NO-                         S03 02861
000366 006375 R
000367 015041 A 2883          LDA     STUS,1                                      S03 02862
000370 006110 A 2884          ORAI    01000           SET "EQUALS" BIT (9)        S03 02863
000371 001000 A
000372 055041 A 2885          STA     STUS,1                                      S03 02864
               2886 *                                                            S03 02865
000373 005101 A 2887          INCR    01                                          S03 02866
000374 001000 A 2888          JMP     XS71                                        S03 02867
000375 006403 R
```

```
                    2889 *   RESET "EQUALS" BIT IF ALU RESULT NOT=ALL ONES                  S03 02868
000376 015041 A     2890 XS70   LDA     STUS,1          STATUS REGISTER                    S03 02869
000377 006150 A     2891        ANAI    0176777         RESET STUS BIT 9                   S03 02870
000400 176777 A
000401 055041 A     2892        STA     STUS,1                                             S03 02871
000402 005001 A     2893        TZA                                                        S03 02872
000403 056006 A     2894 XS71   STA     6,2             "EQUALS" IS POSITION 6 IN TMUX     S03 02873
                    2895 *                                                                 S03 02874
                    2896 *   SET STORED-CARRY F/F IF CARRY OUT WAS GENERATED               S03 02875
000404 015036 A     2897 X101   LDA     CARRY,1         IF CARRY-OUT WAS                   S03 02876
000405 001010 A     2898        JAZ     XS73            GENERATED DURING ALU               S03 02877
000406 006416 R
000407 015041 A     2899        LDA     STUS,1                                             S03 02878
000410 006110 A     2900        ORAI    04000           SET "STORED CARRY" BIT (11)        S03 02879
000411 004000 A
000412 055041 A     2901        STA     STUS,1                                             S03 02880
                    2902 *                                                                 S03 02881
000413 005101 A     2903        INCR    01                                                 S03 02882
000414 001000 A     2904        JMP     XS74                                               S03 02883
000415 006423 R
                    2905 *   RESET STORED-CARRY BIT IF ALU CARRY-OUT WAS NOT GENERATED     S03 02884
000416 015041 A     2906 XS73   LDA     STUS,1                                             S03 02885
000417 006150 A     2907        ANAI    0173777         RESET STUS BIT 11                  S03 02886
000420 173777 A
000421 055041 A     2908        STA     STUS,1                                             S03 02887
000422 005001 A     2909        TZA                                                        S03 02888
000423 056010 A     2910 XS74   STA     8,2             "CARRY" IS POSITION 8 IN  TMUX TABLE S03 02889
                    2911 *                                                                 S03 02890
                    2912 *   SET "ALU OUT=ZERO" F/F IF ALU RESULT IS ZERO                   S03 02891
000424 015034 A     2913 X102   LDA     XALU,1          IS ALU OUTPUT EQUAL TO ZERO ?      S03 02892
000425 001010 A     2914        JAZ     *+4             NO                                 S03 02893
000426 006431 R
000427 001000 A     2915        JMP     XS76                                               S03 02894
000430 006440 R
000431 015041 A     2916        LDA     STUS,1                                             S03 02895
000432 006110 A     2917        ORAI    4                                                  S03 02896
000433 000004 A
000434 055041 A     2918        STA     STUS,1                                             S03 02897
                    2919 *                                                                 S03 02898
000435 005101 A     2920        INCR    01                                                 S03 02899
000436 001000 A     2921        JMP     XS78                                               S03 02900
000437 006445 R
```

```
                    2922 *   RESET ALU OUT=ZERO BIT IF ALU RESULT IS NOT ZERO                S03 02901
000440 015041 A     2923 XS76   LDA     STUS,1                                                 S03 02902
000441 006150 A     2924        ANAI    0177773       RESET BIT 2 OF STATUS WORD               S03 02903
000442 177773 A
000443 055041 A     2925        STA     STUS,1                                                 S03 02904
000444 005001 A     2926        TZA                   RESET                                    S03 02905
000445 056011 A     2927 XS78   STA     9,2           "ZEROS" IS POSITION 9 IN TMUX TABLE      S03 02906
                    2928 *                                                                     S03 02907
                    2929 *                                                                     S03 02908
                    2930 *   SET ALU SIGN BIT IF ALU RESULT WAS NEGATIVE                       S03 02909
000446 015034 A     2931 XS80   LDA     XALU,1        ALU OUTPUT STORAGE                       S03 02910
000447 001002 A     2932        JAP     XS81                                                   S03 02911
000450 006460 R
000451 015041 A     2933        LDA     STUS,1                                                 S03 02912
000452 006110 A     2934        ORAI    02000         SET ALU SIGN BIT (10)                    S03 02913
000453 002000 A
000454 055041 A     2935        STA     STUS,1                                                 S03 02914
000455 005101 A     2936        INCR    01            A=1                                      S03 02915
000456 001000 A     2937        JMP     XS82          SET TMUX #7                              S03 02916
000457 006465 R
                    2938 *   RESET ALU SIGN BIT IF ALU RESULT WAS POSITIVE                     S03 02917
000460 015041 A     2939 XS81   LDA     STUS,1                                                 S03 02918
000461 006150 A     2940        ANAI    0175777       RESET BIT 10                             S03 02919
000462 175777 A
000463 055041 A     2941        STA     STUS,1                                                 S03 02920
000464 005001 A     2942        TZA                   RESET TMUX #7                            S03 02921
000465 056007 A     2943 XS82   STA     7,2           ALU SIGN BIT IS POSITION 7 IN TMUX TABLE S03 02922
                    2944 *                                                                     S03 02923
                    2945 *                                                                     S03 02924
000466 015007 A     2946 X120   LDA     XG,1                                                   S03 02925
000467 006150 A     2947        ANAI    010           G=1XXX                                   S03 02926
000470 000010 A
000471 001010 A     2948        JAZ     XS90                                                   S03 02927
000472 006561 R
                    2949 *  SAMPLE STORED OVERFLOW IF: 1, SPECIAL ALU MOVE(LA=0&LB=0/1&SH(TC)=1XS03 02928
                    2950 *                               AND BIT 6 OF IRG2=1,                  S03 02929
                    2951 *                             2, S=0&T=0&G=1XXX,                      S03 02930
                    2952 *                             3, S=1&T=NOT 0&G=X11X,                  S03 02931
000473 002000 A     2953 X103   CALL    SALU          SPECIAL ALU MODE ?                       S03 02932
000474 004355 R
000475 001000 A     2954        JMP     X108          YES-                                     S03 02933
000476 006512 R
```

```
000477 015037 A 2955 X109   LDA     OVRFL,1         OVERFLOW ON?                                    S03 02934
000500 001010 A 2956        JAZ     X107            NO=                                             S03 02935
000501 000522 R
000502 015041 A 2957        LDA     STUS,1                                                          S03 02936
000503 006110 A 2958        ORAI    0400            SET "STORED OVERFLOW" BIT (8)                   S03 02937
000504 000400 A
000505 055041 A 2959        STA     STUS,1                                                          S03 02938
               2960 *                                                                               S03 02939
000506 005101 A 2961        INCR    01                                                              S03 02940
000507 056000 A 2962        STA     0,2             "OVERFLOW" IS POSITION 0 IN TMUX TABLE          S03 02941
000510 001000 A 2963        JMP     X107            CONTINUE                                        S03 02942
000511 000522 R
               2964 *                                                                               S03 02943
000512 006017 A 2965 X108   LDAE    XIRG2           IRG2 AT LAST CLOCK                              S03 02944
000513 003477 R
000514 006150 A 2966        ANAI    0100            IRG2 BIT 6=1 ?                                  S03 02945
000515 000100 A
000516 001010 A 2967        JAZ     X107            NO=DON'T SAMPLE OVFL                            S03 02946
000517 000522 R
000520 001000 A 2968        JMP     X109            YES=SAMPLE OVFL.                                S03 02947
000521 000477 R
               2969 *                                                                               S03 02948
               2970 *   NO RESET OF "STORED=OVERFLOW"=-FOR COMPATIBILITY WITH 620/F                  S03 02949
000522 001000 A 2971 X107   JMP     XS90                                                            S03 02950
000523 000561 R
               2972 *                                                                               S03 02951
               2973 *                                                                               S03 02952
               2974 *   SET/RESET  "OVERFLOW" BIT IN STUS &TMUX IF S=01&T=00&G=X01X/X10X            S03 02953
               2975 *                                                                               S03 02954
000524 015007 A 2976 X104   LDA     XG,1                                                            S03 02955
000525 006150 A 2977        ANAI    06                                                              S03 02956
000526 000006 A
000527 006140 A 2978        SUBI    2               G FIELD=X01X ?                                  S03 02957
000530 000002 A
000531 001010 A 2979        JAZ     X105            YES=GO SET OVFL BIT                             S03 02958
000532 000541 R
000533 006140 A 2980        SUBI    2               G FIELD=X10X ?                                  S03 02959
000534 000002 A
000535 001010 A 2981        JAZ     X106            YES=GO RESET OVFL BIT                           S03 02960
000536 000551 R
000537 001000 A 2982        JMP     XS90                                                            S03 02961
000540 000561 R
```

```
                    2983 *   SET THE "STORED OVERFLOW" F/F : G=X01X                                  S03 02962
000541 015041 A     2984 X105  LDA     STUS,1                                                        S03 02963
000542 006110 A     2985       ORAI    0400            BIT 8                                         S03 02964
000543 000400 A
000544 055041 A     2986       STA     STUS,1                                                        S03 02965
000545 005101 A     2987       INCR    01                                                            S03 02966
000546 056000 A     2988       STA     0,2             "OVERFLOW" IS POSITION 0 IN TMUX TABLE        S03 02967
000547 001000 A     2989       JMP     XS90                                                          S03 02968
000550 006561 R
                    2990 *                                                                           S03 02969
                    2991 *   RESET THE "STORED OVERFLOW" F/F: G=X10X                                 S03 02970
000551 015041 A     2992 X106  LDA     STUS,1                                                        S03 02971
000552 006150 A     2993       ANAI    0177377         BIT 8                                         S03 02972
000553 177377 A
000554 055041 A     2994       STA     STUS,1                                                        S03 02973
000555 005001 A     2995       TZA                                                                   S03 02974
000556 056000 A     2996       STA     0,2             "OVERFLOW"IS POSITION 0 IN TMUX TABLE         S03 02975
000557 001000 A     2997       JMP     XS90                                                          S03 02976
000560 006561 R
                    2998 *   IF S=0, SET/RESET INTERRUPT FLAG, SUPERVISOR KEY, AND I/O              S03 02977
                    2999 *           REQUEST FLAG--AS SPECIFIED BY FIELD IMC                        S03 02978
000561 015006 A     3000 XS90  LDA     XS,1            S=0 ?                                         S03 02979
000562 001010 A     3001       JAZ     *+4                                                           S03 02980
000563 006566 R
000564 001000 A     3002       JMP*    X100            NO=EXIT                                       S03 02981
000565 106114 R
000566 015012 A     3003       LDA     XIMC,1                                                        S03 02982
000567 006140 A     3004       SUBI    05              IMC=0101                                      S03 02983
000570 000005 A
000571 001010 A     3005       JAZ     XS91            YES=                                          S03 02984
000572 006615 R
000573 005311 A     3006       DAR                     IMC=0110                                      S03 02985
000574 001010 A     3007       JAZ     XS91            YES=                                          S03 02986
000575 006615 R
000576 005311 A     3008       DAR                     IMC=0111 ?                                    S03 02987
000577 001010 A     3009       JAZ     XS92            YES=                                          S03 02988
000600 005620 R
000601 005311 A     3010       DAR                     IMC=1000 ?                                    S03 02989
000602 001010 A     3011       JAZ     X130            YES=                                          S03 02990
000603 006633 R
000604 005311 A     3012       DAR                     IMC=1001 ?                                    S03 02991
000605 005311 A     3013       DAR                     IMC=1010 ?                                    S03 02992
```

```
000606 001010 A 3014         JAZ      X134          YES=                              S03 02993
000607 006624 R
000610 005311 A 3015         DAR                    IMC=1011 ?                        S03 02994
000611 001010 A 3016         JAZ      X136          YES                               S03 02995
000612 006627 R
000613 001000 A 3017         JMP*     X100          EXIT                              S03 02996
000614 106114 R
                3018 *                                                                 S03 02997
                3019 *   IMC=0101/0110: RESET INTERRUPT FLAG                           S03 02998
000615 055067 A 3020 XS91    STA      INPF,1        CLEAR INT, BEING PROCESSED FLAG   S03 02999
000616 001000 A 3021         RETU*    X100          EXIT                              S03 03000
000617 106114 R
                3022 *   IMC=0111: SET INTERRUPT FLAG                                  S03 03001
000620 005101 A 3023 XS92    INCR     01                                              S03 03002
000621 055067 A 3024         STA      INPF,1        SET INT, BEING PROCESSED FLAG     S03 03003
000622 001000 A 3025         RETU*    X100          EXIT                              S03 03004
000623 106114 R
                3026 *   IMC=1010: RESET SUPERVISOR KEY                                S03 03005
000624 055065 A 3027 X134    STA      SUPK,1                                          S03 03006
000625 001000 A 3028         RETU*    X100          EXIT                              S03 03007
000626 106114 R
                3029 *   IMC=1011: SET SUPERVISOR KEY                                  S03 03008
000627 005111 A 3030 X136    IAR                    A=1                               S03 03009
000630 055065 A 3031         STA      SUPK,1                                          S03 03010
000631 001000 A 3032         RETU*    X100          EXIT                              S03 03011
000632 106114 R
                3033 *                                                                 S03 03012
                3034 *   IMC=1000: LOAD I/O KEY REGISTER WITH 3 MSB'S OF               S03 03013
                3035 *             ALU OUTPUT, RIGHT JUSTIFIED                       S03 03014
000633 006020 A 3036 X130    LDBI     DROM+IOKR     ADDR OF I/O KEY REGISTER          S03 03015
000634 000615 R
000635 015034 A 3037         LDA      XALU,1                                          S03 03016
000636 004355 A 3038         LSRA     13            RIGHT JUSTIFY                     S03 03017
000637 056000 A 3039         STA      0,2                                             S03 03018
000640 001000 A 3040         RETU*    X100          RETURN                            S03 03019
000641 106114 R
```

```
                    3041          EJEC                                                    S03 03020
                    3042 *                                                                S03 03021
                    3043 *                                                                S03 03022
                    3044 *    THIS ROUNTINE PERFORMS THE OPERAND REGISTER SHIFTING OPERATIONS  S03 03023
                    3045 *      THE FOLLOWING CONTROL FIELDS ARE USED:OS(SC),Y(W),V,X,&LB      S03 03024
                    3046 *      ALSO USED: DS,QS,OREG,FILE BITS FA00&FA15, & ALU-OUT BIT 15,   S03 03025
                    3047 *                                                                S03 03026
                    3048 *      CALLING SEQUENCE                                          S03 03027
                    3049 *        LDX     ADDR OF ROM FIELD                               S03 03028
                    3050 *        CALL    DORG                                            S03 03029
                    3051 *                                                                S03 03030
                    3052 *        RETU    OPERAND REGISTER SHIFTING COMPLETE              S03 03031
                    3053 *                                                                S03 03032
000642 000000 A     3054 DORG     ENTR                                                    S03 03033
000643 015022 A     3055          LDA     XOS,1           SHIFT OP REG, ?                 S03 03034
000644 001010 A     3056          JAZ     *+4                                             S03 03035
000645 000650 R
000646 001000 A     3057          JMP     D001                                            S03 03036
000647 000662 R
000650 015024 A     3058          LDA     XY,1            IS Y(HARDWARE W FIELD)= 0  ?    S03 03037
000651 001010 A     3059          JAZ*    DORG            YES-NO ACTION, EXIT,            S03 03038
000652 106642 R
000653 015034 A     3060          LDA     XALU,1          STORE SIGN                      S03 03039
000654 000150 A     3061          ANAI    0100000         BIT OF ALU OUTPUT               S03 03040
000655 100000 A
000656 004241 A     3062          LRLA    1               IN                              S03 03041
000657 055063 A     3063          STA     QS,1            QS F/F,                         S03 03042
000660 001000 A     3064          JMP*    DORG            EXIT                            S03 03043
000661 106642 R
000662 015013 A     3065 D001     LDA     XLB,1           LB FIELD                        S03 03044
000663 004341 A     3066          LSRA    1               SPECIFIES MASKING ?             S03 03045
000664 001010 A     3067          JAZ     *+4                                             S03 03046
000665 000670 R
000666 001000 A     3068          JMP*    DORG            YES-EXIT                        S03 03047
000667 106642 R
000670 015044 A     3069          LDA     OREG,1          GET PREV O REG CONTENTS         S03 03048
000671 054203 A     3070          STA     D0T1            TEMP SAVE                       S03 03049
                    3071 *    Y(W) FIELD SPECIFIES LEFT/RIGHT SHIFTING                    S03 03050
000672 015024 A     3072 D002     LDA     XY,1            SHIFT OREG LEFT  ?              S03 03051
000673 001010 A     3073          JAZ     D044            YES-                            S03 03052
000674 000774 R
                    3074 *    RIGHT SHIFTING                                              S03 03053
```

```
                    3075 *                                                                  S03 03054
000675 015025 A     3076 0020   LDA     XX,1        GET X FIELD                            S03 03055
000676 001010 A     3077        JAZ     *+4                                                S03 03056
000677 000702 R
000700 001000 A     3078        JMP     D022                                               S03 03057
000701 000715 R
                    3079 *   X FIELD=0 :OR00 INTO OR15                                      S03 03058
000702 015044 A     3080        LDA     OREG,1                                             S03 03059
000703 004341 A     3081        LSRA    1           RIGHT SHIFT ONE                        S03 03060
000704 054171 A     3082        STA     DOT2        TEMP STORE                             S03 03061
000705 014167 A     3083        LDA     DOT1        GET PREV OREG CONTENTS                 S03 03062
000706 005002 A     3084        TZB                                                        S03 03063
000707 004541 A     3085        LLSR    1           COPY PREV OR00 BIT                     S03 03064
000710 005021 A     3086        TBA                 INTO BIT 15                            S03 03065
000711 134154 A     3087        ERA     DOT2        OF NEW OREG WORD                       S03 03066
000712 055044 A     3088        STA     OREG,1                                             S03 03067
000713 001000 A     3089        RETU*   DORG        EXIT                                   S03 03068
000714 106642 R
                    3090 *                                                                 S03 03069
                    3091 *                                                                 S03 03070
000715 006140 A     3092 D022   SUBI    1           X=01 ?                                 S 03 03071
000716 000001 A
000717 001010 A     3093        JAZ     *+4                                                S03 03072
000720 000723 R
000721 001000 A     3094        JMP     D024        NO                                     S03 03073
000722 000742 R
                    3095 *   X FIELD=01 : FA00 INTO OR15                                    S03 03074
000723 015044 A     3096        LDA     OREG,1      GET OP REGISTER                        S03 03075
000724 004341 A     3097        LSRA    1           SHIFT ONE                              S03 03076
000725 054150 A     3098        STA     DOT2        TEMP STORE                             S03 03077
000726 015030 A     3099        LDA     XA,1        FILE A SOURCE ADDR                     S03 03078
000727 006120 A     3100        ADDI    R0          ADDR OF FILE A REGISTERS               S03 03079
000730 000525 R
000731 005012 A     3101        TAB                                                        S03 03080
000732 016000 A     3102        LDA     0,2         GET FILE A REGISTER                    S03 03081
000733 005002 A     3103        TZB                                                        S03 03082
000734 004541 A     3104        LLSR    1                                                  S03 03083
000735 005021 A     3105        TBA                 COPY FILE A BIT 0 INTO                 S03 03084
000736 134137 A     3106        ERA     DOT2        BIT 15 OF NEW OP REG WORD              S03 03085
000737 055044 A     3107        STA     OREG,1                                             S03 03086
000740 001000 A     3108        RETU*   DORG        EXIT                                   S03 03087
000741 106642 R
```

```
                    3109 *                                                                  S03 03088
 00742 015025 A     3110 D024   LDA     XX,1            GET X FIELD                        S03 03089
 00743 006140 A     3111        SUBI    2               X=10 ?                             S03 03090
 00744 000002 A
 00745 001010 A     3112        JAZ     *+4                                                S03 03091
 00746 006751 R
 00747 001000 A     3113        JMP     D026            NO                                 S03 03092
 00750 006763 R
                    3114 *    X FIELD=10: OR15 INTO OR15                                    S03 03093
 00751 015044 A     3115        LDA     OREG,1          GET CURRENT OP REG,                S03 03094
 00752 004341 A     3116        LSRA    1               SHIFT ONE                          S03 03095
 00753 054122 A     3117        STA     DOT2            TEMP STORE                         S03 03096
 00754 014120 A     3118        LDA     DOT1            GET PREV OREG CONTENTS             S03 03097
 00755 006150 A     3119        ANAI    0100000         SELECT BIT 15                      S03 03098
 00756 100000 A
 00757 134116 A     3120        ERA     DOT2                                             D,103 03099
 00760 055044 A     3121        STA     OREG,1                                           D,103 03100
 00761 001000 A     3122        RETU*   DORG            EXIT                               S03 03101
 00762 106642 R
                    3123 *                                                                  S03 03102
                    3124 *    X FIELD=11: SIGN STORAGE(DS) INTO OR15                        S03 03103
 00763 015044 A     3125 D026   LDA     OREG,1          GET CURRENT OP REG,                S03 03104
 00764 004341 A     3126        LSRA    1               RIGHT SHIFT ONE                    S03 03105
 00765 054110 A     3127        STA     DOT2            TEMP                               S03 03106
 00766 015064 A     3128        LDA     DS,1            PREV SIGN STORAGE                  S03 03107
 00767 004257 A     3129        LRLA    15              MOVE TO BIT 15 POSITION            S03 03108
 00770 134105 A     3130        ERA     DOT2                                               S03 03109
 00771 055044 A     3131        STA     OREG,1                                             S03 03110
 00772 001000 A     3132        RETU*   DORG            EXIT                               S03 03111
 00773 106642 R
                    3133 *                                                                  S03 03112
                    3134 *                                                                  S03 03113
                    3135 *                                                                  S03 03114
                    3136 *                                                                  S03 03115
                    3137 *    COME HERE FOR LEFT SHIFTING                                   S03 03116
                    3138 *                                                                  S03 03117
                    3139 *                                                                  S03 03118
 00774 015025 A     3140 D044   LDA     XX,1            GET X FIELD                        S03 03119
 00775 001010 A     3141        JAZ     *+4                                                S03 03120
 00776 007001 R
 00777 001000 A     3142        JMP     D046                                               S03 03121
 01000 007015 R
```

```
                    3143 *     X FIELD=0 : OR15 INTO OR00                                    S03 03122
 07001 005002 A     3144         TZB                                                         S03 03123
 07002 015044 A     3145         LDA     OREG,1          GET PREV OREG WORD                  S03 03124
 07003 004441 A     3146         LLRL    1               SHIFT LEFT ONE                      S03 03125
 07004 054071 A     3147         STA     DOT2            TEMP STORE                          S03 03126
 07005 014067 A     3148         LDA     DOT1            PREV OREG WORD                      S03 03127
 07006 005002 A     3149         TZB                                                         S03 03128
 07007 004441 A     3150         LLRL    1                                                   S03 03129
 07010 005021 A     3151         TBA                     COPY BIT 15 OF PREV OREG WORD       S03 03130
 07011 134064 A     3152         ERA     DOT2            INTO NEW BIT 0                      S03 03131
 07012 055044 A     3153         STA     OREG,1                                              S03 03132
 07013 001000 A     3154         RETU*   DORG            EXIT                                S03 03133
 07014 106642 R
                    3155 *                                                                   S03 03134
                    3156 *                                                                   S03 03135
 07015 006140 A     3157 D046    SUBI    1                                                   S03 03136
 07016 000001 A
 07017 001010 A     3158         JAZ     *+4                                                 S03 03137
 07020 007023 R
 07021 001000 A     3159         JMP     D048                                                S03 03138
 07022 007043 R
                    3160 *     X FIELD=01: FA15 INTO OR00                                    S03 03139
 07023 015044 A     3161         LDA     OREG,1                                              S03 03140
 07024 005002 A     3162         TZB                                                         S03 03141
 07025 004441 A     3163         LLRL    1               SHIFT PREV OREG WORD LEFT ONE       S03 03142
 07026 054047 A     3164         STA     DOT2            TEMP STORE                          S03 03143
 07027 015030 A     3165         LDA     XA,1            FIE A SOURCE ADDR                   S03 03144
 07030 006120 A     3166         ADDI    R0              ADDR OF FILE A REGISTERS            S03 03145
 07031 000525 R
 07032 005012 A     3167         TAB                                                         S03 03146
 07033 016000 A     3168         LDA     0,2             GET LAST FILE A REG,                S03 03147
 07034 005002 A     3169         TZB                     CONTENTS AND                        S03 03148
 07035 004441 A     3170         LLRL    1               COPY BIT 15                         S03 03149
 07036 005021 A     3171         TBA                     INTO BIT 00                         S03 03150
 07037 134036 A     3172         ERA     DOT2            OF NEW OREG WORD                    S03 03151
 07040 055044 A     3173         STA     OREG,1                                              S03 03152
 07041 001000 A     3174         RETU*   DORG            EXIT                                S03 03153
 07042 106642 R
                    3175 *                                                                   S03 03154
                    3176 *                                                                   S03 03155
 07043 015025 A     3177 D048    LDA     XX,1                                                S03 03156
 07044 006140 A     3178         SUBI    2               X FIELD=10                          S03 03157
```

```
 7045 000002 A
 7046 001010 A 3179          JAZ     *+4                                          S03 03158
 7047 007052 R
 7050 001000 A 3180          JMP     D050        NO                               S03 03159
 7051 007067 R
              3181 *    X FIELD=10: BAR OF ALU=OUT BIT 15 INTO OREG BIT 0          S03 03160
 7052 005002 A 3182          TZB                                                  S03 03161
 7053 015044 A 3183          LDA     OREG,1                                       S03 03162
 7054 004441 A 3184          LLRL    1           LEFT SHIFT ONE,CONTENTS OF OREG  S03 03163
 7055 054020 A 3185          STA     DOT2                                         S03 03164
 7056 015034 A 3186          LDA     XALU,1      COMPLIMENT ALU                   S03 03165
 7057 005211 A 3187          CPA                 OUTPUT AND                       S03 03166
 7060 006150 A 3188          ANAI    0100000     POSITION BIT 15                  S03 03167
 7061 100000 A
 7062 004241 A 3189          LRLA    1           INTO BIT 0,                      S03 03168
 7063 134012 A 3190          ERA     DOT2        BIT 00 OF NEW OREG WORD          S03 03169
 7064 055044 A 3191          STA     OREG,1                                       S03 03170
 7065 001000 A 3192          RETU*   DORG        EXIT                             S03 03171
 7066 106642 R
              3193 *                                                             S03 03172
              3194 *    X FIELD=11: ZERO INTO OR00                               S03 03173
 7067 005002 A 3195 D050     TZB                                                  S03 03174
 7070 015044 A 3196          LDA     OREG,1                                       S03 03175
 7071 004441 A 3197          LLRL    1           LEFT SHIFT ONE,CONTENTS OF OREG  S03 03176
 7072 055044 A 3198          STA     OREG,1                                       S03 03177
 7073 001000 A 3199          JMP*    DORG                                         S03 03178
 7074 106642 R
              3200 *                                                             S03 03179
              3201 *                                                             S03 03180
 7075 000000 A 3202 DOT1     DATA    0           TEMP STORE FOR PREVIOUS OREG CONTENTS S03 03181
 7076 000000 A 3203 DOT2     DATA    0           TEMP STORE FOR NEW SHIFTED OREG  S03 03182
```

```
                    3204          EJEC                                                                  S03 03183
                    3205 *                                                                              S03 03184
                    3206 *                                                                              S03 03185
                    3207 *    STORE ALU OUTPUT AS SPECIFIED BY R-FIELD AND W FIELD                      S03 03186
                    3208 *                                                                              S03 03187
                    3209 *    CALLING SEQUENCE                                                          S03 03188
                    3210 *    LDX   ADDR OF ROM FIELDS/DATA                                             S03 03189
                    3211 *    JMPM  X200                                                                S03 03190
                    3212 *    RETURN                                                                    S03 03191
                    3213 *                                                                              S03 03192
                    3214 *                                                                              S03 03193
'077 000000 A       3215 X200 ENTR                        **                                            S03 03194
'100 015013 A       3216      LDA     XLB,1               DON'T OUTPUT TO                               S03 03195
'101 004341 A       3217      LSRA    1                   FILE REGISTERS                                S03 03196
'102 001010 A       3218      JAZ     *+4                                                               S03 03197
'103 007106 R
'104 001000 A       3219      JMP     X202                IF MSB OF LB FIELD IS "1"                     S03 03198
'105 007117 R
'106 015021 A       3220      LDA     XW,1                WRITE TO FILE REGISTER ?                      S03 03199
'107 001010 A       3221      JAZ     X202                NO=                                           S03 03200
'110 007117 R
'111 006010 A       3222      LDAI    R0                  FORM ADDR                                     S03 03201
'112 000525 R
'113 125030 A       3223      ADD     XA,1                OF SPECIFIED                                  S03 03202
'114 005012 A       3224      TAB                         REG,                                          S03 03203
'115 015034 A       3225      LDA     XALU,1              STORE ALU OUTPUT                              S03 03204
'116 056000 A       3226      STA     0,2                 INTO FILE A REGISTER                          S03 03205
                    3227 *                                                                              S03 03206
'117 015015 A       3228 X202 LDA     XR,1                R-FIELD                                       S03 03207
'120 001010 A       3229      JAZ*    X200                EXIT-NO DESTINATION REG, SPECIFIED            S03 03208
'121 107077 R
'122 005012 A       3230      TAB                                                                       S03 03209
'123 006140 A       3231      SUBI    5                   R=5 MEANS INCR SHIFT COUNTER                  S03 03210
'124 000005 A
'125 001010 A       3232      JAZ     X204                                                              S03 03211
'126 007160 R
'127 001002 A       3233      JAP     X206                R=6 OR 7                                      S03 03212
'130 007170 R
'131 005111 A       3234      IAR                         R=4 MEANS INCR P-REGISTER                     S03 03213
'132 001010 A       3235      JAZ     X205                                                              S03 03214
'133 007165 R
'134 005021 A       3236      TBA                                                                       S03 03215
```

```
 0135 006120 A 3237          ADDI    DROM+PREG-1   ADDR OF FIRST REG, DESIG, BY R FIELD      S03 03216
 0136 000606 R
 0137 005012 A 3238          TAB                                                             S03 03217
 0140 015015 A 3239          LDA     XR,1                                                    S03 03218
 0141 006140 A 3240          SUBI    2                                                       S03 03219
 0142 000002 A
 0143 001010 A 3241          JAZ     *+4                                                     S03 03220
 0144 007147 R
 0145 001000 A 3242          JMP     X207          NO- R=1 OR 3                              S03 03221
 0146 007154 R
 0147 015034 A 3243          LDA     XALU,1        SHIFT COUNTER IS 5 BIT REG THAT IS        S03 03222
 0150 006110 A 3244          ORAI    0177400       INCREMENTED, MUST SET UPPER BITS OF       S03 03223
 0151 177400 A
                3245 *                            16 BIT WORD TO PROPERLY SIMULATE          S03 03224
 0152 001000 A 3246          JMP     *+3                                                     S03 03225
 0153 007155 R
 0154 015034 A 3247 X207     LDA     XALU,1        STORE ALU                                 S03 03226
 0155 056000 A 3248          STA     0,2           OUTPUT                                    S03 03227
 0156 001000 A 3249          RETU*   X200          EXIT                                      S03 03228
 0157 107077 R
 0160 015043 A 3250 X204     LDA     SREG,1        INCREMENT     * SREG CONTENTS IS IN       S03 03229
 0161 005111 A 3251          IAR                   THE SHIFT       1'S COMPLIMENT FORM       S03 03230
 0162 055043 A 3252          STA     SREG,1        COUNTER                                   S03 03231
 0163 001000 A 3253          RETU*   X200                                                    S03 03232
 0164 107077 R
                3254 *                                                                        S03 03233
 0165 045042 A 3255 X205     INR     PREG,1                                                  S03 03234
 0166 001000 A 3256          RETU*   X200          EXIT                                      S03 03235
 0167 107077 R
                3257 *   R=6: ALU BITS 13-15 TO DATA LOOP KEY REGISTER                        S03 03236
                3258 *   R=7: LOAD OREG AND INCREMENT P REGISTER                              S03 03237
 0170 005311 A 3259 X206     DAR                                                             S03 03238
 0171 001010 A 3260          JAZ     X208                                                    S03 03239
 0172 007201 R
                3261 *   R=7                                                                  S03 03240
 0173 006020 A 3262          LDBI    DROM+OREG     ADDR OF OREG                              S03 03241
 0174 000611 R
 0175 015034 A 3263          LDA     XALU,1                                                  S03 03242
 0176 056000 A 3264          STA     0,2                                                     S03 03243
 0177 001000 A 3265          JMP     X205          GO INCR P REG,                            S03 03244
 0200 007165 R
                3266 *   R=6                                                                  S03 03245
```

```
  201 006020 A 3267 X208   LDBI    DROM*KREG                                                  S03 03246
  202 000614 R
  203 015034 A 3268        LDA     XALU,1                                                     S03 03247
  204 004355 A 3269        LSRA    13          RIGHT JUSTIFY 3 MSBIS OF ALU OUTPUT WORD       S03 03248
  205 055000 A 3270        STA     0,2         STORE INTO PROPER KEY REGISTER                 S03 03249
  206 001000 A 3271        RETU*   X200        EXIT                                           S03 03250
  207 107077 R
```

```
                3272          EJEC                                                    S03 03251
                3273 *                                                                S03 03252
                3274 *                                                                S03 03253
                3275 ****** MEMORY OPERATIONS COMPONENT ******                        S03 03254
                3276 *                                                                S03 03256
                3277 *                                                                S03 03257
                3278 *     * OPERATION CODES *                                        S03 03258
                3279 *         MOPC=0: TRANSFER ALU OUTPUT TO MIL AND IREG#1,         S03 03259
                3280 *         MOPC=1: READ FROM MEMORY TO MIL AND IREG#1,            S03 03260
                3281 *         MOPC=2: READ FROM MEMORY TO MIL,                       S03 03261
                3282 *         MOPC=3: WRITE 16-BIT ALU OUTPUT TO MEMORY              S03 03262
                3283 *         MOPC=4: WRITE ALU OUTPUT AS A BYTE TO MEMORY           S03 03263
                3284 *                 (SPECIFIED BY BYTE POINTER)                    S03 03264
                3285 *                                                                S03 03265
                3286 *                                                                S03 03266
                3287 *    * ADDRESS SOURCES *                                         S03 03267
                3288 *         MADS=0: ADDRESS IS ALU OUTPUT                          S03 03268
                3289 *         MADS=1: ADDRESS IS PROGRAM COUNTER                     S03 03269
                3290 *         MADS=2: ADDRESS IS MEMORY INTERFACE LATCH(MIL)         S03 03270
                3291 *                                                                S03 03271
                3292 *                                                                S03 03272
                3293 *                                                                S03 03273
                3294 *  *    MEMORY CONDITION CODES  *                                S03 03274
                3295 *         MCCO=0: IDLE                                           S03 03275
                3296 *         MCCO=1: IDLE WITH REQUEST PENDING                    F ********
                3297 *         MCCO=2-N: ACTIVE  (N=MEMORY TYPE)                    F ********
                3298 *                                                                S03 03278
                3299 *                                                                S03 03279
                3300 *                                                                S03 03280
                3301 *                                                                S03 03281
                3302 *    CALLING SEQUENCE                                            S03 03282
                3303 *       CALL    MOPA                                             S03 03283
                3304 *                                                                S03 03284
                3305 *                                                                S03 03286
                3306 *                                                                S03 03287
                3307 *                                                                S03 03288
'210 000000 A   3308 MOPA   ENTR                                                      S03 03289
'211 006030 A   3309        LDXI    DROM          ADDR OF ROM FIELDS/DATA             S03 03290
'212 000545 R
                3310 *                                                                S03 03291
                3311 *                                                                S03 03292
                3312 *    DETERMINE MEMORY CONDITION                                  S03 03293
```

```
'213 015055 A 3313 M003   LDA     MCCO,1        MCCO IS THE COND. CODE FOR MEM.OPERATIONS S03 03294
'214 001010 A 3314        JAZ     *+4                                                     S03 03295
'215 007220 R
'216 001000 A 3315        JMP     M032          MEMORY IS ACTIVE                    F   ********
'217 007364 R
                3316 *    MEMORY IS IDLE                                                S03 03297
'220 002000 A 3317        CALL    MREQ          ANY MEMORY REQUEST ?                    S03 03298
'221 007701 R
'222 001010 A 3318        JAZ     M070          NO-RTN VIA LISTING ROUTINE              S03 03299
'223 010063 R
'224 002000 A 3319 M004   CALL    M010          DETERMINE MEMORY OPERATIONS             S03 03300
'225 007230 R
'226 001000 A 3320        JMP     M020                                                  S03 03301
'227 007305 R
                3321 *                                                                  S03 03302
                3322 *                                                                  S03 03303
                3323 *                                                                  S03 03304
                3324 *    DETERMINE MEMORY OPERATION TO BE PERFORMED                    S03 03305
                3325 *     RETURN WITH OPERATION CODE STORED IN MOPC                    S03 03306
'230 000000 A 3326 M010   ENTR                                                          S03 03307
'231 015006 A 3327        LDA     XS,1          GET S FIELD                             S03 03308
'232 001010 A 3328        JAZ     M012                                                  S03 03309
'233 007254 R
'234 015012 A 3329        LDA     XIMC,1        GET IMC FIELD                           S03 03310
'235 006150 A 3330 M011   ANAI    03            IMC=XX00                                S03 03311
'236 000003 A
'237 001010 A 3331        JAZ     M014          YES-                                    S03 03312
'240 007266 R
'241 006140 A 3332        SUBI    2             IMC=XX10                                S03 03313
'242 000002 A
'243 001010 A 3333        JAZ     M016          YES                                     S03 03314
'244 007273 R
'245 001002 A 3334        JAP     M018          IMC=XX11                                S03 03315
'246 007300 R
                3335 *    IMC=XX01                                                      S03 03316
'247 006010 A 3336        LDAI    2                                                     S03 03317
'250 000002 A
'251 055054 A 3337        STA     MOPC,1        MOPC=2                                  S03 03318
'252 001000 A 3338        RETU*   M010                                                  S03 03319
'253 107230 R
                3339 *    S=0                                                           S03 03320
'254 015012 A 3340 M012   LDA     XIMC,1                                                S03 03321
```

```
7255 006140 A 3341          SUBI    04              IMC=0100 ?                              S03 03322
7256 000004 A
7257 001010 A 3342          JAZ     **4                                                     S03 03323
7260 007263 R
7261 001000 A 3343          JMP     M011=1          NO                                      S03 03324
7262 007234 R
7263 055054 A 3344          STA     MOPC,1          MOPC=0                                  S03 03325
7264 001000 A 3345          RETU*   M010                                                    S03 03326
7265 107230 R
                  3346 *    IMC=XX00                                                        S03 03327
7266 006010 A 3347 M014     LDAI    1                                                       S03 03328
7267 000001 A
7270 055054 A 3348          STA     MOPC,1          MOPC=1                                  S03 03329
7271 001000 A 3349          RETU*   M010                                                    S03 03330
7272 107230 R
                  3350 *    IMC=XX10                                                        S03 03331
7273 006010 A 3351 M018     LDAI    3                                                       S03 03332
7274 000003 A
7275 055054 A 3352          STA     MOPC,1          MOPC=3                                  S03 03333
7276 001000 A 3353          RETU*   M010                                                    S03 03334
7277 107230 R
                  3354 *    IMC=XX11                                                        S03 03335
7300 006010 A 3355 M018     LDAI    4                                                       S03 03336
7301 000004 A
7302 055054 A 3356          STA     MOPC,1          MOPC=4                                  S03 03337
7303 001000 A 3357          RETU*   M010                                                    S03 03338
7304 107230 R
                  3358 *                                                                    S03 03339
                  3359 *                                                                    S03 03340
                  3360 *    DETERMINE MEMORY ADDRESS SOURCE                                 S03 03341
7305 015006 A 3361 M020     LDA     XS,1            FIELD S=07                              S03 03342
7306 001010 A 3362          JAZ     M026            YES-NOT VALID ADDR SOURCE CONDITION     S03 03343
7307 007352 R
7310 015012 A 3363          LDA     XIMC,1          GET FIELD IMC                           S03 03344
7311 006150 A 3364          ANAI    014                                                     S03 03345
7312 000014 A
7313 004342 A 3365          LSRA    2                                                       S03 03346
7314 006140 A 3366          SUBI    2                                                       S03 03347
7315 000002 A
7316 001010 A 3367          JAZ     M022            IMC=10XX                                S03 03348
7317 007334 R
7320 001002 A 3368          JAP     M024            IMC=11XX                                S03 03349
```

```
 007321 007343 R
 007322 005111 A 3369          IAR                                                    S03 03350
 007323 001010 A 3370          JAZ       **4                                          S03 03351
 007324 007327 R
 007325 001000 A 3371          JMP       M026                                         S03 03352
 007326 007352 R
                 3372 *  ADDRES IS ALU OUTPUT (S IS NOT 0 & IMC=01XX)                  S03 03353
 007327 055053 A 3373          STA       MADS,1          MADS=0                       S03 03354
 007330 015034 A 3374          LDA       XALU,1          STORE ALU OUTPUT             S03 03355
 007331 055070 A 3375          STA       LREG,1          INTO MEM ADDR SELECT REG     S03 03356
 007332 001000 A 3376          JMP       M030            CONTINUE                     S03 03357
 007333 007355 R
                 3377 *    MEM ADDR IS PROGRAM COUNTER                               S03 03358
 007334 006010 A 3378 M022     LDAI      1                                            S03 03359
 007335 000001 A
 007336 055053 A 3379          STA       MADS,1          MADS=1                       S03 03360
 007337 015042 A 3380          LDA       PREG,1                                       S03 03361
 007340 055070 A 3381          STA       LREG,1                                       S03 03362
 007341 001000 A 3382          JMP       M030            CONTINUE                     S03 03363
 007342 007355 R
                 3383 *    MEM ADDR IS MIL                                           S03 03364
 007343 006010 A 3384 M024     LDAI      2                                            S03 03365
 007344 000002 A
 007345 055053 A 3385          STA       MADS,1          MADS=2                       S03 03366
 007346 015056 A 3386          LDA       MIL,1                                        S03 03367
 007347 055070 A 3387          STA       LREG,1                                       S03 03368
 007350 001000 A 3388          JMP       M030            CONTINUE                     S03 03369
 007351 007355 R
                 3389 *    SET MADS=050 TO INDICATE NOT VALID ADDR SOURCE CONDITION   S03 03370
                 3390 *    THIS WILL PRODUCE THE LETTER X ON PRINT OUT.               S03 03371
 007352 006010 A 3391 M026     LDAI      050                                          S03 03372
 007353 000050 A
 007354 055053 A 3392          STA       MADS,1                                       S03 03373
 007355 006010 A 3393 M030     LDAI      1               SET MEM.CONDITION CODE       S03 03374
 007356 000001 A
 007357 055055 A 3394          STA       MCCO,1          TO: ACTIVE BUT NOT DONE      S03 03375
 007360 005001 A 3395          TZA                                                  F  ********
 007361 054626 A 3396          STA       MLIP            CLEAR COMPLETE MEMORY FLAG   F  ********
 007362 001000 A 3397          JMP       M070            NO=RTN VIA LISTING ROUTINE   S03 03376
 007363 010063 R
                 3398 *                                                              S03 03377
                 3399 *    COME HERE IF MCCO IS 1 TO N  (MEMORY ACTIVE) 01/21/75  KERNS  F  ********
```

```
007364 005311 A 3400 M032   DAR                     MCCO=1                                  S03 03379
007365 001010 A 3401        JAZ     M034            YES                                     S03 03380
007366 007371 R
007367 001000 A 3402        JMP     M036            CHECK FOR COMPLETION                F   ********
007370 007417 R
                3403 *   MCCO=1                                                             S03 03383
007371 015054 A 3404 M034   LDA     MOPC,1          MEM OP IS XFER ALU=OUT TO MIL/IRG1      S03 03384
007372 001010 A 3405        JAZ     M036            YES                                 F   ********
007373 007417 R
007374 002000 A 3406        CALL    MOOR            OVERRIDE ?                              S03 03386
007375 007772 R
007376 001004 A 3407        JAN     M038            YES=                                    S03 03387
007377 007422 R
007400 005001 A 3408        TZA                                                         F   ********
007401 054645 A 3409        STA     MPLE            CLEAR MPLE FLAG                     F   ********
007402 015054 A 3410        LDA     MOPC,1          CHECK IF STORE REQ                  F   ********
007403 006140 A 3411        SUBI    3                                                   F   ********
007404 000003 A
007405 001004 A 3412        JAN     M036            NO                                  F   ********
007406 007417 R
007407 015070 A 3413        LDA     LREG,1                                              F   ********
007410 145042 A 3414        SUB     PREG,1          IF LREG=PREG, SET MPLE              F   ********
007411 001010 A 3415        JAZ     **4             YES                                 F   ********
007412 007415 R
007413 001000 A 3416        JMP     M036            NO                                  F   ********
007414 007417 R
007415 005101 A 3417        INCR    1                                                   F   ********
007416 054630 A 3418        STA     MPLE                                                F   ********
                3419 *   MEMORY REQUESTED OR ACTIVE                                     F   ********
007417 045055 A 3420 M036   INR     MCCO,1          UPDATE MEMORY CONDITION CODE        F   ********
007420 001000 A 3421        JMP     M040            CHECK FOR MEMORY COMPLETE OR WAIT   F   ********
007421 007426 R
                3422 *   MCCO=1 WITH OVERRIDE                                               S03 03393
007422 002000 A 3423 M038   CALL    M010            DETERMINE MEMORY OPERATION              S03 03394
007423 007230 R
                3424 *                               MAINTAIN OLD ADDR SOURCE               S03 03395
007424 001000 A 3425        JMP     M036            SET MCCO=2 AND EXIT                     S03 03396
007425 007417 R
                3426 *                                                                      S03 03397
                3427 *                                                                      S03 03398
                3428 *   ENTER HERE IF MEMORY IS REQUESTED OR ACTIVE                     F   ********
                3429 *                                                                  F   ********
```

```
                    3430 *     MEMORY CYCLE COMPLETE?                                                F  ********
          007426 R  3431 M040  EQU     *                                                             F  ********
00/426 005001 A     3432       TZA                                                                   F  ********
00/427 054560 A     3433       STA     MLIP          CLEAR COMPLETE MEMORY FLAG                      F  ********
00/430 015055 A     3434       LDA     MCCO,1                                                        F  ********
00/431 147000 I     3435       SUB     MTYP                                                          F  ********
00/432 001002 A     3436       JAP     M050          IF MEMORY DONE                                  F  ********
00/433 007461 R
                    3437 *     WAIT FOR MEMORY DONE?                                                 F  ********
00/434 015006 A     3438       LDA     XS,1                                                          F  ********
00/435 001010 A     3439       JAZ     *+4           IF S=0                                          F  ********
00/436 007441 R
00/437 001000 A     3440       JMP     M041                                                          F  ********
00/440 007445 R
00/441 015012 A     3441       LDA     XIMC,1                                                        F  ********
00/442 005311 A     3442       DAR                                                                   F  ********
00/443 001010 A     3443       JAZ     M045          IF IMC=1                                        F  ********
00/444 007453 R
                    3444 *     PENDING MEMORY REQUEST?                                               F  ********
00/445 002000 A     3445 M041  CALL    MREQ          ANY NEW MEMORY REQUESTS                         F  ********
00/446 007701 R
00/447 001010 A     3446       JAZ     M070          NO, RETURN VIA LISTING ROUTINE                  F  ********
00/450 010063 R
00/451 001000 A     3447       JMP     M045          COMPLETE CURRENT REQUEST                        F  ********
00/452 007453 R
          007453 R  3448 M045  EQU     *                                                             F  ********
00/453 017000 I     3449       LDA     MTYP          MEMORY COMPLETION COUNT                         F  ********
00/454 055055 A     3450       STA     MCCO,1        SET COMPLETION CODE TO COMPLETE                 F  ********
00/455 005101 A     3451       INCR    1                                                             F  ********
00/456 054531 A     3452       STA     MLIP          SET COMPLETE MEMORY FLAG                        F  ********
00/457 001000 A     3453       JMP     M070          RETURN VIA LISTING ROUTINE                      F  ********
00/460 010063 R
00/461 002000 A     3454 M050  CALL    MOPB          GET MEMORY ADDRESS                                 S03 03401
00/462 007664 R
00/463 015054 A     3455       LDA     MOPC,1                                                           S03 03402
00/464 001010 A     3456       JAZ     M052          MOPC=0                                             S03 03403
00/465 007513 R
00/466 005311 A     3457       DAR                   MOPC=1 ?                                           S03 03404
00/467 001010 A     3458       JAZ     M054          YES=                                               S03 03405
00/470 007543 R
00/471 005311 A     3459       DAR                   MOPC=2 ?                                           S03 03406
00/472 001010 A     3460       JAZ     M056          YES=                                               S03 03407
```

```
)7473 007550 R
)7474 005311 A 3461          DAR                    MOPC=3 ?                          S03 03408
)7475 001010 A 3462          JAZ       M058         YES=                              S03 03409
)7476 007554 R
)7477 005311 A 3463          DAR                    MOPC=4 ?                          S03 03410
)7500 001010 A 3464          JAZ       M060         YES=                              S03 03411
)7501 007574 R
)7502 002000 A 3465          CALL      SIOUT,3,M051   OUTPUT ERROR                     S03 03412
)7503 015406 R
)7504 000003 A
)7505 007510 R
)7506 001000 A 3466          JMP       M053         CONTINUE SIMULATION               S03 03413
)7507 007516 R
)7510 120240 A 3467 M051     DATA      ' MS13'      UNDEFINED OPCODE                  S03 03414
)7511 146723 A
)7512 130663 A
                  3468 *                                                              S03 03415
                  3469 *   MOPC=0: XFER ALU OUTPUT TO MIL & IRG1,                     S03 03416
)7513 015034 A 3470 M052     LDA       XALU,1                                       S03 03417
)7514 055056 A 3471          STA       MIL,1                                        S03 03418
)7515 055051 A 3472          STA       IRG1,1                                       S03 03419
                  3473 *   ESTABLISH TMUX BIT 11: MIL15= SIGN/INDIRECT BIT OF MEM LATCH S03 03420
)7516 006020 A 3474 M053     LDBI      TMUX         ADDR OF TEST CONDITIONS TABLE     S03 03421
)7517 000640 R
)7520 015056 A 3475          LDA       MIL,1        GET MIL REGISTER                  S03 03422
)7521 001004 A 3476          JAN       XS41                                           S03 03423
)7522 007526 R
)7523 005001 A 3477          TZA                                                      S03 03424
)7524 001000 A 3478          JMP       *+3                                            S03 03425
)7525 007527 R
)7526 005101 A 3479 XS41     INCR      01                                             S03 03426
)7527 056013 A 3480          STA       11,2                                           S03 03427
)7530 002000 A 3481          CALL      MREQ         ANY MEM REQUEST ?                 S03 03428
)7531 007701 R
)7532 001010 A 3482          JAZ       *+4          NO=                               S03 03429
)7533 007536 R
)7534 001000 A 3483          JMP       M004         YES=GO DETERMINE MEM, OPERATION   S03 03430
)7535 007224 R
)7536 005001 A 3484          TZA                                                      S03 03431
)7537 055055 A 3485          STA       MCC0,1       SET MCC0=0                        S03 03432
)7540 054447 A 3486          STA       MLIP         CLEAR COMPLETE MEMORY FLAG        ********
)7541 001000 A 3487          JMP       M070         RTN VIA LISTING ROUTINE           S03 03433
```

```
7542 010063 R
                    3488 *    MOPC=1:READ FROM MEMORY TO MIL AND IRG1                    S03 03434
7543 016000 A       3489 M054   LDA     0,2           B REG CONTAINS MEM ADDR            S03 03435
7544 055056 A       3490        STA     MIL,1                                            S03 03436
7545 055051 A       3491        STA     IRG1,1                                           S03 03437
7546 001000 A       3492        JMP     M053          GO CHECK FOR MEM REQUEST           S03 03438
7547 007516 R
                    3493 *    MOPC=2:READ FROM MEMORY TO MIL.                            S03 03439
7550 016000 A       3494 M056   LDA     0,2           B REG CONTAINS MEM ADDR            S03 03440
7551 055056 A       3495        STA     MIL,1                                            S03 03441
7552 001000 A       3496        JMP     M053                                             S03 03442
7553 007516 R
                    3497 *    WRITE 16-BIT ALU OUTPUT TO MEMORY                          S03 03443
7554 002000 A       3498 M058   CALL    PMEM          CHECK PROTECTED MEMORY             S03 03444
7555 007640 R
7556 015034 A       3499        LDA     XALU,1                                           S03 03445
7557 056000 A       3500        STA     0,2           B REG. CONTAINS MEM ADDR VIA MOPB  S03 03446
                    3501 *    IF MPLE SET, WRITE OUTPUT INTO IRG1 (FOR PIPELINE PURPOSES)  ********
7560 014466 A       3502        LDA     MPLE                                       F     ********
7561 005311 A       3503        OAR                                                F     ********
7562 001002 A       3504        JAP     *+4           IF MPLE SET                  F     ********
7563 007566 R
7564 001000 A       3505        JMP     M053          GO CHECK FOR MEM, REQUEST          S03 03451
7565 007516 R
7566 015034 A       3506        LDA     XALU,1                                           S03 03452
7567 055051 A       3507        STA     IRG1,1                                           S03 03453
7570 005001 A       3508 M059   TZA                                                F     ********
7571 054455 A       3509        STA     MPLE          CLEAR MPLE                   F     ********
7572 001000 A       3510        JMP     M053          GO CHECK FOR MEM REQUEST           S03 03454
7573 007516 R
                    3511 *      WRITE ALU OUTPUT AS A BYTE TO MEMORY                     S03 03455
                    3512 *                                                               S03 03456
7574 002000 A       3513 M060   CALL    PMEM          CHECK PROTECTED MEMORY             S03 03457
7575 007640 R
7576 015060 A       3514        LDA     MBYC,1        GET BYTE DESIGNATOR                S03 03458
7577 001010 A       3515        JAZ     *+4           1=RIGHT BYTE  0=LEFT BYTE      C,1 03 03459
7600 007603 R
7601 001000 A       3516        JMP     M061                                         C,1 03 03460
7602 007614 R
7603 016000 A       3517        LDA     0,2           B REG CONTAINS MEM ADDR VIA MOPB   S03 03461
7604 154031 A       3518        ANA     M06B          GET RIGHT BYTE THAT'S IN MEMORY    S03 03462
7605 054027 A       3519        STA     M06A                                             S03 03463
```

```
'606 015034 A 3520          LDA     XALU,1          STORE LEFT BYTE OF                          S03 03464
'607 154027 A 3521          ANA     M06C            ALU-OUTPUT ALONG WITH                       S03 03465
'610 134024 A 3522          ERA     M06A            RIGHT BYTE OF ORIGINAL                      S03 03466
'611 056000 A 3523          STA     0,2             WORD IN MEMORY,                             S03 03467
'612 001000 A 3524          JMP     M062                                                        S03 03468
'613 007623 R
                  3525 *    RIGHT BYTE                                                          S03 03469
'614 016000 A 3526 M061     LDA     0,2                                                         S03 03470
'615 154021 A 3527          ANA     M06C                                                        S03 03471
'616 054016 A 3528          STA     M06A                                                        S03 03472
'617 015034 A 3529          LDA     XALU,1                                                      S03 03473
'620 154015 A 3530          ANA     M06B                                                        S03 03474
'621 134013 A 3531          ERA     M06A                                                        S03 03475
'622 056000 A 3532          STA     0,2                                                         S03 03476
                  3533 *    IF MPLE SET, PUT NEW MEMORY WORD INTO IRG1(FOR PIPELINE PURPOSES)F  ********
'623 014423 A 3534 M062     LDA     MPLE                                                    F   ********
'624 005311 A 3535          DAR                                                             F   ********
'625 001002 A 3536          JAP     *+4             IF MPLE SET                             F   ********
'626 007631 R
'627 001000 A 3537          JMP     M053            GO CHECK FOR MEMORY REQUEST                 S03 03481
'630 007516 R
'631 016000 A 3538          LDA     0,2                                                         S03 03482
'632 055051 A 3539          STA     IRG1,1                                                      S03 03483
'633 001000 A 3540          JMP     M059                                                    F   ********
'634 007570 R
'635 000000 A 3541 M06A     DATA    0               TEMP STORE                                  S03 03485
'636 000377 A 3542 M06B     DATA    0377            MASK                                        S03 03486
'637 177400 A 3543 M06C     DATA    0177400         LEFT BYTE MASK                          C,1 03 03487
                  3544 *                                                                      S03 03488
                  3545 *                                                                      S03 03489
                  3546 *    SUBROUTINE TO CHECK IF MEMORY REF IS OUTSIDE DELARED MAIN MEMORYS03 03490
                  3547 *                                                                      S03 03491
                  3548 *    CALLING SEQUENCE                                                  S03 03492
                  3549 *    LDB     MEMORY ADDRESS                                            S03 03493
                  3550 *    CALL    PMEM                                                      S03 03494
                  3551 *                                                                      S03 03495
                  3552 *    RETURN--IF ERROR,ERROR MESSAGE AND BYPASS READ/WRITE              S03 03496
                  3553 *                                                                      S03 03497
'640 000000 A 3554 PMEM     ENTR                                                              S03 03498
'641 005021 A 3555          TBA                     MEMORY ADDRESS                            S03 03499
'642 006140 A 3556          SUBI    MMEM            START OF MAIN MEMORY                    F   ********
'643 000000 R
```

```
/644 001004 A 3557          JAN     PM1             BELOW MAIN MEMORY                    S03 03501
/645 007653 R
/646 005021 A 3558          TBA                                                          S03 03502
 647 006140 A 3559          SUBI    SMLTR           TOP OF MAIN MEMORY+1                 S03 03503
/650 000201 R
 651 001004 A 3560          JAN*    PMEM            MEMORY ADDR OK                       S03 03504
 652 107640 R
/653 002000 A 3561 PM1      CALL    SIOUT,3,MFAIL   OUTPUT ERROR                         S03 03505
/654 015406 R
/655 000003 A
/656 007661 R
/657 001000 A 3562          JMP     M053            CONTINUE SIMULATION                  S03 03506
/660 007516 R
/661 120240 A 3563 MFAIL    DATA    ' MS14'         MAIN MEMORY ERROR                    S03 03507
/662 146723 A
/663 130664 A
                3564 *                                                                   S03 03508
                3565 *                                                                   S03 03509
                3566 *   GET MEM ADDR STORED IN L REGISTER                               S03 03510
                3567 *   RETURN WITH ADDR IN B REG.                                      S03 03511
 664 000000 A 3568 MOPB     ENTR                                                         S03 03512
/665 015053 A 3569          LDA     MADS,1          GET ADDR SOURCE CODE                 S03 03513
 666 006140 A 3570          SUBI    3               VALID MADS #                         S03 03514
/667 000003 A
/670 001004 A 3571          JAN     MOP1                                                 S03 03515
/671 007675 R
                3572 *   SET ADDR TO 177777 AS DEFAULT IF MADS NOT 0,1,OR 2,            S03 03516
 672 005302 A 3573          DECR    02              B=-1                                 S03 03517
 673 001000 A 3574          RETU*   MOPB                                                 S03 03518
 674 107664 R
 675 015070 A 3575 MOP1     LDA     LREG,1                                               S03 03519
 676 005012 A 3576          TAB                                                          S03 03520
/677 001000 A 3577          RETU*   MOPB                                                 S03 03521
 700 107664 R
                3578 *                                                                   S03 03522
                3579 *                                                                   S03 03523
                3580 *   SUBROUTINE TO CHECK FOR MEMORY REQUEST                          S03 03524
                3581 *    CALLING SEQUENCE                                              S03 03525
                3582 *      LDX     ADDR OF DROM                                        S03 03526
                3583 *      CALL    MREQ                                                S03 03527
                3584 *                                                                  S03 03528
                3585 *    RETURN: A REG=0=NO REQUEST, A=-1=REQUEST                      S03 03529
```

```
                    3586 *                                                          S03 03530
                    3587 *                                                          S03 03531
    701 000000 A    3588 MREQ   ENTR                                                S03 03532
    702 015006 A    3589        LDA     XS,1        S=0                             S03 03533
    703 001010 A    3590        JAZ     *+4                                         S03 03534
    704 007707 R
    705 001000 A    3591        JMP     MRE1        AND                             S03 03535
    706 007721 R
    707 015012 A    3592        LDA     XIMC,1                                      S03 03536
    710 006140 A    3593        SUBI    04          IMC=0100                        S03 03537
    711 000004 A
    712 001010 A    3594        JAZ     *+4                                         S03 03538
    713 007716 R
    714 001000 A    3595        JMP     MRE4        IS REQUEST                      S03 03539
    715 007757 R
    716 005301 A    3596 MRE2   DECR    01          SET A=-1                        S03 03540
    717 001000 A    3597        RETU*   MREQ        RETURN                          S03 03541
    720 107701 R
    721 002000 A    3598 MRE1   CALL    MDOR        OVERRIDE ?                      S03 03542
    722 007772 R
    723 001004 A    3599        JAN     MRE4        YES=THEN NO MEM REQUEST         S03 03543
    724 007757 R
    725 015006 A    3600        LDA     XS,1                                        S03 03544
    726 005311 A    3601        DAR                 S=1 ?                           S03 03545
    727 001010 A    3602        JAZ     MRE2        YES=THIS IS MEM REQ             S03 03546
    730 007716 R
    731 005311 A    3603        DAR                 S=2 ?                           S03 03547
    732 001010 A    3604        JAZ     *+4         YES=                            S03 03548
    733 007736 R
    734 001000 A    3605        JMP     MRE3        S=3                             S03 03549
    735 007751 R
                    3606 *  S=2                                                     S03 03550
    736 015005 A    3607        LDA     XT,1        T=0 ?                           S03 03551
    737 001010 A    3608        JAZ     MRE2        YES=MEM REQUEST                 S03 03552
    740 007716 R
    741 002000 A    3609        CALL    MREZ        CONDITION SPECIFIED BY G IS FALSE ? S03 03553
    742 007762 R
    743 001020 A    3610        JBZ     *+4                                         S03 03554
    744 007747 R
    745 001000 A    3611        JMP     MRE4        NO=NO REQUEST                   S03 03555
    746 007757 R
    747 001000 A    3612        JMP     MRE2        YES REQUEST                     S03 03556
```

```
750 007716 R
                    3613 *   S=3                                                    S03 03557
751 002000 A        3614 MRE3   CALL    MREZ          CONDITION SPECIFIED BY G IS TRUE ?   S03 03558
752 007762 R
753 001020 A        3615        JBZ     MRE4          NO=NO REQUEST                        S03 03559
754 007757 R
755 001000 A        3616        JMP     MRE2          YES REQUEST                          S03 03560
756 007716 R
                    3617 *                                                           S03 03561
757 005001 A        3618 MRE4   TZA                   A=0=NO REQUEST                       S03 03562
760 001000 A        3619        RETU*   MREQ                                       S03 03563
761 107701 R
                    3620 *                                                           S03 03564
                    3621 *   CHECK IF TEST CONDITION SPECIFIED BY G FIELD IS TRUE OR FALSE  S03 03565
                    3622 *      RETURN: B=0=FALSE  B=NOT ZERO=TRUE                  S03 03566
762 000000 A        3623 MREZ   ENTR                                               S03 03567
763 015007 A        3624        LDA     XG,1          GET G FIELD                  S03 03568
764 006120 A        3625        ADDI    TMUX          ADDR OF TEST CONDITIONS TABLE        S03 03569
765 000640 R
766 005012 A        3626        TAB                                                S03 03570
767 026000 A        3627        LDB     0,2           TEST CONDITION TRUE          S03 03571
770 001000 A        3628        RETU*   MREZ          RETURN                       S03 03572
771 107762 R
                    3629 *                                                           S03 03573
                    3630 *                                                           S03 03574
                    3631 *   SUBROUTINE TO CHECK FOR OVERRIDE                        S03 03575
                    3632 *    CALLING SEQUENCE                                      S03 03576
                    3633 *      LDX     ADDR OF DROM                                S03 03577
                    3634 *      CALL    MOVR                                        S03 03578
                    3635 *                                                          S03 03579
                    3636 *    RETURN: A REG=0=NO OVERRIDE, A=-1=OVERRIDE            S03 03580
                    3637 *                                                          S03 03581
                    3638 *   OVERRIDE CONDITIONS: IM=00XX &[S=1 OR (T=NOT ZERO & S=2 & TEST  S03 03582
                    3639 *                                  CONDITION SPECIFIED BY G IS FALSE) -S03 03583
                    3640 *                                  OR-(S=3 & TEST CONDITION SPECIFIED  S03 03584
                    3641 *                                  BY G IS TRUE)]          S03 03585
                    3642 *                                                          S03 03586
772 000000 A        3643 MOOR   ENTR                                               S03 03587
773 015012 A        3644        LDA     XIMC,1        IMC FIELD                    S03 03588
774 006150 A        3645        ANAI    014           EQUALS 00XX ?                S03 03589
775 000014 A
776 001010 A        3646        JAZ     MOO1          YES=CONTINUE                 S03 03590
```

```
 777 010003 R
1000 005001 A 3647 M002   TZA                                                  S03 03591
1001 001000 A 3648        RETU*   M00R                                       S03 03592
 002 107772 R
1003 015006 A 3649 M001   LDA     XS,1                                       S03 03593
1004 006140 A 3650        SUBI    1                                          S03 03594
1005 000001 A
1006 001010 A 3651        JAZ     M003          YES OVERRIDE                 S03 03595
1007 010051 R
                3652 *                                                       S03 03596
1010 015006 A 3653        LDA     XS,1                                       S03 03597
1011 006140 A 3654        SUBI    2             S=2 ?                        S03 03598
1012 000002 A
1013 001010 A 3655        JAZ     *+4                                        S03 03599
1014 010017 R
1015 001000 A 3656        JMP     M004          NO                           S03 03600
1016 010032 R
1017 015005 A 3657        LDA     XT,1          T=0 ?                        S03 03601
1020 001010 A 3658        JAZ     M003          YES=OVERIDE                  S03 03602
1021 010051 R
1022 002000 A 3659        CALL    MREZ          TEST CONDITION SPECIFIED BY G FIELD FALSE?S03 03603
1023 007762 R
1024 001020 A 3660        JBZ     *+4                                        S03 03604
1025 010030 R
1026 001000 A 3661        JMP     M004          N/=N/ OVERRIDE               S03 03605
1027 010032 R
1030 001000 A 3662        JMP     M003          YES=OVERRIDE                 S03 03606
1031 010051 R
                3663 *                                                       S03 03607
1032 015006 A 3664 M004   LDA     XS,1                                       S03 03608
1033 006140 A 3665        SUBI    3                                          S03 03609
1034 000003 A
1035 001010 A 3666        JAZ     *+4                                        S03 03610
1036 010041 R
1037 001000 A 3667        JMP     M002          EXIT=NO OVERRIDE             S03 03611
1040 010000 R
1041 002000 A 3668        CALL    MREZ          TEST CONDITION SPECIFIED BY G FIELD TRUE ?S03 03612
1042 007762 R
1043 001020 A 3669        JBZ     *+4                                        S03 03613
1044 010047 R
1045 001000 A 3670        JMP     M003          YES=OVERRIVE                 S03 03614
1046 010051 R
```

```
0047 001000 A 3671          JMP     M002            NO=NO OVERRIDE                          S03 03615
0050 010000 R
                 3672 *                                                                     S03 03616
0051 005301 A 3673 M003     DECR    01              A=-1                                    S03 03617
0052 001000 A 3674          RETU*   M00R            RETURN                                  S03 03618
0053 107772 R
                 3675 *                                                                     S03 03619
                 3676 *   CHECK IF MEM. CYCLE COMPLETE                                      S03 03620
                 3677 *                                                                     S03 03621
0054 014133 A 3678 M072     LDA     MLIP            COMPLETE MEM. CYCLE FLAG                S03 03622
0055 001010 A 3679          JAZ*    M0PA            EXIT                                    S03 03623
0056 107210 R
0057 005001 A 3680          TZA                                                             S03 03624
0060 054127 A 3681          STA     MLIP                                                    S03 03625
0061 001000 A 3682          JMP     M0PA+1          GO COMPLETE MEMORY CYCLE                S03 03626
0062 007211 R
                 3683 *                                                                     S03 03627
                 3684 *                                                                     S03 03628
                 3685 *   LIST MEMORY OPERATIONS(IF TRACE FLAG IS ON)                       S03 03629
                 3686 *                                                                     S03 03630
                 3687 *                                                                     S03 03631
0063 027000 I 3688 M070     LDB     CPAG                                            D       03 03632
0064 005016 A 3689          LDAE    TRACE,2         TRACE FLAG FOR PAGE             D       03 03633
0065 000472 R
0066 001010 A 3690          JAZ     M072                                                    S03 03634
0067 010054 R
0070 002000 A 3691          JMPM    TRSETA          CHECK IF WITHIN BOUNDS                  S03 03635
0071 014724 R
0072 001004 A 3692          JAN     M072            NO=DO NOT TRACE                         S03 03636
0073 010054 R
0074 002000 A 3693          CALL    SPAC            SPACE LO                                S03 03637
0075 014747 R
                 3694 *                                                                     S03 03638
                 3695 *   LIST MEMORY CONDITION CODE(MCCO)                                  S03 03639
0076 005030 A 3696          LDXI    DROM                                                    S03 03640
0077 000545 R
0100 015055 A 3697          LDA     MCCO,1                                                  S03 03641
0101 124127 A 3698          ADD     MLIU            ASCII FOR SPACE,ZERO(0120260)           S03 03642
0102 054111 A 3699          STA     MLIY+3                                                  S03 03643
0103 002000 A 3700          CALL    LOOUT,4,MLIY                                            S03 03644
0104 015470 R
0105 000004 A
```

```
0106 010211 R
                    3701 *   LIST MEMORY OPERATION CODE(MOPC)                    S03 03645
0107 006030 A       3702         LDXI    DROM                                   S03 03646
0110 000545 R
0111 015054 A       3703         LDA     MOPC,1                                 S03 03647
0112 124116 A       3704         ADD     MLIU                                   S03 03648
0113 054104 A       3705         STA     MLIX+3                                 S03 03649
0114 002000 A       3706         CALL    LOOUT,4,MLIX                           S03 03650
0115 015470 R
0116 000004 A
0117 010215 R
                    3707 *   LIST MEMORY ADDRESS CODE(MADS)                     S03 03651
0120 006030 A       3708         LDXI    DROM                                   S03 03652
0121 000545 R
0122 015053 A       3709         LDA     MADS,1                                 S03 03653
0123 124105 A       3710         ADD     MLIU                                   S03 03654
0124 054077 A       3711         STA     MLIW+3                                 S03 03655
0125 002000 A       3712         CALL    LOOUT,4,MLIW                           S03 03656
0126 015470 R
0127 000004 A
0130 010221 R
                    3713 *   LIST MEMORY BYTE DESIGNATOR(MBYC)                  S03 03657
0131 006030 A       3714         LDXI    DROM                                   S03 03658
0132 000545 R
0133 015060 A       3715         LDA     MBYC,1                                 S03 03659
0134 124074 A       3716         ADD     MLIU                                   S03 03660
0135 054072 A       3717         STA     MLIV+3                                 S03 03661
0136 002000 A       3718         CALL    LOOUT,4,MLIV                           S03 03662
0137 015470 R
0140 000004 A
0141 010225 R
                    3719 *   LIST CONTENTS OF MEMORY INTERFACE LATCH(MIL)       S03 03663
0142 006030 A       3720         LDXI    MLIT+4                                 S03 03664
0143 010236 R
0144 006020 A       3721         LDBI    DROM            ADD OF ROM FIELDS/DATA S03 03665
0145 000545 R
0146 026056 A       3722         LDB     MIL,2                                  S03 03666
0147 002000 A       3723         CALL    OH              CONVERT TO ASCII       S03 03667
0150 014523 R
0151 002000 A       3724         CALL    LOOUT,6,MLIT                           S03 03668
0152 015470 R
0153 000006 A
```

```
0154 010232 R
                    3725 *   LIST CONTENTS OF INST REG #1(IRG1)                                  S03 03669
0155 006030 A       3726         LDXI    MLIS+4                                                 S03 03670
0156 010244 R
0157 006020 A       3727         LDBI    DROM                                                   S03 03671
0160 000545 R
0161 026051 A       3728         LDB     IRG1,2                                                 S03 03672
0162 002000 A       3729         CALL    OH              CONVERT TO ASCII                       S03 03673
0163 014523 R
0164 002000 A       3730         CALL    LOOUT,6,MLIS                                           S03 03674
0165 015470 R
0166 000006 A
0167 010240 R
                    3731 *                                                                      S03 03675
                    3732 *   LIST MAIN MEMORY ADDRESS AND CONTENTS BASED UPON MOPC & MADS.      S03 03676
0170 006030 A       3733         LDXI    DROM                                                   S03 03677
0171 000545 R
0172 002000 A       3734         CALL    MOPB            GET MEMORY ADDRESS                     S03 03678
0173 007664 R
0174 005021 A       3735         TBA                                                            S03 03679
0175 002000 A       3736         CALL    3200            LIST MAIN MEM ADDR&CONTENTS            S03 03680
0176 001606 R
0177 014010 A       3737         LDA     MLIP            COMPLETE MEM, CYCLE FLAG               S03 03681
0200 001010 A       3738         JAZ*    MOPA            EXIT                                   S03 03682
0201 107210 R
0202 005001 A       3739         TZA                                                            S03 03683
0203 054004 A       3740         STA     MLIP                                                   S03 03684
0204 002000 A       3741         CALL    TPFRM           TOP OF FORM                            S03 03685
0205 014760 R
0206 001000 A       3742         JMP     MOPA+1          GO COMPLETE MEMORY CYCLE               S03 03686
0207 007211 R
                    3743 *                                                                      S03 03687
                    3744 *                                                                      S03 03688
0210 000000 A       3745 MLIP    DATA    0               COMPLETE MEMORY CYCLE                  S03 03689
0211 120240 A       3746 MLIY    DATA    '  MCCO  '                                             S03 03690
0212 146703 A
0213 141717 A
0214 120240 A
0215 120240 A       3747 MLIX    DATA    '  MOPC  '                                             S03 03691
0216 146717 A
0217 150303 A
0220 120240 A
```

```
0221 120240 A 3748 MLIW   DATA   ! MADS !                                  S03 03692
0222 146701 A
0223 142323 A
0224 120240 A
0225 120240 A 3749 MLIV   DATA   ! MBYC !                                  S03 03693
0226 146702 A
0227 154703 A
0230 120240 A
0231 120260 A 3750 MLIU   DATA   0120260     SPACE-ZERO                    S03 03694
0232 120240 A 3751 MLIT   DATA   ! MIR  !                                  S03 03695
0233 146711 A
0234 151240 A
0235 120240 A
0236 120240 A
0237 120240 A
0240 120240 A 3752 MLIS   DATA   ! IBR  !                                  S03 03696
0241 144702 A
0242 151240 A
0243 120240 A
0244 120240 A
0245 120240 A
0246 000000 A 3753 MLIR   DATA   0          FLAG TO INDICATE MCCD=2 FOR LISTING  S03 03697
0247 000000 A 3754 MPLE   DATA   0          PIPELINE FLAG                 F ********
```

```
                    3755          EJEC                                                  S03 03698
                    3756 *                                                              S03 03699
                    3757 *        ALTER/DISPLAY MICRO REGISTERS                         S03 03700
                    3758 *                                                              S03 03701
 10250              3759 E100     BSS     0                                             S03 03702
 10250 002000 A     3760          JMPM    PBUF            SETUP PRINTER BUFFER          S03 03703
 10251 014604 R
 10252 002000 A     3761          JMPM    FETCHA          INPUT REGISTER NUMBER         S03 03704
 10253 015644 R
 10254 001010 A     3762          JAZ     EXC90                                         S03 03705
 10255 001144 R
 10256 054334 A     3763          STA     E105            SAVE INPUT                    S03 03706
 10257 006140 A     3764          SUBI    0301            ASCII A ?                     S03 03707
 10260 000301 A
 10261 001010 A     3765          JAZ     EAAU            YES= FOR ALU OUTPUT           S03 03708
 10262 010531 R
 10263 144334 A     3766          SUB     EADA            C ?                           S03 03709
 10264 001010 A     3767          JAZ     EASC            YES= FOR SHIFT COUNTER        S03 03710
 10265 010540 R
 10266 006140 A     3768          SUBI    6               I ?                           S03 03711
 10267 000006 A
 10270 001010 A     3769          JAZ     EAIR            YES= INST REG #1              S03 03712
 10271 010547 R
 10272 005311 A     3770          DAR                     J ?                           S03 03713
 10273 001010 A     3771          JAZ     EAJR            YES=JUMP STACK                S03 03714
 10274 010323 R
 10275 005311 A     3772          DAR                     K ?                           S03 03715
 10276 001010 A     3773          JAZ     EAKR            YES= FOR DATA LOOP KEY REG    S03 03716
 10277 010556 R
 10300 144317 A     3774          SUB     EADA            M ?                           S03 03717
 10301 001010 A     3775          JAZ     EAML            YES= MEMORY LATCH             S03 03718
 10302 010565 R
 10303 144314 A     3776          SUB     EADA            Q ?                           S03 03719
 10304 001010 A     3777          JAZ     EAOR            YES= FOR OPERAND REG          S03 03720
 10305 010574 R
 10306 006140 A     3778          SUBI    1               P ?                           S03 03721
 10307 000001 A
 10310 001010 A     3779          JAZ     EAPR            YES= FOR PROGRAM COUNTER      S03 03722
 10311 010327 R
 10312 144305 A     3780          SUB     EADA            R ?                           S03 03723
 10313 001010 A     3781          JAZ     EAFR            YES= FOR FILE REGISTERS       S03 03724
 10314 010336 R
```

```
10315 006140 A 3782          SUBI    1               S ?                          S03 03725
10316 000001 A
10317 001010 A 3783          JAZ     EASR            YES= FOR STATUS REGISTERS    S03 03726
10320 010603 R
10321 001000 A 3784          JMP     EXC90           ILLEGAL REG SPECIFIED        S03 03727
10322 001144 R
               3785 *                                                            S03 03728
10323 005311 A 3786 EAJR     DAR                                                  S03 03729
10324 054047 A 3787          STA     JRFL            SET JUMP STACK FLAG          S03 03730
10325 001000 A 3788          JMP     EAFR+1          USE FILE REGISTER ROUTINE    S03 03731
10326 010337 R
               3789 *                                                            S03 03732
               3790 *   ALTER/DISPLAY PROGRAM COUNTER                            S03 03733
10327 005030 A 3791 EAPR     LDXI    DROM+PREG       ADDR OF PREG                 S03 03734
10330 000607 R
10331 025000 A 3792          LDB     0,1                                          S03 03735
10332 002000 A 3793          CALL    EADS            TYPE CONTENTS                S03 03736
10333 010375 R
10334 001000 A 3794          JMP     EACH            CHANGE IT AND/OR EXIT        S03 03737
10335 010410 R
               3795 *                                                            S03 03738
               3796 *                                                            S03 03739
               3797 *   ALTER/DISPLAY FILE REGISTERS                             S03 03740
10336 054035 A 3798 EAFR     STA     JRFL            CLEAR JUMP STACK FLAG        S03 03741
10337 002000 A 3799          JMPM    FETCHA          GET REG NUMBER 0-F           S03 03742
10340 015644 R
10341 001010 A 3800          JAZ     EXC90                                        S03 03743
10342 001144 R
10343 002000 A 3801          JMPM    CONV            CONVERT CHAR TO HEX          S03 03744
10344 012741 R
10345 001002 A 3802          JAP     EAF0            JUMP IF LEGAL HEX CHAR       S03 03745
10346 010351 R
10347 001000 A 3803          JMP     EXC90           OUTPUT ERROR MESSAGE         S03 03746
10350 001144 R
10351 054244 A 3804 EAF0     STA     E108            SAVE REGISTER VALUE          S03 03747
               3805 *                                                            S03 03748
10352 014243 A 3806 E102     LDA     E108            REGISTER NUMBER              S03 03749
10353 005012 A 3807          TAB                                                  S03 03750
10354 014017 A 3808          LDA     JRFL            JUMP STACK FLAG              S03 03751
10355 001004 A 3809          JAN     EAJS            SET ?                        S03 03752
10356 010367 R
10357 005021 A 3810          TBA                     NO                           S03 03753
```

```
010360 124233 A 3811          ADD     E106            ADDR OF PSEUDO REGS                    S03 03754
010361 005014 A 3812 EAF1     TAX                     REG LOCATION                           S03 03755
010362 025000 A 3813          LDB     0,1             REG CONTENTS                           S03 03756
010363 002000 A 3814          CALL    EADS            PRINT CONTENTS                         S03 03757
010364 010375 R
010365 001000 A 3815          JMP     EACH            CHANGE IT AND/OR EXIT                  S03 03758
010366 010410 R
010367 005021 A 3816 EAJS     TBA                                                            S03 03759
010370 006120 A 3817          ADDI    STACK           ADDR OF STACK                          S03 03760
010371 000505 R
010372 001000 A 3818          JMP     EAF1                                                   S03 03761
010373 010361 R
010374 000000 A 3819 JRFL     DATA    0               JUMP STACK FLAG                        S03 03762
                3820 *    OUTPUT CONTENTS OF B REG TO TTY PRINTER AS 4 HEX CHAR'S          S03 03763
                3821 *                                                                     S03 03764
010375 000000 A 3822 EADS     ENTR                                                           S03 03765
010376 074213 A 3823          STX     E104            SAVE REG, LOC,                         S03 03766
010377 034215 A 3824          LDX     E107            ASCII STORAGE BUFR                     S03 03767
010400 002000 A 3825          CALL    BH              CONVERT TO ASCII                       S03 03768
010401 014523 R
010402 002000 A 3826 EADS1    CALL    SIOUT,5,BUFR    OUTPUT CONTENTS                        S03 03769
010403 015406 R
010404 000005 A
010405 000200 R
010406 001000 A 3827          RETU*   EADS                                                   S03 03770
010407 110375 R
                3828 *                                                                     S03 03771
                3829 *                                                                     S03 03772
010410 002000 A 3830 EACH     JMPM    INA             INPUT 1 = 4 HEX DIGITS                 S03 03773
010411 013373 R
010412 151240 A 3831          DATA    'R'                                                    S03 03774
010413 074203 A 3832          STX     E109            SAVE LAST CHAR INPUT                   S03 03775
010414 001020 A 3833          JBZ     EAC1            JUMP IF NO CHANGE VALUE INPUT          S03 03776
010415 010425 R
010416 034173 A 3834          LDX     E104            REG,LOC,                               S03 03777
010417 055000 A 3835          STA     0,1                                                    S03 03778
010420 014172 A 3836          LDA     E105            REGISTER                         D     03 03779
010421 006140 A 3837          SUBI    'S'                                              D     03 03780
010422 000323 A
010423 001010 A 3838          JAZ     SETMUX          SET TMUX IF STATUS REG CHANGE    D     03 03781
010424 010457 R
                3839 *                                                                     S03 03782
```

```
010425 014171 A 3840 EAC1   LDA     E109            LAST CHAR INPUT                          S03 03783
010426 006140 A 3841        SUBI    0254            COMMA ?                                  S03 03784
010427 000254 A
010430 001010 A 3842        JAZ     *+4             YES-                                     S03 03785
010431 010434 R
010432 001000 A 3843        JMP     EXC10           NO-RTN TO EXEC                           S03 03786
010433 001106 R
010434 014156 A 3844        LDA     E105            WAS REGISTOR                             S03 03787
010435 006140 A 3845        SUBI    0312            INPUT J ?                                S03 03788
010436 000312 A
010437 001010 A 3846        JAZ     EAC2            YES                                      S03 03789
010440 010474 R
010441 006140 A 3847        SUBI    010             INPUT R ?                                S03 03790
010442 000010 A
010443 001010 A 3848        JAZ     EAC2            YES                                      S03 03791
010444 010474 R
010445 002000 A 3849        CALL    SIOUT,2,ABEL    OUTPUT 'A-BELL'                          S03 03792
010446 015406 R
010447 000002 A
010450 010472 R
010451 002000 A 3850        CALL    SIIN            INPUT REGISTER                           S03 03793
010452 015220 R
010453 002000 A 3851        JMPM    FETCH           GET FIRST CHAR                           S03 03794
010454 015635 R
010455 001000 A 3852        JMP     E100+6                                                   S03 03795
010456 010256 R
010457 006030 A 3853 SETMUX LDXI    16                                                 D     03 03796
010460 000020 A
010461 005002 A 3854        TZB                                                        D     03 03797
010462 004441 A 3855        LLRL    1               POSITION STATUS BIT                D     03 03798
010463 005344 A 3856        DXR                                                        D     03 03799
010464 006065 A 3857        STBE    TMUX,1          STORE IN TMUX TABLE                D     03 03800
010465 000640 R
010466 001040 A 3858        JXZ     EAC1            IF ALL 16 BITS SET                 D     03 03801
010467 010425 R
010470 001000 A 3859        JMP     SETMUX+1                                           D     03 03802
010471 010460 R
                3860 *                                                                       S03 03803
010472 120240 A 3861 ABEL   DATA    ' A '                                                    S03 03804
010473 140640 A
                3862 *   OUTPUT NEXT FILE REGISTER                                           S03 03805
010474 044121 A 3863 EAC2   INR     E108            FILE REG NUMBER(0-F)                     S03 03806
```

```
010475 014120 A 3864        LDA     E108                                    S03 03807
010476 006140 A 3865        SUBI    020                                     S03 03808
010477 000020 A
010500 001004 A 3866        JAN     *+4             JUMP IF IN RANGE0-16    S03 03809
010501 010504 R
010502 001000 A 3867        JMP     EXC10           RETURN TO EXEC          S03 03810
010503 001106 R
010504 006010 A 3868        LDAI    0120240         BLANK-BLANK             S03 03811
010505 120240 A
010506 054016 A 3869        STA     EA3                                     S03 03812
010507 024106 A 3870        LDB     E108            REG NUMBER              S03 03813
010510 004054 A 3871        LRLB    12              POSITION VALUE          S03 03814
010511 002000 A 3872        JMPM    0H2             CONVERT CHAR TO ASCII   S03 03815
010512 014550 R
010513 004250 A 3873        LRLA    8                                       S03 03816
010514 006110 A 3874        ORAI    0207            MASK IN BEL             S03 03817
010515 000207 A
010516 054007 A 3875        STA     EA3+1                                   S03 03818
010517 002000 A 3876        CALL    SIOUT,2,EA3                             S03 03819
010520 015406 R
010521 000002 A
010522 010525 R
010523 001000 A 3877        JMP     E102            GO TYPE CONTENTS        S03 03820
010524 010352 R
                3878 *                                                      S03 03821
010525          3879 EA3    BSS     2                                       S03 03822
010527 001000 A 3880        JMP     E102            GO TYPE CONTENTS        S03 03823
010530 010352 R
                3881 *   ALTER/DISPLAY ALU OUTPUT                           S03 03824
010531 006030 A 3882 EAAU   LDXI    DROM+XALU                               S03 03825
010532 000601 R
010533 025000 A 3883        LDB     0,1                                     S03 03826
010534 002000 A 3884        CALL    EADS            TYPE CONTENTS           S03 03827
010535 010375 R
010536 001000 A 3885        JMP     EACH            CHANGE IT AND/OR EXIT   S03 03828
010537 010410 R
                3886 *   ALTER/DISPLAY SHIFT COUNTER                        S03 03829
010540 006030 A 3887 EASC   LDXI    DROM+SREG                               S03 03830
010541 000610 R
010542 025000 A 3888        LDB     0,1                                     S03 03831
010543 002000 A 3889        CALL    EADS                                    S03 03832
010544 010375 R
```

```
010545 001000 A 3890          JMP     EACH                                    S03 03833
010546 010410 R
                3891 *   ALTER/DISPLAY INST REG #1                            S03 03834
010547 006030 A 3892 EAIR    LDXI    DROM+IRG1                                S03 03835
010550 000616 R
010551 025000 A 3893          LDB     0,1                                     S03 03836
010552 002000 A 3894          CALL    EADS                                    S03 03837
010553 010375 R
010554 001000 A 3895          JMP     EACH                                    S03 03838
010555 010410 R
                3896 *   ALTER/DISPLAY DATA LOOP KEY REGISTER                 S03 03839
010556 006030 A 3897 EAKR    LDXI    DROM+KREG                                S03 03840
010557 000614 R
010560 025000 A 3898          LDB     0,1                                     S03 03841
010561 002000 A 3899          CALL    EADS                                    S03 03842
010562 010375 R
010563 001000 A 3900          JMP     EACH                                    S03 03843
010564 010410 R
                3901 *   ALTER/DISPLAY MEMORY INTERFACE LATCH                 S03 03844
010565 006030 A 3902 EAML    LDXI    DROM+MIL                                 S03 03845
010566 000623 R
010567 025000 A 3903          LDB     0,1                                     S03 03846
010570 002000 A 3904          CALL    EADS                                    S03 03847
010571 010375 R
010572 001000 A 3905          JMP     EACH                                    S03 03848
010573 010410 R
                3906 *   ALTER/DISPLAY OPERAND REGISTER                       S03 03849
010574 006030 A 3907 EAOR    LDXI    DROM+OREG                                S03 03850
010575 000611 R
010576 025000 A 3908          LDB     0,1                                     S03 03851
010577 002000 A 3909          CALL    EADS                                    S03 03852
010600 010375 R
010601 001000 A 3910          JMP     EACH                                    S03 03853
010602 010410 R
                3911 *   ALTER/DISPLAY STATUS REGISTER                        S03 03854
010603 006030 A 3912 EASR    LDXI    DROM+STUS                                S03 03855
010604 000606 R
010605 025000 A 3913          LDB     0,1                                     S03 03856
010606 002000 A 3914          CALL    EADS                                    S03 03857
010607 010375 R
010610 001000 A 3915          JMP     EACH                                    S03 03858
010611 010410 R
```

```
                    3916 *                                                                  S03 03859
010612 000000 A     3917 E104   DATA    0           SAVE REG LOC.                           S03 03860
010613 000000 A     3918 E105   DATA    0           TEMP STORE FOR INITIAL INPUT            S03 03861
010614 000525 R     3919 E106   DATA    R0          ADDR OF PSEUDO REGISTERS                S03 03862
010615 000201 R     3920 E107   DATA    BUFR+1      OUTPUT BUFFER ADDR                      S03 03863
010616 000000 A     3921 E108   DATA    0           TEMP STORAGE                            S03 03864
010617 000000 A     3922 E109   DATA    0           LAST INPUT CHAR                         S03 03865
010620 000002 A     3923 EADA   DATA    2                                                   S03 03866
                    3924 *                                                                  S03 03867
```

```
                    3925          EJEC                                                    S03 03868
                    3926 *                                                                S03 03869
                    3927 *        CHANGE/DISPLAY MEMORY (IN HEXADECIMAL)                  S03 03870
                    3928 *                                                                S03 03871
010621              3929 CMEM     BSS     0                                               S03 03872
010621 002000 A     3930          JMPM    PBUF            INITIALIZE BUFFER               S03 03873
010622 014504 R
010623 002000 A     3931          JMPM    INA             GET DUMP ADDR                   S03 03874
010624 013373 R
010625 147240 A     3932          DATA    'N'                                             S03 03875
010626 054045 A     3933          STA     CME3            SAVE ADDR                       S03 03876
010627 034045 A     3934 CME1     LDX     CME4            OUTPUT BUFFER ADDR              S03 03877
010630 024043 A     3935          LDB     CME3                                            S03 03878
010631 026000 A     3936          LDB     0,2                                             S03 03879
010632 002000 A     3937          JMPM    OH              CONVERT TO ASCII                S03 03880
010633 014523 R
010634 002000 A     3938          CALL    SIOUT,3,BUFR    OUTPUT CONTENTS                 S03 03881
010635 015406 R
010636 000003 A
010637 000200 R
010640 002000 A     3939          JMPM    INA             INPUT CHANGE VALUE              S03 03882
010641 013373 R
010642 151240 A     3940          DATA    'R'                                             S03 03883
010643 001020 A     3941          JBZ     CME2            JUMP IF NO CHANGE INPUT         S03 03884
010644 010647 R
010645 024026 A     3942          LDB     CME3                                            S03 03885
010646 056000 A     3943          STA     0,2             STORE CHANGE VALUE              S03 03886
010647 005041 A     3944 CME2     TXA                                                     S03 03887
010650 006140 A     3945          SUBI    0254            COMMA                           S03 03888
010651 000254 A
010652 001010 A     3946          JAZ     *+4             YES                             S03 03889
010653 010656 R
010654 001000 A     3947          JMP     EXC10           NO-RETURN TO EXEC               S03 03890
010655 001106 R
010656 002000 A     3948          JMPM    PBUF            INITIALIZE BUFFER               S03 03891
010657 014604 R
010660 044013 A     3949          INR     CME3            INCR MEMORY ADDR                S03 03892
010661 024012 A     3950          LDB     CME3            ADDR                            S03 03893
010662 034012 A     3951          LDX     CME4            OUTPUT BUFFER ADDR              S03 03894
010663 002000 A     3952          JMPM    OH              CONVERT TO ASCII                S03 03895
010664 014523 R
010665 002000 A     3953          CALL    SIOUT,3,BUFR    OUTPUT ADDR                     S03 03896
```

```
010666 015406 R
010667 000003 A
010670 000200 R
010671 014002 A 3954          LDA     CME3                                    S03 03897
010672 001000 A 3955          JMP     CME1            GO OUTPUT CONTENTS      S03 03898
010673 010627 R
010674 000000 A 3956 CME3     DATA    0               MEMORY ADDRESS          S03 03899
010675 000201 R 3957 CME4     DATA    BUFR+1          OUTPUT BUFFER           S03 03900
```

```
                    3958          EJEC                                                    S03 03901
                    3959 *                                                                S03 03902
                    3960 *        LOAD CONTROL STORE, CENTRAL OR DECODE                   S03 03903
                    3961 *        ENTERED VIA THE L COMMAND                               S03 03904
                    3962 *                                                                S03 03905
010676              3963 LDRM     BSS     0                                               S03 03906
010676 002000 A     3964          JMPM    FETCHA          GET WHICH TYPE CONTROL STORE    S03 03907
010677 015644 R
010700 054577 A     3965          STA     LDCTL           SAVE LOAD TYPE                  ********
010701 001010 A     3966          JAZ     EXC90           ERROR IF NO TYPE SPECIFIED      S03 03908
010702 001144 R
010703 006140 A     3967          SUBI    0303            C ?                             S03 03909
010704 000303 A
010705 001010 A     3968          JAZ     LDCS            LOADING CENTRAL                 S03 03910
010706 010735 R
010707 005311 A     3969          DAR                     D ?                             S03 03911
010710 001010 A     3970          JAZ     LDDS            LOADING DECODE                  S03 03912
010711 010720 R
010712 006140 A     3971          SUBI    'M'-'D'         LOADING MAIN MEMORY             ********
010713 000011 A
010714 001010 A     3972          JAZ     LDMM                                            ********
010715 010760 R
010716 001000 A     3973          JMP     EXC90           ERROR-ILLEGAL DESIGNATOR        S03 03913
010717 001144 R
010720 002000 A     3974 LDDS     JMPM    FETCHA          GET WHICH DECODE                S03 03914
010721 015644 R
010722 001010 A     3975          JAZ     EXC90           ERROR IF NO TYPE SEPCIFIED      S03 03915
010723 001144 R
010724 006140 A     3976          SUBI    030'            A?                              S03 03916
010725 000301 A
010726 001010 A     3977          JAZ     LDDSA                                           S03 03917
010727 010744 R
010730 005311 A     3978          DAR                     B?                              S03 03918
010731 001010 A     3979          JAZ     LDDSB                                           S03 03919
010732 010751 R
010733 001000 A     3980          JMP     EXC90           ERROR-ILLEGAL DESIGNATOR        S03 03920
010734 001144 R
010735 006020 A     3981 LDCS     LDBI    DBUF                                            S03 03921
010736 000371 R
010737 026000 A     3982          LDB     0,2             ADDR OF CURRENT CCS PAGE        S03 03922
010740 005001 A     3983          TZA                                                     S03 03923
010741 054647 A     3984          STA     LCCS            SET FOR CCS LOAD                S03 03924
```

```
010742 001000 A 3985          JMP     LDRC            START LOAD                              S03 03925
010743 010756 R
010744 006020 A 3986 LDDSA    LDBI    DRM2            DCSA                                    S03 03926
010745 000373 R
010746 026000 A 3987          LDB     0,2             ADDR OF CURRENT DCSA PAGE               S03 03927
010747 001000 A 3988          JMP     LDRC+2          START LOAD                              S03 03928
010750 010754 R
010751 006020 A 3989 LDDSB    LDBI    DRM1            DCSB                                    S03 03929
010752 000372 R
010753 026000 A 3990          LDB     0,2             ADDR OF CURRENT DCSB PAGE               S03 03930
010754 005301 A 3991          DECR    01                                                      S03 03931
010755 054633 A 3992          STA     LCCS            SET FOR DCS LOAD                        S03 03932
010756          3993 LDRC     BSS     0               START LOAD                              S03 03933
010756 064634 A 3994          STB     LDPT            SAVE POINTER                            S03 03934
010757 064632 A 3995          STB     LDADR           DEFAULT ORG TO 0                        C 03 03935
       010760 R 3996 LDMM     EQU     *                                                       ********
010760 006027 A 3997          LDBE    SYST            SYSTEM FLAG                             S03 03936
010761 001374 R
010762 016000 A 3998          LDA     0,2                                                     S03 03937
010763 001004 A 3999          JAN     LMOS            JUMP IF MOS                             S03 03938
010764 010775 R
010765 014555 A 4000          LDA     BIFLG                                                   S03 03939
010766 001002 A 4001          JAP     LMOS            JUMP IF ON NONE RMD                     S03 03940
010767 010775 R
                4002          IOLINK  6,BUFR+1,120                                            S03 03941
010770 002000 A
010771 000000 E
010772 001406 A
010773 000201 R
010774 000170 A
010775 005001 A 4003 LMOS     TZA                                                             S03 03942
010776 054617 A 4004          STA     RCN             ZERO RECORD NUMBER                      S03 03943
                4005 *                                                                        S03 03944
                4006 *        THE READ FCB/DCB AND WORD COUNT ARE SET AT INITIALIZATION        S03 03945
                4007 *                                                                        S03 03946
                4008 LREAD    READ    BIDCB,6,0,1     READ A RECORD                           S03 03947
010777 002000 A
011000 000312 E
011001 100000 A
011002 010006 A
011003 011575 R
011004 000000 A
```

```
011005 000000 A
                    4009 LR1     STAT    LREAD,ERR,EOF,BEOD,LR1                          C,1 03 03948
011006 002000 A
011007 000000 E
011010 010777 R
011011 011407 R
011012 011415 R
011013 011423 R
011014 011006 R
011015 005001 A 4010 LREAD1 TZA                                                          S03 03949
011016 054600 A 4011        STA     WDCT        ZERO WORD COUNT                          S03 03950
011017 054567 A 4012        STA     CKSM        CLEAR CHECKSUM SUPPRESS FLAG             S03 03951
011020 054567 A 4013        STA     FREC        CLEAR FIRST RECORD FLAG                  S03 03952
011021 054572 A 4014        STA     LREC        CLEAR LAST RECORD FLAG                   S03 03953
011022 034557 A 4015        LDX     BIBUF       ADDR OF BI INPUT BUFFER                  S03 03954
011023 015000 A 4016        LDA     0,1         GET WORD ZERO                            S03 03955
011024 005012 A 4017        TAB                                                          S03 03956
011025 154557 A 4018        ANA     BIT15       GET BIT 15                               S03 03957
011026 001010 A 4019        JAZ     *+3         JUMP IF NOT SET                          S03 03958
011027 011031 R
011030 044556 A 4020        INR     CKSM        SET CHECKSUM SUPPRESS                    S03 03959
011031 005021 A 4021        TBA                                                          S03 03960
011032 154551 A 4022        ANA     BIT12       GET BIT 12                               S03 03961
011033 001010 A 4023        JAZ     *+4         JUMP IF NOT SET                          S03 03962
011034 011037 R
011035 001000 A 4024        JMP     *+3                                                  S03 03963
011036 011040 R
011037 044550 A 4025        INR     FREC        SET FIRST RECORD FLAG                    S03 03964
011040 005021 A 4026        TBA                                                          S03 03965
011041 154541 A 4027        ANA     BIT11       GET BIT 11                               S03 03966
011042 001010 A 4028        JAZ     *+4         JUMP IF NOT SET                          S03 03967
011043 011046 R
011044 001000 A 4029        JMP     *+3                                                  S03 03968
011045 011047 R
011046 044545 A 4030        INR     LREC        SET LAST RECORD FLAG                     S03 03969
011047 005021 A 4031        TBA                                                          S03 03970
011050 006150 A 4032        ANAI    0377        GET RECORD NUMBER                        S03 03971
011051 000377 A
011052 144543 A 4033        SUB     RCN         SUB EXPECTED RECORD NUMBER               S03 03972
011053 001010 A 4034        JAZ     *+4                                                  S03 03973
011054 011057 R
011055 001000 A 4035        JMP     SEQER       SEQUENCE ERROR                           S03 03974
```

```
011056 011431 R
011057 014527 A 4036          LDA     CKSM        CHECKSUM SUPPRESS FLAG                  S03 03975
011060 001010 A 4037          JAZ     **4         FLAG SET                                S03 03976
011061 011064 R
011062 001000 A 4038          JMP     LDFR        YES=DO NOT DO CHECKSUM                  S03 03977
011063 011066 R
011064 002000 A 4039          CALL    CKSUM       PERFORM CHECKSUM                        S03 03978
011065 011546 R
011066 014521 A 4040 LDFR     LDA     FREC        FIRST RECORD FLAG                       S03 03979
011067 001010 A 4041          JAZ     LDBP                                                S03 03980
011070 011077 R
011071 014510 A 4042          LDA     BIBUF       BUFFER ADDR                             S03 03981
011072 005120 A 4043          ADDI    11          PLUS 11                                 S03 03982
011073 000013 A
011074 054511 A 4044          STA     BUFPTR      MOVED PAST HEADER BLOCK                 S03 03983
011075 001000 A 4045          JMP     LDWD                                                S03 03984
011076 011103 R
011077 014502 A 4046 LDBP     LDA     BIBUF                                               S03 03985
011100 005120 A 4047          ADDI    2                                                   S03 03986
011101 000002 A
011102 054503 A 4048          STA     BUFPTR      SET BUFFER POINTER                      S03 03987
011103 014502 A 4049 LDWD     LDA     BUFPTR                                              S03 03988
011104 144475 A 4050          SUB     BIBUF                                               S03 03989
011105 006140 A 4051          SUBI    60                                                  S03 03990
011106 000074 A
011107 001002 A 4052          JAP     LDNR        RECORD COMPLETE ?                       S03 03991
011110 011342 R
011111 034474 A 4053          LDX     BUFPTR                                              S03 03992
011112 014365 A 4054          LDA     LDCTL       LOAD TYPE                               ********
011113 006140 A 4055          SUBI    'M'                                                 ********
011114 000315 A
011115 001010 A 4056          JAZ     LDMEM       JUMP IF LOAD MAIN MEMORY                ********
011116 011202 R
011117 015000 A 4057          LDA     0,1         GET WORD                                S03 03993
011120 005012 A 4058          TAB                                                         S03 03994
011121 004355 A 4059          LSRA    13          GET CODE                                S03 03995
011122 001010 A 4060          JAZ     **4                                                 S03 03996
011123 011126 R
011124 001000 A 4061          JMP     **5                                                 S03 03997
011125 011131 R
011126 044457 A 4062          INR     BUFPTR      IGNORE THIS WORD                        S03 03998
011127 001000 A 4063          JMP     LDWD                                                S03 03999
```

```
011130 011103 R
011131 005311 A 4064          OAR                                          S03 04000
011132 001010 A 4065          JAZ     LDORG       SET ORG ADDRESS          S03 04001
011133 011170 R
011134 005311 A 4066          OAR                                          S03 04002
011135 001010 A 4067          JAZ     LDST                                 S03 04003
011136 011141 R
011137 001000 A 4068          JMP     LDCDE       LOADER CODE ERROR        S03 04004
011140 011437 R
011141          4069 LDST     BSS     0                                    S03 04005
011141 044444 A 4070          INR     BUFPTR                               S03 04006
011142 005021 A 4071          TBA                                          S03 04007
011143 154451 A 4072          ANA     LSB13       GET 13 LSBS (INST COUNT) S03 04008
011144 005111 A 4073          IAR                 PLUS ONE AS COUNT IS ACTUAL MINUS ONE S03 04009
011145 004202 A 4074          ASLA    2           TIMES 4 (FOUR 16 BIT WORDS PER MICRO) S03 04010
011146 054006 A 4075          STA     NMIC+2      SET COUNT FOR MOVE       S03 04011
011147 014436 A 4076          LDA     BUFPTR                               S03 04012
011150 054005 A 4077          STA     NMIC+3      SET FROM ADDRESS FOR MOVE S03 04013
011151 014440 A 4078          LDA     LDADR                                S03 04014
011152 054004 A 4079          STA     NMIC+4      SET TO ADDRESS FOR MOVE  S03 04015
011153 002000 A 4080 NMIC     CALL    MOVW,4,0,0                           S03 04016
011154 014517 R
011155 000004 A
011156 000000 A
011157 000000 A
011160 017000 I 4081          LDA     NMIC+2      COUNT                    S03 04017
011161 124424 A 4082          ADD     BUFPTR                               S03 04018
011162 054423 A 4083          STA     BUFPTR      UPDATE  BUFFER POINTER   S03 04019
011163 017000 I 4084          LDA     NMIC+2                               S03 04020
011164 124425 A 4085          ADD     LDADR                                S03 04021
011165 054424 A 4086          STA     LDADR       UPDATE LOAD ADDRESS POINTER S03 04022
011166 001000 A 4087          JMP     LOWD                                 S03 04023
011167 011103 R
                4088 *                                                     S03 04024
011170 005021 A 4089 LDORG    TBA                                          S03 04025
011171 154423 A 4090          ANA     LSB13       GET ORG ADDR             S03 04026
011172 024416 A 4091          LDB     LCCS                                 S03 04027
011173 003020 A 4092          XBZ     LDOR1       IF LOADING CCS           S03 04028
011174 011341 R
011175 124415 A 4093          ADD     LDPT        SET LOAD ADDR            S03 04029
011176 054413 A 4094          STA     LDADR                                S03 04030
011177 044406 A 4095          INR     BUFPTR                               S03 04031
```

```
011200 001000 A 4096          JMP     LDWD                                    S03 04032
011201 011103 R
       011202 R 4097 LDMEM    EQU     *       LOAD MAIN MEMORY                ********
011202 015000 A 4098          LDA     0,1     GET WORD                        ********
011203 004355 A 4099          LSRA    13      FETCH LOAD ADDR                 ********
011204 005012 A 4100          TAB                                             ********
011205 006016 A 4101          LDAE    CODE    CODE SERVICE ADDR               ********
011206 011453 R               STA     *+2
011207 001010 A 4102          JAZ     LDCDE   ERROR IF UNSERVICED CODE        ********
011210 011437 R               JMP*    *-*
011211 054115 A 4103          STA     LDSRV+2 SET SERVICE ADDR                ********
011212 002000 A 4104          JMPM    LDSRV   PERFORM SERVICE                 ********
011213 011325 R
011214 015000 A 4105 LDSCD    LDA     0,1                                     ********
011215 004351 A 4106          LSRA    9       FETCH SUBCODE                   ********
011216 006150 A 4107          ANAI    017                                     ********
011217 000017 A               ADD     SCOD
011220 005012 A 4108          TAB                                             ********
011221 006016 A 4109          LDAE    SCOD,2  SUBCODE SERVICE ADDR            ********
011222 011460 R               STA     *+2
011223 001010 A 4110          JAZ     LDCDE   ERROR IF UNSERVICED SUBCODE     ********
011224 011437 R               JMP*    *-*
011225 054101 A 4111          STA     LDSRV+2                                 ********
011226 002000 A 4112          JMPM    LDSRV   PERFORM SERVICE                 ********
011227 011325 R
011230 015000 A 4113 LDMOR    LDA     0,1                                     ********
011231 004344 A 4114          LSRA    4       FETCH POINTER                   ********
011232 006150 A 4115          ANAI    037                                     ********
011233 000037 A
011234 006140 A 4116          SUBI    037                                     ********
011235 000037 A
011236 001010 A 4117          JAZ     LDPTR   ONLY ABSOLUTE IS VALID POINTER  ********
011237 011242 R
011240 001000 A 4118          JMP     LDCDE   ERROR                           ********
011241 011437 R
       4119 *                                                                 ********
011242 001000 A 4120 LDPTR    JMP     0       ADDRESS SET BY SERVICE ROUTINES ********
011243 000000 A
```

```
                    4121          EJEC                                          ********
011244 000000 A     4122 LDLDR    ENTR                  CODE+4, LOAD DATA WORDS ********
011245 044340 A     4123          INR     BUFPTR                                ********
011246 015000 A     4124          LDA     0,1                                   ********
011247 154345 A     4125          ANA     LSB13         ISOLATE WORD            ********
011250 005111 A     4126          IAR                                           ********
011251 054016 A     4127          STA     LDMV+2        SET MOVE COUNT          ********
011252 014333 A     4128          LDA     BUFPTR                                ********
011253 054015 A     4129          STA     LDMV+3        SET FROM  ADDR          ********
011254 124013 A     4130          ADD     LDMV+2                                ********
011255 054330 A     4131          STA     BUFPTR        UPDATE BUFFER POINTER   ********
011256 014333 A     4132          LDA     LDADR                                 ********
011257 054012 A     4133          STA     LDMV+4        SET TO ADDR             ********
011260 124007 A     4134          ADD     LDMV+2        CALCULATE RANGE         ********
011261 054330 A     4135          STA     LDADR         UPDATE LOAD ADDR        ********
011262 006140 A     4136          SUBI    EMEM                                  ********
011263 000177 R
011264 001002 A     4137          JAP     LDSIZ         ERROR IF MAIN MEMORY EXCEEDED ********
011265 011445 R
011266 002000 A     4138 LDMV     CALL    MOVW,0,0,0    MOVE DATA WORDS TO MEMORY ********
011267 014517 R
011270 000000 A
011271 000000 A
011272 000000 A
011273 001000 A     4139          JMP     LDWD          CONTINUE WITH OBJECT RECORDS ********
011274 011103 R
                    4140 *                                                      ********
011275 000000 A     4141 LDWDR    ENTR                  SET LOAD ADDR           ********
011276 006010 A     4142          LDAI    LDA,0                                 ********
011277 011306 R
011300 057000 I     4143          ST      LDPTR,1       SET FOR ORG ADDR ROUTINE ********
011301 001000 A     4144          RETU    LDWDR                                 ********
011302 111275 R
                    4145 *                                                      ********
011303 000000 A     4146 LDWEX    ENTR                  SET EXECUTION ADDR      ********
011304 001000 A     4147          JMP     LCOM          EXECTION ADDR IS END OF LOAD ********
011305 011401 R
                    4148 *                                                      ********
        011306 R    4149 LDADD    EQU     *                                     ********
011306 044277 A     4150          INR     BUFPTR                                ********
011307 024276 A     4151          LDB     BUFPTR                                ********
011310 016000 A     4152          LDA     0,2           LOAD ADDR               ********
```

```
011311 054300 A 4153          STA     LDADR           SET LOAD ADDR                          ********
011312 006140 A 4154          SUBI    MMEM                                                   ********
011313 000000 R
011314 001004 A 4155          JAN     LDSIZ           IF BELOW MAIN MEMORY                   ********
011315 011445 R
011316 006140 A 4156          SUBI    EMEM-MMEM+1                                      F     ********
011317 000200 A
011320 001002 A 4157          JAP     LDSIZ           IF ABOVE MAIN MEMORY             F     ********
011321 011445 R
011322 044263 A 4158          INR     BUFPTR                                                 ********
011323 001000 A 4159          JMP     LDWD            CONTINUE LOAD                          ********
011324 011103 R
                4160 *                                                                       ********
011325 000000 A 4161 LDSRV    ENTR                                                           ********
011326 002000 A 4162          JMPM    0               SERVICE LOADER CODE (ADDR SET UPON CALL) ********
011327 000000 A
011330 001000 A 4163          RETU*   LDSRV                                                  ********
011331 111325 R
                4164 *                                                                       ********
011332 000000 A 4165 LDSCD    ENTR                    USE SUBCODE, CODE NOT USED             ********
011333 001000 A 4166          RETU*   LDSCD                                                  ********
011334 111332 R
                4167 *                                                                       ********
011335 000000 A 4168 LDIGN    ENTR                    IGNORE ENTRY                           ********
011336 044247 A 4169 LDIGN    INR     BUFPTR          BYPASS WORD                            ********
011337 001000 A 4170          JMP     LDWD            CONTINUE LOAD                          ********
011340 011103 R
011341 004202 A 4171 LDRR1    ASLA    2               TIMES FOUR                             S03 04033
011342 014200 A 4172 LDNR     LDA     BIFLG           BI ON RMD FLAG                         S03 04034
011343 001010 A 4173          JAZ     LDRNS           JUMP IF NOT SET                        S03 04035
011344 011375 R
011345 006027 A 4174          LDBE    SYST            SYSTEM FLAG                            S03 04036
011346 001374 R
011347 016000 A 4175          LDA     0,2                                                    S03 04037
011350 001004 A 4176          JAN     LDRNS           MOS SYSTEM                             S03 04038
011351 011375 R
011352 014233 A 4177          LDA     BUFPTR                                                 S03 04039
011353 144222 A 4178          SUB     BIDCB+1         BUFFER ADDR                            S03 04040
011354 006140 A 4179          SUBI    120             RECORD LENGTH ON RMD                   S03 04041
011355 000170 A
011356 001002 A 4180          JAP     LDRNR           JUMP IF 120 WORDS READ                 S03 04042
011357 011372 R
```

```
011360 014221 A 4181          LDA     BIBUF                                                   S03 04043
011361 006120 A 4182          ADDI    60                                                      S03 04044
011362 000074 A
011363 054216 A 4183          STA     BIBUF           SET FOR NEXT 60 WORD BLOCK              S03 04045
011364 044231 A 4184          INR     RCN             ADVANCE RECORD NUMBER                   S03 04046
011365 014226 A 4185          LDA     LREC            LAST RECORD FLAG                        S03 04047
011366 001010 A 4186          JAZ     LREAD1          JUMP IF NOT LAST RECORD                 S03 04048
011367 011015 R
011370 001000 A 4187          JMP     LCOM            LOAD COMPLETE                           S03 04049
011371 011401 R
011372 014203 A 4188 LDRNR    LDA     BIOCB+1         BUFFER ADDR                             S03 04050
011373 054206 A 4189          STA     BIBUF           RESET BUFFER ADDRESS                    S03 04051
011374 054211 A 4190          STA     BUFPTR                                                  S03 04052
011375 044220 A 4191 LDRNS    INR     RCN             ADVANCE RECORD NUMBER                   S03 04053
011376 014215 A 4192          LDA     LREC            LAST RECORD FLAG                        S03 04054
011377 001010 A 4193          JAZ     LREAD           JUMP IF NOT SET                         S03 04055
011400 010777 R
       011401 R 4194 LCOM     EQU     *                                                       S03 04056
011401 002000 A 4195          CALL    SIOUT,8,LDCM    OUTPUT LOAD COMPLETE                    S03 04057
011402 015406 R
011403 000010 A
011404 011634 R
011405 001000 A 4196          JMP     EXC10           RETURN                                  S03 04058
011406 001106 R
               4197 *                                                                         S03 04059
011407 002000 A 4198 ERR      CALL    SIOUT,3,RDER    OUTPUT ERROR                            S03 04060
011410 015406 R
011411 000003 A
011412 011644 R
011413 001000 A 4199          JMP     EXC10                                                   S03 04061
011414 001106 R
011415 002000 A 4200 EOF      CALL    SIOUT,3,EOFE    OUTPUT ERROR                            S03 04062
011416 015406 R
011417 000003 A
011420 011623 R
011421 001000 A 4201          JMP     EXC10                                                   S03 04063
011422 001106 R
011423 002000 A 4202 BEOD     CALL    SIOUT,3,HOPE    OUTPUT ERROR                            S03 04064
011424 015406 R
011425 000003 A
011426 011626 R
011427 001000 A 4203          JMP     EXC10                                                   S03 04065
```

```
011430 001106 R
011431 002000 A 4204 SEQER  CALL    SIOUT,3,SEQE    OUTPUT ERROR                    S03 04066
011432 015406 R
011433 000003 A
011434 011647 R
011435 001000 A 4205        JMP     EXC10                                           S03 04067
011436 001106 R
011437 002000 A 4206 LOCDE  CALL    SIOUT,3,LCDE    OUTPUT ERROR                    S03 04068
011440 015406 R
011441 000003 A
011442 011631 R
011443 001000 A 4207        JMP     EXC10                                           S03 04069
011444 001106 R
011445 002000 A 4208 LDSIZ  CALL    SIOUT,3,LSIZ  OUTPUT ERROR                      ********
011446 015406 R
011447 000003 A
011450 011652 R
011451 001000 A 4209        JMP     EXC10                                           ********
011452 001106 R
                4210 *                                                              ********
                4211 * CODE SERVICE ADDR TABLE                                     ********
011453 011332 R 4212 CODE   DATA    LDSCD,0,0,0,LDLDR                               ********
011454 000000 A
011455 000000 A
011456 000000 A
011457 011244 R
                4213 * SUBCODE SERVICE ADDR TABLE                                  ********
011460 011335 R 4214 SCOD   DATA    LDISN,LDMOR,0,0,0,0,0,LDNEX                     ********
011461 011275 R
011462 000000 A
011463 000000 A
011464 000000 A
011465 000000 A
011466 000000 A
011467 011303 R
011470 000000 A 4215        DATA    0,0,0,0,0,0,0,0                                 ********
011471 000000 A
011472 000000 A
011473 000000 A
011474 000000 A
011475 000000 A
011476 000000 A
```

```
011477 000000 A
                    4216 *                                                                  ********
011500 000000 A     4217 LOCTL  DATA    0           LOAD TYPE FLAG                          ********
                    4218 *                                                                  ********

                    4220 *                                                                  S03 04071
                    4221 *      THIS ROUTINE DETERMINES IF THE LOGICAL UNIT IS ON A RMD AND  S03 04072
                    4222 *      VORTEX IS THE OPERATING SYSTEM                              S03 04073
                    4223 *                                                                  S03 04074
                    4224 *      CALLING SEQUENCE                                            S03 04075
                    4225 *      CALL    RMD,X       X = LUN                                 S03 04076
                    4226 *      RETURN              A REG ZERO IF ON RMD AND IN VORTEX      S03 04077
                    4227 *                                                                  S03 04078
011501 000000 A     4228 RMD    ENTR                                                        S03 04079
011502 027000 I     4229        LDB     RMD                                                 S03 04080
011503 016000 A     4230        LDA     0,2         LUN PARAM OF CALL                       S03 04081
011504 054010 A     4231        STA     RMD1                                                S03 04082
011505 047000 I     4232        INR     RMD         UPDATE RETURN ADDRESS                   S03 04083
011506 027000 I     4233        LDB     SYST                                                S03 04084
011507 016000 A     4234        LDA     0,2         SYSTEM FLAG                             S03 04085
011510 001004 A     4235        JAN*    RMD         RETURN IF MOS SYSTEM                    S03 04086
011511 111501 R
011512 024025 A     4236        LDB     V$LUT1                                              S03 04087
011513 016000 A     4237        LDA     0,2                                                 S03 04088
011514 006120 A     4238        ADDI    0                                                   S03 04089
011515 000000 A
011515              4239 RMD1   BES     0           LUN                                     S03 04090
011516 005014 A     4240        TAX                                                         S03 04091
011517 015000 A     4241        LDA     0,1         LUN ENTRY                               S03 04092
011520 157000 I     4242        ANA     RMLF                                                S03 04093
011521 005311 A     4243        OAR                                                         S03 04094
011522 054017 A     4244        STA     RMDT                                                S03 04095
011523 004201 A     4245        ASLA    1                                                   S03 04096
011524 124015 A     4246        ADD     RMDT                                                S03 04097
011525 054014 A     4247        STA     RMDT                                                S03 04098
011526 024012 A     4248        LDB     V$DSTB                                              S03 04099
011527 016000 A     4249        LDA     0,2                                                 S03 04100
011530 124011 A     4250        ADD     RMDT                                                S03 04101
011531 005012 A     4251        TAB                                                         S03 04102
011532 016001 A     4252        LDA     1,2         FIRST WORD OF DST                       S03 04103
011533 004350 A     4253        LSRA    8           LEFT CHAR                               S03 04104
011534 006140 A     4254        SUBI    0304        0 ?                                     S03 04105
```

```
011535 000304 A
011536 001000 A 4255         JMP*    RMD             A REG ZERO IF ON RMD                    S03 04106
011537 111501 R
011540 000400 A 4256 VSLUT1  DATA    0400            LUT POINTER                             S03 04107
011541 000355 A 4257 VSOSTB  DATA    0355            OST POINTER                             S03 04108
011542 000000 A 4258 RMDT    DATA    0               TEMP STORE                              S03 04109
011543 000000 A 4259 BIFLG   DATA    0               BI ON RMD FLAG, POS=NO, NEG=YES         S03 04110

                4261 *                                                                       S03 04112
                4262 *       THIS ROUTINE PERFORMS A STANDARD CHECKSUM ON A RECORD           S03 04113
                4263 *                                                                       S03 04114
                4264 *       CALLING SEQUENCE                                                S03 04115
011544 002000 A 4265         CALL    CKSUM                                                   S03 04116
011545 011546 R
                4266 *       RETURN  1) TO LOADER IF CHECKSUM OK 2) TO ERROR OF NOT OK       S03 04117
                4267 *                                                                       S03 04118
011546 000000 A 4268 CKSUM   ENTR                                                            S03 04119
011547 006010 A 4269         LDAI    BUFR+1                                                  S03 04120
011550 000201 R
011551 124027 A 4270         ADD     BIBLK+1         RECORD LENGTH                           S03 04121
011552 054006 A 4271         STA     CKSU2                                                   S03 04122
011553 005002 A 4272         TZB                                                             S03 04123
011554 005021 A 4273 CKSU1   TBA                                                             S03 04124
011555 135000 A 4274         ERA     0,1                                                     S03 04125
011556 005012 A 4275         TAB                     SAVE ACCUM VALUE                        S03 04126
011557 005145 A 4276         INCR    045             A=X=X+1                                 S03 04127
011560 006140 A 4277         SUBI    0                                                       S03 04128
011561 000000 A
011561          4278 CKSU2   BES     0                                                       S03 04129
011562 001004 A 4279         JAN     CKSU1           JUMP IF NOT AT END OF RECORD            S03 04130
011563 011554 R
011564 005021 A 4280         TBA                                                             S03 04131
011565 001010 A 4281         JAZ*    CKSUM           RETURN IF CHECKSUM OK                   S03 04132
011566 111546 R
011567 002000 A 4282         CALL    SIOUT,3,CKSU    OUTPUT ERROR                            S03 04133
011570 015406 R
011571 000003 A
011572 011620 R
011573 001000 A 4283         JMP     EXC10           RETURN                                  S03 04134
011574 001106 R
                4284 *                                                                       S03 04135
                4285 *       DATA BLOCKS AND TEMPORARY STORAGE                               S03 04136
```

```
                    4286 *                                                                  S03 04137
                    4287 BIDCB  DCB     60,BUFR+1,0   LOCAL DCB FOR BI                     S03 04138
011575 000074 A
011576 000201 R
011577 000000 A
                    4288        EXT     BIFCB                                             S03 04139
011600 000335 E     4289 BIBLK  DATA    BIFCB         FCB/DCB ADDR, SET BY INITIALIZATION S03 04140
011601 000074 A     4290        DATA    60            RECORD LENGTH, SET BY INITIALIZATION S03 04141
011602 000201 R     4291 BIBUF  DATA    BUFR+1        POINTER TO BUFFER                   S03 04142
011603 004000 A     4292 BIT11  DATA    04000         BIT 11 MASK                         S03 04143
011604 010000 A     4293 BIT12  DATA    010000        BIT 12 MASK                         S03 04144
011605 100000 A     4294 BIT15  DATA    0100000       BIT 15 MASK                         S03 04145
011606 000201 R     4295 BUFPTR DATA    BUFR+1        BUFFER POINTER                      S03 04146
011607 000000 A     4296 CKSM   DATA    0             CHECKSUM FLAG                       S03 04147
011610 000000 A     4297 FREC   DATA    0             FIRST RECORD FLAG                   S03 04148
011611 000000 A     4298 LCCS   DATA    0             LOAD CCS=0 OR DCS=NEG               S03 04149
011612 000000 A     4299 LOADR  DATA    0             LOAD ADDR                           S03 04150
011613 000000 A     4300 LOPT   DATA    0             BASE ADDR                           S03 04151
011614 000000 A     4301 LREC   DATA    0             LAST RECORD FLAG                    S03 04152
011615 017777 A     4302 LS813  DATA    017777        ADDR BITS                           S03 04153
011616 000000 A     4303 RCN    DATA    0             CURRENT EXPECTED RECORD NUMBER      S03 04154
011617 000000 A     4304 WDCT   DATA    0             WORD COUNT                          S03 04155
011620 120240 A     4305 CKSU   DATA    ' MS12'       CHECKSUM ERROR                      S03 04156
011621 146723 A
011622 130682 A
011623 120240 A     4306 EOFE   DATA    ' MS08'       EOF ENCOUNTERED                     S03 04157
011624 146723 A
011625 130270 A
011626 120240 A     4307 HOPE   DATA    ' MS09'       END OF DEVICE                       S03 04158
011627 146723 A
011630 130271 A
011631 120240 A     4308 LCDE   DATA    ' MS11'       LOADER CODE                         S03 04159
011632 146723 A
011633 130661 A
011634 120240 A     4309 LDCM   DATA    ' LOAD COMPLETE '                                 S03 04160
011635 146317 A
011636 140704 A
011637 120303 A
011640 147715 A
011641 150314 A
011642 142724 A
011643 142640 A
```

```
011644 120240 A 4310 ROER   DATA    ' MS07'      READ ERROR                          S03 04161
011645 146723 A
011646 130267 A
011647 120240 A 4311 SEQE   DATA    ' MS10'      SEQUENCE ERROR                      S03 04162
011650 146723 A
011651 130660 A
011652 120240 A 4312 LSIZ   DATA    ' MS15'      MAIN MEMORY SIZE VIOLATED           ********
011653 146723 A
011654 130665 A
```

```
                    4313          EJEC                                                  S03 04163
                    4314 *                                                              S03 04164
                    4315 *        CHANGE/DISPLAY ROM DATA WORD                          S03 04165
                    4316 *                                                              S03 04166
011655              4317 E110     BSS     0                                             S03 04167
011655 002000 A     4318          JMPM    INA             GET DUMP ADDR                 S03 04168
011656 013373 R
011657 147240 A     4319          DATA    'N'                                           03 04169
011660 054107 A     4320          STA     E119            SAVE ADDR                     S03 04170
011661 006140 A     4321          SUBI    512             ROM BUFFER LIMIT              S03 04171
011662 001000 A
011663 001002 A     4322          JAP     EXC90           INVALID ADDRESS               S03 04172
011664 001144 R
                    4323 *                                                              S03 04173
011665 014102 A     4324 E112     LDA     E119            ROM ADDR                      S03 04174
011666 004242 A     4325          LRLA    2               TIMES FOUR                    S03 04175
011667 127000 I     4326          ADD*    E116            PLUS CCS BUFFER ADDRESS       S03 04176
011670 054042 A     4327          STA     E113            SAVE ADDR                     S03 04177
                    4328 *                                                              S03 04178
011671 002000 A     4329          JMPM    PBUF            SETUP PRINTER BUFFER          S03 04179
011672 014604 R
011673 034072 A     4330          LDX     E117            ASCII BUFFER ADDR             S03 04180
011674 024036 A     4331          LDB     E113            ROM ADDR                      S03 04181
011675 026000 A     4332          LDB     0,2             FIRST 16-BIT DATA BLOCK       S03 04182
011676 002000 A     4333          JMPM    OH              CONVERT HEX TO ASCII          S03 04183
011677 014523 R
                    4334 *                                                              S03 04184
011700 024032 A     4335          LDB     E113            ROM ADDR                      S03 04185
011701 026001 A     4336          LDB     1,2             SECOND 16-BIT DATA BLOCK      S03 04186
011702 002000 A     4337          JMPM    OH              CONVERT DATA TO ASCII         S03 04187
011703 014523 R
                    4338 *                                                              S03 04188
011704 024026 A     4339          LDB     E113            ROM ADDR                      S03 04189
011705 026002 A     4340          LDB     2,2             THIRD 16-BIT DATA BLOCK       S03 04190
011706 002000 A     4341          JMPM    OH              CONVERT DATA TO ASCII         S03 04191
011707 014523 R
                    4342 *                                                              S03 04192
011710 024022 A     4343          LDB     E113            ROM ADDR                      S03 04193
011711 026003 A     4344          LDB     3,2             FOURTH 16-BIT DATA BLOCK      S03 04194
011712 002000 A     4345          JMPM    OH              CONVERT DATA TO ASCII         S03 04195
011713 014523 R
                    4346 *                                                              S03 04196
```

```
011714 002000 A 4347         CALL    SIOUT,11,BUFR   OUTPUT TO SO                          S03 04197
011715 015406 R
011716 000013 A
011717 000200 R
               4348 *                                                                     S03 04198
011720 002000 A 4349         JMPM    INH             INPUT CHANGE VALUE = IF ANY          S03 04199
011721 013473 R
011722 001040 A 4350         JXZ     EXC10                                                S03 04200
011723 001106 R
011724 074042 A 4351         STX     E118            LAST INPUT CHAR                      S03 04201
011725 001020 A 4352         JBZ     E114            JUMP IF NO CHANGE VALUE INPUT        S03 04202
011726 011734 R
011727 002000 A 4353         JMPM    MOVW            MOVE DATA TO ROM BUFFER              S03 04203
011730 014517 R
011731 000004 A 4354         DATA    4               WORD COUNT                           S03 04204
011732 000476 R 4355         DATA    V               FROM ADDR                            S03 04205
011733 000000 A 4356 E113    DATA    0               TO ADDR                              S03 04206
               4357 *                                                                     S03 04207
011734 014032 A 4358 E114    LDA     E118            LAST INPUT CHAR                      S03 04208
011735 006140 A 4359         SUBI    0254            COMMA                                S03 04209
011736 000254 A
011737 001010 A 4360         JAZ     **4             YES = DISPLAY NEXT WORD              S03 04210
011740 011743 R
011741 001000 A 4361         JMP     EXC10           NO = RETURN TO EXEC                  S03 04211
011742 001106 R
       011743 R 4362 E114A   EQU     *                                                    ********
011743 044024 A 4363         INR     E119            STEP ROM RELATIVE ADDR               S03 04212
011744 014023 A 4364         LDA     E119                                                 S03 04213
011745 006140 A 4365         SUBI    512             ROM BUFFER LIMIT                     S03 04214
011746 001000 A
011747 001010 A 4366         JAZ     EXC10           RETURN = AT END OF BUFFER            S03 04215
011750 001106 R
011751 002000 A 4367 E115    JMPM    PBUF            INITIALIZE LD BUFFER                 S03 04216
011752 014604 R
011753 034012 A 4368         LDX     E117            BUFFER ADDR                          S03 04217
011754 024013 A 4369         LDB     E119            ROM ADDR                             S03 04218
011755 002000 A 4370         JMPM    DH              CONVERT TO ASCII                     S03 04219
011756 014523 R
011757 002000 A 4371         CALL    SIOUT,4,BUFR    OUTPUT TO SO                         S03 04220
011760 015406 R
011761 000004 A
011762 000200 R
```

```
011763 001000 A 4372        JMP     E112        OUTPUT CONTENTS OF WORD          S03 04221
011764 011665 R
                4373 *                                                           S03 04222
                4374 *                                                           S03 04223
011765 000371 R 4375 E116   DATA    DBUF        ROM ADDR                         S03 04224
011766 000201 R 4376 E117   DATA    BUFR+1      OUTPUT BUFFER ADDR               S03 04225
011767 000000 A 4377 E118   DATA    0           LAST INPUT CHAR                  S03 04226
011770 000000 A 4378 E119   DATA    0           TEMP STORED ROM ADDR             S03 04227
```

```
                    4379          EJEC                                                  S03 04228
                    4380 *                                                              S03 04229
                    4381 *        ROM ADDRESS HALT                                      S03 04230
                    4382 *                                                              S03 04231
011771              4383 E120     BSS     0                                             S03 04232
011771 014036 A     4384          LDA     E122                                          S03 04233
011772 006127 A     4385          ADOE    CPAG        SELECTED PAGE                     C 03 04234
011773 000503 R
011774 005012 A     4386          TAB                                                   C 03 04235
011775 016000 A     4387          LDA     0,2         PAGE HALT TABLE                   C 03 04236
011776 054021 A     4388          STA     E123        STUFF INTO SUBTRACTION            C 03 04237
011777 054027 A     4389          STA     E121        RESET HALT BUFFER POINTER          S03 04238
012000 002000 A     4390 E124     JMPM    INA         GET HALT ADDRESS                  C 03 04239
012001 013373 R
012002 147240 A     4391          DATA    'N'                                           S03 04240
012003 024023 A     4392          LDB     E121                                          S03 04241
012004 056000 A     4393          STA     0,2         SET HALT ADDR                     S03 04242
012005 005041 A     4394          TXA                                                   S03 04243
012006 006140 A     4395          SUBI    0254        COMMA                             S03 04244
012007 000254 A
012010 001010 A     4396          JAZ     **4         YES                               S03 04245
012011 012014 R
012012 001000 A     4397          JMP     EXC10       RETURN                            S03 04246
012013 001106 R
012014 005122 A     4398          IBR                 ADVANCE POINTER                   S03 04247
012015 064011 A     4399          STB     E121                                          S03 04248
012016 005021 A     4400          TBA                                                   S03 04249
012017 006140 A     4401          SUBI    RHLTO                                         C 03 04250
012020 000445 R
012020              4402 E123     BES     0           OVERLAYED BY ABOVE STORE          C 03 04251
012021 006140 A     4403          SUBI    5           FIVE ALREADY INPUT ?               S03 04252
012022 000005 A
012023 001004 A     4404          JAN     E124        NO=LOOK FOR MORE                  C 03 04253
012024 012000 R
012025 001000 A     4405          JMP     EXC10       YES=RETURN                        S03 04254
012026 001106 R
012027 000441 R     4406 E121     DATA    RHLT                                          S03 04255
012030 000441 R     4407 E122     DATA    RHLT                                          S03 04256
```

```
                    4408          EJEC                                                    S03 04257
                    4409  *                                                               S03 04258
                    4410  *       SINGLE MICRO INSTRUCTION                                S03 04259
                    4411  *                                                               S03 04260
012031              4412  E130    BSS     0                                               S03 04261
012031 002000 A     4413          JMPM    FETCHA          GET MODE FLAG                   S03 04262
012032 015644 R
012033 001010 A     4414          JAZ     EXC90                                           S03 04263
012034 001144 R
012035 005002 A     4415          TZB                     RUN MODE FLAG                   S03 04264
012036 006140 A     4416          SUBI    0322            R ?                             S03 04265
012037 000322 A
012040 001010 A     4417          JAZ     E131            JUMP IF RUN MODE                S03 04266
012041 012050 R
012042 005122 A     4418          IBR                     STEP MODE FLAG                  S03 04267
012043 005311 A     4419          DAR                     0323  ASCII S                   S03 04268
012044 001010 A     4420          JAZ     E131            JUMP IF STEP MODE               S03 04269
012045 012050 R
012046 001000 A     4421          JMP     EXC90           INCORRECT INPUT                 S03 04270
012047 001144 R
                    4422  *                                                               S03 04271
012050 034016 A     4423  E131    LDX     E132                                            S03 04272
012051 065000 A     4424          STB     0,1             SET STEP/RUN MODE FLAG          S03 04273
012052 002000 A     4425          JMPM    INA             LOOK FOR RUN COUNT              S03 04274
012053 013373 R
012054 147240 A     4426          DATA    'N'                                             S03 04275
012055 001020 A     4427          JBZ     E133            NO COUNT GIVEN                  S03 04276
012056 012063 R
012057 005311 A     4428          DAR                                                     S03 04277
012060 054007 A     4429          STA     RCNT            SET RUN COUNT                   S03 04278
012061 001000 A     4430          JMP     EXC10           RETURN                          S03 04279
012062 001106 R
012063 005301 A     4431  E133    DECR    01                                              S03 04280
012064 054003 A     4432          STA     RCNT            SET UNLIMITED RUN COUNT         S03 04281
012065 001000 A     4433          JMP     EXC10           RETURN TO EXEC                  S03 04282
012066 001106 R
012067 000471 R     4434  E132    DATA    STEP            STEP/RUN MODE FLAG              S03 04283
012070 177777 A     4435  RCNT    DATA    -1              RUN COUNT LIMIT                 S03 04284
```

```
                    4436          EJEC                                                    S03 04285
                    4437 *                                                                S03 04286
                    4438 *        TRACE                                                   S03 04287
                    4439 *                                                                S03 04288
012071              4440 E140     BSS     C                                               S03 04289
012071 002000 A     4441          JMPM    FETCHA      GET SET/RESET INPUT                 S03 04290
012072 015644 R
012073 001010 A     4442          JAZ     EXC90                                           S03 04291
012074 001144 R
012075 005002 A     4443          TZB                 TRACE OFF FLAG                      S03 04292
012076 006140 A     4444          SUBI    0322        ASCII R                             S03 04293
012077 000322 A
012100 001010 A     4445          JAZ     E142        JUMP IF TRACE OFF REQUEST           S03 04294
012101 012110 R
012102 005122 A     4446          IBR                 TRACE ON FLAG                       S03 04295
012103 005311 A     4447          DAR                 ASCII S (0323)                      S03 04296
012104 001010 A     4448          JAZ     E143        JUMP IF TRACE ON REQUEST            S03 04297
012105 012115 R
012106 001000 A     4449          JMP     EXC90       INCORRECT INPUT                     S03 04298
012107 001144 R
                    4450 *                                                                S03 04299
012110 037000 I     4451 E142     LDX     CPAG                                        D   03 04300
012111 006055 A     4452          STAE    TRACE,1     SET TRACE FLAG OFF FOR PAGE     D   03 04301
012112 000472 R
012113 001000 A     4453          JMP     EXC10       RETURN TO EXEC                      S03 04302
012114 001106 R
012115 002000 A     4454 E143     CALL    E155        GET ADDRESS BOUNDS                  S03 04303
012116 012145 R
012117 037000 I     4455          LDX     CPAG        CURRENT PAGE                    D   03 04304
012120 014101 A     4456          LDA     START                                           S03 04305
012121 006055 A     4457          STAE    STRTRC,1    SET START TRACE                 D   03 04306
012122 012135 R
012123 014077 A     4458          LDA     END                                         D   03 04307
012124 006055 A     4459          STAE    ENDTRC,1    SET END TRACE                   D   03 04308
012125 012141 R
012126 037000 I     4460          LDX     CPAG                                        D   03 04309
012127 006010 A     4461          LDAI    1                                               S03 04310
012130 000001 A
012131 006055 A     4462          STAE    TRACE,1     SET TRACE FLAG ON FOR PAGE      D   03 04311
012132 000472 R
012133 001000 A     4463          JMP     EXC10       RETURN                              S03 04312
012134 001106 R
```

```
                    4464 *                                                                  S03 04313
012135 000000 A     4465 STRTRC DATA    0,0,0,0       TRACE START                       D   03 04314
012136 000000 A
012137 000000 A
012140 000000 A
012141 000000 A     4466 ENDTRC DATA    0,0,0,0       TRACE END                         D   03 04315
012142 000000 A
012143 000000 A
012144 000000 A
                    4467 *                                                                  S03 04316
```

```
                    4468          EJEC                                                    S03 04317
                    4469 *                                                                S03 04318
                    4470 *        THIS ROUTINE WILL FETCH BEGIN AND END ADDRESSES         S03 04319
                    4471 *        DEFAULT IS EITHER IS MISSING AS FOLLOWS:                S03 04320
                    4472 *                START TO 0                                      S03 04321
                    4473 *                END TO 512 (1FF)                                S03 04322
                    4474 *        CALLING SEQUENCE                                        S03 04323
                    4475 *        CALL    E155                                            S03 04324
                    4476 *        RETURN  START ADDR IN START, END ADDR IN END            S03 04325
                    4477 *                                                                S03 04326
012145 000000 A     4478 E155     ENTR                                                    S03 04327
012146 002000 A     4479          JMPM    INA             GET START ADDRESS               S03 04328
012147 013373 R
012150 147240 A     4480          DATA    'N'                                             S03 04329
012151 054050 A     4481          STA     START           SAVE ADDRESS                    S03 04330
012152 005041 A     4482          TXA                     LAST CHAR                       S03 04331
012153 006140 A     4483          SUBI    0254            COMMA                           S03 04332
012154 000254 A
012155 001010 A     4484          JAZ     *+4             COMMA ?                         S03 04333
012156 012161 R
012157 001020 A     4485          JBZ     E144            NO BOUNDS GIVEN                 S03 04334
012160 012213 R
012161 001020 A     4486          JBZ     *+4             YES-START ADDR GIVEN ?          S03 04335
012162 012165 R
012163 001000 A     4487          JMP     *+3                                             S03 04336
012164 012166 R
012165 054034 A     4488          STB     START           DEFAULT START ADDRESS           S03 04337
012166 017000 I     4489          LDA     CHAR                                            S03 04338
012167 005311 A     4490          DAR                                                     S03 04339
012170 057000 I     4491          STA     CHAR            RESET CHAR COUNT BACK ONE       S03 04340
012171 002000 A     4492          JMPM    FETCHA          LOOK FOR END TRACE              S03 04341
012172 015644 R
012173 001010 A     4493          JAZ     E145                                            S03 04342
012174 012215 R
012175 006140 A     4494          SUBI    0254            COMMA ?                         S03 04343
012176 000254 A
012177 001010 A     4495          JAZ     *+4             YES                             S03 04344
012200 012203 R
012201 001000 A     4496          JMP     E145            NO END TRACE                    S03 04345
012202 012215 R
012203 002000 A     4497          JMPM    INA             GET END TRACE ADDR              S03 04346
012204 013373 R
```

```
012205 147240 A 4498        DATA    INT                                    S03 04347
012206 001020 A 4499        JRZ     E145                                   S03 04348
012207 012215 R
012210 054012 A 4500        STA     END         SET END ADDRESS            S03 04349
012211 001000 A 4501        JMP*    E155        RETURN                     S03 04350
012212 112145 R
012213 005001 A 4502 E144   TZA                                            S03 04351
012214 054005 A 4503        STA     START       DEFAULT START TO 0         S03 04352
012215 006010 A 4504 E145   LDAI    0777                                   S03 04353
012216 000777 A
012217 054003 A 4505        STA     END         DEFAULT END TO 0777 (1FF)  S03 04354
012220 001000 A 4506        JMP*    E155                                   S03 04355
012221 112145 R
012222 000000 A 4507 START  DATA    0           START ADDR                 S03 04356
012223 000000 A 4508 END    DATA    0           END ADDR                   S03 04357
```

```
                    4509          EJEC                                                    S03 04358
                    4510 *                                                                S03 04359
                    4511 *        DUMP CONTENTS OF ROM BUFFER                             S03 04360
                    4512 *                                                                S03 04361
012224              4513 E150     BSS     0                                               S03 04362
012224 002000 A     4514          CALL    E155            BET ADDRESS BOUNDS              S03 04363
012225 012145 R
012226 017000 I     4515          LDA     START                                           S03 04364
012227 054147 A     4516          STA     E158            SET START DUMP                  S03 04365
012230 006140 A     4517          SUBI    512             BUFFER SIZE                     S03 04366
012231 001000 A
012232 001002 A     4518          JAP     EXC90           INVALID ADDRESS                 S03 04367
012233 001144 R
012234 017000 I     4519          LDA     END                                             S03 04368
012235 054142 A     4520          STA     E159            SET END DUMP                    S03 04369
012236 006140 A     4521          SUBI    512             BUFFER SIZE                     S03 04370
012237 001000 A
012240 001002 A     4522          JAP     EXC90           INVALID ADDRESS                 S03 04371
012241 001144 R
012242 014135 A     4523          LDA     E159            END ADDRESS                     S03 04372
012243 144133 A     4524          SUB     E158            START ADDRESS                   S03 04373
012244 001002 A     4525          JAP     E152                                            S03 04374
012245 012250 R
012246 001000 A     4526          JMP     EXC90           INVALID RANGE                   S03 04375
012247 001144 R
                    4527 *                                                                S03 04376
012250 002000 A     4528 E152     CALL    TPFRM           TOP OF FORM                     S03 04377
012251 014760 R
012252 002000 A     4529          CALL    LOOUT,26,E158   OUTPUT HEADER                F  ********
012253 015470 R
012254 000032 A
012255 012402 R
012256 006010 A     4530 E15C     LDAI    14              LINE COUNT                      S03 04379
012257 000016 A
012260 054120 A     4531          STA     E15A            SAVE FOR DUMP                   S03 04380
012261 002000 A     4532          JMPM    SPAC            SPACE LO                        S03 04381
012262 014747 R
                    4533 *                                                                S03 04382
                    4534 *        DUMP DATA TO LO                                         S03 04383
                    4535 *                                                                S03 04384
012263 002000 A     4536 E153     JMPM    PBUF            SETUP PRINTER BUFFER            S03 04385
012264 014604 R
```

```
012265 034105 A 4537          LDX     E154        OUTPUT BUFFER ADDR                  S03 04386
                4538 *                                                                S03 04387
012266 024110 A 4539          LDB     E158        START DUMP ADDR                     S03 04388
012267 002000 A 4540          JMPM    0H          CONVERT TO ASCII IN BUFR            S03 04389
012270 014523 R
012271 005144 A 4541          IXR                 SPACES AFTER ADDRESS IN BUFFER      S03 04390
                4542 *                                                                S03 04391
012272 014104 A 4543          LDA     E158        START DUMP ADDR                     S03 04392
012273 004242 A 4544          LRLA    2           TIMES FOUR                          S03 04393
012274 127000 I 4545          ADD*    E156        PLUS CCS BUFFER ADDRESS             S03 04394
012275 054100 A 4546          STA     E157        SAVE ROM BUFFER ADDR                S03 04395
012276 005012 A 4547          TAB                                                     S03 04396
012277 026000 A 4548          LDB     0,2         FIRST 16 BITS OF ROM WORD           S03 04397
012300 002000 A 4549          JMPM    0H          CONVERT TO ASCII                    S03 04398
012301 014523 R
                4550 *                                                                S03 04399
012302 024073 A 4551          LDB     E157        ROM ADDR                            S03 04400
012303 026001 A 4552          LDB     1,2         SECOND 16 BITS OF ROM WORD          S03 04401
012304 002000 A 4553          JMPM    0H          CONVERT TO ASCII                    S03 04402
012305 014523 R
012306 005144 A 4554          IXR                 SPACE AFTER FIRST 8 DIGITS          S03 04403
                4555 *                                                                S03 04404
012307 024066 A 4556          LDB     E157        ROM ADDR                            S03 04405
012310 026002 A 4557          LDB     2,2         THIRD 16 BITS OF ROM WORD           S03 04406
012311 002000 A 4558          JMPM    0H          CONVERT TO ASCII                    S03 04407
012312 014523 R
                4559 *                                                                S03 04408
012313 024062 A 4560          LDB     E157        ROM ADDR                            S03 04409
012314 026003 A 4561          LDB     3,2         FOURTH 16 BITS OF ROM WORD          S03 04410
012315 002000 A 4562          JMPM    0H          CONVERT TO ASCII                    S03 04411
012316 014523 R
012317 005144 A 4563          IXR                 SPACE AFTER HEX WORD IN BUFFER      S03 04412
                4564 *                                                                S03 04413
012320 024055 A 4565          LDB     E157        ROM ADDR                            S03 04414
012321 026000 A 4566          LDB     0,2         FIRST 16 BITS OF ROM WORD           S03 04415
012322 002000 A 4567          JMPM    E160        CONVERT TO ASCII                    S03 04416
012323 012434 R
012324 005144 A 4568          IXR                 SPACE                               S03 04417
                4569 *                                                                S03 04418
012325 024050 A 4570          LDB     E157        ROM ADDR                            S03 04419
012326 026001 A 4571          LDB     1,2         SECOND 16 BITS OF ROM WORD          S03 04420
012327 002000 A 4572          JMPM    E160        CONCERT TO ASCII                    S03 04421
```

```
012330 012434 R
                    4573 *                                                          S03 04422
012331 002000 A     4574          CALL    LOOUT,31,BUFR   OUTPUT LINE              F ********
012332 015470 R
012333 000037 A                                                                     note 4
012334 000200 R
012335 002000 A     4575 E150     JMPM    PBUF            SETUP LO BUFFER         S03 04432
012336 014604 R
012337 034034 A     4576          LDX     E154+1          BUFFER ADDR             S03 04433
012340 024035 A     4577          LDB     E157            ROM ADDR                S03 04434
012341 026002 A     4578          LDB     2,2             THIRD 16 BITS OF ROM WORD S03 04435
012342 002000 A     4579          JMPM    E160            CONVERT TO ASCII        S03 04436
012343 012434 R
012344 005144 A     4580          IXR                     SPACE                   S03 04437
                    4581 *                                                          S03 04438
012345 024030 A     4582          LDB     E157            ROM ADDR                S03 04439
012346 026003 A     4583          LDB     3,2             FOURTH 16 BITS OF ROM WORD S03 04440
012347 002000 A     4584          JMPM    E160            CONVERT TO ASCII        S03 04441
012350 012434 R
012351 002000 A     4585          CALL    LOOUT,31,BUFR   OUTPUT LINE            S03 04442
012352 015470 R
012353 000037 A
012354 000200 R
012355 002000 A     4586 E15E     JMPM    SPAC                                    S03 04443
012356 014747 R
012357 044017 A     4587          INR     E158            STEP START DUMP ADDR    S03 04444
012360 014017 A     4588          LDA     E159            END DUMP ADDR           S03 04445
012361 144015 A     4589          SUB     E158                                    S03 04446
012362 001004 A     4590          JAN     EXC10           JUMP IF DONE            S03 04447
012363 001106 R
                    4591 *                                                          S03 04448
                    4592 *                                                          S03 04449
012364 014014 A     4593          LDA     E15A            LINE COUNT              S03 04450
012365 005311 A     4594          DAR                                             S03 04451
012366 054012 A     4595          STA     E15A            DECREMENTED COUNT       S03 04452
012367 001010 A     4596          JAZ     E152+2          JUMP IF PAGE COMPLETE   S03 04453
012370 012252 R
012371 001000 A     4597          JMP     E153            OUTPUT NEXT LINE OF PAGE S03 04454
012372 012263 R
                    4598 *                                                          S03 04455
012373 000201 R     4599 E154     DATA    BUFR+1          OUTPUT BUFFER ADDR      S03 04456
012374 000216 R     4600          DATA    BUFR+14         BUFFER ADDR FOR SECOND LINE S03 04457
```

```
012375 000371 R 4601 E156   DATA   DBUF          ROM ADDR                                  S03 04458
012376 000000 A 4602 E157   DATA   0             ROM WORD LOCATION                         S03 04459
012377 000000 A 4603 E158   DATA   0             START DUMP ADDR                           S03 04460
012400 000000 A 4604 E159   DATA   0             END DUMP ADDR                             S03 04461
012401 000000 A 4605 E15A   DATA   0             LINE COUNT FOR DUMP                       S03 04462
012402 120240 A 4606 E15B   DATA   !  ADD        HEXADECIMAL                 BINARY    !   S03 04463
012403 140704 A                                                                            → 044642
012404 142240 A
012405 120240 A
012406 120240 A
012407 144305 A
012410 154301 A
012411 142305 A
012412 141711 A
012413 145701 A
012414 146240 A
012415 120240 A
012416 120240 A
012417 120240 A
012420 120240 A
012421 120240 A
012422 120240 A
012423 120240 A
012424 120240 A
012425 120302 A
012426 144716 A
012427 140722 A
012430 154640 A
012431 120240 A
012432 120240 A
012433 120240 A
```

```
                    4607          EJEC                                                    S03 04465
                    4608 *                                                                S03 04466
                    4609 *        CONVERT 16 BITS IN B TO ASCII CODED BINARY IN BUFF      S03 04467
                    4610 *                                                                S03 04468
                    4611 *        X CONTAINS ADDR OF STORAGE LOCATION IN BUFR             S03 04469
                    4612 *                                                                S03 04470
012434 000000 A     4613 E160     ENTR                                                    S03 04471
012435 005001 A     4614          TZA                                                     S03 04472
012436 004441 A     4615          LLRL    1             SHIFT FIRST BIT INTO A            S03 04473
012437 005122 A     4616          IBR                   SET TRAILING BIT IN B             S03 04474
012440 001000 A     4617          JMP     *+6           START CONVERSION                  S03 04475
012441 012446 R
                    4618 *                                                                S03 04476
012442 005001 A     4619 E162     TZA                                                     S03 04477
012443 004441 A     4620          LLRL    1             SHIFT NEXT BIT INTO A             S03 04478
012444 001020 A     4621          JBZ*    E160          RETURN IF COMPLETE                S03 04479
012445 112434 R
012445 006120 A     4622          ADDI    0260          CONVERT BIT TO ASCII CHAR         S03 04480
012447 000260 A
012450 004247 A     4623          LRLA    7             LEFT JUSTIFY CHAR - ALMOST        S03 04481
012451 004441 A     4624          LLRL    1             SHIFT NEXT BIT INTO A             S03 04482
012452 006120 A     4625          ADDI    0260          CONVERT TO ASCII                  S03 04483
012453 000260 A
012454 055000 A     4626          STA     0,1           STORE CHARS IN BUFFER             S03 04484
012455 005144 A     4627          IXR                   STEP BUFFER INDEX                 S03 04485
012456 001000 A     4628          JMP     E162          CONVERT NEXT TWO BITS             S03 04486
012457 012442 R
```

```
                    4629          EJEC                                                    S03 04487
                    4630 *                                                                S03 04488
                    4631 *        RETURN TO OPERATING SYSTEM                              S03 04489
                    4632 *                                                                S03 04490
012460 002000 A     4633 E170     JMPM    FETCHA          CHECK IF REALLY WANT TO RETURN  S03 04491
012461 015644 R
012462 001010 A     4634          JAZ     E171            YES                             S03 04492
012463 012472 R
012464 006140 A     4635          SUBI    0240            BLANK ?                         S03 04493
012465 000240 A
012466 001010 A     4636          JAZ     E171            YES, GUESS SO                   S03 04494
012467 012472 R
012470 001000 A     4637          JMP     EXC90           NO, MUST BE AN ERROR            S03 04495
012471 001144 R
012472 006017 A     4638 E171     LDAE    LOFLG           LD ON RMD FLAG                  S03 04496
012473 015603 R
012474 001002 A     4639          JAP     E172            JUMP IF NO                      S03 04497
012475 012505 R
                    4640          CLOSE   LOFCB,5,0,1     CLOSE AND UPDATE                S03 04498
012476 002000 A
012477 011000 E
012500 100000 A
012501 013405 A
012502 000334 E
012503 000000 A
012504 000000 A
012505 002000 A     4641 E172     CALL    EXIT            RETURN TO OPERATING SYSTEM      S03 04499
012506 000000 E
012507 001000 A     4642          JMP     EXC             JUST IN CASE                    S03 04500
012510 000715 R
```

```
                    4643          EJEC                                                    S03 04501
                    4644 *        THIS ROUTINE HANDLES THE SELECT INPUT MEDIA COMMAND (M) S03 04502
                    4645 *                                                                S03 04503
                    4646 *        'MR' SELECTS SI TO BE THE INPUT MEDIA                   S03 04504
                    4647 *        'MS' SELECTS PI TO BE THE INPUT MEDIA                   S03 04505
                    4648 *                                                                S03 04506
                    4649 *        CALLING SEQUENCE                                        S03 04507
                    4650 *                                                                S03 04508
                    4651 *        JMP     CHME                                            S03 04509
                    4652 *        RETURN  DESIRED INPUT MEDIA SELECTED                    S03 04510
                    4653 *                                                                S03 04511
012511 002000 A     4654 CHME     JMPM    FETCHA          GET SELECTOR INDICATOR          S03 04512
012512 015644 R
012513 001010 A     4655          JAZ     EXC90                                           S03 04513
012514 001144 R
012515 006140 A     4656          SUBI    0322            R ?                             S03 04514
012516 000322 A
012517 001010 A     4657          JAZ     CHMR                                            S03 04515
012520 012532 R
012521 005311 A     4658          DAR                     S ?                             S03 04516
012522 001010 A     4659          JAZ     CHMS                                            S03 04517
012523 012526 R
012524 001000 A     4660          JMP     EXC90           INVALID INPUT                   S03 04518
012525 001144 R
012526 005301 A     4661 CHMS     DECR    01                                              S03 04519
012527 054006 A     4662          STA     MEDIA           SET TO PI INPUT                 S03 04520
012530 001000 A     4663          JMP     EXC10                                           S03 04521
012531 001106 R
012532 005001 A     4664 CHMR     TZA                                                     S03 04522
012533 054002 A     4665          STA     MEDIA           SET TO SI INPUT                 S03 04523
012534 001000 A     4666          JMP     EXC10                                           S03 04524
012535 001106 R
012536 000000 A     4667 MEDIA    DATA    0                                               S03 04525
```

```
                    4668          EJEC                                                    S03 04526
                    4669 *                                                                S03 04527
                    4670 *    DISPLAY/CHANGE DECODE ROMS(A OR B) WORDS                    S03 04528
                    4671 *                                                                S03 04529
                    4672 *    ENTERED FROM EXEC VIA "E" DIRECTIVE                         S03 04530
                    4673 *                                                                S03 04531
012537 002000 A     4674 EDRM     CALL    PBUF          FILL PRINT BUF WITH ASSCII SPACES S03 04532
012540 014604 R
012541 002000 A     4675          JMPM    FETCHA        GET WHICH CONTROL STORE           S03 04533
012542 015644 R
012543 001010 A     4676          JAZ     EXC90                                           S03 04534
012544 001144 R
012545 006140 A     4677          SUBI    0303          C ?                               S03 04535
012546 000303 A
012547 001010 A     4678          JAZ     E110          CENTRAL=GO TO CENTRAL ROUTINE     S03 04536
012550 011655 R
012551 005311 A     4679          DAR                   D ?                               S03 04537
012552 001010 A     4680          JAZ     EDR2          DECODER                           S03 04538
012553 012556 R
012554 001000 A     4681          JMP     EXC90         INPUT ERROR                       S03 04539
012555 001144 R
012556 002000 A     4682 EDR2     JMPM    FETCHA        INPUT A OR B DCS                  S03 04540
012557 015644 R
012560 001010 A     4683          JAZ     EXC90                                           S03 04541
012561 001144 R
012562 054152 A     4684          STA     ABDCS                                           S03 04542
012563 006140 A     4685          SUBI    0301          A ?                               S03 04543
012564 000301 A
012565 001010 A     4686          JAZ     ED10          YES                               S03 04544
012566 012574 R
012567 005311 A     4687          DAR                   B ?                               S03 04545
012570 001010 A     4688          JAZ     ED20          YES                               S03 04546
012571 012610 R
012572 001000 A     4689          JMP     EXC90         INPUT ERROR                       S03 04547
012573 001144 R
                    4690 *    DECODE ROM A(DRM1) IS USED WITH INST REG BITS 15-12         S03 04548
012574 002000 A     4691 ED10     CALL    ED30          INPUT ROM ADDR(0-F)               S03 04549
012575 012624 R
012576 054137 A     4692          STA     ED41          TEMP STORE                        S03 04550
012577 127000 I     4693 ED11     ADD     DRM2          ADDR OF DCSA                      S03 04551
012600 005014 A     4694          TAX                                                     S03 04552
012601 025000 A     4695          LDB     0,1                                             S03 04553
```

```
012602 002000 A 4696          CALL    ED40            TYPE CONTENTS                                   S03 04554
012603 012637 R
012604 002000 A 4697          CALL    ED50            CHANGE IT AND/OR EXIT                           S03 04555
012605 012653 R
012606 001000 A 4698          JMP     ED11            RETURN HERE IF SEQ VIA COMMA TERMINATOR         S03 04556
012607 012577 R
                4699 *                                                                                S03 04557
                4700 *  DECODE ROM B(DRM2) IS USED WITH INST REG BITS 11-8                             S03 04558
012610 002000 A 4701 ED20     CALL    ED30            INPUT ROM B ADDR(0-F)                           S03 04559
012611 012624 R
012612 054123 A 4702          STA     ED41            TEMP STORE                                      S03 04560
012613 127000 I 4703 ED21     ADD     DRM1            ADDR OF DCSB                                    S03 04561
012614 005014 A 4704          TAX                                                                     S03 04562
012615 025000 A 4705          LDB     0,1                                                             S03 04563
012616 002000 A 4706          CALL    ED40            TYPE CONTENTS                                   S03 04564
012617 012637 R
012620 002000 A 4707          CALL    ED50                                                            S03 04565
012621 012653 R
012622 001000 A 4708          JMP     ED21            RTN HERE IF SEQ VIA COMMA TERMINATOR            S03 04566
012623 012613 R
                4709 *                                                                                S03 04567
                4710 *  INPUT HEX 0-F FOR DECODE ROM ADDR                                             S03 04568
012624 000000 A 4711 ED30     ENTR                                                                    S03 04569
012625 002000 A 4712          JMPM    FETCHA          INPUT CONTROL STORE ADDRESS                     S03 04570
012626 015644 R
012627 001010 A 4713          JAZ     EXC90                                                           S03 04571
012630 001144 R
012631 002000 A 4714          CALL    CONV            CONVERT TO HEX                                  S03 04572
012632 012741 R
012633 001002 A 4715          JAP*    ED30            JMP IF LEGAL                                    S03 04573
012634 112624 R
012635 001000 A 4716          JMP     EXC90           INPUT ERROR                                     S03 04574
012636 001144 R
                4717 *                                                                                S03 04575
                4718 *  OUTPUT CONTENTS OF B REG TO TTY PRINTER AS 4 HEX CHARS                        S03 04576
012637 000000 A 4719 ED40     ENTR                                                                    S03 04577
012640 074076 A 4720          STX     ED42            SAVE REG ADDR                                   S03 04578
012641 006030 A 4721          LDX1    BUFR+1          OUTPUT BUFFER ADDR                              S03 04579
012642 000201 R
012643 002000 A 4722          CALL    OH              CONVERT TO ASCII                                S03 04580
012644 014523 R
012645 002000 A 4723          CALL    SIOUT,5,BUFR    OUTPUT                                          S03 04581
```

```
012646 015406 R
012647 000005 A
012650 000200 R
012651 001000 A 4724          RETU*   ED40                                    S03 04582
012652 112637 R
                4725 *                                                        S03 04583
                4726 *                                                        S03 04584
012653 000000 A 4727 ED50     ENTR                                            S03 04585
012654 002000 A 4728          JMPM    INA             INPUT 1 - 4 HEX DIGITS  S03 04586
012655 013373 R
012656 151240 A 4729          DATA    'R'                                     S03 04587
012657 001040 A 4730          JXZ     EXC10                                   S03 04588
012660 001106 R
012661 074056 A 4731          STX     ED43            SAVE LAST CHAR INPUT    S03 04589
012662 001020 A 4732          JBZ     ED51                                    S03 04590
012663 012666 R
012664 034052 A 4733          LDX     ED42            ADDR OF REG             S03 04591
012665 055000 A 4734          STA     0,1             STORE NEW VALUE         S03 04592
012666 014051 A 4735 ED51     LDA     ED43                                    S03 04593
012667 006140 A 4736          SUBI    0254            COMMA ?                 S03 04594
012670 000254 A
012671 001010 A 4737          JAZ     *+4             YES-                    S03 04595
012672 012675 R
012673 001000 A 4738          JMP     EXC10           NO-RETURN TO EXEC       S03 04596
012674 001106 R
                4739 *   SEQUENCE TO NEXT ROM LOCATION                        S03 04597
012675 044040 A 4740          INR     ED41            ROM LOC 0-16            S03 04598
012676 014037 A 4741          LDA     ED41                                    S03 04599
012677 006140 A 4742          SUBI    16                                      S03 04600
012700 000020 A
012701 001004 A 4743          JAN     *+4             JMP IF IN RANGE 0-16    S03 04601
012702 012705 R
012703 001000 A 4744          JMP     EXC10           RTN TO EXEC             S03 04602
012704 001106 R
012705 006010 A 4745          LDAI    0120240         BLANK-BLANK             S03 04603
012706 120240 A
012707 054023 A 4746          STA     EDA                                     S03 04604
012710 014024 A 4747          LDA     ABDCS           A OR B DCS              S03 04605
012711 004250 A 4748          LRLA    8               MOVE TO LEFT BYTE       S03 04606
012712 054007 A 4749          STA     EDAB            OVERLAY DRAI OPPERAND   S03 04607
012713 024022 A 4750          LDB     ED41            NEXT DCS ADDRESS        S03 04608
012714 004054 A 4751          LRLB    12                                      S03 04609
```

```
012715 002000 A 4752          CALL    OH2             CONVERT TO ASCII                S03 04610
012716 014550 R
012717 006150 A 4753          ANAI    0377                                            S03 04611
012720 000377 A
012721 006110 A 4754          ORAI    0140000                                         S03 04612
012722 140000 A
012722          4755 EDAB     BES     0                                               S03 04613
012723 054010 A 4756          STA     EDA+1                                           S03 04614
012724 002000 A 4757          CALL    SIOUT,2,EDA     OUTPUT NEXT LOCATION            S03 04615
012725 015406 R
012726 000002 A
012727 012733 R
012730 014005 A 4758          LDA     ED41            NEXT DCS ADDR                   S03 04616
012731 001000 A 4759          RETU*   ED50                                            S03 04617
012732 112653 R
012733          4760 EDA      BSS     2               MESSAGE BUFFER                  S03 04618
012735 000000 A 4761 ABDCS    DATA    0               A OR B DCS FLAG                 S03 04619
                4762 *                                                                S03 04620
012736 000000 A 4763 ED41     DATA    0               SAVE HEX INPUT(0-F)             S03 04621
012737 000000 A 4764 ED42     DATA    0               TEMP STORE                      S03 04622
012740 000000 A 4765 ED43     DATA                    TEMP STORE                      S03 04623
                4766 *                                                                S03 04624
                4767 *        CONVERT ASCII CHAR TO HEX DIGIT                         S03 04625
                4768 *                                                                S03 04626
                4769 *        CALLING SEQUENCE                                        S03 04627
                4770 *        LDA     ASCII CHAR TO BE CONVERTED                      S03 04628
                4771 *        JMPM    CONV                                            S03 04629
                4772 *                                                                S03 04630
                4773 *        RETURN  A CONTAINS HEX DIGIT IF LEGAL                   S03 04631
                4774 *                A SET NEGATIVE IF NOT                           S03 04632
                4775 *                                                                S03 04633
012741 000000 A 4776 CONV     ENTR                                                    S03 04634
012742 054031 A 4777          STA     CONV3           SAVE CHAR                       S03 04635
012743 006140 A 4778          SUBI    0260            ASCII 0                         S03 04636
012744 000260 A
012745 054026 A 4779          STA     CONV3           SAVE VALUE                      S03 04637
012746 001004 A 4780          JAN*    CONV            RETURN IF ILLEGAL               S03 04638
012747 112741 R
012750 006140 A 4781          SUBI    012             0272                            S03 04639
012751 000012 A
012752 001004 A 4782          JAN     CONV1           JUMP IF 0-9                     S03 04640
012753 012767 R
```

```
012754 006140 A 4783         SUBI    07          ASCII A  0301                  S03 04641
012755 000007 A
012756 001004 A 4784         JAN*    CONV        RETURN IF ILLEGAL             S03 04642
012757 112741 R
012760 006140 A 4785         SUBI    06          ASCII G  0307                  S03 04643
012761 000006 A
012762 001002 A 4786         JAP     CONV2       JUMP IF ILLEGAL               S03 04644
012763 012771 R
012764 006120 A 4787         ADDI    020         A-F                           S03 04645
012765 000020 A
012766 001006 A 4788         DATA    01006       SKIP NEXT INSTRUCTION         S03 04646
012767 014004 A 4789 CONV1   LDA     CONV3       0-9                           S03 04647
012770 001006 A 4790         DATA    01006       SKIP NEXT INSTRUCTION         S03 04648
012771 005301 A 4791 CONV2   DECR    01          SET A NEGATIVE                S03 04649
012772 001000 A 4792         JMP*    CONV        RETURN                        S03 04650
012773 112741 R
                     4793 *                                                     S03 04651
012774 000000 A 4794 CONV3   DATA    0           TEMP STORAGE                  S03 04652
```

```
                    4795          EJEC                                                    S03 04653
                    4796 *                                                                S03 04654
                    4797 *        THIS ROUTINE WILL TAKE THE ROM WORD INDEXED             S03 04655
                    4798 *        BY X AND BREAK IT DOWN INTO ITS SEPARATE FIELDS         S03 04656
                    4799 *                                                                S03 04657
                    4800 *        CALLING SEQUENCE                                        S03 04658
                    4801 *        JMPM    FELD                                            S03 04659
                    4802 *                                                                S03 04660
                    4803 *        RETURN                                                  S03 04661
                    4804 *        THE FIELDS WILL BE STORED IN XTS, XAF, XMS, ETC.        S03 04662
                    4805 *                                                                S03 04663
012775 000000 A     4806 FELD     ENTR                                                    S03 04664
012776 006030 A     4807          LDXI    DROM                                            S03 04665
012777 000545 R
013000 015057 A     4808          LDA     NROM,1          NEXT ROM AR                     S03 04666
013001 004242 A     4809          LRLA    2               TIMES FOUR                      S03 04667
013002 127000 I     4810          ADD     DBUF            BASE OF CCS PAGE                S03 04668
013003 005014 A     4811          TAX                                                     S03 04669
013004 015000 A     4812          LDA     0,1             FIRST 16-BITS OF ROM WORD       S03 04670
013005 054175 A     4813          STA     FD09                                            S03 04671
013006 015001 A     4814          LDA     1,1             SECOND 16-BITS OF ROM WORD      S03 04672
013007 054174 A     4815          STA     FD09+1                                          S03 04673
013010 015002 A     4816          LDA     2,1             THIRD 16-BITS OF ROM WORD       S03 04674
013011 054173 A     4817          STA     FD09+2                                          S03 04675
013012 015003 A     4818          LDA     3,1             FOURTH 16-BITS OF ROM WORD      S03 04676
013013 054172 A     4819          STA     FD09+3                                          S03 04677
                    4820 *                                                                S03 04678
013014 074173 A     4821          STX     FD11            SAVE X                          S03 04679
013015 006030 A     4822          LDXI    DROM                                            S03 04680
013016 000545 R
013017 024166 A     4823          LDB     FD09+3                                          S03 04681
013020 004450 A     4824          LLRL    010                                             S03 04682
013021 002000 A     4825          CALL    CDAB            DETERMINE A&B FIELDS            S03 04683
013022 013211 R
013023 034163 A     4826          LDX     FD10            ADDR OF FIRST ROM FIELD STORAGE S03 04684
                    4827 *                                                                S03 04685
013024 024156 A     4828          LDB     FD09            FIRST 16-BITS                   S03 04686
                    4829 *                                                                S03 04687
013025 005001 A     4830          TZA                                                     S03 04688
013026 004444 A     4831          LLRL    4                                               S03 04689
013027 055000 A     4832          STA     XTS,1           TS FIELD                        S03 04690
                    4833 *                                                                S03 04691
```

```
013030 005001 A 4834          TZA                                          S03 04692
013031 004445 A 4835          LLRL    5                                    S03 04693
013032 055001 A 4836          STA     XAF,1       AF FIELD                 S03 04694
               4837 *                                                      S03 04695
013033 005001 A 4838          TZA                                          S03 04696
013034 004444 A 4839          LLRL    4                                    S03 04697
013035 055002 A 4840          STA     XMS,1       MS FIELD                 S03 04698
               4841 *                                                      S03 04699
013036 005001 A 4842          TZA                                          S03 04700
013037 004441 A 4843          LLRL    1                                    S03 04701
013040 055003 A 4844          STA     XMT,1       MT FIELD                 S03 04702
013041 005001 A 4845          TZA                                          S03 04703
013042 004442 A 4846          LLRL    2                                    S03 04704
               4847 *                                                      S03 04705
013043 024140 A 4848          LDB     FD09+1      SECOND 16-BITS           S03 04706
               4849 *                                                      S03 04707
013044 004442 A 4850          LLRL    2                                    S03 04708
013045 055004 A 4851          STA     XFS,1       FS FIELD                 S03 04709
               4852 *                                                      S03 04710
013046 005001 A 4853          TZA                                          S03 04711
013047 004442 A 4854          LLRL    2                                    S03 04712
013050 055005 A 4855          STA     XT,1        T = TEST CONTROL         S03 04713
               4856 *                                                      S03 04714
013051 005001 A 4857          TZA                                          S03 04715
013052 004442 A 4858          LLRL    2                                    S03 04716
013053 055006 A 4859          STA     XS,1        S = SPECIAL CONTROL      S03 04717
               4860 *                                                      S03 04718
013054 005001 A 4861          TZA                                          S03 04719
013055 004444 A 4862          LLRL    4                                    S03 04720
013056 055007 A 4863          STA     XG,1        G = GENERAL CONTROL      S03 04721
               4864 *                                                      S03 04722
013057 005001 A 4865          TZA                                          S03 04723
013060 004441 A 4866          LLRL    1                                    S03 04724
013061 055010 A 4867          STA     XH,1        M = FILE ADDR EXTRACTOR MASK S03 04725
               4868 *                                                      S03 04726
013062 005001 A 4869          TZA                                          S03 04727
013063 004442 A 4870          LLRL    2                                    S03 04728
013064 055011 A 4871          STA     XAB,1       AB = FILE ADDR LOAD CONTROL S03 04729
               4872 *                                                      S03 04730
013065 005001 A 4873          TZA                                          S03 04731
013066 004443 A 4874          LLRL    3                                    S03 04732
               4875 *                                                      S03 04733
```

```
013067 024115 A 4876          LDB     FD09+2          THIRD 16-BITS                   S03 04734
               4877 *                                                                S03 04735
013070 004441 A 4878          LLRL    1                                               S03 04736
013071 055012 A 4879          STA     XIMC,1          IMC - I/O AND MEMORY CONTROL    S03 04737
               4880 *                                                                S03 04738
013072 005001 A 4881          TZA                                                     S03 04739
013073 004442 A 4882          LLRL    2                                               S03 04740
013074 055013 A 4883          STA     XLB,1           LB - LATCH B CONTROL            S03 04741
               4884 *                                                                S03 04742
013075 005001 A 4885          TZA                                                     S03 04743
013076 004442 A 4886          LLRL    2                                               S03 04744
013077 055014 A 4887          STA     XLA,1           LA - LATCH A CONTROL            S03 04745
               4888 *                                                                S03 04746
013100 005001 A 4889          TZA                                                     S03 04747
013101 004443 A 4890          LLRL    3                                               S03 04748
013102 055015 A 4891          STA     XR,1            R - REGISTER CONTROL            S03 04749
               4892 *                                                                S03 04750
013103 005001 A 4893          TZA                                                     S03 04751
013104 004444 A 4894          LLRL    4                                               S03 04752
013105 055016 A 4895          STA     XF,1            F - ADDER FUNCTION              S03 04753
               4896 *                                                                S03 04754
013106 005001 A 4897          TZA                                                     S03 04755
013107 004441 A 4898          LLRL    1                                               S03 04756
013110 055017 A 4899          STA     XMD,1           MD - ARITHMETIC/LOGICAL         S03 04757
               4900 *                                                                S03 04758
013111 005001 A 4901          TZA                                                     S03 04759
013112 004442 A 4902          LLRL    2                                               S03 04760
013113 055020 A 4903          STA     XC,1            C - CARRY                       S03 04761
               4904 *                                                                S03 04762
013114 005001 A 4905          TZA                                                     S03 04763
013115 004441 A 4906          LLRL    1                                               S03 04764
013116 055021 A 4907          STA     XW,1            W - WRITE FILE                  S03 04765
               4908 *                                                                S03 04766
013117 024066 A 4909          LDB     FD09+3          FOURTH 16-BITS                  S03 04767
               4910 *                                                                S03 04768
               4911 *                                                                S03 04769
013120 005001 A 4912          TZA                                                     S03 04770
013121 004441 A 4913          LLRL    1                                               S03 04771
013122 055022 A 4914          STA     XDS,1           DP REG SHIFT CONTROL            S03 04772
               4915 *                                                                S03 04773
013123 005001 A 4916          TZA                                                     S03 04774
013124 004441 A 4917          LLRL    1                                               S03 04775
```

```
013125 055023 A 4918          STA     XV,1            OP REG SHIFT GATING CONTROL                    S03 04776
                4919 *                                                                               S03 04777
013126 005001 A 4920          TZA                                                                    S03 04778
013127 004441 A 4921          LLRL    1                                                              S03 04779
013130 055024 A 4922          STA     XY,1            QS CONTROL BIT                                 S03 04780
                4923 *                                                                               S03 04781
013131 005001 A 4924          TZA                                                                    S03 04782
013132 004442 A 4925          LLRL    2                                                              S03 04783
013133 055025 A 4926          STA     XX,1            OP REG LONG SHIFTING END-AROUND CONTROL        S03 04784
                4927 *                                                                               S03 04785
013134 005001 A 4928          TZA                                                                    S03 04786
013135 004443 A 4929          LLRL    3                                                              S03 04787
013136 055026 A 4930          STA     XTC,1           TC = TEST CONTROL                              S03 04788
                4931 *                                                                               S03 04789
                4932 *                                                                               S03 04790
013137 014045 A 4933          LDA     FD09+2          THIRD 16-BITS                                  S03 04791
013140 024045 A 4934          LDB     FD09+3          FOURTH 16-BITS                                 S03 04792
013141 004454 A 4935          LLRL    12                                                             S03 04793
013142 005211 A 4936          CPA                     INVERT 16 BITS FOR MASK                        S03 04794
013143 055031 A 4937          STA     MASK,1          16-BIT ALU MASK                                S03 04795
                4938 *                                                                               S03 04796
                4939 *  OVERRIDE F FIELD IF SPECIAL ALU MODE(LA=00&LB=0/1&TC=1XX)                     S03 04797
013144 002000 A 4940          CALL    SALU            SPECIAL ALU MODE ?                             S03 04798
013145 004355 R
013146 001000 A 4941          JMP     FD15            YES=                                           S03 04799
013147 013152 R
013150 001000 A 4942          JMP     FD17            NO=                                            S03 04800
013151 013200 R
013152 015016 A 4943 FD15     LDA     XF,1            CLEAR THE TWO LSB'S OF F                       S03 04801
013153 006150 A 4944          ANAI    014             FIELD.THEY WILL BE SET                         S03 04802
013154 000014 A
013155 055016 A 4945          STA     XF,1            AS A FUNCTION OF IRG2 BITS 7&6,                S03 04803
013156 015052 A 4946          LDA     IRG2,1                                                         S03 04804
013157 006150 A 4947          ANAI    0300                                                           S03 04805
013160 000300 A
013161 004346 A 4948          LSRA    6               IRG2 BITS 7&6=00(XFER) ?                       S03 04806
013162 001010 A 4949          JAZ     FD16            YES=                                           S03 04807
013163 013175 R
013164 005311 A 4950          OAR                     IRG2 BITS 7&6=01(INCR) ?                       S03 04808
013165 001010 A 4951          JAZ     FD16            YES=                                           S03 04809
013166 013175 R
                4952 *  IRG2 BITS 7&6=10(INVERT)OR 11(DECR): SET TWO LSB'S OF F FIELD=10,            S03 04810
```

```
013167 006010 A 4953          LDAI    2                                        S03 04811
013170 000002 A
013171 135016 A 4954          ERA     XF,1                                     S03 04812
013172 055016 A 4955          STA     XF,1                                     S03 04813
013173 001000 A 4956          JMP     FD17                                     S03 04814
013174 013200 R
                4957 *  IRG2 BITS 7&6=00 OR 01: SET TWO LSB'S OF F FIELD TO "01"  S03 04815
013175 005101 A 4958 FD16     INCR    01              A=01                     S03 04816
013176 135016 A 4959          ERA     XF,1                                     S03 04817
013177 055016 A 4960          STA     XF,1                                     S03 04818
013200 034007 A 4961 FD17     LDX     FD11            RESTORE X                S03 04819
013201 001000 A 4962          JMP*    FELD            RETURN                   S03 04820
013202 112775 R
                4963 *                                                         S03 04821
013203 000000 A 4964 FD09     DATA    0               TEMP STORAGE             S03 04822
013204 000000 A 4965          DATA    0               TEMP STORAGE             S03 04823
013205 000000 A 4966          DATA    0               TEMP STORAGE             S03 04824
013206 000000 A 4967          DATA    0               TEMP STORAGE             S03 04825
013207 000545 R 4968 FD10     DATA    DROM            FIRST ROM FIELD ADDR     S03 04826
013210 000000 A 4969 FD11     DATA    0               SAVED X REGISTER         S03 04827
                4970 *                                                         S03 04828
                4971 *                                                         S03 04829
                4972 *    THIS ROUTINE USES THE AB FIELD AND THE M,G&Y FIELDS TO CONTROL  S03 04830
                4973 *    THE LOADING OF THE A&B FILE ADDRESS FIELDS OF THE ROM WORD  S03 04831
                4974 *   SOME OPERATIONS ARE CONDITIONAL TO FIELDS IMC & S,     S03 04832
                4975 *                                                         S03 04833
                4976 *    CALLING SEQUENCE                                     S03 04834
                4977 *      LDX     ADDR OF ROM FIELDS                         S03 04835
                4978 *      CALL    CDAB                                       S03 04836
                4979 *                                                         S03 04837
                4980 *      RETU    ROM CONTROL FIELDS A AND B ARE ESTABLISHED  S03 04838
                4981 *                                                         S03 04839
                4982 *                                                         S03 04840
013211 000000 A 4983 CDAB     ENTR                                             S03 04841
013212 015005 A 4984          LDA     XS,1            S=0?                     S03 04842
013213 001010 A 4985          JAZ     *+4                                      S03 04843
013214 013217 R
013215 001000 A 4986          JMP     CD05            NO                       S03 04844
013216 013224 R
013217 015012 A 4987          LDA     XIMC,1                                   S03 04845
013220 006140 A 4988          SUBI    03              IMC IS 0011              S03 04846
013221 000003 A
```

```
013222 001010 A 4989          JAZ     CD50            YES                                    S03 04847
013223 013344 R
                4990 *  CONTROL A&B VIA AB IF NO I/O REQUEST: NOT (S=0 AND IMC=0011)          S03 04848
013224 015011 A 4991 CD05     LDA     XAB,1                                                  S03 04849
013225 001010 A 4992          JAZ     CD40                                                   S03 04850
013226 013277 R
013227 006140 A 4993          SUBI    2               FIELD AB= 10 ?                         S03 04851
013230 000002 A
013231 001010 A 4994          JAZ     CD20            YES=                                   S03 04852
013232 013255 R
013233 001002 A 4995          JAP     CD30            AB=3                                   S03 04853
013234 013275 R
                4996 *    AB FIELD=01: ALTER B FIELD USING TEST&M FIELDS & IREG #2           S03 04854
                4997 *      LEAVE A FIELD UNALTERED                                          S03 04855
013235 002000 A 4998          CALL    CDAX            SELECT 4 BITS OF IRG2,RIGHT JUSTIFY    S03 04856
013236 013346 R
                4999 *                                AND SAVE IN CD2B                       S03 04857
013237 015010 A 5000          LDA     XM,1            M FIELD=1 ?                            S03 04858
013240 001010 A 5001          JAZ     *+4                                                    S03 04859
013241 013244 R
013242 001000 A 5002          JMP     CD10            YES                                    S03 04860
013243 013251 R
                5003 *    AB=01 & M=0                                                        S03 04861
013244 014120 A 5004          LDA     CD2B            SET B FIELD EQUAL TO                   S03 04862
013245 154120 A 5005          ANA     CD2C            THE 3 LSB'S OF THE SELECTED            S03 04863
013246 055027 A 5006          STA     XB,1            IRG2 FIELD AND SET MSB OF B=0          S03 04864
013247 001000 A 5007          RETU*   CDAB            RETURN                                 S03 04865
013250 113211 R
                5008 *    AB=01 & M=1                                                        S03 04866
013251 014113 A 5009 CD10     LDA     CD2B            USE 4 BITS FROM                        S03 04867
013252 055027 A 5010          STA     XB,1            IRG2 FOR B FIELD                       S03 04868
013253 001000 A 5011          RETU*   CDAB            RETURN                                 S03 04869
013254 113211 R
                5012 *                                                                       S03 04870
                5013 *                                                                       S03 04871
                5014 *    AB FIELD=10 : ALTER A FIELD USING TEST&M FIELDS & IREG #2,         S03 04872
                5015 *      LEAVE B FIELD UNALTERED                                          S03 04873
013255 002000 A 5016 CD20     CALL    CDAX            SELECT 4 BIT FIELD FROM IRG2           S03 04874
013256 013346 R
013257 015010 A 5017          LDA     XM,1            GET M FIELD                            S03 04875
013260 001010 A 5018          JAZ     *+4                                                    S03 04876
013261 013264 R
```

```
013262 001000 A 5019          JMP     CD22                                    S03 04877
013263 013271 R
                5020 *   AB=10 & M=0                                          S03 04878
013264 014100 A 5021          LDA     CD2B        SET A FIELD EQUAL TO         S03 04879
013265 154100 A 5022          ANA     CD2C        THE 3 LSB'S OF THE SELECTED  S03 04880
013266 055030 A 5023          STA     XA,1        IRG2 FIELD AND SET MSB OF B=0 S03 04881
013267 001000 A 5024          RETU*   CDAB                                     S03 04882
013270 113211 R
                5025 *   AB=10 & M=1                                          S03 04883
013271 014073 A 5026 CD22     LDA     CD2B        SET B FIELD EQUAL TO THE     S03 04884
013272 055030 A 5027          STA     XA,1        SELECTED 4 BITS FROM IRG2    S03 04885
013273 001000 A 5028          RETU*   CDAB                                     S03 04886
013274 113211 R
                5029 *                                                       S03 04887
                5030 *                                                       S03 04888
                5031 *   AB FIELD= 11                                        S03 04889
                5032 *    LEAVE BOTH A&B FIELDS UNALTERED                    S03 04890
                5033 *    ROUTINE FELD CONTROLS ALTERING A&B AS A FUNCTION OF FIELD AB  S03 04891
013275 001000 A 5034 CD30     RETU*   CDAB        USE PREVIOUS CONTENTS OF A&B FIELDS  S03 04892
013276 113211 R
                5035 *                                                       S03 04893
                5036 *                                                       S03 04894
                5037 *                                                       S03 04895
                5038 *   AB FIELD=00:                                        S03 04896
                5039 *                                                       S03 04897
013277 015010 A 5040 CD40     LDA     XM,1        M FIELD= 1 ?                 S03 04898
013300 001010 A 5041          JAZ     **4                                      S03 04899
013301 013304 R
013302 001000 A 5042          JMP     CD44        YES                          S03 04900
013303 013313 R
013304 004444 A 5043 CD42     LLRL    4           USE VALUES OF A&B IN         S03 04901
013305 055027 A 5044          STA     XB,1        CURRENT ROM CONTROL          S03 04902
013306 005001 A 5045          TZA                 WORD FOR THE                 S03 04903
013307 004444 A 5046          LLRL    4           A&B FIELDS                   S03 04904
013310 055030 A 5047          STA     XA,1                                     S03 04905
013311 001000 A 5048          RETU*   CDAB        RETURN                       S03 04906
013312 113211 R
                5049 *                                                       S03 04907
                5050 *   AB FIELD= 00 AND M=1                                S03 04908
                5051 *   LEAVE A FIELD UNALTERED                             S03 04909
013313 006010 A 5052 CD44     LDAI    016         FORCE 3 MSB'S                S03 04910
013314 000016 A
```

```
013315 055027 A 5053          STA     XB,1          OF B FIELD TO 1'S                          S03 04911
013316 015024 A 5054          LDA     XY,1          Y FIELD=0 ?                                S03 04912
013317 001010 A 5055          JAZ     *+4                                                      S03 04913
013320 013323 R
013321 001000 A 5056          JMP     CD46          NO                                         S03 04914
013322 013333 R
013323 015034 A 5057          LDA     XALU,1        COPY ALU 15                                S03 04915
013324 005002 A 5058          TZB                   BIT INTO                                   S03 04916
013325 004441 A 5059          LLRL    1             LSB BIT                                    S03 04917
013326 005021 A 5060          TBA                   OF                                         S03 04918
013327 135027 A 5061          ERA     XB,1          B FIELD                                    S03 04919
013330 055027 A 5062          STA     XB,1                                                     S03 04920
013331 001000 A 5063          RETU*   CDAB          RETURN                                     S03 04921
013332 113211 R
                    5064 *    AB=00, M=1, Y(W)=1 : OR01 INTO B0                              S03 04922
013333 006017 A 5065 CD46     LDAE    DOT1          OREG BEFORE LAST UPDATE(TIMING SITUATION)  S03 04923
013334 007075 R
013335 006150 A 5066          ANAI    02            SELECT BIT OR01 (LOOK AHEAD)               S03 04924
013336 000002 A
013337 004341 A 5067          LSRA    1                                                        S03 04925
013340 135027 A 5068          ERA     XB,1          B FIELD                                    S03 04926
013341 055027 A 5069          STA     XB,1                                                     S03 04927
013342 001000 A 5070          RETU*   CDAB          RETURN                                     S03 04928
013343 113211 R
                    5071 *                                                                     S03 04929
                    5072 *                                                                     S03 04930
                    5073 *    S=0 &IM=0011                                                     S03 04931
                    5074 *    AB FIELD USED IN  I/O ADDR  AND SEL F/F                          S03 04932
                    5075 *                                                                     S03 04933
                    5076 *    I/O NOT SIMULATED AT THIS TIME                                   S03 04934
                    5077 *                                                                     S03 04935
013344 001000 A 5078 CD50     JMP     CD42          IF I/O REQUEST:PUT ROM FIELDS INTO A & B,  S03 04936
013345 013304 R
                    5079 *                                                                     S03 04937
                    5080 *                                                                     S03 04938
                    5081 *                                                                     S03 04939
                    5082 *                                                                     S03 04940
                    5083 *    USE TS FIELD TO SELECT 4-BITS OF IRG2                            S03 04941
013346 000000 A 5084 CDAX     ENTR                                                             S03 04942
013347 015000 A 5085          LDA     XTS,1         USE 3 LSB'S OF TS FIELD TO SELECT          S03 04943
013350 154015 A 5086          ANA     CD2C          4 BITS FROM IREG #2,                       S03 04944
013351 006130 A 5087          ERAI    04340         FORM LSRA INST TO SELECT 4 BIT FIELD        S03 04945
```

```
013352 004340 A
                5088 *                          FROM INST REG. #2                       S03 04946
013353 054010 A 5089        STA     CD2A        TEMP STORE                              S03 04947
013354 015052 A 5090        LDA     IRG2,1                                              S03 04948
013355 003000 A 5091        XEC     CD2A        RIGHT JUSTIFY SELECTED 4 BITS OF IREG2  S03 04949
013356 013364 R
013357 006150 A 5092        ANAI    017         SELECT ONLY 4 LSB'S                     S03 04950
013360 000017 A
013361 054003 A 5093        STA     CD2B        TEMP STORE                              S03 04951
013362 001000 A 5094        JMP*    CDAX                                                S03 04952
013363 113346 R
013364 000000 A 5095 CD2A   DATA    0           TEMP STORE FOR FORMED LSRA INST         S03 04953
013365 000000 A 5096 CD2B   DATA    0           TEMP STORE FOR 4 BITS SELECTED FROM IRG2 S03 04954
013366 000007 A 5097 CD2C   DATA    7           MASK                                    S03 04955
```

```
                    5098          EJEC                                                    S03 04956
                    5099 *        THIS IS A SUBROUTINE TO INPUT A HEXADECIMAL ADDRESS CONSTANT  S03 04957
                    5100 *        MAX 4 DIGITS                                            S03 04958
                    5101 *                                                                S03 04959
                    5102 *        CALLING SEQUENCE                                        S03 04960
                    5103 *        JMPM    INA                                             S03 04961
                    5104 *        DATA    'R' OR 'N'    R FOR READ, N FOR NO READ         S03 04962
                    5105 *                                                                S03 04963
                    5106 *        RETURN                A REGISTER CONTAINS THE ADDRESS VALUE  S03 04964
                    5107 *                              B REGISTER CONTAINS THE NUMBER OF DIGITS  S03 04965
                    5108 *                              X CONTAINS THE LAST INPUT CHAR    S03 04966
                    5109 *                                                                S03 04967
013367 014072 A     5110 INA5     LDA     INAV          GET VALUE                         S03 04968
013370 024070 A     5111          LDB     INAN          GET NUMBER OF DIGITS              S03 04969
013371 034066 A     5112          LDX     INAA          LAST INPUT CHAR                   S03 04970
013372 001000 A     5113          JMP     0             RETURN                            S03 04971
013373 000000 A
                    5114 *                                                                S03 04972
                    5115 *        ENTRY POINT                                             S03 04973
                    5116 *                                                                S03 04974
013373              5117 INA      BES     0             ENTRY                             S03 04975
013374 005001 A     5118          TZA                   INITIATE                          S03 04976
013375 054062 A     5119          STA     INAA                                            S03 04977
013376 054062 A     5120          STA     INAN          COUNT                             S03 04978
013377 054062 A     5121          STA     INAV          VALUE                             S03 04979
013400 027000 I     5122          LDB     INA            PARAM AREA                        03 04980
013401 016000 A     5123          LDA     0,2            GET PARAM                         03 04981
013402 006047 A     5124          INRE    INA           RESET RETURN ADDR                 S03 04982
013403 013373 R
013404 004350 A     5125          LSRA    8             MOVE CHARACTER DONE INTO LOWER BYTE  S03 04983
013405 006140 A     5126          SUBI    0316          N                                 S03 04984
013406 000316 A
013407 001010 A     5127          JAZ     INA3          NO READ REQUESTED                 S03 04985
013410 013417 R
013411 002000 A     5128          CALL    SIIN          INPUT VALUE                       S03 04986
013412 015220 R
013413 002000 A     5129          JMPM    FETCH          GET FIRST CHAR                    03 04987
013414 015635 R
013415 001000 A     5130          JMP     INA3+2                                          S03 04988
013416 013421 R
                    5131 *                                                                S03 04989
013417 002000 A     5132 INA3     JMPM    FETCHA        GET CHARACTER                     S03 04990
```

```
013420 015644 R
013421 001010 A 5133          JAZ     INA5                                    S03 04991
013422 013367 R
013423 054034 A 5134          STA     INAA        SAVE CHAR                   S03 04992
013424 006140 A 5135          SUBI    0240        BLANK                       S03 04993
013425 000240 A
013426 001010 A 5136          JAZ     INA5        GET OUT                     S03 04994
013427 013367 R
013430 006140 A 5137          SUBI    014         0254                        S03 04995
013431 000014 A
013432 001010 A 5138          JAZ     INA5        COMMA                       S03 04996
013433 013367 R
013434 014023 A 5139          LDA     INAA        INPUT CHAR                  S03 04997
013435 002000 A 5140          JMPM    CONV        CONVERT CHAR TO HEX         S03 04998
013436 012741 R
013437 001004 A 5141          JAN     INA8        JUMP IF NOT A HEX CHAR      S03 04999
013440 013456 R
013441 005014 A 5142          TAX                                             S03 05000
013442 014017 A 5143          LDA     INAV        ACCUMULATED VALUE           S03 05001
013443 005002 A 5144          TZB                                             S03 05002
013444 004444 A 5145          LLRL    4                                       S03 05003
013445 001020 A 5146          JBZ     *+4         JUMP IF NO OVERFLOW         S03 05004
013446 013451 R
013447 001000 A 5147          JMP     INA8        REJECT CHAR                 S03 05005
013450 013456 R
013451 005051 A 5148          MERG    051         ADD NEW CHAR                S03 05006
013452 054007 A 5149          STA     INAV        SAVE VALUE                  S03 05007
013453 044005 A 5150          INR     INAN        INCREMENT NUMBER OF DIGITS  S03 05008
013454 001000 A 5151          JMP     INA3        KEEP TRYING                 S03 05009
013455 013417 R
               5152 *                                                         S03 05010
               5153 *                                                         S03 05011
013456 001000 A 5154 INA8     JMP     INH8        INPUT ERROR                 S03 05012
013457 013612 R
013460 000000 A 5155 INAA     DATA    0           LAST INPUT CHAR             S03 05013
013461 000000 A 5156 INAN     DATA    0           NO OF CHARS INPUT           S03 05014
013462 000000 A 5157 INAV     DATA    0           ACCUMULATED INPUT VALUE     S03 05015
               5158 *                                                         S03 05016
```

```
                    5159          EJEC                                                    S03 05017
                    5160 *                                                                S03 05018
                    5161 *        THIS IS A SUBROUTINE TO INPUT A HEXIDECIMAL CONSTANT    S03 05019
                    5162 *                                                                S03 05020
                    5163 *        CALLING SEQUENCE                                        S03 05021
                    5164 *        JMPM    INH                                             S03 05022
                    5165 *                                                                S03 05023
                    5166 *        RETURN  B CONTAINS THE NUMBER OF DIGITS INPUT           S03 05024
                    5167 *                X CONTAINS LAST INPUT CHAR                      S03 05025
                    5168 *                VALUE IS IN V,V+1,V+2,V+3                       S03 05026
                    5169 *                                                                S03 05027
013463 002000 A     5170 INH5   JMPM    MOVW        MOVE INPUT TO V,V+1,V+2,V+3         S03 05028
013464 014517 R
013465 000004 A     5171        DATA    4           WORD COUNT                          S03 05029
013466 013626 R     5172        DATA    INHT        START LOCATION                      S03 05030
013467 000476 R     5173        DATA    V           END LOCATION                        S03 05031
                    5174 *                                                                S03 05032
013470 024134 A     5175        LDB     INHN        GET DIGIT COUNT                     S03 05033
013471 034131 A     5176        LDX     INHA        LAST INPUT CHAR                     S03 05034
013472 001000 A     5177        JMP     0           RETURN                              S03 05035
013473 000000 A
                    5178 *                                                                S03 05036
                    5179 *        ENTRY POINT                                             S03 05037
                    5180 *                                                                S03 05038
013473              5181 INH    BES     0           ENTRY                               S03 05039
013474 005001 A     5182        TZA                 INITIATE                            S03 05040
013475 054127 A     5183        STA     INHN        DIGIT COUNT                         S03 05041
013476 054127 A     5184        STA     INHT        CLEAR INPUT DATA STRING             S03 05042
013477 054127 A     5185        STA     INHT+1                                          S03 05043
013500 054127 A     5186        STA     INHT+2                                          S03 05044
013501 054127 A     5187        STA     INHT+3                                          S03 05045
                    5188 *                                                                S03 05046
013502 002000 A     5189        CALL    SIIN        INPUT VALUE                         S03 05047
013503 015220 R
013504 002000 A     5190        JMPM    FETCH       GET FIRST CHAR                      S03 05048
013505 015635 R
013506 054114 A     5191        STA     INHA                                            ********
013507 006140 A     5192        SUBI    '='                                             ********
013510 000275 A
013511 001010 A     5193        JAZ     INH6        IF ZERO BEFORE STORE FIELD VALUE    ********
013512 013602 R
013513 006140 A     5194        SUBI    '+'-'='                                         ********
```

```
013514 177756 A
013515 001010 A 5195        JAZ     INH7        IF DO NOT ZERO BEFORE STORE FIELD VALUE    ********
013516 013610 R
013517 014103 A 5196        LDA     INHA                                                   ********
013520 001000 A 5197        JMP     INH4        CONTINUE PROCESSING                        ********
013521 013525 R
013522 002000 A 5198 INH3   JMPM    FETCHA                                                 S03 05050
013523 015644 R
013524 054076 A 5199        STA     INHA        SAVE CHAR                                  S03 05051
       013525 R 5200 INH4   EQU     *                                                      ********
013525 001010 A 5201        JAZ     INH5        CARRIAGE RETURN--RETURN TO EXEC            S03 05052
013526 013463 R
013527 006140 A 5202        SUBI    0240        BLANK                                      S03 05053
013530 000240 A
013531 001010 A 5203        JAZ     INH5        JUMP IF BLANK                              S03 05054
013532 013463 R
013533 006140 A 5204        SUBI    014         0254                                       S03 05055
013534 000014 A
013535 001010 A 5205        JAZ     INH5        JUMP IF COMMA                              S03 05056
013536 013463 R
013537 014063 A 5206        LDA     INHA        GET LAST CHAR                              S03 05057
013540 002000 A 5207        JMPM    CONV        CONVERT CHAR TO HEX                        S03 05058
013541 012741 R
013542 001004 A 5208        JAN     INH8        JUMP IF ILLEGAL                            S03 05059
013543 013612 R
013544 005014 A 5209        TAX                                                            S03 05060
                5210 *                                                                     S03 05061
                5211 *      ADD CHAR TO DATA STRING                                        S03 05062
                5212 *                                                                     S03 05063
013545 024057 A 5213 INH2   LDB     INHN        GET COUNT                                  S03 05064
013546 074055 A 5214        STX     INHC        SAVE DIGIT                                 S03 05065
013547 014056 A 5215        LDA     INHT        CHARS 1-4                                  S03 05066
013550 005002 A 5216        TZB                                                            S03 05067
013551 004444 A 5217        LLRL    4           SHIFT OUT MS CHAR                          S03 05068
013552 001020 A 5218        JBZ     *+4         JUMP IF NO OVERFLOW                        S03 05069
013553 013556 R
013554 001000 A 5219        JMP     INH8        16 CHARS ALREADY INPUT                     S03 05070
013555 013612 R
013556 014047 A 5220        LDA     INHT        CHARS 1-4                                  S03 05071
013557 024047 A 5221        LDB     INHT+1      CHARS 5-8                                  S03 05072
013560 004444 A 5222        LLRL    4                                                      S03 05073
013561 054044 A 5223        STA     INHT        NEW CHARS 1-4                              S03 05074
```

```
013562 005001 A 5224          TZA                                                  S03 05075
013563 004454 A 5225          LLRL    12                                           S03 05076
013564 024043 A 5226          LDB     INHT+2        CHARS 9-12                     S03 05077
013565 004444 A 5227          LLRL    4                                            S03 05078
013566 054040 A 5228          STA     INHT+1        NEW CHARS 5-8                  S03 05079
013567 005001 A 5229          TZA                                                  S03 05080
013570 004454 A 5230          LLRL    12                                           S03 05081
013571 024037 A 5231          LDB     INHT+3        CHARS 13-16                    S03 05082
013572 004444 A 5232          LLRL    4                                            S03 05083
013573 054034 A 5233          STA     INHT+2        CHARS 9-12                     S03 05084
013574 014027 A 5234          LDA     INHC          INPUT DIGIT                    S03 05085
013575 005031 A 5235          MERG    031           ADD NEW DIGIT                  S03 05086
013576 054032 A 5236          STA     INHT+3        CHARS 13-16                    S03 05087
               5237 *                                                             S03 05088
013577 044025 A 5238          INR     INHN          INCREMENT COUNT                S03 05089
013600 001000 A 5239          JMP     INH3          KEEP TRYING                    S03 05090
013601 013522 R
013602 027000 I 5240 INH6     LDB     E113          ROM WORD ADDR                  ********
013603 005001 A 5241          TZA                                                  ********
013604 056000 A 5242          STA     0,2           ZERO                           ********
013605 056001 A 5243          STA     1,2           ENTIRE                         ********
013606 056002 A 5244          STA     2,2           ROM                            ********
013607 056003 A 5245          STA     3,2           WORD                           ********
013610 001000 A 5246 INH7     JMP     FLDCG         PROCESS FIELD CHANGE DIRECTIVE ********
013611 013632 R
               5247 *                                                             S03 05091
013612 002000 A 5248 INH8     CALL    SIOUT,3,INER    OUTPUT ERROR                 S03 05092
013613 015406 R
013614 000003 A
013615 013620 R
013616 001000 A 5249          JMP     EXC10         TRY AGAIN                      S03 05093
013617 001106 R
               5250 *                                                             S03 05094
013620 120240 A 5251 INER     DATA    ' MS02'       ILLEGAL HEX INPUT              S03 05095
013621 146723 A
013622 130262 A
               5252 *                                                             S03 05096
013623 000000 A 5253 INHA     DATA    0             LAST INPUT CHAR                S03 05097
013624 000000 A 5254 INHC     DATA    0             LAST INPUT DIGIT               S03 05098
013625 000000 A 5255 INHN     DATA    0                                            S03 05099
013626          5256 INHT     BSS     4             INPUT STRING                   S03 05100
```

```
                    5257          EJEC                                                  ********
                    5258 *        THIS IS A SUBROUTINE TO HANDLE THE CHANGE CENTRAL CONTROL  ********
                    5259 *        STORE BY FIELD SPECIFICATION                          ********
                    5260 *                                                              ********
                    5261 *        CALLING SEQUENCE                                      ********
                    5262 *        JMP     FLDCG                                         ********
                    5263 *                                                              ********
                    5264 *        RETURNS TO SIMULATOR EXEC FOR PROCESSING OF NEXT DIRECTIVE ********
                    5265 *                                                              ********
         013632 R   5266 FLDCG    EQU     *                                             ********
013632 002000 A     5267          JMPM    FETCHA                                        ********
013633 015644 R
013634 004250 A     5268 FLD05    LRLA    8                                             ********
013635 054174 A     5269          STA     FLD90           SAVE LEFT BYTE                ********
013636 002000 A     5270          JMPM    FETCHA                                        ********
013637 015644 R
013640 134171 A     5271          ERA     FLD90           FORM 2 CHAR NAME              ********
013641 054170 A     5272          STA     FLD90                                         ********
013642 006030 A     5273          LDXI    FLNAM           FIELD NAME TABLE              ********
013643 014052 R
013644 015000 A     5274 FLD10    LDA     0,1             FIELD NAME                    ********
013645 001010 A     5275          JAZ     FLD60           IF END OF TABLE               ********
013646 014040 R
013647 134162 A     5276          ERA     FLD90                                         ********
013650 001010 A     5277          JAZ     FLD20           IF MATCH FOUND                ********
013651 013657 R
013652 005144 A     5278          IXR                                                   ********
013653 005144 A     5279          IXR                                                   ********
013654 005144 A     5280          IXR                                                   ********
013655 001000 A     5281          JMP     FLD10           CONTINUE SCAN THROUGH TABLE   ********
013656 013644 R
         013657 R   5282 FLD20    EQU     *                                             ********
013657 074154 A     5283          STX     FLD92           SAVE TABLE PTR                ********
013660 002000 A     5284          JMPM    INA             FETCH CHANGE VALUE            ********
013661 013373 R
013662 147240 A     5285          DATA    'N'                                           ********
013663 074151 A     5286          STX     FLD93           SAVE TERM CHAR                ********
013664 054146 A     5287          STA     FLD91           SAVE VALUE                    ********
013665 034146 A     5288          LDX     FLD92           FIELD TABLE PTR               ********
013666 025001 A     5289          LDB     1,X             FIELD SIZE                    ********
013667 014005 A     5290          LDA     FLD25                                         ********
013670 006150 A     5291          ANAI    07740                                         ********
```

```
013671 007740 A
013672 005031 A 5292          MERGE   031             FORM RIGHT SHIFT                        ********
013673 054001 A 5293          STA     FLD25                                                   ********
013674 014136 A 5294          LDA     FLD91           VALUE                                   ********
013675 004340 A 5295 FLD25    LSRA    0                                                       ********
013676 001010 A 5296          JAZ     FLD30           IF VALUE WITHIN BOUNDS                  ********
013677 013702 R
013700 001000 A 5297          JMP     FLD65           RANGE ERROR                             ********
013701 014046 R
013702 015002 A 5298 FLD30    LDA     2,X             LOW ORDER BIT POSITION                  ********
013703 004344 A 5299          LSRA    4                                                       ********
013704 005211 A 5300          CPA                                                             ********
013705 006150 A 5301          ANAI    3                                                       ********
013706 000003 A
013707 127000 I 5302          ADD     E113            FETCH 16 BIT WORD ADDR                  ********
013710 054126 A 5303          STA     FLD95                                                   ********
013711 015002 A 5304          LDA     2,X                                                     ********
013712 005012 A 5305          TAB                                                         F   ********
013713 006140 A 5306          SUBI    31              CHECK IF IM FIELD                   F   ********
013714 000037 A
013715 001010 A 5307          JAZ     FLD50           YES, SPECIAL PROCESSING             F   ********
013716 013777 R
013717 006140 A 5308          SUBI    15              CHECK IF FS FIELD                   F   ********
013720 000017 A
013721 001010 A 5309          JAZ     FLD50A          YES, SPECIAL PROCESSING             F   ********
013722 013773 R
013723 005021 A 5310          TBA                     NEITHER IM NOR FD, RESTORE VALUE    F   ********
013724 006150 A 5311          ANAI    017             WORD DISPLACEMENT                       ********
013725 000017 A
013726 005012 A 5312          TAB                                                             ********
013727 014007 A 5313          LDA     FLD35                                                   ********
013730 006150 A 5314          ANAI    07740                                                   ********
013731 007740 A
013732 005031 A 5315          MERGE   031                                                     ********
013733 054003 A 5316          STA     FLD35           FORM LEFT ROTATE                        ********
013734 025001 A 5317          LDB     1,X             FIELD SIZE                              ********
013735 006016 A 5318          LDAE    FLMSK,B         BIT MASK FOR FIELD SIZE                 ********
013736 014176 R
013737 004240 A 5319 FLD35    LRLA    0               MOVE MASK INTO POSITION                 ********
013740 005211 A 5320          CPA                                                             ********
013741 024075 A 5321          LDB     FLD95                                                   ********
013742 156000 A 5322          ANA     0,B             MASK OFF BITS FROM WORD                 ********
```

```
013743 005012 A 5323          TAB                                          ********
013744 014066 A 5324          LDA     FLD91       NEW FIELD VALUE          ********
013745 003000 A 5325          XEC     FLD35       MOVE VALUE INTO POSITION ********
013746 013737 R
013747 005031 A 5326          MERGE   031         UPDATE WORD              ********
013750 024066 A 5327          LDB     FLD95       ROM WORD ADDR            ********
013751 056000 A 5328          STA     0,B                                  ********
       013752 R 5329 FLD39    EQU     *                                  F ********
013752 014062 A 5330          LDA     FLD93       TERMINATING CHAR         ********
013753 006140 A 5331          SUBI    ','                                  ********
013754 000254 A
013755 001010 A 5332          JAZ     FLD40       IF MORE CHARS IN RECORD  ********
013756 013761 R
013757 001000 A 5333          JMP     EXC10       GET NEW DIRECTIVE        ********
013760 001106 R
       013761 R 5334 FLD40    EQU     *                                    ********
013761 002000 A 5335          JMPM    FETCHA      FETCH NEXT CHAR          ********
013762 015644 R
013763 005012 A 5336          TAB                                          ********
013764 006140 A 5337          SUBI    ' '                                  ********
013765 000240 A
013766 001010 A 5338          JAZ     E114A       IF DISPLAY NEXT WORD     ********
013767 011743 R
013770 005021 A 5339          TBA                                          ********
013771 001000 A 5340          JMP     FLD05       CONTINUE DIRECTIVE PROCESSING ********
013772 013634 R
       013773 R 5341 FLD50A   EQU     *           SPECIAL PROCESSING FOR FS FIELD  F ********
013773 006020 A 5342          LDBI    2           SET FOR FS FIELD ROTATE          F ********
013774 000002 A
013775 001000 A 5343          JMP     FLD508                                       F ********
013776 014000 R
       013777 R 5344 FLD50    EQU     *           SPECIAL PROCESSING FOR IM FIELD  F ********
013777 005102 A 5345          INCR    02          SET FOR IM FIELD ROTATE          F ********
       014000 R 5346 FLD508   EQU     *                                            F ********
014000 064010 A 5347          STB     FLD51       FIELD FLAG                       F ********
014001 005021 A 5348          TBA                                                  F ********
014002 005120 A 5349          ADDI    16          SET UP LLRL INST                 F ********
014003 000020 A
014004 124024 A 5350          ADD     FLLRL                                        F ********
014005 054012 A 5351          STA     FLD56       ROTATE INTO A REG LSBS           F ********
014006 006010 A 5352          LDAI    16                                           F ********
014007 000020 A
```

```
014010 006140 A 5353          SUBI    0               SET UP RESTORE ROTATE                    F ********
014011 000000 A
014011                5354 FLD51  BES     0                                                    F ********
014012 124016 A 5355          ADD     FLLRL           LLRL INST                                F ********
014013 054010 A 5356          STA     FLD57                                                    F ********
014014 034022 A 5357          LDX     FLD95           CCS WORD SUB ADDR                        F ********
014015 015000 A 5358          LDA     0,X             LSB PORTION                              F ********
014016 005344 A 5359          DXR                     POINT TO NEXT HIGH ORDER BITS            F ********
014017 025000 A 5360          LDB     0,X             MSB PORTION                              F ********
014020 004440 A 5361 FLD56    LLRL    0               POSITION FIELD INTO A REG LSBS           F ********
014021 006150 A 5362          ANAI    0177760         MASK OUT FIELD                           F ********
014022 177760 A
014023 124007 A 5363          ADD     FLD91           CHANGE VALUE                             F ********
014024 004440 A 5364 FLD57    LLRL    0               RETURN FIELDS TO PROPER POSITION         F ********
014025 065000 A 5365          STB     0,X                                                      F ********
014026 055001 A 5366          STA     1,X                                                      F ********
014027 001000 A 5367          JMP     FLD39           CONTINUE FIELD PROCESSING                F ********
014030 013752 R
                5368 *                                                                         ********
014031 004440 A 5369 FLLRL    LLRL    0               LLRL INSTRUCTION BASE VALUE              F ********
014032 000000 A 5370 FLD90    DATA    0               FIELD NAME                                 ********
014033 000000 A 5371 FLD91    DATA    0               NEW FIELD VALUE                            ********
014034 000000 A 5372 FLD92    DATA    0               NAME TABLE POINTER                         ********
014035 000000 A 5373 FLD93    DATA    0               TERM CHAR                                  ********
014036 000000 A 5374 FLD94    DATA    0                                                          ********
014037 000000 A 5375 FLD95    DATA    0               ROM WORD SUBCOMP ADDR                      ********
                5376 *                                                                         ********
014040 002000 A 5377 FLD60    CALL    SIOUT,3,FLER1   OUTPUT FIELD NAME ERROR                    ********
014041 015406 R                                MS16
014042 000003 A
014043 014054 R
014044 001000 A 5378          JMP     EXC10           TRY AGAIN                                ********
014045 001105 R
014046 002000 A 5379 FLD65    CALL    SIOUT,3,FLER2   OUTPUT FIELD RANGE ERROR                 ********
014047 015406 R                                MS17
014050 000003 A
014051 014057 R
014052 001000 A 5380          JMP     EXC10           TRY AGAIN                                ********
014053 001106 R
014054 120240 A 5381 FLER1    DATA    ' MS16'                                                  F ********
014055 146723 A
014056 130666 A
```

```
014057 120240 A 5382 FLER2  DATA     ' MS17'                                    F ********
014060 146723 A
014061 130667 A
               5383 *                                                             ********
               5384 *  FIELD NAME TABLE                                          ********
               5385 *       3 WORD ENTRY                                         ********
               5386 *              1=2 CHAR NAME                                 ********
               5387 *              2=FIELD SIZE                                  ********
               5388 *              3=LOW ORDER BIT POSITION                      ********
               5389 *                                                            ********
      014062 R 5390 FLNAM  EQU      *                                            ********
014062 140701 A 5391         DATA     'AA',4,0                                   ********
014063 000004 A
014064 000000 A
014065 141302 A 5392         DATA     'BB',4,4                                   ********
014066 000004 A
014067 000004 A
014070 151710 A 5393         DATA     'SH',3,8                                   ********
014071 000003 A
014072 000010 A
014073 154306 A 5394         DATA     'XF',2,11                                  ********
014074 000002 A
014075 000013 A
014076 153706 A 5395         DATA     'WF',1,13                                  ********
014077 000001 A
014100 000015 A
014101 153306 A 5396         DATA     'VF',1,14                                  ********
014102 000001 A
014103 000016 A
014104 151703 A 5397         DATA     'SC',1,15                                  ********
014105 000001 A
014106 000017 A
014107 153722 A 5398         DATA     'WR',1,16                                  ********
014110 000001 A
014111 000020 A
014112 141706 A 5399         DATA     'CF',2,17                                  ********
014113 000002 A
014114 000021 A
014115 146706 A 5400         DATA     'MF',1,19                                F ********
014116 000001 A
014117 000023 A
014120 143305 A 5401         DATA     'FF',4,20                                  ********
```

```
014121 000004 A
014122 000024 A
014123 151306 A 5402        DATA    !RF!,3,24                          ********
014124 000003 A
014125 000030 A
014126 146301 A 5403        DATA    !LA!,2,27                          ********
014127 000002 A
014130 000033 A
014131 146302 A 5404        DATA    !LB!,2,29                          ********
014132 000002 A
014133 000035 A
014134 144715 A 5405        DATA    !IM!,4,31                          ********
014135 000004 A
014136 000037 A
014137 140702 A 5406        DATA    !AB!,2,35                          ********
014140 000002 A
014141 000043 A
014142 146722 A 5407        DATA    !MR!,1,37                          ********
014143 000001 A
014144 000045 A
014145 143706 A 5408        DATA    !GF!,4,38                          ********
014146 000004 A
014147 000046 A
014150 151706 A 5409        DATA    !SF!,2,42                          ********
014151 000002 A
014152 000052 A
014153 152306 A 5410        DATA    !TF!,2,44                          ********
014154 000002 A
014155 000054 A
014156 143323 A 5411        DATA    !FS!,4,46                          ********
014157 000004 A
014160 000056 A
014161 146724 A 5412        DATA    !MT!,1,50                          ********
014162 000001 A
014163 000062 A
014164 146723 A 5413        DATA    !MS!,4,51                          ********
014165 000004 A
014166 000063 A
014167 140706 A 5414        DATA    !AF!,5,55                          ********
014170 000005 A
014171 000067 A
014172 152323 A 5415        DATA    !TS!,4,60                          ********
```

```
014173 000004 A
014174 000074 A
014175 000000 A 5416          DATA    0           END OF TABLE                ********
                5417 *                                                      ********
       014176 R 5418 FLMSK    EQU     *           BIT MASK TABLE              ********
014176 000000 A 5419          DATA    0                                       ********
014177 000001 A 5420          DATA    01                                      ********
014200 000003 A 5421          DATA    03                                      ********
014201 000007 A 5422          DATA    07                                      ********
014202 000017 A 5423          DATA    017                                     ********
014203 000037 A 5424          DATA    037                                     ********
```

```
                    5425          EJEC                                                    S03 05101
                    5426 *                                                                S03 05102
                    5427 *        THIS ROUTINE WILL TAKE THE FIELDS OF THE DATA-LOOP      S03 05103
                    5428 *        ROM, CONVERT THEM TO ASCII AND OUTPUT THEM TO THE       S03 05104
                    5429 *        LO AS PART OF THE TRACE FUNCTION                        S03 05105
                    5430 *        ALSO OUTPUT ROM ADDRESS                                 S03 05106
                    5431 *                                                                S03 05107
                    5432 *        MESSAGE FORMAT IS AS FOLLOWS                            S03 05108
                    5433 *                                                                S03 05109
                    5434 *           ROM LOC = DDDD                                       S03 05110
                    5435 *                                                                S03 05111
                    5436 *          TS  AF  MS  MT  FS  TF  SF  GF  MR  AS  IM  LB  LA    S03 05112
                    5437 *          DD  DD  DD  DD  DD  DD  DD  DD  DD  DD  DD  DD  DD    S03 05113
                    5438 *                                                                S03 05114
                    5439 *          RF  FF  MR  CF  WR  SC  VF  WF  XF  SH  BB  AA        S03 05115
                    5440 *          DD  DD  DD  DD  DD  DD  DD  DD  DD  DD  DD  DD        S03 05116
                    5441 *                                                                S03 05117
                    5442 *        CALLING SEQUENCE                                        S03 05118
                    5443 *        JMPM    LIST                                            S03 05119
                    5444 *                                                                S03 05120
                    5445 *        RETURN                                                  S03 05121
                    5446 *                                                                S03 05122
014204 000000 A     5447 LIST     ENTR                                                    S03 05123
014205 027000 I     5448          LDB     CPAG                                      D     03 05124
014206 006016 A     5449          LDAE    TRACE,2         TRACE FLAG FOR PAGE ON ?  D     03 05125
014207 000472 R
014210 001010 A     5450          JAZ*    LIST            NO-                             S03 05126
014211 114204 R
014212 002000 A     5451          JMPM    TRSET           CHECK IF WITHINTRACE BOUNDARIES S03 05127
014213 014744 R
014214 001004 A     5452          JAN     LIST5           NO-PRINT CCS ADDR ONLY          S03 05128
014215 014316 R
014216 002000 A     5453          CALL    TPFRM           TOP OF FORM                     S03 05129
014217 014760 R
014220 006030 A     5454 LIST1    LDXI    LISTC+6         LOC TO STORE ADDRESS            S03 05130
014221 014437 R
014222 006020 A     5455          LDBI    DROM                                            S03 05131
014223 000545 R
014224 026057 A     5456          LDB     NROM,2          GET NEXT ROM ADDRESS            S03 05132
014225 002000 A     5457          CALL    OH              CONVERT TO ASCII                S03 05133
014226 014523 R
014227 017000 I     5458          LDA     CPAG            CURRENT PAGE                    S03 05134
```

```
014230 006120 A 5459          ADDI    0260                                    S03 05135
014231 000260 A
014232 054212 A 5460          STA     LISTC+12                                S03 05136
014233 002000 A 5461          CALL    LOOUT,13,LISTC                          S03 05137
014234 015470 R
014235 000015 A
014236 014431 R
014237 002000 A 5462          JMPM    SPAC            SPACE LO                S03 05138
014240 014747 R
014241 002000 A 5463          CALL    LOOUT,27,LISTA  OUTPUT HEADER           S03 05139
014242 015470 R
014243 000033 A
014244 014345 R
014245 014073 A 5464          LDA     LIST6           ADDR OF FIRST FIELD     S03 05140
014246 054075 A 5465          STA     LIST9                                   S03 05141
014247 006010 A 5466          LDAI    12              FIELD CONVERSION COUNT  S03 05142
014250 000014 A
014251 054071 A 5467          STA     LIST8                                   S03 05143
014252 002000 A 5468          JMPM    LIST3           OUTPUT DATA TO LO       S03 05144
014253 014271 R
                5469 *                                                        S03 05145
014254 002000 A 5470          JMPM    SPAC            SPACE LO                S03 05146
014255 014747 R
014256 002000 A 5471          CALL    LOOUT,25,LISTB  OUTPUT HEADER           S03 05147
014257 015470 R
014260 000031 A
014261 014400 R
014262 006010 A 5472          LDAI    11              FIELD COUNT             S03 05148
014263 000013 A
014264 054056 A 5473          STA     LIST8                                   S03 05149
014265 002000 A 5474          JMPM    LIST3           OUTPUT DATA TO LO       S03 05150
014266 014271 R
014267 001000 A 5475          JMP*    LIST            RETURN                  S03 05151
014270 114204 R
                5476 *                                                        S03 05152
014271 000000 A 5477 LIST3    ENTR                                            S03 05153
014272 002000 A 5478          JMPM    PBUF            SETUP LO BUFFER         S03 05154
014273 014604 R
014274 034045 A 5479          LDX     LIST7           BUFFER ADDR             S03 05155
                5480 *                                                        S03 05156
014275 024046 A 5481 LIST4    LDB     LIST9           ADDR OF NEXT ROM FIELD  S03 05157
014276 026000 A 5482          LDB     0,2             NEXT ROM FIELD          S03 05158
```

```
014277 002000 A 5483         JMPM    OHA             CONVERT TO ASCII                    S03 05159
014300 014567 R
014301 005144 A 5484         IXR                     SPACE AFTER DATA                    S03 05160
014302 044041 A 5485         INR     LIST9           STEP TO NEXT FIELD                  S03 05161
014303 014037 A 5486         LDA     LIST8           FIELD COUNT                         S03 05162
014304 005311 A 5487         DAR                                                         S03 05163
014305 054035 A 5488         STA     LIST8           DECREMENTED COUNT                   S03 05164
014306 001002 A 5489         JAP     LIST4           LOOP IF NOT COMPLETE                S03 05165
014307 014275 R
014310 002000 A 5490         CALL    LOOUT,27,BUFR   OUTPUT DATA TO LO                   S03 05166
014311 015470 R
014312 000033 A
014313 000200 R
014314 001000 A 5491         JMP*    LIST3           RETURN                              S03 05167
014315 114271 R
014316 006030 A 5492 LIST5   LDXI    LISTC+6         LOCATION TO STORE ADDRESS           S03 05168
014317 014437 R
014320 006020 A 5493         LDBI    DROM                                                S03 05169
014321 000545 R
014322 026057 A 5494         LDB     NROM,2          GET NEXT CCS ADDRESS                S03 05170
014323 002000 A 5495         CALL    OH              CONVERT TO ASCII                    S03 05171
014324 014523 R
014325 002000 A 5496         JMPM    SPAC                                                S03 05172
014326 014747 R
014327 017000 I 5497         LDA     CPAG            CURRENT PAGE                        S03 05173
014330 006120 A 5498         ADDI    0260                                                S03 05174
014331 000260 A
014332 054112 A 5499         STA     LISTC+12                                            S03 05175
014333 002000 A 5500         CALL    LOOUT,13,LISTC                                      S03 05176
014334 015470 R
014335 000015 A
014336 014431 R
014337 001000 A 5501         JMP*    LIST                                                S03 05177
014340 114204 R
               5502 *                                                                    S03 05178
014341 000545 R 5503 LIST6   DATA    DROM            ADDR OF FIRST ROM FIELD             S03 05179
014342 000202 R 5504 LIST7   DATA    BUFR+2          OUTPUT BUFFER ADDRESS               S03 05180
014343 000000 A 5505 LIST8   DATA    0               ROM FIELD CONVERSION COUNT          S03 05181
014344 000000 A 5506 LIST9   DATA    0               ADDR OF ROM FIELD TO CONVERT        S03 05182
014345 120240 A 5507 LISTA   DATA    '    TS  AF  MS  MT  FS  TF  SF'                    S03 05183
014346 120240 A
014347 152323 A
```

```
014350 120240 A
014351 140706 A
014352 120240 A
014353 146723 A
014354 120240 A
014355 146724 A
014356 120240 A
014357 143323 A
014360 120240 A
014361 152306 A
014362 120240 A
014363 151706 A
014364 120240 A 5508        DATA    ! GF  MR  AB  IM  LB  LA!                    S03 05184
014365 143706 A
014366 120240 A
014367 146722 A
014370 120240 A
014371 140702 A
014372 120240 A
014373 144715 A
014374 120240 A
014375 146302 A
014376 120240 A
014377 146301 A
014400 120240 A 5509 LISTB  DATA    !   RF  FF  NF  CF  WR  SC!                  S03 05185
014401 120240 A
014402 151306 A
014403 120240 A
014404 143306 A
014405 120240 A
014406 145706 A
014407 120240 A
014410 141706 A
014411 120240 A
014412 153722 A
014413 120240 A
014414 151703 A
014415 120240 A 5510        DATA    ! VF  WF  XF  SH  BB  AA!                    S03 05186
014416 153306 A
014417 120240 A
014420 153706 A
014421 120240 A
```

```
014422 154306 A
014423 120240 A
014424 151710 A
014425 120240 A
014426 141302 A
014427 120240 A
014430 140701 A
014431 120240 A 5511 LISTC  DATA     '  CCS LOC   DDDD   PAGE DD'                    S03 05187
014432 141703 A
014433 151640 A
014434 146317 A
014435 141640 A
014436 120240 A
014437 142304 A
014440 142304 A
014441 120240 A
014442 120320 A
014443 140707 A
014444 142640 A
014445 142304 A
```

```
                    5512          EJEC                                                    S03 05188
                    5513 *                                                                S03 05189
                    5514 *        MOVE WORD SUBROUTINE                                    S03 05190
                    5515 *        IF THE 'TO' AREA OVERLAPS THE 'FROM' AREA               S03 05191
                    5516 *        IT WILL MOVE IN A REVERSE ORDER                         S03 05192
                    5517 *        CALLING SEQUENCE                                        S03 05193
                    5518 *        JMPM    MOVW                                            S03 05194
                    5519 *        DATA    COUNT                                           S03 05195
                    5520 *        DATA    FROM ADDRESS                                    S03 05196
                    5521 *        DATA    TO ADDRESS                                      S03 05197
                    5522 *        RETURN                                                  S03 05198
                    5523 *                                                                S03 05199
014446 034050 A     5524 MOV1     LDX     MOVW                                            S03 05200
014447 015001 A     5525          LDA     1,1       GET 'FROM' ADDRESS                    S03 05201
014450 145002 A     5526          SUB     2,1       SUBTRACT 'TO' ADDRESS                 S03 05202
014451 001004 A     5527          JAN     MOVR      JUMP IF REVERSE MOVE                  S03 05203
014452 014471 R
                    5528 *        FORWARD MOVE                                            S03 05204
014453 025001 A     5529          LDB     1,1       GET 'FROM' ADDRESS                    S03 05205
014454 015000 A     5530          LDA     0,1       GET COUNT                             S03 05206
014455 035002 A     5531          LDX     2,1       GET 'TO' ADDRESS                      S03 05207
014456 005311 A     5532 MOV2     DAR               DECREMENT COUNT                       S03 05208
014457 001004 A     5533          JAN     MOVE      JUMP IF END OF COUNT                  S03 05209
014460 014513 R
014461 054040 A     5534          STA     MOVC                                            S03 05210
014462 016000 A     5535          LDA     0,2                                             S03 05211
014463 055000 A     5536          STA     0,1                                             S03 05212
014464 005122 A     5537          IBR                                                     S03 05213
014465 005144 A     5538          IXR                                                     S03 05214
014466 014033 A     5539          LDA     MOVC      GET COUNT                             S03 05215
014467 001000 A     5540          JMP     MOV2      KEEP TRYING                           S03 05216
014470 014456 R
                    5541 *        REVERSE MOVE                                            S03 05217
014471 015000 A     5542 MOVR     LDA     0,1       GET COUNT                             S03 05218
014472 125001 A     5543          ADD     1,1       ADD 'FROM' ADDRESS                    S03 05219
014473 005012 A     5544          TAB                                                     S03 05220
014474 015000 A     5545          LDA     0,1       GET COUNT                             S03 05221
014475 054024 A     5546          STA     MOVC      SAVE                                  S03 05222
014476 125002 A     5547          ADD     2,1       ADD 'TO' ADDRESS                      S03 05223
014477 005014 A     5548          TAX                                                     S03 05224
014500 014021 A     5549 MOV3     LDA     MOVC                                            S03 05225
014501 005311 A     5550          DAR               DECREMENT COUNT                       S03 05226
```

```
014502 001004 A 5551        JAN     MOVE        JUMP IF END OF COUNT          S03 05227
014503 014513 R
014504 054015 A 5552        STA     MOVC                                      S03 05228
014505 005322 A 5553        DBR                                               S03 05229
014506 005344 A 5554        DXR                                               S03 05230
014507 016000 A 5555        LDA     0,2                                       S03 05231
014510 055000 A 5556        STA     0,1                                       S03 05232
014511 001000 A 5557        JMP     MOV3        KEEP TRYING                   S03 05233
014512 014500 R
                5558 *                                                        S03 05234
014513 044003 A 5559 MOVE   INR     MOVW        ADJUST                        S03 05235
014514 044002 A 5560        INR     MOVW        RETURN                        S03 05236
014515 044001 A 5561        INR     MOVW        ADDRESS                       S03 05237
014516 001000 A 5562        JMP     0           RETURN                        S03 05238
014517 000000 A
                5563 *                                                        S03 05239
                5564 *      ENTRY POINT                                       S03 05240
                5565 *                                                        S03 05241
014517          5566 MOVW   BES     0           ENTRY                         S03 05242
014520 001000 A 5567        JMP     MOV1                                      S03 05243
014521 014446 R
014522 000000 A 5568 MOVC   DATA    0           TEMP STORAGE FOR MOVW         S03 05244
```

```
                    5569          EJEC                                                  S03 05245
                    5570 *                                                              S03 05246
                    5571 *        THIS IS A SUBROUTINE TO CONVERT THE NUMBER IN THE B REGISTER  S03 05247
                    5572 *        INTO 4 HEXADECIMAL CHARS AND STORE THEM IN LOC,       S03 05248
                    5573 *        INDEXED BY X                                          S03 05249
                    5574 *                                                              S03 05250
                    5575 *        CALLING SEQUENCE                                      S03 05251
                    5576 *        LDX     ADDR OF ASCII CHAR STRING                     S03 05252
                    5577 *        LDB     BINARY NUMBER                                 S03 05253
                    5578 *        JMPM    OH                                            S03 05254
                    5579 *        RETURN                                                S03 05255
                    5580 *                                                              S03 05256
                    5581 *                                                              S03 05257
                    5582 *                                                              S03 05258
                    5583 *        ENTRY POINT                                           S03 05259
014523 000000 A     5584 OH       ENTR                                                  S03 05260
014524 002000 A     5585          JMPM    OH2             CONVERT FIRST CHAR            S03 05261
014525 014550 R
014526 004250 A     5586          LRLA    8               SAVE                          S03 05262
014527 055000 A     5587          STA     0,1                                           S03 05263
014530 002000 A     5588          JMPM    OH2             CONVERT SECOND CHAR           S03 05264
014531 014550 R
014532 115000 A     5589          ORA     0,1             ADD TO FIRST CHAR             S03 05265
014533 055000 A     5590          STA     0,1             STORE IN BUFFER               S03 05266
014534 005144 A     5591          IXR                                                   S03 05267
014535 002000 A     5592          JMPM    OH2             CONVERT THIRD CHAR            S03 05268
014536 014550 R
014537 004250 A     5593          LRLA    8                                             S03 05269
014540 055000 A     5594          STA     0,1                                           S03 05270
014541 002000 A     5595          JMPM    OH2             CONVERT FOURTH CHAR           S03 05271
014542 014550 R
014543 115000 A     5596          ORA     0,1             ADD TO THIRD CHAR             S03 05272
014544 055000 A     5597          STA     0,1             STORE IN BUFFER               S03 05273
014545 005144 A     5598          IXR                                                   S03 05274
014546 001000 A     5599          JMP*    OH              RETURN                        S03 05275
014547 114523 R
                    5600 *                                                              S03 05276
014550 000000 A     5601 OH2      ENTR                                                  S03 05277
014551 005001 A     5602          TZA                                                   S03 05278
014552 004444 A     5603          LLRL    4               NEXT 4-BIT DIGIT              S03 05279
014553 006140 A     5604          SUBI    012                                           S03 05280
014554 000012 A
```

```
014555 001004 A 5605        JAN     *+4          JUMP IF 0-9                    S03 05281
014556 014561 R
014557 006120 A 5606        ADDI    07           A-F                            S03 05282
014560 000007 A
014561 006120 A 5607        ADDI    012                                         S03 05283
014562 000012 A
014563 006120 A 5608        ADDI    0260         CONVERT TO ASCII               S03 05284
014564 000260 A
014565 001000 A 5609        JMP*    0H2          RETURN                         S03 05285
014566 114550 R
                5610 *                                                          S03 05286
```

```
                    5611          EJEC                                                    S03 05287
                    5612 *                                                                S03 05288
                    5613 *        THIS ROUTINE WILL CONVERT THE TWO RIGHT-JUSTIFIED       S03 05289
                    5614 *        DIGITS IN THE B REGISTER INTO HEX ASCII AND STORE       S03 05290
                    5615 *        THEM IN THE LOCATION INDEXED BY X                       S03 05291
                    5616 *                                                                S03 05292
                    5617 *        CALLING SEQUENCE                                        S03 05293
                    5618 *        LDB     DIGITS TO BE CONVERTED                          S03 05294
                    5619 *        LDX     ADDR OF ASCII DATA STRING                       S03 05295
                    5620 *        JMPM    OHA                                             S03 05296
                    5621 *                                                                S03 05297
                    5622 *        RETURN                                                  S03 05298
                    5623 *                                                                S03 05299
014567 000000 A     5624 OHA      ENTR                                                    S03 05300
014570 004050 A     5625          LRLB    8               LEFT-JUSTIFY DIGITS             S03 05301
014571 002000 A     5626          JMPM    OH2             CONVERT FIRST DIGIT             S03 05302
014572 014550 R
014573 004250 A     5627          LRLA    8               POSITION DIGIT                  S03 05303
014574 055000 A     5628          STA     0,1                                             S03 05304
014575 002000 A     5629          JMPM    OH2             CONVERT SECOND DIGIT            S03 05305
014576 014550 R
014577 115000 A     5630          ORA     0,1             ADD TO FIRST                    S03 05306
014600 055000 A     5631          STA     0,1                                             S03 05307
014601 005144 A     5632          IXR                     STEP DATA STRING INDEX          S03 05308
014602 001000 A     5633          JMP*    OHA             RETURN                          S03 05309
014603 114567 R
```

```
                    5634          EJEC                                                    S03 05310
                    5635 *                                                                S03 05311
                    5636 *        THIS ROUTINE WILL INITIALIZE THE LO OUTPUT BUFFER       S03 05312
                    5637 *                                                                S03 05313
                    5638 *        CALLING SEQUENCE                                        S03 05314
                    5639 *        JMPM    PBUF                                            S03 05315
                    5640 *                                                                S03 05316
                    5641 *        RETURN                                                  S03 05317
                    5642 *                                                                S03 05318
014604 000000 A     5643 PBUF     ENTR                                                    S03 05319
014605 006010 A     5644          LDAI    0120240       ASCII SPACES                      S03 05320
014606 120240 A
014607 002000 A     5645          JMPM    SAR           INITIALIZE BUFFER                 S03 05321
014610 014711 R
014611 000044 A     5646          DATA    36            WORD COUNT                        S03 05322
014612 000200 R     5647          DATA    BUFR          BUFFER ADDR                       S03 05323
014613 001000 A     5648          JMP*    PBUF          RETURN                            S03 05324
014614 114604 R
```

```
                    5649          EJEC                                                    S03 05325
                    5650 *                                                                S03 05326
                    5651 *        THIS ROUTINE WILL DUMP THE CONTENTS OF THE              S03 05327
                    5652 *        PSEUDO-REGS TO THE LD AS PART OF THE TRACE FUNCTION     S03 05328
                    5653 *                                                                S03 05329
                    5654 *        CALLED BY DATA LOOP PROCESSING COMPONENT - S300         S03 05330
                    5655 *                                                                S03 05331
                    5656 *                                                                S03 05332
                    5657 *        MESSAGE FORMAT IS AS FOLLOWS                            S03 05333
                    5658 *        R0  DDDD  R1  DDDD  R2  DDDD  R3  DDDD                  S03 05334
                    5659 *        R4  DDDD  R5  DDDD  R6  DDDD  R7  DDDD                  S03 05335
                    5660 *        R8  DDDD  R9  DDDD  RA  DDDD  RB  DDDD                  S03 05336
                    5661 *        RC  DDDD  RD  DDDD  RE  DDDD  RF  DDDD                  S03 05337
                    5662 *                                                                S03 05338
                    5663 *                                                                S03 05339
                    5664 *        CALLING SEQUENCE                                        S03 05340
                    5665 *        JMPM    REGS                                            S03 05341
                    5666 *                                                                S03 05342
                    5667 *        RETURN                                                  S03 05343
                    5668 *                                                                S03 05344
014615 000000 A     5669 REGS     ENTR                                                    S03 05345
014616 005001 A     5670          TZA                                                     S03 05346
014617 054050 A     5671          STA     REG6          START WITH REG ZERO               S03 05347
                    5672 *                                                                S03 05348
014620 002000 A     5673          JMPM    SPAC          SPACE LD                          S03 05349
014621 014747 R
014622 002000 A     5674 REG1     JMPM    PBUF          INITIALIZE LD BUFFER              S03 05350
014623 014604 R
014624 034045 A     5675          LDX     REG8          ADDR OF LD BUFFER                 S03 05351
                    5676 *                                                                S03 05352
014625 024042 A     5677 REG2     LDB     REG6          REGISTER NUMBER                   S03 05353
014626 004054 A     5678          LRLB    12            LEFT JUSTIFIED                    S03 05354
014627 002000 A     5679          JMPM    DH2           CONVERT TO ASCII                  S03 05355
014630 014550 R
014631 006110 A     5680          ORAI    0151000       ADD AN R                          S03 05356
014632 151000 A
014633 055000 A     5681          STA     0,1           STORE IN LD BUFFER                S03 05357
014634 005144 A     5682          IXR                                                     S03 05358
014635 005144 A     5683          IXR                                                     S03 05359
014636 014031 A     5684          LDA     REG6          REGISTER NUMBER                   S03 05360
014637 124031 A     5685          ADD     REG7          PLUS ADDR OF REGISTERS            S03 05361
014640 005012 A     5686          TAB                                                     S03 05362
```

```
014641 026000 A 5687        LDB     0,2             REGISTER CONTENTS                S03 05363
014642 002000 A 5688        JMPM    OH              CONVERT TO ASCII IN LO           S03 05364
014643 014523 R
014644 005144 A 5689        IXR                                                      S03 05365
               5690 *                                                                S03 05366
014645 044022 A 5691        INR     REG6            STEP REGISTER NUMBER             S03 05367
014646 014021 A 5692        LDA     REG6            REGISTER NUMBER                  S03 05368
014647 006150 A 5693        ANAI    03              LSB'S OF NO                      S03 05369
014650 000003 A
014651 001010 A 5694        JAZ     *+4             JUMP IF END OF LINE              S03 05370
014652 014655 R
014653 001000 A 5695        JMP     REG2            CONVERT NEXT REGISTER            S03 05371
014654 014625 R
014655 002000 A 5696        CALL    LOOUT,21,BUFR   OUTPUT LINE                      S03 05372
014656 015470 R
014657 000025 A
014660 000200 R
014661 014006 A 5697 REG3   LDA     REG6            REG NUMBER                       S03 05373
014662 006140 A 5698        SUBI    020             REGISTER LIMIT                   S03 05374
014663 000020 A
014664 001010 A 5699        JAZ*    REGS            RETURN IF DONE                   S03 05375
014665 114615 R
014666 001000 A 5700        JMP     REG1            OUTPUT NEXT LINE                 S03 05376
014667 014622 R
               5701 *                                                                S03 05377
014670 000000 A 5702 REG6   DATA    0               REGISTER NUMBER                  S03 05378
014671 000525 R 5703 REG7   DATA    R0              ADDR OF FIRST REGISTER           S03 05379
014672 000202 R 5704 REG8   DATA    BUFR+2          ADDR OF LO BUFFER                S03 05380
```

```
                    5705          EJEC                                                    S03 05381
                    5706 *                                                                S03 05382
                    5707 *        THIS IS A SUBROUTINE TO STORE THE A-REGISTER REPEATEDLY   S03 05383
                    5708 *        CALLING SEQUENCE                                        S03 05384
                    5709 *        JMPM    SAR                                             S03 05385
                    5710 *        DATA    COUNT                                           S03 05386
                    5711 *        DATA    DATA ADDRESS                                    S03 05387
                    5712 *        RETURN                                                  S03 05388
                    5713 *                                                                S03 05389
014673 034015 A     5714 SAR1     LDX     SAR             GET ADDRESS OF CALL             S03 05390
014674 005012 A     5715          TAB                     PUT A-REG. INTO B-REG.          S03 05391
014675 015000 A     5716          LDA     0,X             GET COUNT                       S03 05392
014676 035001 A     5717          LDX     1,X             GET DATA ADDRESS                S03 05393
014677 005311 A     5718 SAR2     DAR                     DECREMENT COUNT                 S03 05394
014700 001004 A     5719          JAN     SAR3            JUMP IF END OF COUNT            S03 05395
014701 014706 R
014702 065000 A     5720          STB     0,X             STORE 'A-REGISTER'              S03 05396
014703 005144 A     5721          IXR                     INCREMENT DATA ADDRESS          S03 05397
014704 001000 A     5722          JMP     SAR2            KEEP TRYING                     S03 05398
014705 014677 R
                    5723 *                                                                S03 05399
014706 044002 A     5724 SAR3     INR     SAR             ADJUST                          S03 05400
014707 044001 A     5725          INR     SAR             RETURN ADDRESS                  S03 05401
014710 001000 A     5726          JMP     0               RETURN                          S03 05402
014711 000000 A
                    5727 *                                                                S03 05403
                    5728 *        ENTRY POINT                                             S03 05404
                    5729 *                                                                S03 05405
014711              5730 SAR      BES     0               ENTRY                           S03 05406
014712 001000 A     5731          JMP     SAR1                                            S03 05407
014713 014673 R
```

```
                    5732          EJEC                                                        S03 05408
                    5733 *                                                                    S03 05409
                    5734 *        THIS IS A SUBROUTINE TO CHECK IF THE CONTROL STORE ADDRESS IS S03 05410
                    5735 *        WITHIN THE GIVEN TRACE BOUNDARIES                           S03 05411
                    5736 *                                                                    S03 05412
                    5737 *        CALLING SEQUENCE                                            S03 05413
                    5738 *        JMPM    TRSET                                               S03 05414
                    5739 *        RETURN                  A REG POS=DO TRACE   A REG NEG=NO TRACE S03 05415
                    5740 *                                                                    S03 05416
014714 014027 A     5741 TRD      LDA     TRSET                                               S03 05417
014715 054006 A     5742          STA     TRSETA          SET RETURN                          S03 05418
014716 006030 A     5743          LDXI    DROM                                                S03 05419
014717 000545 R
014720 015057 A     5744          LDA     NROM,1          NEXT CCS ADDR                   D   03 05420
014721 055045 A     5745          STA     FIL1,1          SAVE CURRENT CCS ADDR           D   03 05421
014722 001000 A     5746          JMP     TRC                                                 S03 05422
014723 014730 R
014724 000000 A     5747 TRSETA   ENTR                    SUBSEQUENT ENTRY                    S03 05423
014725 006030 A     5748          LDXI    DROM                                            D   03 05424
014726 000545 R
014727 015045 A     5749          LDA     FIL1,1                                          D   03 05425
014730 027000 I     5750 TRC      LDB     CPAG            CURRENT PAGE                    D   03 05426
014731 006146 A     5751          SUBE    STRTRC,2        AT OR BEYOND START TRACE ADDR FOR PAGE D 03 05427
014732 012135 R
014733 001004 A     5752          JAN*    TRSETA          NO=SET TRACE TO END ADDR        D   03 05428
014734 114724 R
014735 006015 A     5753 TRA      LDAE    ENDTRC,2        END TRACE ADDR FOR PAGE         D   03 05429
014736 012141 R
014737 145045 A     5754          SUB     FIL1,1          CCS ADDRESS                         S03 05430
014740 001004 A     5755          JAN*    TRSETA          YES=DO NOT TRACE                    S03 05431
014741 114724 R
014742 001000 A     5756          JMP*    TRSETA          RETURN                              S03 05432
014743 114724 R
014744 000000 A     5757 TRSET    ENTR                    INITIAL ENTRY FOR EACH CCS WORD     S03 05433
014745 001000 A     5758          JMP     TRD                                                 S03 05434
014746 014714 R
```

```
                    5759          EJEC                                                    S03 05435
                    5760 *                                                                S03 05436
                    5761 *        THIS ROUTINE WILL SPACE THE LO                          S03 05437
                    5762 *                                                                S03 05438
                    5763 *        CALLING SEQUENCE                                        S03 05439
                    5764 *        JMPM    SPAC                                            S03 05440
                    5765 *                                                                S03 05441
                    5766 *        RETURN                                                  S03 05442
                    5767 *                                                                S03 05443
014747 000000 A     5768 SPAC     ENTR                                                    S03 05444
014750 002000 A     5769          CALL    PBUF            CLEAR OUTPUT BUFFER             S03 05445
014751 014604 R
014752 002000 A     5770          CALL    LDOUT,36,BUFR   SPACE LO                        S03 05446
014753 015470 R
014754 000044 A
014755 000200 R
014756 001000 A     5771          JMP*    SPAC            RETURN                          S03 05447
014757 114747 R
                    5772 *                                                                S03 05448
```

```
                    5773          EJEC                                                    S03 05449
                    5774 *                                                                S03 05450
                    5775 *        THIS ROUTINE HANDLES TOP OF FORM AND STANDARD HEADER OUTPUT S03 05451
                    5776 *                                                                S03 05452
                    5777 *        CALLING SEQUENCE                                        S03 05453
                    5778 *        CALL    TPFRM                                           S03 05454
                    5779 *        RETURN                                                  S03 05455
                    5780 *                                                                S03 05456
014760 000000 A     5781 TPFRM    ENTR                                                    S03 05457
                    5782          FUNC    LODCB,LO,0                                      S03 05458
014761 002000 A
014762 012477 E
014763 100000 A
014764 002405 A
014765 015600 R
014766 000000 A
014767 000000 A
014770 014121 A     5783          LDA     PGNO            PAGE NUMBER                     S03 05459
014771 002000 A     5784          CALL    BNASC                                           S03 05460
014772 015130 R
014773 054061 A     5785          STA     HDR+4                                           S03 05461
014774 064061 A     5786          STB     HDR+5                                           S03 05462
014775 024115 A     5787          LDB     DATE                                            S03 05463
014776 026000 A     5788          LDB     0,2                                             S03 05464
014777 036000 A     5789          LDX     0,2                                             S03 05465
015000 006020 A     5790          LDBI    HDR+7           HEADER AREA                     S03 05466
015001 015060 R
015002 002000 A     5791          JMPM    TPST            STORE                           S03 05467
015003 015115 R
015004 024107 A     5792          LDB     JOB                                             S03 05468
015005 026000 A     5793          LDB     0,2                                             S03 05469
015006 036000 A     5794          LDX     0,2                                             S03 05470
015007 006020 A     5795          LDBI    HDR+12          HEADER AREA                     S03 05471
015010 015065 R
015011 002000 A     5796          JMPM    TPST            STORE                           S03 05472
015012 015115 R
015013 027000 I     5797          LDB     SYST                                            S03 05473
015014 016000 A     5798          LDA     0,2             SYSTEM FLAG                     S03 05474
015015 001010 A     5799          JAZ     *+6             VORTEX                          S03 05475
015016 015023 R
015017 006030 A     5800          LDXI    TPMOS           MOS                             S03 05476
015020 015102 R
```

```
015021 001000 A 5801        JMP     *+4                                          S03 05477
015022 015025 R
015023 006030 A 5802        LDXI    TPVOR           VORTEX                       S03 05478
015024 015106 R
015025 006020 A 5803        LDBI    HDR+17          HEADER AREA                  S03 05479
015026 015072 R
015027 002000 A 5804        JMPM    TPST            STORE                        S03 05480
015030 015115 R
015031 006010 A 5805        LDAI    1                                            S03 05481
015032 000001 A
015033 054557 A 5806        STA     LOLINE          RESET LINE NUMBER            S03 05482
015034 002000 A 5807        CALL    LOOUT,25,HDR      OUTPUT HEADER              S03 05483
015035 015470 R
015036 000031 A
015037 015051 R
015040 002000 A 5808        JMPM    PBUF            CLEAR OUTPUT BUFFER          S03 05484
015041 014604 R
015042 002000 A 5809        CALL    LOOUT,1,BUFR      SPACE LO                   S03 05485
015043 015470 R
015044 000001 A
015045 000200 R
015046 044043 A 5810        INR     PGNO            INCR PAGE NUMBER             S03 05486
015047 001000 A 5811        RETU*   TPFRM                                        S03 05487
015050 114760 R
               5812 *                                                           S03 05488
015051 120240 A 5813 HDR    DATA    ' PAGE  0000  MM/DD/YY  JOBNAME    SYSTEM   MICSIM'  S03 05489
015052 150301 A
015053 143705 A
015054 120240 A
015055 142304 A
015056 142304 A
015057 120240 A
015060 146715 A
015061 127704 A
015062 142257 A
015063 154731 A
015064 120240 A
015065 145317 A
015066 141316 A
015067 140715 A
015070 142640 A
015071 120240 A
```

```
015072 120323 A
015073 154723 A
015074 152305 A
015075 146640 A
015076 120240 A
015077 146711 A
015100 141723 A
015101 144715 A
015102 120240 A 5814 TPMO$  DATA    '  MOS   '                                    S03 05490
015103 146717 A
015104 151640 A
015105 120240 A
               5815         IFF     VORTEX=2                                    V2  03 05491
               5816 TPVOR   DATA    ' VORTXII'                                  V2  03 05492
               5817         IFF     VORTEX=1                                    V2  03 05493
015106 120326 A 5818 TPVOR   DATA    ' VORTEX '                                      S03 05494
015107 147722 A
015110 152305 A
015111 154240 A
015112 000000 A 5819 PGNO    DATA    0             CURRENT PAGE NUMBER           S03 05495
               5820         EXT     $DATE                                       S03 05496
               5821         EXT     $JOB                                        S03 05497
015113 100000 E 5822 DATE    DATA    ($DATE)*                                    S03 05498
015114 100000 E 5823 JOB     DATA    ($JOB)*                                     S03 05499
               5824 *                                                           S03 05500
015115 000000 A 5825 TPST    ENTR                                                S03 05501
015116 015000 A 5826         LDA     0,1           CHAR 1=2                      S03 05502
015117 056000 A 5827         STA     0,2                                         S03 05503
015120 015001 A 5828         LDA     1,1           CHAR 3=4                      S03 05504
015121 056001 A 5829         STA     1,2                                         S03 05505
015122 015002 A 5830         LDA     2,1           CHAR 5=6                      S03 05506
015123 056002 A 5831         STA     2,2                                         S03 05507
015124 015003 A 5832         LDA     3,1           CHAR 7=8                      S03 05508
015125 056003 A 5833         STA     3,2                                         S03 05509
015126 001000 A 5834         JMP*    TPST                                        S03 05510
015127 115115 R
```

```
                    5835          EJEC                                                    S03 05511
                    5836 *                                                                S03 05512
                    5837 *        CONVERT CONTENTS OF A REG TO ASCII DEVIMAL               S03 05513
                    5838 *                                                                S03 05514
                    5839 *        CALLING SEQUENCE                                        S03 05515
                    5840 *        LDA     BINARY                                          S03 05516
                    5841 *        CALL    BNASC                                           S03 05517
                    5842 *        RETURN RESULTS IN A AND B                               S03 05518
                    5843 *                                                                S03 05519
015130 000000 A     5844 BNASC    ENTR                                                    S03 05520
015131 006030 A     5845          LDXI    TABL+8          INITIALIZE POINTER              S03 05521
015132 015215 R
015133 054052 A     5846          STA     PUT                                             S03 05522
015134 005002 A     5847          TZB                     ZERO ACCUM                      S03 05523
015135 014050 A     5848          LDA     PUT             GET REMAINDER                   S03 05524
015136 145000 A     5849 GET      SUB     0,1             DIVIDE BY SUB                   S03 05525
015137 001004 A     5850          JAN     GET2            EXIT IF NEG                     S03 05526
015140 015144 R
015141 005122 A     5851          IBR                     INCR RESULT                     S03 05527
015142 001000 A     5852          JMP     GET                                             S03 05528
015143 015136 R
015144 125000 A     5853 GET2     ADD     0,1             ADD BACK DIVISOR                S03 05529
015145 054040 A     5854          STA     PUT             SAVE REMAINDER                  S03 05530
015146 005021 A     5855          TBA                     CONVERT RESULT TO ASCII         S03 05531
015147 124047 A     5856          ADD     ZEROB                                           S03 05532
015150 055001 A     5857          STA     1,1                                             S03 05533
015151 005344 A     5858          DXR                                                     S03 05534
015152 005344 A     5859          DXR                     ARE WE THRU                     S03 05535
015153 005041 A     5860          TXA                                                     S03 05536
015154 006140 A     5861          SUBI    TABL                                            S03 05537
015155 015205 R
015156 001010 A     5862          JAZ     *+4             YES                             S03 05538
015157 015162 R
015160 001000 A     5863          JMP     GET-2           NO                              S03 05539
015161 015134 R
015162 014023 A     5864          LDA     PUT             CONVERT UNITS TO ASCII          S03 05540
015163 124033 A     5865          ADD     ZEROB                                           S03 05541
015164 054021 A     5866          STA     PUT                                             S03 05542
015165 006030 A     5867          LDXI    PUT             ASSEMBLE 4 ASCII CHAR           S03 05543
015166 015206 R
015167 007401 A     5868          SDF                                                     S03 05544
015170 015002 A     5869 PUTLP    LDA     2,1                                             S03 05545
```

```
015171 004250 A 5870        LRLA    8                                   S03 05546
015172 115000 A 5871        ORA     0,1                                 S03 05547
015173 001001 A 5872        JOF     *+4             MORE ?              S03 05548
015174 015177 R
015175 001000 A 5873        RETU*   BNASC           NO-RETURN           S03 05549
015176 115130 R
015177 005012 A 5874        TAB                                         S03 05550
015200 007400 A 5875        ROF                                         S03 05551
015201 006030 A 5876        LDXI    PUT+4                               S03 05552
015202 015212 R
015203 001000 A 5877        JMP     PUTLP           DO AGAIN            S03 05553
015204 015170 R
015205 000001 A 5878 TABL   DATA    1                                   S03 05554
015206 000000 A 5879 PUT    DATA    0               STORAGE             S03 05555
015207 000012 A 5880        DATA    10,0,100,0,1000,0,10000,0           S03 05556
015210 000000 A
015211 000144 A
015212 000000 A
015213 001750 A
015214 000000 A
015215 023420 A
015216 000000 A
015217 000260 A 5881 ZEROB  DATA    0260            ASCII ZERO          S03 05557
```

```
                    5882          EJEC                                                    S03 05558
                    5883 *                                                                S03 05559
                    5884 *        THIS IS A SUBROUTINE TO READ AN RECORD FROM THE SI DEVICE  S03 05560
                    5885 *                                                                S03 05561
                    5886 *        CALLING SEQUENCE                                        S03 05562
                    5887 *        CALL    SIIN                                            S03 05563
                    5888 *        RETURN  A,B,X REGISTERS RESTORED                        S03 05564
                    5889 *                                                                S03 05565
015220 000000 A     5890 SIIN     ENTR                                                    S03 05566
015221 006017 A     5891          LDAE    MEDIA                                           S03 05567
015222 012536 R
015223 001010 A     5892          JAZ     SIIN2           JUMP IF MEDIA = SI              S03 05568
015224 015235 R
015225 006017 A     5893          LDAE    SIIN                                            S03 05569
015226 015220 R
015227 054072 A     5894          STA     PIIN            SET UP RETURN ADDRESS           S03 05570
015230 001000 A     5895          JMP     PIIN+1          GO TO READ FROM PI              S03 05571
015231 015323 R
015232 054064 A     5896          STA     SIINA                                           S03 05572
015233 064064 A     5897          STB     SIINB                                           S03 05573
015234 074064 A     5898          STX     SIINX                                           S03 05574
015235 006027 A     5899 SIIN2    LDBE    SYST            SYSTEM FLAG ADDR                S03 05575
015236 001374 R
015237 016000 A     5900          LDA     0,2                                             S03 05576
015240 001004 A     5901          JAN     SIIN3           JUMP IF MOS                     S03 05577
015241 015252 R
015242 014053 A     5902          LDA     SIFLG                                           S03 05578
015243 001002 A     5903          JAP     SIIN3           JUMP IF NON-RMD                 S03 05579
015244 015252 R
                    5904          IOLINK  2,BUFI,36                                       S03 05580
015245 002000 A
015246 010771 E
015247 001402 A
015250 000375 R
015251 000044 A
015252 006010 A     5905 SIIN3    LDAI    0120240         BLANK-BLANK                     S03 05581
015253 120240 A
015254 002000 A     5906          JMPM    SAR             INITIALIZE INPUT BUFFER TO BLANKS  S03 05582
015255 014711 R
015256 000044 A     5907          DATA    36                                              S03 05583
015257 000374 R     5908          DATA    BUFI-1                                          S03 05584
                    5909 SIIN1    READ    INDCB,SI,0,1    READ INPUT                      S03 05585
```

```
015260 002000 A
015261 014762 E
015262 100000 A
015263 010002 A
015264 015313 R
015265 000000 A
015266 000000 A
                    5910 SI1     STAT    SIIN1,SI2,E171,SI2,SI1                          C,1 03 05586
015267 002000 A
015270 011007 E
015271 015260 R
015272 015276 R
015273 012472 R
015274 015276 R
015275 015267 R
015276              5911 SI2     BSS     0                                               C,1 03 05587
015276 002000 A     5912         JMPM    SDELO           SO = LO ?                         C 03 05588
015277 015614 R
015300 001010 A     5913         JAZ     SIRTN           IF YES, BYPASS LOOUT              C 03 05589
015301 015306 R
015302 002000 A     5914 SILO    CALL    LOOUT,36,BUFI-1   ECHO TO LO FOR RECORD            S03 05590
015303 015470 R
015304 000044 A
015305 000374 R
015306 014010 A     5915 SIRTN   LDA     SIINA                                           C 03 05591
015307 024010 A     5916         LDB     SIINB                                           S03 05592
015310 034010 A     5917         LDX     SIINX                                           S03 05593
015311 001000 A     5918         RETU*   SIIN            RETURN                          S03 05594
015312 115220 R
                    5919 INDCB   DCB     36,BUFI,0                                       S03 05595
015313 000044 A
015314 000375 R
015315 000000 A
015316 000000 A     5920 SIFLG   DATA    0               SI ON RMD FLAG                  S03 05596
015317 000000 A     5921 SIINA   DATA    0               A REG                           S03 05597
015320 000000 A     5922 SIINB   DATA    0               B REG                           S03 05598
015321 000000 A     5923 SIINX   DATA    0               X REG                           S03 05599
```

```
                    5924          EJEC                                                          S03 05600
                    5925 *                                                                      S03 05601
                    5926 *        THIS IS A SUBROUTINE TO READ A RECORD FROM THE PI DEVICE       S03 05602
                    5927 *                                                                      S03 05603
                    5928 *        CALLING SEQUENCE                                              S03 05604
                    5929 *        CALL    PIIN            NOTE: RECORDS MAY NOT BE BLOCKED ON RMD S03 05605
                    5930 *                                                                      S03 05606
                    5931 *        RETURN: A,B,X REGISTERS RESTORED                              S03 05607
                    5932 *                                                                      S03 05608
015322 000000 A     5933 PIIN     ENTR                                                          S03 05609
015323 054057 A     5934          STA     PIINA                                                 S03 05610
015324 064057 A     5935          STB     PIINB                                                 S03 05611
015325 074057 A     5936          STX     PIINX                                                 S03 05612
015326 027000 I     5937          LDB     SYST            SYSTEM FLAG ADDR                      S03 05613
015327 016000 A     5938          LDA     0,2                                                   S03 05614
015330 001004 A     5939          JAN     PIIN1           JUMP IF MDS                           S03 05615
015331 015342 R
015332 014047 A     5940          LDA     PIFLG                                                 S03 05616
015333 001002 A     5941          JAP     PIIN1           JUMP IF ON NON RMD                    S03 05617
015334 015342 R
                    5942          IOLINK  4,BUFI,36                                             S03 05618
015335 002000 A
015336 015246 E
015337 001404 A
015340 000375 R
015341 000044 A
015342 006010 A     5943 PIIN1    LDAI    0120240         BLANK=BLANK                           S03 05619
015343 120240 A
015344 002000 A     5944          JMPM    SAR             INITIALIZE INPUT BUFFER               S03 05620
015345 014711 R
015346 000044 A     5945          DATA    36                                                    S03 05621
015347 000374 R     5946          DATA    BUFI-1                                                S03 05622
                    5947 PIIN2    READ    PIOCB,4,0,1     READ INPUT                            S03 05623
015350 002000 A
015351 015261 E
015352 100000 A
015353 010004 A
015354 015377 R
015355 000000 A
015356 000000 A
                    5948 PI1      STAT    PIIN2,CHMR,CHMR,CHMR,PI1  IF ERR/EOF/BEOD RETURN SI  C,1 03 05624
015357 002000 A
```

```
015360 015270 E
015361 015350 R
015362 012532 R
015363 012532 R
015364 012532 R
015365 015357 R
015366 002000 A 5949         CALL    LOOUT,36,BUFI-1    ECHO TO LO FOR RECORD                S03 05625
015367 015470 R
015370 000044 A
015371 000374 R
015372 014010 A 5950         LDA     PIINA                                                   S03 05626
015373 024010 A 5951         LDB     PIINB                                                   S03 05627
015374 034010 A 5952         LDX     PIINX                                                   S03 05628
015375 001000 A 5953         RETU*   PIIN            RETURN                                  S03 05629
015376 115322 R
                5954 *                                                                       S03 05630
                5955 PIDCB   DCB     36,BUFI,0                                               S03 05631
015377 000044 A
015400 000375 R
015401 000000 A
015402 000000 A 5956 PIFLG   DATA    0               PI ON RMD FLAG, POS=NO, NEG=YES         S03 05632
015403 000000 A 5957 PIINA   DATA    0                                                       S03 05633
015404 000000 A 5958 PIINB   DATA    0                                                       S03 05634
015405 000000 A 5959 PIINX   DATA    0                                                       S03 05635
```

```
                    5960          EJEC                                                    S03 05636
                    5961 *                                                                S03 05637
                    5962 *        THIS IS A SUBROUTINE TO WRITE A RECORD TO THE SO DEVICE  S03 05638
                    5963 *                                                                S03 05639
                    5964 *        CALLING SEQUENCE                                        S03 05640
                    5965 *        CALL    SIOUT,A,B                                       S03 05641
                    5966 *                WHERE:                                          S03 05642
                    5967 *                A=NUMBER OF WORDS                               S03 05643
                    5968 *                B=BUFFER ADDRESS                                S03 05644
                    5969 *                                                                S03 05645
                    5970 *        RETURN: A,B,X REGISTERS RESTORED                        S03 05646
                    5971 *                                                                S03 05647
015406 000000 A     5972 SIOUT    ENTR                                                    S03 05648
015407 054055 A     5973          STA     SIOUA                                           S03 05649
015410 064055 A     5974          STB     SIOUB                                           S03 05650
015411 074055 A     5975          STX     SIOUX                                           S03 05651
015412 037000 I     5976          LDX     SIOUT           ADDRESS OF PARAMS               S03 05652
015413 015000 A     5977          LDA     0,1             NUMBER OF WORDS                 S03 05653
015414 054045 A     5978          STA     OUDCB           STORE IN DCB                    S03 05654
015415 015001 A     5979          LDA     1,1             BUFFER ADDRESS                  S03 05655
015416 054044 A     5980          STA     OUDCB+1         STORE IN DCB                    S03 05656
                    5981 SIOU1    WRITE   OUDCB,SO,0,1    OUTPUT BUFFER                   S03 05657
015417 002000 A
015420 015351 E
015421 100000 A
015422 015403 A
015423 015462 R
015424 000000 A
015425 000000 A
                    5982 SO1      STAT    SIOU1,SO2,SO2,SO2,SO1                           C,1 03 05658
015426 002000 A
015427 015360 E
015430 015417 R
015431 015435 R
015432 015435 R
015433 015435 R
015434 015426 R
015435              5983 SO2      BSS     0                                               C,1 03 05659
015435 002000 A     5984          JMPM    SOELO           SO = LO ?                         C 03 05660
015435 015514 R
015437 001010 A     5985          JAZ     SORTN           IF YES, BYPASS LOOUT              C 03 05661
015440 015451 R
```

```
015441 014020 A 5986        LDA     OUDCB           REQUESTED WORD COUNT                              S03 05662
015442 054004 A 5987        STA     SOLO+2          OVERLAY WC OF STANDARD CALL                       S03 05663
015443 014017 A 5988        LDA     OUDCB+1         REQUESTED BUFFER ADDRESS                          S03 05664
015444 054003 A 5989        STA     SOLO+3          OVERLAY BUFFER ADDRESS OF STANDARD CALL           S03 05665
015445 002000 A 5990 SOLO   CALL    LOOUT,36,BUFR     ECHO TO LO FOR RECORD                           S03 05666
015446 015470 R
015447 000044 A
015450 000200 R
015451 017000 I 5991 SORTN  LDA     SIOUT                                                           C 03 05667
015452 006120 A 5992        ADDI    2                                                                 S03 05668
015453 000002 A
015454 057000 I 5993        STA     SIOUT           ADVANCE RETURN ADDRESS                            S03 05669
015455 014007 A 5994        LDA     SIOUA                                                             S03 05670
015456 024007 A 5995        LDB     SIOUB                                                             S03 05671
015457 034007 A 5996        LDX     SIOUX                                                             S03 05672
015460 001000 A 5997        RETU*   SIOUT           RETURN                                            S03 05673
015461 115405 R
015462 000000 A 5998 OUDCB  DATA    0,0,0           DATA CONTROL BLOCK (DCB)                          S03 05674
015463 000000 A
015464 000000 A
015465 000000 A 5999 SIOUA  DATA    0               A REG                                             S03 05675
015466 000000 A 6000 SIOUB  DATA    0               B REG                                             S03 05676
015467 000000 A 6001 SIOUX  DATA    0               X REG                                             S03 05677
```

```
                    6002          EJEC                                                    S03 05678
                    6003 *                                                                S03 05679
                    6004 *        THIS IS A SUBROUTINE TO WRITE A RECORD TO THE LO DEVICE  S03 05680
                    6005 *                                                                S03 05681
                    6006 *        CALLING SEQUENCE                                        S03 05682
                    6007 *        CALL    LOOUT,A,B                                       S03 05683
                    6008 *                WHERE:                                          S03 05684
                    6009 *                A=NUMBER OF WORDS                               S03 05685
                    6010 *                B=BUFFER ADDRESS                                S03 05686
                    6011 *                                                                S03 05687
                    6012 *        RETURN: A,B,X REGISTERS RESTORED                        S03 05688
                    6013 *                                                                S03 05689
015470 000000 A     6014 LOOUT    ENTR                                                    S03 05690
015471 054112 A     6015          STA     LOA                                             S03 05691
015472 064112 A     6016          STB     LOB                                             S03 05692
015473 074112 A     6017          STX     LOX                                             S03 05693
015474 037000 I     6018          LDX     LOOUT           ADDRESS OF PARAMS               S03 05694
015475 015000 A     6019          LDA     0,1             NUMBER OF WORDS                 S03 05695
015476 054101 A     6020          STA     LODCB           STORE IN DCB                    S03 05696
015477 015001 A     6021          LDA     1,1             BUFFER ADDRESS                  S03 05697
015500 054100 A     6022          STA     LODCB+1         STORE IN DCB                    S03 05698
015501 006027 A     6023          LDBE    SYST            SYSTEM FLAG                     S03 05699
015502 001374 R
015503 016000 A     6024          LDA     0,2                                             S03 05700
015504 001004 A     6025          JAN     LO1             JUMP IF MOS                     S03 05701
015505 015522 R
015506 014074 A     6026          LDA     LOFLG                                           S03 05702
015507 001002 A     6027          JAP     LO1             JUMP IF NON-RMD                 S03 05703
015510 015522 R
015511 014066 A     6028          LDA     LODCB           RECORD LENGTH                   S03 05704
015512 054006 A     6029          STA     LOLNK+4                                         S03 05705
015513 014065 A     6030          LDA     LODCB+1         BUFFER AREA                     S03 05706
015514 054003 A     6031          STA     LOLNK+3                                         S03 05707
                    6032 LOLNK    IOLINK  5,BUFR+1,40                                     S03 05708
015515 002000 A
015516 015336 E
015517 001405 A
015520 000201 R
015521 000050 A
                    6033 LO1      WRITE   LODCB,LO,0,1    OUTPUT BUFFER                   S03 05709
015522 002000 A
015523 015420 E
```

```
015524 100000 A
015525 010405 A
015526 015600 R
015527 000000 A
015530 000000 A
                6034 L05    STAT    L01,L03,L03,L03,L02                    C,1 03 05710
015531 002000 A
015532 015427 E
015533 015522 R
015534 015607 R
015535 015607 R
015536 015607 R
015537 015567 R
015540          6035 L06    BSS     0                                      C,1 03 05711
015540 044052 A 6036        INR     LOLINE          ADVANCE LINE NUMBER      S03 05712
015541 014051 A 6037        LDA     LOLINE                                   S03 05713
015542 006140 A 6038        SUBI    47              LINES PER PAGE           S03 05714
015543 000057 A
015544 001004 A 6039        JAN     L02             JUMP IF NOT AT LIMIT     S03 05715
015545 015567 R
015546 006017 A 6040        LDAE    LOOUT                                    S03 05716
015547 015470 R
015550 054036 A 6041        STA     L03             SAVE RETURN ADDR         S03 05717
015551 002000 A 6042        CALL    MOVW,3,L0A,L04    SAVE A,B,X             S03 05718
015552 014517 R
015553 000003 A
015554 015604 R
015555 015610 R
015556 002000 A 6043        CALL    TPFRM           TOP OF FORM              S03 05719
015557 014760 R
015560 014026 A 6044        LDA     L03                                      S03 05720
015561 057000 I 6045        STA     LOOUT           RESTORE RETRUN ADDR      S03 05721
015562 002000 A 6046        CALL    MOVW,3,L04,L0A    RESTORE A,B,X          S03 05722
015563 014517 R
015564 000003 A
015565 015610 R
015566 015604 R
        015567 R 6047 L02   EQU     *                                        S03 05723
015567 017000 I 6048        LDA     LOOUT                                    S03 05724
015570 006120 A 6049        ADDI    2                                        S03 05725
015571 000002 A
015572 057000 I 6050        STA     LOOUT           ADVANCE RETURN ADDRESS   S03 05726
```

```
013573 014010 A 6051        LDA     LDA                                          S03 05727
013574 024010 A 6052        LDB     LDB                                          S03 05728
013575 034010 A 6053        LDX     LDX                                          S03 05729
013576 001000 A 6054        RETU*   LDOUT           RETURN                      S03 05730
013577 115470 R
                6055 LODCB  DCB     40,BUFR+1,0                                  S03 05731
013600 000050 A
013601 000201 R
013602 000000 A
013603 000000 A 6056 LOFLG  DATA    0               LO ON RMD FLAG, POS=NO, NEG=YES S03 05732
013604 000000 A 6057 LOA    DATA    0               A REG                        S03 05733
013605 000000 A 6058 LOB    DATA    0               B REG                        S03 05734
013606 000000 A 6059 LOX    DATA    0               X REG                        S03 05735
013607 000000 A 6060 LO3    DATA    0               TEMP STORAGE FOR RETURN ADDR S03 05736
013610 000000 A 6061 LO4    DATA    0,0,0           TEMP STORAGE FOR A,B,X       S03 05737
013611 000000 A
013612 000000 A
013613 000001 A 6062 LOLINE DATA    1               LINE CONT                    S03 05738
```

```
                    6063          EJEC                                                          C 03 05739
                    6064 *                                                                      C 03 05740
                    6065 *        SUBROUTINE TO DETERMINE IF SO = LO                            C 03 05741
                    6066 *              RETURN-- A REG=0 IF LO=SO ELSE A REG NOT= 0             C 03 05742
                    6067 *                                                                      C 03 05743
015614 000000 A     6068 SOELO    ENTR                                                          C 03 05744
015615 006037 A     6069          LDXE    LUT                                                   C 03 05745
015616 015634 R
015617 035000 A     6070          LDX     0,X                                                   C 03 05746
015620 035000 A     6071          LDX     0,X             LUT BASE                              C 03 05747
015621 015003 A     6072          LDA     3,X             SO ASSIGNMENT                       F ********
015622 006150 A     6073          ANAI    0377                                                  C 03 05749
015623 000377 A
015624 054004 A     6074          STA     SOLOCH+1        SAVE IT                               C 03 05750
015625 015005 A     6075          LDA     5,X             LO ASSIGNMENT                         C 03 05751
015626 006150 A     6076          ANAI    0377                                                  C 03 05752
015627 000377 A
015630 006140 A     6077 SOLOCH   SUBI    0                                                     C 03 05753
015631 000000 A
015632 001000 A     6078          JMP*    SOELO                                                 C 03 05754
015633 115614 R
                    6079          EXT     $LUT                                                  C 03 05755
015634 000000 E     6080 LUT      DATA    $LUT            INTERFACE LOGICAL UNIT TABLE POINTER  C 03 05756
```

```
                    6081          EJEC                                                    S03 05757
                    6082 *                                                                S03 05758
                    6083 *                FETCH                                           S03 05759
                    6084 *                                                                S03 05760
                    6085 ************************************************************************S03 05761
                    6086 *                                                                S03 05762
                    6087 *        THIS IS A SUBROUTINE TO FETCH A CHAR FROM THE INPUT BUFFER      S03 05763
                    6088 *                                                                S03 05764
                    6089 *        CALLING SEQUENCE                                        S03 05765
                    6090 *        JMPM    FETCH           GET FIRST CHAR                  S03 05766
                    6091 *              OR                                                S03 05767
                    6092 *        JMPM    FETCHA          GET CHAR THERE AFTER            S03 05768
                    6093 *        RETURN:                                                 S03 05769
                    6094 *        CHAR IN A REG, B REG DESTROYED, X REG SAME              S03 05770
                    6095 *                                                                S03 05771
                    6096 ************************************************************************S03 05772
                    6097 *                                                                S03 05773
015635 000000 A     6098 FETCH  ENTR                                                      S03 05774
015636 017000 I     6099        LDA     FETCH                                             S03 05775
015637 054004 A     6100        STA     FETCHA          SET UP RETURN ADDRESS           S03 05776
015640 005002 A     6101        TZB                                                       S03 05777
015641 064031 A     6102        STB     CHAR            ZERO CHARS FETCHED              S03 05778
015642 001000 A     6103        JMP     FETCHA+1                                          S03 05779
015643 015645 R
015644 000000 A     6104 FETCHA ENTR                                                      S03 05780
015645 014025 A     6105        LDA     CHAR            CHARACTER COUNT                 S03 05781
015646 004341 A     6106        LSRA    1               GET WORD COUNT                  S03 05782
015647 054024 A     6107        STA     WORD                                            S03 05783
015650 006010 A     6108        LDAI    BUFI            GET BUFFER ADDRESS              S03 05784
015651 000375 R
015652 124021 A     6109        ADD     WORD            INDEX INTO BUFFER               S03 05785
015653 005012 A     6110        TAB                                                     S03 05786
015654 026000 A     6111        LDB     0,2             FETCH WORD                      S03 05787
015655 014015 A     6112        LDA     CHAR                                            S03 05788
015656 154016 A     6113        ANA     BIT0            TEST WHICH HALF OF WORD         S03 05789
015657 001010 A     6114        JAZ     FETCHB          LEFT                            S03 05790
015660 015666 R
015661 005021 A     6115        TBA                     RIGHT                           S03 05791
015662 154013 A     6116        ANA     RHLF            MASK OFF                        S03 05792
015663 044007 A     6117        INR     CHAR            NEXT CHAR                       S03 05793
015664 001000 A     6118        JMP*    FETCHA          RETURN                          S03 05794
015665 115644 R
```

```
015666 005021 A 6119 FETCHB TBA                                          S03 05795
015667 004350 A 6120        LSRA    8           SHIFT DOWN               S03 05796
015670 044002 A 6121        INR     CHAR        NEXT HCAR                S03 05797
015671 001000 A 6122        JMP*    FETCHA      RETURN                   S03 05798
015672 115644 R
015673 000000 A 6123 CHAR   DATA    0                                    S03 05799
015674 000000 A 6124 WORD   DATA    0                                    S03 05800
015675 000001 A 6125 BIT0   DATA    01                                   S03 05801
015676 000377 A 6126 RHLF   DATA    0377                                 S03 05802
       000201 R 6127        END     SMLTR                                S03 05803
ENTRY NAMES
000177 R EMEM   000715 R EXC    000000 R MMEM   000201 R SMLTR
EXTERNAL NAMES
015113 E $DATE  001207 E $DBUF  003314 E $DRM1  001214 E $DRM1B
001215 E $DRM1C 001216 E $DRM1D 001005 E $DRM2  001372 E $ELOC
015114 E $JOB   015634 E $LUT   001374 E $SYST  011600 E BIFCB
012506 E EXIT   015516 E INLINK 015523 E INTR   015532 E INTRST
012502 E LOFCB  000333 E PIFCB  000332 E SIFCB  001373 E V$LLUP
SYMBOLS
015113 E $DATE  001207 E $DBUF  003314 E $DRM1  001214 E $DRM1B
001215 E $DRM1C 001216 E $DRM1D 001005 E $DRM2  001372 E $ELOC
015114 E $JOB   015634 E $LUT   001374 E $SYST  012735 R ABDCS
010472 R ABEL   005226 R AR10   005261 R AR12   005303 R AR13
005271 R AR20   000010 A AZ     000002 A B      003275 R BCS
003336 R BCSA   003325 R BCSB   003333 R BCSC   011423 R BEOD
011600 R BIBLK  011602 R BIBUF  011575 R BIDCB  011600 E BIFCB
011543 R BIFLG  000311 R BIDPN  000304 R BIRMD  015675 R BIT0
011603 R BIT11  011604 R BIT12  011605 R BIT15  015130 R BNASC
000375 R BUFI   011606 R BUFPTR 000200 R BUFR   000020 A BZ
000036 A CARRY  013224 R CD05   013251 R CD10   013255 R CD20
013271 R CD22   013364 R CD2A   013365 R CD2B   013366 R CD2C
013275 R CD30   013277 R CD40   013304 R CD42   013313 R CD44
013333 R CD46   013344 R CD50   013211 R CDAB   013346 R CDAX
015673 R CHAR   012511 R CHME   012532 R CHMR   012526 R CHMS
011607 R CKSM   011620 R CKSU   011554 R CKSU1  011561 R CKSU2
011546 R CKSUM  010627 R CME1   010647 R CME2   010674 R CME3
010675 R CME4   010621 R CMEM   003066 R CNOT   011453 R CODE
000660 R COMM   000677 R COMM1  012741 R CONV   012767 R CONV1
012771 R CONV2  012774 R CONV3  000503 R CPAG   002134 R CR10
002137 R CR15   002155 R CR17   002173 R CR19   002213 R CR21
002217 R CR23   002221 R CR30   002231 R CR32   002307 R CR33
002314 R CR34   002352 R CR35   002374 R CR50   002410 R CR52
```

```
002412 R CR54    002430 R CR55    002455 R CR56    002465 R CR57
002447 R CR58    002504 R CR60    002526 R CR6A    002535 R CR6B
002552 R CR6C    002560 R CR6D    002566 R CR6E    002574 R CR6F
002602 R CR6G    002610 R CR6H    002616 R CR6I    002523 R CR6J
002544 R CR6K    002632 R CR6L    003037 R CR6S    003016 R CR6T
002773 R CR6U    002750 R CR6V    002725 R CR6W    002704 R CR6X
002663 R CR6Y    002640 R CR6Z    003076 R CR70    003067 R CR70A
003150 R CR71    003154 R CR72    003141 R CR73    003161 R CR74
003172 R CR76    003177 R CR77    003411 R CR7A    003412 R CR7B
003413 R CR7C    003414 R CR7D    003415 R CR7E    003206 R CR80
003223 R CR84    003243 R CR86    003272 R CR87    001757 R CRA0
001777 R CRA2    002023 R CRA2A   002015 R CRA2B   002047 R CRA2C
002034 R CRA3    002054 R CRA4    002063 R CRA5    002132 R CRA6
002116 R CRA7    002074 R CRA8    003417 R CRAD    001663 R CRAS
001750 R CRAS1   002353 R CRAX    003421 R CRAZ    003416 R CRBA
003420 R CRBD    003063 R CRM1    003064 R CRM2    002371 R CRP
002363 R CRPE    003050 R CRS1    003054 R CRS2    003027 R CRT1
003033 R CRT2    003060 R CRTS    003004 R CRU1    003012 R CRU2
002761 R CRV1    002767 R CRV2    002736 R CRW1    002744 R CRW2
002715 R CRX1    002721 R CRX2    003337 R CRXA    003370 R CRXZ
002674 R CRY1    002700 R CRY2    002653 R CRZ1    002657 R CRZ2
001433 R D2048   015113 R DATE    000371 R DBUF    001213 R DCT8L
000074 R DLM1    006071 R DLM2    006070 R DLM3    006104 R DLM4
000111 R DLM7    006061 R DLMS    006662 R DOO1    006672 R DOO2
006675 R DO20    006715 R DO22    006742 R DO24    006763 R DO26
006774 R DO44    007015 R DO46    007043 R DO48    007067 R DO50
006642 R DORG    007075 R DOT1    007076 R DOT2    000372 R DRM1
000373 R DRM2    000545 R DROM    000064 A DS      010250 R E100
010352 R E102    010612 R E104    010613 R E105    010614 R E106
010615 R E107    010616 R E108    010617 R E109    011655 R E110
011665 R E112    011733 R E113    011734 R E114    011743 R E114A
011751 R E115    011765 R E116    011766 R E117    011767 R E118
011770 R E119    011771 R E120    012027 R E121    012030 R E122
012020 R E123    012000 R E124    012031 R E130    012050 R E131
012067 R E132    012063 R E133    012071 R E140    012110 R E142
012115 R E143    012213 R E144    012215 R E145    012224 R E150
012250 R E152    012263 R E153    012373 R E154    012145 R E155
012375 R E156    012376 R E157    012377 R E158    012400 R E159
012401 R E15A    012402 R E15B    012256 R E15C    012335 R E15D
012355 R E15E    012434 R E160    012442 R E162    012460 R E170
012472 R E171    012505 R E172    010525 R EAS     010531 R EAAU
010425 R EAC1    010474 R EAC2    010410 R EACH    010620 R EADA
```

```
010375 R EADS   010402 R EADS1  010351 R EAF0   010361 R EAF1
010336 R EAFR   010547 R EAIR   010323 R EAJR   010367 R EAJS
010556 R EAKR   010565 R EAML   010574 R EAOR   010327 R EAPR
010540 R EASC   010603 R EASR   012574 R ED10   012577 R ED11
012610 R ED20   012613 R ED21   012624 R ED30   012637 R ED40
012736 R ED41   012737 R ED42   012740 R ED43   012653 R ED50
012666 R ED51   012733 R EDA    012722 R EDAB   012556 R EDR2
012537 R EDRM   001372 R ELOC   000177 R EMEM   012223 R END
012141 R ENDTRC 011415 R EOF    011623 R EOFE   011407 R ERR
001114 R EX10E  000715 R EXC    000744 R EXC0   000753 R EXC1
001106 R EXC10  001123 R EXC12  001135 R EXC14  001140 R EXC16
001141 R EXC17  001142 R EXC18  001143 R EXC19  001022 R EXC1A
001055 R EXC2   001073 R EXC3   001152 R EXC4   001076 R EXC5
001144 R EXC90  001155 R EXC92  001046 R EXCS   012506 E EXIT
000335 R FCBBI  000334 R FCBLO  000333 R FCBPI  000332 R FCBSI
013203 R FD09   013207 R FD10   013210 R FD11   013152 R FD15
013175 R FD16   013200 R FD17   012775 R FELD   015635 R FETCH
013644 R FETCHA 015666 R FETCHB 000045 A FIL1   000046 A FIL2
013634 R FLD05  013644 R FLD10  013657 R FLD20  013675 R FLD25
013702 R FLD30  013737 R FLD35  013752 R FLD39  013761 R FLD40
013777 R FLD50  013773 R FLD50A 014000 R FLD50B 014011 R FLD51
014020 R FLD56  014024 R FLD57  014040 R FLD60  014046 R FLD65
014032 R FLD90  014033 R FLD91  014034 R FLD92  014035 R FLD93
014036 R FLD94  014037 R FLD95  013632 R FLDCG  014054 R FLER1
014057 R FLER2  014031 R FLLRL  014176 R FLMSK  014062 R FLNAM
011610 R FREC   015136 R GET    015144 R GET2   015051 R HDR
011626 R HOPE   000504 R IMD    013373 R INA    013417 R INA3
013357 R INA5   013456 R INA8   013460 R INAA   013461 R INAN
013462 R INAV   015313 R INDCB  013620 R INER   013473 R INH
013545 R INH2   013522 R INH3   013525 R INH4   013463 R INH5
013602 R INH6   013610 R INH7   013612 R INH8   013623 R INHA
013624 R INHC   013625 R INHN   013626 R INHT   015516 E INLINK
000067 A INPF   000062 A INTA   000061 A INTF   015523 E INTR
015532 E INTRST 000040 A IOD    000050 A IOKR   000066 A IORF
000051 A IRG1   000052 A IRG2   015114 R JOB    010374 R JRFL
000502 R JSPT   000047 A KREG   011611 R LCCS   011631 R LCDE
011401 R LCOM   011306 R LDADD  011612 R LDADR  011077 R LDBP
011437 R LDCDE  011634 R LDCM   010735 R LDCS   011500 R LDCTL
010720 R LDDS   010744 R LDDSA  010751 R LDDSB  011066 R LDFR
011335 R LDIGN  011244 R LDLOR  011202 R LDMEM  011303 R LDMEX
010760 R LDMM   011275 R LDMOR  011266 R LDMV   011342 R LDNR
011341 R LDOR1  011170 R LDORG  011613 R LDPT   011242 R LDPTR
```

```
010756 R LDRC   010676 R LDRM   011372 R LDRNR  011375 R LDRNS
011332 R LDSCD  011445 R LDSIZ  011325 R LDSRV  011141 R LDST
011103 R LDWD   014204 R LIST   014220 R LIST1  014271 R LIST3
014275 R LIST4  014316 R LIST5  014341 R LIST6  014342 R LIST7
014343 R LIST8  014344 R LIST9  014345 R LISTA  014400 R LISTB
014431 R LISTC  001373 R LLUP   010775 R LMDS   000005 A LO
015522 R LO1    015567 R LO2    015607 R LO3    015610 R LO4
015531 R LO5    015540 R LO6    015604 R LOA    015605 R LOB
015600 R LODCB  012502 E LOFCB  015603 R LOFLG  015613 R LOLINE
015515 R LOLNK  000256 R LOOPN  015470 R LOOUT  000281 R LORMD
015606 R LOX    011006 R LR1    010777 R LREAD  011015 R LREAD1
011614 R LREC   000070 A LREG   011615 R LS813  011652 R LSIZ
003775 R LTA1   004020 R LTA2   004127 R LTA3   004131 R LTA4
004165 R LTA5   003754 R LTAA   004325 R LTAP   004253 R LTAS
004275 R LTAT   004204 R LTAW   004210 R LTAX   004211 R LTAY
004212 R LTAZ   000032 A LTCHA  000033 A LTCHB  004072 R LTMX
015634 R LUT    000053 A MADS   000031 A MASK   000060 A MBYC
000055 A MCCO   012536 R MEDIA  007661 R MFAIL  000056 A MIL
010210 R MLIP   010246 R MLIR   010240 R MLIS   010232 R MLIT
010231 R MLIU   010225 R MLIV   010221 R MLIW   010215 R MLIX
010211 R MLIY   000000 R MMEM   007213 R MO03   007224 R MO04
007230 R MO10   007235 R MO11   007254 R MO12   007266 R MO14
007273 R MO16   007300 R MO18   007305 R MO20   007334 R MO22
007343 R MO24   007352 R MO26   007355 R MO30   007364 R MO32
007371 R MO34   007417 R MO36   007422 R MO38   007426 R MO40
007445 R MO41   007453 R MO45   007461 R MO50   007510 R MO51
007513 R MO52   007516 R MO53   007543 R MO54   007550 R MO56
007554 R MO58   007570 R MO59   007574 R MO60   007614 R MO61
007623 R MO62   007635 R MO6A   007636 R MO6B   007637 R MO6C
010063 R MO70   010054 R MO72   010003 R MOD1   010000 R MOD2
010051 R MOD3   010032 R MOD4   007772 R MODR   007675 R MOP1
007210 R MOPA   007664 R MOPB   000054 A MOPC   014446 R MOV1
014456 R MOV2   014500 R MOV3   014522 R MOVC   014513 R MOVE
014471 R MOVR   014517 R MOVW   010247 R MPLE   007721 R MRE1
007716 R MRE2   007751 R MRE3   007757 R MRE4   007701 R MREQ
007762 R MREZ   001105 R MTYP   000071 A MULS   011153 R NMIC
001217 R NRM    000057 A NROM   000072 A NSTP   014523 R OH
014550 R OH2    014567 R OHA    000044 A OREG   015462 R OUDCB
000037 A OVRFL  001375 R PA1    001405 R PA2    001414 R PA3
001423 R PA4    001425 R PA5    001431 R PA8    001432 R PA9
001255 R PAG    001313 R PAG1   001326 R PAG2   001334 R PAG3
001342 R PAG4   001343 R PAG5   001352 R PAG6   001200 R PAGE
```

```
001367 R PAV1   001355 R PAVL   014604 R PBUF   015112 R PGNO
001222 R PGOK   000004 A PI     015357 R PI1    015377 R PIOCB
000333 E PIFCB  015402 R PIFLG  015322 R PIIN   015342 R PIIN1
015350 R PIIN2  015403 R PIINA  015404 R PIINB  015405 R PIINX
000243 R PIOPN  000236 R PIRMD  007653 R PM1    007640 R PMEM
000042 A PREG   001160 R PSEL   001174 R PSELB  001207 R PSTBL
015206 R PUT    015170 R PUTLP  000063 A QS     000525 R R0
000526 R R1     000527 R R2     000530 R R3     000531 R R4
000532 R R5     000533 R R6     000534 R R7     000535 R R8
000536 R R9     000537 R RA     000540 R RB     000541 R RC
011516 R RCN    012070 R RCNT   000542 R RD     011644 R RDER
000543 R RE     014622 R REG1   014625 R REG2   014661 R REG3
014670 R REG6   014671 R REG7   014672 R REG8   014615 R REGS
000544 R RF     015676 R RHLF   000441 R RHLT   000445 R RHLTO
000452 R RHLT1  000457 R RHLT2  000464 R RHLT3  011501 R RMD
011515 R RMD1   011542 R RMDT   001434 R S100   001444 R S101
001446 R S102   001460 R S103   001462 R S104   001472 R S105
001476 R S106   001517 R S106A  001525 R S106B  001466 R S108
001601 R S111   001543 R S120   001555 R S120A  001564 R S120B
001577 R S121   001573 R S123   001606 R S200   001645 R S201
001616 R S205   001630 R S210   001651 R S211   001652 R S219
003422 R S300   003424 R S302   003441 R S304   003502 R S305
003655 R S316   003656 R S317   003657 R S318   003726 R S319
003727 R S31A   003741 R S31B   003742 R S31D   003747 R S31E
003671 R S320   003707 R S322   004377 R SAL2   004355 R SALU
014711 R SAR    014673 R SAR1   014677 R SAR2   014706 R SAR3
011460 R SCOD   011647 R SEQE   011431 R SEQER  010457 R SETMUX
000002 A SI     015267 R SI1    015276 R SI2    000332 E SIFCB
015316 R SIFLG  015220 R SIIN   015260 R SIIN1  015235 R SIIN2
015252 R SIIN3  015317 R SIINA  015320 R SIINB  015321 R SIINX
015302 R SILO   015417 R SIOU1  015465 R SIOUA  015466 R SIOUB
015406 R SIOUT  015467 R SIOUX  000227 R SIRMD  015306 R SIRTN
000220 R SMBI   000213 R SMLO   000201 R SMLTR  000206 R SMPI
000003 A SO     015426 R SO1    015435 R SO2    015614 R SOELO
015445 R SOLO   015630 R SOLOCH 015451 R SORTN  014747 R SPAC
000043 A SREG   000505 R STACK  012222 R START  000471 R STEP
012135 R STRTRC 000041 A STUS   000065 A SUPK   001374 R SYST
015205 R TABL   003055 R TMOT   000640 R TMUX   014760 R TPFRM
015102 R TPMUS  015115 R TPST   015106 R TPVOR  014735 R TRA
000472 R TRACE  014730 R TRC    014714 R TRO    014744 R TRSET
014724 R TRSETA 000476 R V      011541 R V$DSTB 001373 E V$LLUP
011540 R V$LUT1 000001 A VORTEX 011617 R WDCT   015674 R WORD
```

```
000001 A X      004405 R X000   004621 R X002   005052 R X004
000055 R X008   005056 R X009   005057 R X00A   005060 R X00C
000061 R X000   005062 R X010   005106 R X012   005150 R X013
000155 R X014   005160 R X015   005165 R X019   005166 R X020
000311 R X021   005312 R X022   005333 R X023   005341 R X024
000342 R X025   005256 R X026   005363 R X030   005367 R X032
000373 R X034   005400 R X035   005403 R X038   005407 R X040
000412 R X042   005416 R X044   005423 R X046   005430 R X048
000434 R X050   005437 R X052   005442 R X054   005445 R X056
000452 R X058   005455 R X060   005460 R X062   005461 R X063
000474 R X064   005500 R X065   005505 R X068   005510 R X070
000522 R X071   005532 R X072   005547 R X074   005577 R X075
000605 R X076   005621 R X078   005633 R X080   005645 R X082
000662 R X084   005703 R X086   005715 R X088   005721 R X089
000726 R X090   005735 R X092   005754 R X094   005764 R X095
000770 R X096   005773 R X097   006027 R X099   006001 R X09A
000014 R X09B   006020 R X09C   006030 R X0A0   006047 R X0A1
000057 R X0AA   006060 R X0AB   006114 R X100   006404 R X101
000424 R X102   006473 R X103   006524 R X104   006541 R X105
000551 R X106   006522 R X107   006512 R X108   006477 R X109
000466 R X120   006633 R X130   006624 R X134   006627 R X136
007077 R X200   007117 R X202   007160 R X204   007165 R X205
007170 R X206   007154 R X207   007201 R X208   000030 A XA
004642 R XA10   004656 R XA12   004664 R XA14   004670 R XA20
004701 R XA22   004715 R XA24   004723 R XA26   004425 R XA30
004433 R XA32   004525 R XA40   004541 R XA41   004555 R XA42
004564 R XA44   004572 R XA46   004576 R XA48   004503 R XA49
004611 R XA50   004615 R XA52   004731 R XA80   004744 R XA82
004753 R XA84   004762 R XA85   004772 R XA88   005007 R XA90
005024 R XA92   005034 R XA94   005042 R XA96   000011 A XAB
000001 A XAF    005210 R XAL1   000034 A XALU   000027 A XB
000020 A XC     000035 A XCIN   000016 A XF     000004 A XFS
000007 A XG     000012 A XIMC   003477 R XIRG2  000014 A XLA
000013 A XLB    000010 A XM     000017 A XMD    000002 A XMS
000003 A XMT    000022 A XOS    000015 A XR     000006 A XS
000137 R XS10   006142 R XS15   006172 R XS20   006215 R XS21
006216 R XS23   006212 R XS24   006243 R XS30   006247 R XS32
004463 R XS33   004475 R XS34   004500 R XS36   007526 R XS41
006250 R XS45   006260 R XS46   006262 R XS50   006267 R XS60
006275 R XS61   006323 R XS64   006345 R XS64A  006353 R XS65
006376 R XS70   006403 R XS71   006416 R XS73   006423 R XS74
006440 R XS76   006445 R XS78   006446 R XS80   006460 R XS81
```

```
000465 R XS82    006561 R XS90    006615 R XS91    006620 R XS92
000005 A XT      000026 A XTC     000000 A XTS     000023 A XV
000021 A XW      000025 A XX      000024 A XY      000040 A XZ
013217 R ZEROB
  0 ERRORS ASSEMBLY COMPLETE
```

```
/PFILE,SS,,SS
/MEM,10
/CONC
```

0	$DATE	5820	5822							
0	$DBUF	126	127	427	516					
0	$DRM1	132	135	429	521	1415				
0	$DRM1B	134	522							
0	$DRM1C	134	523							
0	$DRM1D	134	524							
0	$DRM2	133	136	431						
0	$ELOC	622	624							
0	$JOB	5821	5823							
0	$LUT	6079	6080							
0	$SYST	626	627							
4761	ABDCS	4684	4747							
3861	ABEL	3849								
2155	AR10	2139	2142							
2173	AR12	2157								
2191	AR13	2172								
2181	AR20	2159								
115	B	5318	5322	5328						
1406	BCS	1291								
1423	BCSA	1408	1412							
1420	BCSB	1411								
1422	BCSC	1420								
4202	BEOD	4009								
4289	BIBLK	101	4270							
4291	BIBUF	4015	4042	4046	4050	4181	4183	4189		
4287	BIDCB	4008	4178	4188						
0	BIFCB	66	97	103	4288	4289				
4259	BIFLG	103	4000	4172						
97	BIOPN	96								
93	BIRMD	61								
6125	BITO	6113								
4292	BIT11	4027								
4293	BIT12	4022								
4294	BIT15	4018								
5844	BNASC	5784	5873							
141	BUFI	5904	5908	5914	5919	5942	5946	5949	5955	6108
4295	BUFPTR	4044	4048	4049	4053	4062	4070	4076	4082	4083
		4095	4123	4128	4131	4150	4151	4156	4169	4177
		4190								
50	BUFR	109	1607	1650	1677	1692	1696	3826	3920	3938
		3953	3957	4002	4269	4287	4291	4295	4347	4371
		4376	4574	4585	4599	4600	4721	4723	5490	5504
		5647	5693	5704	5770	5809	5990	6032	6055	

292	CARRY	1575	2163	2572	2580	2897				
4991	CD05	4986								
5009	CD10	5002								
5016	CD20	4994								
5026	CD22	5019								
5095	CD2A	5089	5091							
5096	CD2B	5004	5009	5021	5026	5093				
5097	CD2C	5005	5022	5086						
5034	CD30	4995								
5040	CD40	4992								
5043	CD42	5078								
5052	CD44	5042								
5065	CD46	5056								
5078	CD50	4989								
4983	CDA8	4825	5007	5011	5024	5028	5034	5048	5063	5070
5084	CDAX	4998	5016	5094						
5123	CHAR	4489	4491	5102	6105	6112	6117	6121		
4854	CHME	376								
4964	CHMR	4657	5948	5948	5948					
4961	CHMS	4659								
4296	CKSM	4012	4020	4036						
4305	CKSU	4282								
4273	CKSU1	4279								
4278	CKSU2	4271								
4268	CKSUM	4039	4265	4281						
3934	CME1	3955								
3944	CME2	3941								
3956	CME3	3933	3935	3942	3949	3950	3954			
3957	CME4	3934	3951							
3929	CMEM	370								
1280	CNOT	1132	1139	1174	1184	1196	1207	1215	1230	1242
		1254	1265							
4212	CODE	4101								
352	COMM	451	486							
368	COMM1	487								
4776	CONV	3801	4714	4780	4784	4792	5140	5207		
4789	CONV1	4782								
4791	CONV2	4786								
4794	CONV3	4777	4779	4789						
165	CPAG	513	540	697	738	1114	1435	1503	1662	3688
		4385	4451	4455	4460	5448	5458	5497	5750	
918	CR17	909								
929	CR19	923								

943	CR21	921								
946	CR23	919								
950	CR30	915	927	941	944					
960	CR32	1377	1403							
1002	CR33	966	969	970	973	974	977	978	981	982
		985	986	988	1000					
1007	CR34	799	992							
1029	CR35	1012	1018							
1054	CR50	780	872							
1063	CR52	1057								
1068	CR54	1055	1061							
1084	CR55	1124	1173	1177	1181					
1099	CR56	1072	1178	1180	1188	1191	1200	1202	1210	1213
		1221	1225	1233	1237	1245	1249	1258	1260	1269
		1271								
1107	CR57	1095	1101							
1094	CR58	1076	1086							
1122	CR60	1075								
1139	CR68	1194								
1148	CR6C	1205								
1152	CR6D	1143	1216							
1156	CR6E	1228								
1160	CR6F	1240								
1164	CR6G	1252								
1168	CR6H	1263								
1172	CR6I	1274								
1131	CR6J	1128								
1144	CR6K	1140								
1179	CR6L	1175								
1265	CR6S	1171								
1254	CR6T	1167								
1242	CR6U	1163								
1230	CR6V	1159								
1218	CR6W	1155								
1207	CR6X	1151								
1195	CR6Y	1147								
1184	CR6Z	1138								
1287	CR70A	852	855							
1330	CR71	1317								
1333	CR72	1329								
1325	CR73	1320								
1336	CR74	1362								
1343	CR76	1361	1400							

1346	CR77	1375								
1442	CR7A	1301	1311	1318	1325	1330	1333	1343	1354	1367
		1386								
1443	CR7B	1309	1321	1323	1326	1357	1370	1389		
1444	CR7C	1314	1316	1328	1332	1340	1341	1349	1376	1385
		1392	1394	1398	1399	1402				
1445	CR7D	1339	1348							
1446	CR7E	1356	1360	1369	1373					
1353	CR80	1335								
1358	CR84	1345								
1385	CR86	1342	1350							
1402	CR87	1388	1391							
813	CRA0	790	811							
830	CRA2	817	820							
842	CRA2A	833								
838	CRA2B	846								
853	CRA2C	844								
847	CRA3	839								
861	CRA4	783								
869	CRA5	786								
895	CRA6	841	849	877	879	885	889	892	1040	1097
		1103								
887	CRA7	873	881	883						
875	CRA8	837	870							
1448	CRA0	950	954	955						
776	CRAS	665	825	851	963	1001	1028	1118	1419	
809	CRAS1	796								
1036	CRAX	801	808	812	836	864				
1447	CRBA	900	958							
1449	CRB0	895	959							
1277	CRM1	914								
1045	CRP	1043								
1043	CRPE	1017	1038	1116						
1270	CRS1	1266								
1272	CRS2	1268								
1259	CRT1	1255								
1261	CRT2	1257								
1276	CRTS	911	913	930	933	934	938	939	1109	1112
		1136	1145	1149	1153	1157	1161	1165	1169	1193
		1204	1215	1227	1239	1251	1262	1273		
1247	CRU1	1243								
1250	CRU2	1246								
1235	CRV1	1231								

1238	CRV2	1234								
1223	CRW1	1219								
1226	CRW2	1222								
1212	CRX1	1208								
1214	CRX2	1211								
1426	CRXA	666	1429	1439						
1441	CRXZ	1431	1437	1438						
1201	CRY1	1197								
1203	CRY2	1199								
1190	CRZ1	1185								
1192	CRZ2	1189								
648	D2048	423	425	630	634	638				
5822	DATE	5787								
127	DBUF	428	548	3981	4375	4601	4610			
521	DCTBL	549								
2641	DLM1	2635								
2639	DLM2	2650								
2638	DLM3	2645	2648							
2646	DLM4	2637								
2649	DLM7	2642	2644	2647						
2633	DLMS	1463	2640							
3065	D001	3057								
3092	D022	3078								
3110	D024	3094								
3125	D026	3113								
3140	D044	3073								
3157	D046	3142								
3177	D048	3159								
3195	D050	3180								
3054	DORG	1484	3059	3064	3068	3089	3108	3122	3132	3154
		3174	3192	3199						
3202	DOT1	3070	3083	3118	3148	5065				
3203	DOT2	3082	3087	3098	3106	3117	3120	3127	3130	3147
		3152	3164	3172	3185	3190				
135	DRM1	430	553	1294	1416	3989	4703			
136	DRM2	432	555	1305	1418	3986	4693			
191	DROM	659	667	670	695	777	1413	1432	1585	1605
		1621	1634	1638	1643	1647	2772	3036	3237	3262
		3267	3309	3695	3702	3708	3714	3721	3727	3733
		3791	3882	3887	3892	3897	3902	3907	3912	4807
		4822	4968	5455	5493	5503	5743	5748		
317	DS	931	1474	1643	2611	3128				
3759	E100	368	3852							

3806	E102	3877	3880						
3917	E104	3823	3834						
3918	E105	3763	3836	3844					
3919	E106	3811							
3920	E107	3824							
3921	E108	3804	3806	3863	3864	3870			
3922	E109	3832	3840						
4317	E110	4678							
4324	E112	4372							
4356	E113	4327	4331	4335	4339	4343	5240	5302	
4358	E114	4352							
4362	E114A	5338							
4375	E116	4326							
4376	E117	4330	4368						
4377	E118	4351	4358						
4378	E119	4320	4324	4363	4364	4369			
4383	E120	373							
4406	E121	4389	4392	4399					
4407	E122	4384							
4402	E123	4388							
4390	E124	4404							
4412	E130	379							
4423	E131	4417	4420						
4434	E132	4423							
4431	E133	4427							
4440	E140	380							
4451	E142	4445							
4454	E143	4448							
4502	E144	4485							
4504	E145	4493	4496	4499					
4513	E150	371							
4528	E152	4525	4596						
4536	E153	4597							
4499	E154	4537	4576						
4478	E155	4454	4501	4506	4514				
4501	E156	4545							
4502	E157	4546	4551	4556	4560	4565	4570	4577	4582
4503	E158	4516	4524	4539	4543	4587	4589		
4504	E159	4520	4523	4588					
4505	E15A	4531	4593	4595					
4506	E15B	4529							
4513	E160	4567	4572	4579	4584	4521			
4519	E162	4628							

4633	E170	378								
4638	E171	4634	4636	5910						
4641	E172	4639								
3879	EA3	3869	3875	3876						
3882	EAAU	3765								
3840	EAC1	3833	3858							
3863	EAC2	3846	3848							
3830	EACH	3794	3815	3885	3890	3895	3900	3905	3910	3915
3923	EADA	3766	3774	3775	3780					
3822	EADS	3793	3814	3827	3884	3889	3894	3899	3904	3909
		3914								
3804	EAF0	3802								
3812	EAF1	3818								
3798	EAFR	3781	3788							
3892	EAIR	3769								
3786	EAJR	3771								
3815	EAJS	3809								
3897	EAKR	3773								
3902	EAML	3775								
3907	EAOR	3777								
3791	EAPR	3779								
3887	EASC	3767								
3912	EASR	3783								
4691	ED10	4686								
4693	ED11	4698								
4701	ED20	4688								
4703	ED21	4708								
4711	ED30	4691	4701	4715						
4719	ED40	4696	4706	4724						
4763	ED41	4692	4702	4740	4741	4750	4758			
4764	ED42	4720	4733							
4765	ED43	4731	4735							
4727	ED50	4697	4707	4759						
4735	ED51	4732								
4760	EDA	4746	4756	4757						
4755	EDAB	4749								
4682	EDR2	4680								
4974	EDRM	372								
024	ELOC	418	611							
49	EMEM	47	4136	4156						
4508	END	4458	4500	4505	4519					
4466	ENDTRC	400	4459	5753						
4200	EOF	4009								

```
4306  EOFE    4200
4198  ERR     4009
 387  EXC       62   104   374   385  4642
 404  EXC0     408
 409  EXC1     404
 465  EXC10    453   493   509   514   681   689   712  1044  1421
                3843  3867  3947  4196  4199  4201  4203  4205  4207
                4209  4283  4350  4361  4366  4397  4405  4430  4433
                4453  4463  4590  4663  4666  4730  4738  4744  5249
                5333  5378  5380
 473  EXC12    479
 481  EXC14    476
 484  EXC16    482
 486  EXC17    470
 487  EXC18    471
 488  EXC19    469   475
 438  EXC1A    444   446
 455  EXC2     436
 456  EXC3     401   409   415
 495  EXC4     465
 459  EXC5     438
 492  EXC90    468   474   505  3752  3784  3800  3803  3966  3973
                3975  3980  4322  4414  4421  4442  4449  4518  4522
                4526  4637  4655  4660  4676  4681  4683  4689  4713
                4716
 496  EXC92    492
 448  EXCS     381
   0  EXIT     113  4641
 108  FCBBI     93    98
 107  FCBLO     83    88
 106  FCBPI     73    78
 105  FCBSI     68
4964  FD09    4813  4815  4817  4819  4823  4828  4848  4876  4909
                4933  4934
4968  FD10    4826
4969  FD11    4821  4961
4943  FD15    4941
4958  FD16    4949  4951
4961  FD17    4942  4955
4806  FELD     662  4962
6098  FETCH    440   467   570  3851  5129  5190  6099
6104  FETCHA   504   578  3761  3799  3964  3974  4413  4441  4492
                4633  4654  4675  4682  4712  5132  5198  5257  5270
```

		5335	6100	6103	6118	6122				
6119	FETCHB	6114								
300	FIL1	5745	5749	5754						
5268	FLD05	5340								
5274	FLD10	5281								
5282	FLD20	5277								
5295	FLD25	5290	5293							
5298	FLD30	5296								
5319	FLD35	5313	5316	5325						
5329	FLD39	5367								
5334	FLD40	5332								
5344	FLD50	5307								
5341	FLD50A	5309								
5346	FLD50B	5343								
5354	FLD51	5347								
5361	FLD56	5351								
5364	FLD57	5356								
5377	FLD60	5275								
5379	FLD65	5297								
5370	FLD90	5269	5271	5272	5276					
5371	FLD91	5287	5294	5324	5363					
5372	FLD92	5283	5288							
5373	FLD93	5286	5330							
5375	FLD95	5303	5321	5327	5357					
5266	FLDCG	5246								
5381	FLER1	5377								
5382	FLER2	5379								
5369	FLLRL	5350	5355							
5418	FLMSK	5318								
5390	FLNAM	5273								
4297	FREC	4013	4025	4040						
5349	GET	5852	5863							
5353	GET2	5850								
5813	HDR	5785	5786	5790	5795	5803	5807			
4307	HOPE	4202								
166	IMD	792	807	814	962	999	1027			
5117	INA	657	3830	3931	3939	4318	4390	4425	4479	4497
		4728	5122	5124	5284					
5132	INA3	5127	5130	5151						
5110	INA5	5133	5136	5138						
5154	INA8	5141	5147							
5155	INAA	5112	5119	5134	5139					
5156	INAN	5111	5120	5150						

5157	INAV	5110	5121	5143	5149					
5919	INDCB	5909								
5251	INER	5248								
5181	INH	4349								
5198	INH3	5239								
5200	INH4	5197								
5170	INH5	5201	5203	5205						
5240	INH6	5193								
5246	INH7	5195								
5248	INH8	5154	5208	5219						
5253	INHA	5176	5191	5196	5199	5206				
5254	INHC	5214	5234							
5255	INHN	5175	5183	5213	5238					
5256	INHT	5172	5184	5185	5186	5187	5215	5220	5221	5223
		5226	5228	5231	5233	5236				
0	INLINK	31	32							
320	INPF	838	3020	3024						
315	INTA	821								
314	INTF	819								
0	INTR	18	19							
0	INTRST	26	27							
295	IOD	1638	2078							
303	IOKR	3036								
304	IRG1	1287	1292	1303	1336	1346	1395	1501	3472	3491
		3507	3539	3728	3892					
305	IRG2	912	935	1084	1122	1498	1502	1780	2058	2181
		2778	4946	5090						
5823	JOB	5792								
3819	JRFL	3787	3798	3803						
164	JSPT	800	803	990	994	997	1008	1021	1023	1513
		1521								
302	KREG	1621	2730	3267	3897					
4298	LCCS	3984	3992	4091						
4308	LCDE	4206								
4194	LCOM	4147	4187							
4149	LDADD	4142								
4299	LDADR	3995	4078	4085	4086	4094	4132	4135	4153	
4046	LDBP	4041								
4206	LDCDE	4068	4102	4110	4118					
4309	LDCM	4195								
3981	LDCS	3968								
4217	LDCTL	3965	4054							
3974	LDDS	3970								

		2501	2526	2536	2636	2641			
1561	LTMX	672	1664	1666	1693				
6080	LUT	6069							
307	MADS	3373	3379	3385	3392	3569	3709		
286	MASK	2054	4937						
312	MBYC	929	1799	3514	3715				
309	MCCO	3313	3394	3420	3434	3450	3485	3697	
4067	MEDIA	4662	4665	5891					
3563	MFAIL	3561							
0	MICSIM	16							
310	MIL	2074	3386	3471	3475	3490	3495	3722	3902
3745	MLIP	3396	3433	3452	3486	3678	3681	3737	3740
3752	MLIS	3726	3730						
3751	MLIT	3720	3724						
3750	MLIU	3698	3704	3710	3716				
3749	MLIV	3717	3718						
3748	MLIW	3711	3712						
3747	MLIX	3705	3706						
3746	MLIY	3699	3700						
48	MMEM	47	3556	4154	4156				
3319	M004	3483							
3326	M010	3319	3338	3345	3349	3353	3357	3423	
3330	M011	3343							
3340	M012	3328							
3347	M014	3331							
3351	M016	3333							
3355	M018	3334							
3361	M020	3320							
3378	M022	3367							
3384	M024	3368							
3391	M026	3362	3371						
3393	M030	3376	3382	3388					
3400	M032	3315							
3404	M034	3401							
3420	M036	3402	3405	3412	3416	3425			
3423	M038	3407							
3431	M040	3421							
3445	M041	3440							
3448	M045	3443	3447						
3454	M050	3436							
3467	M051	3465							
3470	M052	3456							
3474	M053	3466	3492	3495	3505	3510	3537	3562	

```
3489  MD54    3458
3494  MD56    3460
3498  MD58    3462
3508  MD59    3540
3513  MD60    3464
3526  MD61    3516
3534  MD62    3524
3541  MD6A    3519  3522  3528  3531
3542  MD6B    3518  3530
3543  MD6C    3521  3527
3588  MD70    3318  3397  3446  3453  3487
3678  MD72    3690  3692
3649  MD01    3646
3647  MD02    3667  3671
3673  MD03    3651  3658  3662  3670
3664  MD04    3656  3661
3643  MDDR    3406  3598  3648  3674
3575  MDP1    3571
3308  MDPA     669  3679  3682  3738  3742
3568  MDPB    3454  3574  3577  3734
 308  MDPC     732  3337  3344  3348  3352  3356  3404  3410  3455
               3703
5524  MDV1    5567
5532  MDV2    5540
5549  MDV3    5557
5568  MDVC    5534  5539  5545  5549  5552
5559  MDVE    5533  5551
5542  MDVR    5527
5566  MDVW    4080  4138  4353  5170  5524  5559  5560  5561  6042
               6046
3754  MPLE    3409  3418  3502  3509  3534
3598  MRE1    3591
3596  MRE2    3602  3608  3612  3616
3614  MRE3    3605
3618  MRE4    3595  3599  3611  3615
3588  MREQ    3317  3445  3481  3597  3619
3623  MREZ    3609  3614  3628  3659  3668
 460  MTYP     447  3435  3449
 322  MULS    1814  2639
4080  NMIC    4075  4077  4079  4081  4084
 526  NRM      510   591
 311  NROM     661   702   961  1020  1113  1414  1433  4808  5456
               5494  5744
```

323	NSTP	925								
5984	OH	749	752	1434	1519	1541	1551	1560	1610	1625
		1636	1640	1645	1649	1680	3723	3729	3825	3937
		3952	4333	4337	4341	4345	4370	4540	4549	4553
		4558	4562	4722	5457	5495	5599	5688		
5901	OH2	3872	4752	5585	5588	5592	5595	5609	5626	5629
		5679								
5924	OHA	5483	5633							
299	OREG	1961	1969	2018	2071	2095	2102	2109	2114	3069
		3080	3088	3096	3107	3115	3121	3125	3131	3145
		3153	3161	3173	3183	3191	3196	3198	3262	3907
5998	OUDCB	5978	5980	5981	5986	5988				
293	OVRFL	1088	2564	2955						
0	P	22	22	22	22	23	28	28	28	28
		28	34	35	35					
029	PA1	620								
034	PA2	631								
038	PA3	635								
042	PA4	639								
043	PA5	633	637	641						
046	PA8	610	644							
047	PA9	629								
067	PAG	437	584	588	590	592				
083	PAG1	579	581							
089	PAG2	573	575	582	586					
093	PAG4	541	577	583						
094	PAG5	568								
095	PAG6	589								
015	PAGE	389	512	539	545	550				
019	PAV1	614								
009	PAVL	585	645							
5943	PBUF	1602	1670	1698	3760	3930	3948	4329	4367	4536
		4575	4674	5478	5648	5674	5769	5808		
5819	PGNO	434	5783	5810						
538	PGOK	507	543	557	854	1015	1037	1115	1410	
5948	PI1	5948								
5955	PIOCB	5947								
0	PIFCB	64	77	106						
5956	PIFLG	81	5940							
5933	PIIN	5894	5895	5953						
5943	PIIN1	5939	5941							
5947	PIIN2	79	5948							
5957	PIINA	5934	5950							

```
 5958  PIINB    5935  5951
 5959  PIINX    5936  5952
   77  PIOPN      76
   73  PIRMD      57
 3561  PM1      3557
 3554  PMEM     3498  3513  3560
  297  PREG     1605  2026  3237  3255  3380  3414  3791
  304  PSEL      377
  310  PSELB     508
  316  PSTBL     422   424   426   544   587
 5879  PUT      5846  5848  5854  5864  5866  5867  5876
 5869  PUTLP    5877
  316  QS       1647  2830  3063
  171  R0       1198  1201  1209  1212  1220  1223  1469  2030  2118
                3100  3166  3222  3919  5703
  172  R1       1232  1235
  173  R2       1244  1247
 4303  RCN      4004  4033  4184  4191
 4435  RCNT      458   682   686  4429  4432
 4310  RDER     4198
 5674  REG1     5700
 5677  REG2     5695
 5702  REG6     5671  5677  5684  5691  5692  5697
 5703  REG7     5685
 5704  REG8     5675
 5669  REGS     1579  5699
 6126  RHLF     4242  6116
  143  RHLT      696   706  1592  4406  4407
  147  RHLT0     143   456  4401
  148  RHLT1     144
  149  RHLT2     145
  150  RHLT3     146
 4228  RMD        54    56    58    60  4229  4232  4235  4255
 4239  RMD1     4231
 4258  RMDT     4244  4246  4247  4250
  656  S100      369
  662  S101      660   674
  677  S105      673   683   687
  688  S106A     684
  690  S106B     688
  714  S111      711
  694  S120      664   710
  701  S120A     709
```

707	S1208	700								
711	S123	703								
730	S200	756	3736							
755	S201	740	742							
737	S205	733								
758	S210	731	748							
759	S211	736	751	755						
760	S219	747	750	753						
1460	S300	668	1505	1507	1582					
1475	S304	1466								
1503	S305	1491	1494	1497						
1585	S316	1462	1539	1549	1558	1566	1574			
1586	S317	1538	1548							
1587	S318	1537	1542	1547	1552	1586				
1590	S319	1557								
1591	S31A	1561	1590							
1593	S31D	1569	1570							
1594	S31E	1577	1578							
1588	S320	1512	1520							
1589	S322	1529	1530							
1728	SAL2	1720	1723	1726						
1717	SALU	1727	1728	1729	1730	2158	2953	4940		
5730	SAR	394	398	450	5645	5714	5724	5725	5906	5944
5714	SAR1	5731								
5718	SAR2	5722								
5724	SAR3	5719								
4214	SCOD	4109								
4311	SEQE	4204								
4204	SEQER	4035								
3853	SETMUX	3838	3859							
116	SI	5909								
5910	SI1	5910								
5911	SI2	5910	5910							
0	SIFCB	63	105							
5920	SIFLG	71	5902							
5890	SIIN	439	466	569	3850	5128	5189	5893	5918	
5909	SIIN1	69	5910							
5899	SIIN2	5892								
5905	SIIN3	5901	5903							
5921	SIINA	5896	5915							
5922	SIINB	5897	5916							
5923	SIINX	5898	5917							
5981	SIOU1	5982								

5999	SIOUA	5973	5994							
6000	SIOUB	5974	5995							
5972	SIOUT	436	438	465	492	510	568	589	591	688
		711	1043	1420	3465	3561	3826	3849	3876	3938
		3953	4195	4198	4200	4202	4204	4206	4208	4282
		4347	4371	4723	4757	5248	5377	5379	5976	5991
		5993	5997							
6001	SIOUX	5975	5996							
68	SIRMD	55								
5915	SIRTN	5913								
60	SMBI	92								
58	SMLO	82								
54	SMLTR	38	3559	6127						
56	SMPI	72								
117	SO	5981								
5982	SO1	5982								
5983	SO2	5982	5982	5982						
6068	SOELO	5912	5984	6078						
5990	SOLO	5987	5989							
6077	SOLOCH	6074								
5991	SORTN	5985								
5768	SPAC	1430	1511	1535	1556	1565	1600	1667	1697	3693
		4532	4586	5462	5470	5496	5673	5771		
298	SREG	2738	2816	3250	3252	3887				
167	STACK	806	993	1005	1007	1026	1516	3817		
4507	START	4456	4481	4488	4503	4515				
151	STEP	390	678	4434						
4465	STRTRC	396	4457	5751						
296	STUS	1090	1092	1634	2081	2727	2729	2732	2733	2735
		2737	2741	2742	2883	2885	2890	2892	2899	2901
		2906	2908	2916	2918	2923	2925	2933	2935	2939
		2941	2957	2959	2984	2986	2992	2994	3912	
318	SUPK	3027	3031							
327	SYST	3997	4174	4233	5797	5899	5937	6023		
5878	TABL	5845	5861							
1279	TMOT	1060	1064	1094	1099					
332	TMUX	1069	1089	1175	1179	1186	1190	1256	1259	1267
		1270	1675	2757	2773	2793	3474	3625	3857	
5781	TPFRM	435	3741	4528	5453	5811	6043			
5814	TPMOS	5800								
5825	TPST	5791	5796	5804	5834					
5816	TPVOR	5802								
152	TRACE	457	739	1427	1504	1663	3689	4452	4462	5449

2287	X036	2241								
2292	X038	2242								
2298	X040	2243								
2303	X042	2244								
2309	X044	2245								
2316	X046	2246								
2323	X048	2247								
2329	X050	2248								
2334	X052	2249								
2339	X054	2250								
2344	X056	2251	2352							
2351	X058	2252								
2355	X060	2253								
2362	X062	2200								
2363	X063	2375	2382	2387						
2373	X064	2201								
2379	X066	2202								
2386	X068	2204								
2391	X070	2205								
2401	X071	2420	2470	2481	2496	2532				
2410	X072	2207								
2424	X074	2210								
2444	X075	2430	2458							
2451	X076	2212								
2463	X078	2214								
2474	X080	2215								
2486	X082	2216								
2500	X084	2219								
2515	X086	2220								
2525	X088	2221								
2530	X089	2541								
2536	X090	2222								
2545	X092	2224								
2560	X094	2364	2397	2419	2428	2456	2469	2478	2495	2504
		2518	2531	2548	2566					
2570	X095	2366	2369	2514	2617	2621	2623			
2573	X096	2437	2442	2446	2459	2507	2510	2521	2551	2553
		2581								
2578	X097	2368	2404	2436	2441	2447	2511	2520	2554	2610
		2616	2624							
2602	X099	2367	2403	2444	2508	2561	2565	2573		
2586	X09A	2570	2578	2594	2595	2596	2600			
2594	X098	2599								

2597	X09C	2589	2593							
2608	X0A0	2402	2405							
2620	X0A1	2612								
2626	X0AA	2399	2412	2417	2464	2475	2489	2493	2608	2611
		2615	2622							
2627	X0AB	2394	2416	2465	2480	2492	2527	2539	2609	2613
		2620								
2724	X100	671	3002	3017	3021	3025	3028	3032	3040	
2953	X103	2877								
2976	X104	2878								
2984	X105	2979								
2992	X106	2981								
2971	X107	2956	2963	2967						
2965	X108	2954								
2955	X109	2968								
2946	X120	2857								
3036	X130	3011								
3027	X134	3014								
3030	X138	3016								
3215	X200	1485	3229	3249	3253	3256	3271			
3228	X202	3219	3221							
3250	X204	3232								
3255	X205	3235	3265							
3259	X206	3233								
3247	X207	3242								
3267	X208	3260								
284	XA	793	1468	1743	2803	3099	3165	3223	5023	5027
		5047								
1888	XA10	1880								
1899	XA12	1889								
1905	XA14	1890								
1910	XA20	1878								
1919	XA22	1912								
1928	XA24	1920								
1933	XA26	1921								
1762	XA30	1748								
1766	XA32	1778								
1809	XA40	1805								
1819	XA41	1811								
1828	XA42	1820								
1835	XA44	1821								
1841	XA46	1808								
1846	XA48	1807								

```
 1797  XA49    1753
 1857  XA50    1848
 1862  XA52    1849
 1940  XA80    1882  1892  1899  1948
 1952  XA82    1893  1924  1957
 1960  XA84    1900  1929  1965
 1968  XA86    1973
 1977  XA88    1914  1923  1928  1986
 1990  XA90    1813  1823  1828  1835  1841  1852  1857  1862  1999
 2002  XA92    1824  2007
 2010  XA94    2014
 2017  XA96    1836  2022
  269  XAB      880   887  4871  4991
  261  XAF      898  1107  4835
 2144  XAL1    2135
  290  XALU    1482  1559  2643  2646  2806  2824  2826  2880  2913
               2931  3037  3060  3186  3225  3243  3247  3263  3268
               3374  3470  3499  3506  3520  3529  3882  5057
  283  XB       797   987  2045  2067  5006  5010  5044  5053  5061
               5062  5068  5069
  276  XC      2160  4903
  291  XCIN    1567  2171  2363  2365  2396  2401  2418  2427  2429
               2455  2457  2468  2477  2494  2503  2505  2517  2530
               2547  2549
  274  XF      2140  2148  2173  2191  2229  4895  4943  4945  4954
               4955  4959  4960
  264  XFS      907   918  4851
  267  XG       815   830   861  1068  1073  1492  2597  2853  2865
               2874  2946  2976  3624  4863
  270  XIMC     787   834   842   847   875   890  3003  3329  3340
               3363  3441  3592  3644  4879  4987
 1900  XIRG2   2965
  272  XLA     1718  1747  4887
  271  XLB     1721  1763  2050  2136  2144  2155  2800  3065  3216
               4883
  268  XM      4867  5000  5017  5040
  275  XMD     2133  4899
  262  XMS      953  4840
  263  XMT      951  4844
  278  XOS      967  3055  4914
  273  XR      3228  3239  4891
  266  XS       781   869  1495  2587  2590  2847  2859  3000  3327
               3361  3436  3589  3600  3649  3653  3664  4859  4984
```

/FINI