```
 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  07/05/20  PAGE   1

#ERRPG   MODULE
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ERR LOC  OBJECT CODE      ADDR STMT SOURCE STATEMENT           VER 15, MOD 00  07/05/20  PAGE   2
    0000                        1 #ERRPG START 0
```

```
      #ERRPG - ERROR MESSAGE PROGRAM

ERR LOC  OBJECT CODE     ADDR STMT SOURCE STATEMENT          VER 15, MOD 00  07/05/20  PAGE   3
                              3      PRINT ON,NODATA
                              4 *    @SYS  EXP-N
                            215+     PRINT ON
                            216 *    @SPF  EXP-N
                            679+     PRINT ON
                            680 *    @FXD  EXP-N
                           1085+     PRINT ON
                           1086 *    @CAN  EXP-N
                           1189+     PRINT ON
                           1190 *    @WKA  EXP-N
                           1260+     PRINT ON
                           1261 *    @HLT  EXP-N
                           1316+     PRINT ON
```

```
1318 ********************************************************************
1319 *   5703-XM1   COPYRIGHT IBM CORP 1970                             *
1320 *                  REFER TO INSTRUCTIONS ON COPYRIGHT NOTICE. 120-2083  *
1321 *                                                                  *
1322 ********************************************************************
1323 *STATUS -                                                          *
1324 *    VERSION 1 MODIFICATION 0                                      *
1325 *                                                                  *
1326 *FUNCTION                                                          *
1327 *    #ERRPG PROGRAM WILL:                                          *
1328 *    * PRINT ALL TERMINAL ERROR MESSAGES (EXCEPT THOSE FROM COPY DISK) *
1329 *      THAT OCCUR DURING BASIC OR UTILITY MODES OF OPERATION.      *
1330 *    * THE ASSEMBLY OF #ERRPG CONTAINS THESE MAJOR SOURCE MODULES: *
1331 *      1. ERRPGM - MAINLINE LOGIC                                  *
1332 *      2. DL2ICS - DISK LOGICAL IOCS                               *
1333 *    THE MESSAGE TEXTS AND TABLE OF RELATIVE DISPLACEMENTS ARE LOCATED *
1334 *    IN THE SYSTEM PROGRAM FILE ##ERMS. ERROR CODES (PASSED TO #ERRPG) *
1335 *    INDEX THESE TABLES.                                           *
1336 *    THE MESSAGE TEXT IS READ FROM DISK WITH A TWO SECTOR READ.    *
1337 *    A MESSAGE CAN OVERLAP AN ONE SECTOR BOUNDARY. AFTER THE TWO   *
1338 *    SECTORS ARE READ, THE MESSAGE IS LOCATED IN THE BUFFER USING THE *
1339 *    2ND BYTE OF THE TABLE ENTRY. THE 4TH BYTE OF EACH MESSAGE IS THE *
1340 *    LENGTH OF THE MESSAGE.                                        *
1341 *                                                                  *
1342 *ENTRY POINTS                                                      *
1343 *    #ERRP                                                         *
1344 *                                                                  *
1345 *INPUT                                                             *
1346 *    THE ERROR CODE IS OBTAINED FROM THE SYSTEM AT LABEL $CAERR.   *
1347 *    STACKED ERROR CODES ARE LOCATED AT LABEL $$ERSK.             *
1348 *    THE ERROR CODES, WHEN PRESENT AT THESE LOCATIONS, ARE THE MESSAGE *
1349 *    NUMBERS WITHIN ##ERMS                                         *
1350 *                                                                  *
1351 *    3-BYTE ERROR ENTRY                                            *
1352 *      BYTE: 1-  ERROR CODE                                        *
1353 *            2&3- LINE NUMBER                                      *
1354 *      NOTE: BYTE 2 IS SET TO X`A0' WHEN NO LINE NUMBER EXISTS.    *
1355 *                                                                  *
1356 *    2-BYTE ERROR MESSAGE ENTRY                                    *
1357 *      BYTE: 1-  RELATIVE SECTOR DISPLACEMENT                      *
1358 *            2-  RELATIVE DISPLACEMENT WITHIN SECTOR               *
1359 *                                                                  *
1360 *OUTPUT                                                            *
1361 *    PRINTED ERROR MESSAGE(S)                                      *
1362 *                                                                  *
1363 *EXTERNAL REFERENCES                                               *
1364 *    $DISKN - ENTRY TO PHYSICAL DISK ROUTINE IS THE SYSTEM NUCLEUS. *
1365 *    $DPRIN - DPRINT AND DEPRES.                                   *
1366 *                                                                  *
1367 *EXITS, NORMAL                                                     *
1368 *    NORMAL - EXIT IS TO THE FIRST INSTRUCTION FOLLOWING THE POINTER *
1369 *    TO THE DPL. THE BASE REGISTER IS RESTORED. THE RETURN ADDRESS IS *
1370 *    THE ADDRESS RECALL REGISTER (ARR) +2.                         *
1371 *                                                                  *
1372 *EXITS, ERROR                                                      *
1373 *    NONE                                                          *
```

```
                             1374 *                                                          *
                             1375 *TABLES/WORK AREAS                                         *
                             1376 *    * ERROR MESSAGES STORED IN ##ERME OBJECT              *
                             1377 *                                                          *
                             1378 *ATTRIBUTES                                                *
                             1379 *    *                                                     *
                             1380 *                                                          *
                             1381 *CHARACTER CODE DEPENDENCY                                 *
                             1382 *    THE OPERATION OF THIS MODULE DOES NOT DEPEND UPON A PARTICULAR  *
                             1383 *    INTERNAL REPRESENTATION OF THE EXTERNAL CHARACTER SET.         *
                             1384 *                                                          *
                             1385 *NOTES                                                     *
                             1386 *    ERROR PROCEDURES                                      *
                             1387 *       NONE                                               *
                             1388 *                                                          *
                             1389 *    REGISTER USAGE                                        *
                             1390 *       INDEX REGISTER 1 (@BR) IS SAVED AND RESTORED. THIS REGISTER IS *
                             1391 *       USED DURING EXECUTION.                             *
                             1392 *                                                          *
                             1393 *    SAVED/RESTORED AREAS                                  *
                             1394 *       NONE                                               *
                             1395 *                                                          *
                             1396 *    MODIFICATION CONSIDERATIONS                           *
                             1397 *       NONE                                               *
                             1398 *                                                          *
                             1399 *    REQUIRED MODULES                                      *
                             1400 *       @SYSEQ - GENERAL SYSTEM EQUATES.                   *
                             1401 *       @FXDEQ - NUCLEUS LOCATION EQUATES.                 *
                             1402 *       @CANEQ - TRANSCIENT LOCATION EQUATES.              *
                             1403 *       @WKAEQ - WORK AREA DISK ADDRESS EQUATES.           *
                             1404 *       $SPFEQ - SYSTEM PROGRAM FILE DISK ADDRESSES.       *
                             1405 *       @HLTEQ - HALT CODES EQUATES                        *
                             1406 *                                                          *
                             1407 *    OTHER                                                 *
                             1408 *       NONE.                                              *
                             1409 **********************************************************************
```

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       #ERRPG - ERROR MESSAGE PROGRAM

ERR LOC   OBJECT CODE      ADDR STMT SOURCE STATEMENT            VER 15, MOD 00  07/05/20  PAGE   6

                           1411 *        HDR    #ERRPG
                           1412 ****************************************************************************
                           1413 * PROGRAM HEADER FOR DISK LOAD                                            *
                           1414 ****************************************************************************
                           1415 *#$ERRP EQU   X'18C0'                         DISK ADDR OF ?ERRPG
                           1416 *#$$ERR EQU   X'0C00'                         CORE LOAD ADDRESS OF #ERRPG
                           1417 *#$@ERR EQU   003                             SECTOR CNT OF #ERRPG
   0C00                    1418        ORG    #$$ERR                          CORE LOAD ADDRESS
                      0C00 1419 $$$$$$ EQU    *                               FIRST LOCATION IN PROGRAM
   0C00 7BC5D9D9D7C7  0C05 1420        DC     CL6'#ERRPG'                     PROGRAM NAME
   0C06 4B            0C06 1421        DC     IL1'075'                        PROGRAM NUMBER OF #ERRPG
                      0C07 1422 #ERRP  EQU    *                               ENTRY POINT TO PROGRAM
                           1423 *** END OF EXPANSION ***
                      0CFF 1424        USING  ERR500,@BR                      FIRST INTERNAL LABEL ADDRESSED
   0C07 F2 87 26           1425        J      ERR050                          LEAVE ROOM FOR TEXT MESSAGES
                           1426 *        MTEXT @@M500=@PRINT,@@M251=@PRINT
                           1427 ****************************************************************************
                           1428 * PPL'S AND TEXT FOR MESSAGE                                               *
                           1429 ****************************************************************************
   0C0A 40            0C0A 1430 @@M251 DC     AL1(@PRINT)                     PRINT CONTROL FUNCTION
   0C0B 09            0C0B 1431        DC     IL1'09'                         LENGTH OF MESSAGE
   0C0C 0C12          0C0D 1432        DC     AL(@CADDR)(@@T251)              ADDR OF MESSAGE
                           1433 *
   0C0E 40            0C0E 1434 @@M500 DC     AL1(@PRINT)                     PRINT CONTROL FUNCTION
   0C0F 06            0C0F 1435        DC     IL1'06'                         LENGTH OF MESSAGE
   0C10 0C1B          0C11 1436        DC     AL(@CADDR)(@@T500)              ADDR OF MESSAGE
                           1437 *
                      0C12 1438 @@T251 EQU    *                               LEFT BYTE OF MESSAGE
   0C12 40C1E340D3C9D5C5 0C1A 1439    DC     CL9' AT LINE '
                           1440 *
                      0C1B 1441 @@T500 EQU    *                               LEFT BYTE OF MESSAGE
   0C1B C5D9D9D6D940  0C20 1442        DC     CL6'ERROR '
                           1443 *
                           1444 * PATCH AREA FOR MESSAGES
                           1445 *
   0C21                0C2F 1446 $$$001 DS     CL15                            MSG EXPANSION PATCH AREA
                           1447 *** END OF EXPANSION ***
   0C30 0C 01 0DCD 03C7     1448 ERR050 MVC    ERRSAV(@REGL),$XRSAV            FETCH POINTER VALUE
                           1449 *
                           1450 *
                           1451 *
   0C36 38 02 03C3          1452        TBN    $KEYCD,$IOYES                   ARE I/O ROUTINES IN CORE ?
   0C3A F2 10 0A            1453        JT     ERR100                          YES, DON'T READ THEM IN
   0C3D C0 87 051A          1454        B      $LOADR                          CALL DISK ROUTINE
   0C41 0DEC          0C42 1455        DC     AL(@CADDR)(ERRIOD)              DPL ADDR TO READ I/O ROUTINES
   0C43 3A 02 03C3          1456        SBN    $KEYCD,$IOYES                   SET I/O ROUTINES IN CORE IND
                           1457 *
                           1458 *
                           1459 *
   0C47 C2 01 0CFF          1460 ERR100 LA     ERR500,@BR                      LOAD BASE REGISTER
   0C4B 0C 01 0E9C 0587     1461        MVC    DL2RAD(@DADDR),$BSADR           SET UP BASE CYLINDER ADDR
   0C51 1E 01 0E9C DC       1462        ALC    DL2RAD,ERRMSG(@DADDR,@BR)  * FOR DL2ICS
                           1463 *        DSKL2 ERRTDP
   0C56 C0 87 0E04          1464        B      DL2ICS                          PERFORM RELATIVE DISK OP
   0C5A 0DF8          0C5B 1465        DC     AL2(ERRTDP)                     DPL ADDRESS
                           1466 *** END OF EXPANSION ***
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     #ERRPG - ERROR MESSAGE PROGRAM


ERR LOC   OBJECT CODE     ADDR STMT SOURCE STATEMENT          VER 15, MOD 00  07/05/20  PAGE   7

     0C5C 3D 30 03CE          1467          CLI   $ERRPG,$ERSTK           CHECK CALL INDICATOR
     0C60 D0 81 89            1468          BE    ERR740(,@BR)            GOTO PROCESS STACK OF ERROR MSG
     0C63 D0 82 B2            1469          BL    ERR820(,@BR)            GOTO ENTERPRETER PROCESSING
                              1470 *
     0C66 3D 40 03CE          1471          CLI   $ERRPG,$ERFIL           FILE LINE ERROR
     0C6A F2 84 1C            1472          JH    ERR200                  NO, GOTO CENTRAL PART
     0C6D F2 81 04            1473          JE    ERR150                  BRANCH IF NOT SYNTAX CHECKER
     0C70 5C 01 0E EA         1474          MVC   ERR550+@OP1(@CADDR,@BR),ERRSTA(,@BR)   SET TABLE TWO ADDR
     0C74 7C 80 7E            1475 ERR150 MVI    ERR720+@Q(,@BR),@NOP     SET OFF READY INDICATOR
                              1476 *
     0C77 38 04 03C3          1477          TBN   $KEYCD,$NOLST           IS NOLIST INDICATOR ON
     0C7B F2 90 0B            1478          JF    ERR200                  NO, CARD HAS BEEN LISTED
     0C7E 4C 00 D8 0601       1479          MVC   ERRLPL+@PRCNT(1,@BR),$$ILEN  MOVE COUNT TO PPL
     0C83 C0 87 0465          1480          B     $SPRNT                  CALL PRINT ROUTINE
     0C87 0DD6          0C88 1481          DC    AL(@CADDR)(ERRLPL)       PPL TO PRINT INPUT LINE
                              1482 *
     0C89 5D 01 CE E6         1483 ERR200 CLC    ERRSAV(@CADDR,@BR),ERRIBF(,@BR)  XR POINT BEYOND BUFFER
     0C8D F2 84 6F            1484          JH    ERR500                  BR IF XR HIGH
     0C90 5F 01 CE EC         1485          SLC   ERRSAV(@CADDR,@BR),ERRBFA(,@BR)   CALCULATE CHAR COUNT
     0C94 F2 82 68            1486          JM    ERR500                  NEGATIVE IF XR LOW
     0C97 3C 40 12F4          1487          MVI   ERRBBF+@LINSZ,C' '        INITIALIZE LAST BYTE OF BUFFER
     0C9B 0C F3 12F3 12F4     1488          MVC   ERRBBF+@LINSZ-1(@LINSZ),ERRBBF+@LINSZ  PERPETRATE BLANKS
     0CA1 5C 00 D4 CE         1489          MVC   ERRUPL+@PRCNT(1,@BR),ERRSAV(,@BR)  MOVE PRINT COUNT TO PPL
     0CA5 1C 00 0602 D4       1490          MVC   $$UPAR,ERRUPL+@PRCNT(1,@BR)   SAVE UPARROW LOCATION (EFUCH)
     0CAA 1E 01 0CB2 CE       1491          ALC   ERR300+@OP1,ERRSAV(@CADDR,@BR)  CALCULATE DISPLACEMENT
     0CAF 3C 5A 11FF          1492 ERR300 MVI    ERRBBF-1+*-*,@UPARW      MOVE UPARROW TO BUFFER
     0CB3 C0 87 0465          1493          B     $SPRNT                  CALL PRINT ROUTINE TO PRINT
     0CB7 0DD2          0CB8 1494          DC    AL(@CADDR)(ERRUPL)       *  UPARROW
     0CB9 3D 50 03CE          1495          CLI   $ERRPG,$ER1N2           BRANCH IF LEVEL TWO
     0CBD F2 81 3F            1496          JE    ERR500                  *  MESSAGE IS FORCED
     0CC0 38 02 03D5          1497          TBN   $INDR2,$CMODE           BRANCH IF UTILITY MODE TO
     0CC4 F2 90 06            1498          JF    ERR350                  *  AVOID SAVING BAD LINE
     0CC7 C0 87 0025          1499          B     $DISKN                  CALL DISK ROUTINE TO WRITE
     0CCB 0DE7          0CCC 1500          DC    AL(@CADDR)(ERRWRK)       BAD LINE TO DISK
     0CCD 38 01 03C3          1501 ERR350 TBN    $KEYCD,$CARDI            IS CARD READER INPUT
     0CD1 F2 10 2B            1502          JT    ERR500                  YES, FORCE LEVEL 2 MSG
     0CD4 3C 00 09E2          1503          MVI   $$KBSN,@ZERO            CLEAR KEY INPUT INDICATOR
     0CD8 3B 10 03D2          1504          SBF   $IOIND,$PGMST           ALLOW AUTO LINE NUMBER
                              1505 *          $PRNT $WAITF               WAIT FOR PRINT
     0CDC C0 87 0465          1506          B     $SPRNT                  PRINT ON SYSTEM PRINTER
     0CE0 057F          0CE1 1507          DC    AL2($WAITF)             PPL ADDRESS
                              1508 *** END OF EXPANSION ***
     0CE2 C0 87 0890          1509          B     $$PRES                  ENABLE INPUT
     0CE6 3D 00 09E2          1510 ERR400 CLI    $$KBSN,@ZERO            FALL THROUGH THIS LOOP WHEN
     0CEA C0 81 0CE6          1511          BE    ERR400                  * FIRST INPUT CHARACTER KEYED
     0CEE 7C 80 7E            1512          MVI   ERR720+@Q(,@BR),@NOP
     0CF1 3D 91 09E1          1513          CLI   $$KBDT,$$$EPL           BRANCH IF THE
     0CF5 38 10 09E2          1514          TBN   $$KBSN,$$$FUN           * KEY ENTERED IS
     0CF9 F2 96 C9            1515          JC    ERR900,ERRSQC           * NOT ENTER PLUS
                              1516 *   THE FOLLOWING THREE BYTE CONSTANT IS TO
                              1517 *   REPRESENT THE FOLLOWING INSTRUCTION
                              1518 *          SIO   DEPLOK,@KEYBD          LOCK KEYBOARD                 1-4
     0CFC F31018        0CFE 1519          DC    XL3'F31018'             THIS IS AN SIO INSTRUCTION    1-4
                              1520 *ERR500 $PRNT MM500
     0CFF C0 87 0465          1521 ERR500 B      $SPRNT                  PRINT ON SYSTEM PRINTER
     0D03 0C0E          0D04 1522          DC    AL2(@@M500)             PPL ADDRESS
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                                1523 *** END OF EXPANSION ***
    0D05 4C 00 E8 03CD        1524         MVC    ERRWRK(1,@BR),$CAERR      FETCH ERROR CODE
    0D0A C2 02 0F00           1525 ERR550 LA     ERRTBL+*-*,@XR            FETCH ADDR OF ERROR TABLE
    0D0E 76 02 E8             1526         A      ERRWRK(,@BR),@XR         INDEX THE TABLE BY TWICE
    0D11 76 02 E8             1527         A      ERRWRK(,@BR),@XR         * THE ERROR CODE
    0D14 C0 87 0025           1528         B      $DISKN                   WAIT UNTIL TABLE
    0D18 057F        0D19     1529         DC     AL(@CADDR)($WAITF)       * IN CORE
    0D1A 6C 00 DF 00          1530         MVC    ERRDPL+@DSAD(1,@BR),0(,@XR)  FIRST BYTE OF ENTRY IS SECTOR
                                1531 *                                      * DISPLACEMENT
    0D1E C0 87 0E04           1532         B      DL2ICS                   CALL LOGICAL DISK IOCS ROUTINE
    0D22 0DDC        0D23     1533         DC     AL(@CADDR)(ERRDPL)       * TO READ ERROR MSG TO CORE
    0D24 6C 00 E8 01          1534         MVC    ERRWRK(1,@BR),ERRDP1(,@XR)  FETCH BYTE DISP FROM TABLE
    0D28 C2 02 1300           1535         LA     ERRBFR,@XR               FETCH ADDRESS OF BUFFER
    0D2C 76 02 E8             1536         A      ERRWRK(,@BR),@XR         ADD DISPLACEMENT TO MESSAGE
    0D2F 74 02 D2             1537         ST     ERRQPL+@PDATA(,@BR),@XR  SET ADDR OF ERROR NUMBER
                                1538 *        DISK $WAITF
    0D32 C0 87 0025           1539         B      $DISKN                   PERFORM PHYSICAL DISK OP
    0D36 057F        0D37     1540         DC     AL2($WAITF)              DPL ADDRESS
                                1541 *** END OF EXPANSION ***
                                1542 *         $PRNT ERRQPL
    0D38 C0 87 0465           1543         B      $SPRNT                   PRINT ON SYSTEM PRINTER
    0D3C 0DCE        0D3D     1544         DC     AL2(ERRQPL)              PPL ADDRESS
                                1545 *** END OF EXPANSION ***
    0D3E E2 02 03             1546         LA     ERRLEN(,@XR),@XR         INCR BY NUMBER LENGTH
    0D41 6C 00 D8 00          1547         MVC    ERRPPL+@PRCNT(1,@BR),0(,@XR)  SET MESSAGE LENGTH
    0D45 BC 40 00             1548         MVI    0(,@XR),C' '             BLANK LENGTH BYTE
    0D48 74 02 DA             1549         ST     ERRPPL+@PDATA(,@BR),@XR  SET MESSAGE ADDR
                                1550 *
    0D4B F2 87 14             1551 ERR600 JC     ERR700,@UCB              SET TO NOP IF LINE NUMBER REF
                                1552 *         $PRNT @@M251
    0D4E C0 87 0465           1553         B      $SPRNT                   PRINT ON SYSTEM PRINTER
    0D52 0C0A        0D53     1554         DC     AL2(@@M251)              PPL ADDRESS
                                1555 *** END OF EXPANSION ***
    0D54 C2 02 03CE           1556         LA     $INLNO-1,@XR             SET BINARY LINE NUMBER POINTER
    0D58 C0 87 0E9D           1557         B      C2DEC5                   CONVERT TO DECIMAL
                                1558 *         $SPRNT ERRSPL
    0D5C C0 87 0465           1559         B      $SPRNT                   PRINT ON SYSTEM PRINTER
    0D60 0E00        0D61     1560         DC     AL2(ERRSPL)              PPL ADDRESS
                                1561 *** END OF EXPANSION ***
                                1562 *
    0D62 C0 87 0465           1563 ERR700 B      $SPRNT                   CALL PRINT ROUTINE TO
    0D66 0DD6        0D67     1564         DC     AL(@CADDR)(ERRPPL)       * OUTPUT ERROR MESSAGE
    0D68 5F 00 E3 DD          1565         SLC    ERRTIM(1,@BR),ERRDEC(,@BR)  DECR MESSAGE COUNT
    0D6C D0 01 8E             1566         BNZ    ERR750(,@BR)             FALL THROUGH IF STACK COMPLETE
                                1567 *         $PRNT ERRTRN
    0D6F C0 87 0465           1568         B      $SPRNT                   PRINT ON SYSTEM PRINTER
    0D73 0DFE        0D74     1569         DC     AL2(ERRTRN)              PPL ADDRESS
                                1570 *** END OF EXPANSION ***
    0D75 38 04 03D6           1571         TBN    $INDR3,$ERHRD            BRANCH IF HARD ERROR
    0D79 F2 10 3E             1572         JT     ERR850                   * INDICATOR IS ON
    0D7C C0 87 049D           1573 ERR720 BC     $CAIPL,@UCB              EXIT TO GUFUDI TO TYPE READY
                                1574 *
    0D80 3A 80 03D5           1575 ERR730 SBN    $INDR2,$READY            TURN OFF READY INDICATOR
    0D84 C0 87 04B4           1576         B      $CABLD                   EXIT TO GUFUDI
                                1577 *
                                1578 *                    STACK HANDLING
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      #ERRPG - ERROR MESSAGE PROGRAM

ERR LOC   OBJECT CODE      ADDR STMT SOURCE STATEMENT          VER 15, MOD 00  07/05/20  PAGE   9

                          1579 *
      0D88 4C 00 E3 03CF   1580 ERR740 MVC    ERRTIM(1,@BR),$ERRCT       SET STACK COUNT
      0D8D 0C 00 03CD 1C00 1581 ERR750 MVC    $CAERR(1),$$ERSK+*-*       MOVE ERROR CODE TO SAVE AREA
      0D93 0C 01 03CF 1C02 1582 ERR760 MVC    $INLNO(@SBLNL),$$ERSK+2+*-*  MOVE LINE NUMBER TO SAVE AREA
                          1583 *
      0D99 5E 00 93 E4     1584        ALC    ERR750+@OP2(1,@BR),ERRINC(,@BR)  INCREMENT POINTERS TO
      0D9D 5E 00 99 E4     1585        ALC    ERR760+@OP2(1,@BR),ERRINC(,@BR)   * ERROR CODE STACK
      0DA1 7C 80 4D        1586 ERR800 MVI    ERR600+@Q(,@BR),@NOP       SET LINE NUMBER REF IND
      0DA4 3D A0 03CE      1587        CLI    $ERRPG,$$$NLN              FALL THROUGH IF LINE RUNNER
      0DA8 D0 01 00        1588        BNE    ERR500(,@BR)               * NOT DESIRED
      0DAB 7C 87 4D        1589        MVI    ERR600+@Q(,@BR),@UCB       SET OFF LINE NUMBER REF IND
      0DAE D0 87 00        1590        B      ERR500(,@BR)               GO TO PROCESS MSG
                          1591 *
                          1592 *                  RETURN CARRIAGE FIRST IN CASE INTERPRETER
                          1593 *                  LEFT IT IN THE MIDDLE OF LINE
                          1594 *
                          1595 *ERR820 $SPRNT ERRTRN
      0DB1 C0 87 0465      1596 ERR820 B      $SPRNT                     PRINT ON SYSTEM PRINTER
      0DB5 0DFE       0DB6 1597        DC     AL2(ERRTRN)                PPL ADDRESS
                          1598 *** END OF EXPANSION ***
      0DB7 D0 87 A2        1599        B      ERR800(,@BR)               PROCESS
                          1600 *
                          1601 *                  HARD HALT
                          1602 *
                          1603 *ERR850 HALT  @HERPG                     MASK AGAINST INQUIRY REQUEST
      0DBA 3C 80 0476      1604 ERR850 MVI    $CIMSK,@NOP                MASK INQUIRY REQUEST
                          1605 *      $HPL  CODE-@HERPG                 ISSUE HARD HALT
      0DBE F0         0DBE 1606+       DC     XL1'F0'                    INLINE HPL INSTRUCTION
      0DBF 087C       0DC0 1607+       DC     AL2(@HERPG)                HALT CODE
      0DC1 C0 87 0DBA      1608        B      ERR850                     LOOP - HARD HALT
                          1609 *** END OF EXPANSION ***
                          1610 *
                          1611 *                  ALREADY ENABLED EXIT
                          1612 *
      0DC5 3A 08 03D6      1613 ERR900 SBN    $INDR3,$NOENB              ALREADY ENABLED INDICATOR
      0DC9 D0 87 81        1614 B      B      ERR730(,@BR)               EXIT
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      #ERRPG - ERROR MESSAGE PROGRAM


ERR LOC   OBJECT CODE        ADDR STMT SOURCE STATEMENT          VER 15, MOD 00  07/05/20  PAGE  10

    0DCC                     0DCD 1616 ERRSAV DS    CL(@REGL)                    ERROR POINTER SAVE AREA
                                  1617 *
                                  1618 *ERRQPL PPL   FUNC=@PRINT,CNT=ERRLEN
                             0DCE 1619 ERRQPL EQU   *                            PPL ADDRESS
    0DCE 40                  0DCE 1620        DC    AL1(@PRINT)                  FUNCTION REQUESTED
    0DCF 03                  0DCF 1621        DC    AL1(ERRLEN)                  PRINT COUNT
    0DD0 0000                0DD1 1622        DC    AL2(*-*)                     DATA ADDRESS
                                  1623 *** END OF EXPANSION ***
    0DD2 C0                  0DD2 1624 ERRUPL DC    AL1(@PRINT+@RETRN)           * PRINT PARAMETER LIST
    0DD3                     0DD3 1625        DS    CL1                          * TO PRINT AN UPARROW
    0DD4 1200                0DD5 1626        DC    AL(@CADDR)(ERRBBF)           * IF APPLICABLE
                                  1627 *
                             0DD6 1628 ERRLPL EQU   *                            PPL USED TO LIST CARD INPUT IF
    0DD6 C0                  0DD6 1629 ERRPPL DC    AL1(@PRINT+@RETRN)           NECCESSARY AND ALSO
    0DD7                     0DD9 1630        DS    CL(1+@CADDR)                 * TO PRINT
                                  1631 *                                        * THE LEVEL TWO
    0DD8                          1632        ORG   *-2                          * ERROR MESSAGE
    0DD8 0607                0DD9 1633        DC    AL(@CADDR)($$INLN)           * IF APPLICABLE
                                  1634 *
    0DDA 0928                0DDB 1635 ERRMSG DC    AL(@DADDR)(#$#ERM)           BASE ADDRESS FOR ERROR MESSAGES
                                  1636 *
                             0DDC 1637 ERRDEC EQU * 			               TO DECR LOOP COUNT
    0DDC 01                  0DDC 1638 ERRDPL DC    AL1(@DGET)                   DISK PARAMETER LIST
    0DDD 00                  0DDD 1639        DC    XL1'00'                      * FOR DL2ICS TO
    0DDE                     0DDE 1640        DS    CL1                          * READ TWO SECTORS
    0DDF 02                  0DDF 1641        DC    IL1'2'                       * OF ERROR MESSAGES
    0DE0 1300                0DE1 1642        DC    AL(@CADDR)(ERRBFR)           * DS BYTE FILLED IN FROM TABLE
                                  1643 *
    0DE2                     0DE2 1644 ERRTIM DS    CL1                          SAVEAREA FOR COUNT OF ERROR
    0DE2                          1645        ORG   *-1                          * MESSAGE STACK INITIALIZED
    0DE2 01                  0DE2 1646        DC    IL1'1'                       * TO ONE FOR NON-STACK MSGS
                                  1647 *
    0DE3 03                  0DE3 1648 ERRINC DC    IL1'3'                       INCR AMOUNT FOR ERROR STACK
    0DE4 06FA                0DE5 1649 ERRIBF DC    AL(@CADDR)($$INND)           LAST CHAR OF INPUT LINE BUFFER
    0DE6                     0DE7 1650 ERRWRK DS    CL2
    0DE6                          1651        ORG   *-2
    0DE6 0000                0DE7 1652        DC    XL2'0000'
    0DE8 1100                0DE9 1653 ERRSTA DC    AL(@CADDR)(ERRSTB)           SYNTAX TABLE ADDR
    0DEA 0606                0DEB 1654 ERRBFA DC    AL(@CADDR)($$INLN-1)         FOR UPARROW DISPLACEMENT
                             0001 1655 ERRDP1 EQU   1                            DISPLACEMENT FROM XR TO BYTE
                                  1656 *                                        * DISP ENTRY IN ERRTSL
                             0003 1657 ERRLTB EQU   3                            LENGTH OF TABLE
                             0003 1658 ERRLEN EQU   3                            LENGTH OF ERROR NUMBER
                             0004 1659 ERRLNC EQU   4                            COUNT OF LINE NUMBER
                             0096 1660 ERRSQC EQU   B'10010110'                  BRANCH TRUE OR EQUAL Q CODE
                                  1661 *
                                  1662 *                       CONSTANT PPL'S AND DPL'S
                                  1663 *
    0DEC 01                  0DEC 1664 ERRIOD DC    AL1(@DGET)                   DISK PARAMETER LIST
    0DED 014C                0DEE 1665        DC    AL(@DADDR)(#$DPRI)           * TO READ THE FOUR
    0DEF 05                  0DEF 1666        DC    AL1(#$@DPR)                  * SECTOR OF I/O ROUTINES
    0DF0 0700                0DF1 1667        DC    AL(@CADDR)(#$$DPR)           * TO CONE IF NECESAARY
                                  1668 *
    0DF2 02                  0DF2 1669 ERWRT  DC    AL1(@DPUT)                   DISK PARAMETER LIST
    0DF3 0455                0DF4 1670        DC    AL(@CADDR)(#@#BAD)           * TO WRITE LINE WITH
    0DF5 01                  0DF5 1671        DC    AL1(#@@#BA)                  * SYNTAX ERROR TO SAVE
```

```
     #ERRPG - ERROR MESSAGE PROGRAM
```

```
    0DF6 0607             0DF7 1672          DC    AL(@CADDR)($$INLN)        * AREA ON DISK
                               1673 *
                               1674 *ERRTDP DPL    FUNC=@DGET,DADDR=@ZERO,CNT-ERRLTB,CADDR=ERRTBL
                          0DF8 1675 ERRTDP EQU    *                         DISK PARAMETER LIST
    0DF8 01              0DF8 1676          DC    AL1(@DGET)               REQUESTED FUNCTION
    0DF9 0000            0DFA 1677          DC    AL2(@ZERO)               DISK ADDRESS
    0DFB 03              0DFB 1678          DC    AL1(ERRLTB)              SECTOR COUNT
    0DFC 0F00            0DFD 1679          DC    AL2(ERRTBL)              BUFFER ADDRESS
                               1680 *** END OF EXPANSION ***
    0DFE 80              0DFE 1681 ERRTRN DC    AL1(@RETRN)              PRINT PARAMETER LIST
    0DFF 80              0DFF 1682          DC    AL1(@RTRNC)              * TO RETURN CARRIAGE
                               1683 *ERRSPL PPL    FUNC=@PRINT,CNT=ERRLNC,CADDR=C2DVAL-ERRLNC+1
                          0E00 1684 ERRSPL EQU    *                         PPT ADDRESS
    0E00 40              0E00 1685          DC    AL1(@PRINT)              FUNCTION REQUESTED
    0E01 04              0E01 1686          DC    AL1(ERRLNC)              PRINT COUNT
    0E02 0ED8            0E03 1687          DC    AL2(C2DVAL-ERRLNC+1)     DATA ADDRESS
                               1688 *** END OF EXPANSION ***
```

```
          1690 *       DL2CD
          1691 ***********************************************************************
          1692 *  5703-XM1  COPYRIGHT IBM CORP 1970                                 *
          1693 *               REFER TO INSTRUCTIONS ON COPYRIGHT NOTICE. 120-2083  *
          1694 *                                                                    *
          1695 ***********************************************************************
          1696 *STATUS -                                                            *
          1697 *   VERSION 1 MODIFICATION 0                                         *
          1698 *                                                                    *
          1699 *FUNCTION                                                            *
          1700 *   * DL2ICS CONVERTS A RELATIVE DISK ADDRESS TO A PHYSICAL DISK     *
          1701 *     ADDRESS AND COMBINES IT WITH A BASE ADDRESS PLACED IN DL2RAD   *
          1702 *     BY THE CALLER.                                                 *
          1703 *   * THE RELATIVE DISK ADIRESS IS A TWO BYTE CVLINIER SECTOR COUNT A *
          1704 *     IN THE CALLERS DISK PARAMETER LIST (DPL)                       *
          1705 *   * THE COUNT IS A CYLINDER SECTOR DISPLACEMENT FROM THE BASE       *
          1706 *     ADDRESS PLACED IN DL2RAD                                       *
          1707 *   * DL2ICS IS USED TO PROCESS DATA ON THE FIXED OR REMOVABLE DISK   *
          1708 *     ON EITHER DRIVE AND PROVIDES THE INTERFACE TO $DISKN.          *
          1709 *   * THE PHYSICAL DISK ADDRESS IS PLACED IN A COPY OF THE USERS DPL  *
          1710 *     IN DL2ICS AND A CALL IS MADE TO $DISKN TO PERFORM THE REQUESTED *
          1711 *     OPERATION.                                                     *
          1712 *                                                                    *
          1713 *ENTRY POINTS                                                        *
          1714 *   * THE ENTRY IS DL2ICS. THE BASE REGISTER IS SAVED AND RESTORED    *
          1715 *     ON RETURN. THE INDEX REGISTER IS NOT USED.                      *
          1716 *   * THE FORMAT OF THE CALLING SEQUENCE IS AS FOLLOWS:               *
          1717 *       B   DL2ICS                                                   *
          1718 *       DC  AL2'DP1'                                                 *
          1719 *     WHERE DPL IS THE ADDRESS OF THE PARAMETER LIST TO BE PROCESSED. *
          1720 *                                                                    *
          1721 *INPUT                                                               *
          1722 *   * THE INPUT IS A TWO BYTE BASE DISK ADDRESS PLACED IN             *
          1723 *     DL2RAD AND A SIX BYTE DPL. THE SAME FORMAT AS THE DPL FOR $DISKN*
          1724 *     EXCEPT FOR THE DISK ADDRESS WHICH IS A RELATIVE CYLINDER AND    *
          1725 *     SECTOR DISPLACEMENT FROM THE BASE ADDRESS IN DL2RAD.            *
          1726 *                                                                    *
          1727 *OUTPUT                                                              *
          1728 *     NONE.                                                          *
          1729 *                                                                    *
          1730 *EXTERNAL REFERENCES                                                 *
          1731 *     $DISKN - ENTRY TO PHYSICAL DISK ROUTINE IS THE SYSTEM NUCLEUS.  *
          1732 *                                                                    *
          1733 *EXITS, NORMAL                                                       *
          1734 *     NORMAL - EXIT IS TO THE FIRST INSTRUCTION FOLLOWING THE POINTER *
          1735 *     TO THE DPL. THE BASE REGISTER IS RESTORED. THE RETURN ADDRESS IS*
          1736 *     THE ADDRESS RECALL REGISTER (APR) +2.                          *
          1737 *                                                                    *
          1738 *EXITS, ERROR                                                        *
          1739 *     NONE                                                           *
          1740 *                                                                    *
          1741 *TABLES/WORK AREAS                                                   *
          1742 *   * THE CONSTANTS AND WORK AREAS RESIDE AT THE END OF THE EXECUTABLE*
          1743 *     CODE AND ARE REFERENCED BY A DISPLACEMENT RELATIVE TO THE VALUE *
          1744 *     IN INDEX REGISTER 1 (@BR).                                     *
          1745 *   * DL2SEC AND DL2SAD ARE EQUATED TO OPERAND LOCATIONS IN THE       *
```

```
                        1746 *      EXECUTABLE CODE TO ELIMINATE EXCESS WORKING STORAGE.        *
                        1747 *                                                                 *
                        1748 *ATTRIBUTES                                                       *
                        1749 *    * DL2ICS IS REUSABLE                                         *
                        1750 *                                                                 *
                        1751 *CHARACTER CODE DEPENDENCY                                        *
                        1752 *      THE OPERATION OF THIS MODULE DOES NOT DEPEND UPON A PARTICULAR *
                        1753 *      INTERNAL REPRESENTATION OF THE EXTERNAL CHARACTER SET.      *
                        1754 *                                                                 *
                        1755 *NOTES                                                            *
                        1756 *    ERROR PROCEDURES                                             *
                        1757 *      NONE                                                       *
                        1758 *                                                                 *
                        1759 *    REGISTER USAGE                                               *
                        1760 *      INDEX REGISTER 1 (@BR) IS SAVED AND RESTORED. THIS REGISTER IS *
                        1761 *      USED DURING EXECUTION. REGISTER 2 (@BR) IS NOT USED.        *
                        1762 *                                                                 *
                        1763 *    SAVED/RESTORED AREAS                                         *
                        1764 *      NONE                                                       *
                        1765 *                                                                 *
                        1766 *    MODIFICATION CONSIDERATIONS                                  *
                        1767 *      NONE                                                       *
                        1768 *                                                                 *
                        1769 *    REQUIRED MODULES                                             *
                        1770 *      @SYSEQ - COMMON SYSTEM EQUATES.                            *
                        1771 *      @FXDEQ - SYSTEM NUCLEUS ADDRESSES AND INDICATORS VALUES EQUATES *
                        1772 *                                                                 *
                        1773 *    OTHER                                                        *
                        1774 *      DL2ICS MAY BE USED TO CONVERT THE DISK ADDRESS ONLY AND NOT TO *
                        1775 *      CALL $DISKN IF THE USER MOVES A UCB CODE TO DL2SWH.         *
                        1776 *      THIS OPTION IS NOT STANDARD USAGE.                         *
                        1777 *****************************************************************************
```

```
      #ERRPG - ERROR MESSAGE PROGRAM
```

```
                             0E08 1779          USING DL2000,@BR               ESTABLISH ADDRESSABILITY
                                  1780 *
                             0001 1781 DL2E01 EQU    X'01'                      FIELD LENGTH OF 1
                             0002 1782 DL2E02 EQU    X'02'                      FIELD LENGTH OF 2
                             0018 1783 DL2E18 EQU    X'18'                      HEX TRACK SECTOR COUNT
                             0060 1784 DL2E60 EQU    X'60'                      PHYSICAL SECTOR COUNT
                             0083 1785 DL2TSD EQU    X'83'                      MASK OFF TRACK SPINDLE DISK
                             007C 1786 DL2E7C EQU    X'7C'                      MASK OUT SECTOR COUNT
                             0E04 1787 DL2ICS EQU    *                          ENTRY POINT
    0E04 34 01 0E85               1788          ST    DL2900+@OP1,@BR           SAVE OLD BASE
                             0E08 1789 DL2000 EQU    *                          START PROCESSING
    0E08 C2 01 0E08               1790          LA    DL2000,@BR                SET BASE ADORESS
    0E0C 76 08 8A                 1791          A     DL2C01(,@BR),@ARR         BUMP TO RIGHT BYTE OF ADDR
    0E0F 74 08 14                 1792          ST    DL2001+@DOP2(,@BR),@ARR   ADDR OF PARAM
    0E12 76 08 8A                 1793          A     DL2C01(,@BR),@ARR         BUMP TO RETURN ADDR
    0E15 74 08 81                 1794          ST    DL2910+@OP1(,@BR),@ARR    SAVE RETURN ADDR
                                  1795 *
    0E18 4C 01 1D 0000            1796 DL2001 MVC    DL2002+@DOP2(@DADDR,@BR),*-*  SETUP ADDR OF DPL
    0E1D 5E 01 1D 8C              1797          ALC   DL2002+@DOP2(@CADDR,@BR),DL2C05(,@BR)  DUMP TO RIGHT END
    0E21 4C 05 92 0000            1798 DL2002 MVC    DL2DPL(@DPLNG,@BR),*-*      MOVE USER DPL TO WORK AREA
    0E26 5F 00 8F 86              1799 DL2005 SLC    DL2LST+@DSAD(DL2E01,@BR),DL2C48(,@BR)  ADJUST SCTR/CYL
    0E2A F2 82 07                 1800          JM    DL2006                     GO TO RESTORE TO CONTINUE
    0E2D 5E 00 8E 8A              1801          ALC   DL2LST+@DCYL(DL2E01,@BR),DL2C01(,@BR)  BUMP CYLINDER COUNT
    0E31 D0 87 1E                 1802          B     DL2005(,@BR)               BACK FOR NEXT CYLINDER
    0E34 5E 00 8F 86              1803 DL2006 ALC    DL2LST+@DSAD(DL2E01,@BR),DL2C48(,@BR)  RESTORE POSITIVE
                                  1804 *
                                  1805 *      GET THE LOGICAL SECTOR FROM THE DPL. THE NUMBER IS LEFT ADJUSTED
                                  1806 *      TO COMAE IT MTN THE POINTER ESTABLISHED PRIOR TO AN ENTRY.
    0E38 5C 00 1D 8F              1807          MVC   DL2SEC(DL2E01,@BR),DL2LST+@DSAD(,@BR)  GET SECTOR NUMBER
    0E3C 7C 00 8F                 1808          MVI   DL2LST+@DSAD(,@BR),@ZERO   CLEAR SECTOR BYTE
                                  1809 *
                                  1810 *      MOVE THE RELATIVE START TO THE DFL
                                  1811 *
    0E3F 5E 01 8F 94              1812          ALC   DL2LST+@DSAD(DL2E02,@BR),DL2RAD(,@BR)  DL2RAD TO DPL
    0E43 7D 18 1D                 1813          CLI   DL2SEC(,@BR),DL2E18        IS COUNT OVER A TRACK
    0E46 F2 82 08                 1814          JL    DL2008                     NO GO CHANGE A PHYSICAL ADOR
    0E49 5E 01 8F 85              1815          ALC   DL2LST+@DSAD(DL2E02,@BR),DL2K80(,@BR)  BUMP TRACK VALUE
    0E4D 5F 00 1D 88              1816          SLC   DL2SEC(1,@BR),DL2K18(,@BR) DECR BY TRACK VALUE
    0E51 5E 00 1D 1D              1817 DL2008 ALC    DL2SEC(1,@BR),DL2SEC(,@BR) SHIFT LEFT 1
    0E55 5E 00 1D 1D              1818          ALC   DL2SEC(1,@BR),DL2SEC(,@BR) SHIFT LEFT
    0E59 5C 00 14 8F              1819          MVC   DL2SAD(DL2E01,@BR),DL2LST+@DSAD(,@BR)  GET SECTOR ADDRESS
                                  1820 *
                                  1821 *      ZERO OUT THE SECTOR COUNT AND LEAVE THE DISK. SPINDLE AND
                                  1822 *      TRACK BITS AS IS TO BE RE INSERTED AFTER THE SECTOR HAS BEEN
                                  1823 *      LOCATES.
                                  1824 *
    0E5D 7B 7C 8F                 1825          SBF   DL2LST+@DSAD(,@BR),DL2E7C  TURN OFF
    0E60 7B 83 14                 1826          SBF   DL2SAD(,@BR),DL2TSD        OFF TRACK SPINDLE DISK
    0E63 5E 00 14 1D              1827          ALC   DL2SAD(DL2E01,@BR),DL2SEC(,@BR)  COMBINE SECTOR COUNTS
    0E67 7D 60 14                 1828 DL2010 CLI    DL2SAD(,@BR),DL2E60        TEST IF TRACK CROSSED
    0E6A F2 82 08                 1829          JL    DL2100
                                  1830 *
                                  1831 *      INCREMENT TRACK BIT. OVERFLOW INTO THE CYLINDER COUNT.
                                  1832 *
    0E6D 5E 01 8F 85              1833          ALC   DL2LST+@DSAD(DL2E02,@BR),DL2K80(,@BR)
    0E71 5F 00 14 83              1834          SLC   DL2SAD(1,@BR),DL2K60(,@BR)  DECR BY TRACK VALUE
```

```
      #ERRPG - ERROR MESSAGE PROGRAM

ERR LOC   OBJECT CODE     ADDR STMT  SOURCE STATEMENT           VER 15, MOD 00  07/05/20  PAGE  15

                               1835 *
     0E75 5E 00 8F 14          1836 DL2100 ALC    DL2LST+@DSAD(1,@BR),DL2SAD(,@BR)  INSERT SECTOR COUNT
                               1837 *
     0E79 F2 80 06             1838 DL2110 JC     DL2900,@NOP               CONVERSION SWITCH
                          0E7A 1839 DL2SWH EQU    DL2110+@Q                 ADDR OF Q CODE FOR SWITCH
     0E7C C0 87 0025           1840        B      $DISKN                    GO PROCESS I/O
     0E80 0E95            0E81 1841        DC     AL2(DL2LST)               ADDRESS OF DPL
     0E82 C2 01 0000           1842 DL2900 LA     *-*,@BR                   RESTORE CALLERS BASE
     0E86 C0 87 0000           1843 DL2910 B      *-*
                               1844 ***********************************************************************
                               1845 *       CONSTANTS
                               1846 ***********************************************************************
     0E8A 0060            0E8B 1847 DL2K60 DC     XL2'0060'                 SECTOR COUNT OF 24 LEFT ADJUSTD
     0E8C 0080            0E8D 1848 DL2K80 DC     XL2'0080'                 BIT FOR INCREMENTING TRACK
     0E8E 30              0E8E 1849 DL2C48 DC     IL1'48'                   CYLINDER VALUE FOR 1 DISK
     0E8F 0018            0E90 1850 DL2K18 DC     XL2'18'                   HEX SECTORS PER TRACK
     0E91 0001            0E92 1851 DL2C01 DC     IL2'1'                    CONSTANT FOR REGISTER MODE
     0E93 0005            0E94 1852 DL2C05 DC     IL2'5'                    DISP TO RIGHT END OF DPL
                               1853 ***********************************************************************
                               1854 *       WORK AREA
                               1855 ***********************************************************************
                          0E95 1856 DL2LST EQU    *                         LIST HIGH END
     0E95                 0E9A 1857 DL2DPL DS     CL(@DPLNG)                WORKING DPL
                          0E97 1858 DL2PHY EQU    DL2LST+@DSAD              POINTER TO PHYSICAL DADDR
                          0E1C 1859 DL2SAD EQU    DL2001+@DOP2             SAVE SECTOR BYTE FROM DPI
                          0E25 1860 DL2SEC EQU    DL2002+@DOP2             WORKING SECTOR ADDRESS FIELD
     0E9B                 0E9C 1861 DL2RAD DS     CL(@DADDR)                USER RELATIVE STARTING ADDR.
                          0E9D 1862 DL2END EQU    *                         END OF DL2ICS
                               1863 *                  END OF DL2ICS
```

```
                                1865 ***********************************************************************
                                1866 * SERIALLY REUSABLE SUBROUTINE TO CONVERT A 2 BYTE BINARY VALUE TO A *
                                1867 * 5 BYTE POSITIVE DECIMAL NUMBER.                                    *
                                1868 * ON ENTRY @XR POINTS TO THE LEFT BYTE OF THE BINARY VALUE.          *
                                1869 * ON RETURN C2DVAL IS THE RIGHT BYTE OF THE FIVE BYTE DECIMAL VALUE  *
                                1870 * WITH LEADING ZEROS WHICH MAY BE MODIFIED BY THE USER IN ANY WAY IN *
                                1871 * ITS LOCATION.  THE TWO BYTE BINARY VALUE IS NOT ALTERED.           *
                                1872 * @XR IS NOT ALTERED.  @BR IS SAVED AND RESTORED                     *
                                1873 ***********************************************************************
                                1874 *C2DEC5 ENTER BASE=C2DEC5,EXIT=C2D05,@BR,,@ARR
                      0E9D 1875          USING C2DEC5,@BR                   BASE ADDRESS SPECIFICATION
                      0E9D 1876 C2DEC5 EQU   *                             MODULE ENTRY POINT
   0E9D 34 01 0ED1             1877          ST    C2D050+@OP1,@BR          SAVE @BR
   0EA1 C2 01 0E9D             1878          LA    C2DEC5,@BR               LOAD BASE REGISTER
   0EA5 74 08 38               1879          ST    C2D052+@OP1(,@BR),@ARR   SAVE RETURN ADDRESS
                                1880 *** END OF EXPANSION ***
                                1881 * INITIALIZE DECIMAL INCREMENTER AND DECIMAL SUM TO 1 AND 0 RESP
   0EA8 54 90 43 39            1882          ZAZ   C2D903(C2D903-C2D901,@BR),C2D901(C2D902-C2D901,@BR)
   0EAC 7C 01 17               1883          MVI   C2D030+@D1(,@BR),@B1     INITIALIZE DISP TO BYTE ONE
   0EAF 7C 01 16               1884 C2D020 MVI   C2D030+@Q(,@BR),@B1       INIT TEST TO BIT 7
                                1885 *
   0EB2 B8 00 00               1886 C2D030 TBN   *-*(,@XR),*-*             IF THIS BIT IS OFF
   0EB5 F2 90 04               1887          JF    C2D040                  * BR AROUND SUM INCR
                                1888 * INCREMENT DECIMAL SUM BY DECIMAL VALUE OF THIS BIT
   0EB8 56 04 3E 43            1889          AZ    C2DVAL(C2D903-C2DVAL,@BR),C2D903(C2D903-C2DVAL,@BR)
                                1890 * DOUBLE DECIMAL VALUE OF INCREMENT TO VALUE OF NEXT BIT
   0EBC 56 04 43 43            1891 C2D040 AZ    C2D903(C2D903-C2DVAL,@BR),C2D903(C2D903-C2DVAL,@BR)
   0EC0 5E 00 16 16            1892          ALC   C2D030+@Q(1,@BR),C2D030+@Q(,@BR)  SHIFT BIT MASK LEFT ONE
   0EC4 D0 20 15               1893          BNOL  C2D030(,@BR)            CONTINUE LOOP UNLESS ALL BITS
                                1894 *
   0EC7 5F 00 17 13            1895          SLC   C2D030+@D1(1,@BR),C2D020+@Q(,@BR)  DECR DISP TO BYTE 0
   0ECB D0 81 12               1896          BZ    C2D020(,@BR)            FALL THROUGH IF UNDERFLOW
                                1897 *C2DOS  EXIT @BR,,RETURN
   0ECE C2 01 0000             1898 C2D050 LA    *-*,@BR                  RESTORE @BR
   0ED2 C0 87 0000             1899 C2D052 B     *-*                      RETURN TO CALLING PROGRAM
                                1900 *** END OF EXPANSION ***
                                1901 *
                                1902 *      WORK AREA
                                1903 *
   0ED6 F1             0ED6 1904 C2D901 DC    DL1'1'                    INIT WORK AREA
                      0ED7 1905 C2D902 EQU   *                         FIRST BYTE OF DECIMAL VALUE
   0ED7               0EDB 1906 C2DVAL DS    CL5                       DECIMAL VALUE
   0EDC               0EE0 1907 C2D903 DS    CL5                       INCREMENTER
                                1908 *      PATCH 4
                                1909 ***********************************************************************
                                1910 * PATCH AREA 4                                                       *
                                1911 ***********************************************************************
                                1912 * CALCULATE AREA LEFT IN THIS SECTOR
                                1913 *
                      0EE1 1914 $$$$L4 EQU   *                         START OF PATCH AREA 4
   0F00               1915          ORG   *,256,0                   SET LOC CNTR TO NEXT SECTOR
                      0F00 1916 $$$$T4 EQU   *                         DEFINE ADDR OF SCTR BNDRY
   0EE1               1917          ORG   $$$$L4                    SET LOC CNTR TO START
                                1918 *                                * OF PATCH AREA
   0EE1               0EFF 1919 $$$$$4 DS    CL($$$$T4-$$$$L4)         PATCH AREA
                                1920 ***********************************************************************
```

```
       #ERRPG - ERROR MESSAGE PROGRAM

ERR LOC   OBJECT CODE      ADDR STMT SOURCE STATEMENT          VER 15, MOD 00  07/05/20  PAGE  17

                          1921 *** END OF EXPANSION ***
                  0F00 1922 ERRTBL EQU    *                        ADDR OF NON-SYNTAX CHECKER TABLE
                  1100 1923 ERRSTB EQU    ERRTBL+X'200'            ADDR OF SYNTAX CHECKERS TABLE
                  1200 1924 ERRBBF EQU    ERRSTB+256               UPARROW BUFFER
                  1300 1925 ERRBFR EQU    ERRBBF+256               ERROR MESSAGE BUFFER (2 SECTOR)
                          1926        PRINT ON
                  FFFF 1927        END

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

```
$$$$$$   001  0C00 1419
$$$$$4   031  0EFF 1919
$$$$L4   001  0EE1 1914   1917  1919
$$$$T4   001  0F00 1916   1919
$$$CMD   001  0020 1124
$$$DAT   001  0040 1123
$$$EPL   001  0091 1120   1513
$$$ERN   001  0080 1174
$$$FUN   001  0010 1125   1514
$$$NLN   001  00A0 1170   1587
$$$STD   001  0081 1119
$$$001   015  0C2F 1446
$$BNLN   001  0605 1100   1102
$$CDBS   001  08C0 1150
$$CDND   001  0666 1109
$$CDRD   001  0890 1148   1150
$$CKEY   001  0603 1098
$$CKFF   001  0B3D 1130
$$COFF   001  0B44 1129
$$CSNS   001  209C 1159
$$DATB   001  0BBF 1131
$$EOSA   001  0AFE 1128
$$ERSK   001  1C00 1169   1581  1582
$$FITS   001  1D00 1177
$$FLIB   001  06FF 1176
$$ILEN   001  0601 1094   1096  1100  1479
$$ILHD   001  0600 1092   1094
$$INLN   001  0607 1107   1109  1111  1633  1654  1672
$$INND   001  06FA 1111   1649
$$KBDT   001  09E1 1118   1122  1513
$$KBSN   001  09E2 1122   1127  1503* 1510  1514
$$KLD1   001  0600 1182
$$KLD2   001  0700 1184
$$KLD3   001  0C00 1186
$$LPOS   001  09EB 1127
$$PCNT   001  07E9 1143
$$PLYN   001  2004 1157
$$PRES   001  0890 1116   1118  1128  1129  1130  1131  1148  1509
$$PRFL   001  2143 1161
$$PRNT   001  0707 1137   1138  1142  1143
$$PRTN   001  0782 1138
$$PSIO   001  07CE 1142
$$PYCD   001  2200 1163
$$PYMP   001  2000 1155   1157  1159  1161  1163
$$SLIB   001  1C00 1172
$$TPCD   001  0606 1102   1107
$$UPAR   001  0602 1096   1098  1490*
$$WSPB   001  1E00 1175
$$XIND   001  06FF 1173   1176
$$ZERO   001  0000 0688   0689  0691  0692  0693  0697  1155
$ABORT   001  0010 0801
$BASIC   001  0080 0859
$BIGCD   001  0080 0935
$BLDPL   001  0579 1068   1070
$BLNOE   001  0569 1058
$BLOAD   001  0522 1049   1051  1054  1067  1068
```

```
$BLRTN  001  0550 1057   1058
$BRSAV  001  03C5 0746   0747
$BSADR  001  0587 1073   1075  1461
$BUFPT  001  03E3 0954   0955
$CABLD  001  04B4 1027   1028  1576
$CAERK  001  0469 1004   1007
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$CALLI  001  0008 0944
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$CARPL  001  04A1 1025   1027
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$CIEXT  001  0480 1013   1014
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$CLBFR  001  0010 0902
$CMDKY  001  0008 0814
$CMODE  001  0002 0864   1497
$CONFG  001  03DD 0927   0937
$CRPOS  001  03E2 0953   0954
$CRTAD  001  044D 0992   0993
$CRTAV  001  0002 0808
$CRTDN  001  0002 0832
$CRTIN  001  03D3 0829   0836
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$CRTPU  001  0004 0833
$CRTSP  001  0008 0834
$CRTUP  001  0001 0831
$CRUSH  001  0080 0940
$CSDPL  001  050E 1039   1040
$C0001  001  0464 0996   1002
$DATE   001  043A 0977   0978
$DBGUF  001  03E0 0939   0948
$DBLOK  001  0001 0889
$DFDET  001  03E8 0960   0961
$DISKN  001  0025 0691   1499  1528  1539  1840
$DKERR  001  0008 0870
$DKSIZ  001  03D7 0914   0922  0963
$DK100  001  0001 0916
$DK200  001  0002 0917
$DK400  001  0004 0918
$DK600  001  0008 0919
$DK800  001  0010 0920
$DPLSV  001  0449 0988   0990
$DTNMB  001  0040 0735
$DTRDR  001  0040 0823
$ENDNU  001  0600 1082   1092  1116  1137  1173  1182  1184  1186
$ERDPL  001  046F 1007   1009
$ERFIL  001  0040 0762   1471
$ERHRD  001  0004 0894   1571
$ERKEY  001  0080 0766
$ERLOG  001  0345 0696
$ERMAD  001  0472 1009   1010
$ERPND  001  0004 0867
$ERRCT  001  03CF 0768   1580
$ERRPG  001  03CE 0756   1467  1471  1495  1587
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$ER050   001  0363 0697
$ER1N2   001  0050 0764   1495
$EXADR   001  0517 1042   1044
$EXCMD   001  0001 0796
$EXFTR   001  043B 0978   0983
$FCIND   001  0010 0874
$FDIND   001  0040 0881
$FEARR   001  0004 0689
$FEMAP   001  0588 1075   1076
$FILIB   001  03DA 0925   0926
$FITIN   001  0010 0850
$FUIND   001  0020 0879
$GUFIO   001  0583 1072   1073
$GUFIR   001  0008 0724
$HISTE   001  042E 0975   0976
$HIST1   001  0435 0976   0977
$HRDER   001  0020 0820
$INDR1   001  03D4 0836   0862
$INDR2   001  03D5 0862   0887  1497  1575*
$INDR3   001  03D6 0887   0914  1571  1613*
$INLNO   001  03CF 0754   0756  0768  0775  1556  1582*
$INRPT   001  0020 0732
$IOIND   001  03D2 0803   0829  1504*
$IOPGS   001  0010 0943
$IOYES   001  0002 0718   1452  1456
$IPLDV   001  05FF 1079   1082
$IRKEY   001  0020 0942
$KEYBD   001  03E1 0948   0953
$KEYCD   001  03C3 0712   0746  1452  1456* 1477  1501
$KEYDT   001  0040 0856
$KE090   001  00DE 0692
$KE130   001  01D5 0693
$KYBSY   001  0010 0729
$LDRTN   001  0571 1067
$LEVEL   001  03DF 0937   0939
$LIST    001  0002 0891
$LMRGN   001  03C1 0707   0709
$LNPTR   001  0080 0826
$LOADB   001  054A 1051
$LOADR   001  051A 1044   1047  1454
$LPRIO   001  03EA 0961
$LPROS   001  03E5 0956   0958
$LPRP3   001  03E4 0955   0956
$MOUNT   001  0020 0905
$MPDWN   001  0001 0805
$NEXTB   001  03E6 0958   0959
$NEXTL   001  03E7 0959   0960
$NOENB   001  0008 0897   1613
$NOLST   001  0004 0721   1477
$NUCBS   001  03C0 0704   0705
$NWRKF   001  0080 0910
$NWRKR   001  0040 0907
$PASWD   001  042D 0974   0975
$PAUSD   001  04BA 1028   1030
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$PGMST  001  0010 0817    1504
$PKERT  001  0419 0972    0974
$PLST1  001  0454 0993    0994
$PLST2  001  045B 0994    0995
$PLST3  001  0462 0995    0996
$PRDEV  001  044B 0990    0992
$PRESN  001  0002 0841
$PROCI  001  0001 0838
$PRPOS  001  03C2 0709    0712
$PSDBR  001  04FA 1033
$PSDXR  001  04F2 1032    1033
$PSTEP  001  0004 0799
$PSTMT  001  0008 0800
$PTCH1  001  03F5 0963    0967
$READY  001  0080 0883    1575
$REORD  001  0040 0941
$RLOAD  001  051E 1047    1049
$RMRGN  001  03C0 0705    0707
$RSTR   001  04D6 1030    1032  1034  1039
$RUNIT  001  0001 0777
$SFAID  001  050D 1035
$SPRNT  001  0465 1002    1004  1480  1493  1506  1521  1543  1553  1559  1563  1568  1596
$SRTRN  001  04FE 1034    1035
$STEPT  001  0002 0778
$SWPCR  001  0511 1040    1042
$TABLN  001  03CB 0749    0752
$TFLOW  001  0008 0784
$TRACE  001  0004 0779
$TRALL  001  0010 0785
$TROVR  001  054E 1054    1057
$TRUNK  001  0080 0737
$TRVAR  001  0020 0786
$UNMSK  001  048D 1015    1018
$USRDR  001  03DC 0926    0927
$VMDEF  001  0080 0790
$VOLF1  001  03FE 0969    0970
$VOLF2  001  040E 0971
$VOLID  001  03F6 0967    0968  0972
$VOLR1  001  03F6 0968    0969
$VOLR2  001  0406 0970    0971
$WAITF  001  057F 1070    1072  1507  1529  1540
$WFDEF  001  0040 0984
$WFLOK  001  0008 0847
$WFNME  001  0443 0983    0988
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$XIND2  001  03D1 0794    0803
$XIND3  001  03D8 0922    0925
$XPREC  001  0040 0787
$XRSAV  001  03C7 0747    0749  1448
$ZTRAD  001  05A2 1076
$12K    001  0004 0931
$16CKY  001  0008 0933
$16K    001  0002 0930
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#$$#SS  001  0000 0492
#$$#VU  001  0600 0452
#$$#0T  001  0700 0224
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#$$DPR  001  0700 0248  1667
#$$DRE  001  0889 0264
#$$DSP  001  2800 0284
#$$ECM  001  0C00 0544
#$$EFK  001  0C00 0564
#$$ERR  001  0C00 0536  1418
#$$EXM  001  0C00 0424
#$$FIL  001  0E00 0504
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#$$FMS  001  0200 0472
#$$GRA  001  0889 0396
#$$GUF  001  0C00 0532
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#$$INS  001  0600 0236
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#$$KDI  001  0D00 0412
#$$KDN  001  0C00 0320
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#$$KED  001  0C00 0256
#$$KEN  001  0C00 0260
#$$KEX  001  0C00 0280
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#$$KHE  001  0C00 0436
#$$KKE  001  0C00 0664
#$$KLI  001  0C00 0340
#$$KLL  001  0920 0640
#$$KLO  001  0C00 0344
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#$$KNA  001  0C00 0380
#$$KOV  001  0E00 0300
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                              CROSS REFERENCE

SYMBOL  LEN VALUE DEFN  REFERENCES                        VER 15, MOD 00  07/05/20  PAGE  23

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#$$KRO  001  0D00 0296
#$$KRS  001  0C00 0620
#$$KRU  001  0C00 0316
#$$KRV  001  0800 0408
#$$KSA  001  0C00 0352
#$$KSE  001  0E00 0392
#$$KSO  001  0C20 0444
#$$KSS  001  0C00 0376
#$$KSV  001  0980 0372
#$$KSY  001  0C00 0384
#$$KWI  001  0C00 0312
#$$KWR  001  0C00 0304
#$$LOA  001  0600 0244
#$$MIP  001  0C00 0440
#$$SDS  001  0C00 0552
#$$SFF  001  0E00 0556
#$$SFL  001  0F00 0548
#$$SFO  001  1500 0520
#$$SFS  001  0C00 0516
#$$SPA  001  0C00 0356
#$$SPO  001  0806 0360
#$$SPS  001  0C00 0348
#$$STR  001  1600 0524
#$$TDC  001  1000 0328
#$$TSY  001  1000 0288
#$$TVK  001  0FC0 0464
#$$UAL  001  0C00 0480
#$$UAT  001  0900 0576
#$$UCD  001  0900 0584
#$$UCN  001  0C00 0568
#$$UCP  001  0700 0572
#$$UDE  001  0C00 0588
#$$UDI  001  0C00 0592
#$$UEX  001  0C00 0476
#$$UIN  001  0C00 0580
#$$UPA  001  0C00 0560
#$$UPO  001  0C00 0628
#$$UPT  001  0C00 0624
#$$VCR  001  2000 0420
#$$VLO  001  0600 0456
#$$VOD  001  0600 0460
#$$VVM  001  0000 0468
#$$VXI  001  0600 0448
#$$ZDU  001  1100 0600
#$$ZLB  001  1100 0644
#$$ZLO  001  1100 0604
#$$ZLV  001  0F00 0660
#$$ZL1  001  0F00 0648
#$$ZL2  001  0F00 0652
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SYMBOL	LEN	VALUE	DEFN	REFERENCES	VER 15, MOD 00 07/05/20 PAGE 24
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#$$ZUT	001	0C00	0608		
#$#BLN	001	18D4	0539		
#$#CKT	001	2118	0667		
#$#CNF	001	2000	0635		
#$#COR	001	0800	0427		
#$#CSA	001	1000	0487		
#$#DRT	001	0000	0231		
#$#ERM	001	0928	0431	1635	
#$#FSP	001	1880	0527		
#$#INV	001	212C	0671		
#$#PWR	001	2300	0675		
#$#RSP	001	1780	0507		
#$#SAV	001	1180	0495		
#$#SSA	001	1128	0491		
#$#VUF	001	0B08	0451		
#$#0TR	001	0000	0223		
#$#1TR	001	0080	0227		
#$@#BL	001	0001	0541		
#$@#CK	001	0004	0669		
#$@#CN	001	0001	0637		
#$@#CO	001	003A	0429		
#$@#CS	001	003A	0489		
#$@#DR	001	0008	0233		
#$@#ER	001	0032	0433		
#$@#FS	001	0030	0529		
#$@#IN	001	003A	0673		
#$@#PW	001	00C0	0677		
#$@#RS	001	0030	0509		
#$@#SA	001	0108	0497		
#$@#SS	001	0001	0493		
#$@#VU	001	0002	0453		
#$@#0T	001	0018	0225		
#$@#1T	001	0018	0229		
#$@BCO	001	0018	0241		
#$@BOV	001	0018	0513		
#$@DPR	001	0005	0249	1666	
#$@DRE	001	0001	0265		
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#$@ECM	001	0006	0545		
#$@EFK	001	0002	0565		
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#$@FMS	001	0052	0473		
#$@GRA	001	0003	0397		
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#$@INL	001	0010	0613		
#$@INS	001	0010	0237		
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#$@KCA	001	000C	0617		
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#$@KCN	001	0010	0485		

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                              CROSS REFERENCE

SYMBOL  LEN VALUE DEFN  REFERENCES               VER 15, MOD 00  07/05/20  PAGE  25

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#$@KDI  001  0005 0413
#$@KDN  001  0010 0321
#$@KDO  001  000C 0417
#$@KED  001  000E 0257
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#$@KEX  001  0003 0281
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#$@KHE  001  000C 0437
#$@KKE  001  0006 0665
#$@KLI  001  0011 0341
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#$@KLO  001  0008 0345
#$@KME  001  0003 0325
#$@KMO  001  0004 0269
#$@KNA  001  0008 0381
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#$@KPO  001  000D 0365
#$@KPR  001  0009 0389
#$@KRE  001  0002 0309
#$@KRL  001  0004 0405
#$@KRM  001  0003 0273
#$@KRN  001  0003 0293
#$@KRO  001  000A 0297
#$@KRS  001  000A 0621
#$@KRU  001  0003 0317
#$@KRV  001  000D 0409
#$@KSA  001  0011 0353
#$@KSE  001  0004 0393
#$@KSO  001  000D 0445
#$@KSS  001  000B 0377
#$@KSV  001  0002 0373
#$@KSY  001  000F 0385
#$@KWI  001  0002 0313
#$@KWR  001  0002 0305
#$@LOA  001  0013 0245
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#$@SDS  001  0004 0553
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#$@SFO  001  0003 0521
#$@SFS  001  0011 0517
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#$@SPS  001  0001 0349
#$@STR  001  0002 0525
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#$@TSY  001  0003 0289
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#$@UAL  001  0011 0481
#$@UAT  001  000C 0577
#$@UCD  001  000B 0585
#$@UCN  001  0009 0569
#$@UCP  001  000F 0573
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SYMBOL	LEN	VALUE	DEFN	REFERENCES	VER 15, MOD 00 07/05/20 PAGE 26
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#$@UIN	001	000F	0581		
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#$@UPO	001	0005	0629		
#$@UPT	001	0012	0625		
#$@VCR	001	0008	0421		
#$@VLO	001	0002	0457		
#$@VOD	001	0016	0461		
#$@VVM	001	0030	0469		
#$@VXI	001	0002	0449		
#$@ZDU	001	0008	0601		
#$@ZLB	001	0002	0645		
#$@ZLO	001	000C	0605		
#$@ZLV	001	0006	0661		
#$@ZL1	001	0007	0649		
#$@ZL2	001	000D	0653		
#$@ZL3	001	000A	0657		
#$@ZTR	001	0001	0597		
#$@ZUT	001	0014	0609		
#$BCOM	001	0080	0239		
#$BOLV	001	1780	0511		
#$DPRI	001	014C	0247	1665	
#$DREA	001	0200	0263		
#$DSPL	001	0240	0283		
#$ECMA	001	1900	0543		
#$EFKE	001	1990	0563		
#$ERRP	001	18C0	0535		
#$EXMS	001	07D4	0423		
#$FILN	001	1724	0503		
#$FIST	001	1700	0499		
#$FMLN	001	1E00	0631		
#$FMST	001	0D00	0471		
#$GRAP	001	0690	0395		
#$GUFU	001	1880	0531		
#$INLN	001	1C84	0611		
#$INST	001	0020	0235		
#$KALL	001	06A4	0399		
#$KCAL	001	1CC4	0615		
#$KCHA	001	053C	0367		
#$KCND	001	0F80	0483		
#$KCTL	001	03BC	0335		
#$KDEL	001	035C	0331		
#$KDIS	001	0744	0411		
#$KDNT	001	0300	0319		
#$KDOV	001	0780	0415		
#$KEDI	001	0188	0255		
#$KENA	001	01C4	0259		
#$KEXT	001	0234	0279		
#$KGOS	001	0180	0251		
#$KHEL	001	0A30	0435		
#$KKEY	001	2100	0663		
#$KLIS	001	0400	0339		
#$KLLA	001	2004	0639		
#$KLOG	001	0444	0343		

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#$KMER  001  030C 0323
#$KMOU  001  0204 0267
#$KNAM  001  05C0 0379
#$KOVM  001  0290 0299
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#$KPOO  001  0508 0363
#$KPRT  001  063C 0387
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#$KRLA  001  0700 0403
#$KRMO  001  0214 0271
#$KRNU  001  0280 0291
#$KROV  001  028C 0295
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#$KRVL  001  0710 0407
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#$KSET  001  0680 0391
#$KSOV  001  0AC8 0443
#$KSSP  001  0594 0375
#$KSVL  001  058C 0371
#$KSYM  001  0600 0383
#$KWID  001  02C4 0311
#$KWRI  001  02B4 0303
#$LOAD  001  0100 0243
#$MIPP  001  0A80 0439
#$SDSY  001  192C 0551
#$SFFI  001  193C 0555
#$SFLO  001  1918 0547
#$SFOV  001  1844 0519
#$SFSY  001  1800 0515
#$SPAC  001  04CC 0355
#$SPOV  001  04DC 0359
#$SPSY  001  0484 0347
#$STRO  001  1850 0523
#$TDCK  001  0350 0327
#$TSYK  001  0250 0287
#$TVKB  001  0BAC 0463
#$UALL  001  0F00 0479
#$UATR  001  1A38 0575
#$UCDI  001  1AD8 0583
#$UCNF  001  19B8 0567
#$UCPL  001  19DC 0571
#$UDEL  001  1B24 0587
#$UDIS  001  1B5C 0591
#$UEXL  001  0EA8 0475
#$UINI  001  1A88 0579
#$UPAC  001  1980 0559
#$UPOV  001  1D24 0627
#$UPTF  001  1D5C 0623
#$VCRT  001  07B4 0419
#$VLOA  001  0B80 0455
#$VODK  001  0B88 0459
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#$VXIT  001  0B00 0447
#$ZDUM  001  1BA4 0599
#$ZLBM  001  2008 0643
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#$ZLVR	001	20B0	0659	
#$ZL1M	001	2010	0647	
#$ZL2M	001	2030	0651	
#$ZL3M	001	2088	0655	
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#$ZUTM	001	1C14	0607	
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#@#IO1	001	0459	1222	
#@#IO2	001	045D	1223	
#@#TAT	001	0941	1250	
#@#TBA	001	09A1	1254	
#@#TFS	001	0941	1248	
#@#TSY	001	0941	1252	
#@#VFP	001	0700	1240	
#@#VLP	001	093D	1243	
#@#WDB	001	050C	1235	
#@#WFT	001	0500	1233	
#@@#BA	001	0001	1215	1671
#@@#IO	001	0001	1227	
#@@#SC	001	0002	1224	
#@@#TA	001	0010	1251	
#@@#TB	001	0010	1255	
#@@#TS	001	0005	1253	
#@@#TW	001	0020	1249	
#@@#VM	001	0100	1244	
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#@@#04	001	0004	1226	
#@@#08	001	0008	1225	
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#@@GUF	001	0010	1207	
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#@@SDS	001	0004	1209	
#@@SFF	001	0008	1221	
#@@SFL	001	0005	1219	
#@@SFO	001	0005	1229	
#@@SFS	001	0011	1205	
#@@VSF	001	0010	1257	
#@@VSL	001	000F	1258	
#@@VTR	001	0001	1242	
#@BOVL	001	0400	1202	
#@ECMA	001	0481	1216	
#@ERRP	001	0441	1210	
#@GUFU	001	0401	1206	
#@LDSV	001	044D	1212	
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#@SFFI	001	04BD	1220	
#@SFLO	001	0499	1218	
#@SFOV	001	04C4	1228	
#@SFSY	001	0480	1204	
#@VSFI	001	09A1	1256	
#@VTRL	001	0708	1241	
#@WAF1	001	0401	1201	

```
#@WAR1   001  0400  1200
#ERRP    001  0C07  1422
#ERRPG   001  0000  0001
@@M251   001  0C0A  1430    1554
@@M500   001  0C0E  1434    1522
@@T251   001  0C12  1438    1432
@@T500   001  0C1B  1441    1436
@ARR     001  0008  0017    1791* 1792  1793* 1794  1879
@ASIGN   001  007C  0072
@ASTER   001  005C  0070
@BCRDL   001  0050  0089
@BE      001  0081  0044
@BF      001  0090  0053
@BH      001  0084  0042
@BL      001  0082  0043
@BLANK   001  0040  0066
@BM      001  0082  0055
@BNE     001  0001  0047
@BNH     001  0004  0045
@BNL     001  0002  0046
@BNM     001  0002  0058
@BNOL    001  0020  0051
@BNOZ    001  0008  0050
@BNP     001  0004  0057
@BNZ     001  0001  0059
@BOL     001  00A0  0049
@BOZ     001  0088  0048
@BP      001  0084  0054
@BR      001  0001  0014    1424  1460* 1462  1468  1469  1474  1474  1475  1479  1483  1483  1485
                           1485  1489  1489  1490  1491  1512  1524  1526  1527  1530  1534  1536
                           1537  1547  1549  1565  1565  1566  1580  1584  1584  1585  1585  1586
                           1588  1589  1590  1599  1614  1779  1788  1790* 1791  1792  1793  1794
                           1796  1797  1797  1798  1799  1799  1801  1801  1802  1803  1803  1807
                           1807  1808  1812  1812  1813  1815  1815  1816  1816  1817  1817  1818
                           1818  1819  1819  1825  1826  1827  1827  1828  1833  1833  1834  1834
                           1836  1836  1842* 1875  1877  1878* 1879  1882  1882  1883  1884  1889
                           1889  1891  1891  1892  1892  1893  1895  1895  1896  1898*
@BT      001  0010  0052
@BZ      001  0081  0056
@B1      001  0001  0064    1883  1884
@CADDR   001  0002  0143    1432  1436  1455  1474  1481  1483  1485  1491  1494  1500  1529  1533
                           1564  1626  1630  1633  1642  1649  1653  1654  1667  1670  1672  1797
@CARDL   001  0060  0088    1109
@CHARA   001  00C1  0073
@CHARF   001  00C6  0074
@CHARR   001  00D9  0075
@CHARZ   001  00E9  0076
@CLOFF   001  0010  0095
@CLON    001  0011  0094
@COMMA   001  006B  0067
@CPLUS   001  004E  0080
@DADDR   001  0002  0141    1461  1462  1635  1665  1796  1861
@DBFR1   001  0004  0130
@DBFR2   001  0005  0131
@DCALK   001  0001  0082
@DCBCY   001  0009  0116
```

```
@DCBT1   001  0050 0118
@DCNT    001  0003 0129
@DCST1   001  0040 0117
@DCTRL   001  0000 0126
@DCYL    001  0001 0127   1801*
@DD2     001  0003 0031
@DGET    001  0001 0135   1638   1664   1676
@DOLAR   001  005B 0069
@DOP2    001  0004 0029   1792* 1796* 1797* 1859   1860
@DPLNG   001  0006 0133   1798   1857
@DPOS    001  0000 0134
@DPUT    001  0002 0136   1669
@DSAD    001  0002 0128   1530* 1799* 1803* 1807   1808* 1812* 1815* 1819   1825* 1833* 1836* 1858
@DSBCY   001  0004 0107
@DSCS1   001  0000 0108
@DSIVF   001  0003 0139
@DSPIN   001  0002 0132
@DTRSZ   001  0018 0086
@DVBCY   001  0007 0109
@DVRFY   001  0031 0137
@DWAIT   001  00FF 0138
@DWBCY   001  0005 0104
@DWSIZ   001  00C0 0106
@DWTB1   001  0003 0105
@DZERO   001  00F0 0065
@D1      001  0002 0027   1883* 1895*
@EOF     001  001C 0078
@EOFTC   001  0075 0163
@EOS     001  001E 0077
@FDDBC   001  0000 0196
@FDE1    001  000C 0201
@FDFNA   001  000B 0199
@FDHLN   001  0002 0209
@FDLNC   001  0002 0194
@FDNSC   001  0003 0211
@FDSD    001  0000 0207
@FLACE   001  0009 0198
@FLDBC   001  0001 0197
@FLENT   001  0004 0202
@FLFNA   001  0002 0200
@FLHLN   001  0002 0210
@FLLNC   001  0002 0195
@FLNSC   001  0001 0212
@FLSD    001  0001 0208
@HCEPK   001  003C 1290
@HCOPS   001  001C 1297
@HCOPY   001  081C 1292
@HCRHE   001  7858 1313
@HDNRY   001  1008 1278
@HDRHE   001  7854 1311
@HDRLN   001  0007 0093   1137
@HDRV1   001  7840 1303
@HDRV2   001  7844 1305
@HDTRD   001  1040 1274
@HDTRJ   001  1010 1276
@HERPG   001  087C 1280   1607
```

```
@HFEHT  001  0804 1295
@HIPLE  001  006C 1287
@HKBER  001  2040 1270
@HKBHE  001  7848 1307
@HLOGE  001  1844 1282
@HPRER  001  0070 1272
@HPRHE  001  784C 1309
@HUNSF  001  1850 1285
@IAR    001  0010 0018
@INDEX  001  0001 0157   0158
@INST3  001  0003 0033
@INST4  001  0004 0034
@INST5  001  0005 0035
@INST6  001  0006 0036
@I1IAR  001  00C0 0021
@LINSZ  001  00F4 0085   1111  1487* 1488  1488  1488*
@MAPEN  001  0005 0090
@MINCR  001  2000 0084
@MINUS  001  0060 0081
@NOP    001  0080 0041   1475  1512  1586  1604  1838
@NUMBR  001  007B 0071
@OPD2   001  0004 0030
@OP1    001  0003 0028   1474* 1491* 1788* 1794* 1877* 1879*
@OP2    001  0005 0032   1584* 1585*
@PCTRL  001  0000 0150
@PDATA  001  0003 0152   1537* 1549*
@PGCSZ  001  0020 0083   0084
@PPLNG  001  0004 0149
@PRCNT  001  0001 0151   1479* 1489* 1490  1547*
@PRETR  001  00C0 0155
@PRINT  001  0040 0153   0155  1430  1434  1620  1624  1629  1685
@PSR    001  0004 0016
@PWAIT  001  00FF 0159
@P1IAR  001  0020 0019
@P2IAR  001  0040 0020
@Q      001  0001 0025   1475* 1512* 1586* 1589* 1839  1884* 1892  1892* 1895
@REGL   001  0002 0013   1448  1616
@RETRN  001  0080 0154   0155  1624  1629  1681
@RLDWN  001  004F 0160
@RTRNC  001  0080 0162   1682
@SBLN   001  0005 0171
@SBLNL  001  0002 0185   1582
@SCTSZ  001  0100 0101
@SDFLN  001  0007 0091
@SDF0   001  0000 0167
@SDF1   001  0001 0168
@SDF2   001  0002 0169
@SDF3   001  0003 0170
@SECCY  001  0030 0087
@SIST   001  0001 0182
@SLASH  001  0061 0068
@SLAST  001  0002 0184
@SMIDL  001  0003 0183
@SNULL  001  0080 0174
@SONLY  001  0000 0181
@STEXT  001  0007 0173
```

```
@STYPE   001  0006 0172
@TBCNT   001  0000 0161
@TBLEF   001  0010 0156   0158
@TBLIX   001  0011 0158
@UCB     001  0087 0040   1551  1573  1589
@UPARW   001  005A 0079   1492
@VADDR   001  0002 0142
@VENTA   001  0056 0114
@VMDDV   001  00FE 0115
@VMFD1   001  0000 0110
@VMFD2   001  0001 0111
@VMRS3   001  0002 0113
@VMTRL   001  0001 0112
@VOLID   001  0006 0092
@VQ      001  0001 0026
@WSFIT   001  0500 0102
@WSTBL   001  0503 0103
@XR      001  0002 0015   1525* 1526* 1527* 1530  1534  1535* 1536* 1537  1546  1546* 1547  1548
                          1549  1556* 1886
@ZERO    001  0000 0063   1503  1510  1677  1808
B        003  0DC9 1614
C2DEC5   001  0E9D 1876   1557  1875  1878
C2DVAL   005  0EDB 1906   1687  1889  1889  1889* 1891  1891
C2D020   003  0EAF 1884   1895  1896
C2D030   003  0EB2 1886   1883* 1884* 1892  1892* 1893  1895*
C2D040   004  0EBC 1891   1887
C2D050   004  0ECE 1898   1877*
C2D052   004  0ED2 1899   1879*
C2D901   001  0ED6 1904   1882  1882  1882
C2D902   001  0ED7 1905   1882
C2D903   005  0EE0 1907   1882  1882* 1889  1889  1889  1891  1891  1891  1891*
DL2C01   002  0E92 1851   1791  1793  1801
DL2C05   002  0E94 1852   1797
DL2C48   001  0E8E 1849   1799  1803
DL2DPL   006  0E9A 1857   1798*
DL2END   001  0E9D 1862
DL2E01   001  0001 1781   1799  1801  1803  1807  1819  1827
DL2E02   001  0002 1782   1812  1815  1833
DL2E18   001  0018 1783   1813
DL2E60   001  0060 1784   1828
DL2E7C   001  007C 1786   1825
DL2ICS   001  0E04 1787   1464  1532
DL2K18   002  0E90 1850   1816
DL2K60   002  0E8B 1847   1834
DL2K80   002  0E8D 1848   1815  1833
DL2LST   001  0E95 1856   1799* 1801* 1803* 1807  1808* 1812* 1815* 1819  1825* 1833* 1836* 1841
                          1858
DL2PHY   001  0E97 1858
DL2RAD   002  0E9C 1861   1461* 1462* 1812
DL2SAD   005  0E1C 1859   1819* 1826* 1827* 1828  1834* 1836
DL2SEC   005  0E25 1860   1807* 1813  1816* 1817  1817* 1818  1818* 1827
DL2SWH   003  0E7A 1839
DL2TSD   001  0083 1785   1826
DL2000   001  0E08 1789   1779  1790
DL2001   005  0E18 1796   1792* 1859
DL2002   005  0E21 1798   1796* 1797* 1860
```

```
DL2005   004 0E26 1799   1802
DL2006   004 0E34 1803   1800
DL2008   004 0E51 1817   1814
DL2010   003 0E67 1828
DL2100   004 0E75 1836   1829
DL2110   003 0E79 1838   1839
DL2900   004 0E82 1842   1788* 1838
DL2910   004 0E86 1843   1794*
ERRBBF   001 1200 1924   1487* 1488   1488* 1492* 1626  1925
ERRBFA   002 0DEB 1654   1485
ERRBFR   001 1300 1925   1535  1642
ERRDEC   001 0DDC 1637   1565
ERRDPL   001 0DDC 1638   1530* 1533
ERRDP1   001 0001 1655   1534
ERRIBF   002 0DE5 1649   1483
ERRINC   001 0DE3 1648   1584  1585
ERRIOD   001 0DEC 1664   1455
ERRLEN   001 0003 1658   1546  1621
ERRLNC   001 0004 1659   1686  1687
ERRLPL   001 0DD6 1628   1479* 1481
ERRLTB   001 0003 1657   1678
ERRMSG   002 0DDB 1635   1462
ERRPPL   001 0DD6 1629   1547* 1549* 1564
ERRQPL   001 0DCE 1619   1537* 1544
ERRSAV   002 0DCD 1616   1448* 1483   1485* 1489  1491
ERRSPL   001 0E00 1684   1560
ERRSQC   001 0096 1660   1515
ERRSTA   002 0DE9 1653   1474
ERRSTB   001 1100 1923   1653  1924
ERRTBL   001 0F00 1922   1525  1679  1923
ERRTDP   001 0DF8 1675   1465
ERRTIM   001 0DE2 1644   1565* 1580*
ERRTRN   001 0DFE 1681   1569  1597
ERRUPL   001 0DD2 1624   1489* 1490  1494
ERRWRK   002 0DE7 1650   1500  1524* 1526  1527  1534* 1536
ERR050   006 0C30 1448   1425
ERR100   004 0C47 1460   1453
ERR150   003 0C74 1475   1473
ERR200   004 0C89 1483   1472  1478
ERR300   004 0CAF 1492   1491*
ERR350   004 0CCD 1501   1498
ERR400   004 0CE6 1510   1511
ERR500   004 0CFF 1521   1424  1460  1484  1486  1496  1502  1588  1590
ERR550   004 0D0A 1525   1474*
ERR600   003 0D4B 1551   1586* 1589*
ERR700   004 0D62 1563   1551
ERR720   004 0D7C 1573   1475* 1512*
ERR730   004 0D80 1575   1614
ERR740   005 0D88 1580   1468
ERR750   006 0D8D 1581   1566  1584*
ERR760   006 0D93 1582   1585*
ERR800   003 0DA1 1586   1599
ERR820   004 0DB1 1596   1469
ERR850   004 0DBA 1604   1572  1608
ERR900   004 0DC5 1613   1515
ERWRT    001 0DF2 1669
```

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

OL105 I   THE CODE LENGTH OF #ERRPG IS  3840 DECIMAL.
OL103 I   TOTAL NUMBER OF LIBRARY SECTORS REQUIRED IS     5
          NAME-#ERRPG,PACK-R1R1R1,UNIT-R1,RETAIN-P,LIBRARY-R,CATEGORY-000
```

```
        OVERLAY LINKAGE EDITOR CORE USAGE MAP      07/05/20


 START    CATEGORY   NAME AND       CODE LENGTH
ADDRESS              ENTRY      HEXADECIMAL DECIMAL

 0C00        0     #ERRPG          0F00    3840


OL100 I  THE TOTAL CORE USED BY #ERRPG IS  3840 DECIMAL.
OL101 I  THE START CONTROL ADDRESS OF THIS MODULE IS 0C00.
OL104 I  TOTAL NUMBER OF LIBRARY SECTORS REQUIRED IS   16
       NAME-#ERRPG,PACK-R1R1R1,UNIT-R1,RETAIN-P,LIBRARY-O
UNTER

                    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
```

```
                        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 *                                                                    *
                        1102 *    CALLING SEQUENCES ARE AS FOLLOWS:                               *
                        1103 *        B    DPRINT                                                  *
                        1104 *        DC   AL2(PPL)                                               *
```

```
                          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 $ERPND IN INDICATING AN ERROR IS READY TO 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 *        NONE                                                        *
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


ERR LOC  OBJECT CODE     ADDR STMT SOURCE STATEMENT           VER 15, MOD 00  29/10/15  PAGE  32

                         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 *
```

```
     DPRINT - DETERMINE ERROR ROUTINE
```

```
                              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
```

```
                           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
      0862 F0 00 00             1405          HPL   *-*,*-*                  HALT IF OP IS TO BE RETRIED
      0863                      1406          ORG   *-2                      PLACE HALT CODE
      0863 0070             0864 1407          DC    AL2(@HPRER)             SOFT HALT '....123..'
      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 *        NONE                                                            *
                           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 *        NONE.                                                           *
                           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 *
```

```
                                 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 DATA 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
    09CB F0 00 00              1720        HPL   *-*,*-*                 HALT IF OP IS TO BE RETRIED
    09CC                       1721        ORG   *-2                     PLACE HALT CODE
    09CC 2040            09CD 1722        DC    AL2(@HKBER)             SOFT HALT '....123..'
    09CE 3A 04 03D5            1723        SBN   $INDR2,$ERPND           SET ERROR PENDING INDR
    09D2 D0 87 00              1724        B     DEPXIT(,@BR)            GO RETRY CHARACTER
                              1725 *
```

```
      DEPRES - CONSTANT AND WORK AREAS


ERR LOC   OBJECT CODE      ADDR STMT  SOURCE STATEMENT            VER 15, MOD 00  29/10/15   PAGE  43

                           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


ERR LOC   OBJECT CODE      ADDR STMT SOURCE STATEMENT          VER 15, MOD 00  29/10/15  PAGE  44

                          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
```

```
                          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 *
```

```
      DEPRES - FUNCTION KEY OPERATIONS
```

```
                              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 *
                              1843 *        FALL-THRU CONTINUE...
```

```
     DEPRES - START PROGRAM KEY OPERATION


ERR LOC   OBJECT CODE      ADDR STMT SOURCE STATEMENT          VER 15, MOD 00  29/10/15  PAGE  48

                           1845 ***************************************************************************
                           1846 *      THIS ROUTINE IS ENTERED WHEN THE PROGRAM KEY IS PRESSED.        *
                           1847 *      IF THE CURRENT POSITION IS AT THE START OF A LINE, THE           *
                           1848 *      AUTOMATIC LINE NUMBER FEATURE IS IMPLEMENTED.                    *
                           1849 ***************************************************************************
                      0A15 1850        USING DEPNDX,@XR                 BASE VALUE FOR PGM START
    0A7B 5D 01 CB CD       1851        CLC   DEPSTN(@CADDR,@BR),DEPLMG(,@BR)  ARE WE AT LEFT MARGIN ?
    0A7F D0 01 00          1852        BNE   DEPXIT-DEPASE(,@BR)        EXIT IF NO
    0A82 38 10 03D2        1853        TBN   $IOIND,$PGMST             REAL PGM START SITUATION
    0A86 D0 10 00          1854        BT    DEPXIT-DEPASE(,@BR)        EXIT IF FIRST KEY
    0A89 0C 04 060B 03CC   1855        MVC   DEPUTO(DEPNLG),$TABLN+1   MOVE AUTOMATIC LINE NO. TO BUF
    0A8F 7C 05 C4          1856        MVI   DEPNPS(,@BR),DEPNLG       SET LENGTH OF INSERTED CHARS
                           1857 *      MVI   DEPUTO,@BLANK              FORCE SPACE AFTER LINE NR (HJS)
    0A92 D0 87 66          1858        B     DEPRNT-DEPASE(,@BR)        PRINT LINE NUMBER
    0A95 D0 87 00          1859        B     DEPXIT-DEPASE(,@BR)        GO EXIT LEVEL
                           1860 *
```

```
                             1862 ************************************************************************
                             1863 *       TAB KEY PROCESSING                                           *
                             1864 ************************************************************************
                        0A15 1865          USING DEPNDX,@XR                BASE VALUE FOR TAB OPERATIONS
                        0A98 1866 DEPTBO EQU    *                          ENTRY FOR TAB OPERATIONS
      0A98 BC 80 B2          1867          MVI   DEP660+@Q(,@XR),@NOP       SET BACKSPACE INDR OFF
      0A9B 3D 1E 0000        1868 DEP580 CLI    *-*,@EOS                   EOS AT CURRENT POSITION ?
      0A9F F2 01 04          1869          JNE   DEP620                     JUMP IF NOT
      0AA2 3C 40 0000        1870 DEP600 MVI    *-*,@BLANK                 MOVE BLANK TO CURRENT POS
      0AA6 D0 87 63          1871 DEP620 B      DEPRT1-DEPASE(,@BR)        GO PRINT ONE CHARACTER
                             1872 *                                        CONTINUE TO TEST TYPO


                        0AA9 1874 DEPATC EQU    *                          ENTRY TO TEST TYPAMATIC
      0AA9 F3 10 18          1875          SIO   DEPLOK,@KEYBD             RESET BAIL FOR TYPO
      0AAC 5C 01 D1 D3       1876          MVC   DEPIME(2,@BR),DEPMCT(,@BR)  INITIALIZE TIMING LOOP
      0AB0 5F 01 D1 C6       1877 DEP640 SLC    DEPIME(2,@BR),DEP001-DEPASE(,@BR)  DECREMENT COUNTER
      0AB4 E0 84 9B          1878          BH    DEP640(,@XR)               LOOP FOR 100 MS
      0AB7 70 10 C2          1879          SNS   DEPNSK-DEPASE(,@BR),@KEYBD  SENSE DATA
      0ABA 79 02 C2          1880          TBF   DEPNSK(,@BR),@TYPAM        TYPAMATIC MODE ?
      0ABD D0 10 00          1881          BT    DEPXIT-DEPASE(,@BR)        EXIT IF NOT
      0AC0 E0 87 2F          1882          B     DEPPFK(,@XR)               RETURN FOR CONTINUED TYPO
                             1883 *
```

```
     DEPRES - BACKSPACE KEY PROCESSING


ERR LOC   OBJECT CODE     ADDR STMT SOURCE STATEMENT           VER 15, MOD 00  29/10/15  PAGE  50

                         1885 ********************************************************************
                         1886 *      BACKSPACE KEY PROCESSING                                    *
                         1887 ********************************************************************
                    0A15 1888        USING DEPNDX,@XR               BASE VALUE FOR TAB OPERATIONS
                    0AC3 1889 DEPSPB EQU   *                        ENTRY FOR BACKSPACE OPERATIONS
    0AC3 BC 10 D1        1890        MVI   DEPPL1+@PCTRL(,@XR),DEPACK   SET BACKSPACE CONTROL
    0AC6 F2 80 06        1891 DEP660 JC    DEP680,@NOP              JUMP IF NOT FIRST BACKSPACE
    0AC9 BC 11 D1        1892        MVI   DEPPL1+@PCTRL(,@XR),DEPKIX   SET BACKSPACE AND INDEX CNTL
    0ACC BC 87 B2        1893        MVI   DEP660+@Q(,@XR),@UCB     SET INDEX INDR OFF
    0ACF 5D 01 CB CD     1894 DEP680 CLC   DEPSTN(@CADDR,@BR),DEPLMG(,@BR)   LEFT MARGIN ?
    0AD3 F2 81 0D        1895        JE    DEP700                   JUMP TO NOT BACKSPACE
    0AD6 C0 87 0465      1896        B     $SPRNT                   GO DO BACKSPACE
    0ADA 0AE6       0ADB 1897        DC    AL2(DEPPL1)              ADDRESS OF PPL
    0ADC 5F 01 CB C6     1898        SLC   DEPSTN(@CADDR,@BR),DEP001(,@BR)   SET NEW POSITION
    0AE0 D0 87 76        1899        B     DEPDLP-DEPASE(,@BR)      GO UPDATE LINE POSITION
    0AE3 E0 87 94        1900 DEP700 B     DEPATC(,@XR)             GO TEST TYPAMATIC

                    0AE6 1902 DEPPL1 EQU   *
    0AE6            0AE6 1903        DS    CL1                      CONTROL BYTE
    0AE7 00         0AE7 1904        DC    XL1'00'                  COUNT BYTE
                         1905 *
```

```
                                1907 *****************************************************************************
                                1908 *       RETURN KEY, ERASE AND SPACE KEY PROCESSING                          *
                                1909 *****************************************************************************
                         0A15   1910        USING DEPNDX,@XR                 BASE VALUE FOR RETURN KEY
     0AE8 78 02 C2              1911 DEP720 TBN   DEPNSK(,@BR),@TYPAM         TYPO BIT ON ?
     0AEB E0 10 94              1912        BT    DEPATC(,@XR)                YES... GO SENSE AGAIN
     0AEE 3A 80 03C3            1913        SBN   $KEYCD,$TRUNK               SET TRUNCATED LINE INDR
                         0AF2   1914 DEPCRR EQU   *                          ENTRY FOR RETURN CARRIER
     0AF2 F3 10 18              1915        SIO   DEPLOK,@KEYBD               LOCK KEYBOARD
     0AF5 C0 87 0465            1916        B     $SPRNT                      START CARRIER RETURN
     0AF9 0B2E           0AFA   1917        DC    AL2(DEPPL2)                 PPL ADRRESS
     0AFB 3C 1E 0000            1918 DEP740 MVI   *-*,@EOS                    MOVE EOS TO CURRENT BUFFER POS
     0AFF 3B 10 03C3            1919 DEP760 SBF   $KEYCD,$KYBSY               INDICATE LINE IS FINISHED
     0B03 75 C0 BE              1920        L     DEPIET(,@BR),@I1IAR         SET INTERRUPT ADDR TO NUCLEUS
     0B06 F3 10 18              1921        SIO   DEPLOK,@KEYBD               LOCK KEYBOARD
     0B09 5C 01 CB CD           1922        MVC   DEPSTN-DEPASE(@CADDR,@BR),DEPLMG(,@BR)  SET NEW POSITION
     0B0D C0 87 0B44            1923        B     DEP840                      GO TURN OFF CMD LIGHTS
     0B11 C0 87 0936            1924        B     DEP240                      GO EXIT LEVEL - LOCK KEYBOARD

                         0B15   1926 DEPERA EQU   *                          ENTRY FOR ERASE KEY
     0B15 C0 87 0465            1927        B     $SPRNT                      PRINT ERASED MESSAGE & RETURN
     0B19 0BA5           0B1A   1928        DC    AL2(@@M170)                 PPL ADRRESS
     0B1B 5C 01 CB CD           1929        MVC   DEPSTN-DEPASE(@CADDR,@BR),DEPLMG(,@BR)  SET NEW POSITION
     0B1F C0 87 0465            1930        B     $SPRNT                      PRINT ERASED MESSAGE & RETURN
     0B23 057F          0B24   1931        DC    AL2($WAITF)                 ADDRESS OF WAIT PPL
     0B25 D0 87 00              1932        B     DEPXIT-DEPASE(,@BR)         GO EXIT LEVEL

                         0B28   1934 DEPSPA EQU   *                          ENTRY FOR SPACE BAR KEY
     0B28 7C 39 C1              1935        MVI   DEPATA-DEPASE(,@BR),DEPLNK  MOVE IN DISP OF BLANK
     0B2B D0 87 50              1936        B     DEP340-DEPASE(,@BR)         BRANCH TO HANDLE DATA KEYS

                         0B2E   1938 DEPPL2 EQU   *                          ADDR OF RETURN PPL
     0B2E 8080          0B2F   1939        DC    XL2'8080'                   RETURN CARRAIGE PPL

                                1941 *       TURN OFF COMMAND INDR LIGHTS
     0B30 C0 87 0465            1942 DEP780 B     $SPRNT                      DO FORMS INDEX
     0B34 09E6          0B35   1943        DC    AL2(DEP001)                 PPL ADRRESS
     0B36 D0 87 00              1944        B     DEPXIT(,@BR)                GO EXIT LEVEL

     0B39 3C 11 0B4D            1946 DEP800 MVI   DEP880+@Q,@KEYBD+@CMLON     SET TURN ON CONTROL
     0B3D 3C 0B 09F1            1947 DEP820 MVI   DEPIME,@CKY11               SET LITES 1 - 11
     0B41 F2 87 04              1948        J     DEP860                      GO TURN ON/OFF

     0B44 3C 10 09F1            1950 DEP840 MVI   DEPIME,@CKY16               SET LITES 1 - 16
     0B48 34 08 0B61            1951 DEP860 ST    DEP900+@OP1,@ARR            SAVE RETURN ADDRESS
     0B4C 31 10 09F1            1952 DEP880 LIO   DEPIME,@KEYBD+@CMOFF        TURN LITE ON/OFF
     0B50 0F 00 09F1 0464       1953        SLC   DEPIME(1),$C0001           GET NEXT LINE
     0B56 C0 84 0B4C            1954        BH    DEP880                      LOOP IF MORE LITES
     0B5A 3C 10 0B4D            1955        MVI   DEP880+@Q,@KEYBD+@CMOFF     RESET TURN OFF CONTROL
     0B5E C0 87 0000            1956 DEP900 B     *-*                         RETURN TO CALLER

     0B62 0C            0B62   1958 DEPK12 DC    AL1(@CKY12)                 CMD KEY 12 LITE CNTL
                                1959 *
```

```
     DEPRES - PATCH AREA


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

                           1961 *********************************************************************
                           1962 *        PATCH AREA #2                                              *
                           1963 *********************************************************************
                      0B63 1964 $$$$L2 EQU    *                         START OF PATCH AREA 2
                      0BA5 1965 DEPMSG EQU    $$DATB-15-7-@PPLNG         START OF MESSAGE + PP 'ERASED'
     0B63             0BA4 1966 $$$$$2 DS     CL(DEPMSG-$$$L2)           PATCH AREA 2
                           1967 *
     0BA5                  1968        ORG    DEPMSG                     PLACE MSG AND PPL
                           1969 *
                           1970 ***    PPL'S AND TEXT FOR MESSAGE
                           1971 *
     0BA5 C0          0BA5 1972 @@M170 DC     AL1(@PRETR)               PRINT CONTROL FUNCTION
     0BA6 07          0BA6 1973        DC     IL1'07'                   LENGTH OF MESSAGE
     0BA7 0BA9        0BA8 1974        DC     AL2(@@T170)               ADDRESS OF MESSAGE
                           1975 *
                      0BA9 1976 @@T170 EQU    *
     0BA9 40C5D9C1E2C5C4 0BAF 1977        DC     CL7' ERASED'
                           1978 *
                           1979 ***    PATCH AREA FOR MESSAGES
                           1980 *
     0BB0             0BBE 1981 $$$001 DS     CL15                      MSG EXPANSION PATCH AREA
```

DEPERS - DATA TABLE

```
                         0BC0 1983 DEPTBL EQU   $$KLD3-64               FIRST BYTE OF DATA TABLE
     0BBF                     1984        ORG   DEPTBL-1               POSITION DATA TABLE
     0BBF 01                 0BBF 1985        DC    IL1'1'                KEYBOARD TYPE INDR (KB1 - KB9)
                             1986 *
     0BC0 F0                 0BC0 1987        DC    CL1'0'                0
     0BC1 F1                 0BC1 1988        DC    CL1'1'                1
     0BC2 F2                 0BC2 1989        DC    CL1'2'                2
     0BC3 F3                 0BC3 1990        DC    CL1'3'                3
     0BC4 F4                 0BC4 1991        DC    CL1'4'                4
     0BC5 F5                 0BC5 1992        DC    CL1'5'                5
     0BC6 F6                 0BC6 1993        DC    CL1'6'                6
     0BC7 F7                 0BC7 1994        DC    CL1'7'                7
     0BC8 F8                 0BC8 1995        DC    CL1'8'                8
     0BC9 F9                 0BC9 1996        DC    CL1'9'                9
     0BCA C1                 0BCA 1997        DC    CL1'A'                A
     0BCB C2                 0BCB 1998        DC    CL1'B'                B
     0BCC C3                 0BCC 1999        DC    CL1'C'                C
     0BCD C4                 0BCD 2000        DC    CL1'D'                D
     0BCE C5                 0BCE 2001        DC    CL1'E'                E
     0BCF C6                 0BCF 2002        DC    CL1'F'                F
     0BD0 5D                 0BD0 2003        DC    XL1'5D'               )
     0BD1 5A                 0BD1 2004        DC    AL1(@UPARW)           UP ARROW
     0BD2 7C                 0BD2 2005        DC    XL1'7C'               @
     0BD3 7B                 0BD3 2006        DC    XL1'7B'               #
     0BD4 5B                 0BD4 2007        DC    XL1'5B'               $
     0BD5 6C                 0BD5 2008        DC    XL1'6C'               %
     0BD6 4A                 0BD6 2009        DC    XL1'4A'               CENTS SIGN
     0BD7 50                 0BD7 2010        DC    XL1'50'               &
     0BD8 7D                 0BD8 2011        DC    XL1'7D'               .
     0BD9 4D                 0BD9 2012        DC    XL1'4D'               (
     0BDA C7                 0BDA 2013        DC    CL1'G'                G
     0BDB C8                 0BDB 2014        DC    CL1'H'                H
     0BDC C9                 0BDC 2015        DC    CL1'I'                I
     0BDD D1                 0BDD 2016        DC    CL1'J'                J
     0BDE D2                 0BDE 2017        DC    CL1'K'                K
     0BDF D3                 0BDF 2018        DC    CL1'L'                L
     0BE0 D4                 0BE0 2019        DC    CL1'M'                M
     0BE1 D5                 0BE1 2020        DC    CL1'N'                N
     0BE2 D6                 0BE2 2021        DC    CL1'O'                O
     0BE3 D7                 0BE3 2022        DC    CL1'P'                P
     0BE4 D8                 0BE4 2023        DC    CL1'Q'                Q
     0BE5 D9                 0BE5 2024        DC    CL1'R'                R
     0BE6 E2                 0BE6 2025        DC    CL1'S'                S
     0BE7 E3                 0BE7 2026        DC    CL1'T'                T
     0BE8 E4                 0BE8 2027        DC    CL1'U'                U
     0BE9 E5                 0BE9 2028        DC    CL1'V'                V
     0BEA E6                 0BEA 2029        DC    CL1'W'                W
     0BEB E7                 0BEB 2030        DC    CL1'X'                X
     0BEC E8                 0BEC 2031        DC    CL1'Y'                Y
     0BED E9                 0BED 2032        DC    CL1'Z'                Z
     0BEE 60                 0BEE 2033        DC    XL1'60'               -
     0BEF 7E                 0BEF 2034        DC    XL1'7E'               EQUAL SIGN
     0BF0 4E                 0BF0 2035        DC    CL1'+'                +
     0BF1 4B                 0BF1 2036        DC    CL1'.'                PERIOD
     0BF2 5E                 0BF2 2037        DC    CL1';'                ;
     0BF3 5C                 0BF3 2038        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 2039        DC    CL1','              COMMA
    0BF5 4B              0BF5 2040        DC    CL1'.'              PERIOD
    0BF6 61              0BF6 2041        DC    XL1'61'             /
    0BF7 6F              0BF7 2042        DC    XL1'6F'             ?
    0BF8 4F              0BF8 2043        DC    XL1'4F'             LOGICAL 'OR'
    0BF9 40              0BF9 2044 DEPLKA DC    CL1' '              BLANK
    0BFA 7A              0BFA 2045        DC    XL1'7A'             COLON
    0BFB 7F              0BFB 2046        DC    XL1'7F'             NOT EQUAL
    0BFC 4C              0BFC 2047        DC    XL1'4C'             < (LESS THAN)
    0BFD 6E              0BFD 2048        DC    XL1'6E'             > (GREATER THAN)
    0BFE 6D              0BFE 2049        DC    XL1'6D'             UNDER SCORE
    0BFF 5F              0BFF 2050        DC    XL1'5F'             LOGICAL 'NOT'
                              2051 ***********************************************************************
                         0039 2052 DEPLNK EQU   DEPLKA-DEPTBL       DISP OF BLANK IN TABLE
                         0370 2053 DEPMSZ EQU   *-DEPRES            SIZE OF DEPRES
                              2054 ***********************************************************************
                              2055        PRINT ON
                         FFFF 2056        END

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

```
                              CROSS REFERENCE

SYMBOL   LEN VALUE DEFN   REFERENCES                    VER 15, MOD 00  29/10/15  PAGE  55

$$$$$$   001  0700 1224
$$$$$1   001  0888 1425
$$$$$2   066  0BA4 1966
$$$$L2   001  0B63 1964   1966
$$$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
$$$001   015  0BBE 1981
$$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   1965
$$EOSA   001  0AFE 0854
$$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
$$KLD3   001  0C00 0912   1983
$$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
$BLOAD   001  0522 0774   0776  0779  0792  0793
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$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  1953
$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
$ERRPG  001  03CE 0481
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$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  1853
$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* 1913* 1919*
$KEYDT  001  0040 0581
$KE090  001  00DE 0417
$KE130  001  01D5 0418
$KYBSY  001  0010 0454    1610  1919
$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
$PAUSD  001  04BA 0753    0755
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$PGMDT   001  0020 0578
$PGMST   001  0010 0542    1853
$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   001  0001 0502
$SFAID   001  050D 0760
$SPRNT   001  0465 0727    0729   1696   1896   1916   1927   1930   1942
$SRTRN   001  04FE 0759    0760
$STEPT   001  0002 0503
$SWPCR   001  0511 0765    0767
$TABLN   001  03CB 0474    0477   1855
$TFLOW   001  0008 0509
$TRACE   001  0004 0504
$TRALL   001  0010 0510
$TROVR   001  054E 0779    0782
$TRUNK   001  0080 0462    1611   1913
$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
$WAITF   001  057F 0795    0797   1931
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$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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                             CROSS REFERENCE

SYMBOL  LEN VALUE DEFN  REFERENCES                    VER 15, MOD 00  29/10/15  PAGE  59

$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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@@M170  001  0BA5 1972   1928
@@T170  001  0BA9 1976   1974
@ALTFL  001  0001 0254
@ARR    001  0008 0018   1245* 1246  1247* 1248  1594  1655* 1661  1694  1701  1770  1951
@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   1870
@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  1851  1851  1852  1854  1856  1858  1859  1871  1876  1876  1877
                         1877  1879  1880  1881  1894  1894  1898  1898  1899  1911  1920  1922
                         1922  1929  1929  1932  1935  1936  1944
@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  1851  1894  1898  1922  1929
@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   1947
@CKY12  001  000C 0323   1958
@CKY13  001  000D 0324
@CKY14  001  000E 0325
@CKY15  001  000F 0326
@CKY16  001  0010 0327   1950
@CLOFF  001  0010 0096
@CLON   001  0011 0095
@CMLON  001  0001 0330   1609* 1946
@CMOFF  001  0000 0329   1952* 1955
@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   1868   1918
@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

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@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* 1920*
@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   1875   1879   1915   1921   1946
                         1952* 1955
@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   1867   1891
@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* 1951*
@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* 1890* 1892*
@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   1965
@PRCNT   001  0001 0152   1264   1264* 1268* 1279* 1280* 1282* 1284   1284* 1287   1290   1291* 1294*
                          1367   1381
@PRETR   001  00C0 0156   1972
@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* 1867* 1893* 1946* 1955*
@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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SYMBOL	LEN	VALUE	DEFN	REFERENCES
@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	1880 1911
@TYPO	001	001C	0333	
@UCB	001	0087	0041	1361 1601 1666 1714 1893
@UPARW	001	005A	0080	2004
@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 1850 1865 1867 1878 1882 1888 1890 1892 1893 1900 1910
				1912
@ZERO	001	0000	0064	1268 1277 1282 1367 1612 1708
@4K	001	0010	0352	
DEPACK	001	0010	1786	1890
DEPARR	002	09F7	1755	1655 1661*
DEPASE	001	0920	1646	1592 1622 1628 1690 1712 1730 1814 1816 1822 1852 1854 1858
				1859 1871 1877 1879* 1881 1899 1922* 1929* 1932 1935* 1936
DEPATA	001	09E1	1739	1673 1807 1809 1814 1935*
DEPATC	001	0AA9	1874	1772 1900 1912
DEPBLE	002	09D8	1732	1674
DEPBSP	001	0016	1778	1827
DEPCNT	001	09E9	1747	1695*
DEPCRR	001	0AF2	1914	1830
DEPDLP	001	0996	1700	1663 1899
DEPEMS	001	0002	1784	1833
DEPENB	001	0012	1794	1658
DEPERA	001	0B15	1926	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	1920
DEPIME	002	09F1	1752	1876* 1877* 1947* 1950* 1952 1953*
DEPIRK	001	09FF	1760	1637
DEPIST	002	09E6	1744	1718
DEPIXT	002	09DC	1734	
DEPKIX	001	0011	1787	1892

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                              CROSS REFERENCE

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

DEPK12   001 0B62 1958    1609
DEPLKA   001 0BF9 2044    2052
DEPLMG   002 09ED 1750    1603   1652   1803   1851   1894   1922   1929
DEPLNK   001 0039 2052    1935
DEPLOK   001 0018 1793    1875   1915   1921
DEPMCT   002 09F3 1753    1876
DEPMSG   001 0BA5 1965    1966   1968
DEPMSZ   001 0370 2053
DEPNDX   001 0A15 1801    1623   1662   1672*  1704   1705*  1706*  1707*  1850   1865   1888   1910
DEPNLG   001 0005 1785    1791   1855   1856
DEPNPS   002 09E4 1741    1596*  1598   1612*  1692*  1695   1702   1708*  1856*
DEPNSK   001 09E2 1740    1636*  1637   1664   1667   1669   1824   1827   1829   1831   1833   1836   1838
                         1840   1879*  1880   1911
DEPNTR   001 08EF 1626    1731
DEPONE   001 0001 1776    1692
DEPPCK   001 0A15 1802    1668
DEPPFK   001 0A44 1823    1670   1882
DEPPL1   001 0AE6 1902    1890*  1892*  1897
DEPPL2   001 0B2E 1938    1917
DEPPPL   001 09E8 1745    1697   1702*  1749   1767
DEPPST   001 0081 1783    1840
DEPREG   002 09FB 1757    1631*  1632
DEPRES   001 0890 1593    2053
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    1858
DEPROR   001 09B8 1713    1665
DEPROS   002 09F9 1756    1635
DEPRTN   001 0015 1779    1829
DEPRT1   001 0983 1691    1676   1871
DEPSPA   001 0B28 1934    1837
DEPSPB   001 0AC3 1889    1828
DEPSPC   001 0040 1781    1836
DEPSRX   002 09DA 1733    1630*  1654
DEPSTN   001 09EB 1749    1603   1652   1703   1705   1706   1707   1803   1851   1894   1898*  1922*  1929*
DEPST1   001 0A07 1769    1826
DEPTAB   001 0005 1777    1838
DEPTBL   001 0BC0 1983    1732   1984   2052
DEPTBO   001 0A98 1866    1839
DEPTEX   001 0000 1788
DEPULK   001 001C 1795    1648
DEPUTO   001 060B 1791    1855*
DEPXIT   001 0920 1647    1677   1724   1816   1841   1852   1854   1859   1881   1932   1944
DEP001   002 09E6 1742    1744   1877   1898   1943
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   1924
DEP260   004 093C 1656    1629*
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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   1936
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 1868   1705*
DEP600  004 0AA2 1870   1706*
DEP620  003 0AA6 1871   1869
DEP640  004 0AB0 1877   1878
DEP660  003 0AC6 1891   1672* 1867* 1893*
DEP680  004 0ACF 1894   1891
DEP700  003 0AE3 1900   1895
DEP720  003 0AE8 1911   1768
DEP740  004 0AFB 1918   1707* 1716  1825
DEP760  004 0AFF 1919   1810
DEP780  004 0B30 1942   1834
DEP800  004 0B39 1946   1606  1653
DEP820  004 0B3D 1947   1649
DEP840  004 0B44 1950   1639  1923
DEP860  004 0B48 1951   1948
DEP880  004 0B4C 1952   1946* 1954  1955*
DEP900  004 0B5E 1956   1951*
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
,LIBRARY-O
```