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 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  22/11/21  PAGE   1
#SPOVL    MODULE
```

```
 0000                        1 #SPOVL START 0
                             2        PRINT ON,NODATA
                             3 *      @DIREQ - LIBRARY DIRECTORY EQUATES.                        *
                             4 *      @SYS  EXP-N
                           213+       PRINT ON
                           214 *      @FXD  EXP-N
                           618+       PRINT ON
                           619 *      @CAN  EXP-N
                           722+       PRINT ON
                           723 *      @DIR  EXP-N
                           843+       PRINT ON
                           844 *      @WKA  EXP-N
                           914+       PRINT ON
                           915 *      @SPF  EXP-N
                          1378+       PRINT ON
                          1379 *      @ERM  EXP-N
                          1380 *      @B@E  EXP-Y
```

```
                              1382 *        HDR   #SPOVL
                              1383 ***************************************************************************
                              1384 * 5703-XM1  COPYRIGHT IBM CORP. 1970                                    *
                              1385 *                REFER TO INSTRUCTIONS ON COPYRIGHT NOTICE, 120-2083     *
                              1386 *                                                                       *
                              1387 ***************************************************************************
                              1388 *STATUS                                                                 *
                              1389 *    VERSION 1 MODIFICATION 0                                            *
                              1390 *                                                                        *
                              1391 *FUNCTION                                                                *
                              1392 *    * #SPOVL COMPRESSES THE LIBRARY AREA AND MOVES ALL UNUSED SPACE     *
                              1393 *      TO THE END OF THE LIBRARY AREA, AND UPDATES THE NULL DIRECTORY.   *
                              1394 *    * TO COMPRESS THE LIBRARY THE DISK ADDRESS OF THE FIRST NULL ENTRY *
                              1395 *      IS SET UP AS THE FIRST OUTPUT ADDRESS.  THE AREAS BETWEEN EACH    *
                              1396 *      NULL AREA IS COPIED TO OVERLAY THE PRECEEDING NULL AREAS.         *
                              1397 *    * WHEN THE FILE IS PACKED THE IO ROUTINES AND FIT ARE READ INTO     *
                              1398 *      CORE.  RETURN IS THEN MADE TO THE ROUTINE WHOES DPL IS IN         *
                              1399 *      $DPLSV VIA $RLOAD.                                                *
                              1400 *                                                                        *
                              1401 *ENTRY POINTS                                                            *
                              1402 *    #SPOVL - ENTRY IS FROM #SPACK AFTER THE DIRECTORIES HAVE            *
                              1403 *              BEEN UPDATED AND WRITTEN BACK TO DISK.  ENTRY IS          *
                              1404 *              MADE BY A BRANCH TO #SPOVL.                               *
                              1405 *INPUT                                                                   *
                              1406 *    INPUT IS THE READ TABLE CONSTRUCTED BY #SPACK.                      *
                              1407 *                                                                        *
                              1408 *OUTPUT                                                                  *
                              1409 *    NONE.                                                               *
                              1410 *                                                                        *
                              1411 *EXTERNAL REFERENCES                                                     *
                              1412 *      $$FLIB - LOCATION OF LIBRARY ADDRESS TO BE PACKED.                *
                              1413 *      DL2RAD - LOCATION OF BASE DISK ADDRESS.                           *
                              1414 *      $EXFTR - LOCATION OF CORE EXTENSION FACTOR.                       *
                              1415 *      DL2ICS - ENTRY TO DISK I/O ROUTINE.                               *
                              1416 *      $XRSAV - SAVE AREA FOR @XR.                                       *
                              1417 *      $KEYCD - LOCATION OF INPUT MODE INDICATOR.                        *
                              1418 *      $LOADR - ENTRY TO SYSTEM LOADER.                                  *
                              1419 *      $RLOAD - ENTRY TO SYSTEM LOADER.                                  *
                              1420 *      $DPLSV - LOCATION OF DPL SAVE AREA.                               *
                              1421 *                                                                        *
                              1422 *EXITS, NORMAL                                                           *
                              1423 *    EXIT IS VIA $RLOAD TO THE ROUTINE WHOES DPL IS IN $DPLSV            *
                              1424 *                                                                        *
                              1425 *EXITS, ERROR                                                            *
                              1426 *    NONE                                                                *
                              1427 *                                                                        *
                              1428 *TABLES/WORKAREAS                                                        *
                              1429 *      $USRDR - LOCATION OF USER DIRECTORY RELATIVE DISK ADDRESS.        *
                              1430 *      DL2RAD - SAVE AREA FOR FILE BASE ADDRESS.                         *
                              1431 *      DL2ICS - ENTRY TO LOGICAL DISK IOCS.                              *
                              1432 *      #SPOVL - ENTRY TO SPACK OVERLAY.                                  *
                              1433 *      $LOADR - ENTRY TO SYSTEM LOADER.                                  *
                              1434 *                                                                        *
                              1435 *ATTRIBUTES                                                              *
                              1436 *    RELOCATABLE                                                         *
                              1437 *                                                                        *
```

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      #SPOVL -- SPACK OVERLAY


ERR LOC   OBJECT CODE      ADDR STMT SOURCE STATEMENT          VER 15, MOD 00  22/11/21  PAGE   4

                           1438 *CHARACTER CODE DEPENDENCY                                        *
                           1439 *    THE OPERATION OF THIS MODULE DEPENDS UPON AS INTERNAL        *
                           1440 *    REPRESENTATION OF THE EXTERNAL CHARACTER SET WHICH IS EQUIQALENT *
                           1441 *    TO THE ONE USED AT ASSEMBLY TIME.   THE CODING HAS BEEN ARRANGED *
                           1442 *    SO THAT REDEFINITION OF CHARACTER CONSTANTS, BY REASSEMBLY, WILL *
                           1443 *    RESULT IN A CORRECT MODULE FOR THE NEW DEFINITIONS.          *
                           1444 *                                                                 *
                           1445 *NOTES                                                            *
                           1446 *    ERROR PROCEDURES                                             *
                           1447 *        NONE                                                     *
                           1448 *                                                                 *
                           1449 *    REGISTER USAGE                                               *
                           1450 *        @BR IS USED AS A BASE REGISTER TO REFERENCE THE PROGRAM IN *
                           1451 *        TERMS OF DISPLACEMENT.                                   *
                           1452 *        @XR IS USED TO POINT TO THE ARGUEMENT FOR UPDATING THE   *
                           1453 *        DIRECTORIES.                                             *
                           1454 *                                                                 *
                           1455 *    SAVED/RESTORED AREAS                                         *
                           1456 *        NONE                                                     *
                           1457 *                                                                 *
                           1458 *    MODIFICATION CONSIDERATIONS                                  *
                           1459 *        TO BUILD THE READ TABLE A RESERVE OR SCRATCH AREA OF TWO *
                           1460 *        BYTES IS REQUIRED IN EACH NULL ENTRY.   THIS SPACE MUST BE *
                           1461 *        REFERENCED BY THE DIRECTORY EQUATE ##DUER.               *
                           1462 *                                                                 *
                           1463 *    REQUIRED MODULES                                             *
                           1464 *        @SYSEQ - SYSTEM SOFTWARE EQUATES.                        *
                           1465 *        @FXDEQ - SYSTEM NUCLEUS EQUATES.                         *
                           1466 *        @CANEQ - COMMON CORE LOCATION EQUATES.                   *
                           1467 *        @DIREQ - LIBRARY DIRECTORY EQUATES.                      *
                           1468 *        DL2CD  - DL2ICS DISK IOCS ROUTINE                        *
                           1469 *                                                                 *
                           1470 *    OTHER                                                        *
                           1471 *        NONE                                                     *
                           1472 ***********************************************************************
      0806                 1473         ORG    $$KLD2+262
                           1474 *       HDR    #SPOVL                    PROGRAM NAME
                           1475 ***********************************************************************
                           1476 *   PROGRAM HEADER FOR DISK LOAD                                  *
                           1477 ***********************************************************************
                           1478 *#$SPOV EQU   X'04DC'                    DISK ADDR OF #SPOVL
                           1479 *#$$SPO EQU   X'0806'                    CORE LOAD ADDRESS OF #SPOVL
                           1480 *#$@SPO EQU   003                        SECTOR CNT OF #SPOVL
      0806                 1481         ORG    #$$SPO                    CORE LOAD ADDRESS
      0806            1482 $$$$$$ EQU    *                        FIRST LOCATION IN PROGRAM
      0806 7BE2D7D6E5D3  080B 1483         DC     CL6'#SPOVL'              PROGRAM NAME
      080C 21           080C 1484         DC     IL1'033'                 PROGRAM NUMBER OF #SPOVL
                        080D 1485 $SPOVL EQU    *                        ENTRY POINT TO PROGRAM
                           1486 *** END OF EXPANSION ***

                        0700 1488 SPANBF EQU    $$KLD2                   POINTER TO NULL DIRCTY
                        0700 1489 SPANEC EQU    $$KLD2+##DNHC            NULL ENTRY COUNT
                        0004 1490 SPANAC EQU    @DADDR+##LNEF            LENGTH OF ENTRY ADDR AND COUNT
                        0030 1491 SPAE30 EQU    X'30'                    HEX CYLINDER VALUE
                        0014 1492 SPAMXT EQU    20                       BUFFER SIZE IN SECTORS
                        0002 1493 SPAE02 EQU    2                        0 CODE VALUE
```

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      #SPOVL -- SPACK OVERLAY


ERR LOC   OBJECT CODE      ADDR STMT SOURCE STATEMENT          VER 15, MOD 00  22/11/21  PAGE   5

                           0700 1494 SPAHDR EQU   SPANBF+##DNHC            NEW DIRCTY HEADER SAVE AREA
                           0705 1495 SPANEW EQU   SPANBF+##LNH+##DNEA      NEW ENTRY DADDR CADDR
                           0707 1496 SPANNC EQU   SPANEW+##LNEF            NEW ENTRY COUNT FIELD CADDR
                           0001 1497 SPAE01 EQU   1                       INITAL COUNT VALUE
                                1498 *SPACK2 ENTER BASE-SPA060
                           0880 1499        USING SPA060,@BR              BASE ADDRESS SPECIFICATION
                           080D 1500 SPACK2 EQU   *                       MODULE ENTRY POINT
      080D C2 01 0880           1501        LA    SPA060,@BR              LOAD BASE REGISTER
                                1502 *** END OF EXPANSION ***

      0811 0C 01 0AA5 06FF      1504        MVC   DL2RAD,$$FLIB(@DADDR)    SET LIBRARY BASE
      0817 4E 00 B7 043B        1505        ALC   SPAPL3+@DCNT(1,@BR),$EXFTR  BUMP OUTPUT SECTOR COUNT
      081C 4E 00 B3 043B        1506        ALC   SPACXT(1,@BR),$EXFTR     ADD IN EXPANSION FACTOR
      0821 7D 30 B3             1507        CLI   SPACXT(,@BR),SPAE30      BUFFER SIZE > 1 CYL 7        1-3
      0824 F2 82 06             1508        JL    SPA005                   NO, GO CHECK NULL ENTRIES    1-3
      0827 7C 30 B7             1509        MVI   SPAPL3+@DCNT(,@BR),SPAE30 LIMIT BUFFER SIZE TO        1-3
      082A 7C 30 B3             1510        MVI   SPACXT(,@BR),SPAE30      * ONE CYLINDER, AT MOST      1-3
      082D 3D 01 0700           1511 SPA005 CLI   SPANEC,SPAE01            CHECK FOR MORE THAN 1 ENTRY
      0831 D0 04 91             1512        BNH   SPA098(,@BR)            GO EXIT AND DO NOTHING


                                1514 ************************************************************************
                                1515 *        CALCULATE HIGH END OF THE NULL ENTRY                        *
                                1516 *        THE DADDR OF THE FIRST NULL ENTRY IS THE INITAL WRITE DADDR. *
                                1517 *        THE HIGH END DADDR OF THE NULL ENTRY IS THE READ ADDR.       *
                                1518 ************************************************************************
      0834 C2 02 0704           1519 SPA011 LA    SPANBF+##DNE1,@XR        BUMP TO FIRST ENTRY
      0838 6C 01 B6 01          1520        MVC   SPAPL3+@DSAD(@DADDR,@BR),##DNEA(,@XR)  INITIAL WRITE DADDR
      083C 5F 03 A8 A8          1521        SLC   SPACNT(,@BR),SPACNT(,@BR) CLEAR COUNTER AREA
      0840 7C 00 A3             1522 SPA040 MVI   SPAENT-1(,@BR),@ZERO     CLEAR CYLINDER BYTE
      0843 6C 00 A4 01          1523        MVC   SPAENT(1,@BR),##DNEA(,@XR) SECTOR ADDR
      0847 6C 01 C2 01          1524        MVC   SPAPL1+@DSAD(@DADDR,@BR),##DNEA(,@XR)
      084B 6E 01 A4 03          1525        ALC   SPAENT(##LNEF,@BR),##DNEF(,@XR)  SECTOR COUNT
      084F 5F 01 A4 AC          1526 SPA042 SLC   SPAENT(SPAE02,@BR),SPAC30(,@BR)  DECR BY CYL COUNT
      0853 F2 82 09             1527        JL    SPA043                   GO PLUG IN SECTOR ADDR
      0856 1E 00 0941 AF        1528        ALC   SPAPL1+@DSAD-1(1),SPAC01(,@BR)   BUMP CYL VALVE
      085B C0 87 084F           1529        B     SPA042
      085F 5E 00 A4 AC          1530 SPA043 ALC   SPAENT(1,@BR),SPAC30(,@BR)    RESTORE POSITIVE
      0863 1C 00 0942 A4        1531        MVC   SPAPL1+@DSAD(1),SPAENT(,@BR) SECTOR ADDR
      0868 6C 01 A4 07          1532        MVC   SPANT2(@DADDR,@BR),##LNE+##DNEA(,@XR)  NEXT ENTRY DADDR


                                1534 ************************************************************************
                                1535 *        CALCULATE NUMBER OF SECTORS BETWEEN THE NULL ENTRIES
                                1536 ************************************************************************
      086C 5F 01 A4 C2          1537        SLC   SPANT2(@DADDR,@BR),SPAPL1+@DSAD(,@BR)  CALC SECTOR COUNT
      0870 D0 81 62             1538        BE    SPA085(,@BR)            LAST ENTRY GOES TO END OF AREA
      0873 7C 00 A7             1539        MVI   SPASCT-1(,@BR),@ZERO     CLEAR LEFT BYTE
      0876 7D 30 A4             1540        CLI   SPANT2(,@BR),SPAE30      TEST IF CYL CROSSED
      0879 D0 82 00             1541        BL    SPA060(,@BR)            SKIP CORRECT
      087C 5E 00 A4 AC          1542        ALC   SPANT2(1,@BR),SPAC30(,@BR) ADJUST SECTOR ADDR
      0880 5C 00 A8 A4          1543 SPA060 MVC   SPASCT(1,@BR),SPANT2(,@BR)  SAVE SECTOR COUNT
                           0881 1544 SPATOT EQU   SPA060+1                WORK AREA FOR NEW ENTRY
      0884 7D 00 A3             1545 SPA065 CLI   SPANT2-1(,@BR),@ZERO     CHECK IF THERE ARE ANY CYL
      0887 D0 81 15             1546        BE    SPA070(,@BR)            COUNT CORRECT
      088A 5E 01 A8 AC          1547        ALC   SPASCT(SPAE02,@BR),SPAC30(,@BR)  COUNT FOR 1 CYLINDER
      088E 5F 00 A3 AF          1548        SLC   SPANT2-1(,@BR),SPAC01(1,@BR)  DECR CYL COUNT
      0892 D0 87 04             1549        B     SPA065(,@BR)            BACK TO LOOK FOR NEXT CYL
```

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       #SPOVL -- SPACK OVERLAY


ERR LOC   OBJECT CODE     ADDR STMT SOURCE STATEMENT          VER 15, MOD 00  22/11/21  PAGE   6

    0895 5E 01 A6 A8          1550 SPA070 ALC    SPABCT(SPAE02,@BR),SPASCT(,@BR)   SECTOR COUNT TO BUFCNT
    0899 5D 01 A6 B3          1551 SPA075 CLC    SPABCT(SPAE02,@BR),SPACXT(,@BR)   TEST IF BUFFER IS FULL
    089D F2 81 32             1552        JE     SPA080                           BUFFER FULL
    08A0 C0 82 09A2           1553        BL     SPA100                           NOT FULL YET
    08A4 5F 01 A6 B3          1554        SLC    SPABCT(SPAE02,@BR),SPACXT(,@BR)  DECR BY MAX COUNT
    08A8 5F 01 A8 A6          1555        SLC    SPASCT(SPAE02,@BR),SPABCT(,@BR)  FIRST HALF TO READ
    08AC C0 87 095C           1556        B      SPARED                           GO READ IN N SECTORS
    08B0 C0 87 0972           1557        B      SPAWRT                           GO WRITE OUT THE BUFFER
    08B4 5C 01 A8 A6          1558        MVC    SPASCT(SPAE02,@BR),SPABCT(,@BR)
    08B8 1C 01 0945 B1        1559        MVC    SPAPL1+@DBFR2(@CADDR),SPAINA(,@BR)   RESET I/P CADDR
    08BD 5E 00 C2 C3          1560        ALC    SPAPL1+@DSAD(1,@BR),SPAPL1+@DCNT(,@BR)   BUMP FOR PART 2
    08C1 7D 30 C2             1561        CLI    SPAPL1+@DSAD(,@BR),SPAE30 TEST IF CYLINDER CROSSED
    08C4 D0 82 19             1562        BL     SPA075(,@BR)                     BRANCH IF NO
    08C7 5F 00 C2 AC          1563        SLC    SPAPL1+@DSAD(1,@BR),SPAC30(,@BR)   DECR BY CYL VALUE
    08CB 5E 00 C1 AF          1564        ALC    SPAPL1+@DSAD-1(,@BR),SPAC01(,@BR)  BUMP CYLINDER VALUE
    08CF D0 87 19             1565        B      SPA075(,@BR)                     BACK TO FINISH REST OF COUNT

    08D2 C0 87 095C           1567 SPA080 B      SPARED                           READ IN N SECTORS
    08D6 C0 87 0972           1568        B      SPAWRT                           GO WRITE
    08DA 5F 01 A6 A6          1569        SLC    SPABCT(SPAE02,@BR),SPABCT(,@BR)  CLEAR BUFF COUNT
    08DE 5C 01 C5 B1          1570        MVC    SPAPL1+@DBFR2(@CADDR,@BR),SPAINA(,@BR)  RESET I/P CADDR
    08E2 1F 00 0700 AF        1571 SPA085 SLC    SPANEC(##LAHC),SPAC01(,@BR)  DECR ENTRY COUNT
    08E7 E2 02 06             1572        LA     ##LNE(,@XR),@XR              BUMP NULL ENTRY POINTER
    08EA C0 01 0840           1573        BNE    SPA040                           GO LOOK AT NEXT ENTRY

    08EE 5D 01 A6 AE          1575 SPA090 CLC    SPABCT(SPAE02,@BR),SPAC00(,@BR)   ANYTHING LEFT IN BUF ?
    08F2 D0 81 7D             1576        BE     SPA091(,@BR)                     ALL SECTORS PROCESSED
    08F5 5C 00 B7 A6          1577        MVC    SPAPL3+@DCNT(1,@BR),SPABCT(,@BR)   SET LAST WRITE COUNT
    08F9 C0 87 0972           1578        B      SPAWRT                           GO WRITE REST OF SECTORS
    08FD 1C 01 0705 B6        1579 SPA091 MVC    SPANEW(@DADDR),SPAPL3+@DSAD(,@BR)   LAST WRITE DADDR
    0902 2C 01 0707 05        1580        MVC    SPANNC(##LNEF),##DNER(,@XR)  NEW TOTAL (MI COUNT
    0907 3C 01 0700           1581        MVI    SPAHDR,SPAE01                SET NEW COUNT IN HEADER
                              1582 *        DSKL2 SPAPL2                      WRITE NULL DIRCTY
    090B C0 87 0A0D           1583        B      DL2ICS                           PERFORM RELATIVE DISK OP
    090F 093A        0910     1584        DC     AL2(SPAPL2)                      DPL ADDRESS
                              1585 *** END OF EXPANSION ***

    0911 35 02 03C7           1587 SPA098 L      $XRSAV,@XR                   LOAD USERS XR
    0915 3B 02 03C3           1588        SBF    $KEYCD,$IOYES                10 ROUTINES NOT IN
    0919 0C 15 0C15 095B      1589        MVC    $$KLD3+SPAI#O-1(SPAI#O),SPAI@O   SET CALL TO LOADER
    091F C0 87 0C00           1590        B      $$KLD3                           GO LOAD I/O AND RETURN
```

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      #SPOVL -- SPACK OVERLAY


ERR LOC   OBJECT CODE     ADDR STMT SOURCE STATEMENT           VER 15, MOD 00  22/11/21  PAGE   7

    0923                  0924 1592 SPAENT DS    CL2                          NULL ENTRY WORK AREA
                          0924 1593 SPANT2 EQU   SPAENT                       WORK AREA FOR NEXT ENTRY
    0925                  0928 1594 SPACNT DS    CL4                          COUNTER WORK AREA
                          0926 1595 SPABCT EQU   SPACNT-2                     BUFFER SECTOR COUNT
                          0928 1596 SPASCT EQU   SPACNT                       CURRENT SECTOR COUNT
    0929 0706             092A 1597 SPABFA DC    AL2(SPANBF+##LNH+@DADDR)     BUFFER + HEADER + RDADDR
    092B 0030             092C 1598 SPAC30 DC    IL2'48'                      SECTORS PER CYLINDER
    092D 0000             092E 1599 SPAC00 DC    IL2'0'                       TEST COUNTS TO ZERO
    092F 01               092F 1600 SPAC01 DC    IL1'1'                       VALUE TO DECR COUNTERS
    0930 0AA6             0931 1601 SPAINA DC    AL2(SPAEND)                  BUFFER ADDR
    0932 0014             0933 1602 SPACXT DC    AL2(SPAMXT+*-*)              MAX SECTOR COUNT


                          1604 *PAPL3 $DPL   FUNC-@DPUT,CNT-SPAMXT,CADDR-SPAEND
                          0934 1605+SPAPL3 EQU   *                           DISK PARAMETER LIST
    0934 02               0934 1606+       DC    AL1(@DPUT)                   REQUESTED FUNCTION
    0935 00               0935 1607+       DC    AL1(*-*)                     CYLINDER ADDRESS
    0936 00               0936 1608+       DC    AL1(*-*)                     HEAD/SECTOR/DRIVE/DISK SPEC
    0937 14               0937 1609+       DC    AL1(SPAMXT)                  SECTOR COUNT
    0938 0AA6             0939 1610+       DC    AL2(SPAEND)                  BUFFER ADDRESS
                          1611+*** END OF EXPANSION ***


                          1613 *PAPL2 $DPL   FUNC-@DPUT,CNT-##LN,CADDR-SPANBF
                          093A 1614+SPAPL2 EQU   *                           DISK PARAMETER LIST
    093A 02               093A 1615+       DC    AL1(@DPUT)                   REQUESTED FUNCTION
    093B 00               093B 1616+       DC    AL1(*-*)                     CYLINDER ADDRESS
    093C 00               093C 1617+       DC    AL1(*-*)                     HEAD/SECTOR/DRIVE/DISK SPEC
    093D 01               093D 1618+       DC    AL1(##LN)                    SECTOR COUNT
    093E 0700             093F 1619+       DC    AL2(SPANBF)                  BUFFER ADDRESS
                          1620+*** END OF EXPANSION ***


                          1622 *PAPL1 $DPL   FUNC-@DGET,CNT-##LU           * DADDR-*-*, CADDR-*-*
                          0940 1623+SPAPL1 EQU   *                           DISK PARAMETER LIST
    0940 01               0940 1624+       DC    AL1(@DGET)                   REQUESTED FUNCTION
    0941 00               0941 1625+       DC    AL1(*-*)                     CYLINDER ADDRESS
    0942 00               0942 1626+       DC    AL1(*-*)                     HEAD/SECTOR/DRIVE/DISK SPEC
    0943 02               0943 1627+       DC    AL1(##LU)                    SECTOR COUNT
    0944 0000             0945 1628+       DC    AL2(*-*)                     BUFFER ADDRESS
                          1629+*** END OF EXPANSION ***


    0944                  1631        ORG   SPAPL1+@DBFR1                INITALIZE BUFFER ADDR
    0944 0AA6             0945 1632        DC    AL2(SPAEND)                  BUFFER ADDR
    0946                  1633        ORG
                          0946 1634 SPAIOR EQU *                             START OF I/O CALL ACTION
    0946 C0 87 0025       1635        B     $DISKN                       GO RELOAD FIT
    094A 099C             094B 1636        DC    AL2(SPAFIT)                  ADDRESS OF DPL
                          1637 *      LOADR SPAIOP                        DPL FOR I/O ROUTINES
    094C C0 87 051A       1638        B     $LOADR                       LOAD PROGRAM AND RETURN
    0950 0996             0951 1639        DC    AL2(SPAIOP)                  DPL ADDRESS
                          1640 *** END OF EXPANSION ***


    0952 35 02 03C7       1642        L     $XRSAV,@XR                   LOAD TO SAVE USERS XR
                          1643 *      RLOAD $DPLSV-@DPLNG+1              CALL CALLING USER BACK IN
    0956 C0 87 051E       1644        B     $RLOAD                       LOAD AND EXECUTE PGM
    095A 0444             095B 1645        DC    AL2($DPLSV-@DPLNG+1)         DPL ADDRESS
                          1646 *** END OF EXPANSION ***
```

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      #SPOVL -- SPACK OVERLAY
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```
                        095B 1648 SPAI@O EQU    *-1                     END OF CODE
                        0016 1649 SPAI#O EQU    SPAI@O+1-SPAIOR         LENGTH OF CODE TO MOVE
                             1650 *
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      #SPOVL -- SPACK OVERLAY


ERR LOC   OBJECT CODE     ADDR STMT SOURCE STATEMENT         VER 15, MOD 00  22/11/21  PAGE   9

                          1652 ***********************************************************************
                          1653 *        SPARED - READ IN N NUMBER OF SECTORS FROM BETWEEN TWO NULL    *
                          1654 *               ENTRIES AND THEN BUMP THE BUFFER CADDR BY THE NUMBER   *
                          1655 *               OF SECTORS READ.                                       *
                          1656 ***********************************************************************
   095C 34 08 0971        1657 SPARED ST    SPARRT+@OP1,@ARR            SAVE RETURN ADDR
   0960 5C 00 C3 A8       1658        MVC   SPAPL1+@DCNT(1,@BR),SPASCT(,@BR)  INPUT SECTOR COUNT
                          1659 *        DSKL2 SPAPL1                    READ
   0964 C0 87 0A0D        1660        B     DL2ICS                     PERFORM RELATIVE DISK OP
   0968 0940         0969 1661        DC    AL2(SPAPL1)                DPL ADDRESS
                          1662 *** END OF EXPANSION ***

   096A 5E 00 C4 C3       1664        ALC   SPAPL1+@DBFR1(1,@BR),SPAPL1+@DCNT(,@BR)  BUMP BUF CADDR
   096E C0 87 0000        1665 SPARRT B     *-*                        RETURN

                          1667 ***********************************************************************
                          1668 *        SPAWRT - WRITE BUFFER TO DISK.  THE DADDR OF THE FIRST NULL   *
                          1669 *               ENTRY IS THE FIRST OUTPUT ADDR.  BUMP THE OUTPUT       *
                          1670 *               DADDR BY THE SECTOR COUNT OF EACH WRITE.               *
                          1671 ***********************************************************************
   0972 34 08 0975        1672 SPAWRT ST    SPAWRT+@OP1,@ARR            SAVE RETURN ADDR
                          1673 *        DSKL2 SPAPL3                    WRITE BUFFER TO DISK
   0976 C0 87 0A0D        1674        B     DL2ICS                     PERFORM RELATIVE DISK OP
   097A 0934         097B 1675        DC    AL2(SPAPL3)                DPL ADDRESS
                          1676 *** END OF EXPANSION ***

   097C 5C 01 C5 B1       1678        MVC   SPAPL1+@DBFR2(@CADDR,@BR),SPAINA(,@BR)  RESTORE IP CADDR
   0980 5E 00 B6 B7       1679        ALC   SPAPL3+@DSAD(1,@BR),SPAPL3+@DCNT(,@BR)
   0984 7D 30 B6          1680        CLI   SPAPL3+@DSAD(,@BR),SPAE30   TEST IF CYL CROSSED
   0987 F2 82 08          1681        JL    SPAWXT                     BRANCH OKAY
   098A 5F 00 B6 AC       1682        SLC   SPAPL3+@DSAD(1,@BR),SPAC30(,@BR)   ADJUST SECTOR ADDR
   098E 5E 00 B5 AF       1683        ALC   SPAPL3+@DSAD-1(1,@BR),SPAC01(,@BR) BUMP CYL COUNT
   0992 C0 87 0000        1684 SPAWXT B     *-*                        RETURN

                          1686 *SPAIOP DPL   FUNC-DGET,DADDR-#$DPRI,CNT-#$@DPR,CADDR-$$KLD2
                     0996 1687 SPAIOP EQU   *                          DISK PARAMETER LIST
   0996 01          0996 1688        DC    AL1(@DGET)                 REQUESTED FUNCTION
   0997 014C        0998 1689        DC    AL2(#$DPRI)                DISK ADDRESS
   0999 05          0999 1690        DC    AL1(#$@DPR)                SECTOR COUNT
   099A 0700        099B 1691        DC    AL2($$KLD2)                BUFFER ADDRESS
                          1692 *** END OF EXPANSION ***

                          1694 *SPAFIT DPL FUNC-@DGET,DADDR-#@#WFT,CNT-#@@#WF,CADDR-$$FITS
                     099C 1695 SPAFIT EQU   *                          DISK PARAMETER LIST
   099C 01          099C 1696        DC    AL1(@DGET)                 REQUESTED FUNCTION
   099D 0500        099E 1697        DC    AL2(#@#WFT)                DISK ADDRESS
   099F 03          099F 1698        DC    AL1(#@@#WF)                SECTOR COUNT
   09A0 1D00        09A1 1699        DC    AL2($$FITS)                BUFFER ADDRESS
                          1700 *** END OF EXPANSION ***

   09A2 C0 87 095C        1702 SPA100 B     SPARED                     READ IN N SECTORS
   09A6 D0 87 62          1703        B     SPA085(,@BR)               BACK TO LOOK AT NEXT ENTRY
```

```
      #SPOVL -- SPACK OVERLAY
```

```
                         1705 *        PATCH 100
                         1706 ******************************************************************************
                         1707 *        PATCH AREA 1                                                       *
                         1708 ******************************************************************************
      09A9               0A0C 1709 $$$$$1 DS    CL100                    PATCH AREA FOR PROGRAM
                         1710 ******************************************************************************
                         1711 *        $DL2P
```

```
                              1713+*********************************************************************
                              1714+*  5703-XM1  COPYRIGHT IBM CORP 1970                                *
                              1715+*              REFER TO INSTRUCTIONS ON COPYRIGHT NOTICE. 120-2083   *
                              1716+*                                                                   *
                              1717+*********************************************************************
                              1718+*STATUS -                                                           *
                              1719+*    VERSION 1 MODIFICATION 0                                       *
                              1720+*                                                                   *
                              1721+*FUNCTION                                                           *
                              1722+*    * DL2ICS CONVERTS A RELATIVE DISK ADDRESS TO A PHYSICAL DISK   *
                              1723+*      ADDRESS AND COMBINES IT WITH A BASE ADDRESS PLACED IN DL2RAD *
                              1724+*      BY THE CALLER.                                                *
                              1725+*    * THE RELATIVE DISK ADIRESS IS A TWO BYTE CVLINIER SECTOR COUNT A *
                              1726+*      IN THE CALLERS DISK PARAMETER LIST (DPL)                      *
                              1727+*    * THE COUNT IS A CYLINDER SECTOR DISPLACEMENT FROM THE BASE     *
                              1728+*      ADDRESS PLACED IN DL2RAD                                      *
                              1729+*    * DL2ICS IS USED TO PROCESS DATA ON THE FIXED OR REMOVABLE DISK *
                              1730+*      ON EITHER DRIVE AND PROVIDES THE INTERFACE TO $DISKN.         *
                              1731+*    * THE PHYSICAL DISK ADDRESS IS PLACED IN A COPY OF THE USERS DPL *
                              1732+*      IN DL2ICS AND A CALL IS MADE TO $DISKN TO PERFORM THE REQUESTED *
                              1733+*      OPERATION.                                                    *
                              1734+*                                                                   *
                              1735+*ENTRY POINTS                                                       *
                              1736+*    * THE ENTRY IS DL2ICS. THE BASE REGISTER IS SAVED AND RESTORED  *
                              1737+*      ON RETURN. THE INDEX REGISTER IS NOT USED.                    *
                              1738+*    * THE FORMAT OF THE CALLING SEQUENCE IS AS FOLLOWS:             *
                              1739+*        B   DL2ICS                                                  *
                              1740+*        DC  AL2(PARMLT)                                             *
                              1741+*      WHERE PARMLT IS THE ADDR OF THE PARAMETER LIST TO BE PROCESSED. *
                              1742+*                                                                   *
                              1743+*INPUT                                                              *
                              1744+*    * THE INPUT IS A TWO BYTE BASE DISK ADDRESS PLACED IN           *
                              1745+*      DL2RAD AND A SIX BYTE DPL. THE SAME FORMAT AS THE DPL FOR $DISKN*
                              1746+*      EXCEPT FOR THE DISK ADDRESS WHICH IS A RELATIVE CYLINDER AND  *
                              1747+*      SECTOR DISPLACEMENT FROM THE BASE ADDRESS IN DL2RAD.          *
                              1748+*                                                                   *
                              1749+*OUTPUT                                                             *
                              1750+*    NONE.                                                          *
                              1751+*                                                                   *
                              1752+*EXTERNAL REFERENCES                                                *
                              1753+*    $DISKN - ENTRY TO PHYSICAL DISK ROUTINE IS THE SYSTEM NUCLEUS.  *
                              1754+*                                                                   *
                              1755+*EXITS, NORMAL                                                      *
                              1756+*    NORMAL - EXIT IS TO THE FIRST INSTRUCTION FOLLOWING THE POINTER *
                              1757+*    TO THE DPL. THE BASE REGISTER IS RESTORED. THE RETURN ADDRESS IS*
                              1758+*    THE ADDRESS RECALL REGISTER (APR) +2.                           *
                              1759+*                                                                   *
                              1760+*EXITS, ERROR                                                       *
                              1761+*    NONE                                                           *
                              1762+*                                                                   *
                              1763+*TABLES/WORK AREAS                                                  *
                              1764+*    * THE CONSTANTS AND WORK AREAS RESIDE AT THE END OF THE EXECUTABLE*
                              1765+*      CODE AND ARE REFERENCED BY A DISPLACEMENT RELATIVE TO THE VALUE *
                              1766+*      IN INDEX REGISTER 1 (@BR).                                    *
                              1767+*    * DL2SEC AND DL2SAD ARE EQUATED TO OPERAND LOCATIONS IN THE     *
                              1768+*      EXECUTABLE CODE TO ELIMINATE EXCESS WORKING STORAGE.          *
```

```
        DL2ICS - TWO TRACK LOGICAL IOCR

ERR LOC   OBJECT CODE      ADDR STMT SOURCE STATEMENT          VER 15, MOD 00  22/11/21  PAGE  12
                                1769+*                                                             *
                                1770+*ATTRIBUTES                                                   *
                                1771+*    * DL2ICS IS REUSABLE                                     *
                                1772+*                                                             *
                                1773+*CHARACTER CODE DEPENDENCY                                    *
                                1774+*     THE OPERATION OF THIS MODULE DOES NOT DEPEND UPON A PARTICULAR  *
                                1775+*      INTERNAL REPRESENTATION OF THE EXTERNAL CHARACTER SET. *
                                1776+*                                                             *
                                1777+*NOTES                                                        *
                                1778+*    ERROR PROCEDURES                                         *
                                1779+*      NONE                                                   *
                                1780+*                                                             *
                                1781+*    REGISTER USAGE                                           *
                                1782+*     INDEX REGISTER 1 (@BR) IS SAVED AND RESTORED. THIS REGISTER IS *
                                1783+*     USED DURING EXECUTION. REGISTER 2 (@BR) IS NOT USED.    *
                                1784+*                                                             *
                                1785+*    SAVED/RESTORED AREAS                                      *
                                1786+*      NONE                                                   *
                                1787+*                                                             *
                                1788+*    MODIFICATION CONSIDERATIONS                              *
                                1789+*      NONE                                                   *
                                1790+*                                                             *
                                1791+*    REQUIRED MODULES                                         *
                                1792+*     @SYSEQ - COMMON SYSTEM EQUATES.                         *
                                1793+*     @FXDEQ - SYSTEM NUCLEUS ADDRESSES AND INDICATORS VALUES EQUATES *
                                1794+*                                                             *
                                1795+*    OTHER                                                    *
                                1796+*     DL2ICS MAY BE USED TO CONVERT THE DISK ADDRESS ONLY AND NOT TO *
                                1797+*     CALL $DISKN IF THE USER MOVES A UCB CODE TO DL2SWH.     *
                                1798+*      THIS OPTION IS NOT STANDARD USAGE.                     *
                                1799+*****************************************************************************
                           0A11 1800+      USING DL2000,@BR              ESTABLISH ADDRESSABILITY
                                1801+*
                           0001 1802+DL2E01 EQU  X'01'                    FIELD LENGTH OF 1
                           0002 1803+DL2E02 EQU  X'02'                    FIELD LENGTH OF 2
                           0018 1804+DL2E18 EQU  X'18'                    HEX TRACK SECTOR COUNT
                           0060 1805+DL2E60 EQU  X'60'                    PHYSICAL SECTOR COUNT
                           0083 1806+DL2TSD EQU  X'83'                    MASK OFF TRACK SPINDLE DISK
                           007C 1807+DL2E7C EQU  X'7C'                    MASK OUT SECTOR COUNT
                           0A0D 1808+DL2ICS EQU  *                        ENTRY POINT
     0A0D 34 01 0A8E            1809+      ST    DL2900+@OP1,@BR          SAVE OLD BASE
                           0A11 1810+DL2000 EQU  *                        START PROCESSING
     0A11 C2 01 0A11           1811+      LA    DL2000,@BR               SET BASE ADORESS
     0A15 76 08 8A             1812+      A     DL2C01(,@BR),@ARR        BUMP TO RIGHT BYTE OF ADDR
     0A18 74 08 14             1813+      ST    DL2001+@DOP2(,@BR),@ARR  ADDR OF PARAM
     0A1B 76 08 8A             1814+      A     DL2C01(,@BR),@ARR        BUMP TO RETURN ADDR
     0A1E 74 08 81             1815+      ST    DL2910+@OP1(,@BR),@ARR   SAVE RETURN ADDR
                                1816+*
     0A21 4C 01 1D 0000        1817+DL2001 MVC  DL2002+@DOP2(@DADDR,@BR),*-* SETUP ADDR OF DPL
     0A26 5E 01 1D 8C          1818+      ALC   DL2002+@DOP2(@CADDR,@BR),DL2C05(,@BR) DUMP TO RIGHT END
     0A2A 4C 05 92 0000        1819+DL2002 MVC  DL2DPL(@DPLNG,@BR),*-*   MOVE USER DPL TO WORK AREA
     0A2F 5F 00 8F 86          1820+DL2005 SLC  DL2LST+@DSAD(DL2E01,@BR),DL2C48(,@BR) ADJUST SCTR/CYL
     0A33 F2 82 07             1821+      JM    DL2006                   GO TO RESTORE TO CONTINUE
     0A36 5E 00 8E 8A          1822+      ALC   DL2LST+@DCYL(DL2E01,@BR),DL2C01(,@BR) BUMP CYLINDER COUNT
     0A3A D0 87 1E             1823+      B     DL2005(,@BR)             BACK FOR NEXT CYLINDER
     0A3D 5E 00 8F 86          1824+DL2006 ALC  DL2LST+@DSAD(DL2E01,@BR),DL2C48(,@BR) RESTORE POSITIVE
```

```
                              1825+*
                              1826+*          GET THE LOGICAL SECTOR FROM THE DPL. THE NUMBER IS LEFT ADJUSTED
                              1827+*          TO COMAE IT MTN THE POINTER ESTABLISHED PRIOR TO AN ENTRY.
    0A41 5C 00 1D 8F          1828+      MVC   DL2SEC(DL2E01,@BR),DL2LST+@DSAD(,@BR) GET SECTOR NUMBER
    0A45 7C 00 8F             1829+      MVI   DL2LST+@DSAD(,@BR),@ZERO  CLEAR SECTOR BYTE
                              1830+*
                              1831+*          MOVE THE RELATIVE START TO THE DFL
                              1832+*
    0A48 5E 01 8F 94          1833+      ALC   DL2LST+@DSAD(DL2E02,@BR),DL2RAD(,@BR) DL2RAD TO DPL
    0A4C 7D 18 1D             1834+      CLI   DL2SEC(,@BR),DL2E18          IS COUNT OVER A TRACK
    0A4F F2 82 08             1835+      JL    DL2008                       NO GO CHANGE A PHYSICAL ADOR
    0A52 5E 01 8F 85          1836+      ALC   DL2LST+@DSAD(DL2E02,@BR),DL2K80(,@BR) BUMP TRACK VALUE
    0A56 5F 00 1D 88          1837+      SLC   DL2SEC(1,@BR),DL2K18(,@BR) DECR BY TRACK VALUE
    0A5A 5E 00 1D 1D          1838+DL2008 ALC  DL2SEC(1,@BR),DL2SEC(,@BR) SHIFT LEFT 1
    0A5E 5E 00 1D 1D          1839+      ALC   DL2SEC(1,@BR),DL2SEC(,@BR) SHIFT LEFT
    0A62 5C 00 14 8F          1840+      MVC   DL2SAD(DL2E01,@BR),DL2LST+@DSAD(,@BR) GET SECTOR ADDRESS
                              1841+*
                              1842+*          ZERO OUT THE SECTOR COUNT AND LEAVE THE DISK. SPINDLE AND
                              1843+*          TRACK BITS AS IS TO BE RE INSERTED AFTER THE SECTOR HAS BEEN
                              1844+*          LOCATES.
                              1845+*
    0A66 7B 7C 8F             1846+      SBF   DL2LST+@DSAD(,@BR),DL2E7C TURN OFF
    0A69 7B 83 14             1847+      SBF   DL2SAD(,@BR),DL2TSD        OFF TRACK SPINDLE DISK
    0A6C 5E 00 14 1D          1848+      ALC   DL2SAD(DL2E01,@BR),DL2SEC(,@BR) COMBINE SECTOR COUNTS
    0A70 7D 60 14             1849+DL2010 CLI  DL2SAD(,@BR),DL2E60        TEST IF TRACK CROSSED
    0A73 F2 82 08             1850+      JL    DL2100
                              1851+*
                              1852+*          INCREMENT TRACK BIT. OVERFLOW INTO THE CYLINDER COUNT.
                              1853+*
    0A76 5E 01 8F 85          1854+      ALC   DL2LST+@DSAD(DL2E02,@BR),DL2K80(,@BR)
    0A7A 5F 00 14 83          1855+      SLC   DL2SAD(1,@BR),DL2K60(,@BR) DECR BY TRACK VALUE
                              1856+*
    0A7E 5E 00 8F 14          1857+DL2100 ALC  DL2LST+@DSAD(1,@BR),DL2SAD(,@BR) INSERT SECTOR COUNT
                              1858+*
    0A82 F2 80 06             1859+DL2110 JC   DL2900,@NOP                CONVERSION SWITCH
                         0A83 1860+DL2SWH EQU  DL2110+@Q                  ADDR OF Q CODE FOR SWITCH
    0A85 C0 87 0025          1861+      B     $DISKN                     GO PROCESS I/O
    0A89 0A9E           0A8A 1862+      DC    AL2(DL2LST)                ADDRESS OF DPL
    0A8B C2 01 0000          1863+DL2900 LA   *-*,@BR                    RESTORE CALLERS BASE
    0A8F C0 87 0000          1864+DL2910 B    *-*
                              1865+*******************************************************************
                              1866+*       CONSTANTS
                              1867+*******************************************************************
    0A93 0060           0A94 1868+DL2K60 DC   XL2'0060'                  SECTOR COUNT OF 24 LEFT ADJUSTD
    0A95 0080           0A96 1869+DL2K80 DC   XL2'0080'                  BIT FOR INCREMENTING TRACK
    0A97 30             0A97 1870+DL2C48 DC   IL1'48'                    CYLINDER VALUE FOR 1 DISK
    0A98 0018           0A99 1871+DL2K18 DC   XL2'18'                    HEX SECTORS PER TRACK
    0A9A 0001           0A9B 1872+DL2C01 DC   IL2'1'                     CONSTANT FOR REGISTER MODE
    0A9C 0005           0A9D 1873+DL2C05 DC   IL2'5'                     DISP TO RIGHT END OF DPL
                              1874+*******************************************************************
                              1875+*       WORK AREA
                              1876+*******************************************************************
                         0A9E 1877+DL2LST EQU  *                         LIST HIGH END
    0A9E               0AA3 1878+DL2DPL DS    CL(@DPLNG)                 WORKING DPL
                         0AA0 1879+DL2PHY EQU  DL2LST+@DSAD              POINTER TO PHYSICAL DADDR
                         0A25 1880+DL2SAD EQU  DL2001+@DOP2             SAVE SECTOR BYTE FROM DPI
```

```
      DL2ICS - TWO TRACK LOGICAL IOCR

ERR LOC   OBJECT CODE      ADDR STMT SOURCE STATEMENT           VER 15, MOD 00  22/11/21  PAGE  14

                           0A2E 1881+DL2SEC EQU   DL2002+@DOP2             WORKING SECTOR ADDRESS FIELD
     0AA4                  0AA5 1882+DL2RAD DS    CL(@DADDR)               USER RELATIVE STARTING ADDR.
                           0AA6 1883+DL2END EQU   *                        END OF DL2ICS
                                1884+***                         END OF DL2ICS                        ***
                           0AA6 1885 SPAEND EQU   *                        END OF CODE
                           FFFF 1886          END

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

```
                          CROSS REFERENCE

SYMBOL  LEN VALUE DEFN   REFERENCES                        VER 15, MOD 00  22/11/21  PAGE  15

$$$$$$  001  0806 1482
$$$$$1  100  0A0C 1709
$$$CMD  001  0020 0657
$$$DAT  001  0040 0656
$$$EPL  001  0091 0653
$$$ERN  001  0080 0707
$$$FUN  001  0010 0658
$$$NLN  001  00A0 0703
$$$STD  001  0081 0652
$$BNLN  001  0605 0633   0635
$$CDBS  001  08C0 0683
$$CDND  001  0666 0642
$$CDRD  001  0890 0681   0683
$$CKEY  001  0603 0631
$$CKFF  001  0B3D 0663
$$COFF  001  0B44 0662
$$CSNS  001  209C 0692
$$DATB  001  0BBF 0664
$$EOSA  001  0AFE 0661
$$ERSK  001  1C00 0702
$$FITS  001  1D00 0710   1699
$$FLIB  001  06FF 0709   1504
$$ILEN  001  0601 0627   0629  0633
$$ILHD  001  0600 0625   0627
$$INLN  001  0607 0640   0642  0644
$$INND  001  06FA 0644
$$KBDT  001  09E1 0651   0655
$$KBSN  001  09E2 0655   0660
$$KLD1  001  0600 0715
$$KLD2  001  0700 0717   1473  1488  1489  1691
$$KLD3  001  0C00 0719   1589* 1590
$$LPOS  001  09EB 0660
$$PCNT  001  07E9 0676
$$PLYN  001  2004 0690
$$PRES  001  0890 0649   0651  0661  0662  0663  0664  0681
$$PRFL  001  2143 0694
$$PRNT  001  0707 0670   0671  0675  0676
$$PRTN  001  0782 0671
$$PSIO  001  07CE 0675
$$PYCD  001  2200 0696
$$PYMP  001  2000 0688   0690  0692  0694  0696
$$SLIB  001  1C00 0705
$$TPCD  001  0606 0635   0640
$$UPAR  001  0602 0629   0631
$$WSPB  001  1E00 0708
$$XIND  001  06FF 0706   0709
$$ZERO  001  0000 0222   0223  0225  0226  0227  0231  0688
$ABORT  001  0010 0334
$BASIC  001  0080 0392
$BIGCD  001  0080 0468
$BLDPL  001  0579 0601   0603
$BLNOE  001  0569 0591
$BLOAD  001  0522 0582   0584  0587  0600  0601
$BLRTN  001  0550 0590   0591
$BRSAV  001  03C5 0279   0280
$BSADR  001  0587 0606   0608
```

```
$BUFPT   001  03E3 0487    0488
$CABLD   001  04B4 0560    0561
$CAERK   001  0469 0537    0540
$CAERR   001  03CD 0285    0287
$CAIPL   001  049D 0556    0558
$CALLI   001  0008 0477
$CARDI   001  0001 0248
$CARPL   001  04A1 0558    0560
$CIENT   001  0483 0547    0548
$CIEXT   001  0480 0546    0547
$CIMSK   001  0476 0543    0546
$CISUS   001  0496 0551    0556
$CLBFR   001  0010 0435
$CMDKY   001  0008 0347
$CMODE   001  0002 0397
$CONFG   001  03DD 0460    0470
$CRPOS   001  03E2 0486    0487
$CRTAD   001  044D 0525    0526
$CRTAV   001  0002 0341
$CRTDN   001  0002 0365
$CRTIN   001  03D3 0362    0369
$CRTNO   001  0004 0344
$CRTPU   001  0004 0366
$CRTSP   001  0008 0367
$CRTUP   001  0001 0364
$CRUSH   001  0080 0473
$CSDPL   001  050E 0572    0573
$C0001   001  0464 0529    0535
$DATE    001  043A 0510    0511
$DBGUF   001  03E0 0472    0481
$DBLOK   001  0001 0422
$DFDET   001  03E8 0493    0494
$DISKN   001  0025 0225    1635   1861
$DKERR   001  0008 0403
$DKSIZ   001  03D7 0447    0455   0496
$DK100   001  0001 0449
$DK200   001  0002 0450
$DK400   001  0004 0451
$DK600   001  0008 0452
$DK800   001  0010 0453
$DPLSV   001  0449 0521    0523   1645
$DTNMB   001  0040 0268
$DTRDR   001  0040 0356
$ENDNU   001  0600 0615    0625   0649   0670   0706   0715   0717   0719
$ERDPL   001  046F 0540    0542
$ERFIL   001  0040 0295
$ERHRD   001  0004 0427
$ERKEY   001  0080 0299
$ERLOG   001  0345 0230
$ERMAD   001  0472 0542    0543
$ERPND   001  0004 0400
$ERRCT   001  03CF 0301
$ERRPG   001  03CE 0289
$ERSFL   001  0035 0294
$ERSTK   001  0030 0292
$ER050   001  0363 0231
```

```
                              CROSS REFERENCE

SYMBOL  LEN VALUE DEFN   REFERENCES                          VER 15, MOD 00  22/11/21  PAGE  17

$ER1N2  001  0050 0297
$EXADR  001  0517 0575   0577
$EXCMD  001  0001 0329
$EXFTR  001  043B 0511   0516  1505  1506
$FCIND  001  0010 0407
$FDIND  001  0040 0414
$FEARR  001  0004 0223
$FEMAP  001  0588 0608   0609
$FILIB  001  03DA 0458   0459
$FITIN  001  0010 0383
$FUIND  001  0020 0412
$GUFIO  001  0583 0605   0606
$GUFIR  001  0008 0257
$HISTE  001  042E 0508   0509
$HIST1  001  0435 0509   0510
$HRDER  001  0020 0353
$INDR1  001  03D4 0369   0395
$INDR2  001  03D5 0395   0420
$INDR3  001  03D6 0420   0447
$INLNO  001  03CF 0287   0289  0301  0308
$INRPT  001  0020 0265
$IOIND  001  03D2 0336   0362
$IOPGS  001  0010 0476
$IOYES  001  0002 0251   1588
$IPLDV  001  05FF 0612   0615
$IRKEY  001  0020 0475
$KEYBD  001  03E1 0481   0486
$KEYCD  001  03C3 0245   0279  1588*
$KEYDT  001  0040 0389
$KE090  001  00DE 0226
$KE130  001  01D5 0227
$KYBSY  001  0010 0262
$LDRTN  001  0571 0600
$LEVEL  001  03DF 0470   0472
$LIST   001  0002 0424
$LMRGN  001  03C1 0240   0242
$LNPTR  001  0080 0359
$LOADB  001  054A 0584
$LOADR  001  051A 0577   0580  1638
$LPRIO  001  03E9 0494
$LPROS  001  03E5 0489   0491
$LPRP3  001  03E4 0488   0489
$MOUNT  001  0020 0438
$MPDWN  001  0001 0338
$NEXTB  001  03E6 0491   0492
$NEXTL  001  03E7 0492   0493
$NOENB  001  0008 0430
$NOLST  001  0004 0254
$NUCBS  001  03C0 0237   0238
$NWRKF  001  0080 0443
$NWRKR  001  0040 0440
$PASWD  001  042D 0507   0508
$PAUSD  001  04BA 0561   0563
$PAUSE  001  0002 0331
$PGMDT  001  0020 0386
$PGMST  001  0010 0350
```

```
$PKERT  001  0419 0505   0507
$PLST1  001  0454 0526   0527
$PLST2  001  045B 0527   0528
$PLST3  001  0462 0528   0529
$PRDEV  001  044B 0523   0525
$PRESN  001  0002 0374
$PROCI  001  0001 0371
$PRPOS  001  03C2 0242   0245
$PSDBR  001  04FA 0566
$PSDXR  001  04F2 0565   0566
$PSTEP  001  0004 0332
$PSTMT  001  0008 0333
$PTCH1  001  03F5 0496   0500
$READY  001  0080 0416
$REORD  001  0040 0474
$RLOAD  001  051E 0580   0582  1644
$RMRGN  001  03C0 0238   0240
$RSTR   001  04D6 0563   0565  0567  0572
$RUNIT  001  0001 0310
$SFAID  001  050D 0568
$SPOVL  001  080D 1485
$SPRNT  001  0465 0535   0537
$SRTRN  001  04FE 0567   0568
$STEPT  001  0002 0311
$SWPCR  001  0511 0573   0575
$TABLN  001  03CB 0282   0285
$TFLOW  001  0008 0317
$TRACE  001  0004 0312
$TRALL  001  0010 0318
$TROVR  001  054E 0587   0590
$TRUNK  001  0080 0270
$TRVAR  001  0020 0319
$UNMSK  001  048D 0548   0551
$USRDR  001  03DC 0459   0460
$VMDEF  001  0080 0323
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$VOLF2  001  040E 0504
$VOLID  001  03F6 0500   0501  0505
$VOLR1  001  03F6 0501   0502
$VOLR2  001  0406 0503   0504
$WAITF  001  057F 0603   0605
$WFDEF  001  0040 0517
$WFLOK  001  0008 0380
$WFNME  001  0443 0516   0521
$WSIND  001  0004 0377
$XIND1  001  03D0 0308   0327
$XIND2  001  03D1 0327   0336
$XIND3  001  03D8 0455   0458
$XPREC  001  0040 0320
$XRSAV  001  03C7 0280   0282  1587  1642
$ZTRAD  001  05A2 0609
$12K    001  0004 0464
$16CKY  001  0008 0466
$16K    001  0002 0463
$22IMP  001  0001 0461
#$$#BL  001  0000 1239
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SYMBOL	LEN	VALUE	DEFN	REFERENCES
#$$#CK	001	0000	1367	
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#$$#DR	001	0000	0931	
#$$#ER	001	0000	1131	
#$$#FS	001	0000	1227	
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#$$#PW	001	0000	1375	
#$$#RS	001	0000	1207	
#$$#SA	001	0000	1195	
#$$#SS	001	0000	1191	
#$$#VU	001	0600	1151	
#$$#0T	001	0700	0923	
#$$#1T	001	0000	0927	
#$$BCO	001	0600	0939	
#$$BOV	001	0800	1211	
#$$DPR	001	0700	0947	
#$$DRE	001	0889	0963	
#$$DSP	001	2800	0983	
#$$ECM	001	0C00	1243	
#$$EFK	001	0C00	1263	
#$$ERR	001	0C00	1235	
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#$$GRA	001	0889	1095	
#$$GUF	001	0C00	1231	
#$$INL	001	0600	1311	
#$$INS	001	0600	0935	
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#$$KCA	001	0C00	1315	
#$$KCH	001	0C00	1067	
#$$KCN	001	0C00	1183	
#$$KCT	001	0C00	1035	
#$$KDE	001	0C00	1031	
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#$$KDN	001	0C00	1019	
#$$KDO	001	0E00	1115	
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#$$KLL	001	0920	1339	
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#$$KSO  001  0C20 1143
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#$$KSV  001  0980 1071
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#$$SFL  001  0F00 1247
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#$$SPA  001  0C00 1055
#$$SPO  001  0806 1059   1481
#$$SPS  001  0C00 1047
#$$STR  001  1600 1223
#$$TDC  001  1000 1027
#$$TSY  001  1000 0987
#$$TVK  001  0FC0 1163
#$$UAL  001  0C00 1179
#$$UAT  001  0900 1275
#$$UCD  001  0900 1283
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#$$UEX  001  0C00 1175
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#$$UPT  001  0C00 1323
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#$$VLO  001  0600 1155
#$$VOD  001  0600 1159
#$$VVM  001  0000 1167
#$$VXI  001  0600 1147
#$$ZDU  001  1100 1299
#$$ZLB  001  1100 1343
#$$ZLO  001  1100 1303
#$$ZLV  001  0F00 1359
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#$$ZL2  001  0F00 1351
#$$ZL3  001  0C00 1355
#$$ZTR  001  1000 1295
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                           CROSS REFERENCE

SYMBOL  LEN VALUE DEFN  REFERENCES                         VER 15, MOD 00  22/11/21  PAGE  21

#$$ZUT  001  0C00 1307
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#$#CKT  001  2118 1366
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#$#COR  001  0800 1126
#$#CSA  001  1000 1186
#$#DRT  001  0000 0930
#$#ERM  001  0928 1130
#$#FSP  001  1880 1226
#$#INV  001  212C 1370
#$#PWR  001  2300 1374
#$#RSP  001  1780 1206
#$#SAV  001  1180 1194
#$#SSA  001  1128 1190
#$#VUF  001  0B08 1150
#$#0TR  001  0000 0922
#$#1TR  001  0080 0926
#$@#BL  001  0001 1240
#$@#CK  001  0004 1368
#$@#CN  001  0001 1336
#$@#CO  001  003A 1128
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#$@#DR  001  0008 0932
#$@#ER  001  0032 1132
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#$@#IN  001  003A 1372
#$@#PW  001  00C0 1376
#$@#RS  001  0030 1208
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#$@#SS  001  0001 1192
#$@#VU  001  0002 1152
#$@#0T  001  0018 0924
#$@#1T  001  0018 0928
#$@BCO  001  0018 0940
#$@BOV  001  0018 1212
#$@DPR  001  0005 0948  1690
#$@DRE  001  0001 0964
#$@DSP  001  0004 0984
#$@ECM  001  0006 1244
#$@EFK  001  0002 1264
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#$@FMS  001  0052 1172
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#$@INL  001  0010 1312
#$@INS  001  0010 0936
#$@KAL  001  000F 1100
#$@KCA  001  000C 1316
#$@KCH  001  000C 1068
#$@KCN  001  0010 1184
#$@KCT  001  0009 1036
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SYMBOL  LEN VALUE DEFN  REFERENCES                         VER 15, MOD 00  22/11/21  PAGE  22

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#$@KED  001  000E 0956
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#$@KKE  001  0006 1364
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#$@KLO  001  0008 1044
#$@KME  001  0003 1024
#$@KMO  001  0004 0968
#$@KNA  001  0008 1080
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#$@KPO  001  000D 1064
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#$@KRV  001  000D 1108
#$@KSA  001  0004 1052
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#$@KSO  001  000D 1144
#$@KSS  001  000B 1076
#$@KSV  001  0002 1072
#$@KSY  001  000F 1084
#$@KWI  001  0002 1012
#$@KWR  001  0002 1004
#$@LOA  001  0013 0944
#$@MIP  001  000D 1140
#$@SDS  001  0004 1252
#$@SFF  001  0008 1256
#$@SFL  001  0005 1248
#$@SFO  001  0003 1220
#$@SFS  001  0011 1216
#$@SPA  001  0004 1056
#$@SPO  001  0003 1060
#$@SPS  001  0001 1048
#$@STR  001  0002 1224
#$@TDC  001  0003 1028
#$@TSY  001  0003 0988
#$@TVK  001  0001 1164
#$@UAL  001  0011 1180
#$@UAT  001  000C 1276
#$@UCD  001  000B 1284
#$@UCN  001  0009 1268
#$@UCP  001  000F 1272
#$@UDE  001  000E 1288
#$@UDI  001  0008 1292
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SYMBOL	LEN	VALUE	DEFN	REFERENCES
#$@UEX	001	000E	1176	
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#$@UPA	001	0004	1260	
#$@UPO	001	0005	1328	
#$@UPT	001	0012	1324	
#$@VCR	001	0008	1120	
#$@VLO	001	0002	1156	
#$@VOD	001	0016	1160	
#$@VVM	001	0030	1168	
#$@VXI	001	0002	1148	
#$@ZDU	001	0008	1300	
#$@ZLB	001	0002	1344	
#$@ZLO	001	000C	1304	
#$@ZLV	001	0006	1360	
#$@ZL1	001	0007	1348	
#$@ZL2	001	000D	1352	
#$@ZL3	001	000A	1356	
#$@ZTR	001	0001	1296	
#$@ZUT	001	0014	1308	
#$BCOM	001	0080	0938	
#$BOLV	001	1780	1210	
#$DPRI	001	014C	0946	1689
#$DREA	001	0200	0962	
#$DSPL	001	0240	0982	
#$ECMA	001	1900	1242	
#$EFKE	001	1990	1262	
#$ERRP	001	18C0	1234	
#$EXMS	001	07D4	1122	
#$FILN	001	1724	1202	
#$FIST	001	1700	1198	
#$FMLN	001	1E00	1330	
#$FMST	001	0D00	1170	
#$GRAP	001	0690	1094	
#$GUFU	001	1880	1230	
#$INLN	001	1C84	1310	
#$INST	001	0020	0934	
#$KALL	001	06A4	1098	
#$KCAL	001	1CC4	1314	
#$KCHA	001	053C	1066	
#$KCND	001	0F80	1182	
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#$KDEL	001	035C	1030	
#$KDIS	001	0744	1110	
#$KDNT	001	0300	1018	
#$KDOV	001	0780	1114	
#$KEDI	001	0188	0954	
#$KENA	001	01C4	0958	
#$KEXT	001	0234	0978	
#$KGOS	001	0180	0950	
#$KHEL	001	0A30	1134	
#$KKEY	001	2100	1362	
#$KLIS	001	0400	1038	
#$KLLA	001	2004	1338	
#$KLOG	001	0444	1042	
#$KMER	001	030C	1022	
#$KMOU	001	0204	0966	

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SYMBOL  LEN VALUE DEFN   REFERENCES                          VER 15, MOD 00  22/11/21  PAGE  24

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#$KPOO  001  0508 1062
#$KPRT  001  063C 1086
#$KREA  001  02BC 1006
#$KRLA  001  0700 1102
#$KRMO  001  0214 0970
#$KRNU  001  0280 0990
#$KROV  001  028C 0994
#$KRSU  001  1D24 1318
#$KRUN  001  02CC 1014
#$KRVL  001  0710 1106
#$KSAV  001  0488 1050
#$KSET  001  0680 1090
#$KSOV  001  0AC8 1142
#$KSSP  001  0594 1074
#$KSVL  001  058C 1070
#$KSYM  001  0600 1082
#$KWID  001  02C4 1010
#$KWRI  001  02B4 1002
#$LOAD  001  0100 0942
#$MIPP  001  0A80 1138
#$SDSY  001  192C 1250
#$SFFI  001  193C 1254
#$SFLO  001  1918 1246
#$SFOV  001  1844 1218
#$SFSY  001  1800 1214
#$SPAC  001  04CC 1054
#$SPOV  001  04DC 1058
#$SPSY  001  0484 1046
#$STRO  001  1850 1222
#$TDCK  001  0350 1026
#$TSYK  001  0250 0986
#$TVKB  001  0BAC 1162
#$UALL  001  0F00 1178
#$UATR  001  1A38 1274
#$UCDI  001  1AD8 1282
#$UCNF  001  19B8 1266
#$UCPL  001  19DC 1270
#$UDEL  001  1B24 1286
#$UDIS  001  1B5C 1290
#$UEXL  001  0EA8 1174
#$UINI  001  1A88 1278
#$UPAC  001  1980 1258
#$UPOV  001  1D24 1326
#$UPTF  001  1D5C 1322
#$VCRT  001  07B4 1118
#$VLOA  001  0B80 1154
#$VODK  001  0B88 1158
#$VVMR  001  0C00 1166
#$VXIT  001  0B00 1146
#$ZDUM  001  1BA4 1298
#$ZLBM  001  2008 1342
#$ZLOA  001  1BC4 1302
#$ZLVR  001  20B0 1358
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#$ZL2M   001  2030 1350
#$ZL3M   001  2088 1354
#$ZTRA   001  1B9C 1294
#$ZUTM   001  1C14 1306
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##DNEF   001  0003 0774    1525
##DNER   001  0005 0775    1580
##DNE1   001  0004 0772    1519
##DNHC   001  0000 0769    1489   1494
##DNHR   001  0003 0771
##DNHY   001  0001 0770
##DPEA   001  0009 0747
##DPEN   001  0007 0746
##DPER   001  000B 0748
##DPE1   001  0004 0745
##DPHC   001  0000 0743
##DPHR   001  0003 0744
##DUEA   001  0009 0758
##DUED   001  0012 0763
##DUEF   001  000B 0759
##DUEH   001  002B 0764
##DUEI   001  000C 0760
##DUEL   001  000F 0762
##DUEN   001  0007 0757
##DUER   001  0031 0765
##DUES   001  000D 0761
##DUE1   001  000C 0756
##DUHA   001  0001 0752
##DUHB   001  0003 0753
##DUHC   001  0004 0754
##DUHR   001  000B 0755
##LAAA   001  0002 0784
##LAHC   001  0001 0783    1571
##LN     001  0001 0812    1618
##LNE    001  0006 0818    1532   1572
##LNEF   001  0002 0816    1490   1496   1525   1580
##LNEZ   001  0002 0817
##LNH    001  0004 0815    1495   1597
##LNHY   001  0001 0813
##LNHZ   001  0002 0814
##LP     001  0004 0788
##LPE    001  000C 0793
##LPEN   001  0008 0790
##LPEZ   001  0002 0791
##LPH    001  0004 0792
##LPHZ   001  0003 0789
##LU     001  0002 0797    1627
##LUE    001  0032 0808
##LUED   001  0003 0805
##LUEF   001  0002 0801
##LUEH   001  0019 0806
##LUEI   001  0001 0802
##LUEL   001  0002 0804
##LUEN   001  0008 0800
##LUES   001  0001 0803
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SYMBOL	LEN	VALUE	DEFN	REFERENCES
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##LUH	001	000C	0799	
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##MPHM	001	0055	0826	
##MUEG	001	0020	0833	
##MUEK	001	0040	0832	
##MUEP	001	0080	0831	
##MUER	001	0008	0835	
##MUEV	001	0002	0837	
##MUEX	001	0010	0834	
##MUE0	001	0004	0836	
##MUHM	001	000A	0830	
##RN	001	0000	0732	
##RP	001	0001	0733	
##R1	001	0007	0735	
##R2	001	0005	0734	
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#@#IO1	001	0459	0876	
#@#IO2	001	045D	0877	
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#@#TSY	001	0941	0906	
#@#VFP	001	0700	0894	
#@#VLP	001	093D	0897	
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#@#WFT	001	0500	0887	1697
#@@#BA	001	0001	0869	
#@@#IO	001	0001	0881	
#@@#SC	001	0002	0878	
#@@#TA	001	0010	0905	
#@@#TB	001	0010	0909	
#@@#TS	001	0005	0907	
#@@#TW	001	0020	0903	
#@@#VM	001	0100	0898	
#@@#WD	001	00BD	0890	
#@@#WF	001	0003	0888	1698
#@@#04	001	0004	0880	
#@@#08	001	0008	0879	
#@@BOV	001	0018	0857	
#@@ECM	001	0006	0871	
#@@ERR	001	0003	0865	
#@@GUF	001	0010	0861	
#@@LDS	001	0002	0867	
#@@SDS	001	0004	0863	
#@@SFF	001	0008	0875	
#@@SFL	001	0005	0873	
#@@SFO	001	0005	0883	
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#@@VSF	001	0010	0911	
#@@VSL	001	000F	0912	
#@@VTR	001	0001	0896	
#@BOVL	001	0400	0856	
#@ECMA	001	0481	0870	
#@ERRP	001	0441	0864	

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#@GUFU  001  0401 0860
#@LDSV  001  044D 0866
#@SDSY  001  04AD 0862
#@SFFI  001  04BD 0874
#@SFLO  001  0449 0872
#@SFOV  001  04C4 0882
#@SFSY  001  0480 0858
#@VSFI  001  09A1 0910
#@VTRL  001  0708 0895
#@WAF1  001  0401 0855
#@WAR1  001  0400 0854
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@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  1499  1501* 1505  1506  1507  1509  1510  1512  1520  1521  1521  1522
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                        1538  1539  1540  1541  1542  1542  1543  1543  1545  1546  1547  1547
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                        1664  1664  1678  1678  1679  1679  1680  1682  1682  1683  1683  1703
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                        1820  1822  1822  1823  1824  1824  1828  1828  1829  1833  1833  1834
                        1836  1836  1837  1837  1838  1838  1839  1839  1840  1840  1846  1847
                        1848  1848  1849  1854  1854  1855  1855  1857  1857  1863*
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@CHARA  001  00C1 0073
@CHARF  001  00C6 0074
@CHARR  001  00D9 0075
@CHARZ  001  00E9 0076
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@CLON   001  0011 0094
@COMMA  001  006B 0067
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@DCBCY  001  0009 0115
@DCBT1  001  0050 0117
@DCNT   001  0003 0128   1505* 1509* 1560  1577* 1658* 1664  1679
@DCST1  001  0040 0116
@DCTRL  001  0000 0125
@DCYL   001  0001 0126   1822*
@DD2    001  0003 0031
@DGET   001  0001 0134   1624  1688  1696
@DOLAR  001  005B 0069
@DOP2   001  0004 0029   1813* 1817* 1818* 1880  1881
@DPLNG  001  0006 0132   1645  1819  1878
@DPOS   001  0000 0133
@DPUT   001  0002 0135   1606  1615
@DSAD   001  0002 0127   1520* 1524* 1528* 1531* 1537  1560* 1561  1563* 1564* 1579  1679* 1680
                         1682* 1683* 1820* 1824* 1828  1829* 1833* 1836* 1840  1846* 1854* 1857*
                         1879
@DSBCY  001  0004 0106
@DSCS1  001  0000 0107
@DSIVF  001  0003 0138
@DSPIN  001  0002 0131
@DTRSZ  001  0018 0086
@DVBCY  001  0007 0108
@DVRFY  001  0031 0136
@DWAIT  001  00FF 0137
@DWBCY  001  0005 0103
@DWSIZ  001  00C0 0105
@DWTB1  001  0003 0104
@DZERO  001  00F0 0065
@D1     001  0002 0027
@EOF    001  001C 0078
@EOFTC  001  0075 0161
@EOS    001  001E 0077
@FDDBC  001  0000 0194
@FDE1   001  000C 0199
@FDFNA  001  000B 0197
@FDHLN  001  0002 0207
@FDLNC  001  0002 0192
@FDNSC  001  0003 0209
@FDSD   001  0000 0205
@FLACE  001  0009 0196
@FLDBC  001  0001 0195
@FLENT  001  0004 0200
@FLFNA  001  0002 0198
@FLHLN  001  0002 0208
@FLLNC  001  0002 0193
@FLNSC  001  0001 0210
@FLSD   001  0001 0206
@HDRLN  001  0007 0093   0670
@IAR    001  0010 0018
@INDEX  001  0001 0155   0156
@INST3  001  0003 0033
```

```
@INST4   001  0004 0034
@INST5   001  0005 0035
@INST6   001  0006 0036
@I1IAR   001  00C0 0021
@LINSZ   001  00F4 0085   0644
@MAPEN   001  0005 0090
@MINCR   001  2000 0084
@MINUS   001  0060 0081
@NOP     001  0080 0041   1859
@NUMBR   001  007B 0071
@OPD2    001  0004 0030
@OP1     001  0003 0028   1657* 1672* 1809* 1815*
@OP2     001  0005 0032
@PCTRL   001  0000 0148
@PDATA   001  0003 0150
@PGCSZ   001  0020 0083   0084
@PPLNG   001  0004 0147
@PRCNT   001  0001 0149
@PRETR   001  00C0 0153
@PRINT   001  0040 0151   0153
@PSR     001  0004 0016
@PWAIT   001  00FF 0157
@P1IAR   001  0020 0019
@P2IAR   001  0040 0020
@Q       001  0001 0025   1860
@REGL    001  0002 0013
@RETRN   001  0080 0152   0153
@RLDWN   001  004F 0158
@RTRNC   001  0080 0160
@SBLNL   001  0002 0183
@SCTSZ   001  0100 0100
@SDFLN   001  0007 0091
@SDF0    001  0000 0165
@SDF1    001  0001 0166
@SDF2    001  0002 0167
@SDF3    001  0003 0168
@SDLN    001  0005 0169
@SECCY   001  0030 0087
@SIST    001  0001 0180
@SLASH   001  0061 0068
@SLAST   001  0002 0182
@SMIDL   001  0003 0181
@SNULL   001  0080 0172
@SONLY   001  0000 0179
@STEXT   001  0007 0171
@STYPE   001  0006 0170
@TBCNT   001  0000 0159
@TBLEF   001  0010 0154   0156
@TBLIX   001  0011 0156
@UCB     001  0087 0040
@UPARW   001  005A 0079
@VADDR   001  0002 0141
@VENTA   001  0056 0113
@VMDDV   001  00FE 0114
@VMFD1   001  0000 0109
@VMFD2   001  0001 0110
```

```
                              CROSS REFERENCE

SYMBOL  LEN VALUE DEFN   REFERENCES                          VER 15, MOD 00  22/11/21  PAGE  30

@VMRS3  001  0002 0112
@VMTRL  001  0001 0111
@VOLID  001  0006 0092
@VQ     001  0001 0026
@WSFIT  001  0500 0101
@WSTBL  001  0503 0102
@XR     001  0002 0015   1519* 1520  1523  1524  1525  1532  1572  1572* 1580  1587* 1642*
@ZERO   001  0000 0063   1522  1539  1545  1829
DL2C01  002  0A9B 1872   1812  1814  1822
DL2C05  002  0A9D 1873   1818
DL2C48  001  0A97 1870   1820  1824
DL2DPL  006  0AA3 1878   1819*
DL2END  001  0AA6 1883
DL2E01  001  0001 1802   1820  1822  1824  1828  1840  1848
DL2E02  001  0002 1803   1833  1836  1854
DL2E18  001  0018 1804   1834
DL2E60  001  0060 1805   1849
DL2E7C  001  007C 1807   1846
DL2ICS  001  0A0D 1808   1583  1660  1674
DL2K18  002  0A99 1871   1837
DL2K60  002  0A94 1868   1855
DL2K80  002  0A96 1869   1836  1854
DL2LST  001  0A9E 1877   1820* 1822* 1824* 1828  1829* 1833* 1836* 1840  1846* 1854* 1857* 1862
                         1879
DL2PHY  001  0AA0 1879
DL2RAD  002  0AA5 1882   1504* 1833
DL2SAD  005  0A25 1880   1840* 1847* 1848* 1849  1855* 1857
DL2SEC  005  0A2E 1881   1828* 1834  1837* 1838  1838* 1839  1839* 1848
DL2SWH  003  0A83 1860
DL2TSD  001  0083 1806   1847
DL2000  001  0A11 1810   1800  1811
DL2001  005  0A21 1817   1813* 1880
DL2002  005  0A2A 1819   1817* 1818* 1881
DL2005  004  0A2F 1820   1823
DL2006  004  0A3D 1824   1821
DL2008  004  0A5A 1838   1835
DL2010  003  0A70 1849
DL2100  004  0A7E 1857   1850
DL2110  003  0A82 1859   1860
DL2900  004  0A8B 1863   1809* 1859
DL2910  004  0A8F 1864   1815*
SPABCT  004  0926 1595   1550* 1551  1554* 1555  1558  1569  1569* 1575  1577
SPABFA  002  092A 1597
SPACK2  001  080D 1500
SPACNT  004  0928 1594   1521  1521* 1595  1596
SPACXT  002  0933 1602   1506* 1507  1510* 1551  1554
SPAC00  002  092E 1599   1575
SPAC01  001  092F 1600   1528  1548  1564  1571  1683
SPAC30  002  092C 1598   1526  1530  1542  1547  1563  1682
SPAEND  001  0AA6 1885   1601  1610  1632
SPAENT  002  0924 1592   1522* 1523* 1525* 1526* 1530* 1531  1593
SPAE01  001  0001 1497   1511  1581
SPAE02  001  0002 1493   1526  1547  1550  1551  1554  1555  1558  1569  1575
SPAE30  001  0030 1491   1507  1509  1510  1540  1561  1680
SPAFIT  001  099C 1695   1636
SPAHDR  001  0700 1494   1581*
```

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                                          CROSS REFERENCE

SYMBOL  LEN VALUE DEFN   REFERENCES                             VER 15, MOD 00  22/11/21  PAGE  31

SPAI#O  001  0016 1649   1589  1589*
SPAI@O  001  095B 1648   1589  1649
SPAINA  002  0931 1601   1559  1570  1678
SPAIOP  001  0996 1687   1639
SPAIOR  001  0946 1634   1649
SPAMXT  001  0014 1492   1602  1609
SPANAC  001  0004 1490
SPANBF  001  0700 1488   1494  1495  1519  1597  1619
SPANEC  001  0700 1489   1511  1571*
SPANEW  001  0705 1495   1496  1579*
SPANNC  001  0707 1496   1580*
SPANT2  002  0924 1593   1532* 1537* 1540  1542* 1543  1545  1548*
SPAPL1  001  0940 1623   1524* 1528* 1531* 1537  1559* 1560  1560* 1561  1563* 1564* 1570* 1631
                        1658* 1661  1664  1664* 1678*
SPAPL2  001  093A 1614   1584
SPAPL3  001  0934 1605   1505* 1509* 1520* 1577* 1579  1675  1679  1679* 1680  1682* 1683*
SPARED  004  095C 1657   1556  1567  1702
SPARRT  004  096E 1665   1657*
SPASCT  004  0928 1596   1539* 1543* 1547* 1550  1555* 1558* 1658
SPATOT  004  0881 1544
SPAWRT  004  0972 1672   1557  1568  1578  1672*
SPAWXT  004  0992 1684   1681
SPA005  004  082D 1511   1508
SPA011  004  0834 1519
SPA040  003  0840 1522   1573
SPA042  004  084F 1526   1529
SPA043  004  085F 1530   1527
SPA060  004  0880 1543   1499  1501  1541  1544
SPA065  003  0884 1545   1549
SPA070  004  0895 1550   1546
SPA075  004  0899 1551   1562  1565
SPA080  004  08D2 1567   1552
SPA085  005  08E2 1571   1538  1703
SPA090  004  08EE 1575
SPA091  005  08FD 1579   1576
SPA098  004  0911 1587   1512
SPA100  004  09A2 1702   1553

TOTAL STATEMENTS IN ERROR IN THIS ASSEMBLY =      0

OL105 I  THE CODE LENGTH OF #SPOVL IS  2726 DECIMAL.
       NAME-#SPOVL,PACK-R1R1R1,UNIT-R1,RETAIN-P,LIBRARY-R,CATEGORY-000
```

```
          OVERLAY LINKAGE EDITOR CORE USAGE MAP     22/11/21


  START      CATEGORY   NAME AND        CODE LENGTH
 ADDRESS                 ENTRY      HEXADECIMAL DECIMAL

  0806         0      #SPOVL          0AA6    2726


 OL100 I  THE TOTAL CORE USED BY #SPOVL IS  2726 DECIMAL.
 OL101 I  THE START CONTROL ADDRESS OF THIS MODULE IS 0806.
 OL104 I  TOTAL NUMBER OF LIBRARY SECTORS REQUIRED IS    11
          NAME-#SPOVL,PACK-R1R1R1,UNIT-R1,RETAIN-P,LIBRARY-O
           1675* 1678  1681  1681* 1695*
 SPAPL2  001  093A 1620    1584
 SPAPL3  001  0934 1605    1505* 1509* 1520* 1577* 1579  1692  1696  1696* 1697  1699* 1700*
 SPARED  004  095C 1674    1556  1567  1719
 SPARRT  004  096E 1682    1674*
 SPASCT  004  0928 1596    1539* 1543* 1547* 1550  1555* 1558* 1675
 SPATOT  004  0881 1544
 SPAWRT  004  0972 1689    1557  1568  1578  1689*
 SPAWXT  004  0992 1701    1698
 SPA005  004  082D 1511    1508
 SPA011  004  0834 1519
 SPA040  003  0840 1522    1573
 SPA042  004  084F 1526    1529
 SPA043  004  085F 1530    1527
 SPA060  004  0880 1543    1499  1501  1541  1544
 SPA065  003  0884 1545    1549
 SPA070  004  0895 1550    1546
 SPA075  004  0899 1551    1562  1565
 SPA080  004  08D2 1567    1552
 SPA085  005  08E2 1571    1538  1720
 SPA090  004  08EE 1575
 SPA091  005  08FD 1579    1576
 SPA098  004  0911 1587    1512
 SPA100  004  09A2 1719    1553

 TOTAL STATEMENTS IN ERROR IN THIS ASSEMBLY =      0

 OL105 I  THE CODE LENGTH OF #SPOVL IS  2726 DECIMAL.
```