```
 OPTIONS NODECK,LIST,XREF,NOREL,OBJ(P)

THE LIST OF OPTIONS USED DURING THIS ASSEMBLY IS--   NODECK,LIST,XREF,NOREL,OBJ
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```
                         EXTERNAL SYMBOL LIST

SYMBOL    TYPE                                    VER 15, MOD 00  29/10/15  PAGE   1

#DPRIN    MODULE
```

```
       #DPRIN - DPRINT AND DEPRES

ERR LOC   OBJECT CODE      ADDR STMT SOURCE STATEMENT          VER 15, MOD 00  29/10/15  PAGE   2

   0000                          2 #DPRIN START 0
                                 3        PRINT ON,NODATA
                                 4 *      @SYS  EXP-Y
                                 6+       PRINT ON
```

```
      @SYSEQ - SYSTEM SOFTWARE EQUATES
```

```
                          8+********************************************************************
                          9+*      CPU EQUATES                                                 *
                         10+********************************************************************
                         11+*
                         12+***    REGISTER EQUATES
                         13+*
               0002      14+@REGL  EQU   2                         HARDWARE REGISTER LENGTH
               0001      15+@BR    EQU   1                         BASE REGISTER
               0002      16+@XR    EQU   2                         USABLE INDEX REGISTER
               0004      17+@PSR   EQU   4                         PROGRAM STATUS REGISTER
               0008      18+@ARR   EQU   8                         ADDRESS RECALL REGISTER
               0010      19+@IAR   EQU   16                        INSTRUCTION ADDRESS REGISTER
               0020      20+@P1IAR EQU   32                        PROGRAM LEVEL 1 IAR
               0040      21+@P2IAR EQU   64                        PROGRAM LEVEL 2 IAR
               00C0      22+@I1IAR EQU   X'C0'                     INTERRUPT LEVEL 1 IAR Q-CODE
                         23+*
                         24+***    EQUATES FOR BYTES OF AN INSTRUCTION
                         25+*
               0001      26+@Q     EQU   1                         Q-CODE BYTE
               0001      27+@VQ    EQU   1                         VARIABLE Q CODE FOR LENGTH
               0002      28+@D1    EQU   2                         1ST DISPLACEMENT
               0003      29+@OP1   EQU   3                         1ST ADDRESS
               0004      30+@DOP2  EQU   4                         2ND ADDR OF 5 BYTE INSTR.
               0004      31+@OPD2  EQU   4                         2ND DISP OF 5 BYTE INSTR.
               0003      32+@DD2   EQU   3                         2ND DISP OF 4 BYTE INSTR.
               0005      33+@OP2   EQU   5                         2ND ADDR OF 5 BYTE INSTR.
               0003      34+@INST3 EQU   3                         LENGTH OF 1 DISP INSTRUCTION
               0004      35+@INST4 EQU   4                         LENGTH OF 1 ADDR INSTRUCTION
               0005      36+@INST5 EQU   5                         LENGTH OF 1 DISP 1 ADDR INSTR.
               0006      37+@INST6 EQU   6                         LENGTH OF 2 ADDR INSTR.
                         38+*
                         39+***    CONDITION CODES FOR BRANCHES
                         40+*
               0087      41+@UCB   EQU   X'87'                     UNCONDITIONAL BRANCH
               0080      42+@NOP   EQU   X'80'                     NO BRANCH
               0084      43+@BH    EQU   X'84'                     BRANCH HIGH
               0082      44+@BL    EQU   X'82'                     BRANCH LOW
               0081      45+@BE    EQU   X'81'                     BRANCH EQUAL
               0004      46+@BNH   EQU   X'04'                     BRANCH NOT HIGH
               0002      47+@BNL   EQU   X'02'                     BRANCH NOT LOW
               0001      48+@BNE   EQU   X'01'                     BRANCH NOT EQUAL
               0088      49+@BOZ   EQU   X'88'                     BRANCH OVERFLOW ZONED
               00A0      50+@BOL   EQU   X'A0'                     BRANCH OVERFLOW LOGICAL
               0008      51+@BNOZ  EQU   X'08'                     BRANCH NO OVERFLOW ZONED
               0020      52+@BNOL  EQU   X'20'                     BRANCH NO OVERFLOW LOGICAL
               0010      53+@BT    EQU   X'10'                     BRANCH TRUE
               0090      54+@BF    EQU   X'90'                     BRANCH FALSE
               0084      55+@BP    EQU   X'84'                     BRANCH PLUS
               0082      56+@BM    EQU   X'82'                     BRANCH MINUS
               0081      57+@BZ    EQU   X'81'                     BRANCH ZERO
               0004      58+@BNP   EQU   X'04'                     BRANCH NOT PLUS
               0002      59+@BNM   EQU   X'02'                     BRANCH NOT MINUS
               0001      60+@BNZ   EQU   X'01'                     BRANCH NOT ZERO
                         61+*
                         62+***    MISCELLANEOUS CONSTANTS
                         63+*
```

```
                         0000   64+@ZERO  EQU   0                        ZERO
                         0001   65+@B1    EQU   1                        BINARY ONE
                         00F0   66+@DZERO EQU   X'F0'                    DECIMAL ZERO
                         0040   67+@BLANK EQU   C' '                     EBCDIC BLANK
                         006B   68+@COMMA EQU   C','                     EBCDIC COMMA
                         0061   69+@SLASH EQU   C'/'                     EBCDIC FORWARD SLASH
                         005B   70+@DOLAR EQU   C'$'                     EBCDIC DOLLAR SIGN
                         005C   71+@ASTER EQU   C'*'                     EBCDIC ASTERISK
                         007B   72+@NUMBR EQU   C'#'                     EBCDIC NUMBER #
                         007C   73+@ASIGN EQU   C'@'                     EBCDIC ASSIGN @
                         00C1   74+@CHARA EQU   C'A'                     EBCDIC CHAR A
                         00C6   75+@CHARF EQU   C'F'                     EBCDIC CHAR F
                         00D9   76+@CHARR EQU   C'R'                     EBCDIC CHAR R
                         00E9   77+@CHARZ EQU   C'Z'                     EBCDIC CHAR Z
                         001E   78+@EOS   EQU   X'1E'                    RETURN CARRIAGE
                         001C   79+@EOF   EQU   X'1C'                    END OF FILE CHARACTER
                         005A   80+@UPARW EQU   X'5A'                    UPARROW FROM KEYBOARD INPUT
                         004E   81+@CPLUS EQU   C'+'                     EBCDIC PLUS SIGN
                         0060   82+@MINUS EQU   C'-'                     EBCDIC MINUS SIGN
                         0001   83+@DCALK EQU   X'01'                    DCAL REQUESTED INDICATOR
                         0020   84+@PGCSZ EQU   32                       CORE SIZE IN PAGES
                         2000   85+@MINCR EQU   256*@PGCSZ               CORE SIZE IN BYTES
                         00F4   86+@LINSZ EQU   244                      LENGTH OF INPUT LINE BUFFER
                         0018   87+@DTRSZ EQU   24                       NO. OF DISK SECTORS PER TRACK
                         0030   88+@SECCY EQU   48                       SECTORS PER CYLINDER
                         0060   89+@CARDL EQU   96                       LENGTH OF 3700 INPUT CARD
                         0050   90+@BCRDL EQU   80                       LENGTH OF 5081 INPUT CARD
                         0005   91+@MAPEN EQU   5                        DISP TO END OF FE CORE MAP
                         0007   92+@SDFLN EQU   7                        LENGTH OF SDF
                         0006   93+@VOLID EQU   6                        LENGTH OF DISK ID FIELD
                         0007   94+@HDRLN EQU   7                        LENGTH OF PROGRAM HEADER
                         0011   95+@CLON  EQU   X'11'                    TURN ON COMMAND LITE Q-CODE
                         0010   96+@CLOFF EQU   X'10'                    TURN Off COMMAND LITE Q-CODE

                                98+*****************************************************************************
                                99+*        DISK REGION EQUATES                                               *
                               100+*****************************************************************************
                               101+*
                         0100  102+@SCTSZ EQU   256                      LENGTH OF ONE SECTOR
                         0500  103+@WSFIT EQU   X'0500'                  SECTOR ADDR OF WS FIT SCTRS
                         0503  104+@WSTBL EQU   X'0503'                  SECTOR ADDR OF WORKING STORAGE
                         0005  105+@DWBCY EQU   5                        BASE CYL SYSTEM WORK FILE
                         0003  106+@DWTB1 EQU   3                        LOGICAL SCTR 1ST TEXT BLOCK
                         00C0  107+@DWSIZ EQU   192                      NO. OF WORK FILE DISK SECTORS
                         0004  108+@DSBCY EQU   4                        BASE CYL SYSTEM ROUTINES
                         0000  109+@DSCS1 EQU   0                        COMPILER SUBROUTINE 1ST SCTR
                         0007  110+@DVBCY EQU   7                        BASE CYL VIRTUAL MEMORY
                         0000  111+@VMFD1 EQU   0                        FILE DIRECTORY 1 PAGE
                         0001  112+@VMFD2 EQU   1                        FILE DIRECTORY 2 PAGE
                         0001  113+@VMTRL EQU   1                        TRACE REFERENCE LIST PAGE
                         0002  114+@VMRS3 EQU   2                        START OF VM RESIDENT SUBROUTINE
                         0056  115+@VENTA EQU   86                       FIRST PSEUDO CODE PAGE IN VM
                         00FE  116+@VMDDV EQU   254                      FUNC AND ARRAY TABLE - PAGE ONE
                         0009  117+@DCBCY EQU   9                        BASE CYL COMPILER VADDR TABLES
                         0040  118+@DCST1 EQU   64                       STMT ADDRESS TABLE 1ST SECTOR
                         0050  119+@DCBT1 EQU   80                       BRANCH ADDRESS TABLE 1ST SECTOR
```

```
      @SYSEQ - SYSTEM SOFTWARE EQUATES
```

```
                         121+*******************************************************************************
                         122+*       DISK IOCR EQUATES                                                     *
                         123+*******************************************************************************
                         124+*
                         125+***     DISK PARAMETER LIST (DPL) EQUATES
                         126+*
                    0000 127+@DCTRL EQU    0                             CONTROL PARAMETER
                    0001 128+@DCYL  EQU    1                             LOGICAL CYLINDER NUMBER
                    0002 129+@DSAD  EQU    2                             HEAD/SECTOR ADDRESS
                    0003 130+@DCNT  EQU    3                             SECTOR COUNT
                    0004 131+@DBFR1 EQU    4                             1ST BYTE OF DATA AREA
                    0005 132+@DBFR2 EQU    5                             DATA AREA ADDRESS
                    0002 133+@DSPIN EQU    X'02'                         SPINDLE BIT IN DISK ADDRESS
                    0006 134+@DPLNG EQU    6                             LENGTH OF DSL
                    0000 135+@DPOS  EQU    X'00'                         DPL - SEEK FUNCTION CODE
                    0001 136+@DGET  EQU    X'01'                         DPL - READ FUNCTION CODE
                    0002 137+@DPUT  EQU    X'02'                         DPL - WRITE FUNCTION CODE
                    0031 138+@DVRFY EQU    X'31'                         DPL - VERIFY FUNCTION CODE
                    00FF 139+@DWAIT EQU    X'FF'                         DPL - WAIT I/O COMPLETE FUNC COD
                    0003 140+@DSIVF EQU    X'03'                         SIO CTRL CODE FOR VERIFY
                         141+*
                    0002 142+@DADDR EQU    2                             LENGTH OF DISK ADDRESS
                    0002 143+@VADDR EQU    2                             LENGTH OF VIRTUAL ADDRESS
                    0002 144+@CADDR EQU    2                             LENGTH OF CORE ADDRESS

                         146+*******************************************************************************
                         147+*       PRINT PARAMETER LIST (PPL) EQUATES                                     *
                         148+*******************************************************************************
                         149+*
                    0004 150+@PPLNG EQU    4                             LENGTH OF PPL
                    0000 151+@PCTRL EQU    0                             CONTROL BYTE DISPLACEMENT
                    0001 152+@PRCNT EQU    1                             COUNT BYTE DISPLACEMENT
                    0003 153+@PDATA EQU    3                             DATA ADDR DISPLACEMENT
                    0040 154+@PRINT EQU    X'40'                         PRINT CONTROL
                    0080 155+@RETRN EQU    X'80'                         RETURN CARRIER CONTROL
                    00C0 156+@PRETR EQU    @PRINT+@RETRN                 PRINT AND RETURN CARRIER
                    0010 157+@TBLEF EQU    X'10'                         TAB LEFT CONTROL
                    0001 158+@INDEX EQU    X'01'                         INDEX FORMS CONTROL
                    0011 159+@TBLIX EQU    @TBLEF+@INDEX                 TAB LEFT AND INDEX CONTROL
                    00FF 160+@PWAIT EQU    X'FF'                         WITH AND CHECK ERROR CONTROL
                    004F 161+@RLDWN EQU    X'4F'                         ROLL DOWN CONTROL (CRT ONLY)
                    0000 162+@TBCNT EQU    0                             TAB LEFT COUNT
                    0080 163+@RTRNC EQU    X'80'                         CARRIER RETURN COUNT
                    0075 164+@EOFTC EQU    X'75'                         EOF RECORD TYPE CODE
                         165+*
                         166+***     STATEMENT/SEGMENT HEADER EQUATES
                         167+*
                    0000 168+@SDF0  EQU    0                             DISP TO NULL SEG INDICATOR
                    0001 169+@SDF1  EQU    1                             DISP TO LENGTH OF SEGMENT
                    0002 170+@SDF2  EQU    2                             DISP TO SEGMENTATION CODE
                    0003 171+@SDF3  EQU    3                             DISP TO END OF SDF
                    0005 172+@SBLN  EQU    5                             DISP TO STMT BINARY LINE NO.
                    0006 173+@STYPE EQU    6                             DISP TO STMT TYPE CODE
                    0007 174+@STEXT EQU    7                             DISP TO 1ST TEXT BYTE OF STMT
                    0080 175+@SNULL EQU    X'80'                         MASK FOR NULL SEG INDICATOR
                         176+*                                           * 1 = SEGMENT IS NULL
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      @SYSEQ - SYSTEM SOFTWARE EQUATES
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```
                              177+*                                      * 0 = SEGMENT IS NOT NULL
                              178+*
                              179+*                        FOLLOWING ARE THE MASKS FOR THE SEGMENTATION
                              180+*                        CODE. THE SEGMENTATION IS INDICATED BY VALUE
                              181+*                        IN @SDF2 AS FOLLOWS:
                0000  182+@SONLY EQU   0                              ONLY SEG. IN RECORD
                0001  183+@SIST  EQU   1                              1ST SEG. OF A MULTI-SEG RCD
                0003  184+@SMIDL EQU   3                              MIDDLE SEG. OF A MULTI-SEG RCD
                0002  185+@SLAST EQU   2                              LAST SEG. OF MULTI-SEG RCD
                0002  186+@SBLNL EQU   2                              LENGTH OF STMT BINARY LINE NO.
                              187+*
                              188+****   FILE INDEX TABLE EQUATES SECTION
                              189+*
                              190+*                        ALL DISPLACEMENT ARE CALCULATED FROM THE
                              191+*                        * FIRST BYTE OF THE FIT TO THE RIGHTMOST BYTE
                              192+*                        * OF THE SPECIFIED FIELD UNLESS OTHERWISE
                              193+*                        * NOTED.
                              194+*
                0002  195+@FDLNC EQU   2                              DISP TO FILE LINE COUNT
                0002  196+@FLLNC EQU   2                              LNG OF FILE LINE COUNT FIELD
                0000  197+@FDDBC EQU   0                              DISP TO FILE DATA BLOCK COUNT
                0001  198+@FLDBC EQU   1                              LNG OF FILE DATA BLOCK COUNT
                0009  199+@FLACE EQU   9                              DISP O ADDR OF CURR ENTRY
                000B  200+@FDFNA EQU   11                             DISP TO ADDR OF 1ST NULL ENTRY
                0002  201+@FLFNA EQU   2                              LNG OF ADDR OF 1ST NULL ENTRY
                000C  202+@FDE1  EQU   12                             DISP TO 1ST BYTE OF 1ST ENTRY
                0004  203+@FLENT EQU   4                              LNG OF A FIT ENTRY
                              204+*
                              205+*                        ENTRY FIELD DISPLACEMENTS ARE CALCULATED FROM
                              206+*                        * THE 1ST BYTE OF THE ENTRY.
                              207+*
                0000  208+@FDSD  EQU   0                              DISP TO DB SECTOR DISP
                0001  209+@FLSD  EQU   1                              LNG OF DB SECTOR DISP FIELD
                0002  210+@FDHLN EQU   2                              DISP TO HIGH LINE NO. FIELD
                0002  211+@FLHLN EQU   2                              LNG OF HIGH LINE NO. FIELD
                0003  212+@FDNSC EQU   3                              DISP TO DB NULL SPACE CNT FIELD
                0001  213+@FLNSC EQU   1                              LNG OF DB NULL SPACE CNT FIELD
                              214+*
                              215+*        END OF SYSTEM SOFTWARE EQUATES
                              216+        PRINT ON
                              217 *       @HDW  EXP-Y
                              219+        PRINT ON
```

```
                        221+*************************************************************************
                        222+*       DISK HARDWARE EQUATES                                          *
                        223+*************************************************************************
                        224+*
                        225+***    DISK CONTROL FIELD EQUATES
                        226+*
                 0000   227+@PFLAG EQU   0                         F-BYTE
                 0001   228+@PCYL  EQU   1                         C-BYTE
                 0002   229+@PSAD  EQU   2                         S-BYTE
                 0003   230+@PCNT  EQU   3                         N-BYTE
                        231+*
                 0004   232+@DCFLN EQU   4                         LENGTH OF DISK CTRL FIELD
                 0001   233+@DCYMV EQU   X'01'                     DIRECTION BIT IN SEEK S-BYTE
                        234+*
                 0006   235+@DFCR  EQU   6                         DFCR Q-CODE FOR LIO
                 0004   236+@DFDR  EQU   4                         DFDR Q-CODE FOR LIO
                        237+*
                 0000   238+@DSEEK EQU   X'00'                     SIO Q-CODE SEEK FUNCTION
                 0001   239+@DREAD EQU   X'01'                     SIO Q-CODE READ FUNCTION
                 0002   240+@DWRIT EQU   X'02'                     SIO Q-CODE WRITE FUNCTION
                        241+*
                 0001   242+@DCWID EQU   X'01'                     CTRL BYTE FOR SIO WRITE ID
                 0000   243+@SKCTL EQU   X'00'                     CTRL BYTE FOR SIO SEEK
                 0003   244+@DVERY EQU   X'03'                     CTRL BYTE FOR SIO VERIFY
                 0000   245+@DCTRW EQU   X'00'                     SIO CTRL FOR READ/WRITE DATA
                 0001   246+@DCRID EQU   X'01'                     SIO CTRL FOR READ ID
                        247+*
                 0002   248+@DBUSY EQU   2                         CONDITION CODE FOR DISK BUSY
                 0000   249+@DERR  EQU   0                         CONDITION CODE FOR DISK ERROR
                 0002   250+@DVST1 EQU   X'02'                     SNS I/O CODE FOR BYTES 0,1
                 0003   251+@DVST2 EQU   X'03'                     SNS I/O CODE FOR BYTES 2,3
                 00A0   252+@SPINA EQU   X'A0'                     DEV CODE ADDR DISK SPINDLE A
                 00B0   253+@SPINB EQU   X'B0'                     DEV CODE ADDR DISK SPINDLE B
                 0001   254+@ALTFL EQU   1                         ALTERNATE TRACK FLAG BYTE
                 0002   255+@DEFLG EQU   2                         DEFECTIVE TRACK FLAG BYTE
                 0000   256+@NORFL EQU   0                         NORMAL TRACK FLAG BYTE
                 0001   257+@HSTQR EQU   1                         Q+R BYTE ENTRIES IN HISTORY LOG
                 0005   258+@HSTSN EQU   5                         SENSE BYTE ENTRY IN HISTORY LOG
                 0006   259+@HSTPE EQU   6                         ERROR TYPE ENTRY IN HISTORY LOG
                 0007   260+@HSTEN EQU   7                         END OF 1ST ENTRY IN HISTORY LOG
                 0009   261+@HSTAD EQU   9                         DISK ADDR ENTRY IN HISTORY LOG
                 000F   262+@HSTVI EQU   15                        VOL-ID ENTRY IN HISTORY LOG
                 0000   263+@DHARD EQU   0                         HARD ERR INDR MASK FOR @ HSTPE
                        264+*
                        265+***    DISK ERROR STATUS BITS
                        266+*
                 0000   267+@SNSB0 EQU   0                         SENSE BYTE 0 DISPLACEMENT
                 0001   268+@SNSB1 EQU   1                         SENSE BYTE 1 DISPLACEMENT
                 0002   269+@SNSB2 EQU   2                         SENSE BYTE 2 DISPLACEMENT
                 0003   270+@SNSB3 EQU   3                         SENSE BYTE 3 DISPLACEMENT
                        271+*
                        272+***    BYTE 0
                        273+*
                 0040   274+@DERIN EQU   X'40'                     INTERVENTION REQUIRED
                 0020   275+@DERMA EQU   X'20'                     MISSING ADDR MARK
                 0010   276+@DEREQ EQU   X'10'                     EQUIPMENT CHECK
```

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                        0008  277+@DERD2 EQU    X'08'                       DATA CHECK
                        0004  278+@DERNR EQU    X'04'                       NO RECORD FOUND
                        0002  279+@DERTC EQU    X'02'                       TRACK CONDITION CHECK
                        0001  280+@DERSC EQU    X'01'                       SEEK CHECK
                        0080  281+@DUNSF EQU    X'80'                       UNSAFE CONDITION MASK - BYTE 2
                              282+*
                              283+***     BYTE 1
                              284+*
                        0020  285+@DERCE EQU    X'20'                       END OF CYLINDER
                        0004  286+@OVRUN EQU    X'04'                       OVERRUN

                              288+************************************************************************
                              289+*         MATRIX PRINTER I/O EQUATES                                  *
                              290+************************************************************************
                        0004  291+@PLNGH EQU    4                           LENGTH OF PCF
                        0002  292+@SYCNT EQU    2                           DISP OF CNT IN SYNC CK PCF
                        0003  293+@RTCNT EQU    3                           RETURN CNT BYTE IN PCF
                        00E4  294+@PDAR  EQU    X'E4'                       DATA LSR FOR MP
                        00E6  295+@PCAR  EQU    X'E6'                       CONTROL LSR FOR MP
                        0000  296+@PSIOR EQU    X'00'                       SIO CTRL CODE FOR MP
                        00E0  297+@PSIOQ EQU    X'E0'                       SIO Q-CODE FOR MP
                        00E2  298+@PBUSY EQU    X'E2'                       TIO BUSY CODE
                        00E1  299+@PFORM EQU    X'E1'                       TIO FORMS CHECK CODE
                        00E2  300+@PLITE EQU    X'E2'                       LIO INDR LIGHT CODE
                        00E0  301+@PERR  EQU    X'E0'                       TIO ERROR CHECK CODE
                        0020  302+@PMGCK EQU    X'20'                       MARGIN CHECK BIT
                        00E2  303+@PSNSQ EQU    X'E2'                       MP SENSE I/O Q-CODE

                              305+************************************************************************
                              306+*         KEYBOARD EQUATES FOR DEPRES                                 *
                              307+************************************************************************
                        001E  308+@KENAB EQU    X'1E'                       ENABLE, UNLOCK KEYBOARD CTRL
                        001F  309+@KEXIT EQU    X'1F'                       RESTORE ENABLE KEYBOARD EXIT CTR
                        001B  310+@KELOK EQU    X'1B'                       LOCK, EXIT, DISABLE CTRL
                        0020  311+@KCMDK EQU    X'20'                       COMMAND KEY MASK
                        0001  312+@CKY01 EQU    1                           COMMAND KEY 1
                        0002  313+@CKY02 EQU    2                           COMMAND KEY 2
                        0003  314+@CKY03 EQU    3                           COMMAND KEY 3
                        0004  315+@CKY04 EQU    4                           COMMAND KEY 4
                        0005  316+@CKY05 EQU    5                           COMMAND KEY 5
                        0006  317+@CKY06 EQU    6                           COMMAND KEY 6
                        0007  318+@CKY07 EQU    7                           COMMAND KEY 7
                        0008  319+@CKY08 EQU    8                           COMMAND KEY 8
                        0009  320+@CKY09 EQU    9                           COMMAND KEY 9
                        000A  321+@CKY10 EQU    10                          COMMAND KEY 10
                        000B  322+@CKY11 EQU    11                          COMMAND KEY 11
                        000C  323+@CKY12 EQU    12                          COMMAND KEY 12
                        000D  324+@CKY13 EQU    13                          COMMAND KEY 13
                        000E  325+@CKY14 EQU    14                          COMMAND KEY 14
                        000F  326+@CKY15 EQU    15                          COMMAND KEY 15
                        0010  327+@CKY16 EQU    16                          COMMAND KEY 16
                        0010  328+@KEYBD EQU    X'10'                       KEYBOARD Q-CODE
                        0000  329+@CMOFF EQU    X'00'                       LIO M+N BYTE CMND INDRS OFF
                        0001  330+@CMLON EQU    X'01'                       LIO M+N BYTE CMND INDRS ON
                        0010  331+@KFUNK EQU    X'10'                       FUNCTION KEY MASK
                        000D  332+@KLEAR EQU    X'0D'                       CLEAR COMMAND KEY MASK
```

@HDWEQ - SYSTEM HARDWARE I/O EQUATES

```
                        001C  333+@TYPO  EQU   X'1C'                    SIO CTRL FOR TYPAMATIC
                        0002  334+@TYPAM EQU   X'02'                    TYPAMATIC FUNCTION BIT
                        0080  335+@PRITY EQU   X'80'                    PARITY ERROR BIT
                        0011  336+@KHARD EQU   X'11'                    SIO CTRL FOR HARD ERROR
                        0012  337+@FLDIN EQU   X'12'                    LIGHT FIELD INDR Q-BYTE

                              339+***************************************************************************
                              340+*         CRT I/O EQUATES                                               *
                              341+***************************************************************************
                              342+*
                        0092  343+@CRTDS EQU   X'92'                    SIO Q-BYTE
                        0092  344+@DSBSY EQU   X'92'                    CRT BUSY MASK
                        0090  345+@CRTQ  EQU   X'90'                    LIO Q-BYTE
                        0090  346+@CRERR EQU   X'90'                    CRT ERROR MASK
                        0040  347+@CURSR EQU   X'40'                    CURSOR BIT
                        0040  348+@DLNLG EQU   64                       LENGTH OF CRT LINE
                        000F  349+@DLNCT EQU   15                       NUMBER OF LINES IN BUFFER
                        0004  350+@CRPRY EQU   X'04'                    PARITY ERROR BIT
                        0010  351+@BKSPC EQU   X'10'                    BACKSPACE CTRL BYTE
                        0010  352+@4K    EQU   16                       NUMBER OF SCTRS = 4K

                              354+***************************************************************************
                              355+*         GENERAL EQUATES FOR 3.7B CARD READER/PUNCH                     *
                              356+***************************************************************************
                              357+*
                              358+***    SIO FUNCTION CODES
                              359+*
                        0000  360+@CC37B EQU   X'00'                    SIO CONTROL CODE
                              361+*
                              362+***    TIO FUNCTION CODES
                              363+*
                        00F2  364+@BZ37B EQU   X'F2'                    DEVICE BUSY CODE
                        00F0  365+@ER37B EQU   X'F0'                    I/O CHECK OR NOT READY
                              366+*
                              367+***    LIO FUNCTION CODES
                              368+*
                        00F0  369+@LO37B EQU   X'F0'                    LOAD READ ADDESS REGISTER
                              370+*
                              371+***    SNS FUNCTION CODES
                              372+*
                        00F2  373+@SN37B EQU   X'F2'                    STORE ERROR STATUS BYTES

                              375+***************************************************************************
                              376+*         3.7B CARD READER EQUATES                                       *
                              377+***************************************************************************
                        00F0  378+@CD37B EQU   X'F0'                    DEVICE ADDRESS - READER
                        00F1  379+@RD37B EQU   X'F1'                    SIO READ FUNCTION

                              381+***************************************************************************
                              382+*         3.7B CARD PUNCH EQUATES                                        *
                              383+***************************************************************************
                        00F0  384+@PN37B EQU   X'F0'                    DEVICE ADDRESS - PUNCH
                        00F2  385+@PC37B EQU   X'F2'                    SIO PUNCH FUNCTION

                              387+***************************************************************************
                              388+*         ERROR FUNCTION CODES                                           *
```

```
        @HDWEQ - SYSTEM HARDWARE I/O EQUATES


ERR LOC   OBJECT CODE      ADDR STMT SOURCE STATEMENT          VER 15, MOD 00  29/10/15  PAGE  10

                          389+*******************************************************************************
                     0040  390+@TJ37B EQU    X'40'                        TRANSPORT JAM
                     0004  391+@CP37B EQU    X'04'                        COMPARE ERROR
                     0005  392+@RT37B EQU    X'05'                        RETRY COUNT
                     00A0  393+@NTRDY EQU    X'A0'                        CARD READER NOT READY TEST

                          395+*******************************************************************************
                          396+*      PPL EQUATES                                                           *
                          397+*******************************************************************************
                     00FF  398+@WA37B EQU    X'FF'                        WAIT AND CHECK FOR ERRORS
                     0080  399+@PD37B EQU    X'80'                        PUNCH DATA
                     00C0  400+@IP37B EQU    X'C0'                        INSERT AND PUNCH DATA
                     0040  401+@ID37B EQU    X'40'                        INSERT DATA
                          402+*      END OF SYSTEM HARDWARE I/O EQUATES
                          403+       PRINT ON
                          404 *      @FXD  EXP-Y
                          406+       PRINT ON
```

```
                                408+**********************************************************************
                                409+*       GLOBAL INDICATORS STORED IN THE SYSTEM NUCLEUS, ENTRY POINTS  *
                                410+*       FOR SYSNUC INTERFACE ROUINES.                                 *
                                411+**********************************************************************
      0000                      412+      ORG     X'0000'                          *
                 0000           413+$$ZERO EQU    *                                ENTRY POINT TO LOAD DUMP PGM
                 0004           414+$FEARR EQU    $$ZERO+4                         VALUE OF ADDR IN ARR ON FE AID
                                415+*
                 0025           416+$DISKN EQU    $$ZERO+37                        ADDR OF ENTRY TO DISK IOCS
                 00DE           417+$KE090 EQU    $$ZERO+X'00DE'                   ADDR OF DKDISK ERR-PEND EXIT
                 01D5           418+$KE130 EQU    $$ZERO+X'01D5'                   ADDR OF DKDISK HARD ERROR EXIT

      0345                      420+      ORG     X'0345'                          *
                 0345           421+$ERLOG EQU    *                                ADDR OF ENTRY TO LOG I/O ERRORS
                 0363           422+$ER050 EQU    $$ZERO+X'0363'                   START OF DISK OPS IN NERLOG

                                424+**********************************************************************
                                425+*       COMMUNICATION AREA REFERENCING NUCLEUS                        *
                                426+**********************************************************************
                                427+*
      03C0                      428+      ORG     X'03C0'                          *
                 03C0           429+$NUCBS EQU    *                                START OF COMMUNICATION AREA
                 03C0           430+$RMRGN EQU    $NUCBS                           ADDR OF BYTE CONTAINING THE
                                431+*                                             * SOFTWARE RIGHT MARGIN VALUE
                 03C1           432+$LMRGN EQU    $RMRGN+1                         ADDR OF BYTE CONTAINING THE
                                433+*                                             * SOFTWARE LEFT MARGIN VALUE
                 03C2           434+$PRPOS EQU    $LMRGN+1                         ADDR OF BYTE CONTAINING CURRENT
                                435+*                                             * POSITION OF MATRIX PRINTER
                                436+*                                             * HEAD
                 03C3           437+$KEYCD EQU    $PRPOS+1                         ADDR OF BYTE CONTAINING KEYBOARD
                                438+*                                             * INDICATORS. A LIST OF THE
                                439+*                                             * INDICATORS AND MASKS FOLLOW
                 0001           440+$CARDI EQU    X'01'                            INPUT SOURCE INDR MASK
                                441+*                                             * 0 - KEYBOARD INPUT
                                442+*                                             * 1 - CARD OR PROC INPUT
                 0002           443+$IOYES EQU    X'02'                            I/O ROUTINES IN CORE INDR MASK
                                444+*                                             * 0 - I/O ROUTINES NOT IN CORE
                                445+*                                             * 1 - I/O ROUTINES IN CORE
                 0004           446+$NOLST EQU    X'04'                            NO LIST INDR MASK
                                447+*                                             * 0 - LISTING REQUIRED
                                448+*                                             * 1 - NO LISTING RESIRED
                 0008           449+$GUFIR EQU    X'08'                            GUFUDI ABORT INDR
                                450+*                                             * 1 - GUFUDI INTERRUPT, NOT ABOR
                                451+*                                             * 0 - GUFUDI ABORTED
                                452+*                                             * FOR THE ABOVE INDICATOR TO BE
                                453+*                                             * VALID, $INTRP MUST BE PRESENT
                 0010           454+$KYBSY EQU    X'10'                            KEYBOARD BUSY INDR
                                455+*                                             * 0 - LINE FINISHED
                                456+*                                             * 1 - LINE NOT YET COMPLETE
                 0020           457+$INRPT EQU    X'20'                            INTERRUPT INDR
                                458+*                                             * 0 - PROGRAM NOT ABORTED
                                459+*                                             * 1 - PROGRAM ABOPRTED
                 0040           460+$DTNMB EQU    X'40'                            * 1 - AUTOMATIC LINE NUMBERS
                                461+*                                             * GENERATED FOR CARD INPUT
                 0080           462+$TRUNK EQU    X'80'                            TRUNCATED LINE INDR
                                463+*                                             * 1 - LAST LINE TRUNCATED
```

                     464+*   * 0 - LAST LINE COMPLETED

```
                          466+********************************************************************
                          467+*        REGISTER SAVE AREAS. THESE AREAS ARE AVAILABLE FOR            *
                          468+*        TEMPORARELY USE BY ANY PROGRAM                                *
                          469+********************************************************************

             03C5  471+$BRSAV EQU    $KEYCD+2                    ADDR OF 2 BYTE BASE REG SAVE
             03C7  472+$XRSAV EQU    $BRSAV+2                    ADDR OF 2 BYTE XR SAVE AREA

             03CB  474+$TABLN EQU    $XRSAV+4                    CURRENT AUTOMATIC LINE NUMBER
                   475+*                                         * TO BE INSERTED IF TAB KEY
                   476+*                                         * PRESSED. (ADDR OF LINE NO.)
             03CD  477+$CAERR EQU    $TABLN+2                    ADDR OF ERROR CODE SAVED FOR
                   478+*                                         * INTERFACE WITH ERRPGM
             03CF  479+$INLNO EQU    $CAERR+2                    ADDR OF EXECUTION TIME LINE
                   480+*                                         * NUMBER FOR INTERPRETER
             03CE  481+$ERRPG EQU    $INLNO-1                    ADDR OF INDICATOR BYTE IF
                   482+*                                         * SPECIAL FUNCTION REQUESTED
                   483+*                                         * OF ERROR PROGRAM
             0030  484+$ERSTK EQU    X'30'                       TO BE MOVED TO $ERRPG IF A STACK
                   485+*                                         * OF ERROR CODES IS TO BE PROCES
             0035  486+$ERSFL EQU    X'35'                       SYNTAX CHECKERS $ERRPG SETTING
             0040  487+$ERFIL EQU    X'40'                       TO BE MOVED TO $ERRPG IF FILE
                   488+*                                         * LINE ERROR OCCURS
             0050  489+$ER1N2 EQU    X'50'                       TO BE MOVED TO $ERRPG IF LEVEL
                   490+*                                         * 1 AND 2 MESSAGES REQUIRED
             0080  491+$ERKEY EQU    X'80'                       STANDARD ERROR SETTING USED BY
                   492+*                                         * COMMAND ANALYZER ONLY
             03CF  493+$ERRCT EQU    $INLNO                      ADDR OF COUNT BYTE FOR STACK
                   494+*                                         * OF ERROR MESSAGES
```

```
                        496+*******************************************************************
                        497+*        SYSTEM STATUS EQUATES                                   *
                        498+*******************************************************************
                        499+*
                  03D0  500+$XIND1 EQU    $INLNO+1                 ADDR OF PRIMARY EXEC MODE INDRS
                        501+*                                     * ENTRIES FOLLOW
                  0001  502+$RUNIT EQU    X'01'                    1 - EXECUTE IN RUN MODE
                  0002  503+$STEPT EQU    X'02'                    1 - EXECUTE IN STEP MODE
                  0004  504+$TRACE EQU    X'04'                    1 - EXECUTE IN TRACE MODE
                        505+*                                     THE THREE MODE INDICATORS ARE
                        506+*                                     MUTUALLY EXCLUSIVE. IF $TRACE
                        507+*                                     IS ON, AT LEAST 1 OF THE TRACE
                        508+*                                     TYPE CODE MUST ALSO BE ON.
                  0008  509+$TFLOW EQU    X'08'                    1 - TRACE FLOW
                  0010  510+$TRALL EQU    X'10'                    1 - TRACE ALL
                  0020  511+$TRVAR EQU    X'20'                    1 - TRACE SELECTED VARIABLES
                  0040  512+$XPREC EQU    X'40'                    EXECUTION PRECISION INDR
                        513+*                                     * 0 - SHORT PRECISION
                        514+*                                     * 1 - LONG PRECISION
                  0080  515+$VMDEF EQU    X'80'                    VM USAGE INDR
                        516+*                                     * 1 - VIRTUAL MEMORY NOT EMPTY
                        517+*                                     * 0 - VIRTUAL MEMORY EMPTY

                  03D1  519+$XIND2 EQU    $XIND1+1                 ADDR OF EXECUTION INDICATORS
                        520+*                                     * MASK AND INDRS FOLLOW
                  0001  521+$EXCMD EQU    X'01'                    EXECUTION INDR
                        522+*                                     * 1 - IN EXECUTION
                  0002  523+$PAUSE EQU    X'02'                    * 1 - PROGRAM IN PAUSE STATE
                  0004  524+$PSTEP EQU    X'04'                    * 1 - PAUSE CAUSED BY STEP MODE
                  0008  525+$PSTMT EQU    X'08'                    * 1 - PAUSE CAUSED BY PAUSE STMT
                  0010  526+$ABORT EQU    X'10'                    * 1 - ABORT EXECUTION

                  03D2  528+$IOIND EQU    $XIND2+1                 I/O STATUS INDICATORS
                        529+*                                     * MASKS AND EXPLANATION FOLLOW
                  0001  530+$MPDWN EQU    X'01'                    MP STATE
                        531+*                                     * 0 - MATRIX PRINTER OPERATIONAL
                        532+*                                     * 1 - MATRIX PRINTER DOWN
                  0002  533+$CRTAV EQU    X'02'                    CRT AVAILABILITY
                        534+*                                     * 0 - NO CRT ON SYSTEM
                        535+*                                     * 1 - CRT ON THE SYSTEM
                  0004  536+$CRTNO EQU    X'04'                    SYSPRNT ON CRT
                        537+*                                     * 0 - CRT NOT AVAIL FOR SYSPRNT
                        538+*                                     * 1 - CRT MAY BE USED FOR SYSPRN
                  0008  539+$CMDKY EQU    X'08'                    KEYBOARD MODE
                        540+*                                     * 0 - NORMAL KEYBOARD INPUT
                        541+*                                     * 1 - COMMAND KEYS USE ONLY
                  0010  542+$PGMST EQU    X'10'                    PGM START KEY
                        543+*                                     * 0 - MAY BE USED FOR AUTO LINE
                        544+*                                     * 1 - NOT USED FOR AUTO LINE #
                  0020  545+$HRDER EQU    X'20'                    HARD ERROR INDICATOR
                        546+*                                     * 0 - SOFT ERROR
                        547+*                                     * 1 - HARD ERROR
                  0040  548+$DTRDR EQU    X'40'                    DATA RECORDER
                        549+*                                     * 0 - DATA RECORDER NOT ON SYSTE
                        550+*                                     * 1 - DATA RECORDER IS ON SYSTEM
                  0080  551+$LNPTR EQU    X'80'                    MP OPTION
```

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        @FXDEQ - FIXED ADDRESSES FOR SYSTEM NUCLEUS
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ERR LOC OBJECT CODE   ADDR STMT SOURCE STATEMENT   VER 15, MOD 00 29/10/15 PAGE 15

```
                          552+*                                  * 1 - 50 LPM OPTION AVAILABLE

                   03D3   554+$CRTIN EQU    $IOIND+1              CRT COMMAND INDICATORS
                          555+*                                  * MASKS AND EXPLANATION FOLLOW
                   0001   556+$CRTUP EQU    X'01'                1 - CRT IN ROLL UP MODE
                   0002   557+$CRTDN EQU    X'02'                1 - CRT IN ROLL DOWN MODE
                   0004   558+$CRTPU EQU    X'04'                1 - POP UP CONDITION REQUESTED
                   0008   559+$CRTSP EQU    X'08'                1 - ROLL STOP REQUESTED

                   03D4   561+$INDR1 EQU    $CRTIN+1             WORK FILE STATUS INDICATORS
                          562+*                                  * MASKS AND EXPLANATION FOLLOW
                   0001   563+$PROCI EQU    X'01'                PROCEDURE FILE INDR
                          564+*                                  * 0 - NOT A PROCEDURE
                          565+*                                  * 1 - A PROCEDURE
                   0002   566+$PRESN EQU    X'02'                WORK FILE PRECISION INDR
                          567+*                                  * 0 - SHORT PRECISION USED
                          568+*                                  * 1 - LONG PRECISION BEING USED
                   0004   569+$WSIND EQU    X'04'                WORKING STORAGE INDR MASK
                          570+*                                  * 0 - WORKING STOR ON DISK IS EM
                          571+*                                  * 1 - WORKING STORAGE IS NOT EMP
                   0008   572+$WFLOK EQU    X'08'                WORK FILE LOCK INDR
                          573+*                                  * 0 - FILE NOT PROTECTED
                          574+*                                  * 1 - FILE PROTECTED
                   0010   575+$FITIN EQU    X'10'                FIT SECTORS INDR MASK
                          576+*                                  * 0 - FIT SECTORS NOT PRESENT
                          577+*                                  * 1 - FIT SECTORS IN CORE
                   0020   578+$PGMDT EQU    X'20'                PGM DATA FILE INDR
                          579+*                                  * 1 - PROGRAM GENERATED
                          580+*                                  * DATA FILE IN WORK FILE
                   0040   581+$KEYDT EQU    X'40'                KEYBOARD OR CARD FILE INDR
                          582+*                                  * 1 - KYBRD OR CARD GENERATED
                          583+*                                  * DATA FILE IN WORK FILE
                   0080   584+$BASIC EQU    X'80'                BASIC PROGRAM INDR
                          585+*                                  * 1 - BASIC PGM IN WORK FILE

                   03D5   587+$INDR2 EQU    $INDR1+1             ADDR OF SYSTEM 1-BIT INDRS
                          588+*                                  * MASKS AND EXPLANATION FOLLOW
                   0002   589+$CMODE EQU    X'02'                CONVERSATIONAL MODE INDR MASK
                          590+*                                  * 0 - UTILITY MODE
                          591+*                                  * 1 - CONVERSATIONAL MODE
                   0004   592+$ERPND EQU    X'04'                ERROR LOG PENDING INDR
                          593+*                                  * 0 - NO LOGGING REQUIRED
                          594+*                                  * 1 - ERROR LOGGING PENDING
                   0008   595+$DKERR EQU    X'08'                DISK ERROR INDR
                          596+*                                  * 0 - ERROR WAS NOT DISK
                          597+*                                  * 1 - ERROR WAS DISK, 2 ENTRIES
                          598+*                                  * REQUIRED IN HISTORY LOG
                   0010   599+$FCIND EQU    X'10'                CRUSH INDR MASK
                          600+*                                  * 1 - SINGLE LINE NO DELETION
                          601+*                                  * THROUGH THE CMD ANALYZER REQUI
                          602+*                                  * IF $FUIND, $FCIND AND $FDIND A
                          603+*                                  * ALL ZERO, CRUCHING OP REQUIRED
                   0020   604+$FUIND EQU    X'20'                LINE PASSED INDR MASK
                          605+*                                  * 1 - LINE PASSED
                   0040   606+$FDIND EQU    X'40'                LINE NUMBER LIST
                          607+*                                  * 1 - LINE NO LIST IS DELETED
```

```
                     0080  608+$READY EQU   X'80'                    PRINT READY INDR
                           609+*                                     * 0 - READY WILL BE PRINTED
                           610+*                                     * 1 - READY WON'T BE PRINTED

                     03D6  612+$INDR3 EQU   $INDR2+1                 ADDR OF SYSTEM 1-BIT INDRS
                           613+*                                     * MASKS AND EXPLANATION FOLLOW
                     0001  614+$DBLOK EQU   X'01'                    SAVE PROTECTED WORK FILE MASK
                           615+*                                     * 1 - FILE MAY BE SAVED TO $$LIB
                     0002  616+$LIST  EQU   X'02'                    KLISTN INDR
                           617+*                                     * 0 - IGNORE ROLL DOWN KEY
                           618+*                                     * 1 - EXCEPT ROLL DOWN KEY
                     0004  619+$ERHRD EQU   X'04'                    ERRPGM HARD ERROR INDR
                           620+*                                     * 1 - ERRPGM WILL EXECUTE HARD
                           621+*                                     *     HALT AFTER PRINTING MSG
                     0008  622+$NOENB EQU   X'08'                    KEYBOARD ENABLE INDR
                           623+*                                     * 0 - KEYBOARD NOT ENABLED -
                           624+*                                     *     GUFUDI WILL ENABLE
                           625+*                                     * 1 - KEYBOARD HAS ALREADY
                           626+*                                     *     BEEN ENABLED
                     0010  627+$CLBFR EQU   X'10'                    CLEAR INPUT LINE BUFFER INDR
                           628+*                                     * 0 - DON'T CLEAR LINE BUFFER
                           629+*                                     * 1 - CLEAR THE INPUT LINE BUFF
                     0020  630+$MOUNT EQU   X'20'                    MOUNT KEYBOARD INDR MASK
                           631+*                                     * 1 - ONLY MOUNT COMMAND VALID
                     0040  632+$NWRKR EQU   X'40'                    REMOVABLE DISK WORK AREA INDR
                           633+*                                     * 0 - CORRECT WORK AREA ON R1
                           634+*                                     * 1 - NO WORK AREA ON R1
                     0080  635+$NWRKF EQU   X'80'                    FIXED DISK WORK AREA INDR
                           636+*                                     * 0 - CORRECT WORK AREA ON F1
                           637+*                                     * 1 - NO WORK AREA ON F1

                     03D7  639+$DKSIZ EQU   $INDR3+1                 ADDR OF DISK SIZE INDR
                           640+*                                     * MASKS AND EXPLANATION FOLLOW
                     0001  641+$DK100 EQU   X'01'                    1 - SYSTEM HAS 100 CYLS
                     0002  642+$DK200 EQU   X'02'                    1 - SYSTEM HAS 200 CYLS
                     0004  643+$DK400 EQU   X'04'                    1 - SYSTEM HAS 400 CYLS
                     0008  644+$DK600 EQU   X'08'                    1 - SYSTEM HAS 600 CYLS
                     0010  645+$DK800 EQU   X'10'                    1 - SYSTEM HAS 800 CYLS

                     03D8  647+$XIND3 EQU   $DKSIZ+1                 PAST $XIND1
                           648+*                                     * SEE $XIND1 FOR INDR MASKS

                     03DA  650+$FILIB EQU   $XIND3+2                 ADDR OF CURRENT FILE LIB DADDR
                     03DC  651+$USRDR EQU   $FILIB+2                 ADDR OF REL DISP TO 1ST USER BK
                     03DD  652+$CONFG EQU   $USRDR+1                 CONFIGURATION INDRS
                     0001  653+$22IMP EQU   X'01'                    0 - 13 INCH MATRIX PRINTER
                           654+*                                     1 - 22 INCH MATRIX PRINTER
                     0002  655+$16K   EQU   X'02'                    1 - CPU HAS 12 KBYTE
                     0004  656+$12K   EQU   X'04'                    1 - CPU HAS 16 KBYTE
                           657+*                                     * IF BOTH OFF: CPU HAS 8 KBYTE
                     0008  658+$16CKY EQU   X'08'                    0 - KEYBOARD HAS  8 CMD KEYS
                           659+*                                     1 - KEYBOARD HAS 16 CMD KEYS
                     0080  660+$BIGCD EQU   X'80'                    1 - CPU HAS 129 DATA RECORDER

                     03DF  662+$LEVEL EQU   $CONFG+2                 ADDR OF SYSTEM LEVEL NUMBER
```

@FXDEQ - FIXED ADDRESSES FOR SYSTEM NUCLEUS

```
                        03E0  664+$DBGUF EQU   $LEVEL+1                    ADDR OF GUFUDI DEBUG INDR
                        0080  665+$CRUSH EQU   X'80'                       0 - CRUSH THE FILE
                        0040  666+$REORD EQU   X'40'                       0 - REORDER THE FILE
                        0020  667+$IRKEY EQU   X'20'                       1 - ENABLE KEYBOARD INPUT
                        0010  668+$IOPGS EQU   X'10'                       D1 PAGES INDR: 0 - ONE
                        0008  669+$CALLI EQU   X'08'                       PROCEDURE CALL INDR
                              670+*                                        * 0 - NOT A CALL
                              671+*                                        * 1 - A CALL

                        03E1  673+$KEYBD EQU   $DBGUF+1                    KEYBOARD TYPE INDR
                              674+*                                        * THIS VALUE WILL BE A BINARY
                              675+*                                        * VALUE FROM 1 TO 12 INDICATING
                              676+*                                        * WHICH DATA TABLE IS IN USE

                        03E2  678+$CRPOS EQU   $KEYBD+1                    ADDR OF CURRENT CURSOR POSITION
                        03E3  679+$BUFPT EQU   $CRPOS+1                    LINE PRINTER BUFFER POINTER  1-3
                        03E4  680+$LPRP3 EQU   $BUFPT+1                    LINE PRINTER FLAGS           1-3
                        03E5  681+$LPROS EQU   $LPRP3+1                    TRUE LINE PRINTER PRINT POS. 1-3

                        03E6  683+$NEXTB EQU   $LPROS+1                    REL DADDR PROCEDURE CALL     1-4
                        03E7  684+$NEXTL EQU   $NEXTB+1                    DISPLACEMENT WITHIN DB       1-4
                        03E8  685+$DFDET EQU   $NEXTL+1                    GRAPRO INTERNAL INDR         1-4
                        03EA  686+$LPRIO EQU   $DFDET+2                    LINE PRINTER BUF INC. + PDAR 1-4

                        03F5  688+$PTCH1 EQU   $DKSIZ+30                   LAST BYTE OF NUCLUES AREA
                              689+************************************************************************
                              690+*         TABLES AND SYSTEM WORK AREAS                                *
                              691+************************************************************************
                        03F6  692+$VOLID EQU   $PTCH1+1                    ADDR OF LEFT BYTE VOLID TABLE
                        03F6  693+$VOLR1 EQU   $VOLID                      ADDR LEFT BYTE VOLID FOR R1
                        03FE  694+$VOLF1 EQU   $VOLR1+8                    ADDR LEFT BYTE VOLID FOR F1
                        0406  695+$VOLR2 EQU   $VOLF1+8                    ADDR LEFT BYTE VOLID FOR R2
                        040E  696+$VOLF2 EQU   $VOLR2+8                    ADDR LEFT BYTE VOLID FOR F2
                        0419  697+$PKERT EQU   $VOLID+35                   ADDR OF 1ST ENTRY IN PACK ERROR
                              698+*                                        * RATE TABLE
                        042D  699+$PASWD EQU   $PKERT+20                   ADDR OF CURRENT PASSWORD
                        042E  700+$HISTE EQU   $PASWD+1                    LEFT BYTE OF HISTORY LOG ENTRY
                        0435  701+$HIST1 EQU   $HISTE+7                    ADDR OF 1ST ENTRY OF HIST LOG
                        043A  702+$DATE  EQU   $HIST1+5                    ADDR OF CURRENT DATE
                        043B  703+$EXFTR EQU   $DATE+1                     ADDR OF CORE EXPANSION FACTOR
                              704+*                                        * THIS VALUE WILL BE ADDED TO
                              705+*                                        * BUFFER ADDRESS (SET FOR 8K)
                              706+*                                        * TO RE-POSITION THEM FOR
                              707+*                                        * LARGER MACHINES
                        0443  708+$WFNME EQU   $EXFTR+8                    ADDR OF WORK FILE NAME
                        0040  709+$WFDEF EQU   X'40'                       WORK FILE DEFINED INDR
                              710+*                                        * THIS MASK IS USED ON $WFNME
                              711+*                                        * 0 - WORK FILE UNDEFINED
                              712+*                                        * 1 - WORK FILE DEFINED
                        0449  713+$DPLSV EQU   $WFNME+6                    ADDR OF 6 BYTE DPL SAVE AREA
                              714+*                                        * FOR KEYBOARD PROGRAMS
                        044B  715+$PRDEV EQU   $DPLSV+2                    ADDR OF 2 BYTE FIELD POINTING
                              716+*                                        * TO THE SYSTEM PRINTER IOCR
                        044D  717+$CRTAD EQU   $PRDEV+2                    ADDR OF ENTRY TO RELOCATE CRT
                        0454  718+$PLST1 EQU   $CRTAD+7                    ADDR OF THREE 7-BYTES ENTRY I/O
                        045B  719+$PLST2 EQU   $PLST1+7                    * PARM LISTS MOST RECENTLY USED
```

@FXDEQ - FIXED ADDRESSES FOR SYSTEM NUCLEUS

                        0462   720+$PLST3 EQU $PLST2+7   * THE 1ST ENTRY IS MOST RECENT
                        0464   721+$C0001 EQU $PLST3+2   ADDR OF 2 BYTE CONSTANT 1

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       @FXDEQ - FIXED ADDRESSES FOR SYSTEM NUCLEUS
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```
                         723+***************************************************************************
                         724+*        ENTRY POINTS TO INTERFACE ROUTINES AND THEIR WORK AREAS        *
                         725+***************************************************************************
                  0465   727+$SPRNT EQU   $C0001+1                      ADDR OF ENTRY TO THE SYSTEM
                         728+*                                          * PRINTER IOCR
                  0469   729+$CAERK EQU   $SPRNT+4                      ADDR OF ENTRY TO ERR ROUTINE
                         730+*                                          * INTERFACE. ERROR CODE MUST
                         731+*                                          * BE STORED PREVIOUS TO ENTRY
                  046F   732+$ERDPL EQU   $CAERK+6                      ADDR OF LEFT BYTE OF ERRPGM
                         733+*                                          * LOAD DPL
                  0472   734+$ERMAD EQU   $ERDPL+3                      ADDR OF DK ADDR, CNT OF ERRPGM
                  0476   735+$CIMSK EQU   $ERMAD+4                      ADDR OF THE INQUIRY REQUEST INDR
                         736+*                                          * X'87' IR NOT DISABLED
                         737+*                                          * X'80' IR MASKED
                  0480   738+$CIEXT EQU   $CIMSK+10                     ADDR OF IR EXIT INSTRUCTION
                  0483   739+$CIENT EQU   $CIEXT+3                      ADDR OF ENTRY FOR IR
                  048D   740+$UNMSK EQU   $CIENT+10                     ADDR OF ENTRY TO UNMASK IR
                         741+*                                          * IF NO SUSPENDED IR, CALLING
                         742+*                                          * PROGRAM RETURNED TO
                  0496   743+$CISUS EQU   $UNMSK+9                      ADDR OF INDR FOR SUSPENDED IR
                         744+*                                          * IF X'80' AN IR OCCURRED WHILE
                         745+*                                          * IR WAS MASKED
                         746+*                                          * IF X'87' NO IR TOOK PLACE
                         747+*                                          * WHILE IR WAS MASKED
                  049D   748+$CAIPL EQU   $CISUS+7                      ADDR OF ENTRY TO ABORT CURRENT
                         749+*                                          * OP AND RE-ENABLE KEYBOARD AND
                  04A1   750+$CARPL EQU   $CAIPL+4                      ADDR OF ENTRY TO ABORT CURRENT
                         751+*                                          * OP AND ENABLE IR
                  04B4   752+$CABLD EQU   $CARPL+X'13'                  ADDR OF ENTRY TO ABORT CURRENT O
                  04BA   753+$PAUSD EQU   $CABLD+6                      ADDR OF ENTRY OF ROUTINE TO
                         754+*                                          * SWAP CORE
                  04D6   755+$RSTR  EQU   $PAUSD+X'1C'                  ADDR OF ENTRY TO ENTRY CORE
                         756+*                                          * FROM DISK
                  04F2   757+$PSDXR EQU   $RSTR+X'1C'                   ADDR OF SAVED XR IN NPAUSE
                  04FA   758+$PSDBR EQU   $PSDXR+8                      ADDR OF SAVED BR IN NPAUSE
                  04FE   759+$SRTRN EQU   $RSTR+X'28'                   ADDR OF RETURN ADDR FROM $PAUSD
                  050D   760+$SFAID EQU   $SRTRN+15                     ADDR OF RETURN IF FE AID REQUEST
                         761+*                                          * IF THE ABOVE TWO ADDRESSES ARE
                         762+*                                          * EQUAL, RETURN TO $RSTR WILL BE
                         763+*                                          * BE FROM THE FE AID PROGRAM
                  050E   764+$CSDPL EQU   $RSTR+X'38'                   ADDR OF LEFT BYTE OF SAVE/RSTR D
                  0511   765+$SWPCR EQU   $CSDPL+3                      ADDR OF DKADDR, COUNT FOR CORE
                         766+*                                          * SAVE AREA
                  0517   767+$EXADR EQU   $SWPCR+6                      ADDRR OF DK ADDR, COUNT OF EXEC
                         768+*                                          * TIME MESSAGE PROGRAM
                  051A   769+$LOADR EQU   $EXADR+3                      ADDR OF ENTRY TO BLAST LOAD
                         770+*                                          * PROGRAM NOT RESIDING ON CYL 4
                         771+*                                          * RETURN IS TO CALLING PROGRAM
                  051E   772+$RLOAD EQU   $LOADR+4                      ADDR OF ENTRY TO BLAST LOAD
                         773+*                                          * PROGRAM NOT RESIDING ON CYL 4
                  0522   774+$BLOAD EQU   $RLOAD+4                      ADDR OF ENTRY TO BLAST LOAD
                         775+*                                          * PROGRAM RESIDING ON CYL 4
                  054A   776+$LOADB EQU   $BLOAD+X'28'                  ADDR OF SPECIAL ENTRY TO
                         777+*                                          * NBLOAD FOR SFLOAD/SFFIND
                         778+*                                          * AND FZPINV
```

```
                         054E  779+$TROVR EQU    $BLOAD+X'2C'               ADDR OF FE TRACE INDR
                               780+*                                       * @NOP - NO TRACE PERFORMED
                               781+*                                       * @UCB - TRACE PERFORMED
                         0550  782+$BLRTN EQU    $TROVR+2                   ADDR OF RETURN POINT FROM ZTRACE
                         0569  783+$BLNOE EQU    $BLRTN+X'19'               ADDR OF NO EXECUTE INDR-NBLOAD
                               784+*                                       * @NOP - CALLING PGM RETURNED TO
                               785+*                                       * @UCB - LOADED PROGRAM EXECUTED
                               786+*                                       * ENTRY TO $LOADR SETS THE ABOVE
                               787+*                                       * INDR TO @NOP.  IF THE CALLING
                               788+*                                       * SETS THE INDR TO @NOP BEFORE
                               789+*                                       * CALLING $BLOAD, RETURN WILL BE
                               790+*                                       * MADE UPON COMPLETION OF THE
                               791+*                                       * ABSOLUE LOAD
                         0571  792+$LDRTN EQU    $BLOAD+X'4F'               ADDR OF THE RETURN ADDR IN NBLOA
                         0579  793+$BLDPL EQU    $BLOAD+X'57'               ADDR OF LEFT BYTE OF $BLOAD'S
                               794+*                                       * DPL (DPL OF LAST PGM LOADED)
                         057F  795+$WAITF EQU    $BLDPL+6                   ADDR OF LEFT BYTE OF DISK
                               796+*                                       * WAIT AND CHECK ERRORS DPL
                         0583  797+$GUFIO EQU    $WAITF+4                   ADDR OF DK ADDR, COUNT OF GUFUDI
                         0587  798+$BSADR EQU    $GUFIO+4                   ADDR OF DADDR RELOCATION FACTOR
                               799+*                                       * FOR PGMS NOT RESIDING ON CYL 6
                         0588  800+$FEMAP EQU    $BSADR+1                   ADDR OF START OF CORE MAP
                         05A2  801+$ZTRAD EQU    $FEMAP+X'1A'               ADDR OF ZTRACE DADDR

   05FF                        803+      ORG    X'05FF'
                         05FF  804+$IPLDV EQU    *                         ADDR OF IPL INDR
                               805+*                                       * X'00' - IPL WAS FROM R1
                               806+*                                       * X'01' - IPL WAS FROM F1
                         0600  807+$ENDNU EQU    $IPLDV+1                   ADDR OF THE FIRST BYTE
                               808+*                                       * FOLLOWING SYSNUC
                               809+*      END OF FIXED ADDRESSES SYSTEM NUCLEUS EQUATES
                               810+      PRINT ON
                               811 *     @CAN  EXP-Y
                               813+      PRINT ON
```

```
                    815+*********************************************************************
                    816+*        INPUT LINE HEADER                                          *
                    817+*********************************************************************
           0600 818+$$ILHD EQU    $ENDNU                       FIRST BYTE OF INPUT LINE HEADER
                    819+*
           0601 820+$$ILEN EQU    $$ILHD+1                     SECOND BYTE OF SDF LENGTH FIELD
                    821+*
           0602 822+$$UPAR EQU    $$ILEN+1                     UP ARROW LOCATION IN LAST LINE
                    823+*
           0603 824+$$CKEY EQU    $$UPAR+1                     CMD KEY FUNCTION CODE
                    825+*                                      * EXECUTABLE CMD KEYS
           0605 826+$$BNLN EQU    $$ILEN+4                     SECOND BYTE OF BINARY LINE NO.
                    827+*
           0606 828+$$TPCD EQU    $$BNLN+1                     TYPE CODE FIELD

                    830+*********************************************************************
                    831+*        INPUT LINE TEXT                                            *
                    832+*********************************************************************
           0607 833+$$INLN EQU    $$TPCD+1                     FIRST BYTE CHAR OF INPUT LINE
                    834+*
           0666 835+$$CDND EQU    $$INLN+@CARDL-1              LAST CHAR OF CARD INPUT
                    836+*
           06FA 837+$$INND EQU    $$INLN+@LINSZ-1              LAST CHAR OF INPUT LINE BUFFER

                    839+*********************************************************************
                    840+*        KEYBOARD ROUTINE LOCATIONS AND MASKS                       *
                    841+*********************************************************************
           0890 842+$$PRES EQU    $ENDNU+X'0290'               ENABLE KEYBOARD ENTRY TO DEPRES
                    843+*
           09E1 844+$$KBDT EQU    $$PRES+X'0151'               DATA BYTE FROM KEYBOARD
           0081 845+$$$STD EQU    B'10000001'                  CLI MASK FOR START KEY DATA
           0091 846+$$$EPL EQU    B'10010001'                  CLI MASK FOR ENTER PLUS KEY
                    847+*
           09E2 848+$$KBSN EQU    $$KBDT+1                     TYPE BYTE FROM KEYBOARD
           0040 849+$$$DAT EQU    B'01000000'                  TBM MASK FOR DATA KEY
           0020 850+$$$CMD EQU    B'00100000'                  TBM MASK FOR COMMAND KEY
           0010 851+$$$FUN EQU    B'00010000'                  TBM MASK FOR FUNCTION KEY
                    852+*
           09EB 853+$$LPOS EQU    $$KBSN+9                     PRINT HEAD POSITION ADDR
           0AFE 854+$$EOSA EQU    $$PRES+X'026E'               LOCATION OF EOS ADDR
           0B44 855+$$COFF EQU    $$PRES+X'02B4'               ENTRY TO TURN OFF CMD LIGHTS
           0B3D 856+$$CKFF EQU    $$PRES+X'02AD'               ENTRY TO TURN OFF CMD LIGHTS 1-1
           0BBF 857+$$DATB EQU    $$PRES+X'032F'               ADDR OF DATA TABLE TYPE INDR IN
                    858+*                                      * DEPRES (VALUE: 1-9)

                    860+*********************************************************************
                    861+*        MATRIX PRINTER ROUTINE ENTRY POINT                         *
                    862+*********************************************************************
           0707 863+$$PRNT EQU    $ENDNU+X'0100'+@HDRLN        DPRINT ENTRY
           0782 864+$$PRTN EQU    $$PRNT+X'007B'               ADDR OF CARRIER RETURN TEST IN
                    865+*                                      * DPRINT.  MASKS FOLLOE
                    866+*                                      * @NOP - NO TEST MADE
                    867+*                                      * @BNL - TEST WILL BE MADE
           07CE 868+$$PSIO EQU    $$PRNT+X'00C7'               ADDR OF SIO CTRL IN DPRINT
           07E9 869+$$PCNT EQU    $$PRNT+X'00E2'               ADDR OF PPL CNT IN DPRINT
```

```
                      871+****************************************************************************
                      872+*        CARD READER LOCATIONS                                             *
                      873+****************************************************************************
            0890      874+$$CDRD EQU    $$PRES                        ENTRY POINT TO READ CARDS
                      875+*
            08C0      876+$$CDBS EQU    $$CDRD+X'0030'                ENTRY POINT TO WAIT FOR READ

                      878+****************************************************************************
                      879+*        CRT OUTPUT ROUTINE LOCATIONS                                      *
                      880+****************************************************************************
            2000      881+$$PYMP EQU    $$ZERO+X'2000'                ENTRY POINT TO CRT PLUS PRINT
                      882+*
            2004      883+$$PLYN EQU    $$PYMP+4                      ENTRY POINT TO CRT ONLY
                      884+*
            209C      885+$$CSNS EQU    $$PYMP+X'009C'                LOCATION OF SENSE BYTE IN
                      886+*                                           * DSPLYN
            2143      887+$$PRFL EQU    $$PYMP+X'0143'                ENTRY POINT FOR PRINTER FAILURE
                      888+*
            2200      889+$$PYCD EQU    $$PYMP+X'0200'                ENTRY POINT FOR COMMAND KEYS
                      890+*                                           * OR CLEAR CRT FUNCTION

                      892+****************************************************************************
                      893+*        MISCELLANEOUS LOCATIONS                                           *
                      894+****************************************************************************
            1C00      895+$$ERSK EQU    X'1C00'                       START ADDR OF ERROR CODE STACK
            00A0      896+$$$NLN EQU    X'00A0'                       HIGH ORDER BYTE OF LINE NUMBER
                      897+*                                           * IN STACK IF NO. NOT DESIRED
            1C00      898+$$SLIB EQU    X'1C00'                       SECONDAIRY LINE INPUT BUFFER
            06FF      899+$$XIND EQU    $ENDNU+X'00FF'                EXEC INDR PASS AREA
            0080      900+$$$ERN EQU    B'10000000'                   RUN FUNC SAVED FILE INDR MASK
            1E00      901+$$WSPB EQU    X'1E00'                       LOCATION OF BAGETC BUFFER
            06FF      902+$$FLIB EQU    $$XIND                        FILE LIB ADDR PASS AREA
            1D00      903+$$FITS EQU    X'1D00'                       LOCATION OF FIT

                      905+****************************************************************************
                      906+*        KEYWORD COMMAND LOAD ADDRESSES                                    *
                      907+****************************************************************************
            0600      908+$$KLD1 EQU    $ENDNU                        PROGRAMS THAT LOAD BEHIND
                      909+*                                           * SYSNUC
            0700      910+$$KLD2 EQU    $ENDNU+X'0100'                PROGRAMS THAT LOAD BEHIND
                      911+*                                           * THE INPUT LINE BUFFER
            0C00      912+$$KLD3 EQU    $ENDNU+X'0600'                STANDARD LOAD ADDRESS BEHIND
                      913+*                                           * I/O ROUTINES
                      914+*        END OF COMMON CORE LOCATIONS EQUATES
                      915+       PRINT ON
                      916 *       @CY0  EXP-Y
                      918+       PRINT ON
```

```
         @CY0EQ - CYLINDER ZERO EQUATES
```

```
                          920+*****************************************************************************
                          921+*        DISK TABLE EQUATES                                                 *
                          922+*****************************************************************************
          0006  923+#VOLNG EQU    6                               LENGTH OF VOL ID
          0005  924+#VOLOC EQU    5                               DISPLACEMENT OF VOL ID ON SCTR
          0008  925+#VLTBE EQU    #VOLNG+2                        LENGTH OF VOLID TABLE ENTRY

                          927+*****************************************************************************
                          928+*        SDS (ERROR LOG) EQUATES                                            *
                          929+*****************************************************************************
          0003  930+#PKRTD EQU    3                               DISP TO END OF PK ERR/RATE ENTRY
          0003  931+#PKRDD EQU    3                               DISP TO RESPECTIVE READ COUNTER
          0001  932+#PKWTD EQU    1                               DISP TO RESPECTIVE WRITE COUNTER
          0002  933+#PKCNT EQU    2                               LENGTH OF IN-CORE COUNTERS
          002B  934+#PKMRW EQU    43                              DISP TO MASTER RD/WT COUNTERS
          000B  935+#PKVRD EQU    11                              DISP TO VOLUME RD COUNTERS IN SD
          0007  936+#PKVWD EQU    7                               DISP TO VOLUME WT COUNTERS IN SD
          0004  937+#PKRTL EQU    4                               LENGTH PACK ERROR RATE ENTRY
          0004  938+#RDWTL EQU    4                               LENGTH RD/WT ERROR RATE COUNTER

          0001  940+#CNDIS EQU    1                               SECTOR DISPLACEMENT OF
                          941+*                                   * CONFIGURATION RECORD

                          943+*****************************************************************************
                          944+*        ERROR HISTORY TABLE EQUATES                                        *
                          945+*****************************************************************************
          0008  946+#HISLN EQU    8                               LENGTH OF HISTORY TABLE ENTRY
          0002  947+#DKEXT EQU    #HISLN-#VOLNG                   HIST LOG EXTENSION FOR DISK ERRO
          0001  948+#HSENT EQU    1                               DISP OF DISP TO NEXT OBR ENTRY
          0003  949+#HISDX EQU    3                               DISP OF DISP PAST LAST ENTRY
          0000  950+#HISTQ EQU    0                               DISP OF SIO Q BYTE
          0001  951+#HISTR EQU    1                               DISP OF SIO CNTL BYTE
          0003  952+#HISN1 EQU    3                               DISP OF PRIMARY  SENSE REG
          0005  953+#HISN2 EQU    5                               DISP OF SECONDARY SENSE REG
          0006  954+#HISCT EQU    6                               DISP OF RETRY COUNT
          0007  955+#HSEND EQU    7                               DISP OF END OF 1ST ENTRY
          0007  956+#HISTC EQU    7                               DISP OF DCF F-BYTE
          0008  957+#HISTS EQU    8                               DISP OF DCF S-BYTE
          0009  958+#HISTN EQU    9                               DISP OF DCF N-BYTE
          000F  959+#HISTV EQU    15                              DISP OF DISK VOL-ID

                          961+*****************************************************************************
                          962+*        CYLINDER ZERO DISK ADDRESSES                                       *
                          963+*****************************************************************************
          0010  964+#CORSV EQU    X'0010'                         DADDR OF TEMP CORE SAVE AREA
          0005  965+#@CORS EQU    5                               SCTR COUNT TEMP CORE SAVE AREA
          009C  966+#NEROV EQU    X'009C'                         DADDR OF NERLOG OVERLAY
          0003  967+#@NERO EQU    3                               SCTR COUNT NERLOG OVERLAY
          001D  968+#OBRAD EQU    X'001D'                         DADDR OF OBR TABLE
          0002  969+#@OBRA EQU    2                               SCTR COUNT OF OBR
          000C  970+#VLSDR EQU    X'000C'                         DADDR OF VOL STATISTICS SCTR R1
          0001  971+#@VLSD EQU    1                               SCTR COUNT OF VOL STATISTICS
          000D  972+#MVSDR EQU    X'000D'                         DADDR OF MASTER VOL STAT SCTR
          0001  973+#@MVSD EQU    1                               SCTR COUNT OF MASTER VOL STAT
          0011  974+#SDRDK EQU    X'0011'                         DADDR OF DISK SDR SCTR
          0019  975+#IOSDR EQU    X'0019'                         DADDR OF NON-DISK SDR SCTR
```

```
      @CY0EQ - CYLINDER ZERO EQUATES
```

```
                          0005  976+#CNFIG EQU   X'0005'                    DADDR OF CONFIG RECORD
                          0001  977+#FIGSC EQU   1                          SCTR COUNT OF CONFIG RECORD
                          0009  978+#VOLF1 EQU   X'0009'                    DADDR OF VOLUME LABEL (F1)
                          0008  979+#VOLR1 EQU   X'0008'                    DADDR OF VOLUME LABEL (R1)
                          0001  980+#@VLAB EQU   1                          SCTR COUNT OF VOLUME LABEL
                          0024  981+#VTCR1 EQU   X'0024'                    DADDR OF R1 VTOC
                          0025  982+#VTCF1 EQU   X'0025'                    DADDR OF F1 VTOC
                          0026  983+#VTCR2 EQU   X'0026'                    DADDR OF R2 VTOC
                          0027  984+#VTCF2 EQU   X'0027'                    DADDR OF F2 VTOC
                          0002  985+#@VCNT EQU   2                          SCTR COUNT OF VTOC
                          00DC  986+#PTFDA EQU   X'00DC'                    DADDR OF PTF LOG
                          0001  987+#@PTFS EQU   1                          SCTR COUNT FOR PTF LOG
                          0006  988+#@PTFL EQU   6                          LENGTH OF ENTRY IN PTF LOG
                                989+*       END OF CYLINDER ZERO EQUATES
                                990+        PRINT ON
                                991 *       @HLT  EXP-Y
                                993+        PRINT ON
```

```
         @HLTEQ - HALT INDICATOR EQUATES
```
```
                         995+*********************************************************************
                         996+*        THESE EQUATES, WHEN USED WITH THE HPL INSTRUCTION AS A TWO     *
                         997+*        ADDRESS CONSTANT REPLACING THE Q AND R FIELDS, WILL CAUSE THE *
                         998+*        CORRESPONDING HALT INDICATORS TO BE LIT.                       *
                         999+*********************************************************************

             2040 1001+@HKBER EQU    X'2040'                   KEYBOARD PARITY ERROR SOFT HALT
                  1002+*                                       * CODE ' B  1    '
             0070 1003+@HPRER EQU    X'0070'                   MATRIX PRINTER ERROR SOFT HALT
                  1004+*                                       * CODE '     123 '
             1040 1005+@HDTRD EQU    X'1040'                   DATA RECORDER ERROR SOFT HALT
                  1006+*                                       * CODE ' C 1     '
             1010 1007+@HDTRJ EQU    X'1010'                   DATA RECORDER TRANSPORT JAM
                  1008+*                                       * CODE ' C    3  '
             1008 1009+@HDNRY EQU    X'1008'                   DATA RECORDER NOT READY
                  1010+*                                       * CODE ' C      4 '
             087C 1011+@HERPG EQU    X'087C'                   HARD HALT AFTER ERROR MESSAGE
                  1012+*                                       * CODE '   D12345'
             1844 1013+@HLOGE EQU    X'1844'                   HARD DISK ERROR WHILE LOGGING
                  1014+*                                       * AN I/O ERROR
                  1015+*                                       * CODE ' CD1   5'
             1850 1016+@HUNSF EQU    X'1850'                   HARD DISK UNSAFE ERROR
                  1017+*                                       * CODE '  CD1 3  '
             006C 1018+@HIPLE EQU    X'006C'                   HARD HALT WHEN NO SYSTEM PGM
                  1019+*                                       * FILE FOUND ON IPL'D DISK
                  1020+*                                       * CODE '     12 45'
             003C 1021+@HCEPK EQU    X'003C'                   HARD HALT FOR CE PACK
                  1022+*                                       * CODE '      2345'
             081C 1023+@HCOPY EQU    X'081C'                   HARD HALT ON TERMINATION OF
                  1024+*                                       * COPY DISK FUNCTION
                  1025+*                                       * CODE '   D 345'
             0804 1026+@HFEHT EQU    X'0804'                   HARD HALT ON ZUTMON 'H' OPTION
                  1027+*                                       * CODE '   D   5'
             001C 1028+@HCOPS EQU    X'001C'                   SOFT HALT ON INTERMEDIATE COPY
                  1029+*                                       * DISK FUNCTION
                  1030+*                                       * CODE '      345'
                  1031+*
                  1032+***    HARD I/O ERROR HALTS
                  1033+*
             7840 1034+@HDRV1 EQU    X'7840'                   HARD ERROR ON DRIVE 1
                  1035+*                                       * CODE 'ABCD1     '
             7844 1036+@HDRV2 EQU    X'7844'                   HARD ERROR ON DRIVE 2
                  1037+*                                       * CODE 'ABCD1   5'
             7848 1038+@HKBHE EQU    X'7848'                   HARD KEYBOARD ERROR
                  1039+*                                       * CODE 'ABCD1  4 '
             784C 1040+@HPRHE EQU    X'784C'                   HARD PRINTER ERROR
                  1041+*                                       * CODE 'ABCD1  45'
             7854 1042+@HDRHE EQU    X'7854'                   HARD DATA RECORDER ERROR
                  1043+*                                       * CODE 'ABCD1 3 5'
             7858 1044+@HCRHE EQU    X'7858'                   HARD CRT ERROR
                  1045+*                                       * CODE 'ABCD1 34 '
                  1046+*       END OF HALT EQUATES
                  1047+        PRINT ON
```

```
               1049 ****************************************************************************
               1050 * 5703-XM1   COPYRIGHT IBM CORP. 1970                                  *
               1051 *             REFER TO INSTRUCTIONS ON COPYRIGHT NOTICE   120-2083      *
               1052 *                                                                       *
               1053 ****************************************************************************
               1054 *STATUS                                                                 *
               1055 *    VERSION 1 MODIFICATION 0                                            *
               1056 *                                                                        *
               1057 *FUNCTION                                                                *
               1058 *    DPRINT IS THE IOCR USED TO PRINT AND CONTOL THE SYSTEM/3 MODEL 6    *
               1059 *    MATRIX PRINTER.  THERE ARE SIX PRINT I/O FUNCTIONS PROVIDED.        *
               1060 *    IF AN OPERATION IS NOT IN PROGRESS WHEN A CALL IS MADE TO IOCR,     *
               1061 *    THE REQUESTED OPERATIONS IS STARTED AND A RETURN IS MADE TO THE     *
               1062 *    CALLING PROGRAM.  IF A PREVIOUS OPERATION IS IN PROGRESS THE IOCR    *
               1063 *    WILL NOT RETURN UNTIL THAT OPERATION IS COMPLETED ERROR FREE        *
               1064 *    AND THE NEW OP IS STARTED.  THE I/O FUNCTION PROVIDED ARE AS        *
               1065 *    FOLLOWS:                                                            *
               1066 *    * PRINT --                                                          *
               1067 *        THE DATA TO BE PRINTED (A MAX OF 255 CHARACTERS IN ONE CALL)    *
               1068 *        MUST RESIDE IN CORE.  THE IOCR WILL START PRINTING THE DATA      *
               1069 *        AT THE CURRENT PRINT HEAD POSITION.  IF THE SOFTWARE RIGHT      *
               1070 *        MARGIN IS HIT, THE CARRIAGE WILL BE RETURNED TO THE SOFTWARE    *
               1071 *        LEFT MARGIN.  UPON COMPLETION OF THE PRINT FUNCTION, THE PRINT *
               1072 *        HEAD WILL BE POSITIONED AT THE NEXT PRINT POSITION  AFTER THE   *
               1073 *        CHARACTER PRINTED.                                              *
               1074 *    * PRINT AND RETURN CARRIAGE --                                      *
               1075 *        SAME AS PRINT (ABOVE) EXCEPT THAT THE PRINT HEAD WILL BE        *
               1076 *        POSITIONED AT THE SOFTWARE LEFT MARGIN AN THE NEXT LINE         *
               1077 *        FOLLOWING THE COMPLETION OF THE PRINT.                          *
               1078 *    * RETURN CARRIAGE --                                                *
               1079 *        THE PRINT HEAD WILL BE POSITIONED AT THE SOFTWARE LEFT          *
               1080 *        MARGIN AND THE FORMS ROLLED UP TO THE NEXT LINE.                *
               1081 *    * BACKSPACE AND INDEX --                                            *
               1082 *        THIS OPERATION WILL CAUSE THE PRINT HEAD TO BE MOVED LEFT       *
               1083 *        ONE PRINT POSITION AND THE FORMS TO BE INDEXED ONE LINE.        *
               1084 *        IF THE LEFT MARGIN IS HIT, NO MORE SPACING IS DONE.             *
               1085 *    * BACKSPACE --                                                      *
               1086 *        THIS WILL CAUSE THE PRINT HEAD TO BE MOVED LEFT ONE PRINT       *
               1087 *        POSITION, WITH NO MORE SPACING DONE AFTER THE LEFT MARGIN       *
               1088 *        IS HIT.                                                          *
               1089 *    * WAIT AND CHECK FOR ERRORS --                                      *
               1090 *        TO ALLOW PRINTER OVERLAP, A SPECIAL WAIT FUNCTION IS PROVIDED. *
               1091 *        THE IOCR WILL WAIT FOR THE PREVIOUS OP TO BE COMPLETED AND      *
               1092 *        THEN CHECK FOR ERRORS.  IF THE PREVIOUS OP HIT THE SOFTWARE     *
               1093 *        RIGHT MARGIN, A NEW OP TO CONTINUE PRINTING ON THE NEXT LINE    *
               1094 *        WILL BE STARTED AND COMPLETED BEFORE A RETURN IS MADE.          *
               1095 *                                                                        *
               1096 *ENTRY POINTS                                                            *
               1097 *    THE PRINT IOCR IS CALLED FROM A REQUESTING PROGRAM OR AN            *
               1098 *    INTERFACE ROUTINE.  THE TWO RESPECTIVE ENTRY POINTS ARE:           *
               1099 *        DPRINT - FOR DIRECT CALL                                        *
               1100 *        $SPRNT - FOR SYSTEM PRINTER FUNCTION                           *
               1101 *    CALLING SEQUENCES ARE AS FOLLOWS:                                   *
               1102 *        B     DPRINT                                                    *
               1103 *        DC    AL2(PPL)                                                  *
               1104 *                                                                        *
```

```
1105 *         B      $SPRNT                                      *
1106 *         DC     AL2(PPL)                                    *
1107 *    PPL IS THE ADDRESS OF THE LEFTMOST BYTE OF THE 4 BYTE PARAMETER   *
1108 *    LIST.  (SEE INPUT FOR FORMAT)                           *
1109 *                                                            *
1110 *INPUT                                                       *
1111 *    INPUT TO DPRINT IS A 4 BYTE PARAMETER LIST WITH THE FOLLOWING   *
1112 *    FORMAT:                                                 *
1113 *         BYTE 0  = FUNCTION DESIRED                         *
1114 *                      X'40'   PRINT ONLY                    *
1115 *                      X'C0'   PRINT AND RETURN CARRIAGE     *
1116 *                      X'80'   RETURN CARRIAGE ONLY          *
1117 *                      X'FF'   WAIT FOR OP COMPLETE          *
1118 *                      X'11'   BACKSPACE AND INDEX           *
1119 *                      X'10'   BACKSPACE                     *
1120 *         BYTE 1  = IF PRINT - CHARACTER COUNT               *
1121 *                    IF RETURN CARRIAGE ONLY - X'80'         *
1122 *                    IF BACKSPACE - X'00'                    *
1123 *         BYTE 2&3 = ADDRESS OF THE LEFT BYTE OF CHARACTER STRING TO BE   *
1124 *                    PRINTED.                                *
1125 *    NOTE: BYTES 1,2&3 ARE NOT NEEDED IF THE FUNCTION IS A WAIT OP.   *
1126 *          BYTES 2&3 ARE NEEDED ONLY WHEN PRINTING IS REQUESTED   *
1127 *                                                            *
1128 *OUTPUT                                                      *
1129 *    ALL MATRIX PRINTER OUTPUT IS HANDLED BY THIS IOCR.  THE FORMAT OF   *
1130 *    THE DATA IS A CONTIGUOUS EBCDIC CHARACTER STRING CONTAINED IN CORE *
1131 *                                                            *
1132 *EXTERNAL REFERENCES                                         *
1133 *      $RMRGN - SOFTWARE RIGHT MARGIN                        *
1134 *      $LMRGN - SOFTWARE LEFT MARGIN                         *
1135 *      $PRPOS - LOCATION OF CURRENT PRINT POSITION           *
1136 *      $ERLOG - ENTRY TO INTERFACE FOR ERROR LOGGING         *
1137 *      $CIMSK - ENTRY TO UMASK IR                            *
1138 *      $UNMSK - INDICATOR TO MASK IR                         *
1139 *      HIST1  - ADDRESS OF ERROR HISTORY TABLE ENTRY         *
1140 *      $ERPND - INDICATES ERROR IS TO BE LOGGED              *
1141 *      $CRTAV - CRT ON SYSTEM INDICATOR                      *
1142 *      $INDR2 - I/O ERROR INDICATOR                          *
1143 *      $IOIND - I/O STATUS INDICATOR.                        *
1144 *      $$PRES - ENTRY TO KEYBOARD IOCS.                      *
1145 *      $PLST1 - PUSH-DOWN PARAMETER LIST STACK               *
1146 *      $PLST2 - *                                            *
1147 *      $PLST3 - *                                            *
1148 *                                                            *
1149 *EXITS, NORMAL                                               *
1150 *    NORMAL EXIT IS TO THE CALLING PROGRAM FOLLOWING THE IN-LINE   *
1151 *    PPL ADDRESS CONSTANT.                                   *
1152 *                                                            *
1153 *EXITS, ERROR                                                *
1154 *    NO ERROR RETURNS ARE MADE TO THE CALLING PROGRAM.  EXTENSIVE   *
1155 *    ERP'S ARE INCLUDED WITHIN THE ROUTINE.  (SEE ERROR PROCEDURES)   *
1156 *                                                            *
1157 *TABLES/WORK AREAS                                           *
1158 *    DPLIST - 4-BYTE WORKAREA USED TO HOLD THE CURRENT PPL   *
1159 *    DPXPCF - 3-BYTE PRINT FIELD COMMAND                     *
1160 *    DPXSYC - 3-BYTE SYNC CHECK PRINT COMMAND FIELD          *
```

```
                          1161 *                                                              *
                          1162 *ATTRIBUTES                                                    *
                          1163 *    RELOCATABLE                                               *
                          1164 *    CORE RESIDENT FOR ALL ROUTINES USING PRINT FUNCTIONS      *
                          1165 *                                                              *
                          1166 *CHARACTER CODE DEPENDENCY                                     *
                          1167 *    THE OPERATION OF THIS MODULE DOES NOT DEPEND UPON A PARTICULAR *
                          1168 *    INTERNAL REPRESENTATION OF THE EXTERNAL CHARACTER SET.    *
                          1169 *                                                              *
                          1170 *NOTES                                                         *
                          1171 *    ERROR PROCEDURES                                          *
                          1172 *      THE FOLLOWING ERRORS ARE DETECTED BY AND HANDLED IN THE ERP *
                          1173 *      SECTION:                                                *
                          1174 *      * END OF FORMS CHECK                                    *
                          1175 *        THE END OF FORMS INDICATOR LIGHT IS ACTIVATED AND THE *
                          1176 *        ROUTINE LOOPS UNTIL THE PROBLEM IS CORRECTED.  THE LAMP IS *
                          1177 *        THEN TURNED OFF AND PROCESSING CONTINUES.             *
                          1178 *      * UNIT CHECK ERROR                                      *
                          1179 *        A SOFT HALT IS ISSUED (CODE 123).  PROCESSING CONTINUES WHEN *
                          1180 *        START IS PRESSED.                                     *
                          1181 *      * MARGIN CHECK ERROR                                    *
                          1182 *        THE PRINT HEAD IS RETURNED TO THE SOFTWARE LEFT MARGIN. *
                          1183 *      * IF NONE OF THE ABOVE, THE PRINTER IS REPOSITIONED AT THE *
                          1184 *        HARDWARE LEFT MARGIN.  THE FORMS ARE INDEXED AND THE  *
                          1185 *        CARRIAGE SPACED TO ITS POSITION BEFORE PRINTING STARTED. *
                          1186 *        THE SAVED COUNT AND CORE ADDRESS IS RESTORED TO THE PPL. *
                          1187 *        THE CALL SECTION IN THEN ENTERED TO RETRY THE OPERATION. *
                          1188 *      ALL ERRORS, SET UP THE ERROR HISTORY TABLE ANTRY AT $HISTE, AND *
                          1189 *      SET $EROND IN INDICATING AN ERROR IS READY FO BE LOGGED. *
                          1190 *                                                              *
                          1191 *    REGISTER USAGE                                            *
                          1192 *      INDEX REGISTER 1 (@BR) IS USED FOR BASE ADDRESSING.     *
                          1193 *      REGISTER 2 (@XR) IS USED FOR DISPLACING AND AS A POINTER. *
                          1194 *                                                              *
                          1195 *    SAVED/RESTORED AREAS                                      *
                          1196 *      DPADSV - SAVE AREA FOR INITIAL COUNT AND DATA ADDRESS FROM PPL. *
                          1197 *      DPLIST - SAVED COUNT FIELD AND DATA ADDRESS FIELD RESTORED HERE *
                          1198 *             FOR RETRIES.                                     *
                          1199 *                                                              *
                          1200 *    MODIFICATION CONSIDERATIONS                               *
                          1201 *      N/A                                                     *
                          1202 *                                                              *
                          1203 *    REQUIRED MODULES                                          *
                          1204 *      @SYSEQ - GENERAL SYSTEM EQUATES                          *
                          1205 *      @HDWEQ - HARDWARE VALUE EQUATES                          *
                          1206 *      @FXDEQ - NUCLEUS LOCATION EQUATES                        *
                          1207 *      @CANEQ - TRANSCIENT LOCATION EQUATES                     *
                          1208 *      @CY0EQ - CYLINDER ZERO EQUATES                           *
                          1209 *      $HLTEQ - HALT INDICATOR EQUATES                          *
                          1210 *                                                              *
                          1211 *OTHER                                                         *
                          1212 *    N/A                                                       *
                          1213 *                                                              *
                          1214 ***************************************************************************
```

```
      #PRINT - MATRIX PRINTER IOCR


ERR LOC   OBJECT CODE      ADDR STMT SOURCE STATEMENT            VER 15, MOD 00  29/10/15  PAGE  29

    0700                        1216         ORG    $$KLD2                    POSITION OVERLAY
                                1217 ********************************************************************
                                1218 *        PROGRAM HEADER FOR DISK LOAD                              *
                                1219 ********************************************************************
            014C 1220 #$DPRI EQU    X'014C'                   DISK ADDR OF #DPRIN
            0700 1221 #$$DPR EQU    X'0700'                   CORE LOAD ADDRESS OF #DPRIN
            0005 1222 #$@DPR EQU    05                        SECTOR COUNT OF #DPRIN
    0700                        1223         ORG    #$$DPR                    CORE LOAD ADDRESS
            0700 1224 $$$$$$ EQU    *                         FIRST LOCATION IN PROGRAM
    0700 7BC4D7D9C9D5     0705 1225        DC     CL6'#DPRIN'               PROGRAM NAME
    0706 06               0706 1226        DC     IL1'06'                   PROGRAM NUMBER OF #DPRIN
                                1227 *#DPRIN EQU    *                          ENTRY POINT TO PROGRAM


                                1229 ********************************************************************
                                1230 *        THIS IOCR IS USED FOR ALL MATRIX PRINTER FUNCTIONS.     *
                                1231 *        AVAILABLE FUNCTIONS INCLUDE...                           *
                                1232 *                                        PRINT ONLY              *
                                1233 *                                        RETURN CARRIAGE ONLY    *
                                1234 *                                        PRINT AND CARRIER RETURN *
                                1235 *                                        BACKSPACE               *
                                1236 *                                        INDEX AND BACKSPACE     *
                                1237 *                                        WAIT AND CHECK FOR ERRORS *
                                1238 ********************************************************************

            0731 1240         USING DPBASE,@BR                SET BASE REGISTER
            0707 1241 DPRINT EQU    *                         ENTRY TO PRINTER IOCR
    0707 34 01 07D9         1242         ST     DP0900+@OP1,@BR           SAVE BASE REGISTER
    070B C2 01 0731         1243         LA     DPBASE,@BR                LOAD BASE REGISTER
    070F 74 02 AC           1244         ST     DP0910+@OP1(,@BR),@XR     SAVE XR
    0712 76 08 CC           1245         A      DPC001(,@BR),@ARR         CALC PARM ADDRESS
    0715 74 08 03           1246         ST     DP0020+@OP1(,@BR),@ARR    SET PARAMETER ADDRESS
    0718 76 08 CC           1247         A      DPC001(,@BR),@ARR         CALC PARM ADDRESS
    071B 74 08 B0           1248         ST     DP1000+@OP1(,@BR),@ARR    SAVE RETURN ADDRESS
    071E 38 01 03D2         1249         TBN    $IOIND,$MPDWN             IS THE PRINTER INOPERABLE ?
    0722 F2 10 B1           1250         JT     DP0900                    EXIT IOCR IF YES
    0725 4C 00 A2 0476      1251         MVC    DP0850+@Q(1,@BR),$CIMSK   SAVE MASK STATUS
    072A 3C 80 0476         1252         MVI    $CIMSK,@NOP               MASK INQUIRY REQUEST
    072E D0 87 D4           1253         B      DPERCK(,@BR)              GO WAIT AND CHECK FOR ERRORS
    0731 35 02 0000         1254 DP0020 L      *-*,@XR                   XR POINTS TO PPL
    0735 BD FF 00           1255         CLI    @PCTRL(,@XR),DPWAIT       WAIT ONLY FUNCTION
    0738 F2 81 97           1256         JE     DP0850                    BRANCH TO EXIT
    073B 6C 03 BA 03        1257         MVC    DPLIST+@PLNGH-1(@PLNGH,@BR),@PLNGH-1(,@XR)  MOVE THE
                                1258 *                                        * PRINT PARM LIST TO WK AREA
    073F 0C 0D 0462 045B    1259         MVC    $PLST3(2*@DPLNG+2),$PLST2 PUSH DOWN PARM LIST STACK
    0745 1C 06 0454 BC      1260         MVC    $PLST1(@DPLNG+1),DPLIST+@DPLNG-1(,@BR)  SAVE PPL ON STACK
    074A 5C 02 B3 BA        1261 DP0050 MVC    DPADSV(@CADDR+1,@BR),DPLIST+@PDATA(,@BR)  SAVE ORIGINAL
                                1262 *                                        * COUNT AND DATA ADDRESS
    074E 4C 00 C1 03C1      1263         MVC    DPXSYC+@SYCNT(1,@BR),$LMRGN  SAVE HEAD POSITION FOR SYNC
    0753 5C 01 BC B8        1264 DP0060 MVC    DPXPCF+@PRCNT(2,@BR),DPLIST+@PRCNT(,@BR)  SET CNTL AND
                                1265 *                                        * COUNT BYTES IN PCF
    0757 78 40 B7           1266         TBN    DPLIST+@PCTRL(,@BR),@PRINT  PRINT OP ?
    075A F2 10 11           1267         JT     DP0100                    JUMP IF YES
    075D 7C 00 B8           1268         MVI    DPLIST+@PRCNT(,@BR),@ZERO SET PPL CNTL BYTE TO ZERO
    0760 78 10 BB           1269         TBN    DPXPCF+@PCTRL(,@BR),@TBLEF  TAB LEFT OPERATION ?
    0763 F2 90 43           1270         JF     DP0120                    GO TO OP IF NOT
    0766 1F 00 03C2 CC      1271         SLC    $PRPOS(1),DPC001(,@BR)    SET NEW CURRENT POSITION
```

```
    076B F2 87 5B           1272        J     DP0250                    GO DO OP
                            1273 *
                            1274 ***     PRINTING IS REQUIRED - SET UP PRINT PCF
                            1275 *
    076E 71 E4 BA           1276 DP0100 LIO   DPLIST+@PDATA(,@BR),@PDAR LOAD DATA LSR WITH DATA ADDR
    0771 7D 00 9D           1277        CLI   DP0300+@D1(,@BR),@ZERO    LINE PRINTER MODE ?
    0774 F2 01 48           1278        JNE   DP0240                    DON'T CHECK MARGIN IF YES
    0777 4E 00 B8 03C2      1279        ALC   DPLIST+@PRCNT(1,@BR),$PRPOS  ADD CURRENT POSITION
    077C 4F 00 B8 03C0      1280        SLC   DPLIST+@PRCNT(1,@BR),$RMRGN  SUBTRACT RIGHT MARGIN VALUE
    0781 F2 84 06           1281        JH    DP0105                    JUMP IF RIGHT MARGIN EXCEEDED
    0784 7C 00 B8           1282        MVI   DPLIST+@PRCNT(,@BR),@ZERO SET COUNT BYTE TO ZERO
    0787 F2 87 0F           1283        J     DP0110                    GO SET NEW PRINT POSITION
    078A 5F 00 BC B8        1284 DP0105 SLC   DPXPCF+@PRCNT(1,@BR),DPLIST+@PRCNT(,@BR)  SET CNT TO HIT
                            1285 *                                     * MARGIN
    078E 7A 80 BB           1286        SBN   DPXPCF+@PCTRL(,@BR),@RETRN  SET CARRIAGE TO RETURN
    0791 5C 00 CE BC        1287        MVC   DPWRK1(1,@BR),DPXPCF+@PRCNT(,@BR)  RIGHT JUSTIFY COUNT
    0795 5E 01 BA CE        1288        ALC   DPLIST+@PDATA(@CADDR,@BR),DPWRK1(,@BR)  ADD CNT TO DATA
                            1289 *                                     * ADDRESS IN LIST
    0799 1E 00 03C2 BC      1290 DP0110 ALC   $PRPOS(1),DPXPCF+@PRCNT(,@BR)  UPDATE HEAD POSITION
    079E 5F 00 BC CC        1291        SLC   DPXPCF+@PRCNT(1,@BR),DPC001(,@BR)  SET PCF CNT MINUS 1
                            1292 *                                     * THIS IS A HARDWARE REQUIREMENT
    07A2 F2 02 04           1293        JNL   DP0120                    JUMP IF SOMETHING TO PRINT
    07A5 5C 01 BC D3        1294        MVC   DPXPCF+@PRCNT(2,@BR),DPRETN(,@BR)  SET CARRIER RETURN ONLY
    07A9 78 80 BB           1295 DP0120 TBN   DPXPCF+@PCTRL(,@BR),@RETRN  OP FOR CARRIAGE RETURN ?
    07AC F2 90 1A           1296        JF    DP0250                    JUMP IF NOT
    07AF 4C 00 BE 03C2      1297 DP0200 MVC   DPXPCF+@RTCNT(1,@BR),$PRPOS  SET CURRENT POSITION IN
                            1298 *                                     * CARRIAGE RETURN COUNT
    07B4 4F 00 BE 03C1      1299        SLC   DPXPCF+@RTCNT(1,@BR),$LMRGN  SUBTRACT LEFT MARGIN VALUE
    07B9 F2 84 03           1300        JH    DP0240                    JUMP IF NO
    07BC 7C 01 BB           1301        MVI   DPXPCF+@PCTRL(,@BR),@INDEX  SET OP INDEX ONLY
    07BF 0C 00 03C2 03C1    1302 DP0240 MVC   $PRPOS(1),$LMRGN          SET CURRENT POS TO LEFT MARGIN
    07C5 5F 00 BE CC        1303        SLC   DPXPCF+@RTCNT(1,@BR),DPC001(,@BR)  SET HARDWARE COUNT
    07C9 71 E6 B5           1304 DP0250 LIO   DPAPCF(,@BR),@PCAR        LOAD CONTROL LSR WITH NORMAL PCF
    07CC F3 E0 00           1305 DP0300 SIO   @PSIOR,@PSIOQ             START THE PRINT OPERATION
    07CF F2 00 3E           1306 DP0400 JC    DPE100,*-*                JUMP TO ERP IF ERP IN PROGRESS
    07D2 3C 00 0476         1307 DP0850 MVI   $CIMSK,*-*                RESTORE MASK STATUS
    07D6 C2 01 0000         1308 DP0900 LA    *-*,@BR                   RESTORE CALLERS BR
    07DA C2 02 0000         1309 DP0910 LA    *-*,@XR                   RESTORE CALLERS XR
    07DE C0 87 0000         1310 DP1000 B     *-*                       RETURN TO CALLING PROGRAM
                            1311 *
```

DPRINT - CONSTANTS AND WORK AREAS

```
                           1313 *********************************************************************
                           1314 *       CONSTANTS AND EQUATES FOR DPRINT.                          *
                           1315 *********************************************************************
                      0731 1316 DPBASE EQU   DP0020                    BASE VALUE FOR CALL SECTION
                      07E2 1317 DPINDX EQU   *                         ERP BASE VALUE
                      0002 1318 DPERCL EQU   2                         NUMBER OF RETRY COUNTERS
  07E2 000000         07E4 1319 DPADSV DC    XL3'000000'               SAVE AREA FOR COUNT & DATA ADDR
  07E5 07EC           07E6 1320 DPAPCF DC    AL2(DPXPCF)               ADDRESS OF NORMAL PCF
  07E7 D7             07E7 1321        DC    CL1'P'                    PRINTER PPL FE INDR
                      07E8 1322 DPLIST EQU   *                         LEFT BYTE OF PPL
  07E8 01000000       07EB 1323        DC    XL4'01000000'             PRINTER PARAMETER LIST (PPL)
                      07EC 1324 DPXPCF EQU   *                         LEFT BYTE OF PCF
  07EC               07ED 1325        DS    CL2                       CTRL AND COUNT BYTES
  07EE 11            07EE 1326        DC    XL1'11'                   RETURN CARRIAGE + INDEX COMMAND
  07EF               07EF 1327        DS    CL1                       RETURN COUNT
                      07F0 1328 DPXSYC EQU   *                         LEFT BYTE OF SYNC CHECK PCF
  07F0 0520          07F1 1329        DC    XL2'0520'                 RETURN AND INDEX, TAB RIGHT
  07F2               07F2 1330        DS    CL1                       TAB COUNT TO SOFT LEFT MARGIN
  07F3 07F0          07F4 1331 DPASYC DC    AL2(DPXSYC)               ADDRESS OF ERP PCF
  07F5 00            07F5 1332 DPLOFF DC    XL1'00'                   TURN OFF INDR LAMP CNTL
  07F6 E0            07F6 1333 DPHIST DC    AL1(@PSIOQ)               HISTORY LOG SIO Q BYTE
  07F7 00            07F7 1334        DC    AL1(@PSIOR)               HISTORY LOG SIO R BYTE
  07F8               07F9 1335 DPERSN DS    CL2                       ERROR SENSE BYTES
  07FA 0000          07FB 1336 DPWORK DC    XL2'0000'                 WORK AREA
  07FC 0001          07FD 1337 DPC001 DC    XL2'0001'                 CONSTANT OF ONE
                      07FD 1338 DPLOGE EQU   *-1                       LAST BYTE OF LOG
  07FE 0000          07FF 1339 DPWRK1 DC    XL2'00'                   WORK AREA FOR DATA COUNT
                           1340 *                                     * LEFT BYTE REMAINS 0 THROUGHOUT
  0800               0801 1341 DPERCT DS    CL(DPERCL)                ERROR COUNTERS
  0802 02            0802 1342 DPIERC DC    XL1'02'                   RETRY COUNT
  0803 8080          0804 1343 DPRETN DC    2AL1(@RETRN)              CARRIAGE RETURN PPL
                           1344 *
                      07FD 1345 DPLITE EQU   DPC001                    FORMS INDR LIGHT CNTL
                      0000 1346 DPMGCT EQU   0                         DISPLACEMENT MARGIN CHK CNTR
                      0001 1347 DPSYCT EQU   1                         DISPLACEMENT SYNC CHK CNTR
                      00FF 1348 DPWAIT EQU   X'FF'                     WAIT FUNCTION CODE
                      0004 1349 DPRVER EQU   X'04'                     VERTICALE CYCLE CHK BIT
                           1350 *
```

```
     DPRINT - WAIT AND CHECK FOR ERRORS ROUTINE
```

```
                           1352 ********************************************************************
                           1353 *      THIS ROUTINE WAITS FOR THE OPERATION TO COMPLETE AND CHECKS    *
                           1354 *      FOR ERRORS.   FORMS CHECKS WILL CAUSE A SOFT HALT.             *
                           1355 *      UNIT CHECKS WILL CAUSE ENTRY TO ERP.                          *
                           1356 ********************************************************************
                      07E2 1357        USING DPINDX,@XR
                      0805 1358 DPERCK EQU   *                         ENTRY TO CHECK FOR ERRORS
     0805 C2 02 07E2       1359        LA    DPINDX,@XR                LOAD INDEX REGISTER
     0809 AC 01 1F 20      1360        MVC   DPERCT(DPERCL,@XR),DPIERC(,@XR)  INITIALIZE RETRY COUNTERS
     080D 7C 87 9F         1361        MVI   DP0400+@Q-DPBASE(,@BR),@UCB  SET ERP IN PROGRESS INDR
     0810 F1 E2 00         1362 DPE100 APL   @PBUSY                    WAIT FOR NOT BUSY
     0813 B1 E2 1B         1363 DPE150 LIO   DPLITE(,@XR),@PLITE       TURN ON INDR IF END OF FORMS
     0816 E1 E1 31         1364        TIO   DPE150(,@XR),@PFORM       LOOP ON LIGHT UNTIL READY
     0819 B1 E2 13         1365        LIO   DPLOFF(,@XR),@PLITE       TURN OFF FORMS LIGHT
     081C E1 E0 49         1366        TIO   DPERPE(,@XR),@PERR        BRANCH TO ERP IF UNIT CHECK
     081F BD 00 07         1367        CLI   DPLIST+@PRCNT(,@XR),@ZERO ANOTHER LINE TO PRINT ?
     0822 D0 01 19         1368        BNE   DP0050-DPBASE(,@BR)       GO START NEXT LINE IF YES
     0825 7C 80 9F         1369        MVI   DP0400+@Q-DPBASE(,@BR),@NOP  SET ERP INDR OFF
     0828 D0 87 00         1370        B     DP0020-DPBASE(,@BR)       RETURN TO CALL SECTION
                           1371 *
```

```
ERR LOC   OBJECT CODE     ADDR STMT SOURCE STATEMENT          VER 15, MOD 00  29/10/15  PAGE  33

                          1373 ***********************************************************************
                          1374 *       THIS ROUTINE DETERMINE THE ERROR AND BRACHES TO THE PROPER ERP. *
                          1375 ***********************************************************************
                     07E2 1376         USING DPINDX,@XR
                     082B 1377 DPERPE EQU   *                           ENTRY TO PROCESS AN ERROR
    082B B0 E2 17         1378         SNS   DPERSN(,@XR),X'E2'         SENSE ERROR BITS
    082E 38 04 03D5       1379         TBN   $INDR2,$ERPND             HAS LOG ENTRY BEEN SET UP ?
    0832 F2 10 0D         1380         JT    DPE250                    JUMP IF YES
    0835 AC 01 19 0B      1381         MVC   DPWORK(2,@XR),DPXPCF+@PRCNT(,@XR)  SET CNTL + CNT FOR OBR
    0839 2C 07 0435 1B    1382         MVC   $HIST1(#HISLN),DPLOGE(,@XR)  MOVE LOG ENTRY TO NUCLEUS
    083E 3A 04 03D5       1383         SBN   $INDR2,$ERPND             SET ERROR PENDING INDR
    0842 2E 00 0434 1B    1384 DPE250 ALC   $HISTE+@HSTPE(1),DPC001(,@XR)  ADD ONE TO ENTRY COUNT
    0847 B9 24 17         1385         TBF   DPERSN(,@XR),@PMGCK+DPRVER  MARGIN OR VERT-CYCLE CHECK ?
    084A F2 90 0B         1386         JF    DPE500                    JUMP IF YES
    084D F2 87 12         1387         J     DPE600                    OTHERWISE RETRY OP

                          1389 ***********************************************************************
                          1390 *       MATRIX PRINTER HARD FAILURE ROUTINE                         *
                          1391 ***********************************************************************
    0850 3A 21 03D2       1392 DPE260 SBN   $IOIND,$MPDWN+$HRDER      SET MATRIX PRINTER DOWN INDR
    0854 C0 87 07D2       1393         B     DP0850                    EXIT ROUTINE
                          1394 *
```

```
      DPRINT - ERP ROUTINES


ERR LOC   OBJECT CODE      ADDR STMT SOURCE STATEMENT           VER 15, MOD 00  29/10/15  PAGE  34

                           07E2 1396           USING DPINDX,@XR               BASE VALUE FOR ERP
                           0858 1397 DPE500 EQU  *                            ENTRY FOR MARGIN CHECK
     0858 AF 00 1F 1B           1398        SLC   DPERCT-DPMGCT(1,@XR),DPC001(,@XR)  DECREMENT RETRY COUNT
     085C E0 81 6E             1399         BZ    DPE260(,@XR)                 BRANCH IF NO MORE TRYS
     085F F2 87 0E             1400         J     DPE630                       GO DO FIRST PART OF SYNC CHECK
                               1401 *
                               1402 ***    SYNC CHECK ERP
                               1403 *
                           0862 1404 DPE600 EQU  *                            ENTRY FOR SYNC CHECK
                               1405 *       $HPL  CODE-@HPRER                  SOFT HALT '....123..'
     0862 F0              0862 1406+        DC    XL1'F0'                      INLINE HPL INSTRUCTION
     0863 0070            0864 1407+        DC    AL2(@HPRER)                  HALT CODE
     0865 AF 00 1E 1B          1408         SLC   DPERCT-DPSYCT(1,@XR),DPC001(,@XR)  DECREMENT SYNC COUNT
     0869 E0 81 6E             1409         BZ    DPE260(,@XR)                 BRANCH IF NO MORE RETRIES
     086C AC 02 09 02          1410         MVC   DPLIST+@PDATA(@CADDR+1,@XR),DPADSV(,@XR)  RESTORE ORIGINAL
                               1411 *                                         * COUNT AND DATA ADDRESS
     0870 B1 E6 12             1412 DPE630 LIO   DPASYC(,@XR),@PCAR           LOAD CONTROL LSR WITH SYNC PCF
     0873 BA 80 0E             1413         SBN   DPXSYC+@PCTRL(,@XR),@RETRN   SET CHAIN BIT ON
     0876 2C 00 03C2 10        1414         MVC   $PRPOS(1),DPXSYC+@SYCNT(,@XR)  SET UP NEW HEAD POSITION
     087B AF 00 10 1B          1415         SLC   DPXSYC+@SYCNT(1,@XR),DPC001(,@XR)  SUBTRACT ONE
     087F F2 02 03             1416         JNL   DPE640                       JUMP IF NOT NEGATIVE
     0882 BB 80 0E             1417         SBF   DPXSYC+@PCTRL(,@XR),@RETRN   SET CHAIN BIT OFF
     0885 D0 87 9B             1418 DPE640 B     DP0300-DPBASE(,@BR)          RETURN LEFT MARGIN

                               1420 *************************************************************************
                               1421 *       PATCH AREA #1                                                  *
                               1422 *************************************************************************
                           0181 1423 LENGTH EQU  *-DPRINT                     LENGTH OF DPRINT
                           0888 1424 DPREND EQU  *                            END OF DPRINT
     0888                  0888 1425 $$$$$1 DS    CL($$PRES-@HDRLN-DPREND)    PATCH AREA 1
     0890                       1426         ORG   $$PRES                       POSITION DEPRES
                               1427 *
```

```
                              1429 ****************************************************************************
                              1430 *                                                                          *
                              1431 * 5703-XM1  COPYRIGHT IBM CORP. 1970                                        *
                              1432 *              REFER TO INSTRUCTIONS ON COPYRIGHT NOTICE  120-2083          *
                              1433 *                                                                          *
                              1434 ****************************************************************************
                              1435 *STATUS                                                                    *
                              1436 *    VERSION 1 MODIFICATION 0                                               *
                              1437 *                                                                          *
                              1438 *FUNCTION                                                                  *
                              1439 *    DEPRES IS DIVIDED INTO TWO SECTIONS PERFORMING TWO GENERAL            *
                              1440 *    FUNCTIONS:                                                            *
                              1441 *    * CALL SECTION                                                        *
                              1442 *       THE CALL SECTION ENABLES AND UNLOCKS THE KEYBOARD IN               *
                              1443 *       PREPARATION FOR LINE INPUT.  IT THEN SETS THE INTERRUPT            *
                              1444 *       ADDRESS WHICH IS ENTERED ON THE KEYBOARD INTERRUPT LEVEL WHEN      *
                              1445 *       A KEY IS DEPRESSED.                                                *
                              1446 *    * INTERRUPT SECTION                                                   *
                              1447 *       THE INTERRUPT SECTION SAVES THE SYSTEM STATUS (BR, XR, PSR)        *
                              1448 *       AND HANDLES THE INPUT FORM THE KEYBOARD.  UPON COMPLETION OF       *
                              1449 *       THE INPUT LINE, $KYBSY IS SET TO ZERO INDICATING THAT THE          *
                              1450 *       LINE IS COMPLETE.  THEN THE KEYBOARD IS LOCKED.                    *
                              1451 *       THE INPUT FROM THE KEYBOARD IS CLASSIFIED AND HANDLED              *
                              1452 *       AS FOLLOWS:                                                        *
                              1453 *            * DATA KEYS -- THE CHARACTER IS PLACED IN THE INPUT LINE      *
                              1454 *                          BUFFER AND PRINTED ON THE SYSTEM PRINTER.       *
                              1455 *            * CMD KEYS  -- IF THE CRT IS PRESENT, DSPLYN IS CALLED TO      *
                              1456 *                          SET THE FUNCTION FOR KEYS 12-16.               *
                              1457 *                          AN INDICATOR IS PLACED IN THE INPUT LINE        *
                              1458 *                          BUFFER (SPECIFIED LOCATION) FOR COMMAND         *
                              1459 *                          KEYS 1-11.                                      *
                              1460 *            * FUNC KEYS -- THE REQUESTED FUNCTION IS HANDLED.             *
                              1461 *                          THE FUNCTION KEY KEYS ARE:                      *
                              1462 *                               * TAB                                     *
                              1463 *                               * BACKSPACE                               *
                              1464 *                               * PROGRAM START                           *
                              1465 *                               * ENTER (-)                               *
                              1466 *                               * ERASE                                   *
                              1467 *                               * RETURN                                  *
                              1468 *                               * INQUIRY REQUEST                         *
                              1469 *                               * ENTER (+)                               *
                              1470 *                               * SPACE                                   *
                              1471 *                                                                          *
                              1472 *ENTRY POINTS                                                              *
                              1473 *         DEPRES ($$PRES)                                                  *
                              1474 *    THIS IS THE ENTRY POINT FOR REQUESTING THAT THE KEYBOARD TO BE        *
                              1475 *    UNLOCKED AND ENABLED.  THE CALLING SEQUENCE IS:                       *
                              1476 *         B     $$PRES                                                     *
                              1477 *                                                                          *
                              1478 *         DEPWTR                                                           *
                              1479 *    THIS IS THE ENTRY POINT FOR ALL KEYBOARD INTERRUPT.  ENTRY IS         *
                              1480 *    MADE HERE VIA AN ADDRESS IN @I1IAR (INTERRUPT LVL ADDR REGISTER )     *
                              1481 *                                                                          *
                              1482 *INPUT                                                                     *
                              1483 *    INPUT TO THIS ROUTINE, WHEN AN INTERRUPT OCCURS, IS A 2-BYTE          *
                              1484 *    FIELD MADE UP OF A STATUS BYTE AND A DATA BYTE.  THE INFORMATION      *
```

```
                            1485 *    TO DETERMIME THE FUNCTION OF THIS ROUTINE.                    *
                            1486 *                                                                  *
                            1487 *OUTPUT                                                            *
                            1488 *    THE OUTPUT FROM THIS ROUTINE IS A PRINTED CHARACTER OR THE    *
                            1489 *    FUNCTION REQUESTED.                                           *
                            1490 *                                                                  *
                            1491 *EXTERNAL REFERENCES                                               *
                            1492 *        $IOIND - I/O STATUS INDICATOR.                            *
                            1493 *                - COMMAND KEYS ONLY INDICATOR ($CMDKY)            *
                            1494 *                - CRT AVAILABLE ($CRTAV & $CRTNO)                 *
                            1495 *        $KEYCD - TRUNCATED LINE INDICATOR ($TRUNK)                *
                            1496 *        $CIENT - ENTRY POINT TO CHECK MASKED STATUS               *
                            1497 *        $SPRNT - ENTRY TO PRINT ON SYSTEM PRINTER                 *
                            1498 *        $HIST1 - OBR ENTRY                                        *
                            1499 *        $INDR2 - I/O ERROR INDICATOR ($ERPND)                     *
                            1500 *        $CIEXT - ENTRY TO EXIT INTERRUPT LEVEL                    *
                            1501 *        $$INLN - FIRST TEXT CHARACTER OF INPUT LINE               *
                            1502 *        $$CKEY - COMMAND CODE FOR ECMANL                          *
                            1503 *        $$CSNS - SENSE BYTE FOR DSPLYN                            *
                            1504 *        $$PYCD - ENTRY TO DSPLYN                                  *
                            1505 *        $TABLN - AUTOMATIC LINE NUMBER                            *
                            1506 *        $LMRGN - SOFTWARE LEFT MARGIN INDICATOR                   *
                            1507 *        $RMRGN - SOFTWARE RIGHT MARGIN INDICATOR                  *
                            1508 *        $EXFTR - CORE EXPANSION FACTOR                            *
                            1509 *                - FINISHED INPUT LINE INDICATOR ($KYBSY)          *
                            1510 *                - PROGRAM START INDICATOR ($PGMST)                *
                            1511 *                                                                  *
                            1512 *EXITS, NORMAL                                                     *
                            1513 *    * EXIT FROM THE CALL SECTION OF DEPRES IS TO THE CALLING ROUTINE *
                            1514 *      AT THE INSTRUCTION FOLLOWING THE BRANCH INSTRUCTION TO DEPRESS. *
                            1515 *    * EXIT FROM THE INTERRUPT SECTION IS TO THE INTERRUPTED PROGRAM *
                            1516 *      AT THE POINT OF THE INTERRUPT.                               *
                            1517 *                                                                  *
                            1518 *EXITS, ERROR                                                      *
                            1519 *    NO ERROR RETURNS ARE MADE TO THE CALLING PROGRAM.  EXTENSIVE  *
                            1520 *    ERP'S ARE INCLUDED WITHIN THE ROUTINE.  (SEE ERROR PROCEDURES) *
                            1521 *                                                                  *
                            1522 *TABLES/WORK AREAS                                                 *
                            1523 *    DEPTBL - KEYBOARD TABLE CONTAINING THE EBCDIC CHATACTER CODES  *
                            1524 *             ARRANGED SUCH THAT AN INDEX VALUE IS SENSED FROM THE  *
                            1525 *             KEYBOARD AND USED AS A DISPLACEMENT INTO THE TABLE TO *
                            1526 *             FETCH THE PROPER EBCDIC VALUE.  THE TABLE IS INITIALIZED *
                            1527 *             TO KEYBOARD TYPE KB1 BUT MAY BE CHANGED TO REFECT THE *
                            1528 *             CONFIGURATION RECORD.                                *
                            1529 *                                                                  *
                            1530 *ATTRIBUTES                                                        *
                            1531 *    RELOCATABLE                                                   *
                            1532 *                                                                  *
                            1533 *CHARACTER CODE DEPENDENCY                                         *
                            1534 *    THE OPERATION OF THIS MODULE DEPENDS UPON AN INTERNAL         *
                            1535 *    REPRESENTATION OF THE EXTERNAL CHARACTER SET WHICH IS EQUIVALENT *
                            1536 *    TO THE ONE USED AT ASSEMBLY TIME.  THE CODING HAS BEEN ARRANGED *
                            1537 *    SO THAT REDEFINITION OF CHARACTER CONSTANTS, BY ASSEMBLY, WILL *
                            1538 *    RESULT IN A CORRECT MODULE FOR THE NEW DEFINITIONS.          *
                            1539 *                                                                  *
                            1540 *NOTES                                                             *
```

```
                              1541 *    ERROR PROCEDURES                                            *
                              1542 *       UPON DETECTION OF A DATA REGISTER PARITY ERROR THE SYSTEM WILL  *
                              1543 *       HALT INDICATING TO THE USER THAT A PARITY ERROR HAS OOCURED.    *
                              1544 *       TO CONTINUE, OR RETRY THE CHARACTER, THE START WHICH MUST BE    *
                              1545 *       PRESSED.  THE ERROR IS LOGGED IN THE COUNT LOG ON DISK.         *
                              1546 *       IF ANOTHER IS DETECTED, THE HISTORY LOG IS UPDATED AND A HARD   *
                              1547 *       HALT EXECUTED.                                                  *
                              1548 *                                                                       *
                              1549 *    REGISTER USAGE                                                     *
                              1550 *       GENERAL REGISTER 1 AND 2 ARE USED FOR BASE ADRESSING.           *
                              1551 *         * BOTH P1IAR AND I1IAR ARE USED FOR BRANCHING BETWEEN         *
                              1552 *            PROGRAM AND INTERRUPT LEVEL.                               *
                              1553 *         * EXECPT FOR THE INSTRUCTION ADDRESS REGISTERS, ALL           *
                              1554 *            REGISTERS ARE SAVED AND RESTORED.                          *
                              1555 *                                                                       *
                              1556 *    SAVED/RESTORED AREAS                                               *
                              1557 *       N/A                                                             *
                              1558 *                                                                       *
                              1559 *    MODIFICATION CONSIDERATIONS                                        *
                              1560 *       CERTAIN AREAS WHICH ARE INTERNAL TO DEPRES ARE REFERENCED       *
                              1561 *       DIRECTLY BY OTHER MODULES VIA EQUATES IN THE MODULE @CANEQ.     *
                              1562 *         * MODIFICATIONS TO THIS CODE COULD HAVE AN IMPACT UPON        *
                              1563 *            THESE MODULES.                                             *
                              1564 *         * ANY RELOCATION OF THESE EXTERNALLY REFERENCED AREAS         *
                              1565 *            REQUIRES MODIFICATION OF THE EQUATE MODULE @CANEQ.         *
                              1566 *       THE FOLLOWING IS A LIST OF THE LABELS WHICH ARE INTERNAL TO     *
                              1567 *       DEPRES BUT REFERENCED BY OTHER MODULES:                         *
                              1568 *          DEPRES - ENTRY TO ENABLE THE KEYBOARD                        *
                              1569 *          DEDATA - DATA BYTE FROM SENSE INSTRUCTION                    *
                              1570 *          DESNSK - STATUS BYTE FROM SENSE INSTRUCTION                  *
                              1571 *          DEPSTN - ADDRESS OF CURRENT POSITION IN INPUT LINE           *
                              1572 *          DEF310   BUFFER                                              *
                              1573 *                                                                       *
                              1574 *    REQUIRED MODULES                                                   *
                              1575 *       @SYSEQ - GENERAL SYSTEM EQUATES                                 *
                              1576 *       @HDWEQ - HARDWARE VALUE EQUATES                                 *
                              1577 *       @FXDEQ - NUCLEUS LOCATION EQUATES                               *
                              1578 *       @CANEQ - TRANSCIENT LOCATION EQUATES                            *
                              1579 *       @CY0EQ - CYLINDER ZERO EQUATES                                  *
                              1580 *       $HLTEQ - HALT INDICATOR EQUATES                                 *
                              1581 *                                                                       *
                              1582 *OTHER                                                                  *
                              1583 *    N/A                                                                *
                              1584 *                                                                       *
                              1585 ************************************************************************
```

```
     DEPRES - KEYBOARD CALL SECTION
```

```
                               1587 ********************************************************************
                               1588 *        ENTRY TO THIS SECTION UNLOCKS THE KEYBOARD AND SETS THE        *
                               1589 *        INTERRUPT LEVEL IAR TO THE INTERRUPT SECTION OF DEPRES.        *
                               1590 *        EXIT IS TO THE CALLING PROGRAM.                                *
                               1591 ********************************************************************
                          0920 1592          USING DEPASE,@BR                BASE VALUE FOR DEPRES
                          0890 1593 DEPRES EQU   *                            ENTRY TO INITIALIZE KEYBOARD
     0890 34 08 08EB           1594        ST    DEP180+@OP1,@ARR             SAVE RETURN ADDRESS
     0894 F2 80 22             1595 DEP100 JC    DEP120,@NOP                  JUMP IF MARGINS SET UP
     0897 0C 00 09E4 03C1      1596        MVC   DEPNPS(1),$LMRGN             SET LEFT MARGIN AS TWO DEPMSZ
     089D 0E 00 09EF 03C0      1597        ALC   DEPRMG(1),$RMRGN             SET RIGHT MARGIN ADRESS
     08A3 0F 01 09EF 09E4      1598        SLC   DEPRMG(@CADDR),DEPNPS        CALCULATE RIGHT MARGIN ADDRESS
     08A9 0E 00 0A3A 043B      1599        ALC   DEP500+@D1(1),$EXFTR         SET DSPLYN SENSE BYTE ADDRESS
     08AF 0E 00 0A3F 043B      1600        ALC   DEP520+@D1(1),$EXFTR         SET BRANCH TO DSPLYN CMD RETURN
     08B5 3C 87 0895           1601        MVI   DEP100+@Q,@UCB               SET BRANCH OVER MERGIN LOGIC
     08B9 35 C0 09D6           1602 DEP120 L     DEPIAR,@I1IAR                SET INTERRUPT ADDRESS
     08BD 0D 01 09EB 09ED      1603        CLC   DEPSTN(@CADDR),DEPLMG        AT LEFT MARGIN ?
     08C3 F2 01 08             1604        JNE   DEP140                       SKIP CMD LITES IF NO
     08C6 38 08 03D2           1605        TBN   $IOIND,$CMDKY                COMMAND KEYS ONLY ?
     08CA C0 90 0B39           1606        BF    DEP800                       TURN ON LITES 1 - 11 IF NOT
     08CE 38 06 03D2           1607 DEP140 TBN   $IOIND,$CRTAV+$CRTNO         IS THE CRT AVAILABLE ?
     08D2 F2 90 04             1608        JF    DEP160                       SKIP LITE IF NO
     08D5 31 11 0B62           1609        LIO   DEPK12,@KEYBD+@CMLON         TURN ON CLEAR CRT LITE (CK12)
     08D9 3A 10 03C3           1610 DEP160 SBN   $KEYCD,$KYBSY                SET KEYBOARD BUSY INDR
     08DD 3B 80 03C3           1611        SBF   $KEYCD,$TRUNK                SET TRUNCATED LINE INDR OFF
     08E1 3C 00 09E4           1612        MVI   DEPNPS,@ZERO                 SET LINE POS CHANGE TO 0
     08E5 F3 10 1E             1613        SIO   @KENAB,@KEYBD                UNLOCK, ENBALE KEYBOARD
     08E8 C0 87 0000           1614 DEP180 B     *-*
                               1615 *
```

```
      DEPRES - INTERRUPT ENTRY/EXIT SECTION
```

```
                              1617 **********************************************************************
                              1618 *      ONCE THE KEYBOARD HAS BEEN UNLOCKED, ALL KEYBOARD INTERRUPTS    *
                              1619 *      WILL ENTER AT DEPNTR.  THE INTERRUPT WILL BE SERVICED AND THE   *
                              1620 *      LEVEL EXITED.                                                  *
                              1621 **********************************************************************
                         0920 1622          USING DEPASE,@BR              BASE VALUE FOR INTERRUPT SECTION
                         0A15 1623          USING DEPNDX,@XR              BASE VALU FOR FUNCTION KEYS
      08EC F3 10 1D           1624 DEP200 SIO   DEPEUD,@KEYBD            EXIT, UNLOCK, DISABLE KEYBOARD
                              1625 *
                         08EF 1626 DEPNTR EQU   *                        INTERRUPT ENTRY ADDRESS
      08EF 34 01 0943         1627        ST    DEP280+@OP1,@BR          SAVE BR
      08F3 C2 01 0920         1628        LA    DEPASE,@BR               LOAD BASE REGISTER
      08F7 74 02 1F           1629        ST    DEP260+@OP1(,@BR),@XR    SAVE XR
      08FA 74 04 BA           1630        ST    DEPSRX(,@BR),@PSR        SAVE STATUS REGISTER
      08FD 74 20 DB           1631        ST    DEPREG(,@BR),@P1IAR      TEST INTERRUPT ADDRESS
      0900 5D 01 DD DB        1632        CLC   DEPEXA(@CADDR,@BR),DEPREG(,@BR) FOR INTERRUPT FROM
      0904 F2 81 03           1633        JE    DEP220                   * DEPRES EXIT ROUTINE
      0907 74 20 D5           1634        ST    DEPRET(,@BR),@P1IAR      SAVE RETURN ADDRESS
      090A 75 20 D9           1635 DEP220 L     DEPROS(,@BR),@P1IAR      LOAD P1IAR WITH PROCESSOR ENTRY
      090D 70 10 C2           1636        SNS   DEPNSK(,@BR),@KEYBD      SENSE KEYBOARD DATA
      0910 5D 01 C2 DF        1637        CLC   DEPNSK(@REGL,@BR),DEPIRK(,@BR)  IS IT INQUIRY REQUEST ?
      0914 C0 01 08EC         1638        BNE   DEP200                   GO EXIT LEVEL IF NOT
      0918 C0 87 0B44         1639        B     DEP840                   TURN OFF COMMAND KEY LIGHT
      091C C0 87 0483         1640        B     $CIENT                   GO CHECK MASK STATUS
                              1641 *
```

```
      DEPRES - DATA HANDLING ROUTINE


ERR LOC   OBJECT CODE      ADDR STMT SOURCE STATEMENT          VER 15, MOD 00  29/10/15  PAGE   40

                          1643 ********************************************************************************
                          1644 *         DATA HANDLING ROUTINE                                               *
                          1645 ********************************************************************************
                     0920 1646 DEPASE EQU   *                          PRIMARY BASE ADDRESS
                     0920 1647 DEPXIT EQU   *                          ENTRY TO EXIT DEPRES
    0920 F3 10 1C        1648        SIO   DEPULK,@KEYBD              UNLOCK KEYBOARD
    0923 C0 87 0B3D      1649        B     DEP820                     TURN OFF LITES 1 - 11
    0927 38 08 03D2      1650        TBN   $IOIND,$CMDKY              COMMAND KEYS ONLY ?
    092B F2 10 08        1651        JT    DEP240                     DON'T TURN ON LITES
    092E 5D 01 CB CD     1652        CLC   DEPSTN(@CADDR,@BR),DEPLMG(,@BR)  AT LEFT MARGIN TOO ?
    0932 C0 81 0B39      1653        BE    DEP800                     TURN ON LITES 1 -11 IF YES
    0936 75 04 BA        1654 DEP240 L     DEPSRX(,@BR),@PSR          RESTORE STATUS REGISTER
    0939 75 08 D7        1655        L     DEPARR(,@BR),@ARR          RESTORE ARR
    093C C2 02 0000      1656 DEP260 LA    *-*,@XR                    RESTORE XR
    0940 C2 01 0000      1657 DEP280 LA    *-*,@BR                    RESTORE BR
    0944 F3 10 12        1658        SIO   DEPENB,@KEYBD              ENABLE INTERRUPTS
    0947 35 20 09F5      1659 DEP300 L     DEPRET,@P1IAR              RETURN TO INTERRUPTED PROGRAM
                          1660 *
    094B 74 08 D7        1661 DEP320 ST    DEPARR(,@BR),@ARR          SAVE ARR
    094E C2 02 0A15      1662        LA    DEPNDX,@XR                 LOAD INDEX REGISTER
    0952 D0 FF 76        1663        BC    DEPDLP(,@BR),X'FF'         UPDATE LINE POSITION
    0955 78 80 C2        1664        TBN   DEPNSK(,@BR),@PRITY        PARITY ERROR ?
    0958 D0 10 98        1665        BT    DEPROR(,@BR)               JUMP IF PARITY ERROR
    095B 7C 87 99        1666        MVI   DEP420+@Q(,@BR),@UCB       SET PARITY INDR OFF
    095E 78 20 C2        1667        TBN   DEPNSK(,@BR),@KCMDK        COMMAND KEY ?
    0961 F2 10 B1        1668        JT    DEPPCK                     JUMP IF YES
    0964 78 10 C2        1669        TBN   DEPNSK(,@BR),@KFUNK        FUNCTION KEY ?
    0967 F2 10 DA        1670        JT    DEPPFK                     JUMP IF YES
    096A D0 87 E0        1671        B     DEPEST(,@BR)               GO CHK COMMAND KEY ONLY, RT MRGN
    096D BC 80 B2        1672        MVI   DEP660+@Q-DEPNDX(,@XR),@NOP  SET BACKSPACE INDEX OFF
    0970 4C 00 5C 09E1   1673 DEP340 MVC   DEP360+@OPD2(1,@BR),DEPATA    MOVE DAAT KEY DISP TO MVC INST
    0975 75 02 B8        1674        L     DEPBLE(,@BR),@XR           LOAD XR WITH TABLE ADDRESS
    0978 2C 00 0000 00   1675 DEP360 MVC   *-*(1),*-*(,@XR)           MOVE DATA CHARACTER TO LINE BUFF
    097D D0 87 63        1676        B     DEPRT1(,@BR)               PRINT AND UPDATE POSITION
    0980 D0 87 00        1677        B     DEPXIT(,@BR)               GO EXIT
                          1678 *
```

```
                               1680 ***********************************************************************
                               1681 *      THIS ROUTINE UPDATES ALL LINE BUFFER ADDRESSES IN DEPRESS BY     *
                               1682 *      THE VALUE PLACED IN 'DEPNPS'.  IT CHKS FOR MARGIN REQUIREMENTS. *
                               1683 *      IF THE RIGHT MARGIN IS HIT, A CARRIAGE RETURN AND EOS ARE        *
                               1684 *      GENERATED.  IF LEFT MARGIN IS HIT, NOTHING IS UPDATED.           *
                               1685 *      3 ENTRY POINTS ARE PROVIDED:                                     *
                               1686 *          B   DEPRT1(,@BR) - PRINTS 1 CHAR AND UPDATES POSITION        *
                               1687 *          B   DEPRNT(,@BR) - PRINTS AND UPDATES POSITION               *
                               1688 *          B   DEPDLP(,@BR) - UPDATES POSITION, TEST RIGHT MARGIN       *
                               1689 ***********************************************************************
                     0920      1690        USING  DEPASE,@BR                BASE VALUE FOR UPDATE
                     0983      1691 DEPRT1 EQU    *                         ENTRY POINT
    0983 7C 01 C4               1692        MVI    DEPNPS(,@BR),DEPONE       SET CHARACTER COUNT TO 1
                     0986      1693 DEPRNT EQU    *                         ENTRY TO PRINT
    0986 74 08 97               1694        ST     DEP400+@OP1(,@BR),@ARR    SAVE RETURN ADDRESS
    0989 5C 00 C9 C4            1695        MVC    DEPCNT(1,@BR),DEPNPS(,@BR)  SET PRINT COUNT
    098D C0 87 0465             1696        B      $SPRNT                    GO PRINT CHARACTER ON SYS PRINT
    0991 09E8            0992   1697        DC     AL2(DEPPPL)               ADDRESS OF PPL
    0993 F2 87 03               1698        J      DEP380                    GO UPDATE POSITION
                               1699 *
                     0996      1700 DEPDLP EQU    *                         ENTRY TO UPDATE POSITION
    0996 74 08 97               1701        ST     DEP400+@OP1(,@BR),@ARR    SAVE RETURN ADDRESS
    0999 5E 01 CB C4            1702 DEP380 ALC    DEPPPL+@PDATA(@CADDR,@BR),DEPNPS(,@BR)  UPDATE DATA ADDR
    099D 5C 01 5B CB            1703        MVC    DEP360+@OP1(@CADDR,@BR),DEPSTN(,@BR)   UPDATE POS ADDR
    09A1 C2 02 0A15             1704        LA     DEPNDX,@XR                LOAD INDEX REGISTER
    09A5 9C 01 89 CB            1705        MVC    DEP580-DEPNDX+@OP1(@CADDR,@XR),DEPSTN(,@BR)
    09A9 9C 01 90 CB            1706        MVC    DEP600-DEPNDX+@OP1(@CADDR,@XR),DEPSTN(,@BR)
    09AD 9C 01 E9 CB            1707        MVC    DEP740-DEPNDX+@OP1(@CADDR,@XR),DEPSTN(,@BR)
    09B1 7C 00 C4               1708        MVI    DEPNPS(,@BR),@ZERO        ZERO LINE POSITION INCREMENT
    09B4 C0 87 0000             1709 DEP400 B      *-*                       RETURN
                               1710 *
```

```
     DEPRES - ERP SECTION


ERR LOC   OBJECT CODE       ADDR STMT SOURCE STATEMENT           VER 15, MOD 00  29/10/15  PAGE  42

                            0920 1712           USING DEPASE,@BR             BASE VALUE FOR ERP
                            09B8 1713 DEPROR EQU  *                          ENTRY TO ERP
    09B8 F2 87 07                1714 DEP420 JC   DEP440,@UCB                JUMP IF 1ST ERROR
    09BB 3A 20 03D2              1715        SBN  $IOIND,$HRDER              SET HARD ERROR INDR
    09BF E0 87 E6                1716        B    DEP740(,@XR)               GO EXIT - HARD ERROR
                                 1717 *
    09C2 1C 07 0435 C6           1718 DEP440 MVC  $HIST1(#HISLN),DEPIST(,@BR)  SET UP HISTORY ENTRY
    09C7 3C 80 09B9              1719        MVI  DEP420+@Q,@NOP             SET PARITY ERROR INDR
                                 1720 *      $HPL CODE-@HKBER               KEYBOARD PARITY ERROR
    09CB F0                 09CB 1721+       DC   XL1'F0'                    INLINE HPL INSTRUCTION
    09CC 2040               09CD 1722+       DC   AL2(@HKBER)                HALT CODE
    09CE 3A 04 03D5              1723        SBN  $INDR2,$ERPND              SET ERROR PENDING INDR
    09D2 D0 87 00                1724        B    DEPXIT(,@BR)               GO RETRY CHARACTER
                                 1725 *
```

```
                             1727 ***********************************************************************
                             1728 *        CONSTANTS AND WORK AREAS FOR KEYBOARD IOCR.                    *
                             1729 ***********************************************************************
                        0920 1730           USING DEPASE,@BR              BASE VALUE
      09D5 08EF          09D6 1731 DEPIAR DC    AL2(DEPNTR)              INTERRUPT ENTRY ADDRESS
      09D7 0BC0          09D8 1732 DEPBLE DC    AL2(DEPTBL)              ADDRESS OF DATA TABLE
      09D9               09DA 1733 DEPSRX DS    CL2                      SAVE AREA FOR PSR
      09DB 0480          09DC 1734 DEPIXT DC    AL2($CIEXT)              ADDRESS OF CI EXIT
      09DD 0483          09DE 1735 DEPIET DC    AL2($CIENT)              ADDRESS OF CI ENTRY
                             1736 *
      09DF 10            09DF 1737        DC    AL1(@KEYBD)              SIO Q BYTE
      09E0 1E            09E0 1738        DC    AL1(@KENAB)              SIO R BYTE - ENABLE KEYBOARD
      09E1               09E1 1739 DEPATA DS    CL1                      DATA BYTE
      09E2               09E2 1740 DEPNSK DS    CL1                      SENSE BYTE
      09E3 0000          09E4 1741 DEPNPS DC    XL2'0000'                LINE POSITION CHANGE
      09E5 0001          09E6 1742 DEP001 DC    XL2'0001'                CONSTANT 1
      09E7 00            09E7 1743        DC    XL1'00'                  INDEX PPL COUNT BYTE
                        09E6 1744 DEPIST EQU   DEP001                   UN-USED
                        09E8 1745 DEPPPL EQU   *                        PRINT PPL
      09E8 40            09E8 1746        DC    XL1'40'                  PRINT COMMAND
      09E9               09E9 1747 DEPCNT DS    CL1                      PRINT COUNT
      09EA 0607          09EB 1748        DC    AL2($$INLN)              INITIAL PRINT POSITION
                        09EB 1749 DEPSTN EQU   DEPPPL+@PDATA            ADDR OF CURRENT POS IN LINE BUF
      09EC 0607          09ED 1750 DEPLMG DC    AL2($$INLN)              ADDR OF LEFT POS OF LINE BUF
      09EE 0607          09EF 1751 DEPRMG DC    AL2($$INLN)              ADDR OF RIGHT POS OF LINE BUF
      09F0               09F1 1752 DEPIME DS    CL2                      100 MS LOOP COUNTER
      09F2 15B3          09F3 1753 DEPMCT DC    IL2'5555'                INITIAL COUNT FOR 100MS
      09F4               09F5 1754 DEPRET DS    CL2                      INTERRUPT RETURN ADDR
      09F6               09F7 1755 DEPARR DS    CL2                      ARR SAVE AREA
      09F8 094B          09F9 1756 DEPROS DC    AL2(DEP320)              PROCESS DATA ENTRY ADDRESS
      09FA               09FB 1757 DEPREG DS    CL2                      SAVE AREA FOR P1IAR
      09FC 0947          09FD 1758 DEPEXA DC    AL2(DEP300)              DEPRES EXIT ADDRESS
      09FE 11            09FE 1759        DC    AL1(DEPRKY)              I R KEY CODE
      09FF 10            09FF 1760 DEPIRK DC    AL1(@KFUNK)              FUNCTION KEY CODE
                             1761 *
```

DEPRES - TEST RIGHT MARGIN + COMMAND KEYS ONLY

                              1763 **
                              1764 *   TEST RIGHT MARGIN + COMMAND KEYS   *
                              1765 **
                         0A00 1766 DEPEST EQU   *   ENTRY TO TEST RIGHT MARGIN
     0A00 5D 01 CB CF   1767   CLC   DEPPPL+@PDATA(@CADDR,@BR),DEPRMG(,@BR) AT RIGHT MARGIN ?
     0A04 F2 02 E1   1768   JNL   DEP720   DO CARRIER RETURN IF YES
                         0A07 1769 DEPST1 EQU   *   ENTRY TO TEST CMD KEYS ONLY
     0A07 74 08 F4   1770   ST   DEP460+@OP1(,@BR),@ARR   SAVE RETURN ADDRESS
     0A0A 38 08 03D2   1771   TBN $IOIND,$CMDKY   CMD KEY ONLY REQUEST ?
     0A0E E0 10 94   1772   BT   DEPATC(,@XR)   GO TEST TYPAMATIC
     0A11 C0 87 0000   1773 DEP460 B   *-*   RETURN TO CALLING ROUTINE
                              1774 *

```
     DEPRES - EQUATES

ERR LOC   OBJECT CODE      ADDR STMT SOURCE STATEMENT          VER 15, MOD 00  29/10/15  PAGE  45

                          0001 1776 DEPONE EQU   1                        ONE
                          0005 1777 DEPTAB EQU   X'05'                    TAB KEY
                          0016 1778 DEPBSP EQU   X'16'                    BACKSPACE KEY
                          0015 1779 DEPRTN EQU   X'15'                    RETURN KEY
                          0003 1780 DEPERS EQU   X'03'                    ERASE KEY
                          0040 1781 DEPSPC EQU   X'40'                    SPACE BAR
                          0011 1782 DEPRKY EQU   X'11'                    INQUIRY REQUEST KEY
                          0081 1783 DEPPST EQU   X'81'                    PROGRAM START KEY
                          0002 1784 DEPEMS EQU   X'02'                    ENTER MINUS FUNC KEY
                          0005 1785 DEPNLG EQU   5                        LENGTH OF AUTOMATIC LINE NO.
                          0010 1786 DEPACK EQU   X'10'                    BACKSPACE CNTL
                          0011 1787 DEPKIX EQU   X'11'                    BACKSPACE & INDEX CNTL
                          0000 1788 DEPTEX EQU   0                        DISPLACEMENT OF $CIENT EXIT
                          0004 1789 DEPREX EQU   4                        DISPLACEMENT OF $CIENT EXIT
                          0008 1790 DEPRML EQU   8                        NORMAL EXIT DISPLACEMENT
                          060B 1791 DEPUTO EQU   $$INLN+DEPNLG-1          LOCATION OF AUTO LINE NR IN BUF
                          001D 1792 DEPEUD EQU   X'1D'                    EXIT, UNLOCK, DISABLE CNTL
                          0018 1793 DEPLOK EQU   X'18'                    LOCK KEYBOARD CNTL
                          0012 1794 DEPENB EQU   X'12'                    ENABLE INTERRUPT CNTL
                          001C 1795 DEPULK EQU   X'1C'                    UNLOCK KEYBOARD CNTL
                               1796 *
```

```
     DEPRES - COMMAND KEY ROUTINE
```

```
                          1798 ***********************************************************************
                          1799 *        COMMAND KEY ROUTINE                                          *
                          1800 ***********************************************************************
                    0A15  1801 DEPNDX EQU   *                           DECONDARY BASE ADDRESS
                    0A15  1802 DEPPCK EQU   *                           ENTRY TO PROCESS COMMAND KEY
   0A15 5D 01 CB CD       1803        CLC   DEPSTN(@CADDR,@BR),DEPLMG(,@BR)  AT LEFT MARGIN ?
   0A19 F2 01 15          1804        JNE   DEP480                      DON'T TEST DCAL IF NOT
   0A1C 38 08 03D2        1805        TBN   $IOIND,$CMDKY               COMMAND KEYS ONLY ?
   0A20 F2 10 0E          1806        JT    DEP480                      GO CHECK CRT KEYS IF YES
   0A23 7D 0B C1          1807        CLI   DEPATA(,@BR),@CKY11         IS IT A CRT KEY ?
   0A26 F2 84 08          1808        JH    DEP480                      DO CRT KEYS IF YES
   0A29 1C 00 0603 C1     1809        MVC   $$CKEY,DEPATA(1,@BR)        SET CODE FOR ECMANL
   0A2E F2 87 CE          1810        J     DEP760                      GO LOCK KEYBOARD

   0A31 38 06 03D2        1812 DEP480 TBN   $IOIND,$CRTAV+$CRTNO        IS CRT AVAILABLE ?
   0A35 F2 90 09          1813        JF    DEP540                      EXIT IT NOT
   0A38 1C 00 209C C1     1814 DEP500 MVC   $$CSNS(1),DEPATA-DEPASE(,@BR)  SET SENSE BYTE FOR DSPLYN
   0A3D C0 87 2200        1815 DEP520 B     $$PYCD                      GO TO DSPLYN IF SO
   0A41 D0 87 00          1816 DEP540 B     DEPXIT-DEPASE(,@BR)         GO EXIT LEVEL
                          1817 *
```

```
                              1819 ********************************************************************
                              1820 *        FUNCTION KEY OPERATIONS                                    *
                              1821 ********************************************************************
                         0920 1822          USING DEPASE,@BR              BASE VALUE FOR FUNCTION KEY
                         0A44 1823 DEPPFK EQU   *                         ENTRY FOR FUNC KEY PROCESSING
     0A44 7D 11 C1            1824          CLI   DEPNSK-1(,@BR),DEPRKY    INQUIRY REQUEST ?
     0A47 C0 81 0AFB          1825          BE    DEP740                   GO EXIT
     0A4B D0 87 E7            1826 DEP560 B     DEPST1(,@BR)               TEST CMD KEYS ONLY OPTION
     0A4E 7D 16 C1            1827          CLI   DEPNSK-1(,@BR),DEPBSP    BACKSPACE KEY ?
     0A51 F2 81 6F            1828          JE    DEPSPB                   JUMP IF YES
     0A54 7D 15 C1            1829          CLI   DEPNSK-1(,@BR),DEPRTN    RETURN KEY ?
     0A57 F2 81 98            1830          JE    DEPCRR                   JUMP IF YES
     0A5A 7D 03 C1            1831          CLI   DEPNSK-1(,@BR),DEPERS    ERASE KEY ?
     0A5D F2 81 B5            1832          JE    DEPERA                   JUMP IF YES
     0A60 7D 02 C1            1833          CLI   DEPNSK-1(,@BR),DEPEMS    ENTER MINUS ?
     0A63 F2 81 CA            1834          JE    DEP780                   DO INDEX IF YES
     0A66 D0 87 E0            1835          B     DEPEST(,@BR)             CHECK FOR RIGHT MARGIN
     0A69 7D 40 C1            1836          CLI   DEPNSK-1(,@BR),DEPSPC    SPACE BAR ?
     0A6C F2 81 B9            1837          JE    DEPSPA                   JUMP IF YES
     0A6F 7D 05 C1            1838          CLI   DEPNSK-1(,@BR),DEPTAB    TAB KEY ?
     0A72 F2 81 23            1839          JE    DEPTBO                   JUMP IF YES
     0A75 7D 81 C1            1840          CLI   DEPNSK-1(,@BR),DEPPST    PROGRAM START ?
     0A78 D0 01 00            1841          BNE   DEPXIT(,@BR)             EXIT IF NO
                              1842 *        CONTINUE
```

```
                            1844 ***********************************************************************
                            1845 *       THIS ROUTINE IS ENTERED WHEN THE PROGRAM KEY IS PRESSED.        *
                            1846 *       IF THE CURRENT POSITION IS AT THE START OF A LINE, THE          *
                            1847 *       AUTOMATIC LINE NUMBER FEATURE IS IMPLEMENTED                    *
                            1848 ***********************************************************************
                       0A15 1849        USING  DEPNDX,@XR                 BASE VALUE FOR PGM START
 0A7B 5D 01 CB CD           1850        CLC    DEPSTN(@CADDR,@BR),DEPLMG(,@BR)  ARE WE AT LEFT MARGIN ?
 0A7F D0 01 00              1851        BNE    DEPXIT-DEPASE(,@BR)         EXIT IF NO
 0A82 38 10 03D2            1852        TBN    $IOIND,$PGMST              REAL PGM START SITUATION
 0A86 D0 10 00              1853        BT     DEPXIT-DEPASE(,@BR)         EXIT IF FIRST KEY
 0A89 0C 04 060B 03CC       1854        MVC    DEPUTO(DEPNLG),$TABLN+1    MOVE AUTOMATIC LINE NO. TO BUF
 0A8F 7C 05 C4              1855        MVI    DEPNPS(,@BR),DEPNLG         SET LENGTH OF INSERTED CHARS
 0A92 D0 87 66              1856        B      DEPRNT-DEPASE(,@BR)         PRINT LINE NUMBER
 0A95 D0 87 00              1857        B      DEPXIT-DEPASE(,@BR)         GO EXIT LEVEL
                            1858 *
```

```
                              1860 ********************************************************************
                              1861 *        TAB KEY PROCESSING                                         *
                              1862 ********************************************************************
                         0A15 1863        USING DEPNDX,@XR                BASE VALUE FOR TAB OPERATIONS
                         0A98 1864 DEPTBO EQU   *                         ENTRY FOR TAB OPERATIONS
     0A98 BC 80 B2            1865        MVI   DEP660+@Q(,@XR),@NOP       SET BACKSPACE INDR OFF
     0A9B 3D 1E 0000          1866 DEP580 CLI   *-*,@EOS                  EOS AT CURRENT POSITION ?
     0A9F F2 01 04            1867        JNE   DEP620                     JUMP IF NOT
     0AA2 3C 40 0000          1868 DEP600 MVI   *-*,@BLANK                MOVE BLANK TO CURRENT POS
     0AA6 D0 87 63            1869 DEP620 B     DEPRT1-DEPASE(,@BR)        GO PRINT ONE CHARACTER
                              1870 *                                      CONTINUE TO TEST TYPO

                         0AA9 1872 DEPATC EQU   *                         ENTRY TO TEST TYPAMATIC
     0AA9 F3 10 18            1873        SIO   DEPLOK,@KEYBD              RESET BAIL FOR TYPO
     0AAC 5C 01 D1 D3         1874        MVC   DEPIME(2,@BR),DEPMCT(,@BR)  INITIALIZE TIMING LOOP
     0AB0 5F 01 D1 C6         1875 DEP640 SLC   DEPIME(2,@BR),DEP001-DEPASE(,@BR)  DECREMENT COUNTER
     0AB4 E0 84 9B            1876        BH    DEP640(,@XR)               LOOP FOR 100 MS
     0AB7 70 10 C2            1877        SNS   DEPNSK-DEPASE(,@BR),@KEYBD  SENSE DATA
     0ABA 79 02 C2            1878        TBF   DEPNSK(,@BR),@TYPAM        TYPAMATIC MODE ?
     0ABD D0 10 00            1879        BT    DEPXIT-DEPASE(,@BR)        EXIT IF NOT
     0AC0 E0 87 2F            1880        B     DEPPFK(,@XR)               RETURN FOR CONTINUED TYPO
                              1881 *
```

```
                              1883 *********************************************************************
                              1884 *        BACKSPACE KEY PROCESSING                                    *
                              1885 *********************************************************************
                         0A15 1886        USING DEPNDX,@XR                BASE VALUE FOR TAB OPERATIONS
                         0AC3 1887 DEPSPB EQU  *                          ENTRY FOR BACKSPACE OPERATIONS
    0AC3 BC 10 D1             1888        MVI   DEPPL1+@PCTRL(,@XR),DEPACK  SET BACKSPACE CONTROL
    0AC6 F2 80 06             1889 DEP660 JC    DEP680,@NOP                JUMP IF NOT FIRST BACKSPACE
    0AC9 BC 11 D1             1890        MVI   DEPPL1+@PCTRL(,@XR),DEPKIX  SET BACKSPACE AND INDEX CNTL
    0ACC BC 87 B2             1891        MVI   DEP660+@Q(,@XR),@UCB       SET INDEX INDR OFF
    0ACF 5D 01 CB CD          1892 DEP680 CLC   DEPSTN(@CADDR,@BR),DEPLMG(,@BR)   LEFT MARGIN ?
    0AD3 F2 81 0D             1893        JE    DEP700                     JUMP TO NOT BACKSPACE
    0AD6 C0 87 0465           1894        B     $SPRNT                     GO DO BACKSPACE
    0ADA 0AE6            0ADB 1895        DC    AL2(DEPPL1)                ADDRESS OF PPL
    0ADC 5F 01 CB C6          1896        SLC   DEPSTN(@CADDR,@BR),DEP001(,@BR)   SET NEW POSITION
    0AE0 D0 87 76             1897        B     DEPDLP-DEPASE(,@BR)        GO UPDATE LINE POSITION
    0AE3 E0 87 94             1898 DEP700 B     DEPATC(,@XR)               GO TEST TYPAMATIC

                         0AE6 1900 DEPPL1 EQU  *
    0AE6                 0AE6 1901        DS    CL1                        CONTROL BYTE
    0AE7 00              0AE7 1902        DC    XL1'00'                    COUNT BYTE
                              1903 *
```

```
                              1905 ********************************************************************
                              1906 *      RETURN KEY, ERASE AND SPACE KEY PROCESSING                  *
                              1907 ********************************************************************
                         0A15 1908           USING DEPNDX,@XR                 BASE VALUE FOR RETURN KEY
     0AE8 78 02 C2            1909 DEP720 TBN   DEPNSK(,@BR),@TYPAM            TYPO BIT ON ?
     0AEB E0 10 94            1910        BT    DEPATC(,@XR)                   YES... GO SENSE AGAIN
     0AEE 3A 80 03C3          1911        SBN   $KEYCD,$TRUNK                  SET TRUNCATED LINE INDR
                         0AF2 1912 DEPCRR EQU   *                             ENTRY FOR RETURN CARRIER
     0AF2 F3 10 18            1913        SIO   DEPLOK,@KEYBD                  LOCK KEYBOARD
     0AF5 C0 87 0465          1914        B     $SPRNT                         START CARRIER RETURN
     0AF9 0B2E           0AFA 1915        DC    AL2(DEPPL2)                    PPL ADRRESS
     0AFB 3C 1E 0000          1916 DEP740 MVI   *-*,@EOS                       MOVE EOS TO CURRENT BUFFER POS
     0AFF 3B 10 03C3          1917 DEP760 SBF   $KEYCD,$KYBSY                  INDICATE LINE IS FINISHED
     0B03 75 C0 BE            1918        L     DEPIET(,@BR),@I1IAR            SET INTERRUPT ADDR TO NUCLEUS
     0B06 F3 10 18            1919        SIO   DEPLOK,@KEYBD                  LOCK KEYBOARD
     0B09 5C 01 CB CD         1920        MVC   DEPSTN-DEPASE(@CADDR,@BR),DEPLMG(,@BR)  SET NEW POSITION
     0B0D C0 87 0B44          1921        B     DEP840                         GO TURN OFF CMD LIGHTS
     0B11 C0 87 0936          1922        B     DEP240                         GO EXIT LEVEL - LOCK KEYBOARD


                         0B15 1924 DEPERA EQU   *                             ENTRY FOR ERASE KEY
     0B15 C0 87 0465          1925        B     $SPRNT                         PRINT ERASED MESSAGE & RETURN
     0B19 0BA5           0B1A 1926        DC    AL2(@@M170)                    PPL ADRRESS
     0B1B 5C 01 CB CD         1927        MVC   DEPSTN-DEPASE(@CADDR,@BR),DEPLMG(,@BR)  SET NEW POSITION
     0B1F C0 87 0465          1928        B     $SPRNT                         PRINT ERASED MESSAGE & RETURN
     0B23 057F           0B24 1929        DC    AL2($WAITF)                    ADDRESS OF WAIT PPL
     0B25 D0 87 00            1930        B     DEPXIT-DEPASE(,@BR)            GO EXIT LEVEL


                         0B28 1932 DEPSPA EQU   *                             ENTRY FOR SPACE BAR KEY
     0B28 7C 39 C1            1933        MVI   DEPATA-DEPASE(,@BR),DEPLNK  MOVE IN DISP OF BLANK
     0B2B D0 87 50            1934        B     DEP340-DEPASE(,@BR)            BRANCH TO HANDLE DATA KEYS


                         0B2E 1936 DEPPL2 EQU   *                             ADDR OF RETURN PPL
     0B2E 8080           0B2F 1937        DC    XL2'8080'                      RETURN CARRAIGE PPL


                              1939 *      TURN OFF COMMAND INDR LIGHTS
     0B30 C0 87 0465          1940 DEP780 B     $SPRNT                         DO FORMS INDEX
     0B34 09E6           0B35 1941        DC    AL2(DEP001)                    PPL ADRRESS
     0B36 D0 87 00            1942        B     DEPXIT(,@BR)                   GO EXIT LEVEL


     0B39 3C 11 0B4D          1944 DEP800 MVI   DEP880+@Q,@KEYBD+@CMLON        SET TURN ON CONTROL
     0B3D 3C 0B 09F1          1945 DEP820 MVI   DEPIME,@CKY11                  SET LITES 1 - 11
     0B41 F2 87 04            1946        J     DEP860                         GO TURN ON/OFF


     0B44 3C 10 09F1          1948 DEP840 MVI   DEPIME,@CKY16                  SET LITES 1 - 16
     0B48 34 08 0B61          1949 DEP860 ST    DEP900+@OP1,@ARR               SAVE RETURN ADDRESS
     0B4C 31 10 09F1          1950 DEP880 LIO   DEPIME,@KEYBD+@CMOFF           TURN LITE ON/OFF
     0B50 0F 00 09F1 0464     1951        SLC   DEPIME(1),$C0001               GET NEXT LINE
     0B56 C0 84 0B4C          1952        BH    DEP880                         LOOP IF MORE LITES
     0B5A 3C 10 0B4D          1953        MVI   DEP880+@Q,@KEYBD+@CMOFF        RESET TURN OFF CONTROL
     0B5E C0 87 0000          1954 DEP900 B     *-*                            RETURN TO CALLER


     0B62 0C             0B62 1956 DEPK12 DC    AL1(@CKY12)                    CMD KEY 12 LITE CNTL
                              1957 *
```

```
     DEPRES - PATCH AREA


ERR LOC   OBJECT CODE      ADDR STMT SOURCE STATEMENT            VER 15, MOD 00  29/10/15  PAGE  52

                                1959 ******************************************************************************
                                1960 *        PATCH AREA #2                                                      *
                                1961 ******************************************************************************
                           0B63 1962 $$$$L2 EQU    *                           START OF PATCH AREA 2
                           0BA5 1963 DEPMSG EQU    $$DATB-15-7-@PPLNG          START OF MESSAGE + PP 'ERASED'
     0B63                   0BA4 1964 $$$$$2 DS     CL(DEPMSG-$$$$L2)           PATCH AREA 2
                                1965 *
     0BA5                        1966        ORG    DEPMSG                      PLACE MSG AND PPL
                                1967 *
                                1968 ***    PPL'S AND TEXT FOR MESSAGE
                                1969 *
     0BA5 C0                0BA5 1970 @@M170 DC     AL1(@PRETR)                 PRINT CONTROL FUNCTION
     0BA6 07                0BA6 1971        DC     IL1'07'                     LENGTH OF MESSAGE
     0BA7 0BA9              0BA8 1972        DC     AL2(@@T170)                 ADDRESS OF MESSAGE
                                1973 *
                           0BA9 1974 @@T170 EQU    *
     0BA9 40C5D9C1E2C5C4    0BAF 1975        DC     CL7' ERASED'
                                1976 *
                                1977 ***    PATCH AREA FOR MESSAGES
                                1978 *
     0BB0                   0BBE 1979 $$$001 DS     CL15                        MSG EXPANSION PATCH AREA
```

DEPERS - DATA TABLE

```
                        0BC0 1981 DEPTBL EQU   $$KLD3-64             FIRST BYTE OF DATA TABLE
     0BBF                    1982        ORG   DEPTBL-1             POSITION DATA TABLE
     0BBF 01                 0BBF 1983        DC    IL1'1'               KEYBOARD TYPE INDR (KB1 - KB9)
                        1984 *
     0BC0 F0            0BC0 1985        DC    CL1'0'               0
     0BC1 F1            0BC1 1986        DC    CL1'1'               1
     0BC2 F2            0BC2 1987        DC    CL1'2'               2
     0BC3 F3            0BC3 1988        DC    CL1'3'               3
     0BC4 F4            0BC4 1989        DC    CL1'4'               4
     0BC5 F5            0BC5 1990        DC    CL1'5'               5
     0BC6 F6            0BC6 1991        DC    CL1'6'               6
     0BC7 F7            0BC7 1992        DC    CL1'7'               7
     0BC8 F8            0BC8 1993        DC    CL1'8'               8
     0BC9 F9            0BC9 1994        DC    CL1'9'               9
     0BCA C1            0BCA 1995        DC    CL1'A'               A
     0BCB C2            0BCB 1996        DC    CL1'B'               B
     0BCC C3            0BCC 1997        DC    CL1'C'               C
     0BCD C4            0BCD 1998        DC    CL1'D'               D
     0BCE C5            0BCE 1999        DC    CL1'E'               E
     0BCF C6            0BCF 2000        DC    CL1'F'               F
     0BD0 5D            0BD0 2001        DC    XL1'5D'              )
     0BD1 5A            0BD1 2002        DC    AL1(@UPARW)          UP ARROW
     0BD2 7C            0BD2 2003        DC    XL1'7C'              @
     0BD3 7B            0BD3 2004        DC    XL1'7B'              #
     0BD4 5B            0BD4 2005        DC    XL1'5B'              $
     0BD5 6C            0BD5 2006        DC    XL1'6C'              %
     0BD6 4A            0BD6 2007        DC    XL1'4A'              CENTS SIGN
     0BD7 50            0BD7 2008        DC    XL1'50'              &
     0BD8 7D            0BD8 2009        DC    XL1'7D'              .
     0BD9 4D            0BD9 2010        DC    XL1'4D'              (
     0BDA C7            0BDA 2011        DC    CL1'G'               G
     0BDB C8            0BDB 2012        DC    CL1'H'               H
     0BDC C9            0BDC 2013        DC    CL1'I'               I
     0BDD D1            0BDD 2014        DC    CL1'J'               J
     0BDE D2            0BDE 2015        DC    CL1'K'               K
     0BDF D3            0BDF 2016        DC    CL1'L'               L
     0BE0 D4            0BE0 2017        DC    CL1'M'               M
     0BE1 D5            0BE1 2018        DC    CL1'N'               N
     0BE2 D6            0BE2 2019        DC    CL1'O'               O
     0BE3 D7            0BE3 2020        DC    CL1'P'               P
     0BE4 D8            0BE4 2021        DC    CL1'Q'               Q
     0BE5 D9            0BE5 2022        DC    CL1'R'               R
     0BE6 E2            0BE6 2023        DC    CL1'S'               S
     0BE7 E3            0BE7 2024        DC    CL1'T'               T
     0BE8 E4            0BE8 2025        DC    CL1'U'               U
     0BE9 E5            0BE9 2026        DC    CL1'V'               V
     0BEA E6            0BEA 2027        DC    CL1'W'               W
     0BEB E7            0BEB 2028        DC    CL1'X'               X
     0BEC E8            0BEC 2029        DC    CL1'Y'               Y
     0BED E9            0BED 2030        DC    CL1'Z'               Z
     0BEE 60            0BEE 2031        DC    XL1'60'              -
     0BEF 7E            0BEF 2032        DC    XL1'7E'              EQUAL SIGN
     0BF0 4E            0BF0 2033        DC    CL1'+'               +
     0BF1 4B            0BF1 2034        DC    CL1'.'               PERIOD
     0BF2 5E            0BF2 2035        DC    CL1';'               ;
     0BF3 5C            0BF3 2036        DC    CL1'*'               *
```

```
     DEPERS - DATA TABLE


ERR LOC   OBJECT CODE     ADDR STMT SOURCE STATEMENT          VER 15, MOD 00  29/10/15  PAGE  54

    0BF4 6B              0BF4 2037        DC    CL1','            COMMA
    0BF5 4B              0BF5 2038        DC    CL1'.'            PERIOD
    0BF6 61              0BF6 2039        DC    XL1'61'           /
    0BF7 6F              0BF7 2040        DC    XL1'6F'           ?
    0BF8 4F              0BF8 2041        DC    XL1'4F'           LOGICAL 'OR'
    0BF9 40              0BF9 2042 DEPLKA DC    CL1' '            BLANK
    0BFA 7A              0BFA 2043        DC    XL1'7A'           COLON
    0BFB 7F              0BFB 2044        DC    XL1'7F'           NOT EQUAL
    0BFC 4C              0BFC 2045        DC    XL1'4C'           LESS THAN
    0BFD 6E              0BFD 2046        DC    XL1'6E'           > (GREATER THAN)
    0BFE 6D              0BFE 2047        DC    XL1'6D'           UNDER SCORE
    0BFF 5F              0BFF 2048        DC    XL1'5F'           LOGICAL 'NOT'
                              2049 ******************************************************************
                         0039 2050 DEPLNK EQU  DEPLKA-DEPTBL     DISP OF BLANK IN TABLE
                         0370 2051 DEPMSZ EQU  *-DEPRES          SIZE OF DEPRES
                              2052 ******************************************************************
                              2053        PRINT ON
                         FFFF 2054        END

TOTAL STATEMENTS IN ERROR IN THIS ASSEMBLY =        0
```

```
$$$$$$   001  0700 1224
$$$$$1   001  0888 1425
$$$$$2   066  0BA4 1964
$$$$L2   001  0B63 1962   1964
$$$CMD   001  0020 0850
$$$DAT   001  0040 0849
$$$EPL   001  0091 0846
$$$ERN   001  0080 0900
$$$FUN   001  0010 0851
$$$NLN   001  00A0 0896
$$$STD   001  0081 0845
$$$001   015  0BBE 1979
$$BNLN   001  0605 0826   0828
$$CDBS   001  08C0 0876
$$CDND   001  0666 0835
$$CDRD   001  0890 0874   0876
$$CKEY   001  0603 0824   1809*
$$CKFF   001  0B3D 0856
$$COFF   001  0B44 0855
$$CSNS   001  209C 0885   1814*
$$DATB   001  0BBF 0857   1963
$$EOSA   001  0AFE 0854
$$ERSK   001  1C00 0895
$$FITS   001  1D00 0903
$$FLIB   001  06FF 0902
$$ILEN   001  0601 0820   0822  0826
$$ILHD   001  0600 0818   0820
$$INLN   001  0607 0833   0835  0837  1748  1750  1751  1791
$$INND   001  06FA 0837
$$KBDT   001  09E1 0844   0848
$$KBSN   001  09E2 0848   0853
$$KLD1   001  0600 0908
$$KLD2   001  0700 0910   1216
$$KLD3   001  0C00 0912   1981
$$LPOS   001  09EB 0853
$$PCNT   001  07E9 0869
$$PLYN   001  2004 0883
$$PRES   001  0890 0842   0844  0854  0855  0856  0857  0874  1425  1426
$$PRFL   001  2143 0887
$$PRNT   001  0707 0863   0864  0868  0869
$$PRTN   001  0782 0864
$$PSIO   001  07CE 0868
$$PYCD   001  2200 0889   1815
$$PYMP   001  2000 0881   0883  0885  0887  0889
$$SLIB   001  1C00 0898
$$TPCD   001  0606 0828   0833
$$UPAR   001  0602 0822   0824
$$WSPB   001  1E00 0901
$$XIND   001  06FF 0899   0902
$$ZERO   001  0000 0413   0414  0416  0417  0418  0422  0881
$ABORT   001  0010 0526
$BASIC   001  0080 0584
$BIGCD   001  0080 0660
$BLDPL   001  0579 0793   0795
$BLNOE   001  0569 0783
$BLOAD   001  0522 0774   0776  0779  0792  0793
```

```
$BLRTN  001  0550 0782   0783
$BRSAV  001  03C5 0471   0472
$BSADR  001  0587 0798   0800
$BUFPT  001  03E3 0679   0680
$CABLD  001  04B4 0752   0753
$CAERK  001  0469 0729   0732
$CAERR  001  03CD 0477   0479
$CAIPL  001  049D 0748   0750
$CALLI  001  0008 0669
$CARDI  001  0001 0440
$CARPL  001  04A1 0750   0752
$CIENT  001  0483 0739   0740  1640  1735
$CIEXT  001  0480 0738   0739  1734
$CIMSK  001  0476 0735   0738  1251  1252* 1307*
$CISUS  001  0496 0743   0748
$CLBFR  001  0010 0627
$CMDKY  001  0008 0539   1605  1650  1771  1805
$CMODE  001  0002 0589
$CONFG  001  03DD 0652   0662
$CRPOS  001  03E2 0678   0679
$CRTAD  001  044D 0717   0718
$CRTAV  001  0002 0533   1607  1812
$CRTDN  001  0002 0557
$CRTIN  001  03D3 0554   0561
$CRTNO  001  0004 0536   1607  1812
$CRTPU  001  0004 0558
$CRTSP  001  0008 0559
$CRTUP  001  0001 0556
$CRUSH  001  0080 0665
$CSDPL  001  050E 0764   0765
$C0001  001  0464 0721   0727  1951
$DATE   001  043A 0702   0703
$DBGUF  001  03E0 0664   0673
$DBLOK  001  0001 0614
$DFDET  001  03E8 0685   0686
$DISKN  001  0025 0416
$DKERR  001  0008 0595
$DKSIZ  001  03D7 0639   0647  0688
$DK100  001  0001 0641
$DK200  001  0002 0642
$DK400  001  0004 0643
$DK600  001  0008 0644
$DK800  001  0010 0645
$DPLSV  001  0449 0713   0715
$DTNMB  001  0040 0460
$DTRDR  001  0040 0548
$ENDNU  001  0600 0807   0818  0842  0863  0899  0908  0910  0912
$ERDPL  001  046F 0732   0734
$ERFIL  001  0040 0487
$ERHRD  001  0004 0619
$ERKEY  001  0080 0491
$ERLOG  001  0345 0421
$ERMAD  001  0472 0734   0735
$ERPND  001  0004 0592   1379  1383  1723
$ERRCT  001  03CF 0493
$ERRPG  001  03CE 0481
```

```
$ERSFL  001  0035 0486
$ERSTK  001  0030 0484
$ER050  001  0363 0422
$ER1N2  001  0050 0489
$EXADR  001  0517 0767   0769
$EXCMD  001  0001 0521
$EXFTR  001  043B 0703   0708  1599  1600
$FCIND  001  0010 0599
$FDIND  001  0040 0606
$FEARR  001  0004 0414
$FEMAP  001  0588 0800   0801
$FILIB  001  03DA 0650   0651
$FITIN  001  0010 0575
$FUIND  001  0020 0604
$GUFIO  001  0583 0797   0798
$GUFIR  001  0008 0449
$HISTE  001  042E 0700   0701  1384*
$HIST1  001  0435 0701   0702  1382* 1718*
$HRDER  001  0020 0545   1392  1715
$INDR1  001  03D4 0561   0587
$INDR2  001  03D5 0587   0612  1379  1383* 1723*
$INDR3  001  03D6 0612   0639
$INLNO  001  03CF 0479   0481  0493  0500
$INRPT  001  0020 0457
$IOIND  001  03D2 0528   0554  1249  1392* 1605  1607  1650  1715* 1771  1805  1812  1852
$IOPGS  001  0010 0668
$IOYES  001  0002 0443
$IPLDV  001  05FF 0804   0807
$IRKEY  001  0020 0667
$KEYBD  001  03E1 0673   0678
$KEYCD  001  03C3 0437   0471  1610* 1611* 1911* 1917*
$KEYDT  001  0040 0581
$KE090  001  00DE 0417
$KE130  001  01D5 0418
$KYBSY  001  0010 0454   1610  1917
$LDRTN  001  0571 0792
$LEVEL  001  03DF 0662   0664
$LIST   001  0002 0616
$LMRGN  001  03C1 0432   0434  1263  1299  1302  1596
$LNPTR  001  0080 0551
$LOADB  001  054A 0776
$LOADR  001  051A 0769   0772
$LPRIO  001  03EA 0686
$LPROS  001  03E5 0681   0683
$LPRP3  001  03E4 0680   0681
$MOUNT  001  0020 0630
$MPDWN  001  0001 0530   1249  1392
$NEXTB  001  03E6 0683   0684
$NEXTL  001  03E7 0684   0685
$NOENB  001  0008 0622
$NOLST  001  0004 0446
$NUCBS  001  03C0 0429   0430
$NWRKF  001  0080 0635
$NWRKR  001  0040 0632
$PASWD  001  042D 0699   0700
$PAUSD  001  04BA 0753   0755
```

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$PAUSE   001  0002 0523
$PGMDT   001  0020 0578
$PGMST   001  0010 0542   1852
$PKERT   001  0419 0697   0699
$PLST1   001  0454 0718   0719  1260*
$PLST2   001  045B 0719   0720  1259
$PLST3   001  0462 0720   0721  1259*
$PRDEV   001  044B 0715   0717
$PRESN   001  0002 0566
$PROCI   001  0001 0563
$PRPOS   001  03C2 0434   0437  1271* 1279  1290* 1297  1302* 1414*
$PSDBR   001  04FA 0758
$PSDXR   001  04F2 0757   0758
$PSTEP   001  0004 0524
$PSTMT   001  0008 0525
$PTCH1   001  03F5 0688   0692
$READY   001  0080 0608
$REORD   001  0040 0666
$RLOAD   001  051E 0772   0774
$RMRGN   001  03C0 0430   0432  1280  1597
$RSTR    001  04D6 0755   0757  0759  0764
$RUNIT   002  0001 0502
$SFAID   001  050D 0760
$SPRNT   001  0465 0727   0729  1696  1894  1914  1925  1928  1940
$SRTRN   001  04FE 0759   0760
$STEPT   001  0002 0503
$SWPCR   001  0511 0765   0767
$TABLN   001  03CB 0474   0477  1854
$TFLOW   001  0008 0509
$TRACE   001  0004 0504
$TRALL   001  0010 0510
$TROVR   001  054E 0779   0782
$TRUNK   001  0080 0462   1611  1911
$TRVAR   001  0020 0511
$UNMSK   001  048D 0740   0743
$USRDR   001  03DC 0651   0652
$VMDEF   001  0080 0515
$VOLF1   001  03FE 0694   0695
$VOLF2   001  040E 0696
$VOLID   001  03F6 0692   0693  0697
$VOLR1   001  03F6 0693   0694
$VOLR2   001  0406 0695   0696
$WAITF   001  057F 0795   0797  1929
$WFDEF   001  0040 0709
$WFLOK   001  0008 0572
$WFNME   001  0443 0708   0713
$WSIND   001  0004 0569
$XIND1   001  03D0 0500   0519
$XIND2   001  03D1 0519   0528
$XIND3   001  03D8 0647   0650
$XPREC   001  0040 0512
$XRSAV   001  03C7 0472   0474
$ZTRAD   001  05A2 0801
$12K     001  0004 0656
$16CKY   001  0008 0658
$16K     001  0002 0655
```

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$22IMP  001  0001 0653
#$$DPR  001  0700 1221   1223
#$@DPR  001  0005 1222
#$DPRI  001  014C 1220
#@CORS  001  0005 0965
#@MVSD  001  0001 0973
#@NERO  001  0003 0967
#@OBRA  001  0002 0969
#@PTFL  001  0006 0988
#@PTFS  001  0001 0987
#@VCNT  001  0002 0985
#@VLAB  001  0001 0980
#@VLSD  001  0001 0971
#CNDIS  001  0001 0940
#CNFIG  001  0005 0976
#CORSV  001  0010 0964
#DKEXT  001  0002 0947
#DPRIN  001  0000 0002
#FIGSC  001  0001 0977
#HISCT  001  0006 0954
#HISDX  001  0003 0949
#HISLN  001  0008 0946   0947   1382   1718
#HISN1  001  0003 0952
#HISN2  001  0005 0953
#HISTC  001  0007 0956
#HISTN  001  0009 0958
#HISTQ  001  0000 0950
#HISTR  001  0001 0951
#HISTS  001  0008 0957
#HISTV  001  000F 0959
#HSEND  001  0007 0955
#HSENT  001  0001 0948
#IOSDR  001  0019 0975
#MVSDR  001  000D 0972
#NEROV  001  009C 0966
#OBRAD  001  001D 0968
#PKCNT  001  0002 0933
#PKMRW  001  002B 0934
#PKRDD  001  0003 0931
#PKRTD  001  0003 0930
#PKRTL  001  0004 0937
#PKVRD  001  000B 0935
#PKVWD  001  0007 0936
#PKWTD  001  0001 0932
#PTFDA  001  00DC 0986
#RDWTL  001  0004 0938
#SDRDK  001  0011 0974
#VLSDR  001  000C 0970
#VLTBE  001  0008 0925
#VOLF1  001  0009 0978
#VOLNG  001  0006 0923   0925   0947
#VOLOC  001  0005 0924
#VOLR1  001  0008 0979
#VTCF1  001  0025 0982
#VTCF2  001  0027 0984
#VTCR1  001  0024 0981
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CROSS REFERENCE

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#VTCR2   001  0026 0983
@@M170   001  0BA5 1970    1926
@@T170   001  0BA9 1974    1972
@ALTFL   001  0001 0254
@ARR     001  0008 0018    1245* 1246  1247* 1248  1594  1655* 1661  1694  1701  1770  1949
@ASIGN   001  007C 0073
@ASTER   001  005C 0071
@BCRDL   001  0050 0090
@BE      001  0081 0045
@BF      001  0090 0054
@BH      001  0084 0043
@BKSPC   001  0010 0351
@BL      001  0082 0044
@BLANK   001  0040 0067    1868
@BM      001  0082 0056
@BNE     001  0001 0048
@BNH     001  0004 0046
@BNL     001  0002 0047
@BNM     001  0002 0059
@BNOL    001  0020 0052
@BNOZ    001  0008 0051
@BNP     001  0004 0058
@BNZ     001  0001 0060
@BOL     001  00A0 0050
@BOZ     001  0088 0049
@BP      001  0084 0055
@BR      001  0001 0015    1240  1242  1243* 1244  1245  1246  1247  1248  1251  1253  1257  1260
                          1261  1261  1263  1264  1264  1266  1268  1269  1271  1276  1277  1279
                          1280  1282  1284  1284  1286  1287  1287  1288  1288  1290  1291  1291
                          1294  1294  1295  1297  1299  1301  1303  1303  1304  1308* 1361  1368
                          1369  1370  1418  1592  1622  1627  1628* 1629  1630  1631  1632  1632
                          1634  1635  1636  1637  1637  1652  1652  1654  1655  1657* 1661  1663
                          1664  1665  1666  1667  1669  1671  1673  1674  1676  1677  1690  1692
                          1694  1695  1695  1701  1702  1702  1703  1703  1705  1706  1707  1708
                          1712  1718  1724  1730  1767  1767  1770  1803  1803  1807  1809  1814
                          1816  1822  1824  1826  1827  1829  1831  1833  1835  1836  1838  1840
                          1841  1850  1850  1851  1853  1855  1856  1857  1869  1874  1874  1875
                          1875  1877  1878  1879  1892  1892  1896  1896  1897  1909  1918  1920
                          1920  1927  1927  1930  1933  1934  1942
@BT      001  0010 0053
@BZ      001  0081 0057
@BZ37B   001  00F2 0364
@B1      001  0001 0065
@CADDR   001  0002 0144    1261  1288  1410  1598  1603  1632  1652  1702  1703  1705  1706  1707
                          1767  1803  1850  1892  1896  1920  1927
@CARDL   001  0060 0089    0835
@CC37B   001  0000 0360
@CD37B   001  00F0 0378
@CHARA   001  00C1 0074
@CHARF   001  00C6 0075
@CHARR   001  00D9 0076
@CHARZ   001  00E9 0077
@CKY01   001  0001 0312
@CKY02   001  0002 0313
@CKY03   001  0003 0314
@CKY04   001  0004 0315
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@CKY05   001  0005 0316
@CKY06   001  0006 0317
@CKY07   001  0007 0318
@CKY08   001  0008 0319
@CKY09   001  0009 0320
@CKY10   001  000A 0321
@CKY11   001  000B 0322   1807   1945
@CKY12   001  000C 0323   1956
@CKY13   001  000D 0324
@CKY14   001  000E 0325
@CKY15   001  000F 0326
@CKY16   001  0010 0327   1948
@CLOFF   001  0010 0096
@CLON    001  0011 0095
@CMLON   001  0001 0330   1609*  1944
@CMOFF   001  0000 0329   1950*  1953
@COMMA   001  006B 0068
@CPLUS   001  004E 0081
@CP37B   001  0004 0391
@CRERR   001  0090 0346
@CRPRY   001  0004 0350
@CRTDS   001  0092 0343
@CRTQ    001  0090 0345
@CURSR   001  0040 0347
@DADDR   001  0002 0142
@DBFR1   001  0004 0131
@DBFR2   001  0005 0132
@DBUSY   001  0002 0248
@DCALK   001  0001 0083
@DCBCY   001  0009 0117
@DCBT1   001  0050 0119
@DCFLN   001  0004 0232
@DCNT    001  0003 0130
@DCRID   001  0001 0246
@DCST1   001  0040 0118
@DCTRL   001  0000 0127
@DCTRW   001  0000 0245
@DCWID   001  0001 0242
@DCYL    001  0001 0128
@DCYMV   001  0001 0233
@DD2     001  0003 0032
@DEFLG   001  0002 0255
@DERCE   001  0020 0285
@DERD2   001  0008 0277
@DEREQ   001  0010 0276
@DERIN   001  0040 0274
@DERMA   001  0020 0275
@DERNR   001  0004 0278
@DERR    001  0000 0249
@DERSC   001  0001 0280
@DERTC   001  0002 0279
@DFCR    001  0006 0235
@DFDR    001  0004 0236
@DGET    001  0001 0136
@DHARD   001  0000 0263
@DLNCT   001  000F 0349
```

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@DLNLG   001  0040 0348
@DOLAR   001  005B 0070
@DOP2    001  0004 0030
@DPLNG   001  0006 0134   1259   1260   1260
@DPOS    001  0000 0135
@DPUT    001  0002 0137
@DREAD   001  0001 0239
@DSAD    001  0002 0129
@DSBCY   001  0004 0108
@DSBSY   001  0092 0344
@DSCS1   001  0000 0109
@DSEEK   001  0000 0238
@DSIVF   001  0003 0140
@DSPIN   001  0002 0133
@DTRSZ   001  0018 0087
@DUNSF   001  0080 0281
@DVBCY   001  0007 0110
@DVERY   001  0003 0244
@DVRFY   001  0031 0138
@DVST1   001  0002 0250
@DVST2   001  0003 0251
@DWAIT   001  00FF 0139
@DWBCY   001  0005 0105
@DWRIT   001  0002 0240
@DWSIZ   001  00C0 0107
@DWTB1   001  0003 0106
@DZERO   001  00F0 0066
@D1      001  0002 0028   1277   1599* 1600*
@EOF     001  001C 0079
@EOFTC   001  0075 0164
@EOS     001  001E 0078   1866   1916
@ER37B   001  00F0 0365
@FDDBC   001  0000 0197
@FDE1    001  000C 0202
@FDFNA   001  000B 0200
@FDHLN   001  0002 0210
@FDLNC   001  0002 0195
@FDNSC   001  0003 0212
@FDSD    001  0000 0208
@FLACE   001  0009 0199
@FLDBC   001  0001 0198
@FLDIN   001  0012 0337
@FLENT   001  0004 0203
@FLFNA   001  0002 0201
@FLHLN   001  0002 0211
@FLLNC   001  0002 0196
@FLNSC   001  0001 0213
@FLSD    001  0001 0209
@HCEPK   001  003C 1021
@HCOPS   001  001C 1028
@HCOPY   001  081C 1023
@HCRHE   001  7858 1044
@HDNRY   001  1008 1009
@HDRHE   001  7854 1042
@HDRLN   001  0007 0094   0863   1425
@HDRV1   001  7840 1034
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SYMBOL	LEN	VALUE	DEFN	REFERENCES	VER 15, MOD 00 29/10/15 PAGE 63
@HDRV2	001	7844	1036		
@HDTRD	001	1040	1005		
@HDTRJ	001	1010	1007		
@HERPG	001	087C	1011		
@HFEHT	001	0804	1026		
@HIPLE	001	006C	1018		
@HKBER	001	2040	1001	1722	
@HKBHE	001	7848	1038		
@HLOGE	001	1844	1013		
@HPRER	001	0070	1003	1407	
@HPRHE	001	784C	1040		
@HSTAD	001	0009	0261		
@HSTEN	001	0007	0260		
@HSTPE	001	0006	0259	1384*	
@HSTQR	001	0001	0257		
@HSTSN	001	0005	0258		
@HSTVI	001	000F	0262		
@HUNSF	001	1850	1016		
@IAR	001	0010	0019		
@ID37B	001	0040	0401		
@INDEX	001	0001	0158	0159 1301	
@INST3	001	0003	0034		
@INST4	001	0004	0035		
@INST5	001	0005	0036		
@INST6	001	0006	0037		
@IP37B	001	00C0	0400		
@I1IAR	001	00C0	0022	1602* 1918*	
@KCMDK	001	0020	0311	1667	
@KELOK	001	001B	0310		
@KENAB	001	001E	0308	1613 1738	
@KEXIT	001	001F	0309		
@KEYBD	001	0010	0328	1609* 1613 1624 1636 1648 1658 1737 1873 1877 1913 1919 1944	
				1950* 1953	
@KFUNK	001	0010	0331	1669 1760	
@KHARD	001	0011	0336		
@KLEAR	001	000D	0332		
@LINSZ	001	00F4	0086	0837	
@LO37B	001	00F0	0369		
@MAPEN	001	0005	0091		
@MINCR	001	2000	0085		
@MINUS	001	0060	0082		
@NOP	001	0080	0042	1252 1369 1595 1672 1719 1865 1889	
@NORFL	001	0000	0256		
@NTRDY	001	00A0	0393		
@NUMBR	001	007B	0072		
@OPD2	001	0004	0031	1673*	
@OP1	001	0003	0029	1242* 1244* 1246* 1248* 1594* 1627* 1629* 1694* 1701* 1703* 1705* 1706*	
				1707* 1770* 1949*	
@OP2	001	0005	0033		
@OVRUN	001	0004	0286		
@PBUSY	001	00E2	0298	1362	
@PCAR	001	00E6	0295	1304* 1412*	
@PCNT	001	0003	0230		
@PCTRL	001	0000	0151	1255 1266 1269 1286* 1295 1301* 1413* 1417* 1888* 1890*	
@PCYL	001	0001	0228		
@PC37B	001	00F2	0385		

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@PDAR    001  00E4 0294   1276*
@PDATA   001  0003 0153   1261   1276   1288* 1410* 1702* 1749   1767
@PD37B   001  0080 0399
@PERR    001  00E0 0301   1366
@PFLAG   001  0000 0227
@PFORM   001  00E1 0299   1364
@PGCSZ   001  0020 0084   0085
@PLITE   001  00E2 0300   1363* 1365*
@PLNGH   001  0004 0291   1257   1257   1257*
@PMGCK   001  0020 0302   1385
@PN37B   001  00F0 0384
@PPLNG   001  0004 0150   1963
@PRCNT   001  0001 0152   1264   1264* 1268* 1279* 1280* 1282* 1284   1284* 1287   1290   1291* 1294*
                          1367   1381
@PRETR   001  00C0 0156   1970
@PRINT   001  0040 0154   0156   1266
@PRITY   001  0080 0335   1664
@PSAD    001  0002 0229
@PSIOQ   001  00E0 0297   1305   1333
@PSIOR   001  0000 0296   1305   1334
@PSNSQ   001  00E2 0303
@PSR     001  0004 0017   1630   1654*
@PWAIT   001  00FF 0160
@P1IAR   001  0020 0020   1631   1634   1635* 1659*
@P2IAR   001  0040 0021
@Q       001  0001 0026   1251* 1361* 1369* 1601* 1666* 1672* 1719* 1865* 1891* 1944* 1953*
@RD37B   001  00F1 0379
@REGL    001  0002 0014   1637
@RETRN   001  0080 0155   0156   1286   1295   1343   1413   1417
@RLDWN   001  004F 0161
@RTCNT   001  0003 0293   1297* 1299* 1303*
@RTRNC   001  0080 0163
@RT37B   001  0005 0392
@SBLN    001  0005 0172
@SBLNL   001  0002 0186
@SCTSZ   001  0100 0102
@SDFLN   001  0007 0092
@SDF0    001  0000 0168
@SDF1    001  0001 0169
@SDF2    001  0002 0170
@SDF3    001  0003 0171
@SECCY   001  0030 0088
@SIST    001  0001 0183
@SKCTL   001  0000 0243
@SLASH   001  0061 0069
@SLAST   001  0002 0185
@SMIDL   001  0003 0184
@SNSB0   001  0000 0267
@SNSB1   001  0001 0268
@SNSB2   001  0002 0269
@SNSB3   001  0003 0270
@SNULL   001  0080 0175
@SN37B   001  00F2 0373
@SONLY   001  0000 0182
@SPINA   001  00A0 0252
@SPINB   001  00B0 0253
```

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@STEXT   001  0007 0174
@STYPE   001  0006 0173
@SYCNT   001  0002 0292   1263* 1414  1415*
@TBCNT   001  0000 0162
@TBLEF   001  0010 0157   0159  1269
@TBLIX   001  0011 0159
@TJ37B   001  0040 0390
@TYPAM   001  0002 0334   1878  1909
@TYPO    001  001C 0333
@UCB     001  0087 0041   1361  1601  1666  1714  1891
@UPARW   001  005A 0080   2002
@VADDR   001  0002 0143
@VENTA   001  0056 0115
@VMDDV   001  00FE 0116
@VMFD1   001  0000 0111
@VMFD2   001  0001 0112
@VMRS3   001  0002 0114
@VMTRL   001  0001 0113
@VOLID   001  0006 0093
@VQ      001  0001 0027
@WA37B   001  00FF 0398
@WSFIT   001  0500 0103
@WSTBL   001  0503 0104
@XR      001  0002 0016   1244  1254* 1255  1257  1309* 1357  1359* 1360  1360  1363  1364  1365
                          1366  1367  1376  1378  1381  1381  1382  1384  1385  1396  1398  1398
                          1399  1408  1408  1409  1410  1410  1412  1413  1414  1415  1415  1417
                          1623  1629  1656* 1662* 1672  1674* 1675  1704* 1705  1706  1707  1716
                          1772  1849  1863  1865  1876  1880  1886  1888  1890  1891  1898  1908
                          1910
@ZERO    001  0000 0064   1268  1277  1282  1367  1612  1708
@4K      001  0010 0352
DEPACK   001  0010 1786   1888
DEPARR   002  09F7 1755   1655  1661*
DEPASE   001  0920 1646   1592  1622  1628  1690  1712  1730  1814  1816  1822  1851  1853  1856
                          1857  1869  1875  1877* 1879  1897  1920* 1927* 1930  1933* 1934
DEPATA   001  09E1 1739   1673  1807  1809  1814  1933*
DEPATC   001  0AA9 1872   1772  1898  1910
DEPBLE   002  09D8 1732   1674
DEPBSP   001  0016 1778   1827
DEPCNT   001  09E9 1747   1695*
DEPCRR   001  0AF2 1912   1830
DEPDLP   001  0996 1700   1663  1897
DEPEMS   001  0002 1784   1833
DEPENB   001  0012 1794   1658
DEPERA   001  0B15 1924   1832
DEPERS   001  0003 1780   1831
DEPEST   001  0A00 1766   1671  1835
DEPEUD   001  001D 1792   1624
DEPEXA   002  09FD 1758   1632
DEPIAR   002  09D6 1731   1602
DEPIET   002  09DE 1735   1918
DEPIME   002  09F1 1752   1874* 1875* 1945* 1948* 1950  1951*
DEPIRK   001  09FF 1760   1637
DEPIST   002  09E6 1744   1718
DEPIXT   002  09DC 1734
DEPKIX   001  0011 1787   1890
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                          CROSS REFERENCE

SYMBOL  LEN VALUE DEFN   REFERENCES                          VER 15, MOD 00  29/10/15  PAGE  66

DEPK12  001 0B62 1956   1609
DEPLKA  001 0BF9 2042   2050
DEPLMG  002 09ED 1750   1603   1652   1803   1850   1892   1920   1927
DEPLNK  001 0039 2050   1933
DEPLOK  001 0018 1793   1873   1913   1919
DEPMCT  002 09F3 1753   1874
DEPMSG  001 0BA5 1963   1964   1966
DEPMSZ  001 0370 2051
DEPNDX  001 0A15 1801   1623   1662   1672*  1704   1705*  1706*  1707*  1849   1863   1886   1908
DEPNLG  001 0005 1785   1791   1854   1855
DEPNPS  002 09E4 1741   1596*  1598   1612*  1692*  1695   1702   1708*  1855*
DEPNSK  001 09E2 1740   1636*  1637   1664   1667   1669   1824   1827   1829   1831   1833   1836   1838
                       1840   1877*  1878   1909
DEPNTR  001 08EF 1626   1731
DEPONE  001 0001 1776   1692
DEPPCK  001 0A15 1802   1668
DEPPFK  001 0A44 1823   1670   1880
DEPPL1  001 0AE6 1900   1888*  1890*  1895
DEPPL2  001 0B2E 1936   1915
DEPPPL  001 09E8 1745   1697   1702*  1749   1767
DEPPST  001 0081 1783   1840
DEPREG  002 09FB 1757   1631*  1632
DEPRES  001 0890 1593   2051
DEPRET  002 09F5 1754   1634*  1659
DEPREX  001 0004 1789
DEPRKY  001 0011 1782   1759   1824
DEPRMG  002 09EF 1751   1597*  1598*  1767
DEPRML  001 0008 1790
DEPRNT  001 0986 1693   1856
DEPROR  001 09B8 1713   1665
DEPROS  002 09F9 1756   1635
DEPRTN  001 0015 1779   1829
DEPRT1  001 0983 1691   1676   1869
DEPSPA  001 0B28 1932   1837
DEPSPB  001 0AC3 1887   1828
DEPSPC  001 0040 1781   1836
DEPSRX  002 09DA 1733   1630*  1654
DEPSTN  001 09EB 1749   1603   1652   1703   1705   1706   1707   1803   1850   1892   1896*  1920*  1927*
DEPST1  001 0A07 1769   1826
DEPTAB  001 0005 1777   1838
DEPTBL  001 0BC0 1981   1732   1982   2050
DEPTBO  001 0A98 1864   1839
DEPTEX  001 0000 1788
DEPULK  001 001C 1795   1648
DEPUTO  001 060B 1791   1854*
DEPXIT  001 0920 1647   1677   1724   1816   1841   1851   1853   1857   1879   1930   1942
DEP001  002 09E6 1742   1744   1875   1896   1941
DEP100  003 0894 1595   1601*
DEP120  004 08B9 1602   1595
DEP140  004 08CE 1607   1604
DEP160  004 08D9 1610   1608
DEP180  004 08E8 1614   1594*
DEP200  003 08EC 1624   1638
DEP220  003 090A 1635   1633
DEP240  003 0936 1654   1651   1922
DEP260  004 093C 1656   1629*
```

```
                                CROSS REFERENCE

SYMBOL   LEN VALUE DEFN    REFERENCES                        VER 15, MOD 00  29/10/15  PAGE  67

DEP280   004 0940 1657    1627*
DEP300   004 0947 1659    1758
DEP320   003 094B 1661    1756
DEP340   005 0970 1673    1934
DEP360   005 0978 1675    1673* 1703*
DEP380   004 0999 1702    1698
DEP400   004 09B4 1709    1694* 1701*
DEP420   003 09B8 1714    1666* 1719*
DEP440   005 09C2 1718    1714
DEP460   004 0A11 1773    1770*
DEP480   004 0A31 1812    1804  1806  1808
DEP500   005 0A38 1814    1599*
DEP520   004 0A3D 1815    1600*
DEP540   003 0A41 1816    1813
DEP560   003 0A4B 1826
DEP580   004 0A9B 1866    1705*
DEP600   004 0AA2 1868    1706*
DEP620   003 0AA6 1869    1867
DEP640   004 0AB0 1875    1876
DEP660   003 0AC6 1889    1672* 1865* 1891*
DEP680   004 0ACF 1892    1889
DEP700   003 0AE3 1898    1893
DEP720   003 0AE8 1909    1768
DEP740   004 0AFB 1916    1707* 1716  1825
DEP760   004 0AFF 1917    1810
DEP780   004 0B30 1940    1834
DEP800   004 0B39 1944    1606  1653
DEP820   004 0B3D 1945    1649
DEP840   004 0B44 1948    1639  1921
DEP860   004 0B48 1949    1946
DEP880   004 0B4C 1950    1944* 1952  1953*
DEP900   004 0B5E 1954    1949*
DPADSV   003 07E4 1319    1261* 1410
DPAPCF   002 07E6 1320    1304
DPASYC   002 07F4 1331    1412
DPBASE   004 0731 1316    1240  1243  1361* 1368  1369* 1370  1418
DPC001   002 07FD 1337    1245  1247  1271  1291  1303  1345  1384  1398  1408  1415
DPERCK   001 0805 1358    1253
DPERCL   001 0002 1318    1341  1360
DPERCT   002 0801 1341    1360* 1398* 1408*
DPERPE   001 082B 1377    1366
DPERSN   002 07F9 1335    1378* 1385
DPE100   003 0810 1362    1306
DPE150   003 0813 1363    1364
DPE250   005 0842 1384    1380
DPE260   004 0850 1392    1399  1409
DPE500   001 0858 1397    1386
DPE600   001 0862 1404    1387
DPE630   003 0870 1412    1400
DPE640   003 0885 1418    1416
DPHIST   001 07F6 1333
DPIERC   001 0802 1342    1360
DPINDX   001 07E2 1317    1357  1359  1376  1396
DPLIST   001 07E8 1322    1257* 1260  1261  1264  1266  1268* 1276  1279* 1280* 1282* 1284  1288*
                         1367  1410*
DPLITE   002 07FD 1345    1363
```

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                              CROSS REFERENCE

SYMBOL   LEN VALUE DEFN   REFERENCES                          VER 15, MOD 00  29/10/15  PAGE  68

DPLOFF   001  07F5 1332   1365
DPLOGE   001  07FD 1338   1382
DPMGCT   001  0000 1346   1398*
DPREND   001  0888 1424   1425
DPRETN   001  0804 1343   1294
DPRINT   001  0707 1241   1423
DPRVER   001  0004 1349   1385
DPSYCT   001  0001 1347   1408*
DPWAIT   001  00FF 1348   1255
DPWORK   002  07FB 1336   1381*
DPWRK1   002  07FF 1339   1287* 1288
DPXPCF   001  07EC 1324   1264* 1269  1284* 1286* 1287  1290  1291* 1294* 1295  1297* 1299* 1301*
                         1303* 1320  1381
DPXSYC   001  07F0 1328   1263* 1331  1413* 1414  1415* 1417*
DP0020   004  0731 1254   1246* 1316  1370
DP0050   004  074A 1261   1368
DP0060   004  0753 1264
DP0100   003  076E 1276   1267
DP0105   004  078A 1284   1281
DP0110   005  0799 1290   1283
DP0120   003  07A9 1295   1270  1293
DP0200   005  07AF 1297
DP0240   006  07BF 1302   1278  1300
DP0250   003  07C9 1304   1272  1296
DP0300   003  07CC 1305   1277  1418
DP0400   003  07CF 1306   1361* 1369*
DP0850   004  07D2 1307   1251* 1256  1393
DP0900   004  07D6 1308   1242* 1250
DP0910   004  07DA 1309   1244*
DP1000   004  07DE 1310   1248*
LENGTH   001  0181 1423


TOTAL STATEMENTS IN ERROR IN THIS ASSEMBLY =      0


OL105 I  THE CODE LENGTH OF #DPRIN IS  3072 DECIMAL.
OL103 I  TOTAL NUMBER OF LIBRARY SECTORS REQUIRED IS    9
         NAME-#DPRIN,PACK-R1R1R1,UNIT-R1,RETAIN-P,LIBRARY-R,CATEGORY-000
```

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         OVERLAY LINKAGE EDITOR CORE USAGE MAP     29/10/15


  START      CATEGORY   NAME AND       CODE LENGTH
 ADDRESS                 ENTRY     HEXADECIMAL DECIMAL

  0000          0      #DPRIN          0C00    3072


OL100 I  THE TOTAL CORE USED BY #DPRIN IS  3072 DECIMAL.
OL101 I  THE START CONTROL ADDRESS OF THIS MODULE IS 0000.
OL104 I  TOTAL NUMBER OF LIBRARY SECTORS REQUIRED IS   13
         NAME-#DPRIN,PACK-R1R1R1,UNIT-R1,RETAIN-P,LIBRARY-O
```