```
 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  11/05/20  PAGE   1

#SFSYN   MODULE
```

```
ERR LOC  OBJECT CODE     ADDR STMT SOURCE STATEMENT          VER 15, MOD 00  11/05/20  PAGE   2

    0000                        1 #SFSYN START 0
                                2       PRINT ON,NODATA
                                3 *     @SYS  EXP-N
                              212+      PRINT ON
                              213 *     @FXD  EXP-N
                              618+      PRINT ON
                              619 *     @CAN  EXP-N
                              722+      PRINT ON
                              723 *     @WKA  EXP-N
                              793+      PRINT ON
                              794 *     @SPF  EXP-N
                             1257+      PRINT ON
                             1258 *     @ERM  EXP-N
                             1880+      PRINT ON
                             1881 *     @B@E  EXP-Y
                             1883+      PRINT ON
```

```
      $B@EQU - S/3 BASIC COMPILER FIXED ADDRESS EQUATES
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```
                    1885+****************************************************************************
                    1886+*       COMPILER DISK INPUT/OUTPUT WORK BUFFER ADDRESSES              *
                    1887+****************************************************************************
                    1888+*
           0600 1889+B$CSBF EQU    $ENDNU                    DISK RESIDENT PMC GENERATORS
           1A00 1890+B$LDRP EQU    X'1A00'                   LOADER PARAM COMM AREA CADDR
           1C00 1891+B$SABF EQU    X'1C00'                   STATEMENT ADDRESS TABLE BFR
           1D00 1892+B$BABF EQU    X'1D00'                   PMC BRANCH ADDRESS TABLE BFR
           1E00 1893+B$GTBF EQU    X'1E00'                   SOURCE TEXT INPUT BUFFER
           1F00 1894+B$PTBF EQU    X'1F00'                   PSEUDO CODE OUTPUT BUFFER
           2000 1895+B$CSXA EQU    X'2000'                   STARTING CADDR FOR EXCESS CORE
```

```
                      1897+*******************************************************************
                      1898+* COMPILER STATEMENT PROCESSOR CORE ADDRESS ENTRY POINTS - 8K SYSTEM  *
                      1899+* NOTE - AN EQUATE TO ZERO (0) INDICATES PERMANENT CORE RESIDENCY      *
                      1900+*******************************************************************
                      1901+*
          0000 1902+B$CREM EQU   0                            REM
          0600 1903+B$CDAT EQU   B$CSBF+X'00'                 DATE
          0600 1904+B$CDEF EQU   B$CSBF+X'00'                 DEF
          0673 1905+B$CDIM EQU   B$CSBF+X'73'                 DIM
          0000 1906+B$CLTA EQU   0                            LET (ARITHMETIC, SIMPLE)
          0000 1907+B$CASA EQU   0                            ASSIGNMENT (ARITH. SIMPLE)
          0600 1908+B$CLTM EQU   B$CSBF+X'00'                 LET (ARITHMETIC, MULTIPLE)
          0608 1909+B$CASM EQU   B$CSBF+X'08'                 ASSIGNMENT (ARITH, MULTIPLE)
          0669 1910+B$CLTC EQU   B$CSBF+X'69'                 LET (CHARACTER)
          0671 1911+B$CASC EQU   B$CSBF+X'71'                 ASSIGNMENT (CHARACTER)
          0600 1912+B$CFOR EQU   B$CSBF+X'00'                 FOR
          0600 1913+B$CNXT EQU   B$CSBF+X'00'                 NEXT
          0600 1914+B$CIFA EQU   B$CSBF+X'00'                 IF (ARITHMETIC)
          0600 1915+B$CIFC EQU   B$CSBF+X'00'                 IF (CHARACTER)
          06B3 1916+B$CGTO EQU   B$CSBF+X'B3'                 GO TO (SIMPLE)
          0600 1917+B$CCGT EQU   B$CSBF+X'00'                 GO TO (COMPUTED)
          0690 1918+B$CGSB EQU   B$CSBF+X'90'                 GO SUB
          06CF 1919+B$CRTN EQU   B$CSBF+X'CF'                 RETURN
          06A3 1920+B$CGET EQU   B$CSBF+X'A3'                 GET
          0600 1921+B$CPUT EQU   B$CSBF+X'00'                 PUT
          06A6 1922+B$CRST EQU   B$CSBF+X'A6'                 RESET
          0695 1923+B$CCLS EQU   B$CSBF+X'95'                 CLOSE
          0600 1924+B$CINP EQU   B$CSBF+X'00'                 INPUT
          06CF 1925+B$CREA EQU   B$CSBF+X'CF'                 READ
          06E3 1926+B$CRSR EQU   B$CSBF+X'E3'                 RESTORE
          0600 1927+B$CPRT EQU   B$CSBF+X'00'                 PRINT
          0600 1928+B$CPRU EQU   B$CSBF+X'00'                 PRINT USING
          0600 1929+B$CIMG EQU   B$CSBF+X'00'                 IMAGE
          0600 1930+B$CMAT EQU   B$CSBF+X'00'                 MAT (ASSIGNMENT)
          0665 1931+B$CMGT EQU   B$CSBF+X'65'                 MAT GET
          06D3 1932+B$CMIN EQU   B$CSBF+X'D3'                 MAT INPUT
          06D0 1933+B$CMRD EQU   B$CSBF+X'D0'                 MAT READ
          069B 1934+B$CMPT EQU   B$CSBF+X'9B'                 MAT PUT
          069B 1935+B$CMPR EQU   B$CSBF+X'9B'                 MAT PRINT
          0600 1936+B$CMPU EQU   B$CSBF+X'00'                 MAT PRINT USING
          06E7 1937+B$CPSE EQU   B$CSBF+X'E7'                 PAUSE
          06D6 1938+B$CSTP EQU   B$CSBF+X'D6'                 STOP
          0600 1939+B$CEND EQU   B$CSBF+X'00'                 END
          0600 1940+B$CEOF EQU   B$CEND                       END-OF-FILE
          0000 1941+B$CDUM EQU   0                            TRUNCATED STATEMENT
          0600 1942+B$STRL EQU   B$CSBF+X'00'                 LET (CHAR,SIMPLE,SUBSTRING)   1-4
          0600 1943+B$STML EQU   B$CSBF+X'00'                 LET (CHAROULT,SUBSTRING)      1-4
          061B 1944+B$STAS EQU   B$CSBF+X'1B'                 ASSIGNMENT (C,S,SUBSTRING)    1-4
          061B 1945+B$STMA EQU   B$CSBF+X'1B'                 ASSIGNMENT (C,M,SUBSTRING)    1-4
          0606 1946+B$STIF EQU   B$CSBF+X'06'                 IF (CHARACTER,SUBSTRING)      1-4
```

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                     1948+*****************************************************************************
                     1949+* CORE RESIDENT ROUTINE ENTRY POINTS AND PARAMETER ADDRESSES        *
                     1950+* NOTE - THESE ADDRESS CONSTANTS ARE COPIED FROM THE 'COMMON CORE    *
                     1951+*         ADDRESS EQUATE' SECTION OR THE ASSEMBLED LISTING FOR THE   *
                     1952+*         COMPILER COMMON SECTION MODULE (BZCOMN).                   *
                     1953+*****************************************************************************
                     1954+*
          0700 1955+B$DIST EQU    X'0700'                    ENTRY - COMPILER DISTRIBUTOR
          073A 1956+B$DST2 EQU    X'073A'                    ENTRY - STMT PROC SEG LOADER
          07D0 1957+B$LINE EQU    X'07D0'                    CURRENT STATEMENT LINE NO.
          0739 1958+B$TYPE EQU    X'0739'                    CURRENT STATEMENT TYPE
          07DA 1959+B$SDPL EQU    X'07DA'                    STMT ADDR TABLE DPL CADDOR
          07E0 1960+B$SPAT EQU    X'07E0'                    CADDR OF STMT PROCESSOR TABLE
                     1961+*
          1996 1962+B$BTAB EQU    X'1996'                    ENTRY - BRANCH TABLE ROUTINE
          19EE 1963+B$BRVP EQU    X'19EE'                    BRANCH TABLE VIRTUAL PAGE NO.
          19EF 1964+B$BRVA EQU    X'19EF'                    BRANCH TABLE VIRTUAL PAGE DISP
          19F1 1965+B$BRLN EQU    X'19F1'                    BRANCH TABLE STMT LINE NO.
          19E8 1966+B$BDPL EQU    X'19E8'                    BRANCH ADD, TABLE DPL CADDR
          19EA 1967+B$BDSA EQU    X'19EA'                    BRANCH TBL FILE NEXT AVAIL SCR
                     1968+*
          0867 1969+B$GETC EQU    X'0867'                    ENTRY - SOURCE TEXT 'GET' RTN
          0873 1970+B$NUMC EQU    X'0873'                    CHARACTER SKIP PARAMETER
          0878 1971+B$GPTR EQU    X'0878'                    INPUT BUFFER POINTER
                     1972+*
          093A 1973+B$PUTC EQU    X'093A'                    ENTRY - COMPILER OUTPUT RTN
          094E 1974+B$PFNC EQU    X'094E'                    'PUT' ROUTINE FUNCTION PARAM
          0015 1975+B$PFWP EQU    X'0015'                    'PUT' RTN 'WRITE PAGE' CODE
          0033 1976+B$PFAE EQU    X'0033'                    'PUT' RTN 'ADD ERROR' FOC CODE
          009D 1977+B$PFCL EQU    X'009D'                    RTN 'CLOSE' FUNC CODE
          0A41 1978+B$PARP EQU    X'0A41'                    'ADD RECORD' DATA PARAMETERS
          0A40 1979+B$PCAD EQU    X'0A40'                    CORE ADDR OF PMC STRIND
          0A41 1980+B$PNBY EQU    X'0A41'                    PMC STRING LENSTH PARAMETER
          0A43 1981+B$PVAD EQU    X'0A43'                    NEYT AVAILABLE VADDR FOR PMC
          0A35 1982+B$PCPG EQU    X'0A35'                    LAST PAGE FILLED WITH CONSTANTS
          09D3 1983+B$PCDL EQU    X'09D3'                    BYTE COUNT FOR LAST PUT STRING
          0A01 1984+B$PBNL EQU    X'0A01'                    NO. BYTES LEFT IN CURR PMC BFR
          0A39 1985+B$PERC EQU    X'0A39'                    COMPILER ERROR MESSAGE CODE
          0A44 1986+B$PECT EQU    X'0A44'                    COMPILER ERROR MESSAGE COUNT
                     1987+*
          0A46 1988+B$FCON EQU    X'0A46'                    ENTRY - CONSTANT ROUTINE
          0A5F 1989+B$CTYP EQU    X'0A5F'                    CONSTANT RTN TYPE PARAMETER
          001F 1990+B$CCON EQU    X'001F'                    CONSTANT RTN CHAR CON CODE
          001B 1991+B$SCON EQU    X'001B'                    CONSTANT RTN STRING CON CODE
          0CBC 1992+B$CBFA EQU    X'0CBC'                    CONSTANT CORE BUFFER ADDR
          0CA5 1993+B$CVPG EQU    X'0CA5'                    CONSTANT VIRTUAL PAGE NO.
          0C5D 1994+B$CVPD EQU    X'0C5D'                    CONSTANT BUFFER POINTER DISP
          0CA8 1995+B$CPCT EQU    X'0CA8'                    CONSTANT RTN SEGMENT COUNT
                     1996+*
          0DBC 1997+B$SYMB EQU    X'0DBC'                    ENTRY - SYMBOL TABLE ROUTINE
          0E53 1998+B$FACA EQU    X'0E53'                    FUNC AND ARRAY ATTRIBUTE CADDR
          0E4C 1999+B$FSC1 EQU    X'0E4C'                    USER FUNC ARGUMENT 1ST DAR
          0E4D 2000+B$FSC2 EQU    X'0E4D'                    USER FUNC ARGUMENT 2ND CHAR
          0E4F 2001+B$FSVA EQU    X'0E4F'                    USER FUNC ARGUMENT VADDR
          0E46 2002+B$SVRB EQU    X'0E46'                    VARIABLE ALLOCATION BASE VADDR
          0E48 2003+B$SFAB EQU    X'0E48'                    SEE TABLE ALLOCATION BASE VADDR
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                          1062 2004+B$SLVT EQU   X'1062'                  LETTER VAR SYMBOL TABLE CADDR
                          109C 2005+B$SLDT EQU   X'109C'                  LTR-DIG VAR SYMBOL TABLE CADDR
                          12E0 2006+B$SCVT EQU   X'12E0'                  CHAR VAR SYMBOL TABLE CADDR
                          131A 2007+B$SNAT EQU   X'131A'                  ARITH ARRAY SYMBOL TABLE CADDR
                          13C8 2008+B$SCAT EQU   X'13C8'                  CHAR ARRAY SYMBOL TABLE CADDR
                          143C 2009+B$SFNT EQU   X'143C'                  USER FUNC SYMBOL TABLE CADDR
                               2010+*
                          14B0 2011+B$CSCN EQU   X'14B0'                  ENTRY - CHARACTER SCAN RTN
                               2012+*
                          1514 2013+B$SCAN EQU   X'1514'                  ENTRY - ARITHMETIC SCAN RTN
                          1590 2014+B$BCKT EQU   X'1590'                  SYMBOL ADDR OUTPUT PARAMETER
                          15AC 2015+B$FAIS EQU   X'15AC'                  VADDR FOR 1ST INTERNAL CONSTANT
                          15A0 2016+B$FAIW EQU   X'15A0'                  VADDR FOR 1ST INTERNAL VARIABLE
                          15A8 2017+B$FVPE EQU   X'15A8'                  VADDR OR INTERNAL CON 'E'
                          15AA 2018+B$FVPP EQU   X'15AA'                  VADDR OF INTERNAL CON 'PI'
                          15AC 2019+B$FVPS EQU   X'15AC'                  VADDR OF INTERNAL CON 'SQR2'
                          15A2 2020+B$FVME EQU   X'15A2'                  VADDR OF INTERNAL CON '-E'
                          15A4 2021+B$FVMP EQU   X'15A4'                  VADDR OF INTERNAL CON '-PI'
                          15A6 2022+B$FVMS EQU   X'15A6'                  VADDR OF INTERNAL CON '-SQR2'
                               2023+*
                          1853 2024+B$LIST EQU   X'1853'                  ENTRY - ASSIGNMENT LIST RTN
                          18F2 2025+B$LTYP EQU   X'18F2'                  LIST ELEMENT TYPE CODE BYTE
                               2026+*
                          18F3 2027+B$MATR EQU   X'18F3'                  ENTRY - MATRIX REFERENCE RTN
                               2028+*
                          19F2 2029+B$ZDBN EQU   X'19F2'                  ENTRY - DECIMAL TO BINARY CONV
                          1A6A 2030+B$BINO EQU   X'1A6A'                  BINARY NUMBER ACCUMULATOR
                               2031+*
                          1A6B 2032+B$DL4T EQU   X'1A6B'                  ENTRY - DISK 4-TRACK LIOCR
                               2033+*
                          1AE6 2034+B$RMRK EQU   X'1AE6'                  ENTRY - 'REM' STMT PROCESSOR
                          14CC 2035+B$CSTR EQU   X'14CC'                  STRING ENTRY POINT FOR BECSCN1-4
                          150D 2036+B$CRAD EQU   X'150D'                  RETURN BR OPERAND IN BECSCN  1-4
                          14BB 2037+B$CBAS EQU   X'14BB'                  BASE ADDRESS IN BECSCN       1-4
                          1509 2038+B$CRBS EQU   X'1509'                  SAVE AREA FOR RTRN BASE REG  1-4
                          1862 2039+B$LSTR EQU   X'1862'                  ENTRY PT BLISTA FOR STR RTN  1-4
                          18E7 2040+B$LBSV EQU   X'18E7'                  BASE REG SV AREA IN BLISTA   1-4
                          18EB 2041+B$LRTN EQU   X'18EB'                  RETURN ADDR SV AREA IN BLISTA1-4
                          185E 2042+B$LBAS EQU   X'185E'                  BLISTA BASE ADDRESS          1-4
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                         2044+*********************************************************************
                         2045+* MISCELLANEOUS FIXED EQUATES                                       *
                         2046+* NOTE - THESE ADDRESS CONSTANTS ARE COPIED FROM THE 'COMMON CORE    *
                         2047+*         ADDRESS EQUATE' SECTION OF THE ASSEMBLED LISTING FOR THE   *
                         2048+*         COMPILER COMMON SECTION MODULE (BZCOMN).                   *
                         2049+*********************************************************************
                         2050+*
                    1B38 2051+B$INVT EQU   X'1B38'                     INPUT VERIFICATION TABLE ADDR
                         2052+*
                    1B8F 2053+B$MFBK EQU   X'1B8F'                     MAT ASSIGN FUNCTION BUCKET ADP
                         2054+*
                    1BAC 2055+B$SSTA EQU   X'1BAC'                     INDICATOR FOR 'STEP' ALLOWED
                         2056+*
                    1B0E 2057+B$FORT EQU   X'1B0E'                     'FOR' TABLE STARTING ADDRESS
                    1B0D 2058+B$FTPT EQU   X'1B0D'                     'FOR' TABLE POINTER
                    1B0B 2059+B$FTND EQU   X'1B0B'                     'FOR' 1NBLE ENDING ADDRESS
                         2060+*
                    1B37 2061+B$DLNK EQU   X'1B37'                     'DATA' FILE LINKAGE OPERAND
                    15A0 2062+B$WORK EQU   X'15A0'                     VIRTUAL ADDR CONSTANT FOR WORK
                    F500 2063+B$CWRK EQU   X'F500'                     VADDR CONSTANT FOR CWRK       1-4
                         2064+*
                    0A35 2065+B$PPWA EQU   X'0A35'                     CADDR CF BBPUTC PRECISION AREA
                    0CA6 2066+B$CPWA EQU   X'0CA6'                     CADDR OF BCFCON PRECISION AREA
                    0E46 2067+B$DPWA EQU   X'0E46'                     CADDR OF BDSYMB PRECISION AREA
                    15AC 2068+B$FPWA EQU   X'15AC'                     CADDR OF BFSCAN PRECISION AREA
                    1AF3 2069+B$PRM1 EQU   X'1AF3'                     BSTRIF PARAM WORKAREA         1-4
                    1AF5 2070+B$RTRN EQU   X'1AF5'                     BSTMLT-CONTROL RETURN ADDR    1-4
                    1AF7 2071+B$BROP EQU   X'1AF7'                     BSTMLT-RETURN BR VADDR OPRND 1-4
                    1AF9 2072+B$CADR EQU   X'1AF9'                     BSTMLT-CONTROL CADDR          1-4
                    1AFA 2073+B$TTAB EQU   X'1AFA'                     REL OPRTR-COND CODE TBL ADDR 1-4
                    0000 2074+B$TOD1 EQU   0                           DISP FOR TABLE OPERATOR       1-4
                    0001 2075+B$TCD2 EQU   1                           DISP FOR TABLE COND CODE      1-4
                    0002 2076+B$TLTH EQU   2                           LENGTH OF TABLE ENTRY         1-4
                    1AF8 2077+B$TOTB EQU   B$TTAB-B$TLTH               CODE TABLE BASE ADDRESS       1-4
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```
                         2079+*******************************************************************************
                         2080+* COMPILER SWITCHES                                                           *
                         2081+* NOTE - THESE ADDRESS CONSTANTS ARE COPIED FROM THE 'COMMON CORE             *
                         2082+*        ADDRESS EQUATE' SECTION OF' THE ASSEMBLED LISTING FOR THE            *
                         2083+*        COMPILER COMMON SECTION MODULE (BZCOMN).                             *
                         2084+*******************************************************************************
                         2085+*
         0A45            2086+B$ARSW EQU    X'0A45'                       'ADD RECORD' EXECUTIOW SWITCH
         0001            2087+B$ARMK EQU    X'0001'                       'ADD RECORD' EXEC SWITCH MASK
                         2088+*
         0993            2089+B$ERSW EQU    X'0993'                       COMPILER ERROR SWITCH
         0007            2090+B$ERMK EQU    X'0007'                       COMPILER ERROR SWITCH MASK
                         2091+*
         08AF            2092+B$GBSW EQU    X'08AF'                       GETC 'BLANK' BYPASS SWITCH
         0001            2093+B$GBWK EQU    X'0001'                       GETC 'BLANK' BYPASS SWITCH MASK
                         2094+*
         071D            2095+B$NXSW EQU    X'071D'                       'NEXT' UNRESOLVED BRANCH SWITCH
         0007            2096+B$NXMK EQU    X'0007'                       'NEXT' UNRESOLVED BRANCH MASK
                         2097+*
         0E5C            2098+B$FSSW EQU    X'0E5C'                       USER FUNCTION SCAN SWITCH
         0007            2099+B$FSMK EQU    X'0007'                       USER FUNCTION SCAN SWITCH MASK
                         2100+*
         159D            2101+B$ADSW EQU    X'159D'                       AVAILABLE ADDRESS SWITCH
         0001            2102+B$ADMK EQU    X'0001'                       AVAILABLE ADDRESS SWITCH MASK
                         2103+*
         159E            2104+B$KWSW EQU    X'159E'                       EXPRESSION KEYWORD SWITCH
         0001            2105+B$KWMK EQU    X'0001'                       EXPRESSION KEYWORD SWITCH MASK
                         2106+*
         16CC            2107+B$FRSW EQU    X'16CC'                       FUNCTION REFERENCE SWITCH
         0007            2108+B$FRMK EQU    X'0007'                       FUNCTION REFERENCE SWITCH MASK
                         2109+*
         16E5            2110+B$IFSW EQU    X'16E5'                       INTRINSIC FUNCTION SWITCH
         0007            2111+B$IFMK EQU    X'0007'                       INTRINSIC FUNCTION SWITCH MASK
                         2112+*
         0E42            2113+B$CRSW EQU    X'0E42'                       CHARACTER REFERENCE SWITCH
         0001            2114+B$CRMK EQU    X'0001'                       CHARACTER REFERENCE SWITCH MASK
                         2115+*
         14BC            2116+B$CSSW EQU    X'14BC'                       CHARACTER EXPR SCAN SWITCH
         0007            2117+B$CSMK EQU    X'0007'                       CHARACTER EXPR SCAN SWITCH MASK
                         2118+*
         0DDE            2119+B$MRSW EQU    X'0DDE'                       MATRIX REFERENCE SCAN SWITCH
         0007            2120+B$MRMK EQU    X'0007'                       MATRIX REFERENCE SCAN SW MASK
                         2121+*
         18FF            2122+B$MGSW EQU    X'18FF'                       MAT ASSIGNMENT 'GET' SWITCH
         0007            2123+B$MGMK EQU    X'0007'                       MAT ASSIGNMENT 'GET' SW MASK
                         2124+*
         1903            2125+B$MBSW EQU    X'1903'                       MAT SYMBOL PROC BYPASS SWITCH
         0007            2126+B$MBMK EQU    X'0007'                       MAT SYMBOL PROC BYPASS SW MASK
                         2127+*
         1981            2128+B$MPSW EQU    X'1981'                       MAT ASSIGNMENT 'PUT' SWITCH
         0007            2129+B$MPMK EQU    X'0007'                       MAT ASSIGNMENT 'PUT' SW MASK
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                        2131+*********************************************************************
                        2132+*       PSEUDO OP CODE EQUATES                                       *
                        2133+*********************************************************************
                        2134+*
                   0002 2135+B@CSVC EQU   2                        SUPERVISOR CALL
                   0004 2136+B@CHLT EQU   4                        HALT EXECUTION
                   0006 2137+B@CADD EQU   6                        ADD
                   0008 2138+B@CSUB EQU   8                        SUBTRACT
                   000A 2139+B@CMPY EQU   10                       MULTIPLY
                   000C 2140+B@CDIV EQU   12                       DIVIDE
                   000E 2141+B@CPWR EQU   14                       EXPONENTIATE
                   0010 2142+B@CNEG EQU   16                       NEGATE
                   0012 2143+B@CFN0 EQU   18                       FUNCTION CALL - NO ARGUMENT
                   0014 2144+B@CFN1 EQU   20                       FUNCTION CALL - 1 ARGUMENT
                   0016 2145+B@CFCI EQU   22                       FUNCTION CALL - INDIRECT
                   0018 2146+B@CMF1 EQU   24                       1 MATRIX FUNCTION CALL
                   001A 2147+B@CMF2 EQU   26                       2 MATRIX FUNCTION CALL
                   001C 2148+B@CMF3 EQU   28                       3 MATRIX FUNCTION CALL
                   001E 2149+B@CMSM EQU   30                       MATRIX-SCALAR MPY FUNC CALL
                   0020 2150+B@CSTF EQU   32                       STACK FLOATING VALUE
                   0022 2151+B@CSF1 EQU   34                       STACK ARITH VECTOR VALUE
                   0024 2152+B@CSF2 EQU   36                       STACK ARITH MATRIX VALUE
                   0026 2153+B@CUSF EQU   38                       UNSTACK FLOATING VALUE
                   0028 2154+B@CSTC EQU   40                       STACK CHARACTER FIELD
                   002A 2155+B@CSC1 EQU   42                       STACK CHARACTER ARRAY FIELD
                   002C 2156+B@CUSC EQU   44                       UNSTACK CHARACTER FIELD
                   002E 2157+B@CSD0 EQU   46                       STACK DOPE VECTOR
                   0030 2158+B@CSD1 EQU   48                       STACK DOPE VECTOR - REDIM 1
                   0032 2159+B@CSD2 EQU   50                       STACK DOPE VECTOR - REDIM 2
                   0034 2160+B@CSTA EQU   52                       STACK VIRTUAL ADDRESS
                   0036 2161+B@CSA1 EQU   54                       STACK ARITH VECTOR ADDRESS
                   0038 2162+B@CSA2 EQU   56                       STACK ARITH MATRIX ADDRESS
                   003A 2163+B@CSB1 EQU   58                       STACK CHARACTER ARRAY ADDRESS
                   003C 2164+B@CSTX EQU   60                       STACK EXECUTION CONTROL CODE
                   003E 2165+B@CCSA EQU   62                       COMPUTE STACKED ADDRESS
                   0040 2166+B@CCMF EQU   64                       COMPARE FLOATING VALUES
                   0042 2167+B@CCMC EQU   66                       COMPARE CHARACTER FIELDS
                   0044 2168+B@CBRC EQU   68                       BRANCH ON CONDITION
                   0046 2169+B@CBRA EQU   70                       BRANCH UNCONDITIONALLY
                   0048 2170+B@CBRD EQU   72                       BRANCH AND DELETE FUNC REF
                   004A 2171+B@CBNX EQU   74                       BRANCH AND SKIP EXECUTION
                   004C 2172+B@CBRS EQU   76                       BRANCH TO STACKED ADDRESS
                   004E 2173+B@CFOR EQU   78                       BEGIN 'FOR' LOOP
                   0050 2174+B@CNXT EQU   80                       CONTINUE 'FOR' LOOP
                   0052 2175+B@CGET EQU   82                       INPUT DATA ELEMENT
                   0054 2176+B@CPUT EQU   84                       OUTPUT DATA ELEMENT
                   0056 2177+B@CINI EQU   86                       INITIATE DATA INPUT
                   0058 2178+B@CADF EQU   88                       ACTIVATE DATA FILE
                   005A 2179+B@CRSR EQU   90                       RESTORE DATA FILE POINTER
                   005C 2180+B@CRST EQU   92                       RESET DATA FILE POINTER
                   005E 2181+B@CCLS EQU   94                       CLOSE A DATA FILE
                   0060 2182+B@CPRS EQU   96                       PRINT AND SPACE CARRIER
                   0062 2183+B@CPRU EQU   98                       PRINT USING IMAGE
                   0064 2184+B@CSTH EQU   100                      STATEMENT HEADER
                   0066 2185+B@CIMH EQU   102                      IMAGE STATEMENT HEADER
                   0068 2186+B@CEOP EQU   104                      END OF PSEUDO CODE PAGE
```

$B@EQU - S/3 BASIC COMPILER FIXED ADDRESS EQUATES

                         006A 2187+B@CDCA EQU   106   DEFINE CONSTANT ADDRESS
                         006C 2188+B@CDDL EQU   108   DEFINE DATA LINKAGE
                         006E 2189+B@CDWA EQU   110   DEFINE WORK AREA
                         0070 2190+B@CEOF EQU   112   END OF PROGRAM PMC

```
                         2192+*********************************************************************
                         2193+*        PSEUDO INSTRUCTION EQUATES                                  *
                         2194+*********************************************************************
                         2195+*
              0001 2196+B@LCOP EQU    1                         LENGTH OF PSEUDO OPCODE
              0001 2197+B@LCER EQU    1                         LENGTH OF COMPILER ERROR CODE
              0002 2198+B@LCVA EQU    @VADDR                    LENGTH OF VADDR OPERAND
              0001 2199+B@LCCC EQU    1                         LENGTH OF CONDITION CODE OPRND
              0001 2200+B@LCNN EQU    1                         LENGTH OF COUNT OPERAND
              0001 2201+B@LCXX EQU    1                         LENGTH OF EXEC CTRL CODE OPRND
              0002 2202+B@LCLN EQU    2                         LENGTH OF LINE NO. OPERAND
                         2203+*
              0001 2204+B@LSVC EQU    B@LCOP                    SUPERVISOR CALL
              0001 2205+B@LHLT EQU    B@LCOP                    HALT EXECUTION
              0001 2206+B@LADD EQU    B@LCOP                    ADD
              0001 2207+B@LSUB EQU    B@LCOP                    SUBTRACT
              0001 2208+B@LMPY EQU    B@LCOP                    MULTIPLY
              0001 2209+B@LDIV EQU    B@LCOP                    DIVIDE
              0001 2210+B@LPWR EQU    B@LCOP                    EXPONENTIATE
              0001 2211+B@LNEG EQU    B@LCOP                    NEGATE
              0003 2212+B@LFN0 EQU    B@LCOP+B@LCVA             FUNCTION CALL - NO ARGUMENT
              0003 2213+B@LFN1 EQU    B@LCOP+B@LCVA             FUNCTION CALL - 1 ARGUMENT
              0003 2214+B@LFCI EQU    B@LCOP+B@LCVA             FUNCTION CALL - INDIRECT
              0003 2215+B@LMF1 EQU    B@LCOP+B@LCVA             1 MATRIX FUNCTION CALL
              0003 2216+B@LMF2 EQU    B@LCOP+B@LCVA             2 MATRIX FUNCTION CALL
              0003 2217+B@LMF3 EQU    B@LCOP+B@LCVA             3 MATRIY FUNCTION CALL
              0003 2218+B@LMSM EQU    B@LCOP+B@LCVA             MATRIX-SCALAR MPY FUNC CALL
              0003 2219+B@LSTF EQU    B@LCOP+B@LCVA             STACK FLOATING VALUE
              0003 2220+B@LSF1 EQU    B@LCOP+B@LCVA             STACK ARITH VECTOR VALUE
              0003 2221+B@LSF2 EQU    B@LCOP+B@LCVA             STACK ARITH MATRIX VALLE
              0001 2222+B@LUSF EQU    B@LCOP                    UNSTACK, FLOATING VALUE
              0003 2223+B@LSTC EQU    B@LCOP+B@LCVA             STACK CHARACTER FIELD
              0003 2224+B@LSC1 EQU    B@LCOP+B@LCVA             STACK CHARACTER ARRAY FIELD
              0002 2225+B@LUSC EQU    B@LCOP+B@LCNN             UNSTACK CHARACTER FIELD
              0003 2226+B@LSD0 EQU    B@LCOP+B@LCVA             STACK DOPE VECTOR
              0003 2227+B@LSD1 EQU    B@LCOP+B@LCVA             STACK DOPE VECTOR - REDIM
              0003 2228+B@LSD2 EQU    B@LCOP+B@LCVA             STACK DOPE VECTOR - REDIM 2
              0003 2229+B@LSTA EQU    B@LCOP+B@LCVA             STACK VIRTUAL ADDRESS
              0003 2230+B@LSA1 EQU    B@LCOP+B@LCVA             STACK ARITH VECTOR ADDRESS
              0003 2231+B@LSA2 EQU    B@LCOP+B@LCVA             STACK ARITH MATRIX ADDRESS
              0003 2232+B@LSB1 EQU    B@LCOP+B@LCVA             STACK CHARACTER ARRAY ADDRESS
              0002 2233+B@LSTX EQU    B@LCOP+B@LCXX             STACK EXECUTION CONTROL CODE
              0002 2234+B@LCSA EQU    B@LCOP+B@LCNN             COMPUTE STACKED ADDRESS
              0001 2235+B@LCMF EQU    B@LCOP                    COMPARE FLOATING VALUES
              0001 2236+B@LCMC EQU    B@LCOP                    COMPARE CHARACTER FIELDS
              0004 2237+B@LBRC EQU    B@LCOP+B@LCVA+B@LCCC      BRANCH ON CONDITION
              0003 2238+B@LBRA EQU    B@LCOP+B@LCVA             BRANCH UNCONDITIONALLY
              0003 2239+B@LBRD EQU    B@LCOP+B@LCVA             BRANCH AND DELETE FUNC REF
              0003 2240+B@LBNX EQU    B@LCOP+B@LCVA             BRANCH AND SKIP EXECUTION
              0001 2241+B@LBRS EQU    B@LCOP                    BRANCH TO STACKED ADDRESS
              0003 2242+B@LFOR EQU    B@LCOP+B@LCVA             BEGIN 'FOR' LOOP
              0003 2243+B@LNXT EQU    B@LCOP+B@LCVA             CONTINUE 'FOR' LOOP
              0003 2244+B@LGET EQU    B@LCOP+B@LCVA             INPUT DATA ELEMENT
              0002 2245+B@LPUT EQU    B@LCOP+B@LCXX             OUTPUT DATA ELEMENT
              0002 2246+B@LINI EQU    B@LCOP+B@LCNN             INITIATE DATA INPUT
              0002 2247+B@LADF EQU    B@LCOP+B@LCXX             ACTIVATE DATA FLIT
```

```
        $B@EQU - S/3 BASIC COMPILER FIXED ADDRESS EQUATES


ERR LOC   OBJECT CODE      ADDR STMT SOURCE STATEMENT          VER 15, MOD 00  11/05/20  PAGE  12

                          0001 2248+B@LRSR EQU   B@LCOP                 RESTORE DATA FILE POINTER
                          0001 2249+B@LRST EQU   B@LCOP                 RESET DATA FILE POINTER
                          0001 2250+B@LCLS EQU   B@LCOP                 CLOSE A DATA RILE
                          0002 2251+B@LPRS EQU   B@LCOP+B@LCXX          PRINT AND SPACE CARRIER
                          0002 2252+B@LPRU EQU   B@LCOP+B@LCXX          PRINT USING IMAGE
                          0003 2253+B@LSTH EQU   B@LCOP+B@LCLN          STATEMENT HEADER
                          0003 2254+B@LIMH EQU   B@LCOP+B@LCLN          IMAGE STATEMENT HEADER
                          0001 2255+B@LEOP EQU   B@LCOP                 END OF PSEUDO CODE PAGE
                          0003 2256+B@LDCA EQU   B@LCOP+B@LCVA          DEFINE CONSTANT ADDRESS
                          0003 2257+B@LDDL EQU   B@LCOP+B@LCVA          DEFINE DATA LINKAGE
                          0002 2258+B@LDWA EQU   B@LCOP+B@LCNN          DEFINE WORK AREA
                          0001 2259+B@LEOF EQU   B@LCOP                 END OF PROGRAM PMC
                               2260+*
                          0003 2261+B@LERC EQU   B@LCER+B@LCLN          ERROR MESSAGE RECORD LENSTN
```

```
                        2263+*****************************************************************************
                        2264+*        PSEUDO CONDITIONAL BRANCH EQUATES                                  *
                        2265+*****************************************************************************
                        2266+*
            0082 2267+B@BRLO EQU    X'82'                       BRANCH CONDITION - LOW
            0084 2268+B@BREQ EQU    X'84'                       BRANCH CONDITION - EQUAL
            0088 2269+B@BRHI EQU    X'88'                       BRANCH CONDITION - HIGH
            0092 2270+B@BRNL EQU    X'92'                       BRANCH CONDITION - NOT LOW
            0094 2271+B@BRNE EQU    X'94'                       BRANCH CONDITION - NOT EQUAL
            0098 2272+B@BRNH EQU    X'98'                       BRANCH CONDITION - NOT HIGH


                        2274+*****************************************************************************
                        2275+*        PSEUDO PRINT INSTRUCTION EXECUTION CONTROL CODES                  *
                        2276+*****************************************************************************
                        2277+*
                        2278+* PRINT AND SPACE (PRS) INSTRUCTION CODES
                        2279+*
            0001 2280+B@PRPN EQU    1                           PRINT AND NO SPACE
            0002 2281+B@PRPL EQU    2                           PRINT AND SPACE TO LONG ZONE
            0003 2282+B@PRPS EQU    3                           PRINT AND SPACE TO SHORT ZONE
            0004 2283+B@PRPR EQU    4                           PRINT AND RETURN CARRIAGE
            0005 2284+B@PRSL EQU    5                           SPACE TO LONG ZONE
            0006 2285+B@PRSS EQU    6                           SPACE TO SHORT ZONE
            0007 2286+B@PRRC EQU    7                           RETURN THE CARRIAGE
            0008 2287+B@PRRL EQU    8                           RETURN CARRIAGE CONDITIONALLY
                        2288+*
                        2289+* PRINT USING (PRU) INSTRUCTION CODES
                        2290+*
            0001 2291+B@PUI0 EQU    1                           NULL IMAGE SPECIFICATION
            0004 2292+B@PUI1 EQU    4                           1ST SEGMENT OF IMAGE STRING
            0005 2293+B@PUI2 EQU    5                           SECONDARY IMAGE STRING SEGMENT
                        2294+*
            0002 2295+B@PUNL EQU    2                           NULL PRINT USING LIST
            0003 2296+B@PUNS EQU    3                           NULL CHARACTER STRING
            0006 2297+B@PUD1 EQU    6                           PRIMARY DATA ELEMENT
            0007 2298+B@PUD2 EQU    7                           SECONDARY DATA ELEMENT
                        2299+*
            0010 2300+B@PUTM EQU    X'10'                       PRINT USING TERMINATION MASK
            0020 2301+B@DURE EQU    X'20'                       MAY PRINT USING END-OF-ROW MASK
```

```
                           2303+*******************************************************************
                           2304+*        BASIC STATEMENT TYPE CODES                               *
                           2305+*******************************************************************
                           2306+*
              0003 2307+B@TREM EQU   3                          REM
              0006 2308+B@TDAT EQU   6                          DATA
              0009 2309+B@TDEF EQU   9                          DEF
              000C 2310+B@TDIM EQU   12                         DIM
              000F 2311+B@TLTA EQU   15                         LET (ARITHMETIC, SIMPLE)
              0012 2312+B@TASA EQU   18                         ASSIGNMENT (ARITH, SIMPLE)
              0015 2313+B@TLTM EQU   21                         LET (ARITHMETIC, MULTIPLE)
              0018 2314+B@TASM EQU   24                         ASSIGNMENT (ARITH, MULTIPLE)
              001B 2315+B@TLTC EQU   27                         LET (CHARACTER)
              0079 2316+B@TLTS EQU   121                        LET (CHAR, SIMPLE, SUBSTR)   1-4
              007A 2317+B@TMLS EQU   122                        LET (CHAR, MULT, SUNSTR)     1-4
              001E 2318+B@TASC EQU   30                         ASSIGNMENT (CHARACTER)
              007B 2319+B@TASS EQU   123                        ASSIGN (CHAR, SIMPLE, SUBSTR)1-4
              007C 2320+B@TMAS EQU   124                        ASSIGN (CHAR, MULT, SUBSTR)  1-4
              0021 2321+B@TFOR EQU   33                         FOR
              0024 2322+B@TNXT EQU   36                         NEXT
              0027 2323+B@TIFA EQU   39                         IF (ARITHMETIC)
              002A 2324+B@TIFC EQU   42                         IF (CHARACTER)
              007D 2325+B@TIFS EQU   125                        IF (CHAR, SUBSTR)            1-4
              002D 2326+B@TGTO EQU   45                         GO TO (SIMPLE)
              0030 2327+B@TCGT EQU   48                         GO TO (COMPUTED)
              0033 2328+B@TGSB EQU   51                         GO SUB
              0036 2329+B@TRTN EQU   54                         RETURN
              0039 2330+B@TGET EQU   57                         GET
              003C 2331+B@TPUT EQU   60                         PUT
              003F 2332+B@TRST EQU   63                         RESET
              0042 2333+B@TCLS EQU   66                         CLOSE
              0045 2334+B@TINP EQU   69                         INPUT
              0048 2335+B@TREA EQU   72                         READ
              004B 2336+B@TRSR EQU   75                         RESTORE
              004E 2337+B@TPRT EQU   78                         PRINT
              0051 2338+B@TPRU EQU   81                         PRINT USING
              0054 2339+B@TIMG EQU   84                         IMAGE
              0057 2340+B@TMAT EQU   87                         MAT (ASSIGNMENT)
              005A 2341+B@TMGT EQU   90                         MAT GET
              005D 2342+B@TMIN EQU   93                         MAT INPUT
              0060 2343+B@TMRD EQU   96                         MAT READ
              0063 2344+B@TMPT EQU   99                         MAT PUT
              0066 2345+B@TMPR EQU   102                        MAT PRINT
              0069 2346+B@TMPU EQU   105                        MAT PRINT USING
              006C 2347+B@TPSE EQU   108                        PAUSE
              006F 2348+B@TSTP EQU   111                        STOP
              0072 2349+B@TEND EQU   114                        END
              0075 2350+B@TEOF EQU   117                        END-OF-FILE
              0078 2351+B@TDUM EQU   120                        TRUNCATED STATEMENT
```

```
        $B@EQU - S/3 BASIC COMPILER FIXED ADDRESS EQUATES


ERR LOC   OBJECT CODE      ADDR STMT SOURCE STATEMENT          VER 15, MOD 00  11/05/20  PAGE  15

                           2353+***********************************************************************
                           2354+*        BASIC STATEMENT KEYWORD LENGTH EQUATES                        *
                           2355+***********************************************************************
                           2356+*
                           2357+* PRIMARY STATEMENT KEYWORDS
                           2358+*
                      0003 2359+B@LREM EQU   3                           REM
                      0004 2360+B@LDAT EQU   4                           DATA
                      0003 2361+B@LDEF EQU   3                           DEF
                      0003 2362+B@LDIM EQU   3                           DIM
                      0003 2363+B@LLET EQU   3                           LET
                      0003 2364+B@LKFR EQU   3                           FOR
                      0004 2365+B@LNEX EQU   4                           NEXT
                      0002 2366+B@LKIF EQU   2                           IF
                      0004 2367+B@LGTO EQU   4                           GO TO
                      0005 2368+B@LGSB EQU   5                           GO SUB
                      0006 2369+B@LRTN EQU   6                           RETURN
                      0003 2370+B@LKGT EQU   3                           GET
                      0003 2371+B@LKPT EQU   3                           PUT
                      0005 2372+B@LKRT EQU   5                           RESET
                      0005 2373+B@LKCL EQU   5                           CLOSE
                      0005 2374+B@LINP EQU   5                           INPUT
                      0004 2375+B@LREA EQU   4                           READ
                      0007 2376+B@LKRR EQU   7                           RESTORE
                      0005 2377+B@LPRT EQU   5                           PRINT
                      000A 2378+B@LKPU EQU   10                          PRINT USING
                      0001 2379+B@LIMG EQU   1                           IMAGE (:)
                      0003 2380+B@LMAT EQU   3                           MAT
                      0006 2381+B@LMGT EQU   6                           MAT GET
                      0008 2382+B@LMIN EQU   8                           MAT INPUT
                      0007 2383+B@LMRD EQU   7                           MAT READ
                      0006 2384+B@LMPT EQU   6                           MAT PUT
                      0008 2385+B@LMPR EQU   8                           MAT PRINT
                      000D 2386+B@LMPU EQU   13                          MAT PRINT USING
                      0005 2387+B@LPSE EQU   5                           PAUSE
                      0004 2388+B@LSTP EQU   4                           STOP
                      0003 2389+B@LEND EQU   3                           END
                           2390+*
                           2391+* SECUNDARY (EMBEDDED) STATEMENT KEYWORDS
                           2392+*
                      0002 2393+B@LKTO EQU   2                           TO
                      0004 2394+B@LSTE EQU   4                           STEP
                      0004 2395+B@LTHN EQU   4                           THEN (SAME LENGTH AS GOTO)
                           2396+*
                           2397+* OTHER SECONDARY STATEMENT KEYWORDS
                           2398+*
                      0002 2399+B@LKON EQU   2                           ON
```

```
                         2401+*******************************************************************************
                         2402+*        COMPILER STATEMENT PROCESSOR DISK REGION EQUATES (PHYSICAL)     *
                         2403+*******************************************************************************
                         2404+*
          0004 2405+B@DSCY EQU     @DSBCY                      STATEMENT PROCESSOR CYLINDER
          0000 2406+B@DSS1 EQU     @DSCS1                      SECTOR ADDR FOR 1ST STMT PROC
          0018 2407+B@DSNS EQU     24                          NO. OF STMT PROCESSOR SECTORS
                         2408+*
          00FF 2409+B@CPMK EQU     X'FF'                       CORE RESIDENT PROCESSOR MASK
                         2410+*
                         2411+* STATEMENT PROCESSOR PHYSICAL SECTOR ADDRESSES
                         2412+*
          00FF 2413+B@DREM EQU     B@CPMK                      REM
          0024 2414+B@DDAT EQU     X'24'                       DATA
          0034 2415+B@DDEF EQU     X'34'                       DEF
          0004 2416+B@DDIM EQU     X'04'                       DIM
          00FF 2417+B@DLTA EQU     B@CPMK                      LET (ARITHMETIC, SIMPLE)
          00FF 2418+B@DASA EQU     B@CPMK                      ASSIGNMENT (ARITH, SIMPLE)
          0038 2419+B@DLTM EQU     X'38'                       LET (ARITHMETIC, MULTIPLE)
          0038 2420+B@DASM EQU     X'38'                       ASSIGNMENT (ACTH, MULTIPLE)
          0040 2421+B@DLTC EQU     X'40'                       LET (CHARACTER)
          0040 2422+B@DASC EQU     X'40'                       ASSIGNMENT (CHARACTER)
          0028 2423+B@DFOR EQU     X'28'                       FOR
          0044 2424+B@DNXT EQU     X'44'                       NEXT
          0048 2425+B@DIFA EQU     X'48'                       IF (ARITHMETIC)
          004C 2426+B@DIFC EQU     X'4C'                       IF (CHARACTER)
          0044 2427+B@DGTO EQU     X'44'                       GO TO (SIMPLE)
          0050 2428+B@DCGT EQU     X'50'                       GO TO (COMPUTED)
          0020 2429+B@DGSB EQU     X'20'                       GO SUB
          005C 2430+B@DRTN EQU     X'5C'                       RETURN
          0040 2431+B@DGET EQU     X'40'                       SET
          0040 2432+B@DPUT EQU     X'40'                       PUT
          0050 2433+B@DRST EQU     X'50'                       RESET
          0054 2434+B@DCLS EQU     X'54'                       CASE
          0000 2435+B@DINP EQU     X'00'                       INPUT
          000C 2436+B@DREA EQU     X'0C'                       READ
          005C 2437+B@DRSR EQU     X'5C'                       RESTORE
          002C 2438+B@DPRT EQU     X'2C'                       PRINT
          0030 2439+B@DPRU EQU     X'30'                       PRINT USING
          003C 2440+B@DIMG EQU     X'3C'                       IMAGE
          0008 2441+B@DMAT EQU     X'08'                       MAT (ASSIGNMENT)
          0044 2442+B@DMGT EQU     X'44'                       MAT GET
          0038 2443+B@DMIN EQU     X'38'                       MAT INPUT
          003C 2444+B@DMRD EQU     X'3C'                       MAT READ
          004C 2445+B@DMPT EQU     X'4C'                       MAT PUT
          0048 2446+B@DMPR EQU     X'48'                       MAT PRINT
          0054 2447+B@DMPU EQU     X'54'                       MAT PRINT USING
          0050 2448+B@DPSE EQU     X'50'                       PAUSE
          0054 2449+B@DSTP EQU     X'54'                       STOP
          0058 2450+B@DEND EQU     X'58'                       END
          0058 2451+B@DEOF EQU     B@DEND                      END-OF-FILE
          00FF 2452+B@DDUM EQU     B@CPMK                      TRUNCATED STATEMENT
          0010 2453+B@DSLT EQU     X'10'                       LET - SUBSTRINS           1-4
          001C 2454+B@DSIF EQU     X'1C'                       IF - SUBSTRING            1-4
          0010 2455+B@DSML EQU     X'10'                       LET - MULTIPLE, SUBSTRING 1-4
```

```
                         2457+*********************************************************************
                         2458+*        COMPILER DISK REGION EQUATES (LOGICAL)                      *
                         2459+*********************************************************************
                         2460+*
              0005 2461+B@DWCY EQU    @DWBCY                   BASE CYL FOR SYSTEM WORK FILE
              0003 2462+B@DWT1 EQU    @DWTB1                   SECTOR ADDR FOR 1ST TEXT BLOCK
                         2463+*
              0007 2464+B@DVCY EQU    @DVBCY                   BASE CYL FOR VIRTUAL MEMORY
              0056 2465+B@DVC1 EQU    @VENTA                   SECTOR ADDR FOR 1ST PMC PAGE
                         2466+*
              0009 2467+B@DTCY EQU    @DCBCY                   BASE CYL FOR COMPILER TABLES
              0040 2468+B@DTS1 EQU    @DCST1                   STMT ADDRESS TABLE 1ST SECTOR
              0010 2469+B@DTSN EQU    16                       NO. OF SECTORS IN STMT TABLE
              0050 2470+B@DTB1 EQU    @DCBT1                   BRANCH ADDR TABLE 1ST SECTOR
              0010 2471+B@DTBN EQU    16                       NO. OF SECTORS IN BRANCH TABLE
```

```
                     2473+********************************************************************
                     2474+*         CHARACTER EQUATES - SPECIAL USAGE CHARACTERS                 *
                     2475+********************************************************************
                     2476+*
                001E 2477+B@EOST EQU    @EOS                      END-OF-STATEMENT (CARR RETURN)
                005B 2478+B@CVAR EQU    C'$'                      CHARACTER VARIABLE DESIGNATOR
                005C 2479+B@ALLA EQU    C'*'                      'ALL' ARRAY ELEMENTS SYMBOL
                00C5 2480+B@EXPC EQU    C'E'                      ARITHMETIC EXPONENT SYMBOL
                007B 2481+B@DIGS EQU    C'#'                      IMAGE STMT DIGIT SPEC CHAR
                005C 2482+B@FOFL EQU    C'*'                      IMAGE SCAN SPEC OVERFLOW CHAR


                     2484+********************************************************************
                     2485+*         CHARACTER EQUATES - SPECIAL CHARACTERS (COLLATING SEQUENCE)   *
                     2486+********************************************************************
                     2487+*
                0040 2488+B@BLNK EQU    C' '                      BLANK
                004B 2489+B@DPNT EQU    C'.'                      DECIMAL POINT
                004C 2490+B@LESS EQU    C'<'                      'LESS THAN' OPERATOR
                004D 2491+B@LPAR EQU    C'('                      LEFT PARENTHESIS
                004E 2492+B@PLUS EQU    C'+'                      PLUS SIGN
                005F 2493+B@POWR EQU    C'^'                      POWER SIGN
                005C 2494+B@MULT EQU    C'*'                      MULTIPLICATION SIGN
                005D 2495+B@RPAR EQU    C')'                      RIGHT PARENTHESIS
                005E 2496+B@SCLN EQU    C';'                      SEMICOLON
                0060 2497+B@MINS EQU    C'-'                      MINUS SIGN
                0061 2498+B@DIVD EQU    C'/'                      DIVISION SIGN
                006B 2499+B@CMMA EQU    C','                      COMMA
                006E 2500+B@GRTR EQU    C'>'                      'GREATER THAN' OPERATOR
                007A 2501+B@COLN EQU    C':'                      COLON
                007D 2502+B@SQUO EQU    C''''                     SINGLE QUOTE
                007E 2503+B@EQUL EQU    C'='                      EQUAL SIGN
                007F 2504+B@NEQL EQU    C'"'                      'NOT EQUAL' OPERATOR
```

```
                        2506+**********************************************************************
                        2507+*        CHARACTER EQUATES - BASIC ALPHABET (COLLATING SEQUENCE)         *
                        2508+**********************************************************************
                        2509+*
           005B 2510+B@LET$ EQU    C'$'                       1ST LETTER IN BASIC ALPHABET
           007B 2511+B@LET# EQU    C'#'                       2ND LETTER IN BASIC ALPHABET
           007C 2512+B@LET@ EQU    C'@'                       3RD LETTER IN BASIC ALPHABET
                        2513+*
           00C1 2514+B@LETA EQU    C'A'                       4TH LETTER IN BASIC ALPHABET
                        2515+*                                 * (1ST LETTER IN STD ALPHABET)
           00C2 2516+B@LETB EQU    C'B'                       5TH LETTER IN BASIC ALPHABET
           00C3 2517+B@LETC EQU    C'C'                       6TH LETTER IN BASIC ALPHABET
           00C4 2518+B@LETD EQU    C'D'                       7TH LETTER IN BASIC ALPHABET
           00C5 2519+B@LETE EQU    C'E'                       8TH LETTER IN BASIC ALPHABET
           00C6 2520+B@LETF EQU    C'F'                       9TH LETTER IN BASIC ALPHABET
           00C7 2521+B@LETG EQU    C'G'                       10TH LETTER IN BASIC ALPHABET
           00C8 2522+B@LETH EQU    C'H'                       11TH LETTER IN BASIC ALPHABET
           00C9 2523+B@LETI EQU    C'I'                       12TH LETTER IN BASIC ALPHABET
           00D1 2524+B@LETJ EQU    C'J'                       13TH LETTER IN BASIC ALPHABET
           00D2 2525+B@LETK EQU    C'K'                       14TH LETTER IN BASIC ALPHABET
           00D3 2526+B@LETL EQU    C'L'                       19TH LETTER IN BASIC ALPHABET
           00D4 2527+B@LETM EQU    C'M'                       16TH LETTER IN BASIC ALPHABET
           00D5 2528+B@LETN EQU    C'N'                       17TH LETTER IN BASIC ALPHABET
           00D6 2529+B@LETO EQU    C'O'                       18TH LETTER IN PASIC ALPHABET
           00D7 2530+B@LETP EQU    C'P'                       19TH LETTER IN BASIC ALPHABET
           00D8 2531+B@LETQ EQU    C'Q'                       20TH LETTER IN BASIC ALPHABET
           00D9 2532+B@LETR EQU    C'R'                       21ST LETTER IN BASIC ALPHABET
           00E2 2533+B@LETS EQU    C'S'                       22ND LETTER IN BASIC ALPHABET
           00E3 2534+B@LETT EQU    C'T'                       23RD LETTER IN BASIC ALPHABET
           00E4 2535+B@LETU EQU    C'U'                       24TH LETTER IN BASIC ALPHABET
           00E5 2536+B@LETV EQU    C'V'                       25TH LETTER IN BASIC ALPHABET
           00E6 2537+B@LETW EQU    C'W'                       26TH LETTER IN BASIC ALPHABET
           00E7 2538+B@LETX EQU    C'X'                       27TH LETTER IN BASIC ALPHABET
           00E8 2539+B@LETY EQU    C'Y'                       28TH LETTER IN BASIC ALPHABET
           00E9 2540+B@LETZ EQU    C'Z'                       29TH LETTER IN BASIC ALPHABET
                        2541+*                                 * (LAST LETTER IN STD ALPHABET)
```

```
                        2543+*****************************************************************************
                        2544+*        CHARACTER EQUATES - BASIC NUMERIC SET (COLLATING SEQUENCE)      *
                        2545+*****************************************************************************
                        2546+*
          00F0 2547+B@DEC0 EQU   C'0'                         1ST NUMERAL
          00F1 2548+B@DEC1 EQU   C'1'                         2ND NUMERAL
          00F2 2549+B@DEC2 EQU   C'2'                         3RD NUMERAL
          00F3 2550+B@DEC3 EQU   C'3'                         4TH NUMERAL
          00F4 2551+B@DEC4 EQU   C'4'                         5TH NUMERAL
          00F5 2552+B@DEC5 EQU   C'5'                         6TH NUMERAL
          00F6 2553+B@DEC6 EQU   C'6'                         7TH NUMERAL
          00F7 2554+B@DEC7 EQU   C'7'                         8TH NUMERAL
          00F8 2555+B@DEC8 EQU   C'8'                         9TH NUMERAL
          00F9 2556+B@DEC9 EQU   C'9'                         10TH NUMERAL

                        2558+*****************************************************************************
                        2559+*        INTERNAL CONSTANT AND VARIABLE EQUATES                           *
                        2560+*****************************************************************************
                        2561+*
          0050 2562+B@ICON EQU   X'50'                        AMPERSAND IS THE
                        2563+*                                * INTERNAL CONSTANT DESIGNATOR
          00C5 2564+B@CIEX EQU   C'E'                         2ND CHARACTER IN 'E'
          0002 2565+B@LIEX EQU   2                            LENGTH OF 'E'
                        2566+*
          00D7 2567+B@CIPI EQU   C'P'                         2ND CHARACTER IN 'PI'
          0003 2568+B@LIPI EQU   3                            LENGTH OF 'PI'
                        2569+*
          00E2 2570+B@CIS2 EQU   C'S'                         2ND CHARACTER IN 'SQR2'
          0005 2571+B@LIS2 EQU   5                            LENGTH OF 'SQR2'
```

```
                       2573+*********************************************************************
                       2574+*        DATA STATUS AND EXPONENT EQUATES                          *
                       2575+*********************************************************************
                       2576+*
          0000 2577+B@STAT EQU    0                        DISP FOR ELEMENT STATUS BYTE
          0004 2578+B@SEXP EQU    4                        DISP FOR SHORT PREC EXPONENT
          0008 2579+B@LEXP EQU    8                        DISP FOR LONG PREC EXPONENT
               2580+*
          0080 2581+B@TRAC EQU    X'80'                    TRACE STATUS INDICATOR -
               2582+*                                      * 0 = NO TRACE, 1 = TRACE
          0040 2583+B@DTYP EQU    X'40'                    ELEMENT TYPE STATUS INDICATOR -
               2584+*                                      * 0 = ARITHMETIC, 1 = CHARACTER
          0020 2585+B@PREC EQU    X'20'                    PRECISION STATUS INDICATOR -
               2586+*                                      * SHORT PREC, 1 = LONG PREC
          0010 2587+B@SIGN EQU    X'10'                    SIGN STATUS INDICATOR -
               2588+*                                      * 0 POSITIVE, 1 = NEGATIVE
          0020 2589+B@CTYP EQU    X'20'                    CHARACTER STATUS TYPE INDR -
               2590+*                                      * 0 = ELEMENT, 1 = STRING SEG
          001F 2591+B@CCNT EQU    X'1F'                    CHARACTER STATUS COUNT MASK
               2592+*
          00F0 2593+B@ZPOS EQU    X'F0'                    POSITIVE ARITHMETIC ZONE MASK
          00D0 2594+B@ZNEG EQU    X'D0'                    NEGATIVE ARITHMETIC ZONE MASK
               2595+*
          0080 2596+B@NXZR EQU    128                      ZERO NORMALIZED EXPONENT
          001E 2597+B@NXLO EQU    B@NXZR-98                MINIMUM NORMALIZED EXPONENT
          00E3 2598+B@NXHI EQU    B@NXZR+99                MAXIMUM NORMALIZED EXPONENT

                       2600+*********************************************************************
                       2601+*        SUBROUTINE PARAMETER EQUATES                              *
                       2602+*********************************************************************
               2603+*
          0000 2604+B@CHAR EQU    0                        CURRENT TEXT CHARACTER DISP
          0000 2605+B@GETS EQU    0                        SETS GETC TO GET SAME CHARACTER
          0001 2606+B@GETC EQU    1                        SETS GETC TO GET NEXT CHARACTER
          00FF 2607+B@GETE EQU    255                      SETS GETC TO SCAN TO CARR RET
```

```
                         2609+*****************************************************************************
                         2610+*        MISCELLANEOUS SYSTEM CONSTANTS                                      *
                         2611+*****************************************************************************
                         2612+*
               0100 2613+B@BLSZ EQU    256                        SYSTEM BLOCK SIZE
               0004 2614+B@LSDF EQU    4                          LENGTH OF SEGMENT DESCRIPTOR
                         2615+*
               0002 2616+B@LBIN EQU    2                          LENGTH OF BINARY INTEGER
               0002 2617+B@LDMN EQU    B@LBIN                     LENGTH OF BINARY DIMENSION
                         2618+*
               0004 2619+B@LDIN EQU    4                          LENGTH OF DECIMAL INTEGER (MAX)
               0004 2620+B@LDDM EQU    B@LDIN                     LENGTH OF DEC DIMENSION (MAX)
               0004 2621+B@LDSN EQU    B@LDIN                     LENGTH OF DEC STMT NO. (MAX)
                         2622+*
               0002 2623+B@LSNO EQU    B@LBIN                     LENGTH OF BINARY STMT NO.
               0001 2624+B@LTYP EQU    1                          LENGTH OF STATEMENT TYPE COOS
               0080 2625+B@SDMK EQU    X'80'                      STMT DEACT MASK FOR TYPE CODE
                         2626+*
               0018 2627+B@NIFN EQU    24                         NUMBER OF INTRINSIC FUNCTIONS
               0003 2628+B@LIFN EQU    3                          LENGTH OF INTRINSIC FUNC SYMBOL
               0004 2629+B@NSKW EQU    4                          NO. OF EMBEDDED STMT KEYWORDS
               0002 2630+B@LSKW EQU    2                          LENGTH OF KEYWORD IDENTIFIER
               0002 2631+B@LUFN EQU    2                          LENGTH OF USER FUNC IDENTIFIER
                         2632+*
               000A 2633+B@NFRT EQU    10                         NUMBER OF 'FOR' TABLE ENTRIES
               0004 2634+B@LFRT EQU    2*@VADDR                   LENGTH OF 'FOR' TABLE ENTRY
               0028 2635+B@SFRT EQU    B@NFRT*B@LFRT              'FOR' TABLE SIZE (NEST 9 DEEP)
                         2636+*
               0028 2637+B@NSPT EQU    40                         NO. OF STMT PROC TABLE ENTRIES
               0003 2638+B@LSPT EQU    @CADDR+1                   LENGTH OF STMT PROC TABLE ENTRY
               0000 2639+B@PTAB EQU    @CADDR-2                   DISP FOR PROC ENTRY POINT BASE
               0001 2640+B@PTAD EQU    @CADDR-1                   DISP FOR PROC ENTRY POINT DISP
               0002 2641+B@PTSA EQU    B@LSPT-1                   DISP FOR PROC PHYS SECTOR ADDR
                         2642+*
               0057 2643+B@NIVT EQU    87                         NO. OF INPUT VER. TBL ENTRIES
               0001 2644+B@LIVT EQU    1                          LENGTH OF INPUT VER. TBL ENTRY
                         2645+*
               0006 2646+B@LCNA EQU    @VADDR+2*B@LDMN            COMPILE-TIME NAT ENTRY LENGTH
               0004 2647+B@LCCA EQU    @VADDR+B@LDMN              COMPILE-TIME CAT ENTRY LENGTH
               0004 2648+B@LCFN EQU    @VADDR+@VADDR              COMPILE-TIME FNT ENTRY LENGTH
```

```
                        2650+******************************************************************************
                        2651+*        FUNCTION AND ARRAY TABLE ELEMENT EQUATES                             *
                        2652+******************************************************************************
                        2653+*
           0000 2654+B@AFLG EQU    0                         DOPE VECTOR ARRAY FLAG DISP
           0080 2655+B@D1MK EQU    X'80'                     ARRAY FLAG DEFINED VECTOR MASK
           00C0 2656+B@D2MK EQU    X'C0'                     ARRAY FLAG DEFINED MATRIX MASK
           0080 2657+B@DAMK EQU    X'80'                     ARRAY FLAG DEFINED ARRAY MASK
                        2658+*
           0001 2659+B@ACD1 EQU    B@LDMN-1                  ARITH ARRAY CURR 1ST DIM DISP
           0003 2660+B@ACD2 EQU    B@ACD1+B@LDMN             ARITH ARRAY CURR 2ND DIM DISP
           0005 2661+B@AMAX EQU    B@ACD2+B@LDMN             ARITH ARRAY MAXIMUM SIZE DISP
           0007 2662+B@ABAS EQU    B@AMAX+@VADDR             ARITH ARRAY BASE VADDR DISP
                        2663+*
           0001 2664+B@CDMN EQU    B@LDMN-1                  CHAR ARRAY DIMENSION DISP
           0003 2665+B@CBAS EQU    B@CDMN+@VADDR             CHAR ARRAY BASE VADDR D1SP
                        2666+*
           0001 2667+B@FVAD EQU    @VADDR-1                  USER FUNC EXPRESSION VADDR DISP
```

```
          $B@EQU - S/3 BASIC COMPILER FIXED ADDRESS EQUATES


ERR LOC   OBJECT CODE      ADDR STMT SOURCE STATEMENT          VER 15, MOD 00  11/05/20   PAGE  24

                          2669+*********************************************************************
                          2670+*         BASIC SYSTEM PARAMETER EQUATES                              *
                          2671+*********************************************************************
                          2672+*
               001D       2673+B@NLTR EQU    29                       NO. OF LETTERS IN BASIC ALPHABET
               000A       2674+B@NDGT EQU    10                       NO. OF DECIMAL DIGITS
                          2675+*
               0006       2676+B@NICN EQU    6                        NO. OF INTERNAL CONSTANTS
               0001       2677+B@NIVR EQU    1                        NO. OF INTERNAL VARIABLES
               0007       2678+B@NIEL EQU    B@NICN+B@NIVR            NO. OF INTERNAL ELEMENTS
               001D       2679+B@NLRV EQU    B@NLTR                   NO. OF LETTER VARIABLES
               0122       2680+B@NLDV EQU    B@NDGT*B@NLTR            NO. OF LETTER-DIGIT VARIABLES
               001D       2681+B@NCRV EQU    B@NLTR                   NO. OF CHARACTER VARIABLES
               001D       2682+B@NAAR EQU    B@NLTR                   NO. OF ARITHMETIC ARRAYS
               001D       2683+B@NCAR EQU    B@NLTR                   NO. OF CHARACTER ARRAYS
               001D       2684+B@NUFN EQU    B@NLTR                   NO. OF USER DEFINED FUNCTIONS
                          2685+*
               0005       2686+B@LISP EQU    5                        SHORT PREC INTERNAL LENGTH
               0009       2687+B@LILP EQU    9                        LONG PREC INTERNAL LENGTH
               0008       2688+B@LESP EQU    8                        SHORT PREC EXTERNAL LENGTH
               0010       2689+B@LELP EQU    16                       LONG PREC EXTERNAL LENGTH
               0013       2690+B@LCRV EQU    19                       CHARACTER VARIABLE LENGTH
               0008       2691+B@LADV EQU    3*B@LDMN+@VADDR          ARITHMETIC DOPE VECTOR LENGTH
               0004       2692+B@LCDV EQU    1*B@LDMN+@VADDR          CHARACTER DOPE VECTOR LENGTH
               0002       2693+B@LFNA EQU    @VADDR                   USER FUNCTION ADDRESS LENGTH
               0023       2694+B@PROD EQU    B@NIEL*B@LISP            LENGTH OF INTRNL CON AREA SP 1-4
```

```
     $B@EQU - S/3 BASIC COMPILER FIXED ADDRESS EQUATES
```

```
                         2696+*********************************************************************
                         2697+*        VIRTUAL MEMORY ALLOCATION EQUATES                          *
                         2698+*********************************************************************
                         2699+*
                    0023 2700+B@SIES EQU    B@NIEL*B@LISP              SHORT PREC INTNL ELEMT AREA SIZE
                    0091 2701+B@SLVS EQU    B@NLRV*B@LISP              SHORT PREC LETTER VAR AREA SIZE
                    05AA 2702+B@SLDS EQU    B@NLDV*B@LISP              SHORT PREC LTR-DIG VAR AREA SIZE
                    065E 2703+B@SAVS EQU    B@SIES+B@SLVS+B@SLDS       SHORT PREC MAX ARITH AREA SIZE
                         2704+*
                    003F 2705+B@SIEL EQU    B@NIEL*B@LILP              LONG PREC INTNL ELEMT AREA SIZE
                    0105 2706+B@SLVL EQU    B@NLRV*B@LILP              LONG PREC LETTER VAR AREA SIZE
                    0A32 2707+B@SLDL EQU    B@NLDV*B@LILP              LONG PREC LTR-DIG VAR AREA SIZE
                    0B76 2708+B@SAVL EQU    B@SIEL+B@SLVL+B@SLDL       LONG PREC MAX ARITH AREA SIZE
                         2709+*
                    0227 2710+B@SCRV EQU    B@NCRV*B@LCRV              CHARACTER VARIABLE AREA SIZE
                         2711+*
                    00E8 2712+B@SADV EQU    B@NAAR*B@LADV              ARITH DOPE VECTOR AREA SIZE
                    0074 2713+B@SCDV EQU    B@NCAR*B@LCDV              CHAR DOPE VECTOR AREA SIZE
                    003A 2714+B@SFNA EQU    B@NUFN*B@LFNA              USER FUNC ADDRESS AREA SIZE
                    0196 2715+B@SFAT EQU    B@SADV+B@SCDV+B@SFNA       FUNC AND ARRAY TABLE AREA SIZE
                         2716+*
                    0100 2717+B@NVPG EQU    256                        NO. OF VIRTUAL PAGES
                    0100 2718+B@LVPG EQU    256                        LENGTH OF A VIRTUAL PAGE
                         2719+*
                    0056 2720+B@VMC1 EQU    @VENTA                     BEGINNING PAGE FOR PSEUDO CODE
                    0000 2721+B@VMSZ EQU    B@NVPG*B@LVPG-256*256      VIRTUAL MEMORY SIZE (MOD 2**16)
                         2722+*
                    0000 2723+B@VMTB EQU    B@VMSZ                     FUNC AND ARRAY BASE VADDR
                    F5E5 2724+B@VMSB EQU    B@VMSZ-B@SAVS-B@SCRV-B@SFAT SHORT PREC VAR BASE VADDR
                    F0CD 2725+B@VMLB EQU    B@VMSZ-B@SAVL-B@SCRV-B@SFAT LONG PREC VAR BASE VADDR
```

```
                      2727+**********************************************************************
                      2728+*        LOADER PARAMETER AREA EQUATES                               *
                      2729+**********************************************************************
                      2730+*
                 0002 2731+B@LL01 EQU    @VADDR                      LENGTH AND DISPLACEMENT FOR
                 0001 2732+B@DL01 EQU    B@LL01-1                    * REGION-1 1ST AVAILABLE VADDR
                      2733+*
                 0002 2734+B@LL02 EQU    @VADDR                      LENGTH AND DISPLACEMENT FOR
                 0003 2735+B@DL02 EQU    B@DL01+B@LL02               * 1ST VADDR FOLLOWING REGION-1
                      2736+*
                 0002 2737+B@LL03 EQU    @VADDR                      LENGTH AND DISPLACEMENT FOR
                 0005 2738+B@DL03 EQU    B@DL02+B@LL03               * REGION-2 1ST AVAILABLE VADDR
                      2739+*
                 0002 2740+B@LL04 EQU    @VADDR                      LENGTH AND DISPLACEMENT FOR
                 0007 2741+B@DL04 EQU    B@DL03+B@LL04               * 1ST VADDR FOLLOWING REGION-2
                      2742+*
                 0002 2743+B@LL05 EQU    @VADDR                      LENGTH AND DISPLACEMENT FOR
                 0009 2744+B@DL05 EQU    B@DL04+B@LL05               * 1ST INTERNAL CONSTANT VADDR
                      2745+*
                 0002 2746+B@LL06 EQU    @VADDR                      LENGTH AND DISPLACEMENT FOR
                 000B 2747+B@DL06 EQU    B@DL05+B@LL06               * 1ST INTERNAL VARIABLE VADDR
                      2748+*
                 003A 2749+B@LL07 EQU    B@NLRV*@VADDR               LENGTH AND DISPLACEMENT FOR
                 0045 2750+B@DL07 EQU    B@DL06+B@LL07               * LETTER VARIABLE SYMBOL TABLE
                      2751+*
                 0100 2752+B@LL08 EQU    B@BLSZ                      LENGTH AND DISPLACEMENT FOR
                 0145 2753+B@DL08 EQU    B@DL07+B@LL08               * LETTER-DIG SYMBOL TBL BLOCK 1
                      2754+*
                 0100 2755+B@LL09 EQU    B@BLSZ                      LENGTH AND DISPLACEMENT FOR
                 0245 2756+B@DL09 EQU    B@DL08+B@LL09               * LETTER-DIG SYMBOL TBL BLOCK 2
                      2757+*
                 0044 2758+B@LL10 EQU    B@NLDV*@VADDR-2*B@BLSZ      LENGTH AND DISPLACEMENT FOR
                 0289 2759+B@DL10 EQU    B@DL09+B@LL10               * LETTER-DIG SYMBOL TBL BLOCK 3
                      2760+*
                 003A 2761+B@LL11 EQU    B@NCRV*@VADDR               LENGTH AND DISPLAREMENT FOR
                 02C3 2762+B@DL11 EQU    B@DL10+B@LL11               * CHARACTER VAR SYMBOL TABLE
                      2763+*
                 003A 2764+B@LL12 EQU    B@NAAR*@VADDR               LENTH AND DISPLACEMENT FOR
                 02FD 2765+B@DL12 EQU    B@DL11+B@LL12               * ARITHMETIC ARRAY SYMBOL TABLE
                      2766+*
                 003A 2767+B@LL13 EQU    B@NCAR*@VADDR               LENGTH AND DISPLACEMENT FOR
                 0337 2768+B@DL13 EQU    B@DL12+B@LL13               * CHARACTER ARRAY SYMBOL TABLE
                      2769+*
                 003A 2770+B@LL14 EQU    B@NUFN*@VADDR               LENGTH AND DISPLACEMENT FOR
                 0371 2771+B@DL14 EQU    B@DL13+B@LL14               * USER FUNCTION SYMBOL TABLE
                      2772+*
                 0100 2773+B@LL15 EQU    B@BLSZ                      LENGTH AND DISPLACEMENT FOR
                 0471 2774+B@DL15 EQU    B@DL14+B@LL15               * FUNC AND ARRAY TABLE BLOCK 1
                      2775+*
                 0096 2776+B@LL16 EQU    B@SFAT-B@BLSZ               LENGTH AND DISPLACEMENT FOR
                 0507 2777+B@DL16 EQU    B@DL15+B@LL16               * FUNC AND ARRAY TABLE BLOCK 2
                      2778+*
                      2779+**********************************************************************
                      2780+*        END OF COMPILER SYSTEM EQUATES CODING                       *
                      2781+**********************************************************************
                      2782+      PRINT ON
```

```
                          2784 *         HDR   #SFSYN
                          2785 ***********************************************************************
                          2786 * 5703-XM1  COPYRIGHT IBM CORP. 1970                            *
                          2787 *                REFER TO INSTRUCTIONS ON COPYRIGHT NOTICE, 120-2083    *
                          2788 *                                                             *
                          2789 ***********************************************************************
                          2790 *STATUS                                                       *
                          2791 *    VERSION 1 MODIFICATION 0                                  *
                          2792 *                                                             *
                          2793 *FUNCTION                                                     *
                          2794 *    * SFSYNC CHECKS EVERY BASIC LANGUAGE STATEMENT ENTERED BY THE USER*
                          2795 *        EITHER VIA THE KEYBOARD OR CARDS FOR VALID SYNTAX.    *
                          2796 *    * BASIC LANGUAGE STATEMENTS ARE CHECKED CHARACTER BY CHARACTER  *
                          2797 *        FROM LEFT TO RIGHT FOR VALID SYNTAX. WHEN A CHARACTER IS TESTED *
                          2798 *        AND FOUND TO BE INVALID XR IS LEFT POINTING AT THE INVALID    *
                          2799 *        CHARACTER, AN ERROR CODE IS GENERATED INDICATING THE NUMBER OF  *
                          2800 *        THE ERROR MESSAGE TO BE PRINTED (IN $CAERR) AND THE ROUTINE IS  *
                          2801 *        EXITED TO THE ERROR MESSAGE MODULE.                   *
                          2802 *    * SYNTAX IS ALWAYS CHECKED FROM LEFT TO RIGHT UNTIL AN ERROR IS A *
                          2803 *        DETECTED. THE CHARACTERS TO THE RIGHT OF THE ERRONEOUS CHARACTER*
                          2804 *        WILL NOT BE CHECKED UNTIL THE ERROR IS CORRECTED.     *
                          2805 *    * THE ARITHMETIC EXPRESSION ROUTINE, USED BY EACH STATEMENT MODULE*
                          2806 *        ALLOWING SUBSCRIPTS OR ARITHMETIC EXPRESSIONS TESTS CHARACTERS  *
                          2807 *        UNTIL IT DETECTS A CHARACTER INVALIDLY USED. IT IS LEFT UP TO   *
                          2808 *        THE CALLING ROUTINE OR MODULE TO DETERMINE THE VALIDITY OF THE  *
                          2809 *        CHARACTER. IF THE CHARACTER IS REQUIRED TO BE OF A CERTAIN TYPE *
                          2810 *        (I.E. AN OPERATOR) THE ERROR EXIT WOULD BE USED TO IDENTIFY THE *
                          2811 *        ERROR.                                               *
                          2812 *    * THE MAT CHECKING(SFOVRL), A VERY DEFINITE PART OF THE BASIC    *
                          2813 *        LANGUAGE SYNTAX CHECKER IS LOCATED AS AN INDEPENDENT MODULE, BUT*
                          2814 *        IS LOADED BY $BLOAD AFTER THE LETTERS 'MA' ARE DETECTED BY A   *
                          2815 *        TABLE SEARCH. THE OVERLAY IS LOADED OVER OTHER MODULES NOT USED *
                          2816 *        IN CONJUNCTION WITH STATEMENTS BEGINNING WITH 'MA'. IF A      *
                          2817 *        STATEMENT DOES NOT BEGIN WITH 'MA' THE OVERLAY WILL NOT BE USED.*
                          2818 *    * IF AN 'STR' KEYWORD IS FOUND IN A VALID PLACE IN AN ASSIGNMENT  *
                          2819 *        OR AN IF STATEMENT, STROVL IS LINKED TO (BROUGHT IN BY $BLOAD  *
                          2820 *        THE FIRST OCCURANCE IN A STATEMENT, AND BRANCHED DIRECTLY TO   *
                          2821 *        ON SUBSEQUENT OCCURANCES). UPON FINDING VALID STR OPERANDS.   *
                          2822 *        SFSYNC RESUMES THE LEFT TO RIGHT SCAN.                *
                          2823 *    * AT VARIOUS POINTS DURING SYNTAX CHECKING A BASIC LINE THE BASIC *
                          2824 *        LANGUAGE SYNTAX CHECKER SETS A CODE AT @STYPE TO IDENTIFY THE  *
                          2825 *        BASIC STATEMENT AS TO STATEMENT TYPE. @STYPE IS LOCATED IN THE  *
                          2826 *        STATEMENT HEADER IMMEDIATELY PRECEEDING THE FIRST BYTE OF THE  *
                          2827 *        BASIC LINE IN THE PRIMARY INPUT LINE BUFFER.          *
                          2828 *                                                             *
                          2829 *ENTRY POINT                                                  *
                          2830 *    * THE ENTRY POINT TO $SFYNC IS THE LOAD POINT OF THE MODULE. NO   *
                          2831 *        REGISTERS ARE SAVED. AS ENTRY IS VIA $BLOAD THERE IS NO CALLING *
                          2832 *        SEQUENCE OTHER THAN A BRANCH TO THE LOAD POINT.       *
                          2833 *                                                             *
                          2834 *INPUT                                                        *
                          2835 *    * THE ONLY INPUT REQUIRED IS THE PRIMARY INPUT LINE BUFFER. THE   *
                          2836 *        INPUT LINE BUFFER MUST CONTAIN A STATEMENT NUMBER FOLLOWED BY  *
                          2837 *        AT LEAST ONE NON-BLANK NON-NUMERIC CHARACTER PRECEEDING THE END *
                          2838 *        OF STATEMENT SYMBOL.                                 *
                          2839 *                                                             *
```

```
2840 *OUTPUT                                                       *
2841 *    * FOR A VALID BASIC STATEMENT A ONE-BYTE TYPE CODE IS PROVIDED IN *
2842 *      THE BYTE IMMEDIATELY PRECEEDING THE INPUT LINE BUFFER. THE      *
2843 *      INDICATORS $FUIND AND $READY ARE SET IN $INDR2.                 *
2844 *                                                             *
2845 *EXTERNAL REFERENCES                                          *
2846 *                                                             *
2847 *      $BLOAD - ENTRY POINT TO LOAD OVERLAY                   *
2848 *      $INDR2 - ONE-BYTE INDICATOR                            *
2849 *      $CAERK - ENTRY POINT FOR ERROR MESSAGE MODULE          *
2850 *      $CAERR - ONE-BYTE ERROR CODE                           *
2851 *      $CABLD - VALID EXIT ADDRESS                            *
2852 *      OVRNTR - SECONDARY ENTRY POINT TO $TROVR               *
2853 *                                                             *
2854 *EXITS,NORMAL                                                 *
2855 *      NORMAL EXIT IS TO $BLOAD VIA A BRANCH TO $CABLD WHICH LOADS    *
2856 *      GUFUDI OVER SFSYNC. INDICATOR $INDR2 IS SET TO $FUIND+$READY TO *
2857 *      INDICATE A VALID BASIC STATEMENT HAS BEEN ENTERED.     *
2858 *                                                             *
2859 *EXITS,ERROR                                                  *
2860 *      XR IS LEFT (OR SET) POINTING TO THE FIRST INVALID CHARACTER. AN *
2861 *      ERROR CODE IS SET AT SCAERR AND A BRANCH IS MADE TO SCAERK TO   *
2862 *      PRINT THE UP ARROW (^) BENEATH THE ERRONEOUS CHARACTER AND THE  *
2863 *      ERROR MESSAGE IF REQUIRED.                             *
2864 *                                                             *
2865 *TABLES                                                       *
2866 *    * THE BASIC LANGUAGE SYNTAX CHECKER CONTAINS TWO TABLES: STATEMENT*
2867 *      BRANCH TABLE AND BUILT-IN FUNCTION TABLE AND ONE 8 BYTE PUSHDOWN*
2868 *      STACK WITH 8 ONE-BYTE ENTRIES. THE ENTRIES IN THE PUSHDOWN STACK*
2869 *      REPRESENT NESTED SUBSCRIPTS FOR UP TO 8 NESTINGS. EACH ENTRY IS *
2870 *      MERELY AN INDICATOR SHOWING THE STATUS OF THE COMMA SWITCH.     *
2871 *    * THE BUILT-IN FUNCTION TABLE CONSISTS OF 23 ENTRIES OF 3 BYTES   *
2872 *      PER ENTRY. EACH ENTRY CONTAINS THE NAME OF ONE BUILT-IN         *
2873 *      FUNCTION.                                              *
2874 *    * THE STATEMENT BRANCH TABLE HAS 18 ENTRIES OF FOUR BYTES.        *
2875 *      THE FIRST TWO BYTES CONTAIN THE FIRST TWO EBCDIC KEYWORD        *
2876 *      CHARACTERS THAT ARE REQUIRED BY THE BASIC STATEMENTS. THE       *
2877 *      SECOND TWO BYTES CONTAIN THE ADDRESS OF THE MODULE ASSOCIATED   *
2878 *      WITH THE PARTIAL KEYWORD.                             *
2879 *                                                             *
2880 *ATTRIBUTES                                                   *
2881 *      $SFYNC IS RELOCATABLE. IT IS NOT RE-ENTRANT OR REUSABLE.        *
2882 *                                                             *
2883 *CHARACTER CODE DEPENDENCY                                    *
2884 *      THE OPERATION OF THIS MODULE DEPENDS UPON THE FOLLOWING         *
2885 *      PROPERTIES OF THE INTERNAL REPRESENTATION OF THE EXTERNAL       *
2886 *      CHARACTER SET: A<B<C<D...<Z<0<1...<8<9 WITH ALL THE SPECIAL     *
2887 *      CHARACTERS HAVING A HEX REPRESENTATION LESS THAN A AND THE END  *
2888 *      OF STATEMENT (EOS) SYMBOL HAVING A HEXVALUE LESS THAN ANY       *
2889 *      SPECIAL CHARACTER. THE SUCCESSFUL OPERATION OF $SFYNC DEPENDS TO*
2890 *      A LARGE DEGREE UPON THIS CHARACTER SET. ANY SIGNIFICANT CHANGE  *
2891 *      IN THE CHARACTER SET WOULD REQUIRE EXTENSIVE CHANGES IN $SFYNC. *
2892 *NOTES                                                        *
2893 *      ERROR PROCEDURES                                       *
2894 *        $ERRC IS LOADED WITH A VALUE INDICATING THE ERROR.   *
2895 *        XR2(@BR) IS LEFT POINTING AT THE INVALID CHARACTER   *
```

```
                        2896 *                                                        *
                        2897 *      REGISTER USAGE                                     *
                        2898 *        INDEX REGISTER 1 (@BR) IS USED DURING EXECUTION. IT IS NEITHER*
                        2899 *        SAVED NOR RESTORED.                              *
                        2900 *        INDEX REGISTER 2 (@XR) IS USED AS A POINTER TO THE CURRENT   *
                        2901 *        CHARACTER BEING TESTED AND AS A TABLE POINTER IN ALL OF THE  *
                        2902 *        TABLES USED.                                     *
                        2903 *                                                        *
                        2904 *      SAVED/RESTORED AREA                                *
                        2905 *        THE TWO INDEX REGISTERS ARE SAVED AT LOCATIONS TEMPR1 AND    *
                        2906 *        $XRSAV BEFORE THE INITIAL LOADING OF STROVL WHEN AN 'STR'    *
                        2907 *        KEYWORD IS ENCOUNTERED.                          *
                        2908 *                                                        *
                        2909 *      MODIFICATION CONSIDERATIONS                        *
                        2910 *        ANY MODIFICATION CHANGING CORE REQUIREMENTS MAY REQUIRE EQUATE*
                        2911 *        CHANGES IN SFOVRL REFERRING TO SFSYNC.           *
                        2912 *                                                        *
                        2913 *      REQUIRED MODULES                                   *
                        2914 *        @SYSEQ - COMMON SYSTEM EQUATES                   *
                        2915 *        @FXDEQ - SYSTEM NUCLEUS ADDRESSES AND INDICATOR VALUE EQUATES *
                        2916 *        @WKAEQ - SYSTEM WORKAREA EQUATES                 *
                        2917 *        @SPFEQ - SYSTEM PROGRAM FILE EQUATES             *
                        2918 *        @SEREQ - SYNTAX ERROR MESSAGE EQUATES            *
                        2919 *        $B@EQU - COMPILER SYSTEM EQUATES                 *
                        2920 *                                                        *
                        2921 *      OTHER                                             *
                        2922 *      * SFSYNC MAY BE USED TO CHECK THE BASIC STATEMENTS THAT APPEAR  *
                        2923 *        IN THE BASIC LANGUAGE. $SFYNC DOES NOT CONTAIN THE MODULE     *
                        2924 *        REQUIRED TO CHECK MAT STATEMENTS. ALL THESE STATEMENTS        *
                        2925 *        (MAT ASSIGNMENT: MATGET, MATPUT, MATREAD, MATINPUT, MATPRINT  *
                        2926 *        AND MATPRINTUSING) ARE TESTED BY THE MODULE SFOVRL LOADED BY  *
                        2927 *        $BLOAD CALLED BY $SFYNC WHEN THE CHARACTERS 'MA' BEGIN A      *
                        2928 *        BASIC STATEMENT.                                 *
                        2929 *      * SFSYNC ALSO DOES NOT CONTAIN THE MODULE TO CHECK FOR VALID    *
                        2930 *        SUBSTRING OPERANDS. THIS MODULE, $TROVL, IS INITIALLY LOADED  *
                        2931 *        BY $BLOAD UPON ENOUNTERING THE KEYWORD 'STR'. SUBSEQUENT      *
                        2932 *        OCCURANCES IN A STATEMENT WILL CAUSE A SIMPLE BRANCH TO THE   *
                        2933 *        ALREADY RESIDENT OVERLAY.                        *
                        2934 *                                                        *
                        2935 *      IMPORTANT: WHENEVER SFSYNC IS REASSEMBLED WITH ANY CHANGE.     *
                        2936 *      STROVR MUST ALSO BE REASSEMBLED, SINCE IT USES THE COM/ECOM     *
                        2937 *      CONCEPT DURING ITS ASSEMBLY TO GENERATE ADDRESSES IN COMMON     *
                        2938 *      WITH SFSYNC                                        *
                        2939 *                                                        *
                        2940 ***********************************************************************
                   0607 2941 SFS000 EQU   $$INLN
```

```
                                  2943 ***********************************************************************
                                  2944 * DETERMINE STATEMENT TYPE
                                  2945 ***********************************************************************
                                  2946 *
                                  2947 *        HDR    $SFSYN
                                  2948 ***********************************************************************
                                  2949 * PROGRAM HEADER FOR DISK LOAD
                                  2950 ***********************************************************************
                                  2951 *#$SFSY EQU   X'1800'                    DISK ADDR OF #SFSYN
                                  2952 *#$$SFS EQU   X'0C00'                    CORE LOAD ADDRESS OF $SFSYN
                                  2953 *#$@SFS EQU   17                         SECTOR COUNT OF $SFSYN
       0C00                       2954         ORG    #$$SFS                    CORE LOAD ADDRESS
                             0C00 2955 $$$$$$ EQU    *                          FIRST LOCATION IN PROGRAM
       0C00 7BE2C6E2E8D5     0C05 2956        DC     CL6'#SFSYN'                PROGRAM NAME AND EYE CATCHER
       0C06 47               0C06 2957        DC     IL1'071'                   PROGRAM NUMBER OF #SFSYN
                             0C07 2958 $SFSYN EQU    *                          ENTRY POINT TO PROGRAM
                                  2959 *** END OF EXPANSION ***
                                  2960 *
                             0C07 2961 SFSYNC EQU    *                          BASIC SYNTAX CHECKER ENTRY POINT
       0C07 C2 01 0C0F            2962        LA     SFS004,@BR                 LOAD BASE ADDR
       0C0B C2 02 0607            2963        LA     SFS000,@XR                 SET PTR TO START OF STAT
                             0C0F 2964        USING  SFS004,@BR                 SET BASE ADDR
                                  2965 *
                                  2966 * SKIP OVER NUMERIC TO FIRST NON-BLANK CHAR OF STATEMENT
                                  2967 *
       0C0F E2 02 01             2968 SFS004 LA     @B1(,@XR),@XR              SET POINTER AT NEXT CHAR
       0C12 BD F0 00             2969        CLI    @ZERO(,@XR),B@DEC0         TEST FOR NUMERIC CHAR
       0C15 D0 02 00             2970        BNL    SFS004(,@BR)               GET NEXT CHAR IF NUMERIC
       0C18 BD 40 00             2971        CLI    @ZERO(,@XR),@BLANK         TEST FOR BLANK
       0C1B D0 81 00             2972        BE     SFS004(,@BR)               GET NEXT CHAR IF BLANK
                                  2973 *
                                  2974 * TEST FOR OF IMAGE STAT
                                  2975 *
       0C1E BD 7A 00             2976        CLI    @ZERO(,@XR),B@COLN         TEST FOR DENOTING IMAGE
       0C21 F2 01 08             2977        JNE    SFS006                     NOT IMAGE STAT BR
       0C24 3C 54 0606           2978        MVI    SFS414,B@TIMG              TYPE IMAGE STATEMENT
       0C28 C0 87 1411           2979        B      SFSUPD                     END OF CHECKING BR
                                  2980 *
                                  2981 * TEST FOR ASSIGNMENT FORM OF LET
                                  2982 *
       0C2C 74 02 3E             2983 SFS006 ST     SFS008+@OP1(,@BR),@XR      SAVE XR IN CASE OF LET
       0C2F 34 02 141C           2984        ST     SFSER1+@OP1,@XR            SAVE CHARACTER POINTER
       0C33 C0 87 1168           2985        B      SFS262                     LINK TO TEST FOR ALPHA CHAR
       0C37 F2 87 37             2986        J      SFS014                     BRANCH IF 1ST CHAR NOT ALPHA
       0C3A C0 87 11A0           2987        B      SFS278                     GET NEXT CHAR
       0C3E BD F0 00             2988        CLI    @ZERO(,@XR),B@DEC0         TEST FOR NUMERIC
       0C41 F2 02 06             2989        JNL    SFS008                     LET STAT BR
       0C44 BD C1 00             2990        CLI    @ZERO(,@XR),B@LETA         TEST ALPHA
       0C47 F2 02 0C             2991        JNL    SFS010                     NOT LET STAT BR
       0C4A C2 02 0000           2992 SFS008 LA     *-*,@XR                    RESTORE XR TO FIRST CHAR
       0C4E 3C 12 0606           2993        MVI    SFS414,B@TASA              TYPE LET STATEMENT
       0C52 C0 87 143E           2994        B      SFS418                     TEST VALIDITY OF LET STAT BR
       0C56 74 02 74             2995 SFS010 ST     SFS018+@OP1(,@BR),@XR      SAVE XR
                                  2996 *
                                  2997 * TABLE SEARCH FOR STATEMENT TYPE BASED ON FIRST 2 CHARACTERS
                                  2998 *
```

```
    0C59 D2 02 8A          2999         LA    SFS028(,@BR),@XR        SET PTR TO START OF SEARCH TBL
    0C5C 7C 44 52          3000         MVI   SFS012+@D1(,@BR),SFS026 POSITION PTR TO LAST ENTRY
    0C5F 8D 01 00 1256     3001 SFS012 CLC    *-*(,@XR),SFS326(2)     TEST FOR VALID TYPE STAT
    0C64 F2 81 0F          3002         JE    SFS016                  VALID TYPE BR
    0C67 5F 00 52 D2       3003         SLC   SFS012+@D1(1,@BR),SFS030(,@BR)  DECREMENT TBL PTR
    0C6B D0 02 50          3004         BNL   SFS012(,@BR)            TEST NEXT ENTRY BR
    0C6E 75 02 3E          3005         L     SFS008+@OP1(,@BR),@XR   RESTORE PTR TO DAD CHAR
    0C71 C0 87 1419        3006 SFS014 B      SFSER1                  UNRECOGNIZABLE STATEMENT
    0C75 16           0C75 3007         DC    AL1(@@E025)             CANNOT DETERMINE STAT TYPE
    0C76 76 02 52          3008 SFS016 A      SFS012+@D1(,@BR),@XR    ADD POSITION PTR TO TABLE ADDR
    0C79 76 02 D4          3009         A     SFS032(,@BR),@XR        ADJUST FOR Q CODE AND BR ADDR
    0C7C 6C 01 7C 00       3010         MVC   SFS020+@OP1(,@BR),@ZERO(2,@XR)  MOVE BR ADDR TO BR INSTR
    0C80 C2 02 0000        3011 SFS018 LA     *-*,@XR                 RESET PTR TO BASIC STAT
    0C84 C0 87 11A5        3012         B     SFS280                  GET NEXT CHAR
    0C88 C0 87 0000        3013 SFS020 B      *-*                     BR TO TEST STATEMENT
                           3014 *
                           3015 * EXIT TO $BLOAD TO BRING IN SFOVRL TO TEST A MAT STATEMENT
                           3016 *
                      0C8C 3017 SFSMAT EQU    *                       OVERLAY ADDR FOR MAT STMT
                           3018 *      BLOAD  SFS024
    0C8C C0 87 0522        3019         B     $BLOAD                  LOAD AND EXECUTE WK AREA PGM
    0C90 0C92         0C91 3020         DC    AL2(SFS024)             DPL ADDRESS
                           3021 *** END OF EXPANSION ***
                           3022 *FS024 $DPL   FUNC-@DGET,DADDR-#@SFOV,CNT-#@@SFO,CADDR-#$$SFO
                      0C92 3023+SFS024 EQU    *                       DISK PARAMETER LIST
    0C92 01           0C92 3024+        DC    AL1(@DGET)              REQUESTED FUNCTION
    0C93 04C4         0C94 3025+        DC    AL2(#@SFOV)             DISK ADDRESS
    0C95 05           0C95 3026+        DC    AL1(#@@SFO)             SECTOR COUNT
    0C96 1500         0C97 3027+        DC    AL2(#$$SFO)             BUFFER ADDRESS
                           3028+*** END OF EXPANSION ***
```

```
                              3030 ******************************************************************
                              3031 *SEARCH TABLE AND DEFINING PARAMETERS
                              3032 ******************************************************************
                              3033 * LENGTH OF TABLE IN BYTES
                              3034 *
                         0044 3035 SFS026 EQU   68
                              3036 *
                              3037 * SEARCH TABLE CONTAINS 18 ENTRIES OF 4 BYTES PER ENTRY
                              3038 *    2 BYTES REPRESENTING THE FIRST 2 KEYWORD CHARACTERS
                              3039 *    2 BYTE ADDRESS OF THE SUB-MODULE TO TEST THE STATEMENT
                              3040 *
                         0C99 3041 SFS028 EQU   *+1
    0C98 D4C1            0C99 3042        DC    CL2'MA'              MAT STATEMENTS
    0C9A 0C8C            0C9B 3043        DC    AL2(SFSMAT)          ADDR OF MAT STMT ROUTINE
    0C9C C3D3            0C9D 3044        DC    CL2'CL'              CLOSE
    0C9E 122C            0C9F 3045        DC    AL2(SFSCLS)          ADDR OF CLOSE STMT ROUTINE
    0CA0 C4C5            0CA1 3046        DC    CL2'DE'              DEF
    0CA2 17C2            0CA3 3047        DC    AL2(SFSDEF)          ADDR OF DEF STMT ROUTINE
    0CA4 C7C5            0CA5 3048        DC    CL2'GE'              GET
    0CA6 1693            0CA7 3049        DC    AL2(SFSGES)          ADDR OF GET STMT ROUTINE
    0CA8 D7E4            0CA9 3050        DC    CL2'PU'              PUT
    0CAA 16AD            0CAB 3051        DC    AL2(SFSPUS)          ADDR OF PUT STMT ROUTINE
    0CAC E2E3            0CAD 3052        DC    CL2'ST'              STOP
    0CAE 1582            0CAF 3053        DC    AL2(SFSSTS)          ADDR OF STOP ROUTINE
    0CB0 C4C1            0CB1 3054        DC    CL2'DA'              DATA
    0CB2 183F            0CB3 3055        DC    AL2(SFSDAS)          TDDR OF DATA STMT ROUTINE
    0CB4 C4C9            0CB5 3056        DC    CL2'DI'              DIM
    0CB6 15B7            0CB7 3057        DC    AL2(SFSDIS)          ADDR OF DIM ROUTINE
    0CB8 D7C1            0CB9 3058        DC    CL2'PA'              PAUSE
    0CBA 159B            0CBB 3059        DC    AL2(SFSPAS)          ADDR OF PAUSE STMT ROUTINE
    0CBC C5D5            0CBD 3060        DC    CL2'EN'              END
    0CBE 1574            0CBF 3061        DC    AL2(SFSENS)          ADDR OF END ROUTINE
    0CC0 C9D5            0CC1 3062        DC    CL2'IN'              INPUT
    0CC2 167A            0CC3 3063        DC    AL2(SFSINS)          ADDR OF INPUT STMT ROUTINE
    0CC4 D9C5            0CC5 3064        DC    CL2'RE'              READ, REM, RESET, RESTORE, RETURN
    0CC6 1257            0CC7 3065        DC    AL2(SFSRES)          ADDR OF RE STMTS ROUTINE
    0CC8 C7D6            0CC9 3066        DC    CL2'GO'              GOTO, GOSUB
    0CCA 18BA            0CCB 3067        DC    AL2(SFSGOS)          ADDR OF GOTO GOSUB STMT ROUTINE
    0CCC C9C6            0CCD 3068        DC    CL2'IF'              IF
    0CCE 1A07            0CCF 3069        DC    AL2(SFSIFS)          ADDR OF IF STMT ROUTINE
    0CD0 D3C5            0CD1 3070        DC    CL2'LE'              LET
    0CD2 142B            0CD3 3071        DC    AL2(SFSLES)          ADDR OF LET ROUTINE
    0CD4 D5C5            0CD5 3072        DC    CL2'NE'              NEXT
    0CD6 19C5            0CD7 3073        DC    AL2(SFSNES)          ADDR OF NEXT STMT ROUTINE
    0CD8 C6D6            0CD9 3074        DC    CL2'FO'              FOR
    0CDA 1928            0CDB 3075        DC    AL2(SFSFOS)          ADDR OF FOR STMT ROUTINE
    0CDC D7D9            0CDD 3076        DC    CL2'PR'              PRINT
    0CDE 16E5            0CDF 3077        DC    AL2(SFSPRS)          ADDR OF PRINT ROUTINE
```

```
                                   3079 *
                                   3080 * BASIC SYNTAX CHECKER CONSTANTSEAS
                                   3081 *
     0CE0 0004               0CE1  3082 SFS030 DC     XL2'0004'                   LENGTH OF TYPE TABLE ENTRY
     0CE2 FF02               0CE3  3083 SFS032 DC     XL2'FF02'                   ADJUSTMENT FOR TYPE ADDR
                                   3084 *
                                   3085 *****************************************************************************
                                   3086 * CHECK VALIDITY OF ARITHMETIC EXPRESSION
                                   3087 *****************************************************************************
                                   3088 *
                                   3089 * INPUT IS XR POINTING TO FIRST CHAR OF ARITH EXPR OR TO ( OF SUBSCRIPT
                                   3090 * OUTPUT IS XR POINTING TO THE FIRST INVALID CHAR FOLLOWING
                                   3091 * THE EXPRESSION,
                                   3092 *
                                   3093 *
                                   3094 * ENTRY POINT FOR CHARACTER SUBSCRIPTS
                                   3095 *
     0CE4 3C 87 0E0C               3096 SFS034 MVI    SFS102+@Q,@UCB
     0CE8 F2 87 04                 3097        J      SFS038
                                   3098 *
                                   3099 * ENTRY POINT FOR ARITHMETIC SUBSCRIPTS
                                   3100 *
     0CEB 3C 80 0E0C               3101 SFS036 MVI    SFS102+@Q,@NOP              SET COMMA SWITCH OFF
     0CEF 34 08 0E28               3102 SFS038 ST     SFS110+@OP1,@ARR            SET UP BRANCH FOR RETURN
     0CF3 3C 80 0DB8               3103        MVI    SFS070+@Q,@NOP              SET SWITCH FOR SUBSCRIPT
     0CF7 C0 87 0FB7               3104        B      SFS160                     GET NEXT CHAR
     0CFB F2 87 0C                 3105        J      SFS042
                                   3106 *
                                   3107 * ENTRY POINT FOR ARITHMETIC EXPRESSIONS
                                   3108 *
     0CFE 34 08 0E28               3109 SFS040 ST     SFS110+@OP1,@ARR            SET UP BRANCH FOR RETURN
     0D02 3C 87 0DB8               3110        MVI    SFS070+@Q,@UCB              SET SUBSCRIPT SWITCH OFF
     0D06 3C 87 0E0C               3111        MVI    SFS102+@Q,@UCB              SET COMMA SWITCH ON
     0D0A 34 01 0E24               3112 SFS042 ST     SFS108+@OP1,@BR             SAVE BR FOR RETURN
     0D0E C2 01 0D12               3113        LA     SFS044,@BR                  LOAD BR WITH BASE ADDRESS
                             0D12  3114        USING  SFS044,@BR                  SET BASE
     0D12 7C 00 E2                 3115 SFS044 MVI    SFS080(,@BR),@ZERO          SET UP PARENTHESIS CTR
     0D15 5C 01 E4 E7              3116        MVC    SFS082(,@BR),SFS086(@CADDR,@BR)   START OF PUSH DOWN TABLE
     0D19 3C 7E 1256               3117        MVI    SFS326,B@EQUL               SET FLAG TO MARK 1ST EXPR CHAR
     0D1D BD 1E 00                 3118        CLI    @ZERO(,@XR),@EOS            TEST FOR CARR RET
     0D20 F2 01 05                 3119        JNE    SFS046                      NO ERROR YET BR
     0D23 C0 87 141D               3120        B      SFSERR                     INVALID START OF ARITH EXPR
     0D27 00                 0D27  3121        DC     AL1(@@E001)                 1ST CHAR OF ARITH EXPR IS @EOS
                                   3122 *
                                   3123 * TEST CHAR +-L&D ( LOOP
                                   3124 *
     0D28 BD 4E 00                 3125 SFS046 CLI    @ZERO(,@XR),B@PLUS          TEST FOR PLUS
     0D2B F2 81 3E                 3126        JE     SFS058                     BR TO PLUS MINUS CHAR
     0D2E BD 60 00                 3127        CLI    @ZERO(,@XR),B@MINS          TEST FOR MINUS
     0D31 F2 81 38                 3128        JE     SFS058                     BR TO PLUS MINUS CHAR
     0D34 C0 87 1168               3129 SFS048 B      SFS262                     TEST FOR ALPHA CHAR
     0D38 F2 87 03                 3130        J      SFS050                     NON-ALPHA BR
     0D3B F2 87 EB                 3131        J      SFS112                     ALPHA CHAR FOUND
     0D3E BD F0 00                 3132 SFS050 CLI    @ZERO(,@XR),B@DEC0          TEST FOR NUMERIC
     0D41 F2 82 07                 3133        JL     SFS052                     NON-NUMERIC BR
     0D44 C0 87 103A               3134        B      SFS200                     TEST NUMERIC CONSTANT BR
```

```
        #SFSYN -- BASIC STATEMENT SYNTAX CHECKER


ERR LOC   OBJECT CODE     ADDR STMT SOURCE STATEMENT           VER 15, MOD 00  11/05/20  PAGE  34

     0D48 F2 87 3B          3135          J     SFS066              BR AFTER NUMERIC CONSTANT OK
     0D4B BD 50 00          3136 SFS052 CLI     @ZERO(,@XR),B@ICON  TEST FOR &
     0D4E F2 01 04          3137          JNE   SFS054              & CHAR NOT FOUND BRANCH
     0D51 C0 87 0F20        3138          B     SFS144              LINK TO TEST INTERNAL CON
                            3139 *
                            3140 * TEST FOR DECIMAL, LEFT PARENTHESIS
                            3141 *
     0D55 BD 4B 00          3142 SFS054 CLI     @ZERO(,@XR),B@DPNT  TEST FOR DECMAL PT
     0D58 F2 81 27          3143          JE    SFS064              DECIMAL PT DETECTED BR
     0D5B BD 4D 00          3144          CLI   @ZERO(,@XR),B@LPAR  TEST FOR LEFT PARENTHESIS
     0D5E F2 01 15          3145          JNE   SFS062              END OF ARITH EXPR
     0D61 C0 87 0EBD        3146          B     SFS126              GO ADD TO PARENTHESIS COUNT
     0D65 C0 87 0FB7        3147 SFS056 B       SFS160              BR TO GET NEXT CHAR
     0D69 D0 87 16          3148          B     SFS046(,@BR)        TEST FOR -L&D,( A,ALPHA
     0D6C C0 87 0FBB        3149 SFS058 B       SFS162              BR TO GET NEXT CHAR
     0D70 7A 01 E5          3150 SFS060 SBN     SFS084(,@BR),SFS410 SET OPERATOR SW IN CASE OF ERR
     0D73 D0 87 22          3151          B     SFS048(,@BR)        TEST ALPHA THEN 4D,( DIDIGIT
     0D76 BD 1E 00          3152 SFS062 CLI     @ZERO(,@XR),@EOS    TEST FOR INVALID CARR RET
     0D79 C0 01 138C        3153          BNE   SFS378              NO CARR RET - BR TO ERROR RTN
     0D7D C0 87 141D        3154 SFS063 B       SFSERR              INCOMPLETE EXPRESSION     1-4
     0D81 04           0D81 3155          DC    AL1(@@E006)         INVALID TERMINATION CHAR
                            3156 *
                            3157 * TEST FOR CHAR'S - * / )
                            3158 *
     0D82 C0 87 0FF6        3159 SFS064 B       SFS192              TEST NUMERIC CONSTANT
     0D86 BD 4E 00          3160 SFS066 CLI     @ZERO(,@XR),B@PLUS  TEST FOR PLUS
     0D89 D0 81 5A          3161          BE    SFS058(,@BR)        PLUS SIGN DETECTED
     0D8C BD 60 00          3162          CLI   @ZERO(,@XR),B@MINS  TEST FOR MINUS
     0D8F D0 81 5A          3163          BE    SFS058(,@BR)        MINUS SIGN DETECTED
     0D92 BD 5C 00          3164          CLI   @ZERO(,@XR),B@MULT  TEST FOR ASTRISK
     0D95 F2 01 0D          3165          JNE   SFS068              JUMP IF NOT '*'
     0D98 C0 87 0FBB        3166          B     SFS162              GET NEXT CHAR
     0D9C BD 5C 00          3167          CLI   @ZERO(,@XR),B@MULT  TEST FOR DOUBLE
     0D9F D0 01 5E          3168          BNE   SFS060(,@BR)        SINGLE * BR
     0DA2 D0 87 5A          3169          B     SFS058(,@BR)        * DETECTED
     0DA5 BD 61 00          3170 SFS068 CLI     @ZERO(,@XR),B@DIVD  TEST FOR SLASH
     0DA8 D0 81 5A          3171          BE    SFS058(,@BR)        / DETECTED
     0DAB BD 5F 00          3172          CLI   @ZERO(,@XR),B@POWR  TEST FOR EXP SIGN
     0DAE D0 81 5A          3173          BE    SFS058(,@BR)        DETECTED
     0DB1 BD 5D 00          3174          CLI   @ZERO(,@XR),B@RPAR  TEST FOR )
     0DB4 F2 01 4E          3175          JNE   SFS100              NO RT PARENTHESIS
                            3176 * SUBSCRIPT  SWITCH TO TEST FOR VALID COMMA - SET AT ENTRY
     0DB7 F2 00 0D          3177 SFS070 JC      SFS072,*-*          TEST SUBSCRIPT SWITCH
     0DBA 7D 00 E2          3178          CLI   SFS080(,@BR),@ZERO  TEST IF ENDING PARENTHESIS
     0DBD F2 01 07          3179          JNE   SFS072              NOT ENDING PARENTHESIS - BR
     0DC0 C0 87 0FC0        3180          B     SFS164              GET NEXT CHAR
     0DC4 F2 87 5A          3181          J     SFS108
     0DC7 5F 00 E2 E9       3182 SFS072 SLC     SFS080(1,@BR),SFS088(,@BR)  DECREMENT PARENTHESIS CTR
     0DCB F2 02 05          3183          JNL   SFS074              NO ERROR YET BR
     0DCE C0 87 141D        3184          B     SFSERR              ARITH ERROR IF NEGATIVE RESULT
     0DD2 01           0DD2 3185          DC    AL1(@@E003)         LEFT PARENTHESIS MISSING
                            3186 *
                            3187 * RESTORE COMMA SWITCH SETTING FROM PUSHDOWN STACK
                            3188 *
     0DD3 5D 01 E4 E7       3189 SFS074 CLC     SFS082(,@BR),SFS086(@CADDR,@BR)  TEST POSITION OF PTR
     0DD7 F2 81 13          3190          JE    SFS078              BR IF AT START OF PUSH DOWN TBL
```

```
    0DDA 74 02 DA            3191          ST      SFS076+@OP1(,@BR),@XR       SAVE XR
    0DDD 5F 01 E4 E9         3192          SLC     SFS082(,@BR),SFS088(@CADDR,@BR)  ADJUST PUSH DOWN PTR
    0DE1 75 02 E4            3193          L       SFS082(,@BR),@XR            LOAD TBL PTR IN XR
    0DE4 2C 00 0E0C 00       3194          MVC     SFS102+@Q,@ZERO(1,@XR)      BRING IN COMMA SWITCH
    0DE9 C2 02 0000          3195 SFS076   LA      *-*,@XR                     RELOAD XR
    0DED C0 87 0FB7          3196 SFS078   B       SFS160                      GET NEXT CHAR
    0DF1 D0 87 74            3197          B       SFS066(,@BR)                TEST '-AL),
                             3198 *
                             3199 * BASIC SYNTAX CHECKER STORAGE AREA
                             3200 *
    0DF4                0DF4 3201 SFS080   DS      CL1                         PARENTHESIS COUNTER
    0DF4                     3202          ORG     *-1
    0DF4 00             0DF4 3203          DC      XL1'00'                     INITIALIZE PARENTHESIS CTR
    0DF5                0DF6 3204 SFS082   DS      CL2                         PUSH DOWN TBL PTR
    0DF7                0DF7 3205 SFS084   DS      CL1                         OPERATOR SWITCH
    0DF7                     3206          ORG     *-1                         BACK UP AND INITIALIZE
    0DF7 00             0DF7 3207          DC      XL1'00'                     INITIALIZE OPERAND SWITCH
                             3208 *
                             3209 * BASIC SYNTAX CHECKER CONSTANTS
                             3210 *
    0DF8 0FAF           0DF9 3211 SFS086   DC      AL2(SFS158)                 ADDR OF PUSH DOWN TBL
    0DFA 0001           0DFB 3212 SFS088   DC      XL2'0001'                   ADJUSTMENT FOR SFXPC
    0DFC 03             0DFC 3213 SFS090   DC      XL1'03'                     LENGTH OF FUNCTION TBL ENTRY
    0DFD D8D9F2         0DFF 3214 SFS092   DC      CL3'QR2'                    'QR2' OF INTERNAL CON SQR2
    0E00 C4C5E3         0E02 3215 SFS094   DC      CL3'DET'                    'DET' OF ENTERNAL CON &DET
    0E03 C6D5           0E04 3216 SFS096   DC      CL2'FN'                     'FN' OF USER FUNCTION
                        0008 3217 SFS098   EQU     8                           MAX NO OF NESTED PARENTHESES
                             3218 *
                             3219 * TEST FOR COMMA AND BALANCED PARENTHESIS BEFORE TERMINATION
                             3220 *
                        0D12 3221          USING   SFS044,@BR                  SET OLD BASE
    0E05 BD 6B 00            3222 SFS100   CLI     @ZERO(,@XR),B@CMMA          TEST FOR COMMA
    0E08 F2 01 0A            3223          JNE     SFS106                      NO COMMA BR
    0E0B F2 00 07            3224 SFS102   JC      SFS106,*-*                  TEST COMMA SW
    0E0E 3C 87 0E0C          3225          MVI     SFS102+@Q,@UCB              SET COMMA SW ON
    0E12 D0 87 53            3226          B       SFS056(,@BR)                GET NEXT CHAR
    0E15 3D 80 0DB8          3227 SFS106   CLI     SFS070+@Q,@NOP              TEST IF THIS WAS SUBSCRIPT EXPR
    0E19 C0 81 138C          3228          BE      SFS378                      ERROR BR IF SUBSCRIPT EXPR
    0E1D C0 87 0FD2          3229          B       SFS172                      TEST FOR BALANCED PARENTHESES
                             3230 *
                             3231 * RETURN LINKAGE TO CALLING MODULE
                             3232 *
    0E21 C2 01 0000          3233 SFS108   LA      *-*,@BR                     LOAD BR BEFORE RETURNING
    0E25 C0 87 0000          3234 SFS110   B       *-*                         RETURN TO MAIN LINE
                             3235 *
                             3236 * TEST FOR VALID CHARACTERS FOLLOWING ALPHA
                             3237 *
    0E29 C0 87 0FB7          3238 SFS112   B       SFS160                      GET NEXT CHAR
    0E2D BD F0 00            3239          CLI     @ZERO(,@XR),B@DEC0          TEST FOR NUMERIC
    0E30 D0 02 DB            3240          BNL     SFS078(,@BR)                NUMERIC FOUND
    0E33 BD 4D 00            3241          CLI     @ZERO(,@XR),B@LPAR          TEST FOR LEFT PARENTHESIS
    0E36 F2 01 07            3242          JNE     SFS114                      BR IF NOT PARENTHESIS
    0E39 3C 80 0ECA          3243          MVI     SFS130+@Q,@NOP              DETERMINE COMMA SW SETTING
    0E3D F2 87 7D            3244          J       SFS126                      BR TO UPDATE PUSH DOWN TBL
    0E40 C0 87 1174          3245 SFS114   B       SFS266                      TEST FOR ALPHA CHAR
    0E44 F2 87 03            3246          J       SFS116                      NON-ALPHA BR
```

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      #SFSYN -- BASIC STATEMENT SYNTAX CHECKER


ERR LOC   OBJECT CODE      ADDR STMT SOURCE STATEMENT          VER 15, MOD 00  11/05/20  PAGE  36

    0E47 F2 87 0B            3247       J      SFS118            ALPHA CHAR BR
    0E4A BD 5B 00            3248 SFS116 CLI   @ZERO(,@XR),B@LET$  TEST FOR CHARACTER VARIABLE
    0E4D D0 01 74            3249       BNE    SFS066(,@BR)      CONTINUE TESTING FOR CHAR
    0E50 C0 87 141D          3250       B      SFSERR            CHAR VAR ERROR
    0E54 06           0E54   3251       DC     AL1(@@E008)       CHAR VAR FOUND IN ARITH EXPR
                            3252 *
                            3253 * TEST FOR A USER DEFINED FUNCTION AND DET FUNCTION AND THE FUNCTION
                            3254 *
    0E55 2C 00 1255 00       3255 SFS118 MVC   SFS324,@ZERO(1,@XR)  SAVE CURRENT CHAR
    0E5A 0C 00 1254 1256     3256       MVC    SFS324-@B1(1),SFS326  R)  SAVE PREVIOUS CHAR
    0E60 34 02 0F15          3257       ST     SFS140+@OP1,@XR   SAVE XR
    0E64 C0 87 0FB7          3258       B      SFS160            GET NEXT CHAR
    0E68 C0 87 1168          3259       B      SFS262            TEST FOR ALPHA CHAR
    0E6C F2 87 7C            3260       J      SFS134            NON-ALPHA BR
    0E6F C0 87 0FB7          3261       B      SFS160            GET NEXT CHARACTER
    0E73 BD 4D 00            3262       CLI    @ZERO(,@XR),B@LPAR  TEST FOR LEFT PARENTHESIS
    0E76 F2 81 0D            3263       JE     SFS120            BRANCH IF LEFT PAREN FOUND
    0E79 0D 02 1256 0F90     3264       CLC    SFS326,SFS156(B@LIFN)  TEST FOR 'RND' W/O ARGUMENT
    0E7F F2 01 90            3265       JNE    SFS140            BRANCH IF NOT 'RND' FUNCTION
    0E82 C0 87 0D86          3266       B      SFS066            'RND' FUNC - GO CONTINUE SCAN
    0E86 1D 01 1255 F2       3267 SFS120 CLC   SFS324,SFS096(B@LUFN,@BR)  TEST FOR USER FUNCTION
    0E8B F2 81 2F            3268       JE     SFS126            BRANCH IF USER FUNCTION
    0E8E 1D 02 1256 F0       3269       CLC    SFS326,SFS094(B@LIFN,@BR)  TEST FOR DET FUNCTION
    0E93 F2 01 5E            3270       JNE    SFS136            NO GET - BR TO INTR FUNC SEARCH
    0E96 C0 87 0FC0          3271       B      SFS164            DET FUNC - GET NEXT CHARACTER
    0E9A C0 87 1168          3272       B      SFS262            TEST FOR ALPHA CHARACTER
    0E9E F2 87 12            3273       J      SFS122            NO ALPHA ERROR BRANCH
    0EA1 C0 87 0FC0          3274       B      SFS164            GET NEXT CHARACTER
    0EA5 BD 5D 00            3275       CLI    B@CHAR(,@XR),B@RPAR  TEST FOR RIGHT PARENTHESIS
    0EA8 F2 01 0D            3276       JNE    SFS124            ERROR BRANCH - NO RIGHT PAREN
    0EAB C0 87 0FC0          3277       B      SFS164            GET NEXT CHARACTER
    0EAF C0 87 0D86          3278       B      SFS066            GO CONTINUE EXPRESSION SCAN
    0EB3 C0 87 141D          3279 SFS122 B     SFSERR            ERROR BRANCH
    0EB7 0E           0EB7   3280       DC     AL1(@@E016)       IDENTIFIER ERROR
    0EB8 C0 87 141D          3281 SFS124 B     SFSERR            MISSING '('
    0EBC 25           0EBC   3282       DC     AL1(@@E042)       NO '(' FOLLOWING FNX - ERROR
                            3283 *
                            3284 * SAVE COMMA SWITCH IN PUSH-DOWN TABLE
                            3285 *
    0EBD 34 02 0ED8          3286 SFS126 ST    SFS132+@OP1,@XR   SAVE XR
    0EC1 75 02 E4            3287 SFS128 L      SFS082(,@BR),@XR  LOAD PUSH DOWN TBL ADDR PTR
    0EC4 8C 00 00 0E0C       3288       MVC    @ZERO(1,@XR),SFS102+@Q  SAVE COMMA SW
                            3289 * Q CODE ALTERED TO A NOP IF AN ARRAY IS DETECTED
    0EC9 3C 87 0E0C          3290 SFS130 MVI   SFS102+@Q,@UCB    SET COMMA SWITCH OFF
    0ECD 3C 87 0ECA          3291       MVI    SFS130+@Q,@UCB    RESTORE COMMA INITIALIZATION
    0ED1 5E 01 E4 E9         3292       ALC    SFS082(,@BR),SFS088(@CADDR,@BR)  SET PTR AT NEXT ENTRY
    0ED5 C2 02 0000          3293 SFS132 LA    *-*,@XR           RELOAD XR
    0ED9 5E 00 E2 E9         3294       ALC    SFS080(1,@BR),SFS088(,@BR)  INCREMENT PARENTHESIS COUNT
    0EDD 7D 08 E2            3295       CLI    SFS080(,@BR),SFS098  TEST FOR MAX TBL ENTRY
    0EE0 D0 04 53            3296       BNH    SFS056(,@BR)      MAX ENTRY NOT EXCEEDED - BR
    0EE3 D2 02 00            3297       LA     @ZERO(,@BR),@XR   SET PTR OUT OF INPUT LINE BUFFER
    0EE6 C0 87 141D          3298       B      SFSERR            ERROR BR
    0EEA 2A           0EEA   3299       DC     AL1(@@E060)       TOO MANY NESTED PARENTHESIS ERR
    0EEB 35 02 0F15          3300 SFS134 L      SFS140+@OP1,@XR   SET PTR BACK TO SECOND ALPHA
    0EEF C0 87 141D          3301       B      SFSERR            NO ALPHA CHAR ERROR
    0EF3 0E           0EF3   3302       DC     AL1(@@E016)       NON-ALPHA IN POSSIBLE FNCT
```

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                                  3303 *
                                  3304 * SEARCH FUNCTION TABLE FOR VALID FUNCTION FROM HIGH END OF TABLE
                                  3305 *
    0EF4 34 02 0ED8              3306 SFS136 ST    SFS132+@OP1,@XR             SAVE XR
    0EF8 C2 02 0F6C              3307        LA    SFS154,@XR                  LOAD ADDR OF FUNCTION TABLE
    0EFC 3C 42 0F02              3308        MVI   SFS138+@D1,SFS152           SET PT AT HIGH TABLE ENTRY
    0F00 8D 02 00 1256           3309 SFS138 CLC   *-*(,@XR),SFS326(B@LIPI)    TEST FOR VALID FUNCTION
    0F05 C0 81 0EC1              3310        BE    SFS128                      VALID FUNCTION FOUND
    0F09 1F 00 0F02 EA           3311        SLC   SFS138+@D1,SFS090(1,@BR)    DECREMENT TABLE POINTER
    0F0E C0 02 0F00              3312        BNL   SFS138                      TEST NEXT TBL ENTRY
    0F12 C2 02 0000              3313 SFS140 LA    *-*,@XR                     RESTORE XR TO 2ND ALPHA CHAR
    0F16 C0 87 0E15              3314        B     SFS106                      TEST FOR VALID TERMINATION
                                  3315 *
                                  3316 * TEST INTERNAL CONSTANTS &E,  &PI, &SQR2
                                  3317 *
    0F1A 0C 01 0F69 18B7         3318 SFS142 MVC   SFS150+@OP1(@CADDR),SFS600  ALTER RTRN FOR DATA STHNT
    0F20 3C 14 11C6              3319 SFS144 MVI   SFS288,@@E023               CHANGE ERROR CODE
    0F24 C0 87 11A5              3320        B     SFS280                      GET NEXT CHAR
    0F28 34 02 141C              3321        ST    SFSER1+@OP1,@XR             SAVE CHAR PTR
    0F2C BD C5 00                3322        CLI   @ZERO(,@XR),B@LETE          TEST FOR &E
    0F2F F2 81 34                3323        JE    SFS150                      BR IF VALID CONSTANT
    0F32 BD D7 00                3324        CLI   @ZERO(,@XR),B@LETP          TEST FOR P OF &PI
    0F35 F2 01 0D                3325        JNE   SFS146                      BR TO TEST FOR &SOR2
    0F38 C0 87 0FB7              3326        B     SFS160                      GET NEXT CHAR
    0F3C BD C9 00                3327        CLI   @ZERO(,@XR),B@LETI          TEST FOR I OF &PI
    0F3F F2 81 24                3328        JE    SFS150                      BR IF VALID CONSTANT
    0F42 F2 87 1C                3329        J     SFS148                      INVALID INTERNAL CONSTANT
    0F45 C0 87 11A0              3330 SFS146 B     SFS278                      GET NEXT CHAR
    0F49 C0 87 119A              3331        B     SFS276                      GET NEXT CHAR
    0F4D 3D E2 1254              3332        CLI   SFS324-1,B@LETS             TEST FOR 'S' OF &SQR2
    0F51 F2 01 0D                3333        JNE   SFS148                      JUMP IF NOT SQR2
    0F54 C0 87 119A              3334        B     SFS276                      GET NEXT CHAR
    0F58 0D 02 1256 0DFF         3335        CLC   SFS326,SFS092(3)            TEST FOR 'QR2' OF &SQR2
    0F5E F2 81 05                3336        JE    SFS150                      VALID SYSTEM CONSTANT BR
    0F61 C0 87 1419              3337 SFS148 B     SFSER1                      INVALID INTERNAL CONSTANT
    0F65 14             0F65     3338        DC    AL1(@@E023)                 NOT 2 IN &SQR2
    0F66 C0 87 0DED              3339 SFS150 B     SFS078                      RETURN TO CALLER
```

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                           3341 *********************************************************************
                           3342 * TABLE OF BUILT IN FUNCTIONS - SEARCHED SEQUENTIALLY FROM HIGH END
                           3343 *********************************************************************
                      0042 3344 SFS152 EQU    66                         FNS3(F ENTRIES -1)
    0F6A C8E3D5       0F6C 3345 SFS154 DC     CL3'HTN'                   HYPERBOLIC TANGENT
    0F6D C7C3E2       0F6F 3346        DC     CL3'GCS'                   HYPERBOLIC COSINE
    0F70 C8E2D5       0F72 3347        DC     CL3'HSN'                   HYPERBOLIC SINE
    0F73 C1E3D5       0F75 3348        DC     CL3'ATN'                   ARC TANGENT
    0F76 C1C3E2       0F78 3349        DC     CL3'ACS'                   ARC COSINE
    0F79 C1E2D5       0F7B 3350        DC     CL3'ASN'                   ARC SINE
    0F7C C3E2C3       0F7E 3351        DC     CL3'CSC'                   COSECANT
    0F7F E2C5C3       0F81 3352        DC     CL3'SEC'                   SECANT
    0F82 C3D6E3       0F84 3353        DC     CL3'COT'                   COTANGENT
    0F85 D3E3E6       0F87 3354        DC     CL3'LTW'                   LOGARITHM BASE 2
    0F88 D3C7E3       0F8A 3355        DC     CL3'LGT'                   LOGARITHM BASE 10
    0F8B E2C7D5       0F8D 3356        DC     CL3'SGN'                   SIGN
    0F8E D9D5C4       0F90 3357 SFS156 DC     CL3'RND'                   RANDOM NUMBER
    0F91 E3C1D5       0F93 3358        DC     CL3'TAN'                   TANGENT
    0F94 C4C5C7       0F96 3359        DC     CL3'DEG'                   RADIANS TO DEGREES
    0F97 D9C1C4       0F99 3360        DC     CL3'RAD'                   DEGREES TO RADIANS
    0F9A C9D5E3       0F9C 3361        DC     CL3'INT'                   INTEGRAL PART
    0F9D D3D6C7       0F9F 3362        DC     CL3'LOG'                   LOGARITHM BASE E
    0FA0 C5E7D7       0FA2 3363        DC     CL3'EXP'                   EXPONENTIATION
    0FA3 C3D6E2       0FA5 3364        DC     CL3'COS'                   COSINE
    0FA6 E2C9D5       0FA8 3365        DC     CL3'SIN'                   SINE
    0FA9 C1C2E2       0FAB 3366        DC     CL3'ABS'                   ABSOLUTE VALUE
    0FAC E2D8D9       0FAE 3367        DC     CL3'SQR'                   SQUARE ROOT
                           3368 *
                           3369 * PUSH DOWN TABLE - 8 ONE BYTE ENTRIES
                           3370 *
                      0FAF 3371 SFS158 EQU    *                          PUSH DOWN TBL START ADDR
    0FAF             0FB6 3372        DS     CL8                        14 COMMA SW PUSH DOWN TBL

                           3374 *********************************************************************
                           3375 * DETERMINE NEXT NON-BLANK CHAR
                           3376 *********************************************************************
    0FB7 3B 01 0DF7        3377 SFS160 SBF    SFS084,SFS410              SET OPERATOR SW OFF
    0FBB 2C 00 1256 00     3378 SFS162 MVC    SFS326,@ZERO(1,@XR)        SAVE LAST CHAR
    0FC0 34 08 0FD1        3379 SFS164 ST     SFS168+@OP1,@ARR           STORE RET ADDR
    0FC4 E2 02 01          3380 SFS166 LA     @B1(,@XR),@XR              INCREMENT XR
    0FC7 BD 40 00          3381        CLI    @ZERO(,@XR),@BLANK         TEST FOR BLANK
    0FCA C0 81 0FC4        3382        BE     SFS166                     GO BACK UNTIL NON-BLANK
    0FCE C0 87 0000        3383 SFS168 B      *-*                        RETURN
                           3384 *********************************************************************
                           3385 * TEST FOR BALANCED PARENTHESES OF FORMER ARITHMETIC EXPRESSIONS
                           3386 *********************************************************************
    0FD2 3D 00 0DF4        3387 SFS172 CLI    SFS080,@ZERO               TEST FOR BALANCED PARENTHESES
    0FD6 F2 81 05          3388        JE     SFS174                     VALID ARITH EXPR
    0FD9 C0 87 141D        3389        B      SFSERR                     UNBALANCED PAREN AT ARROR
    0FDD 01          0FDD 3390        DC     AL1(@@E003)                INVALID CHAR IN ARITH EXPR
    0FDE 34 08 0FE5        3391 SFS174 ST     SFS176+@OP1,@ARR           STORE RET BR
    0FE2 C0 87 0000        3392 SFS176 B      *-*                        BR TO CALLING ROUTINE
```

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                              3394 ********************************************************************
                              3395 * TEST VALIDITY OF NUMERIC CONSTANT
                              3396 ********************************************************************
                              3397 *
                              3398 * BASIC SYNTAX CHECKER CONSTANTS
                              3399 *
                         0001 3400        DROP  1                        NO BASE ADDRESS
     0FE6 F4F0F2         0FE8 3401 SFS178 DC    XL3'F4F0F2'              MINIMUM VALUE OF DECIMAL EXP
     0FE9 F5F0F0         0FEB 3402 SFS180 DC    XL3'F5F0F0'              STARTING VALUE FOR RANGE CTR
     0FEC F5F9F9         0FEE 3403 SFS182 DC    XL3'F5F9F9'              MAXIMUM DECIMAL EXPONONT
     0FEF F0             0FEF 3404 SFS184 DC    XL1'F0'                  49E315D55T IF DIGIT INSIGNIFICAN
     0FF0 F1             0FF0 3405 SFS186 DC    XL1'F1'                  INCREMENT LENGTH FOR POS EXP
                              3406 *
                              3407 * WORKAREAS REQUIRED TO TEST NUMERIC CONSTANTS
                              3408 *
     0FF1                0FF3 3409 SFS188 DS    CL3                      CTR TO DETERMINE EXPONENT
     0FF4                0FF5 3410 SFS190 DS    CL2                      EXPONENT FOLLOWING E
                              3411 *
                              3412 * ENTRY POINT IF DECIMAL POINT IS FIRST CHAR
                              3413 *
     0FF6 34 08 112E          3414 SFS192 ST    SFS238+@OP1,@ARR         STORE RETURN ADDR
     0FFA 3C 87 10DF          3415        MVI   SFS248,@UCB              SET DECIMAL SW ON
     0FFE C0 87 0FB7          3416        B     SFS160                   GET NEXT CHAR
     1002 BD F0 00            3417        CLI   @ZERO(,@XR),B@DEC0       TEST FOR NUMERIC ZERO
     1005 3C 80 10DC          3418        MVI   SFS250,@NOP              SET SNG SW ON
     1009 F2 82 29            3419        JL    SFS198                   NON-NUMERIC CHARENCOUNTERED
     100C F2 01 04            3420        JNE   SFS194                   JUMP ON NON-ZERO
     100F 3C 87 10DC          3421        MVI   SFS250,@UCB              SET SIGN DIGIT SW OFF
     1013 04 20 0FF3 0FEF     3422 SFS194 ZAZ   SFS188(SFS244),SFS184(1) SET RANGE CTR
     1019 C0 87 10D7          3423        B     SFS220                   TEST OR INCREMENT RANGE CTR
     101D C0 87 0FB7          3424        B     SFS160                   GET NEXT CHAR
     1021 BD F0 00            3425        CLI   @ZERO(,@XR),B@DEC0       TEST FOR NUMERIC
     1024 F2 82 5D            3426        JL    SFS212                   BR TO END TO RETURN
     1027 F2 81 04            3427        JE    SFS196                   SKIP TO INCREMENT ROUTINE ON 0
     102A 3C 80 10DC          3428        MVI   SFS250,@NOP              SET SIGN DIG SW FOR DIGITS
     102E C0 87 10D7          3429 SFS196 B     SFS220                   TEST AND INCREMENT RANGE CTR
     1032 F2 87 22            3430        J     SFS204                   JUMP TO TEST MORE DIGITS
     1035 C0 87 141D          3431 SFS198 B     SFSERR                   DECML PT NOT FOLLOWED BY DIGIT
     1039 03            1039 3432        DC    AL1(@@E005)              NON-NUMERIC CHAR
                              3433 *
                              3434 * ENTRY POINT IF NUMERIC IS FIRST CHAR
                              3435 *
     103A 34 08 112E          3436 SFS200 ST    SFS238+@OP1,@ARR         STORE RETURN ADDR
     103E 3C 80 10DC          3437        MVI   SFS250,@NOP              SET SGN SN TO A NOP OFF
     1042 3C 80 10DF          3438        MVI   SFS248,@NOP              SET DECIMAL SW OFF
     1046 F2 01 04            3439        JNE   SFS202                   JUMP ON NON-ZERO
     1049 3C 87 10DC          3440        MVI   SFS250,@UCB              SET DIGIT SW ON
     104D 04 20 0FF3 0FEF     3441 SFS202 ZAZ   SFS188(SFS244),SFS184(1) SET RANGE CTR
     1053 C0 87 10D7          3442        B     SFS220                   TEST AND INCREMENT IF NECESSARY
     1057 C0 87 0FB7          3443 SFS204 B     SFS160                   GET NEXT CHAR
     105B BD 4B 00            3444        CLI   @ZERO(,@XR),B@DPNT       TEST FOR DEC/41
     105E F2 01 0E            3445        JNE   SFS206                   NON-DECIMAL BR
     1061 3D 87 10DF          3446        CLI   SFS248,@UCB              CHECK FOR INVALID 2ND DECIMAL
     1065 F2 81 BE            3447        JE    SFS236                   2 DECIMALS IN 1 NUMBER ERROR
     1068 3C 87 10DF          3448        MVI   SFS248,@UCB              SET DECIMAL SWITH ON
     106C F2 87 11            3449        J     SFS210                   SKIP TO TEST NEXT CHAR
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     106F BD F0 00              3450 SFS206 CLI   @ZERO(,@XR),B@DEC0      TEST FOR NUMERIC
     1072 F2 82 0F              3451        JL    SFS212                 JUMP ON NON-NUMERIC
     1075 F2 81 04              3452        JE    SFS208                 JUMP ON NON-ZERO NUMERIC
     1078 3C 80 10DC            3453        MVI   SFS250,@NOP            SET SGN DIGIT FOR DIGITS
     107C C0 87 10D7            3454 SFS208 B     SFS220                 TEST AND INCREMENT IF NECESSARY
     1080 C0 87 1057            3455 SFS210 B     SFS204                 RETURN AND TEST ANOTHER DIGIT
                                3456 *
                                3457 * TEST FOR EXPONENT PORTION OF A NUMERIC CONSTANT
                                3458 *
     1084 BD C5 00              3459 SFS212 CLI   @ZERO(,@XR),B@LETE     TEST FOR FLOATING PT E
     1087 F2 01 77              3460        JNE   SFS232                 NOT FLOATING POINT NUMBER
     108A 04 10 0FF5 0FEF       3461        ZAZ   SFS190(SFS246),SFS184(1)  INITIALIZE EXPONENT
     1090 C0 87 0FB7            3462        B     SFS160                 GET NEXT CHAR
     1094 BD 4E 00              3463        CLI   @ZERO(,@XR),B@PLUS     TEST FOR PLUS
     1097 F2 81 0A              3464        JE    SFS214                 PLUS SIGN BR
     109A BD 60 00              3465        CLI   @ZERO(,@XR),B@MINS     TEST FOR MINUS
     109D F2 01 08              3466        JNE   SFS216                 NOT MINUS BR
     10A0 3C D0 0FF5            3467        MVI   SFS190,SFS242          SET UNITS DIGIT TO MINUS
     10A4 C0 87 0FB7            3468 SFS214 B     SFS160                 GET NEXT CHAR
     10A8 BD F0 00              3469 SFS216 CLI   @ZERO(,@XR),B@DEC0     TEST NUMERIC
     10AB 28 03 0FF5 00         3470        MNN   SFS190,@ZERO(,@XR)     MOVE DIGIT TO UNITS POSITION
     10B0 F2 82 1F              3471        JL    SFS218                 NUMERIC BR
     10B3 C0 87 0FB7            3472        B     SFS160                 GET NEXT CHAR
     10B7 BD F0 00              3473        CLI   @ZERO(,@XR),B@DEC0     TEST NUMERIC
     10BA F2 82 3E              3474        JL    SFS230                 NON-NUMERIC BR
     10BD 08 03 0FF4 0FF5       3475        MNN   SFS190-1,SFS190        SHIFT UNITS DIGIT TO LEFT
     10C3 28 03 0FF5 00         3476        MNN   SFS190,@ZERO(,@XR)     INSERT UNITS DIGIT
     10C8 C0 87 0FB7            3477        B     SFS160                 GET NEXT CHAR
     10CC BD F0 00              3478        CLI   @ZERO(,@XR),B@DEC0     TEST FOR INVALID NUMERIC
     10CF F2 82 29              3479        JL    SFS230                 INVALID NUMERIC BR
     10D2 C0 87 141D            3480 SFS218 B     SFSERR                 NON-NUMERIC CHAR FOUND
     10D6 0F            10D6    3481        DC    AL1(@@E017)            INVALID CHAR AFTER E
                                3482 *****************************************************************
                                3483 * SUBROUTINE TO INCREMENT OR DECREMENT RANGE IF NECESSARY
                                3484 *****************************************************************
                                3485 *
     10D7 34 08 10FA            3486 SFS220 ST    SFS228+@OP1,@ARR       SAVE RETURN ADDRESS
     10DB F2 00 0C              3487 SFS222 JC    SFS226,*-*             JUMP IF DIGIT SWITCH IS A UCB
     10DE F2 00 16              3488 SFS224 JC    SFS228,*-*             JUMP IF DECIMAL SW IS A UCB
     10E1 06 20 0FF3 0FF0       3489        AZ    SFS188(SFS244),SFS186(1)  INCREMENT RANGE CTR
     10E7 F2 87 0D              3490        J     SFS228                 SKIP REST OF ROUTINE
     10EA 3D 87 10DF            3491 SFS226 CLI   SFS248,@UCB            TEST IF DECIMAL SW IS UCB
     10EE F2 01 06              3492        JNE   SFS228                 JUMP ON NON DECIMAL
     10F1 07 20 0FF3 0FF0       3493        SZ    SFS188(SFS244),SFS186(1)  DECREMENT CTR
     10F7 C0 87 0000            3494 SFS228 B     *-*                    RETURN CONTROL
                                3495 *
                                3496 * ADD EXPONENT IN E-FORMAT TO THE COMPUTED RANGE COUNT
                                3497 *
     10FB 06 11 0FF3 0FF5       3498 SFS230 AZ    SFS188(SFS244),SFS190(SFS244-1)  INCREMENT RANGE CT BY EXP
     1101 06 02 0FF3 0FEB       3499 SFS232 AZ    SFS188(SFS244),SFS180(SFS244)    ADJUST EXP CTR
     1107 3D 87 10DC            3500        CLI   SFS250,@UCB           TEST FOR A ZERO NUMBER
     110B F2 81 1D              3501        JE    SFS238                 JUMP ON ZERO NUMBER
                                3502 *
                                3503 * TEST RANGE COUNT TO SEE IF IT IS IN THE REQUIRED LIMITS
                                3504 *
     110E 0D 02 0FF3 0FEE       3505        CLC   SFS188,SFS182(SFS244)  TEST FOR MAX EXPONENT
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     1114 F2 84 18                3506          JH     SFS240                      ERROR BR IF EXP TOO LARGE
     1117 0D 02 0FF3 0FE8         3507          CLC    SFS188,SFS178(SFS244)       TEST FOR MIN EXP
     111D F2 82 0F                3508          JL     SFS240                      ERROR BR IF EXP TOO SMALL
     1120 BD 4B 00                3509          CLI    @ZERO(,@XR),B@DPNT          TEST FOR INVALID DECIMAL POINT
     1123 F2 01 05                3510          JNE    SFS238                      NON-DECIMAL BR
     1126 C0 87 141D              3511 SFS236 B        SFSERR                      DECIMAL POINT ERROR
     112A 02             112A     3512          DC     AL1(@@E004)                 2 DECIMALS IN ONE NUM. CONSTANT
     112B C0 87 0000              3513 SFS238 B        *-*                         RETURN TO MAIN LINE
     112F C0 87 141D              3514 SFS240 B        SFSERR                      ERROR BR
     1133 29             1133     3515          DC     AL1(@@E046)                 RANGE ERROR
                                  3516 *
                                  3517 * EQUATES REFERENCED BY NUMERIC CONSTANT SUBROUTINE
                                  3518 *
                         00D0     3519 SFS242 EQU     X'D0'                       UNITS DIGIT OF EXPONENT
                         0003     3520 SFS244 EQU     3                           LENGTH OF EXPONENT CTR
                         0002     3521 SFS246 EQU     2                           LENGTH OF EXPONENT
                         10DF     3522 SFS248 EQU     SFS224+@Q                   DECIMAL SW
                         10DC     3523 SFS250 EQU     SFS222+@Q                   SGN SW - UCB IS OFF
```

```
                          3525 ****************************************************************************
                          3526 * TEST CHARACTER CONSTANT
                          3527 ****************************************************************************
     1134 34 08 1167      3528 SFS252 ST    SFS260+@OP1,@ARR          SAVE RET ADDR
     1138 E2 02 01        3529 SFS254 LA    @B1(,@XR),@XR             GET NEXT CHAR
     113B BD 7D 00        3530        CLI   @ZERO(,@XR),B@SQUO        TEST FOR DELIMITER
     113E F2 81 0C        3531        JE    SFS256                    DELIMITER FOUND
     1141 BD 1E 00        3532        CLI   @ZERO(,@XR),@EOS          TEST FOR INVALID CARR RET
     1144 C0 01 1138      3533        BNE   SFS254                    GO BACK AND TEST NEXT CHAR
     1148 C0 87 141D      3534        B     SFSERR                    INVALID TERMINATION
     114C 0B         114C 3535        DC    AL1(@@E013)               CARR RET BEFORE END OF CONSTANT
     114D E2 02 01        3536 SFS256 LA    @B1(,@XR),@XR             GET NEXT CHAR
     1150 BD 7D 00        3537        CLI   @ZERO(,@XR),B@SQUO        TEST FOR DELIMITER - DUPLICATE
     1153 C0 81 1138      3538        BE    SFS254                    GO BACK IF PAIR OF DELIMITERS
     1157 BD 40 00        3539 SFS258 CLI   B@CHAR(,@XR),B@BLNK       TEST FOR A BLANK CHAR
     115A F2 01 07        3540        JNE   SFS260                    BRANCH IF NOT BLANK CHAR
     115D E2 02 01        3541        LA    @B1(,@XR),@XR             GET NEXT CHARACTER
     1160 C0 87 1157      3542        B     SFS258                    GO TEST FOR A BLANK
     1164 C0 87 0000      3543 SFS260 B     *-*                       RETURN TO CALLING PROGRAM
```

```
                              3545 *********************************************************************
                              3546 * TEST FOR ALPHA OR NATIONAL CHARACTER
                              3547 *********************************************************************
                              3548 *
                              3549 * RETURN LINKAGE IS NOT FIRST AS DEFINED BY CONVENTION
                              3550 *
                              3551 *
                              3552 * ENTRY POINT WHEN $ IS TO BE INCLUDED IN TEST
                              3553 *
     1168 BD 5B 00           3554 SFS262 CLI   @ZERO(,@XR),B@LET$        TEST FOR $ CHAR
     116B F2 81 20           3555        JE    SFS272                    $ CHAR DETECTED BR
     116E BD E9 00           3556        CLI   @ZERO(,@XR),B@LETZ        TEST ALPHA HIGH
                              3557 * THIS INSTRUCTION WILL BE CHANGED TO NO-OP FOR FILE STATEMENTS
     1171 F2 84 12           3558 SFS264 JH    SFS268                    NOT ALPHA CHAR BR
     1174 BD C1 00           3559 SFS266 CLI   @ZERO(,@XR),B@LETA        TEST ALPHA LOW
     1177 F2 02 14           3560        JNL   SFS272                    ALPHA CHAR DETECTED BR
     117A BD 7C 00           3561        CLI   @ZERO(,@XR),B@LET@        TEST NAT'L CHAR @
     117D F2 81 0E           3562        JE    SFS272                    ALPHA CHAR DETECTED BR
     1180 BD 7B 00           3563        CLI   @ZERO(,@XR),B@LET#        TEST NAT'L CHAR #
     1183 F2 81 08           3564        JE    SFS272                    ALPHA CHAR DETECTED BR
                              3565 *
                              3566 * RETURN TO NEXT INSTR AFTER FINDING A NON-ALPHA CHAR
                              3567 *
     1186 34 08 118D         3568 SFS268 ST    SFS270+@OP1,@ARR          SET RET ARR
     118A C0 87 0000         3569 SFS270 B     *-*                       BR TO CALLING PROG
                              3570 *
                              3571 * RETURN TO 2ND INSTR AFTER BR ON FINDING VALID ALPHA CHAR
                              3572 *
     118E 36 08 1228         3573 SFS272 A     SFS308,@ARR               ADD LENGTH TO ARR
     1192 34 08 1199         3574        ST    SFS274+@OP1,@ARR          SET RETURN ARR
     1196 C0 87 0000         3575 SFS274 B     *-*                       BR TO CALLING PROG
```

                          3577 ***
                          3578 * DETERMINE NEXT NON-BLANK CHAR IN KEYWORD
                          3579 ***
                     119A 3580   USING SFS276,@BR
     119A 0C 00 1254 1255 3581 SFS276 MVC   SFS324-@B1(1),SFS324   MOVE FIRST OF 3 CHAR'S
     11A0 2C 00 1255 00   3582 SFS278 MVC   SFS324,@ZERO(1,@XR)   SAVE LAST CHARACTER
     11A5 34 08 11C1   3583 SFS280 ST   SFS284+@OP1,@ARR   STORE RETURN BR
     11A9 E2 02 01   3584 SFS282 LA   @B1(,@XR),@XR   SET PTR UP ONE POSITION
     11AC BD 40 00   3585   CLI   @ZERO(,@XR),@BLANK   TEST FOR BLANK
     11AF C0 81 11A9   3586   BE   SFS282   BLANK - GO BACK
     11B3 BD 1E 00   3587   CLI   @ZERO(,@XR),@EOS   TEST FOR END OF STMT
     11B6 F2 81 09   3588   JE   SFS286   ERROR BR
     11B9 2C 00 1256 00   3589   MVC   SFS326,@ZERO(1,@XR)   MOVE CHAR INTO CHAR STRING
     11BE C0 87 0000   3590 SFS284 B   *-*

     11C2 C0 87 1419   3592 SFS286 B   SFSER1   ERROR BR
                          3593 * ERROR CODE MODIFIED
     11C6 28   11C6 3594 SFS288 DC   AL1(@@E045)   KEYWORD ERROR CODE

```
                             3596 ******************************************************************************
                             3597 * TEST FOR VALID FILE SPECIFICATION FOR GET, PUT OR RESET STATEMENTS
                             3598 ******************************************************************************
    11C7 C2 01 119A          3599 SFS290 LA      SFS276,@BR                  LOAD BASE REGISTER
    11CB 74 08 85            3600        ST      SFS300+@OP1(,@BR),@ARR      SAVE RETURN ADDR
    11CE C0 87 0FC0          3601        B       SFS164                      GET NEXT CHAR
    11D2 BD 7D 00            3602        CLI     B@CHAR(,@XR),B@SQUO         TEST FOR PRECEDING QUOTE
    11D5 F2 81 0C            3603        JE      SFS291                      YES-TEST FILENAME
    11D8 E2 02 01            3604        LA      @B1(,@XR),@XR               GET NEXT CHARACTER
    11DB BD 5B 00            3605        CLI     @ZERO(,@XR),B@LET$          TEST FOR CHAR VARIABLE
    11DE F2 81 37            3606        JE      SFS298                      YES-VALID FILE SPECIFICATION
    11E1 F2 87 3C            3607        J       SFS302                      NO-INVALID FILE SPECIFICATION
    11E4 E2 02 01            3608 SFS291 LA      @B1(,@XR),@XR               GET NEXT CHARACTER
    11E7 C0 87 1168          3609        B       SFS262                      TEST IF ALPHA
    11EB F2 87 25            3610        J       SFS296                      INVALID FILE NAME
    11EE 7C 07 8C            3611        MVI     SFS306(,@BR),SFS412         SET UP CTR
                             3612 *
                             3613 * TEST VALIDITY OF FILE NAME
                             3614 *
    11F1 3C 80 1172          3615        MVI     SFS264+@Q,@NOP              MODIFY INSTR TO ALLOW NUMERIC
    11F5 E2 02 01            3616 SFS292 LA      @B1(,@XR),@XR               GET NEXT CHARACTER
    11F8 C0 87 1168          3617        B       SFS262                      TEST ALPHANUMERIC
    11FC F2 87 0A            3618        J       SFS294                      NON-ALPHANUMERIC BR
    11FF 5F 00 8C 8B         3619        SLC     SFS306(1,@BR),SFS304(,@BR)  DECREMENT CTR
    1203 D0 84 5B            3620        BH      SFS292(,@BR)                GO BACK IF NOT ZERO
    1206 E2 02 01            3621        LA      @B1(,@XR),@XR               GET NEXT CHARACTER
    1209 3C 84 1172          3622 SFS294 MVI     SFS264+@Q,X'84'             RESTORE INSTR TO TEST ALPHA
    120D BD 7D 00            3623        CLI     @ZERO(,@XR),B@SQUO          TEST FOR END OF FILE NAME
    1210 F2 81 05            3624        JE      SFS298                      VALID TERMINATION OF FILE NAME
    1213 C0 87 141D          3625 SFS296 B       SFSERR                      INVALID FILE NAME
    1217 0C          1217    3626        DC      AL1(@@E014)                 FILE NAME TOO LONG OR NOT ALPHA
    1218 C0 87 0FC0          3627 SFS298 B       SFS164                      LINK TO GET NEXT CHAR
    121C C0 87 0000          3628 SFS300 B       *-*                         RETURN TO CALLING ROUTINE
    1220 C0 87 141D          3629 SFS302 B       SFSERR                      ERROR BR
    1224 0C          1224    3630        DC      AL1(@@E014)                 NO FILE SPECIFIED
                             3631 *
                             3632 * CONSTANTS AND WORKAREA REQUIRED BY FILE SPECIFICATION ROUTINE
                             3633 *
    1225 01          1225    3634 SFS304 DC      XL1'01'                     DECREMENT CTR
    1226             1226    3635 SFS306 DS      CL1                         LENGTH CTR FOR FILE NAME
    1227 0003        1228    3636 SFS308 DC      XL2'0003'                   SKIP THIS MANY BYTE ON RETURN
```

```
      #SFSYN -- BASIC STATEMENT SYNTAX CHECKER

ERR LOC   OBJECT CODE      ADDR STMT SOURCE STATEMENT           VER 15, MOD 00  11/05/20  PAGE  46

                           3638 *********************************************************************
                           3639 * TEST STATEMENT BEGINNING WITH CL - CLOSE
                           3640 *********************************************************************
                      119A 3641        USING SFS276,@BR                BASE ADDRESS
                           3642 *
                           3643 * CONSTANTS USED BY CL STATEMENT ROUTINE
                           3644 *
    1229 D6E2C5            122B 3645 SFS310 DC    CL3'OSE'                'OSE' OF CLOSE
                           3646 *
    122C C2 01 119A             3647 SFSCLS LA    SFS276,@BR              LOAD BASE REGISTER
    1230 D0 87 06               3648        B     SFS278(,@BR)            GET NEXT CHAR SAVING LAST
    1233 D0 87 00               3649        B     SFS276(,@BR)            GET NEXT CHAR SAVING LAST TWO
    1236 1D 02 1256 91          3650        CLC   SFS326,SFS310(3,@BR)    TEST FOR CLOSE
    123B 3C 42 0606             3651        MVI   SFS414,B@TCLS           TYPE CLOSE STATEMENT
    123F F2 81 3B               3652        JE    SFS332                  CLOSE, GO TEST FILE SPECS
    1242 C0 87 1419             3653        B     SFSER1                  ERROR BRANCH
    1246 16              1246 3654        DC    AL1(@@E025)             INVALID KEYWORD
```

```
                                3656 ****************************************************************************
                                3657 * TEST STATEMENTS BEGINNING WITH RE - REM, READ, RESET, RESTORE, RETURN
                                3658 ****************************************************************************
                 119A 3659          USING SFS276,@BR              BASE ADDRESS
                                3660 *
                                3661 * CONSTANTS USED BY RE STATEMENT ROUTINE
                                3662 *
    1247 E2C5E3     1249 3663 SFS314 DC    CL3'SET'                'SET' OF RESET
    124A E2E3D6     124C 3664 SFS316 DC    CL3'STO'                'STO' OF RESTORE
    124D E3E4D9     124F 3665 SFS313 DC    CL3'TUR'                'TUR' OF RETURN
    1250 D9C5       1251 3666 SFS320 DC    CL2'RE'                 'RE'  OF RESTORE
    1252 C1C4       1253 3667 SFS322 DC    CL2'AD'                 'AD'  OF READ
                                3668 *
                                3669 * WORKAREAS REQUIRED BY BASIC SYNTAX CHECKER
                                3670 *
    1254            1255 3671 SFS324 DS    CL2                     SAVE FOR PREVIOUS TWO CHARS
    1256            1256 3672 SFS326 DS    CL1                     SAVE FOR CHAR OR LAST CHAR
    1257 C2 01 119A      3673 SFSRES LA    SFS276,@BR              LOAD BASE REG
    125B BD D4 00        3674        CLI   @ZERO(,@XR),B@LETM      TEST FOR REM STMT
    125E F2 82 67        3675        JL    SFS338                  READ STMT BR
    1261 F2 84 08        3676        JH    SFS330                  RESET,RESTORE,RETURN BR
    1264 3C 03 0606      3677        MVI   SFS414,B@TREM           TYPE REM STMT
    1268 C0 87 1411      3678        B     SFSUPD                  BR TO FILE UPDATE ROUTINE
    126C D0 87 06        3679 SFS330 B     SFS278(,@BR)            GET NEXT CHAR SAVING LAST
    126F D0 87 00        3680        B     SFS276(,@BR)            GET NEXT CHAR SAVING LAST TWO
    1272 5D 02 BC AF     3681        CLC   SFS326(,@BR),SFS314(3,@BR)  TEST FOR RESET
    1276 F2 01 1B        3682        JNE   SFS334                  RESTORE, RETURN BR
                                3683 ****************************************************************************
                                3684 * RESET STATEMENT - CHECK IF RESET OR RESET FILE AND TYPE STATEMENT
                                3685 ****************************************************************************
    1279 3C 3F 0606      3686        MVI   SFS414,B@TRST           TYPE RESET STATEMENT
    127D C0 87 11C7      3687 SFS332 B     SFS290                  TEST FOR FILE SPECIFICATION
    1281 BD 6B 00        3688        CLI   B@CHAR(,@XR),B@CMMA      TEST FOR COMMA DELIMITER
    1284 C0 81 127D      3689        BE    SFS332                  COMMA - GO TEST NEXT FILE SPEC
    1288 BD 1E 00        3690        CLI   @ZERO(,@XR),@EOS        TEST FOR MANDATORY CARR RET
    128B C0 81 1411      3691        BE    SFSUPD                  BR TO UPDATE FILE ROUTINE
    128F C0 87 141D      3692        B     SFSERR                  CHAR NOT CARR RET AFTER STMI
    1293 0A         1293 3693        DC    AL1(@@E012)             COMMENT NOT ALLOWED
                                3694 ****************************************************************************
                                3695 * TEST RESTORE AND RETURN STATEMENTS
                                3696 ****************************************************************************
    1294 5D 02 BC B2     3697 SFS334 CLC   SFS326(,@BR),SFS316(3,@BR)  TEST FOR 'STO' OF RESTORE
    1298 F2 01 15        3698        JNE   SFS336                  BR TO TEST FOR RETURN
    129B D0 87 0B        3699        B     SFS280(,@BR)            GET CHAR
    129E D0 87 06        3700        B     SFS278(,@BR)            GET CHAR
    12A1 5D 01 BC B7     3701        CLC   SFS326(,@BR),SFS320(2,@BR)  TEST FOR 'RE' IN RESTORE
    12A5 F2 01 2A        3702        JNE   SFS340                  KEYWORD ERROR BR
    12A8 3C 4B 0606      3703        MVI   SFS414,B@TRSR           TYPE RESET STMT
    12AC C0 87 1411      3704        B     SFSUPD                  BR TO UPDATE FILE ROUTINE
                                3705 *
                                3706 * TEST FOR RETURN STATEMENT
                                3707 *
    12B0 5D 02 BC B5     3708 SFS336 CLC   SFS326(,@BR),SFS313(3,@BR)  TEST FOR 'TUR' OF RETURN
    12B4 F2 01 1B        3709        JNE   SFS340                  KEYWORD ERROR BR
    12B7 D0 87 0B        3710        B     SFS280(,@BR)            GET CHAR
    12BA BD D5 00        3711        CLI   @ZERO(,@XR),B@LETN      TEST FOR 'N' OF RETURN
```

```
    12BD F2 01 12              3712         JNE    SFS340                   KEYWORD ERROR BR
    12C0 3C 36 0606            3713         MVI    SFS414,B@TRTN            TYPE RETURN STMT
    12C4 C0 87 1411            3714         B      SFSUPD                   BR TO UPDATE FILE ROUTINE
                              3715 ***********************************************************************
                              3716 * TEST READ STATEMENT
                              3717 ***********************************************************************
    12C8 D0 87 06             3718 SFS338 B      SFS278(,@BR)             GET NEXT CHAR
    12CB 5D 01 BC B9          3719         CLC    SFS326(,@BR),SFS322(2,@BR)  TEST 'AD' OF READ
    12CF F2 81 05             3720         JE     SFS342                   BR TO TYPE STATEMENT
    12D2 C0 87 1419           3721 SFS340 B      SFSER1                   KEYWORD ERROR
    12D6 16              12D6 3722         DC     AL1(@@E025)              INVALID KEYWORD
    12D7 3C 48 0606           3723 SFS342 MVI    SFS414,B@TREA            TYPE READ STATEMENT
```

```
                              3725 ********************************************************************************
                              3726 * CHECK INPUT LIST OF READ. INPUT AND GET STATEMENTS
                              3727 ********************************************************************************
                              3728 *
                              3729 * TEST FOR VALID VARIABLE NAME
                              3730 *
    12DB C0 87 0FC0          3731 SFS344 B     SFS164                       GET NEXT CHAR
    12DF BD 1E 00            3732        CLI   @ZERO(,@XR),@EOS             TEST FOR EOS AFTER KEYWORD
    12E2 F2 01 09            3733        JNE   SFS348                       NO EOS - GO CONTINUE SCAN
    12E5 C0 87 141D          3734        B     SFSERR                       ERROR BRANCH
    12E9 0D          12E9    3735        DC    AL1(@@E015)                  NO INPUT LIST ELEMENTS
    12EA C0 87 0FC0          3736 SFS346 B     SFS164                       GET NEXT CHARACTER
    12EE C0 87 1168          3737 SFS348 B     SFS262                       TEST FOR ALPHA
    12F2 F2 87 45            3738        J     SFS358                       INVALID CHAR ERROR BR
    12F5 C0 87 0FC0          3739        B     SFS164                       GET NEXT CHAR
    12F9 BD F0 00            3740        CLI   @ZERO(,@XR),B@DEC0           TEST FOR NUMERIC
    12FC F2 82 07            3741        JL    SFS350                       NOT LETTER DIGIT VARIABLE - BR
    12FF C0 87 0FC0          3742        B     SFS164                       GET NEXT CHAR
    1303 F2 87 1E            3743        J     SFS354                       BR TO TEST FOR DELIMITER
    1306 BD 5B 00            3744 SFS350 CLI   @ZERO(,@XR),B@LET$           TEST FOR CHARACTER VARIABLE
    1309 F2 01 11            3745        JNE   SFS352                       ARRAY BR
    130C C0 87 0FC0          3746        B     SFS164                       GET NEXT CHAR
    1310 BD 4D 00            3747        CLI   @ZERO(,@XR),B@LPAR           TEST FOR CHAR ARRAY
    1313 F2 01 0E            3748        JNE   SFS354                       NO CHAR ARRAY - BR
    1316 C0 87 0CE4          3749        B     SFS034                       TEST SUBSCRIPT EXPRESSION
    131A F2 87 07            3750        J     SFS354                       SKIP TO TEST FOR DELIMITER
    131D BD 4D 00            3751 SFS352 CLI   @ZERO(,@XR),B@LPAR           TEST FOR ARRAY
    1320 C0 81 0CEB          3752        BE    SFS036                       TEST ARITH EXPR FROM SUBSCRIPT
                              3753 *
                              3754 * TEST FOR DELIMITERS - COMMA OR CARRIAGE RETURN
                              3755 *
    1324 BD 1E 00            3756 SFS354 CLI   @ZERO(,@XR),@EOS             TEST CHAR CARR RET
    1327 C0 81 1411          3757        BE    SFSUPD                       BR TO UPDATE FILE ROUTINE IF CR
    132B BD 6B 00            3758        CLI   @ZERO(,@XR),B@CMMA           TEST FOR COMMA DELIMITER
    132E F2 01 04            3759        JNE   SFS356                       ERROR BR - INVALID DELIMITER
    1331 C0 87 12EA          3760        B     SFS346                       GO BACK AND TEST MORE CHARS
    1335 C0 87 141D          3761 SFS356 B     SFSERR                       DELIMITER ERROR
    1339 0A          1339    3762        DC    AL1(@@E012)                  NOT A COMMA OR CARR RET
    133A C0 87 141D          3763 SFS358 B     SFSERR                       IDENTIFIER ERROR BR
    133E 0E          133E    3764        DC    AL1(@@E016)                  NOT AN IDENTIFIER
```

```
        #SFSYN -- BASIC STATEMENT SYNTAX CHECKER


ERR LOC   OBJECT CODE     ADDR STMT SOURCE STATEMENT           VER 15, MOD 00  11/05/20  PAGE  50

                          3766 ********************************************************************
                          3767 * AT SECONDARY STATEMENT NUMBER PROCESSING - VALIDATION OF STATEMENT  *
                          3768 * NUMBERS APPEARING IN GOTO, IF, GOSUB AND PRINT USING STATEMENTS.    *
                          3769 ********************************************************************
                          3770 *
                          3771 * ENTRY 1 - THIS ENTRY POINT IS USED WHEN THE STATEMENT NUMBER BEING
                          3772 *            SCANNED CAN BE FOLLOWED WITH A CARRIAGE RETURN
                          3773 *
                133F      3774 SFS360 EQU  *                         VALID CARR RETURN ENTRY POINT
     133F 3C 87 1382      3775        MVI   SFS372+@Q,@UCB           SET VALID CARR RET SWITCH ON
     1343 F2 87 04        3776        J     SFS364                   BYPASS ENTRY 2 CODING
                          3777 *
                          3778 * ENTRY 2 - THIS ENTRY POINT IS USED WHEN THE STATEMENT NUMBER BEING
                          3779 *            SCANNED MUST NOT BE FOLLOWED WITH A CARRIAGE RETURN
                          3780 *
                1346      3781 SFS362 EQU  *                         INVALID CARR RET ENTRY POINT
     1346 3C 80 1382      3782        MVI   SFS372+@Q,@NOP           SET VALID CARR RET SWITCH OFF
                          3783 *
                          3784 * SAVE THE RETURN ADDRESS AND INITIALIZE THE ROUTINE
                          3785 *
     134A 34 08 1380      3786 SFS364 ST    SFS370+@OP1,@ARR         SET RETURN BRANCH ADDRESS
     134E 3C 04 138B      3787        MVI   SFS376,B@LDSN            SET STMT NO. DIGIT COUNTER
                          3788 *
                          3789 * TEST FOR EXISTENCE OF A STATEMENT NUMBER
                          3790 *
     1352 C0 87 0FC0      3791        B     SFS164                   LINK TO GET NEXT CHARACTER
     1356 BD F0 00        3792        CLI   B@CHAR(,@XR),B@DEC0      IF CHARACTER IS DECIMAL DIGIT
     1359 F2 02 05        3793        JNL   SFS366                   * BRANCH TO CONTINUE THE SCAN
                          3794 *
                          3795 * NO STATEMENT NUMBER IS FOUND - EXECUTE A 'MISSING STATEMENT NUMBER'
                          3796 * SYNTAX ERROR
                          3797 *
     135C C0 87 141D      3798        B     SFSERR                   GO INDICATE A SYNTAX ERROR
     1360 15         1360 3799        DC    AL1(@@E024)              'MISSING STATEMENT NUMBER'
                          3800 *
                          3801 * TEST FOR ADDITIONAL DIGITS IN THE STATEMENT NUMBER
                          3802 *
     1361 C0 87 0FC0      3803 SFS366 B     SFS164                   LINK TO GET NEXT CHARACTER
     1365 BD F0 00        3804        CLI   B@CHAR(,@XR),B@DEC0      IF CHARACTER IS NOT A DIGIT
     1368 F2 82 0F        3805        JL    SFS368                   * GO CHECK THE NO. DELIMITER
                          3806 *
                          3807 * DECREMENT DIGIT COUNTER AND TEST FOR STATEMENT NO. VALIDITY
                          3808 *
     136B 0F 00 138B 138A 3809        SLC   SFS376,SFS374(1)         DECR DIGIT COUNTER AND CONTINUE
     1371 C0 84 1361      3810        BH    SFS366                   * SCAN UNLESS TOO MANY DIGITS
                          3811 *
                          3812 * MAXIMUM NUMBER OF DIGITS EXCEEDED - EXECUTE A 'STATEMENT NUMBER
                          3813 * TOO LONG' SYNTAX ERROR
                          3814 *
     1375 C0 87 141D      3815        B     SFSERR                   GO INDICATE A SYNTAX ERROR
     1379 13         1379 3816        DC    AL1(@@E021)              'STATEMENT NUMBER TOO LONG'
                          3817 *
                          3818 * TEST FOR A CARRIAGE RETURN STATEMENT NUMBER DELIMITER
                          3819 *
     137A BD 1E 00        3820 SFS368 CLI   B@CHAR(,@XR),B@EOST      IF DELIMITER NOT A CHAR RETURN
     137D C0 01 0000      3821 SFS370 BNE   *-*                      * RETURN TO CALLING PROGRAM
```

```
                                3823 *
                                3824 * A CARRIAGE RETURN HAS BEEN ENCOUNTERED - TEST FOR VALIDITY
                                3825 *
    1381 C0 00 1411             3826 SFS372 BC     SFSUPD,*-*              IF SUBROUTINE WAS ENTERED AT
                                3827 *                                    * ENTRY 1, GO UPDATE THE WORK
                                3828 *                                    * FILE
                                3829 *
                                3830 * CARRIAGE RETURN IS INVALID - EXECUTE AN 'INVALID STATEMENT NUMBER
                                3831 * DELIMITER' SYNTAX ERROR
                                3832 *
    1385 C0 87 141D             3833        B      SFSERR                 GO INDICATE A SYNTAX ERROR
    1389 0A            1389 3834        DC     AL1(@@E012)            'INVALID STMT NO. DELIMITER'

                                3836 ************************************************************************
                                3837 * BASIC SYNTAX CHECKER CONSTANTS
                                3838 ************************************************************************
    138A 01            138A 3839 SFS374 DC     IL1'1'                 BINARY INTEGER 1

                                3841 ************************************************************************
                                3842 * BASIC STATEMENT SYNTAX CHECKER WORK AREAS
                                3843 ************************************************************************
    138B               138B 3844 SFS376 DS     CL1                    STMT NO. DIGIT COUNTER
```

```
                              3846 ********************************************************************
                              3847 * ERROR ROUTINE - DETERMINE SPECIFIC ERRORS IN ARITH EXPRESSIONS
                              3848 ********************************************************************
                              3849 *
                              3850 * TEST FOR ALPHA SAVE CHAR OR ALPHA CHAR
                              3851 *
    138C 3D 80 0DB8           3852 SFS378 CLI    SFS070+@Q,@NOP             TEST IF SUBSCRIPT EXP.
    1390 F2 01 05             3853        JNE    SFS380                     JUMP IF NOT SUBSCRIPT EXPRESSION
    1393 C0 87 141D           3854        B      SFSERR                     ERROR BR IF PC=0
    1397 01          1397     3855        DC     AL1(@@E003)                UNBALANCED PARENTHESIS
    1398 C0 87 1168           3856 SFS380 B      SFS262                     TEST FOR ALPHA
    139C F2 87 21             3857        J      SFS384                     NON-ALPHA TERMINATION CHAR
    139F 34 02 13BA           3858        ST     SFS382+@OP1,@XR            SAVE PTR
    13A3 C2 02 1256           3859        LA     SFS326,@XR                 LOAD XR WITH PTR TO LAST CHAR
    13A7 C0 87 1168           3860        B      SFS262                     TEST FOR ALPHA
    13AB F2 87 09             3861        J      SFS382                     ALPHA FOLLOWING A NON-ALPHA
    13AE 35 02 13BA           3862        L      SFS382+@OP1,@XR            RESTORE PTR TO INPUT AREA
    13B2 C0 87 141D           3863        B      SFSERR                     TWO ALPHA CHARS TOGETHER
    13B6 0E          13B6     3864        DC     AL1(@@E016)                INVALID INDENTIFIER
    13B7 C2 02 0000           3865 SFS382 LA     *-*,@XR                    LOAD XR WITH PTR TO ERROR
    13BB C0 87 141D           3866        B      SFSERR                     ALPHA FOLLOWS DIGIT . )
    13BF 11          13BF     3867        DC     AL1(@@E019)                ALPHA NOT OK AFTER CONSTANT )
                              3868 *
                              3869 * TERMINATION CHARACTER IS NON-ALPHA
                              3870 *
    13C0 3D 7E 1256           3871 SFS384 CLI    SFS326,B@EQUL              TEST FOR 1ST EXPR CHAR
    13C4 F2 01 05             3872        JNE    SFS386                     BRANCH IF NOT 1ST EXPR CHAR
    13C7 C0 87 141D           3873        B      SFSERR                     ERROR BRANCH - 1ST EXPRESSION
    13CB 07          13CB     3874        DC     AL1(@@E009)                * CHAR IS INVALID VARIABLE ID
    13CC 38 01 0DF7           3875 SFS386 TBN    SFS084,SFS410              TEST OPERATOR SWITCH
    13D0 F2 90 05             3876        JF     SFS388                     NO OPERATOR AS SAVE CHAR
    13D3 C0 87 141D           3877        B      SFSERR                     OPERATOR ERROR
    13D7 05          13D7     3878        DC     AL1(@@E007)                OPERATOR FOLLOWED BY BAD CHAR
                              3879 *
                              3880 * TEST FOR ERROR AT OPERATOR
                              3881 *
    13D8 BD 5C 00             3882 SFS388 CLI    @ZERO(,@XR),B@MULT         TEST FOR OPERATOR
    13DB F2 81 0C             3883        JE     SFS390                     OPERATOR ERROR
    13DE BD 61 00             3884        CLI    @ZERO(,@XR),B@DIVD         TEST FOR OPERATOR
    13E1 F2 81 06             3885        JE     SFS390                     OPERATOR ERROR
    13E4 BD 5F 00             3886        CLI    @ZERO(,@XR),B@POWR         TEST FOR OPERATOR
    13E7 F2 01 05             3887        JNE    SFS392                     NON-OPERATOR CHAR
    13EA C0 87 141D           3888 SFS390 B      SFSERR                     OPERATOR ERROR
    13EE 10          13EE     3889        DC     AL1(@@E018)                BINARY OPERATOR USED WRONG
    13EF BD F0 00             3890 SFS392 CLI    B@CHAR(,@XR),B@DEC0        TEST FOR NUMERIC CHAR
    13F2 F2 02 17             3891        JNL    SFS394                     BRANCH IF NUMERIC
    13F5 BD 4D 00             3892        CLI    B@CHAR(,@XR),B@LPAR        TEST FOR LEFT PARENTHESIS
    13F8 F2 81 11             3893        JE     SFS394                     BRANCH IF LEFT PARENTHESIS
    13FB BD 4B 00             3894        CLI    B@CHAR(,@XR),B@DPNT        TEST FOR DECIMAL POINT
    13FE F2 81 0B             3895        JE     SFS394                     BRANCH IF DECIMAL POINT
    1401 BD 50 00             3896        CLI    B@CHAR(,@XR),B@ICON        TEST FOR INTERNAL CONSTANT
    1404 F2 81 05             3897        JE     SFS394                     BRANCH IF INTERNAL CONSTANT
    1407 C0 87 141D           3898        B      SFSERR                     ERROR BRANCH - INVALID CHAR
    140B 1E          140B     3899        DC     AL1(@@E035)                * AFTER VALID STATEMENT
    140C C0 87 141D           3900 SFS394 B      SFSERR                     ERROR BRANCH - OPERATOR
    1410 11          1410     3901        DC     AL1(@@E019)                * REQUIRED BETWEEN LAST 2 CHARS
```

```
                              3903 *******************************************************************
                              3904 * RETURN IF VALID STATEMENT
                              3905 *******************************************************************
    1411 3A A0 03D5           3906 SFSUPD SBN    $INDR2,$FUIND+$READY       SET VALID STMT INDICATOR
    1415 C0 87 04B4           3907        B      $CABLD                     VALID RETURN BR

                              3909 *******************************************************************
                              3910 * RETURN TO ERROR PROCESSING ROUTINE
                              3911 *******************************************************************
    1419 C2 02 0000           3912 SFSER1 LA     *-*,@XR                    RESTORE DATA PT
    141D 34 08 1426           3913 SFSERR ST     SFS408+@OP2,@ARR           STORE ARR FOR MOVE
    1421 0C 00 03CD 0000      3914 SFS408 MVC    $CAERR(1),*-*              MOVE ERROR CODE
    1427 C0 87 0469           3915        B      $CAERK                     BR TO ERROR ROUTINE

                              3917 *******************************************************************
                              3918 * EQUATES USED IN BASIC SYNTAX CHECKER
                              3919 *******************************************************************
    0001 3920 SFS410 EQU    X'1'                       BIT MASK FOR OPERATOR SWITCH
    0007 3921 SFS412 EQU    7                          LENGTH -1 OF FILE NAME
    0606 3922 SFS414 EQU    $$INLN-1                   ADDR OF TYPE
```

```
                                  3924 ********************************************************************
                                  3925 * TEST VALIDITY OF LET STATEMENT
                                  3926 ********************************************************************
                                  3927 *
                                  3928 * XR POINTS TO T OF LET OR TO FIRST CHAR IF NO 'LET' IN LET STMT
                                  3929 *
                                  3930 *
                                  3931 * ENTRY POINT WHEN 'LET' IS PRESENT
                                  3932 *
                                  3933 *
                                  3934 * TEST FOR PRESENCE OF T IN 'LET'
                                  3935 *
    142B BD E3 00                 3936 SFSLES CLI    @ZERO(,@XR),B@LETT        TEST FOR T IN 'LET'
    142E C0 01 15C1               3937        BNE    SFS474                    KEYWORD ERROR BR
    1432 3C 0F 0606               3938        MVI    SFS414,B@TLTA             TYPE LET STATEMENT
    1436 3A 01 1BEE               3939        SBN    SFSLSW,SFSMSK             SET 'LET' SWITCH ON
                                  3940 *
                                  3941 * TEST FOR ALPHA - MUST BE ALPHA TO BE VALID LET
                                  3942 *
    143A C0 87 0FC0               3943        B      SFS164                    GET NEXT CHAR
                                  3944 *
                                  3945 * ENTRY POINT IF 'LET' IS NOT PRESENT
                                  3946 *
    143E 34 02 1C03               3947 SFS418 ST     SFS805+@OP1,@XR           SAVE PTR TO 1ST CHARACTER    1-4
    1442 C0 87 1168               3948        B      SFS262                    TEST FOR ALPHA CHAR          1-4
    1446 F2 87 7C                 3949        J      SFS434                    NON-ALPHA BR
    1449 3A 01 1C88               3950        SBN    INCORE,INMASK             INITIALIZE OVERLAY SW TO 1   1-4
    144D C0 87 0FC0               3951        B      SFS164                    GET NEXT CHAR
    1451 BD 5B 00                 3952        CLI    @ZERO(,@XR),B@LET$        TEST FOR CHARACTER VARIABLE
    1454 F2 81 73                 3953        JE     SFS436                    CHARACTER LET BR
                                  3954 *
                                  3955 * TEST FOR DIGIT FOLLOWING ALPHA CHAR.
                                  3956 *
    1457 BD F0 00                 3957 SFS420 CLI    @ZERO(,@XR),B@DEC0        TEST NUMERIC - HIGH
    145A F2 82 07                 3958        JL     SFS422                    NOT NUMERIC BR
    145D C0 87 0FC0               3959        B      SFS164                    GET NEXT CHAR
    1461 F2 87 0A                 3960        J      SFS424                    TEST DELIMITER BR
                                  3961 *
                                  3962 * TEST FOR PARENTHESIS AND VALIDITY WITHIN, COMMA AND CHAR STRING
                                  3963 *
    1464 BD 4D 00                 3964 SFS422 CLI    @ZERO(,@XR),B@LPAR        TEST FOR LEFT PARENTHESIS
    1467 F2 01 04                 3965        JNE    SFS424                    NO ( PRESENT - TEST FOR .
    146A C0 87 0CEB               3966        B      SFS036                    TEST VALIDITY OF ARITH EXPR
                                  3967 *
                                  3968 * TEST FOR EQUAL SIGN, RIGHT SIDE AND VALID TERMINATION THEN ADD TYPE
                                  3969 *
    146E BD 7E 00                 3970 SFS424 CLI    @ZERO(,@XR),B@EQUL        TEST FOR EQUAL SIGN
    1471 F2 01 13                 3971        JNE    SFS426                    NOT EQUAL SIGN BR
    1474 C0 87 0FB7               3972        B      SFS160                    GET NEXT CHAR
    1478 C0 87 0CFE               3973        B      SFS040                    TEST VALIDITY OF ARITH EXPR
    147C BD 1E 00                 3974        CLI    @ZERO(,@XR),@EOS          TEST FOR CARR RET
    147F C0 01 138C               3975        BNE    SFS378                    INVALID TERMINATION
    1483 C0 87 1411               3976        B      SFSUPD                    COMPUTE BINARY STMT NUMBER
    1487 BD 6B 00                 3977 SFS426 CLI    @ZERO(,@XR),B@CMMA        TEST FOR COMMA
    148A C0 01 1B61               3978        BNE    SFS700                    NO COMMA. TRY SUBSTRING      1-4
    148E 3D 12 0606               3979        CLI    SFS414,B@TASA             TEST FOR SIMPLE ARITH ASSIGN
```

```
     1492 F2 81 0E            3980          JE      SFS428              BRANCH IF SIMPLE ARITH ASSIGN
     1495 3D 18 0606          3981          CLI     SFS414,B@TASM       TEST FOR MULTIPLE ARITH ASSIGN
     1499 F2 81 0B            3982          JE      SFS430              BRANCH IF MULTIPLE ARUN ASSIGN
     149C 3C 15 0606          3983          MVI     SFS414,B@TLTM       TYPE MULTIPLE ARITH LET STMT
     14A0 F2 87 04            3984          J       SFS430              GO GET NEXT CHARACTER
     14A3 3C 18 0606          3985 SFS428   MVI     SFS414,B@TASM       TYPE MULTIPLE ARITH ASSIGN
     14A7 C0 87 0FC0          3986 SFS430   B       SFS164              LINK TO GET NEXT CHARACTER
     14AB C0 87 1168          3987          B       SFS262              TEST FOR ALPHA CHARACTER
     14AF F2 87 13            3988          J       SFS434              NON-ALAN IM
     14B2 C0 87 0FC0          3989          B       SFS164              GET NEXT CHAR
     14B6 BD 5B 00            3990          CLI     B@CHAR(,@XR),B@CVAR TEST FOR CHARACTER VARIABLE
     14B9 F2 81 A4            3991          JE      SFS454              BRANCH FOR MIXED VARIABLE ERR
     14BC C0 87 1457          3992          B       SFS420              RETURN AND TEST
     14C0 C0 87 141D          3993 SFS432   B       SFSERR              INVALID CHAR
     14C4 1F            14C4  3994          DC      AL1(@@E036)         INVALID CHAR - SHOULD BE * OR .
     14C5 C0 87 141D          3995 SFS434   B       SFSERR              NON-ALPHA ERROR OR
     14C9 0E            14C9  3996          DC      AL1(@@E016)         INVALID VARIABLE NAME
                              3997 *********************************************************************
                              3998 * CHARACTER LET STATEMENT
                              3999 *********************************************************************
     14CA 3D 12 0606          4000 SFS436   CLI     SFS414,B@TASA       TEST IF ASSIGNMENT LET
     14CE F2 81 07            4001          JE      SFS438              ASSIGNMENT LET BR
     14D1 3C 1B 0606          4002          MVI     SFS414,B@TLTC       TYPE CHAR ASSIGN LET
     14D5 F2 87 04            4003          J       SFS440              SKIP TO PROCESS CHAR ROUTINE
     14D8 3C 1E 0606          4004 SFS438   MVI     SFS414,B@TASC       TYPE CHAR ASSIGNMENT LET
     14DC C0 87 0FC0          4005 SFS440   B       SFS164              GET NEXT CHAR
     14E0 BD 7E 00            4006 SFS442   CLI     @ZERO(,@XR),B@EQUL  TEST FOR = SIGN
     14E3 F2 01 48            4007          JNE     SFS450              TEST FOR ADDITIONAL CHAR VAR
     14E6 C0 87 0FC0          4008          B       SFS164              GET NEXT CHAR
     14EA 34 02 1C03          4009          ST      SFS805+@OP1,@XR     SAVE PTR TO 1ST CHARACTER     1-4
     14EE C0 87 1168          4010          B       SFS262              TEST IF ALPHA
     14F2 F2 87 23            4011          J       SFS444              NON-ALPHA BR
     14F5 C0 87 0FC0          4012          B       SFS164              GET NEXT CHAR
     14F9 BD 5B 00            4013          CLI     @ZERO(,@XR),B@LET$  TEST FOR CHAR VARIABLE
     14FC C0 01 1B7C          4014          BNE     SFS720              NOT CHAR VAR VARIABLE        1-4
     1500 C0 87 0FC0          4015          B       SFS164              GET NEXT CHAR
     1504 BD 4D 00            4016          CLI     @ZERO(,@XR),B@LPAR  TEST FOR SUBSCRIPT
     1507 F2 01 18            4017          JNE     SFS446              BR TO TEST FOR CAM MET
     150A C0 87 0CE4          4018          B       SFS034              TEST SUBSCRIPT EXPR
     150E BD 1E 00            4019 SFS443   CLI     @ZERO(,@XR),@EOS    TEST FOR CARR RETURN         1-4
     1511 F2 01 15            4020          JNE     SFS448              ERROR ROUTINE BR IF NO CARR RET
     1514 C0 87 1411          4021          B       SFSUPD              FILE UPDATE BR
                              4022 *
                              4023 * TEST FOR CHAR CONSTANT AFTER EQUAL
                              4024 *
     1518 BD 7D 00            4025 SFS444   CLI     @ZERO(,@XR),B@SQUO  TEST FOR CHAR CONSTAMT
     151B F2 01 4C            4026          JNE     SFS458              ERROR BR - INVALID CHAR EXPR
     151E C0 87 1134          4027          B       SFS252              TEST CHAR CONSTANT
     1522 BD 1E 00            4028 SFS446   CLI     @ZERO(,@XR),@EOS    TEST FOR CARR RET
     1525 C0 81 1411          4029          BE      SFSUPD              FILE UPDATE BM
     1529 C0 87 141D          4030 SFS448   B       SFSERR              ERROR AFTER STMT
     152D 1E            152D  4031          DC      AL1(@@E035)         CARR RET NOT PRESENT
     152E BD 6B 00            4032 SFS450   CLI     @ZERO(,@XR),B@CMMA  TEST FOR DELIMITER CHAR
     1531 F2 81 0E            4033          JE      SFS452              BR BACK FOR HOME CHAR VARIABLES
     1534 BD 4D 00            4034          CLI     @ZERO(,@XR),B@LPAR  TEST FOR ARRAY
     1537 F2 01 35            4035          JNE     SFS460              BR ERR - DELIMETER
```

```
      #SFSYN -- BASIC STATEMENT SYNTAX CHECKER

ERR LOC   OBJECT CODE     ADDR STMT SOURCE STATEMENT          VER 15, MOD 00  11/05/20  PAGE  56

    153A C0 87 0CE4         4036      B     SFS034              TEST SUBSCRIPT EXPR
    153E C0 87 14E0         4037      B     SFS442              RETURN
    1542 C0 87 0FC0         4038 SFS452 B   SFS164              GET NEXT CHARACTER          1-4
    1546 34 02 1C03         4039      ST    SFS805+@OP1,@XR     SAVE PTR TO 1ST CHARACTER   1-4
    154A C0 87 1168         4040      B     SFS262              TEST IF ALPHA
    154E F2 87 14           4041      J     SFS456              NON-ALPHA ERROR BR
    1551 C0 87 0FC0         4042      B     SFS164              GET NEXT CHAR
    1555 BD 5B 00           4043      CLI   @ZERO(,@XR),B@LET$  TEST FOR CHAR VARIABLE
    1558 C0 81 14DC         4044      BE    SFS440              BR BACK TO TEST CHAR VAR
    155C C0 87 1BA7         4045      B     SFS740              GO CHECK FOR SUBSTRING      1-4
    1560 C0 87 141D         4046 SFS454 B   SFSERR              IDENTIFIER ERROR
    1564 20            1564 4047      DC    AL1(@@E037)         CHAR AND ARITH VAR TOGETHER
    1565 C0 87 141D         4048 SFS456 B   SFSERR              IDENTIFIER ERROR
    1569 21            1569 4049      DC    AL1(@@E038)         INVALID CHARACTER VARIABLE
    156A C0 87 141D         4050 SFS458 B   SFSERR              CHAR EXPRESSION ERROR
    156E 1B            156E 4051      DC    AL1(@@E030)         CHAR EXPRESSION MISSING
    156F C0 87 141D         4052 SFS460 B   SFSERR              DELIMITER ERROR
    1573 0A            1573 4053      DC    AL1(@@E012)         INVALID DELIMITER AFTER EXPR
```

```
          END, STOP & PAUSE


ERR LOC   OBJECT CODE      ADDR STMT SOURCE STATEMENT          VER 15, MOD 00  11/05/20  PAGE  57

                           4055 ************************************************************************
                           4056 * TEST FOR VALIDITY OF END STATEMENT
                           4057 ************************************************************************
    1574 BD C4 00          4058 SFSENS CLI   @ZERO(,@XR),B@LETD     TEST FOR D IN 'END'
    1577 F2 01 47          4059        JNE   SFS474                 NO ERROR YET BR
    157A 3C 72 0606        4060        MVI   SFS414,B@TEND          TYPE END STATEMENT
    157E C0 87 1411        4061        B     SFSUPD                 COMPUTE BINARY STMT NO

                           4063 ************************************************************************
                           4064 * TEST FOR VALIDITY OF STOP STATEMENT
                           4065 ************************************************************************
    1582 BD D6 00          4066 SFSSTS CLI   @ZERO(,@XR),B@LETO     TEST FOR O IN 'STOP'
    1585 C0 01 1BD1        4067        BNE   SFS760                 NOT 'STOP'; TRY 'STR'        1-4
    1589 C0 87 0FB7        4068        B     SFS160                 GET NEXT CHAR
    158D BD D7 00          4069        CLI   @ZERO(,@XR),B@LETP     TEST FOR P IN 'STOP'
    1590 F2 01 2E          4070        JNE   SFS474                 NO ERROR YET BR
    1593 3C 6F 0606        4071        MVI   SFS414,B@TSTP          TYPE STOP STATEMENT
    1597 C0 87 1411        4072        B     SFSUPD                 COMPUTE BINARY STAT NO BR

                           4074 ************************************************************************
                           4075 * TEST FOR VALIDITY OF PAUSE STATEMENT
                           4076 ************************************************************************
    159B C0 87 11A0        4077 SFSPAS B     SFS278                 GET NEXT CHAR
    159F C0 87 119A        4078        B     SFS276                 GET THIRD CHAR
    15A3 0D 02 1256 15B6   4079        CLC   SFS326,SFS468(3)       TEST 'USE' IN PAUSE
    15A9 F2 01 15          4080        JNE   SFS474                 KEYWORD ERROR BR
    15AC 3C 6C 0606        4081        MVI   SFS414,B@TPSE          TYPE PAUSE STMT
    15B0 C0 87 1411        4082        B     SFSUPD                 BR TO UPDATE FILE
    15B4 E4E2C5       15B6 4083 SFS468 DC    CL3'USE'               CONSTANT 'USE' OF PAUSE
```

```
                                4085 *****************************************************************************
                                4086 * TEST VALIDITY OF DIM STATEMENT
                                4087 *****************************************************************************
   15B7 C2 01 15BB              4088 SFSDIS LA    SFS472,@BR                  LOAD BASE ADDR
                      15BB      4089        USING SFS472,@BR                  SET BASE
                                4090 *
                                4091 * TEST FOR M IN 'DIM'
                                4092 *
   15BB BD D4 00               4093 SFS472 CLI   @ZERO(,@XR),B@LETM          TEST FOR M IN 'DIM'
   15BE F2 81 05               4094        JE    SFS476                      NO ERROR YET BR
   15C1 C0 87 1419             4095 SFS474 B     SFSER1                      KEYWORD ERROR BR
   15C5 16            15C5      4096        DC    AL1(@@E025)                 INVALID PRIMARY KEYWORD
                                4097 *
                                4098 * TEST FOR ALPHA CHAR
                                4099 *
   15C6 C0 87 0FC0             4100 SFS476 B     SFS164                      GET NEXT CHAR
   15CA C0 87 1168             4101        B     SFS262                      TEST FOR ALPHA CHAR
   15CE F2 87 1A               4102        J     SFS478                      NON-ALPHA BR
                                4103 *
                                4104 * TEST FOR ( AND A DIGIT THAT MUST FOLLOW
                                4105 *
   15D1 C0 87 0FC0             4106        B     SFS164                      GET NEXT CHAR
   15D5 BD 4D 00               4107        CLI   @ZERO(,@XR),B@LPAR          TEST FOR NECESSARY (
   15D8 F2 81 15               4108        JE    SFS480                      NO ERROR YET BR
   15DB BD 5B 00               4109        CLI   @ZERO(,@XR),B@LET$          TEST FOR CHAR VARIABLE
   15DE F2 01 0A               4110        JNE   SFS478                      ERROR ROUTINE BR
   15E1 C0 87 0FC0             4111        B     SFS164                      GET NEXT CHAR
   15E5 BD 4D 00               4112        CLI   @ZERO(,@XR),B@LPAR          TEST FOR SUBSCRIPT
   15E8 F2 81 3D               4113        JE    SFS490                      ONE DIMENSION DR
   15EB C0 87 141D             4114 SFS478 B     SFSERR                      NON-ALPHA ERROR BR
   15EF 22            15EF      4115        DC    AL1(@@E039)                 INVALID ARRAY NAME
   15F0 C0 87 0FC0             4116 SFS480 B     SFS164                      GET NEXT CHAR
   15F4 34 02 141C             4117        ST    SFSER1+@OP1,@XR             SAVE CHAR POINTER
   15F8 BD F0 00               4118 SFS482 CLI   @ZERO(,@XR),B@DEC0          TEST NUMERIC LOW
   15FB F2 82 58               4119        JL    SFS498                      NOT A NUMERIC DIMENSION
                                4120 *
                                4121 * TEST FOR ( OR , OR DIGIT - PARAMATERS WITHIN AND INCLUDING PARENTHESIS
                                4122 *
   15FE F2 84 07               4123        JH    SFS484                      TEST STMT NO BR
   1601 C0 87 0FC0             4124        B     SFS164                      GET NEXT CHAR
   1605 D0 87 3D               4125        B     SFS482(,@BR)                GO BACK FOR NON-ZERO
   1608 7C 04 BE               4126 SFS484 MVI   SFS508(,@BR),SFS504         INITIALIZE CTR
   160B C0 87 0FC0             4127 SFS486 B     SFS164                      GET NEXT CHAR
   160F BD 5D 00               4128        CLI   @ZERO(,@XR),B@RPAR          TEST FOR RT PAREN
   1612 F2 81 46               4129        JE    SFS500                      PAREN FOUND TEST FOR , OR @EOS
   1615 BD F0 00               4130        CLI   @ZERO(,@XR),B@DEC0          TEST NUMERIC LOW
   1618 F2 82 07               4131        JL    SFS488                      NON-NUMERIC BR
   161B 5F 00 BE BD            4132        SLC   SFS508(1,@BR),SFS506(,@BR)  DECREMENT CTR
   161F D0 84 50               4133        BH    SFS486(,@BR)                NUMERIC BR
   1622 BD 6B 00               4134 SFS488 CLI   @ZERO(,@XR),B@CMMA          TEST FOR COMMA
   1625 F2 01 2E               4135        JNE   SFS498                      INVALID DIMENSION
   1628 7C 04 BE               4136 SFS490 MVI   SFS508(,@BR),SFS504         INITIALIZE CTR
   162B C0 87 0FC0             4137 SFS492 B     SFS164                      GET NEXT CHAR
   162F 34 02 141C             4138        ST    SFSER1+@OP1,@XR             SAVE CHAR PTR
   1633 BD F0 00               4139        CLI   @ZERO(,@XR),B@DEC0          TEST NUMERIC LOW
   1636 F2 82 1D               4140        JL    SFS498                      2ND DIMENSION NOT NUMERIC
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    1639 F2 84 03           4141         JH      SFS494                      TEST STMT NO BR
    163C D0 87 70           4142         B       SFS492(,@BR)                GO BACK FOR NON-ZERO
    163F C0 87 0FC0         4143 SFS494 B        SFS164                      GET NEXT CHAR
    1643 BD F0 00           4144         CLI     @ZERO(,@XR),B@DEC0          TEST NUMERIC LOU
    1646 F2 82 07           4145         JL      SFS496                      NON-NUMERIC BR
    1649 5F 00 BE BD        4146         SLC     SFS508(1,@BR),SFS506(,@BR)  DECREMENT CTR
    164D D0 84 84           4147         BH      SFS494(,@BR)                NUMERIC BR - LOOP BACK
    1650 BD 5D 00           4148 SFS496 CLI      @ZERO(,@XR),B@RPAR          TEST FOR ENDING RT PAREN
    1653 F2 81 05           4149         JE      SFS500                      NO ERROR YET BR
    1656 C0 87 1419         4150 SFS498 B        SFSER1                      INVALID CHAR
    165A 23            165A 4151         DC      AL1(@@E040)                 INVALID CHAR IN 2ND DIMENSION
                           4152 *
                           4153 * TEST FOR CARR RET OR OTHER ARRAY DEFINITIONS
                           4154 *
    165B C0 87 0FC0         4155 SFS500 B        SFS164                      GET NEXT CHAR
    165F BD 6B 00           4156         CLI     @ZERO(,@XR),B@CMMA          TEST FOR COMMA
    1662 D0 81 0B           4157         BE      SFS476(,@BR)                BR BACK FOR NEXT ARRAY
    1665 BD 1E 00           4158         CLI     @ZERO(,@XR),@EOS            TEST FOR CARR RET
    1668 F2 81 05           4159         JE      SFS502                      VALID TERMINATION OF EXPRESSION
    166B C0 87 141D         4160         B       SFSERR                      INVALID CHAR BE - ERROR
    166F 24            166F 4161         DC      AL1(@@E041)                 INVALID CHAR AFTER VALID ARRAY
    1670 3C 0C 0606         4162 SFS502 MVI      SFS414,B@TDIM               TYPE DIM STATEMENT
    1674 C0 87 1411         4163         B       SFSUPD                      CONVERT STAT NO BINARY BR
                           4164 *
                           4165 *
         0004              4166 SFS504 EQU      4                           MAX DIMENSION SIZE
    1678 01            1678 4167 SFS506 DC      XL1'01'                     DECREMENT CTR BY ONE HERE
    1679              1679 4168 SFS508 DS      CL1                         CTR FOR TESTING MAX DIMENSION
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ERR LOC   OBJECT CODE       ADDR STMT SOURCE STATEMENT          VER 15, MOD 00  11/05/20  PAGE  60

                            4170 ********************************************************************
                            4171 * TEST INPUT, GET AND GET FILE STATEMENTS
                            4172 ********************************************************************
    167A C0 87 11A0         4173 SFSINS B      SFS278                    GET 2ND CHAR
    167E C0 87 119A         4174        B      SFS276                    GET 3RD CHAR
    1682 0D 02 16E4 1256    4175        CLC    SFS522,SFS326(3)          ARE CHAR 'PUT' OF INPUT STMT ?
    1688 F2 01 52           4176        JNE    SFS520                    KEYWORD ERROR BR
    168B 3C 45 0606         4177        MVI    SFS414,B@TINP             TYPE INPUT STMT
    168F C0 87 12DB         4178        B      SFS344                    TEST LIST BR
    1693 BD E3 00           4179 SFSGES CLI    @ZERO(,@XR),B@LETT        TEST FOR T IN 'GET' STMT
    1696 F2 01 44           4180        JNE    SFS520                    KEYWORD ERROR BR
    1699 C0 87 11C7         4181        B      SFS290                    TEST FOR FILE SPECIFICATION
    169D 3C 39 0606         4182        MVI    SFS414,B@TGET             TYPE GET FILE STMT
    16A1 BD 6B 00           4183        CLI    @ZERO(,@XR),B@CMMA        TEST FOR FILE SPEC DELIMITER
    16A4 C0 81 12DB         4184        BE     SFS344                    DELIMITER OK - GO TEST LIST
    16A8 C0 87 141D         4185        B      SFSERR                    ERROR BRANCH
    16AC 0A          16AC   4186        DC     AL1(@@E012)               INVALID DELIMITER
                            4187 ********************************************************************
                            4188 * TEST PUT AND PUT FILE STMTS
                            4189 ********************************************************************
    16AD BD E3 00           4190 SFSPUS CLI    @ZERO(,@XR),B@LETT        TEST '1' IN PUT
    16B0 F2 01 2A           4191        JNE    SFS520                    KEYWORD ERROR BR
    16B3 C0 87 11C7         4192        B      SFS290                    TEST FOR FILE BR
    16B7 3C 3C 0606         4193        MVI    SFS414,B@TPUT             TYPE PUT FILE STMT
    16BB BD 6B 00           4194        CLI    @ZERO(,@XR),B@CMMA        TEST FOR FILE SPEC DELIMITER
    16BE F2 81 05           4195        JE     SFS516                    DELIMITER OK - GO TEST LIST
    16C1 C0 87 141D         4196        B      SFSERR                    ERROR BRANCH
    16C5 0A          16C5   4197        DC     AL1(@@E012)               INVALID DELIMITER
    16C6 C0 87 0FC0         4198 SFS516 B      SFS164                    LINK TO GET NEXT CHARACTER
                     174C   4199        USING  SFS532,@BR                SET BASE ADDR
    16CA C2 01 174C         4200        LA     SFS532,@BR                LOAD BASE REGISTER
                            4201 *
                            4202 * ENTRY POINT FOR PRINT USING.
                            4203 *
    16CE 7C 80 01           4204 SFS518 MVI    SFS532+@Q(,@BR),@NOP      MODIFY INSTR
    16D1 7C 80 1B           4205        MVI    SFS540+@Q(,@BR),@NOP      MODIFY INSTR
    16D4 7C 87 0A           4206        MVI    SFS536+@Q(,@BR),@UCB      MODIFY INSTR
    16D7 7C 1A 22           4207        MVI    SFS544+@D1(,@BR),SFS552-SFS546  MODIFY BR ADDR
    16DA F2 87 8C           4208        J      SFS542                    BR TO TEST OUTPUT LIST ROUTINE
    16DD C0 87 1419         4209 SFS520 B      SFSER1                    ERROR BR
    16E1 16          16E1   4210        DC     AL1(@@E025)               INVALID PRIMARY KEYWORD
    16E2 D7E4E3       16E4   4211 SFS522 DC     CL3'PUT'                  'PUT' FOR TESTING INPUT
```

```
                                    4213 ********************************************************************************
                                    4214 * TEST PRINT STATEMENT ROUTINE
                                    4215 ********************************************************************************
                                    4216 *
                                    4217 * TEST FOR VALID KEYWORD
                                    4218 *
                          174C      4219          USING SFS532,@BR
        16E5 C0 87 11A0             4220 SFSPRS B     SFS278               GET NEXT CHAR
        16E9 C0 87 119A             4221        B     SFS276               GET NEXT CHAR
        16ED C2 01 174C             4222        LA    SFS532,@BR           LOAD BASE REGISTER
        16F1 1D 02 1256 75          4223        CLC   SFS326,SFS564(3,@BR) TEST FOR 'INT' OF PRINT STMT
        16F6 F2 01 33               4224        JNE   SFS526               ERROR IN KEYWORD BR
        16F9 C0 87 0FB7             4225        B     SFS160               GET NEXT CHAR
                                    4226 *
                                    4227 * TEST FOR USING KEYWORD IN PRINT STAT
                                    4228 *
        16FD 3C 4E 0606             4229        MVI   SFS414,B@TPRT        TYPE PRINT STATEMENT
        1701 BD E4 00               4230        CLI   @ZERO(,@XR),B@LETU   TEST FOR 'U' IN USING
        1704 F2 01 45               4231        JNE   SFS532               NOT PRINT USING
        1707 74 02 65               4232        ST    SFS556+@OP1(,@BR),@XR SAVE XR IF NOT USING STATEMENT
        170A 34 02 141C             4233        ST    SFSER1+@OP1,@XR
        170E C0 87 0FB7             4234        B     SFS160               GET NEXT CHAR
        1712 BD E2 00               4235        CLI   @ZERO(,@XR),B@LETS   TEST FOR 'S' IN USING
        1715 F2 01 7F               4236        JNE   SFS554               TEST FOR '$' BR
                                    4237 *
                                    4238 * NOTE OF CAUTION:
                                    4239 *    THE ASSUMPTION IS HERE SET FORTH THAT NO FUNCTION
                                    4240 *    WILL BEGIN WITH THE LETTERS 'US'
                                    4241 *
        1718 C0 87 11A5             4242        B     SFS280               GET NEXT CHAR
        171C C0 87 11A0             4243        B     SFS278               GET NEXT CHAR
        1720 C0 87 119A             4244        B     SFS276               GET NEXT CHAR
        1724 1D 02 1256 72          4245        CLC   SFS326,SFS562(3,@BR) TEST FOR 'ING' OF USING
        1729 F2 81 05               4246        JE    SFS528               VALID USING SO FAR
        172C C0 87 1419             4247 SFS526 B     SFSER1               BR TO ERROR ROUTINE
        1730 16            1730     4248        DC    AL1(@@E025)          INVALID SECONDARY KEYWORD
                                    4249 *
                                    4250 * TEST LENGTH OF STATEMENT NO. OF IMAGE STAT
                                    4251 *
        1731 3C 51 0606             4252 SFS528 MVI   SFS414,B@TPRU        TYPE PRINT USING STMT
        1735 C0 87 133F             4253        B     SFS360               TEST STATEMENT NUMBER
        1739 BD 6B 00               4254        CLI   @ZERO(,@XR),B@CMMA   TEST FOR COMMA
        173C F2 81 05               4255        JE    SFS530               VALID STAT THUS FAR - BR TO PUT
        173F C0 87 141D             4256        B     SFSERR               ERROR IN STAT
        1743 09            1743     4257        DC    AL1(@@E011)          INVALID STAT NO. IN USING STAT
        1744 C0 87 11A5             4258 SFS530 B     SFS280               GET NEXT CHAR
        1748 C0 87 16CE             4259        B     SFS518               TEST OUTPUT LIST BR
                                    4260 *
                                    4261 * PRINT STATEMENT - SEARCH FOR DELIMITERS IN OUTPUT LIST
                                    4262 *
        174C 7C 87 36               4263 SFS532 MVI   SFS550+@Q(,@BR),@UCB SET EXPR SW OFF
        174F BD 6B 00               4264 SFS534 CLI   @ZERO(,@XR),B@CMMA   TEST FOR COMMA
        1752 F2 81 09               4265        JE    SFS538               COMMA FOUND
                                    4266 * THE NEXT INSTR IS CHANGED FOR ALL OUTPUT LISTS BUT PRINT
        1755 F2 80 22               4267 SFS536 JC    SFS548,@NOP          CHANGED TO UCB
        1758 BD 5E 00               4268        CLI   @ZERO(,@XR),B@SCLN   TEST FOR SEMI-COLON
```

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     175B F2 01 0B           4269          JNE   SFS542               SEMI-COLON NOT FOUND
     175E C0 87 0FD2         4270 SFS538 B     SFS172               TEST FOR BALANCED PARENTHESIS
     1762 C0 87 0FB7         4271        B     SFS160               GET NEXT CHAR
     1766 D0 87 00           4272 SFS540 B     SFS532(,@BR)         GO BACK AND TEST NEXT CHAR
                             4273 *
                             4274 * ENTRY POINT OF OUTPUT LIST OF PUT AND USING STMTS
                             4275 *
     1769 BD 7D 00           4276 SFS542 CLI   @ZERO(,@XR),B@SQUO   TEST FOR '
                             4277 *  THE NEXT INSTR HAS THE DISPLACEMENT ALTERED FOR ALL BUT PRINT LISTS
     176C F2 01 0B           4278 SFS544 JNE   SFS548               NOT CHAR CONSTANT BR
     176F C0 87 0FD2         4279 SFS546 B     SFS172               TEST FOR BALANCED PARENTHESIS
     1773 C0 87 1134         4280        B     SFS252               TEST CHAR CONSTANT BR
     1777 D0 87 00           4281        B     SFS532(,@BR)         GO BACK AND TEST NEXT CHAR
     177A BD 1E 00           4282 SFS548 CLI   @ZERO(,@XR),@EOS     TEST FOR CARR RET
     177D C0 81 1411         4283        BE    SFSUPD               FILE UPDATE BR
     1781 F2 00 05           4284 SFS550 JC    SFS552,*-*           TEST EXPR SW
     1784 C0 87 141D         4285        B     SFSERR               ERROR IN OUTPUT LIST OF PRINT
     1788 0A          1788   4286        DC    AL1(@@E012)          INVALID DELIMITER IN PRINT STAT
                             4287 *
                             4288 * TEST ARITH EXPR AND CHAR VARIABLE
                             4289 *
     1789 C0 87 1168         4290 SFS552 B     SFS262               TEST FOR ALPHA CHAR
     178D F2 87 22           4291        J     SFS558               NOT ALPHA CHAR
     1790 74 02 65           4292        ST    SFS556+@OP1(,@BR),@XR SAVE CURRENT PTR TO CHAR
     1793 C0 87 0FB7         4293        B     SFS160               GET NEXT CHAR
     1797 BD 5B 00           4294 SFS554 CLI   @ZERO(,@XR),B@LET$   TEST FOR CHAR VAR
     179A F2 01 11           4295        JNE   SFS556               ARUN EXPR BR
     179D C0 87 0FB7         4296        B     SFS160               GET NEXT CHAR
     17A1 BD 4D 00           4297        CLI   @ZERO(,@XR),B@LPAR   TEST FOR CHAR ARRAY
     17A4 F2 01 0F           4298        JNE   SFS560               SET EXPR SW OFF BR
     17A7 C0 87 0CE4         4299        B     SFS034               TEST SUBSCRIPT EXPR
     17AB F2 87 08           4300        J     SFS560               SET EXPR SW OFF BR
     17AE C2 02 0000         4301 SFS556 LA    *-*,@XR              RESTORE PTR
     17B2 C0 87 0CFE         4302 SFS558 B     SFS040               TEST ARITN EXPR
     17B6 7C 80 36           4303 SFS560 MVI   SFS550+@Q(,@BR),@NOP SET EXPR SR OFF
     17B9 D0 87 03           4304        B     SFS534(,@BR)         GO BACK AND TEST NEXT CHAR
                             4305 *
                             4306 * DEFINE CONSTANTS AREA
                             4307 *
     17BC C9D5C7       17BE  4308 SFS562 DC    CL3'ING'             'ING' OF USING
     17BF C9D5E3       17C1  4309 SFS564 DC    CL3'INT'             'INT' OF PRINT
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                              4311 ******************************************************************************
                              4312 * DEF STATEMENT
                              4313 ******************************************************************************
                              4314 *
                              4315 * TEST FOR VALID FUNCTION DEFINITION AND FOLLOWING EXPRESSION
                              4316 *
     17C2 BD C6 00            4317 SFSDEF CLI   @ZERO(,@XR),B@LETF       TEST FOR 'F' IN DEF
     17C5 F2 01 E9            4318        JNE   SFS598                   PRIMARY KEYWORD E P BR
     17C8 C0 87 11A5          4319        B     SFS280                   GET NEXT CHAR
     17CC C0 87 11A0          4320        B     SFS278                   GET NEXT CHAR
     17D0 0D 01 1256 183E     4321        CLC   SFS326,SFS576(2)         TEST FOR FUNCTION IDENTIFIER
     17D6 F2 01 55            4322        JNE   SFS570                   FUNCTION DEF ERROR BR
     17D9 C0 87 0FC0          4323        B     SFS164                   GET NEXT CHAR
     17DD C0 87 1168          4324        B     SFS262                   TEST IF ALPHA
     17E1 F2 87 4A            4325        J     SFS570                   FUNCTION DEF ERROR BR
     17E4 C0 87 0FC0          4326        B     SFS164                   GET NEXT CHAR
     17E8 BD 4D 00            4327        CLI   @ZERO(,@XR),B@LPAR       TEST FOR '(' OF FUNCTION
     17EB F2 01 40            4328        JNE   SFS570                   FUNCTION DEFINITION ERROR BR
     17EE C0 87 0FC0          4329        B     SFS164                   GET NEXT CHAR
     17F2 C0 87 1168          4330        B     SFS262                   TEST IF ALPHA
     17F6 F2 87 3A            4331        J     SFS572                   INVALID SIMPLE ARITH VARIABLE
     17F9 C0 87 0FC0          4332        B     SFS164                   GET NEXT CHAR
     17FD BD F0 00            4333        CLI   @ZERO(,@XR),B@DEC0       TEST IF NUMERIC
     1800 F2 82 04            4334        JL    SFS568                   NON-NUMERIC BR
     1803 C0 87 0FC0          4335        B     SFS164                   GET NEXT CHAR
     1807 BD 5D 00            4336 SFS568 CLI   @ZERO(,@XR),B@RPAR       TEST FOR ')' ENDING FUNCT DEF
     180A F2 01 26            4337        JNE   SFS572                   FUNCTION DEF ERROR BR
     180D C0 87 0FC0          4338        B     SFS164                   GET NEXT CHAR
     1811 BD 7E 00            4339        CLI   @ZERO(,@XR),B@EQUL       TEST FOR MANDATORY ??? SIGN
     1814 F2 01 21            4340        JNE   SFS574                   NO EQUAL AFTER FN DEF - BR
     1817 C0 87 0FC0          4341        B     SFS164                   GET NEXT CIS
     181B C0 87 0CFE          4342        B     SFS040                   TEST ARUN PPR
     181F BD 1E 00            4343        CLI   @ZERO(,@XR),@EOS         TEST FOR IIINIATORY CARR RET
     1822 C0 01 138C          4344        BNE   SFS378                   ERROR ROUTINE ON NO CARR RET
     1826 3C 09 0606          4345        MVI   SFS414,B@TDEF            TYPE DEF STMT
     182A C0 87 1411          4346        B     SFSUPD                   RETURN VALID DEF STINT
     182E C0 87 141D          4347 SFS570 B     SFSERR                   FUNCTION DEFINITION ERROR
     1832 1C              1832 4348        DC    AL1(@@E031)              INVALID FUNCTION DEFINITION
     1833 C0 87 141D          4349 SFS572 B     SFSERR                   IDENTIFIER ERROR
     1837 18              1837 4350        DC    AL1(@@E027)              INVALID SIMPLE ARITH VARIABLE
     1838 C0 87 141D          4351 SFS574 B     SFSERR                   RELATIONAL OPERATOR ERROR
     183C 1D              183C 4352        DC    AL1(@@E032)              NO '.' AFTER VALID FUNCTION DEF
     183D C6D5            183E 4353 SFS576 DC    CL2'FN'                  FUNCTION CALL LETTERS
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                            4355 *******************************************************************
                            4356 * TEST DATA STATEMENT
                            4357 *******************************************************************
     183F C0 87 11A0        4358 SFSDAS B    SFS278                 GET SECOND CHAR
     1843 0D 01 1256 18B9   4359        CLC  SFS326,SFS602(2)       TEST IF 'TA' IN DATA
     1849 F2 01 65          4360        JNE  SFS598                 KEYWORD ERRCR BR
     184C C0 87 0FC0        4361 SFS580 B    SFS164                 GET NEXT CHAR
                            4362 *
                            4363 * TEST FOR VALID DATA ELEMENT
                            4364 *
     1850 BD 7D 00          4365        CLI  @ZERO(,@XR),B@SQUO     TEST IF CHAR STRING
     1853 F2 01 07          4366        JNE  SFS582                 BR TO TEST FOR NUMERIC CONSTANT
     1856 C0 87 1134        4367        B    SFS252                 BR TO TEST CHAR STRING
     185A F2 87 3D          4368        J    SFS596                 TEST DELIMITER BR
     185D BD 4E 00          4369 SFS582 CLI  @ZERO(,@XR),B@PLUS     TEST FOR SIGNED CONSTANT
     1860 F2 81 06          4370        JE   SFS584                 SIGND CONSTANT BR
     1863 BD 60 00          4371        CLI  @ZERO(,@XR),B@MINS     TEST FOR SIGNED CONSTANT
     1866 F2 01 04          4372        JNE  SFS586                 NOT SIGNED CONSTANT - BR
     1869 C0 87 0FC0        4373 SFS584 B    SFS164                 GET NEXT CHAR
     186D BD E9 00          4374 SFS586 CLI  @ZERO(,@XR),B@LETZ     TEST NUMERIC
     1870 F2 84 11          4375        JH   SFS588                 NUMERIC BR
     1873 BD 4B 00          4376        CLI  @ZERO(,@XR),B@DPNT     TEST IF '.' OF NUMERIC CONSTANT
     1876 F2 81 12          4377        JE   SFS590                 NUMERIC BR
     1879 BD 50 00          4378        CLI  @ZERO(,@XR),B@ICON     TEST FOR INTERNAL CONSTANT
     187C F2 81 13          4379        JE   SFS592                 INTERNAL CONSTANT BRANCH
     187F C0 87 141D        4380        B    SFSERR                 DATA CONSTANT NOT NUM OR CHAR.
     1883 12          1883  4381        DC   AL1(@@E020)            INVALID DATA CONSTANT
     1884 C0 87 103A        4382 SFS588 B    SFS200                 TEST NUMERIC CONSTANT
     1888 F2 87 0F          4383        J    SFS596                 TEST DELIMITER BR
     188B C0 87 0FF6        4384 SFS590 B    SFS192                 TEST NUMERIC CONSTANT
     188F F2 87 08          4385        J    SFS596                 TEST DELIMITER BRANCH
     1892 C0 87 0F1A        4386 SFS592 B    SFS142                 LINK TO TEST INTERNAL CON
     1896 C0 87 0FC0        4387 SFS594 B    SFS164                 GET NEXT CHARACTER
                            4388 *
                            4389 * TEST FOR VALID DELIMITER
                            4390 *
     189A BD 6B 00          4391 SFS596 CLI  @ZERO(,@XR),B@CMMA     TEST FOR COMMA DELIMITER
     189D C0 81 184C        4392        BE   SFS580                 COMMA DETECTED-BR SACK
     18A1 3C 06 0606        4393        MVI  SFS414,B@TDAT          TYPE DATA STMT
     18A5 BD 1E 00          4394        CLI  @ZERO(,@XR),@EOS       TEST FOR VALID TERMINATION
     18A8 C0 81 1411        4395        BE   SFSUPD                 BR TO FILE UPDATE
     18AC C0 87 141D        4396        B    SFSERR                 DELIMITER ERROR BR NOT OR EOS
     18B0 0A          18B0  4397        DC   AL1(@@E012)            INVALID DELIMITER
     18B1 C0 87 1419        4398 SFS598 B    SFSER1                 KEYWORD ERROR
     18B5 16          18B5  4399        DC   AL1(@@E025)            INVALID PRIMARY KEYWORD
     18B6 1896        18B7  4400 SFS600 DC   AL2(SFS594)            RETURN FROM NUM COM ROUTINE
     18B8 E3C1        18B9  4401 SFS602 DC   CL2'TA'                CONSTANT 'TA' OF DATA
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                              4403 ********************************************************************
                              4404 * GOTO STATEMENT - SIMPLE AND COMPUTED
                              4405 ********************************************************************
                    18D9 4406        USING SFS606,@BR              ASSEMBLY BASE
     18BA C2 01 18D9           4407 SFSGOS LA    SFS606,@BR              LOAD BASE REGISTER
     18BE C0 87 11A0           4408        B     SFS278                  GET CHAR
     18C2 1D 01 1256 4B        4409        CLC   SFS326,SFS614(2,@BR)    TEST FOR 'TO' OF GOTO
     18C7 F2 81 40             4410        JE    SFS610                  TEST FOR GOSUB BR
     18CA 3C 2D 0606           4411        MVI   SFS414,B@TGTO           TYPE SIMPLE GOTO STMT
     18CE C0 87 133F           4412        B     SFS360                  TEST STMT NO.
     18D2 3C 30 0606           4413        MVI   SFS414,B@TCGT           TYPE COMPUTED GOTO STMT
     18D6 F2 87 04             4414        J     SFS608                  SKIP NEXT INSTRUCTION
     18D9 C0 87 1346           4415 SFS606 B     SFS362                  TEST STMT NO.
     18DD BD 6B 00             4416 SFS608 CLI   @ZERO(,@XR),B@CMMA      IF COMMA AFTER STMT NO.
     18E0 D0 81 00             4417        BE    SFS606(,@BR)            IF COMMA GO BACK
                              4418 *
                              4419 * TEST FOR KEYWORD 'ON' AND EXPRESSION OF COMPUTED GOTO
                              4420 *
     18E3 34 02 141C           4421        ST    SFSER1+@OP1,@XR         SAVE DATA PTR
     18E7 BD D6 00             4422        CLI   @ZERO(,@XR),B@LETO      TEST 'O' OF ON
     18EA F2 01 31             4423        JNE   SFS612                  KEYWORD ERROR BR
     18ED C0 87 11A5           4424        B     SFS280                  GET NEXT CHAR
     18F1 BD D5 00             4425        CLI   @ZERO(,@XR),B@LETN      TEST 'N' OF ON
     18F4 F2 01 27             4426        JNE   SFS612                  KEYWORD ERROR BIT
     18F7 C0 87 0FB7           4427        B     SFS160                  GET NEXT CHAR
     18FB C0 87 0CFE           4428        B     SFS040                  TEST ARITH EXPTR
     18FF BD 1E 00             4429        CLI   @ZERO(,@XR),@EOS        IS CHAR CARR RET ?
     1902 C0 81 1411           4430        BE    SFSUPD                  FILE UPDATE BR
     1906 C0 87 138C           4431        B     SFS378                  ERROR ROUTINE
                              4432 ********************************************************************
                              4433 * GOSUB STATEMENT
                              4434 ********************************************************************
     190A C0 87 119A           4435 SFS610 B     SFS276                  GET NEXT CHAR
     190E 1D 02 1256 4E        4436        CLC   SFS326,SFS616(3,@BR)    TEST 'SUB' OF GOSUB
     1913 F2 01 EA             4437        JNE   SFS634                  KEYWORD ERROR BR
     1916 3C 33 0606           4438        MVI   SFS414,B@TGSB           TYPE GOSUB STMT
     191A C0 87 133F           4439        B     SFS360                  TEST STMT NO. - NO RETURN
     191E C0 87 1419           4440 SFS612 B     SFSER1                  KEYWORD ERROR BR
     1922 08             1922 4441        DC    AL1(@@E010)             INVALID SECONDARY KEYWORD
     1923 E3D6           1924 4442 SFS614 DC    CL2'TO'                 'TO' FOR TESTING GOTO
     1925 E2E4C2         1927 4443 SFS616 DC    CL3'SUB'                'SUB' FOR TESTING GOSUB
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                             4445 ********************************************************************
                             4446 * TEST FOR STATEMENT
                             4447 ********************************************************************
     1928 BD D9 00           4448 SFSFOS CLI   @ZERO(,@XR),B@LETR      TEST FOR  'R'  OF FOR
     192B F2 01 D2           4449        JNE   SFS634                  KEYWORD ERROR BR
                             4450 *
                             4451 * TEST FOR SIMPLE ARITHMETIC VARIABLE AND FOLLOWING EQUAL SIGN AND EXPR
                             4452 *
     192E C0 87 0FC0         4453        B     SFS164                  GET NEXT CHAR
     1932 C0 87 1168         4454        B     SFS262                  TEST FOR ALPHA
     1936 F2 87 C2           4455        J     SFS632                  INVALID IDENTIFIER
     1939 C0 87 0FC0         4456        B     SFS164                  GET NEXT CHAR
     193D BD F0 00           4457        CLI   @ZERO(,@XR),B@DEC0      TEST IT A NUMERIC ?
     1940 F2 82 04           4458        JL    SFS620                  NON-NUMERIC BR
     1943 C0 87 0FC0         4459        B     SFS164                  GET NEXT CHAR
     1947 BD 7E 00           4460 SFS620 CLI   @ZERO(,@XR),B@EQUL      TEST FOR  €  SIGN
     194A F2 01 6B           4461        JNE   SFS622                  NO EQUAL - ERROR BR
     194D C0 87 0FB7         4462        B     SFS160                  GET NEXT CHAR
     1951 C0 87 0CFE         4463        B     SFS040                  TEST ARITH EXPR
                             4464 *
                             4465 * TEST FOR KEYWORD 'TO' AND ARITHMETIC EXPRESSION
                             4466 *
     1955 C0 87 0FD2         4467        B     SFS172                  TEST FOR BALANCED PARENTHESIS
     1959 34 02 141C         4468        ST    SFSER1+@OP1,@XR         SAVE XR IN CASE OF ERROR
     195D BD E3 00           4469        CLI   @ZERO(,@XR),B@LETT      TEST FOR 'T' OF TO
     1960 F2 01 5D           4470        JNE   SFS626                  ERROR ROUTINE BR IF NOT 'T'
     1963 C0 87 0FC0         4471        B     SFS164                  GET NEXT CHARACTER
     1967 BD D6 00           4472        CLI   @ZERO(,@XR),B@LETO      TEST FOR 'O' OF TO
     196A F2 01 53           4473        JNE   SFS626                  KEYWORD ERROR BR
     196D C0 87 0FC0         4474        B     SFS164                  GET NEXT CHAR
     1971 C0 87 0CFE         4475        B     SFS040                  TEST ARITH EXPR
     1975 3C 21 0606         4476        MVI   SFS414,B@TFOR           TYPE FOR STMT
     1979 BD 1E 00           4477        CLI   @ZERO(,@XR),@EOS        TEST FOR CARR RET
     197C C0 81 1411         4478        BE    SFSUPD                  FILE UPDATE BR
                             4479 *
                             4480 * TEST FOR KEYWORD 'STEP' AND ARITHMETIC EXPRESSION
                             4481 *
     1980 BD E2 00           4482        CLI   @ZERO(,@XR),B@LETS      TEST FOR 'S' OF STEP
     1983 C0 01 138C         4483        BNE   SFS378                  ERROR ROUTINE BR IF NOT STEP
     1987 C0 87 0FD2         4484        B     SFS172                  TEST IF BALANCED PARENTHESIS
     198B 34 02 141C         4485        ST    SFSER1+@OP1,@XR         SAVE DATA PTR
     198F C0 87 11A5         4486        B     SFS280                  GET CHAR
     1993 C0 87 11A0         4487        B     SFS278                  GET CHAR
     1997 C0 87 119A         4488        B     SFS276                  GET CHAR
     199B 0D 02 1256 19BF    4489        CLC   SFS326,SFS624(3)        TEST FOR 'TEP' OF STEP
     19A1 C0 81 1ABA         4490        BE    SFS662                  KEYWORD ERROR BRANCH        1-4
     19A5 C0 87 0FB7         4491        B     SFS160                  GET CHAR
     19A9 C0 87 0CFE         4492        B     SFS040                  TEST ARITH EXPR
     19AD BD 1E 00           4493        CLI   @ZERO(,@XR),@EOS        TEST FOR CARR RET
     19B0 C0 01 138C         4494        BNE   SFS378                  ERROR ROUTINE BR
     19B4 C0 87 1411         4495        B     SFSUPD                  FILE UPDATE BR
     19B8 C0 87 141D         4496 SFS622 B     SFSERR                  RELATIONAL OPERATOR ERROR BR
     19BC 17           19BC  4497        DC    AL1(@@E026)             NO EQUAL SIGN
     19BD E3C5D7       19BF  4498 SFS624 DC    CL3'TEP'                'TEP' OF STEP
     19C0 C0 87 1419        4499 SFS626 B     SFSERR1                 ERROR NR
     19C4 08          19C4   4500        DC    AL1(@@E010)             STATEMENT TERMINATED PREMATURELY
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                              4502 *********************************************************************
                              4503 * TEST NEXT STATEMENT
                              4504 *********************************************************************
    19C5 C0 87 11A0           4505 SFSNES B      SFS278                      GET NEXT CHAR
    19C9 0D 01 1256 1A06      4506        CLC    SFS326,SFS636(2)            TEST FOR 'XT' OF NEXT
    19CF F2 01 2E             4507        JNE    SFS634                      KEYWORD ERROR BR
    19D2 C0 87 0FC0           4508        B      SFS164                      GET NEXT CHAR
    19D6 C0 87 1168           4509        B      SFS262                      TEST ALPHA
    19DA F2 87 1E             4510        J      SFS632                      INVALID IDENTIFIER ERROR BR
    19DD C0 87 0FC0           4511        B      SFS164                      GET NEXT CHAR
    19E1 3C 24 0606           4512        MVI    SFS414,B@TNXT               TYPE NEXT STMT
    19E5 BD F0 00             4513        CLI    @ZERO(,@XR),B@DEC0          TEST FOR NUMERIC
    19E8 F2 82 04             4514        JL     SFS630                      NON-NUMERIC BR
    19EB C0 87 0FC0           4515        B      SFS164                      GET NEXT CHAR
    19EF BD 1E 00             4516 SFS630 CLI    @ZERO(,@XR),@EOS            TEST FOR CARR RET
    19F2 C0 81 1411           4517        BE     SFSUPD                      FILE UPDATE BR
    19F6 C0 87 141D           4518        B      SFSERR                      CHAR AFTER STMT
    19FA 19            19FA   4519        DC     AL1(@@E028)                 INVALID CHAR AFTER NEXT STMT
    19FB C0 87 141D           4520 SFS632 B      SFSERR                      IDENTIFIER ERROR BR
    19FF 18            19FF   4521        DC     AL1(@@E027)                 SIMPLE ARITH VARIABLE ERROR
    1A00 C0 87 1419           4522 SFS634 B      SFSER1                      KEYWORD ERROR BR
    1A04 16            1A04   4523        DC     AL1(@@E025)                 INVALID KEYWORD
    1A05 E7E3          1A06   4524 SFS636 DC     CL2'XT'                     'XT' OF NEXT
```

```
                                    4526 ***************************************************************************
                                    4527 * TEST VALIDITY OF ARITHMETIC OR CHARACTER IF STATEMENTS
                                    4528 ***************************************************************************
                               1A26 4529        USING SFS640,@BR                    SET ASSEMBLY BASE
      1A07 C2 01 1A26              4530 SFSIFS LA     SFS640,@BR                    LOAD BASE ADDR
      1A0B 3A 01 1C88              4531        SBN    INCORE,INMASK                 INITIALIZE OVERLAY SW TO 1    1-4
      1A0F C0 87 1168              4532        B      SFS262                        TEST IF ALPHA CHAR
      1A13 F2 87 CE                4533        J      SFS672                        NON-ALPHA BR
      1A16 74 02 03                4534        ST     SFS640+@OP1(,@BR),@XR         SAVE PTR
      1A19 74 02 28                4535        ST     SFS642+@OP1(,@BR),@XR         SAVE PT TO 1ST CHARACTER      1-4
      1A1C C0 87 0FC0              4536        B      SFS164                        GET NEXT CHAR
      1A20 BD 5B 00                4537        CLI    @ZERO(,@XR),B@LET$            TEST FOR CHAR VARIABLE
      1A23 F2 81 CB                4538        JE     SFS674                        CHAR VARIABLE BR.
      1A26 C2 02 0000              4539 SFS640 LA     *-*,@XR                       RESTORE PTR TO FIRST CHAR
      1A2A C0 87 1C34              4540        B      SFS850                        PACK 3 CHAR TO CHECK VS STR  1-4
      1A2E 0D 02 1C59 1BF1         4541        CLC    SFS865,SFS788(3)              IS IT 'STR' ?                1-4
      1A34 F2 01 14                4542        JNE    SFS642                        NOT 'STR'; CONTINUE SCAN     1-4
      1A37 C0 87 1C5A              4543        B      SFS880                        CHECK FOR VALID SUBST OPRNDS 1-4
      1A3B 3C 7D 0606              4544        MVI    SFS414,B@TIFS                 TYPE=IF, CHAR, SUBSTR        1-4
      1A3F 7C 87 58                4545        MVI    SFS650+@Q(,@BR),@UCB          ENABLE IR TO CHAR ROUTINE    1-4
      1A42 7C 80 6F                4546        MVI    SFS654+@Q(,@BR),@NOP          DISABLE ERROR ROUTINE BR     1-4
      1A45 7C 80 A9                4547        MVI    SFS668+@Q(,@BR),@NOP          DISABLE ERROR ROUTINE BR     1-4
      1A48 F2 87 0C                4548        J      SFS644                        CONTINUE SCAN                1-4
      1A4B C2 02 0000              4549 SFS642 LA     *-*,@XR                       RESTORE POINTER TO 1ST CHAR  1-4
      1A4F 3C 27 0606              4550 SFS643 MVI    SFS414,B@TIFA                 TYPE = ARITHMETIC IF         1-4
      1A53 C0 87 0CFE              4551        B      SFS040                        TEST ARITHMETIC EXPRESSION
                                    4552 *
                                    4553 * TEST RELATIONAL OPERATORS
                                    4554 *
      1A57 BD 7E 00                4555 SFS644 CLI    @ZERO(,@XR),B@EQUL            IS CHAR '='
      1A5A F2 81 1C                4556        JE     SFS648                        EQUAL SION BR
      1A5D BD 7F 00                4557        CLI    @ZERO(,@XR),B@NEQL            IS CHAR A NOT-EQUAL
      1A60 F2 81 16                4558        JE     SFS648                        NOT-EQUAL SIGN BR
      1A63 BD 4C 00                4559        CLI    @ZERO(,@XR),B@LESS            IS CMWR A LESS-THAN
      1A66 F2 01 5F                4560        JNE    SFS666                        CHAR NOT A LESS THAN IR
      1A69 C0 87 0FC0              4561        B      SFS164                        GET NEXT CHAR
      1A6D BD 6E 00                4562        CLI    @ZERO(,@XR),B@GRTR            IS CHAR A GREATER THAN
      1A70 F2 81 06                4563        JE     SFS648                        GREATER-THAN IR
      1A73 BD 7E 00                4564 SFS646 CLI    @ZERO(,@XR),B@EQUL            IS CHAR AN EQUAL
      1A76 F2 01 04                4565        JNE    SFS650                        SIMPLE RELATIONAL OPRTR BR   1-4
      1A79 C0 87 0FC0              4566 SFS648 B      SFS164                        GET NEXT CHAR
                                    4567 * INSTR IS CHANGED TO A UCB FOR CHAR IF STMT
      1A7D F2 80 8F                4568 SFS650 JC     SFS678,@NOP                   IR IF CHAR IF SINT
      1A80 C0 87 0FD2              4569        B      SFS172                        TEST FOR BALANCED PARENTHESIS
                                    4570 *
                                    4571 * TEST ARITHMETIC EXPR, KEYWORD AND STATEMENT NO.
                                    4572 *
      1A84 C0 87 0CFE              4573        B      SFS040                        TEST MITH EAR
      1A88 BD E3 00                4574 SFS652 CLI    @ZERO(,@XR),B@LETT            IS CHAR 'T' OF THEN
      1A8B F2 81 10                4575        JE     SFS658                        THEN KEYWORD BR
      1A8E BD C7 00                4576        CLI    @ZERO(,@XR),B@LETG            IS CHAR 'G' OF GOTO
      1A91 F2 81 07                4577        JE     SFS656                        GOTO KEYWORD BR
                                    4578 * INSTRUCTION IS CHANGED TO NOP FOR CHAR IF STMT
      1A94 C0 87 138C              4579 SFS654 BC     SFS378,@UCB                   ERROR ROUTINE BR IF ARITM IF
      1A98 F2 87 1F                4580        J      SFS662                        KEYWORD ERROR BR
      1A9B 7C B6 90                4581 SFS656 MVI    SFS660+@DOP2(,@BR),SFS682-SFS640  CHANGE CMP FOR 'GOTO'
```

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      ARITH

ERR LOC   OBJECT CODE        ADDR STMT SOURCE STATEMENT            VER 15, MOD 00  11/05/20  PAGE  69

    1A9E C0 87 0FD2              4582 SFS658 B      SFS172                TEST FOR BALANCED PARENTHESIS
    1AA2 34 02 141C              4583        ST     SFSER1+@OP1,@XR       SAVE DATA PT
    1AA6 C0 87 11A5              4584        B      SFS280                GET NEXT CHAR
    1AAA C0 87 11A0              4585        B      SFS278                GET NEXT CHAR
    1AAE C0 87 119A              4586        B      SFS276                GET NEXT CHAR
                                 4587 *  2ND OPERAND MODIFIED WHEN TEST ING FOR 'GOTO' KEYWORD
    1AB2 1D 02 1256 B3           4588 SFS660 CLC    SFS326,SFS680(3,@BR)  TEST FOR VALID KEYWORD
    1AB7 F2 81 05               4589        JE     SFS664                JUMP ON GOOD KYWD
    1ABA C0 87 1419              4590 SFS662 B      SFSER1                KEYWORD ERROR BR
    1ABE 08              1ABE    4591        DC     AL1(@@E010)           INVALID KEYWORD - ERROR
    1ABF C0 87 133F              4592 SFS664 B      SFS360                TEST STMT NO.
    1AC3 C0 87 141D              4593        B      SFSERR                KEYWORD ERROR BR
    1AC7 1E              1AC7    4594        DC     AL1(@@E035)           INVALID SECONDARY KEYWORD
                                 4595 *
                                 4596 * TEST FOR RELATIONAL OPERATOR > AND = THAT MAY FOLLOW
                                 4597 *
    1AC8 BD 6E 00               4598 SFS666 CLI    @ZERO(,@XR),B@GRTR    IS CHAR A GREATER THAN
    1ACB F2 81 0F               4599        JE     SFS670                TEST FOR MULTIPLE OPERATORS BR
                                 4600 * INSTRUCTION CHANGED TO A NOP FOR CHAR IF
    1ACE C0 87 138C              4601 SFS668 BC     SFS378,@UCB           ERROR ROUTINE BR IF ARITH IF 1-4
    1AD2 C0 87 141D              4602        B      SFSERR                OPERATOR ERROR BR
    1AD6 1A              1AD6    4603        DC     AL1(@@E029)           MISSING OPERATOR
    1AD7 C8C5D5          1AD9    4604 SFS680 DC     CL3'HEN'              'HEN' OF KEYWORD THEN       1-4
    1ADA D6E3D6          1ADC    4605 SFS682 DC     CL3'OTO'              'OTO' OF KEYWORD GOTO       1-4
    1ADD C0 87 0FC0              4606 SFS670 B      SFS164                GET NEXT CHAR
    1AE1 D0 87 4D                4607        B      SFS646(,@BR)          TEST FOR ADITIONAL OPERATOR
                                 4608 *
                                 4609 * CHARACTER IF STATEMENT ROUTINE
                                 4610 *
    1AE4 BD 7D 00               4611 SFS672 CLI    @ZERO(,@XR),B@SQUO    IS CHAR A STRING DELIMITER ?
    1AE7 D0 01 29                4612        BNE    SFS643(,@BR)          ARITH EXPR BRANCH           1-4
    1AEA C0 87 1134              4613        B      SFS252                TEST CHAR STRING
    1AEE F2 87 0E                4614        J      SFS676                BR TO INITIALIZE ARITH IF
    1AF1 C0 87 0FC0              4615 SFS674 B      SFS164                GET NEXT CHAR
    1AF5 BD 4D 00               4616        CLI    @ZERO(,@XR),B@LPAR    TEST FOR CHAR ARRAY
    1AF8 F2 01 04                4617        JNE    SFS676                BR TO INITIALIZE ARITH IF
    1AFB C0 87 0CE4              4618        B      SFS034                TEST SUBSCRIPT EXPRESSION
                                 4619 *
                                 4620 * MODIFY INSTRUCTIONS IN ARITH IF ROUTINE FOR CHAR IF
                                 4621 *
    1AFF 7C 87 58                4622 SFS676 MVI    SFS650+@Q(,@BR),@UCB  ENABLE BR TO CHAR ROUTINE
    1B02 7C 80 6F                4623        MVI    SFS654+@Q(,@BR),@NOP  IDSABLE ERROR ROUTINE BR
    1B05 7C 80 A9                4624        MVI    SFS668+@Q(,@BR),@NOP  DISABLE ERROR ROUTINE BR
    1B08 3C 2A 0606              4625        MVI    SFS414,B@TIFC         YPE CHARACTER IF SIM
    1B0C D0 87 31                4626        B      SFS644(,@BR)          BR TO TEST FOR OPERATOR
                                 4627 *
                                 4628 * TEST FOR VALID CHAR VARIABLE OR STRING AFTER VITA OPERATOR
                                 4629 *
    1B0F 34 02 1B2F              4630 SFS678 ST     SFS681+@OP1,@XR       SAVE POINTER TO 1ST CHAR    1-4
    1B13 C0 87 1C34              4631        B      SFS850                PACK NEXT 3 CHARACTERS      1-4
    1B17 0D 02 1C59 1BF1         4632        CLC    SFS865,SFS788(3)      IS IT 'STR17                1-4
    1B1D F2 01 0C                4633        JNE    SFS681                NOT 'STR': CONTINUE SCAN    1-4
    1B20 C0 87 1C5A              4634        B      SFS880                CHECK FOR VALID SUBST OPRNDS 1-4
    1B24 3C 7D 0606              4635        MVI    SFS414,B@TIFS         TYPE IF, CHAR, SUBSTRING    1-4
    1B28 C0 87 1A88              4636        B      SFS652                CONTINUE SCAN               1-4
    1B2C C2 02 0000              4637 SFS681 LA     *-*,@XR               RESTORE POINTER TO 1ST CHAR 1-4
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    1B30 C0 87 1168          4638      B     SFS262               TEST FOR ALPHA              1 4
    1B34 F2 87 18            4639      J     SFS684               NON-ALPHA BR
    1B37 C0 87 0FC0          4640      B     SFS164               GET NEXT CHAR
    1B3B BD 5B 00            4641      CLI   @ZERO(,@XR),B@LET$    TEST FOR CHAR VARIABLE
    1B3E F2 01 1B            4642      JNE   SFS688               INVALID CHARACTER CONSTANT  1-4
    1B41 C0 87 0FC0          4643      B     SFS164               GET NEXT CHAR
    1B45 BD 4D 00            4644      CLI   @ZERO(,@XR),B@LPAR   TEST FOR CHAR ARRAY VARIABLE
    1B48 C0 81 0CE4          4645      BE    SFS034               TEST SUBSCRIPT EXPR
    1B4C D0 87 62            4646      B     SFS652(,@BR)         BR TO TEST KEYWORD
                             4647 *
                             4648 * CONSTANTS REQUIRED BY IF STATEMENT CHECKING ROUTINE
                             4649 *
    1B4F BD 7D 00            4650 SFS684 CLI @ZERO(,@XR),B@SQUO   TEST FOR CHAR STRING
    1B52 F2 01 07            4651      JNE   SFS688               INVALID CHAR EXPR BR
    1B55 C0 87 1134          4652 SFS686 B   SFS252               TEST CHAR STRING
    1B59 D0 87 62            4653      B     SFS652(,@BR)         BR TO TEST KEYWORD
    1B5C C0 87 141D          4654 SFS688 B   SFSERR               CHAR EXPR ERROR BR
    1B60 1B          1B60    4655      DC    AL1(@@E030)          INVALID OR MISSING CHAR EXPR
                             4656 *********************************************************************
                             4657 * CHECK AND HANDLE SUBSTRING TYPES OF ASSIGNMENT
                             4658 *********************************************************************
    1B61 3A 01 1BED          4659 SFS700 SBN RTRNSW,SFSMS2        SET SW COME BACK NEXT INSTR 1-4
    1B65 C0 87 1BFC          4660      B     SFS800               CHECK FOR SUBSTRING         1-4
    1B69 39 02 1BED          4661      TBF   RTRNSW,ERRCON        CHECK FOR ERROR RETURN      1-4
    1B6D F2 10 04            4662      JT    SFS710               NO ERROR                    1-4
    1B70 C0 87 14C0          4663      B     SFS432               ERROR - NO COMMA OR EQUAL   1-4
    1B74 3C 79 0606          4664 SFS710 MVI SFS414,B@TLTS        TYPE LET, CHAR, SUBST       1-4
    1B78 C0 87 14E0          4665      B     SFS442               CONTINUE SCAN               1-4

    1B7C C0 87 1BFC          4667 SFS720 B   SFS800               CHECK FOR SUBSTRING         1-4
    1B80 3D 7A 0606          4668      CLI   SFS414,B@TMLS        IS TYPE MULT, LET, SUBST ?  1-4
    1B84 C0 81 150E          4669      BE    SFS443               YES, CONTINUE SCAN          1-4
    1B88 3D 7C 0606          4670      CLI   SFS414,B@TMAS        IS TYPE MULT, ASSIGN, SUBST ?1-4
    1B8C C0 81 150E          4671      BE    SFS443               YES, CONTINUE SCAN          1-4
    1B90 38 01 1BEE          4672      TBN   SFSLSW,SFSMSK        IS THIS A 'LET' STATEMENT ? 1-4
    1B94 F2 10 08            4673      JT    SFS730               GO SET UP LET TYPE          1-4
    1B97 3C 7B 0606          4674      MVI   SFS414,B@TASS        TYPE ASSIGN, CHAR, SUBSTR   1-4
    1B9B C0 87 150E          4675      B     SFS443               CONTINUE SCAN               1-4
    1B9F 3C 79 0606          4676 SFS730 MVI SFS414,B@TLTS        TYPE LET, CHAR, SUBSTR      1-4
    1BA3 C0 87 150E          4677      B     SFS443               CONTINUE SCAN               1-4

    1BA7 3A 01 1BED          4679 SFS740 SBN RTRNSW,SFSMS2        SET SW COME BACK NEXT INSTR 1-4
    1BAB C0 87 1BFC          4680      B     SFS800               CHECK FOR SUBSTRING         1-4
    1BAF 39 02 1BED          4681      TBF   RTRNSW,ERRCON        CHECK FOR ERROR RETURN      1-4
    1BB3 F2 10 04            4682      JT    SFS745               NO ERROR                    1-4
    1BB6 C0 87 1560          4683      B     SFS454               ERROR - MIXED MODE          1-4
    1BBA 39 01 1BEE          4684 SFS745 TBF SFSLSW,SFSMSK        IS THIS A 'LET' STATEMENT?  1-4
    1BBE F2 10 08            4685      JT    SFS750               NO, MUST BE ASSIGNMENT      1-4
    1BC1 3C 7A 0606          4686      MVI   SFS414,B@TMLS        TYPE MULT, LET, SUBSTR      1-4
    1BC5 C0 87 14E0          4687      B     SFS442               CONTINUE SCAN               1-4
    1BC9 3C 7C 0606          4688 SFS750 MVI SFS414,B@TMAS        TYPE MULLASSIGN, SUBSTR     1-4
    1BCD C0 87 14E0          4689      B     SFS442               CONTINUE SCAN               1-4

    1BD1 3A 01 1C88          4691 SFS760 SBN INCORE,INMASK        INITIALIZE OVRLY SW TO 1    1-4
    1BD5 BD D9 00            4692      CLI   @ZERO(,@XR),B@LETR   IS KEYWORD 'SIR'?           1-4
    1BD8 C0 01 15C1          4693      BNE   SFS474               ERROR - INVALID KEYWORD     1-4
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     1BDC C0 87 0FC0          4694        B     SFS164               GET NEXT CHARACTER            1-4
     1BE0 C0 87 1C5A          4695        B     SFS880               BRING IN OVERLAY TO CHK STR  1-4
     1BE4 3C 7B 0606          4696        MVI   SFS414,B@TASS        TYPE ASSIGN, CHAR, SUBST     1-4
     1BE8 C0 87 14E0          4697        B     SFS442               CONTINUE SCAN                1-4
                              4698 *                                                              1-4
                              4699 * SUBSTRING CONSTANTS, EQUATES AND STORAGE ASSIGNMENTS         1-4
                              4700 *                                                              1-4
                         0002 4701 ERRCON EQU   X'02'                TEST FOR ERROR (RTRNSW)      1-4
     1BEC 0000           1BED 4702 RTRNSW DC    1XL2'0000'           SWITCH: BIT 7 ON: RETURN     1-4
                              4703 *                                        BIT 6 ON: ERROR       1-4
                         0001 4704 SFSMS2 EQU   X'01'                RETURN TO CALLING PROGRAM ?  1-4
     1BEE               1BEE 4705 SFSLSW DS    AL1                  SWITCH FOR LET TYPE COMMANDS 1-4
                         0001 4706 SFSMSK EQU   X'01'                TO TEST LET SW (SFSLSW)      1-4
     1BEF E2E3D9        1BF1 4707 SFS788 DC    CL3'STR'             TO CHECK SUBSTRING OPERATION 1-4
     1BF2 0001          1BF3 4708 SFS790 DC    1XL2'0001'           PARENTHESES COUNTER          1-4
     1BF4 0003          1BF5 4709 SFS797 DC    1XL2'0003'           INCR PAST 'STR' IN BUFFER    1-4
     1BF6 FFFF          1BF7 4710 SFS798 DC    1XL2'FFFF'           DECREMENT BUFFER POINTER     1-4
     1BF8 0001          1BF9 4711 SFS799 DC    1XL2'0001'           INCREMENT BUFFER POINTER     1-4
     1BFA               1BFB 4712 TEMPR1 DS    CL2                  TEMP STORAGE FOR ORR         1-4

                              4714 ******************************************************************* 1-4
                              4715 * SUBROUTINE TO CHECK FOR 'STR'; IF YES, CHECK IT'S OPERANDS       1-4
                              4716 ******************************************************************* 1-4
     1BFC 34 08 1C1C          4717 SFS800 ST    SFS810+@OP1,@ARR     SAVE RETURN ADDRESS          1-4
     1C00 C2 02 0000          4718 SFS805 LA    *-*,@XR              RESTORE POINTER TO 1ST CHAR  1-4
     1C04 34 02 1C20          4719        ST    SFS820+@OP1,@XR      SAVE RETURN ADDRESS          1-4
     1C08 C0 87 1C34          4720        B     SFS850               PACK 3 CHAR TO CHECK VS STR  1-4
     1C0C 0D 02 1C59 1BF1     4721        CLC   SFS865,SFS788(3)     IS KEYWORD 'STR'? (SUBSTRING)1-4
     1C12 F2 01 08            4722        JNE   SFS820               NO. THEN KEYWORD ERROR       1-4
     1C15 C0 87 1C5A          4723        B     SFS880               CHECK SUBSTRING OPERAS 'S    1-4
     1C19 C0 87 0000          4724 SFS810 B     *-*                  RETURN                       1-4
     1C1D C2 02 0000          4725 SFS820 LA    *-*,@XR              RESET POINTER TO PT OF EMU    1-4
     1C21 39 01 1BED          4726        TBF   RTRNSW,SFSMS2        RETURN TO CALLING ROUTINE?   1-4
     1C25 F2 10 08            4727        JT    SFS830               NO; GO TO ERROR MESSAGE      1-4
     1C28 3A 02 1BED          4728        SBN   RTRNSW,ERRCON        SET ERROR BIT ON             1-4
     1C2C C0 87 1C19          4729        B     SFS810               RETURN TO CALLING PROGRAM    1-4
     1C30 C0 87 1565          4730 SFS830 B     SFS456               ERROR - INVALID VARIABLE     1-4
     1C34 34 08 1C56          4731 SFS850 ST    SFS860+@OP1,@ARR     SAVE RETURN ADDRESS          1-4
     1C38 2C 02 1C57 00       4732        MVC   SFS865-2,@ZERO(,@XR) SAVE 1ST CHARACTER           1-4
     1C3D C0 87 0FC0          4733        B     SFS164               GET NEXT CHARACTER           1-4
     1C41 2C 02 1C58 00       4734        MVC   SFS865-1,@ZERO(,@XR) SAVE 2ND CHARACTER           1-4
     1C46 C0 87 0FC0          4735        B     SFS164               GET NEXT CHARACTER           1-4
     1C4A 2C 02 1C59 00       4736        MVC   SFS865-0,@ZERO(,@XR) SAVE 3RD CHARACTER           1-4
     1C4F C0 87 0FC0          4737        B     SFS164               PT TO NEXT CHAR PAST STR     1-4
     1C53 C0 87 0000          4738 SFS860 B     *-*                  RETURN                       1-4
     1C57               1C59 4739 SFS865 DS    CL3                  BUFFER FOR PACKED KEYWORD    1-4
     1C5A 34 08 1C87          4740 SFS880 ST    SFS888+@OP1,@ARR     SAVE RETURN ADDRESS          1-4
     1C5E 38 01 1C88          4741        TBN   INCORE,INMASK        IS OVERLAY IN CORE ALREADY ? 1-4
     1C62 F2 90 1B            4742        JF    SFS884               YES; BRANCH TO IT            1-4
     1C65 34 02 03C7          4743        ST    $XRSAV,@XR           SAVE XR2 FOR OVERLAY         1-4
     1C69 34 01 1BFB          4744        ST    TEMPR1,@BR           SAVE XR1 FOR OVERLAY         1-4
     1C6D C0 87 0522          4745        B     $BLOAD               LOAD AND EXEC WORK AREA PGM  1-4
     1C71 1C78          1C72 4746        DC    AL2(SFS882)          DPL ADDRESS                  1-4
                              4747 *FS882 $DPL  FUNC-@DGET,DADDR-#$STRO,CNT-#$@STR,CADDR-#$$STR   1-4
     1C73 0104D0021600  1C78 4748 SFS882 DC    XL6'0104D0021600'    ORIGINAL Q&D DPL             1-4
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    1C79 3B 01 1C88          4750 OVRTRN SBF    INCORE,INMASK            SET INCORE INDICATOR OFF   1-4
    1C7D F2 87 04            4751        J      SFS888                   GO RETURN                  1-4
    1C80 C0 87 160F          4752 SFS884 B      STRNTR                   BRANCH TO ROUTINE IN CORE  1-4
    1C84 C0 87 0000          4753 SFS888 B      *-*                      RETURN                     1-4
                        160F 4754 STRNTR EQU    X'160F'                  ENTRY TO OVERLAY           1-4
                        0001 4755 INMASK EQU    1                        MASK POINTS TO BIT 7 (X'01') 1-4
    1C88                1C88 4756 INCORE DS     XL1                      OVERLAY IN CORE (7 ON=YES> 1-4
```

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                         4758 ****************************************************************** 1-4
                         4759 * PATCH AREA 1                                                 * 1-4
                         4760 ****************************************************************** 1-4
                         4761 *                                                                1-4
                         4762 * CALCULATE AREA LEFT IN THIS SECTOR                             1-4
                         4763 *                                                                1-4
                    1C89 4764 $$$$L1 EQU    *                      START OF PATCH AREA 1        1-4
     1D00                4765        ORG    *,256,0                SET LOC CNTR TO NEXT AREA    1-4
                    1D00 4766 $$$$T1 EQU    *                      DEFINE ADDR OF SCTR BOUNDARY 1-4
     1C89                4767        ORG    $$$$L1                 SET LOC CTR TO START OF      1-4
                         4768 *                                    * PATCH AREA                 1-4
     1C89           1CFF 4769 $$$$S1 DS     CL($$$$T1-$$$$L1)      * PATCH AREA                 1-4
                         4770 ****************************************************************** 1-4
                         4771        PRINT ON
                    FFFF 4772        END
```

TOTAL STATEMENTS IN ERROR IN THIS ASSEMBLY =   0

```
$$$$$$  001  0C00 2955
$$$$L1  001  1C89 4764   4767  4769
$$$$S1  119  1CFF 4769
$$$$T1  001  1D00 4766   4769
$$$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
$$FLIB  001  06FF 0709
$$ILEN  001  0601 0627   0629  0633
$$ILHD  001  0600 0625   0627
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$$KBSN  001  09E2 0655   0660
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$$KLD2  001  0700 0717
$$KLD3  001  0C00 0719
$$LPOS  001  09EB 0660
$$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 0221   0222  0224  0225  0226  0230  0688
$ABORT  001  0010 0334
$BASIC  001  0080 0392
$BIGCD  001  0080 0468
$BLDPL  001  0579 0601   0603
$BLNOE  001  0569 0591
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$CABLD  001  04B4 0560   0561  3907
$CAERK  001  0469 0537   0540  3915
$CAERR  001  03CD 0285   0287  3914*
$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 0224
$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
$DTNMB  001  0040 0268
$DTRDR  001  0040 0356
$ENDNU  001  0600 0615   0625  0649  0670  0706  0715  0717  0719  1889
$ERDPL  001  046F 0540   0542
$ERFIL  001  0040 0295
$ERHRD  001  0004 0427
$ERKEY  001  0080 0299
$ERLOG  001  0345 0229
$ERMAD  001  0472 0542   0543
$ERPND  001  0004 0400
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$ERRPG  001  03CE 0289
$ERSFL  001  0035 0294
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                              CROSS REFERENCE

SYMBOL  LEN VALUE DEFN   REFERENCES                       VER 15, MOD 00  11/05/20  PAGE  76

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$ER050  001  0363 0230
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$FDIND  001  0040 0414
$FEARR  001  0004 0222
$FEMAP  001  0588 0608   0609
$FILIB  001  03DA 0458   0459
$FITIN  001  0010 0383
$FUIND  001  0020 0412   3906
$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   3906*
$INDR3  001  03D6 0420   0447
$INLNO  001  03CF 0287   0289   0301   0308
$INRPT  001  0020 0265
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$IOPGS  001  0010 0476
$IOYES  001  0002 0251
$IPLDV  001  05FF 0612   0615
$IRKEY  001  0020 0475
$KEYBD  001  03E1 0481   0486
$KEYCD  001  03C3 0245   0279
$KEYDT  001  0040 0389
$KE090  001  00DE 0225
$KE130  001  01D5 0226
$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
$LPRIO  001  03EA 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
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SYMBOL  LEN VALUE DEFN   REFERENCES                        VER 15, MOD 00  11/05/20  PAGE  77

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$PGMST  001  0010 0350
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$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   3906
$REORD  001  0040 0474
$RLOAD  001  051E 0580   0582
$RMRGN  001  03C0 0238   0240
$RSTR   001  04D6 0563   0565  0567  0572
$RUNIT  001  0001 0310
$SFAID  001  050D 0568
$SFSYN  001  0C07 2958
$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
$VOLF1  001  03FE 0502   0503
$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
$WFLOK  001  0008 0380
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$XIND3  001  03D8 0455   0458
$XPREC  001  0040 0320
$XRSAV  001  03C7 0280   0282  4743*
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#$$BCO  001  0600 0818
#$$BOV  001  0800 1090
#$$DPR  001  0700 0826
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#$$DSP  001  2800 0862
#$$ECM  001  0C00 1122
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SYMBOL   LEN VALUE DEFN   REFERENCES                          VER 15, MOD 00  11/05/20  PAGE  79

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#$$KSA   001  0C00 0930
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#$$KSO   001  0C20 1022
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#$$KSV   001  0980 0950
#$$KSY   001  0C00 0962
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#$$SFO   001  1500 1098   3027
#$$SFS   001  0C00 1094   2954
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#$$SPO   001  0806 0938
#$$SPS   001  0C00 0926
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#$$TSY   001  1000 0866
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#$$UPT   001  0C00 1202
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#$$VLO   001  0600 1034
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#$$VVM   001  0000 1046
#$$VXI   001  0600 1026
#$$ZDU   001  1100 1178
#$$ZLB   001  1100 1222
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                                CROSS REFERENCE

SYMBOL  LEN VALUE DEFN  REFERENCES                        VER 15, MOD 00  11/05/20  PAGE  80

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#$#CKT  001  2118 1245
#$#CNF  001  2000 1213
#$#COR  001  0800 1005
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#$#DRT  001  0000 0809
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#$#FSP  001  1880 1105
#$#INV  001  212C 1249
#$#PWR  001  2300 1253
#$#RSP  001  1780 1085
#$#SAV  001  1180 1073
#$#SSA  001  1128 1069
#$#VUF  001  0B08 1029
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#$#1TR  001  0080 0805
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#$@#CO  001  003A 1007
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#$@#DR  001  0008 0811
#$@#ER  001  0032 1011
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#$@#PW  001  00C0 1255
#$@#RS  001  0030 1087
#$@#SA  001  0108 1075
#$@#SS  001  0001 1071
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#$@BCO  001  0018 0819
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#$@FMS  001  0052 1051
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#$@KLI	001	0008	0919	
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#$@KLO	001	0008	0923	
#$@KME	001	0003	0903	
#$@KMO	001	0004	0847	
#$@KNA	001	0008	0959	
#$@KOV	001	0009	0879	
#$@KPA	001	0005	0855	
#$@KPO	001	000D	0943	
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#$@KRM	001	0003	0851	
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#$@KRO	001	000A	0875	
#$@KRS	001	000A	1199	
#$@KRU	001	0003	0895	
#$@KRV	001	000D	0987	
#$@KSA	001	0004	0931	
#$@KSE	001	0004	0971	
#$@KSO	001	000D	1023	
#$@KSS	001	000B	0955	
#$@KSV	001	0002	0951	
#$@KSY	001	000F	0963	
#$@KWI	001	0002	0891	
#$@KWR	001	0002	0883	
#$@LOA	001	0013	0823	
#$@MIP	001	000D	1019	
#$@SDS	001	0004	1131	
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#$@SFO	001	0003	1099	
#$@SFS	001	0011	1095	
#$@SPA	001	0004	0935	
#$@SPO	001	0003	0939	
#$@SPS	001	0001	0927	
#$@STR	001	0002	1103	
#$@TDC	001	0003	0907	
#$@TSY	001	0003	0867	
#$@TVK	001	0001	1043	
#$@UAL	001	0011	1059	
#$@UAT	001	000C	1155	
#$@UCD	001	000B	1163	
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SYMBOL	LEN	VALUE	DEFN	REFERENCES
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#$@UPA	001	0004	1139	
#$@UPO	001	0005	1207	
#$@UPT	001	0012	1203	
#$@VCR	001	0008	0999	
#$@VLO	001	0002	1035	
#$@VOD	001	0016	1039	
#$@VVM	001	0030	1047	
#$@VXI	001	0002	1027	
#$@ZDU	001	0008	1179	
#$@ZLB	001	0002	1223	
#$@ZLO	001	000C	1183	
#$@ZLV	001	0006	1239	
#$@ZL1	001	0007	1227	
#$@ZL2	001	000D	1231	
#$@ZL3	001	000A	1235	
#$@ZTR	001	0001	1175	
#$@ZUT	001	0014	1187	
#$BCOM	001	0080	0817	
#$BOLV	001	1780	1089	
#$DPRI	001	014C	0825	
#$DREA	001	0200	0841	
#$DSPL	001	0240	0861	
#$ECMA	001	1900	1121	
#$EFKE	001	1990	1141	
#$ERRP	001	18C0	1113	
#$EXMS	001	07D4	1001	
#$FILN	001	1724	1081	
#$FIST	001	1700	1077	
#$FMLN	001	1E00	1209	
#$FMST	001	0D00	1049	
#$GRAP	001	0690	0973	
#$GUFU	001	1880	1109	
#$INLN	001	1C84	1189	
#$INST	001	0020	0813	
#$KALL	001	06A4	0977	
#$KCAL	001	1CC4	1193	
#$KCHA	001	053C	0945	
#$KCND	001	0F80	1061	
#$KCTL	001	03BC	0913	
#$KDEL	001	035C	0909	
#$KDIS	001	0744	0989	
#$KDNT	001	0300	0897	
#$KDOV	001	0780	0993	
#$KEDI	001	0188	0833	
#$KENA	001	01C4	0837	
#$KEXT	001	0234	0857	
#$KGOS	001	0180	0829	
#$KHEL	001	0A30	1013	
#$KKEY	001	2100	1241	
#$KLIS	001	0400	0917	
#$KLLA	001	2004	1217	
#$KLOG	001	0444	0921	

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#$KMER  001  030C 0901
#$KMOU  001  0204 0845
#$KNAM  001  05C0 0957
#$KOVM  001  0290 0877
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#$KPOO  001  0508 0941
#$KPRT  001  063C 0965
#$KREA  001  02BC 0885
#$KRLA  001  0700 0981
#$KRMO  001  0214 0849
#$KRNU  001  0280 0869
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#$KRSU  001  1D24 1197
#$KRUN  001  02CC 0893
#$KRVL  001  0710 0985
#$KSAV  001  0488 0929
#$KSET  001  0680 0969
#$KSOV  001  0AC8 1021
#$KSSP  001  0594 0953
#$KSVL  001  058C 0949
#$KSYM  001  0600 0961
#$KWID  001  02C4 0889
#$KWRI  001  02B4 0881
#$LOAD  001  0100 0821
#$MIPP  001  0A80 1017
#$SDSY  001  192C 1129
#$SFFI  001  193C 1133
#$SFLO  001  1918 1125
#$SFOV  001  1844 1097
#$SFSY  001  1800 1093
#$SPAC  001  04CC 0933
#$SPOV  001  04DC 0937
#$SPSY  001  0484 0925
#$STRO  001  1850 1101
#$TDCK  001  0350 0905
#$TSYK  001  0250 0865
#$TVKB  001  0BAC 1041
#$UALL  001  0F00 1057
#$UATR  001  1A38 1153
#$UCDI  001  1AD8 1161
#$UCNF  001  19B8 1145
#$UCPL  001  19DC 1149
#$UDEL  001  1B24 1165
#$UDIS  001  1B5C 1169
#$UEXL  001  0EA8 1053
#$UINI  001  1A88 1157
#$UPAC  001  1980 1137
#$UPOV  001  1D24 1205
#$UPTF  001  1D5C 1201
#$VCRT  001  07B4 0997
#$VLOA  001  0B80 1033
#$VODK  001  0B88 1037
#$VVMR  001  0C00 1045
#$VXIT  001  0B00 1025
#$ZDUM  001  1BA4 1177
#$ZLBM  001  2008 1221
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#$ZL3M	001	2088	1233	
#$ZTRA	001	1B9C	1173	
#$ZUTM	001	1C14	1185	
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#@#IO2	001	045D	0756	
#@#TAT	001	0941	0783	
#@#TBA	001	09A1	0787	
#@#TFS	001	0941	0781	
#@#TSY	001	0941	0785	
#@#VFP	001	0700	0773	
#@#VLP	001	093D	0776	
#@#WDB	001	050C	0768	
#@#WFT	001	0500	0766	
#@@#BA	001	0001	0748	
#@@#IO	001	0001	0760	
#@@#SC	001	0002	0757	
#@@#TA	001	0010	0784	
#@@#TB	001	0010	0788	
#@@#TS	001	0005	0786	
#@@#TW	001	0020	0782	
#@@#VM	001	0100	0777	
#@@#WD	001	00BD	0769	
#@@#WF	001	0003	0767	
#@@#04	001	0004	0759	
#@@#08	001	0008	0758	
#@@BOV	001	0018	0736	
#@@ECM	001	0006	0750	
#@@ERR	001	0003	0744	
#@@GUF	001	0010	0740	
#@@LDS	001	0002	0746	
#@@SDS	001	0004	0742	
#@@SFF	001	0008	0754	
#@@SFL	001	0005	0752	
#@@SFO	001	0005	0762	3026
#@@SFS	001	0011	0738	
#@@VSF	001	0010	0790	
#@@VSL	001	000F	0791	
#@@VTR	001	0001	0775	
#@BOVL	001	0400	0735	
#@ECMA	001	0481	0749	
#@ERRP	001	0441	0743	
#@GUFU	001	0401	0739	
#@LDSV	001	044D	0745	
#@SDSY	001	04AD	0741	
#@SFFI	001	04BD	0753	
#@SFLO	001	0449	0751	
#@SFOV	001	04C4	0761	3025
#@SFSY	001	0480	0737	
#@VSFI	001	09A1	0789	
#@VTRL	001	0708	0774	
#@WAF1	001	0401	0734	

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                                     CROSS REFERENCE

SYMBOL  LEN VALUE DEFN   REFERENCES                         VER 15, MOD 00  11/05/20  PAGE  85

#@WAR1  001  0400 0733
#SFSYN  001  0000 0001
@@E001  001  0000 1792   1794  3121
@@E003  001  0001 1794   1796  3185  3390  3855
@@E004  001  0002 1796   1798  3512
@@E005  001  0003 1798   1800  3432
@@E006  001  0004 1800   1802  3155
@@E007  001  0005 1802   1804  3878
@@E008  001  0006 1804   1806  3251
@@E009  001  0007 1806   1808  3874
@@E010  001  0008 1808   1810  4441  4500  4591
@@E011  001  0009 1810   1812  4257
@@E012  001  000A 1812   1814  3693  3762  3834  4053  4186  4197  4286  4397
@@E013  001  000B 1814   1816  3535
@@E014  001  000C 1816   1818  3626  3630
@@E015  001  000D 1818   1820  3735
@@E016  001  000E 1820   1822  3280  3302  3764  3864  3996
@@E017  001  000F 1822   1824  3481
@@E018  001  0010 1824   1826  3889
@@E019  001  0011 1826   1828  3867  3901
@@E020  001  0012 1828   1830  4381
@@E021  001  0013 1830   1832  3816
@@E023  001  0014 1832   1834  3319  3338
@@E024  001  0015 1834   1836  3799
@@E025  001  0016 1836   1838  3007  3654  3722  4096  4210  4248  4399  4523
@@E026  001  0017 1838   1840  4497
@@E027  001  0018 1840   1842  4350  4521
@@E028  001  0019 1842   1844  4519
@@E029  001  001A 1844   1846  4603
@@E030  001  001B 1846   1848  4051  4655
@@E031  001  001C 1848   1850  4348
@@E032  001  001D 1850   1852  4352
@@E035  001  001E 1852   1854  3899  4031  4594
@@E036  001  001F 1854   1856  3994
@@E037  001  0020 1856   1858  4047
@@E038  001  0021 1858   1860  4049
@@E039  001  0022 1860   1862  4115
@@E040  001  0023 1862   1864  4151
@@E041  001  0024 1864   1866  4161
@@E042  001  0025 1866   1868  3282
@@E043  001  0026 1868   1870
@@E044  001  0027 1870   1872
@@E045  001  0028 1872   1874  3594
@@E046  001  0029 1874   1876  3515
@@E060  001  002A 1876   1878  3299
@@E080  001  002B 1878
@@E100  001  0000 1264   1266
@@E101  001  0001 1266   1268
@@E102  001  0002 1268   1270
@@E103  001  0003 1270   1272
@@E110  001  0004 1272   1274
@@E112  001  0005 1274   1276
@@E113  001  0006 1276   1278
@@E114  001  0007 1278   1280
@@E115  001  0008 1280   1282
@@E116  001  0009 1282   1284
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SYMBOL   LEN VALUE DEFN   REFERENCES                         VER 15, MOD 00  11/05/20  PAGE  86

@@E117   001  000A 1284   1286
@@E120   001  000B 1286   1288
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@@E123   001  000D 1290   1292
@@E124   001  000E 1292   1294
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@@E130   001  0010 1296   1298
@@E131   001  0011 1298   1300
@@E133   001  0012 1300   1302
@@E134   001  0013 1302   1304
@@E135   001  0014 1304   1306
@@E136   001  0015 1306   1308
@@E137   001  0016 1308   1310
@@E138   001  0017 1310   1312
@@E139   001  0018 1312   1314
@@E142   001  0019 1314   1316
@@E143   001  001A 1316   1318
@@E150   001  001B 1318   1320
@@E151   001  001C 1320   1322
@@E160   001  001D 1322   1324
@@E162   001  001E 1324   1326
@@E163   001  001F 1326   1328
@@E164   001  0020 1328   1330
@@E200   001  0021 1330   1332
@@E205   001  0022 1332   1334
@@E210   001  0023 1334   1336
@@E211   001  0024 1336   1338
@@E212   001  0025 1338   1340
@@E213   001  0026 1340   1342
@@E215   001  0027 1342   1344
@@E216   001  0028 1344   1346
@@E217   001  0029 1346   1348
@@E220   001  002A 1348   1350
@@E221   001  002B 1350   1352
@@E222   001  002C 1352   1354
@@E223   001  002D 1354   1356
@@E225   001  002E 1356   1358
@@E226   001  002F 1358   1360
@@E227   001  0030 1360   1362
@@E228   001  0031 1362   1364
@@E229   001  0032 1364   1366
@@E230   001  0033 1366   1368
@@E232   001  0034 1368   1370
@@E234   001  0035 1370   1372
@@E237   001  0036 1372   1374
@@E240   001  0037 1374   1376
@@E241   001  0038 1376   1378
@@E242   001  0039 1378   1380
@@E248   001  003A 1380   1382
@@E249   001  003B 1382   1384
@@E250   001  003C 1384   1386
@@E251   001  003D 1386   1388
@@E252   001  003E 1388   1390
@@E253   001  003F 1390   1392
@@E254   001  0040 1392   1394
@@E255   001  0041 1394   1396
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SYMBOL	LEN	VALUE	DEFN	REFERENCES	VER 15, MOD 00 11/05/20 PAGE 87
@@E256	001	0042	1396	1398	
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@@E301	001	0044	1400	1402	
@@E302	001	0045	1402	1404	
@@E303	001	0046	1404	1406	
@@E304	001	0047	1406	1408	
@@E305	001	0048	1408	1410	
@@E308	001	0049	1410	1412	
@@E310	001	004A	1412	1414	
@@E315	001	004B	1414	1416	
@@E316	001	004C	1416	1418	
@@E320	001	004D	1418	1420	
@@E325	001	004E	1420	1422	
@@E330	001	004F	1422	1424	
@@E335	001	0050	1424	1426	
@@E338	001	0051	1426	1428	
@@E340	001	0052	1428	1430	
@@E350	001	0053	1430	1432	
@@E351	001	0054	1432	1434	
@@E352	001	0055	1434	1436	
@@E360	001	0056	1436	1438	
@@E361	001	0057	1438	1440	
@@E362	001	0058	1440	1442	
@@E371	001	0059	1442	1444	
@@E380	001	005A	1444	1446	
@@E390	001	005B	1446	1448	
@@E400	001	005C	1448	1450	
@@E410	001	005D	1450	1452	
@@E415	001	005E	1452	1454	
@@E417	001	005F	1454	1456	
@@E420	001	0060	1456	1458	
@@E430	001	0061	1458	1460	
@@E432	001	0062	1460	1462	
@@E433	001	0063	1462	1464	
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@@E451	001	0065	1466	1468	
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@@E461	001	0067	1470	1472	
@@E464	001	0068	1472	1474	
@@E465	001	0069	1474	1476	
@@E466	001	006A	1476	1478	
@@E467	001	006B	1478	1480	
@@E469	001	006C	1480	1482	
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@@E473	001	006F	1486	1488	
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@@E479	001	0075	1498	1500	
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SYMBOL	LEN	VALUE	DEFN	REFERENCES
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@@E489	001	007F	1518	1520
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@@E491	001	0081	1522	1524
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@@E494	001	0084	1528	1530
@@E495	001	0085	1530	1532
@@E496	001	0086	1532	1534
@@E497	001	0087	1534	1536
@@E498	001	0088	1536	1538
@@E500	001	0089	1538	1540
@@E501	001	008A	1540	1542
@@E530	001	008B	1542	1544
@@E531	001	008C	1544	1546
@@E535	001	008D	1546	1548
@@E540	001	008E	1548	1550
@@E541	001	008F	1550	1552
@@E542	001	0090	1552	1554
@@E543	001	0091	1554	1556
@@E544	001	0092	1556	1558
@@E545	001	0093	1558	1560
@@E546	001	0094	1560	1562
@@E547	001	0095	1562	1564
@@E548	001	FFFF	1768	
@@E549	001	0096	1564	1566
@@E550	001	0097	1566	1568
@@E551	001	0098	1568	1570
@@E552	001	0099	1570	1572
@@E553	001	009A	1572	1574
@@E554	001	009B	1574	1576
@@E555	001	009C	1576	1578
@@E556	001	009D	1578	1580
@@E558	001	009E	1580	1582
@@E570	001	009F	1582	1584
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@@E612   001  00B1 1618    1620
@@E613   001  00B2 1620    1622
@@E614   001  00B3 1622    1624
@@E700   001  00B4 1624    1626
@@E701   001  00B5 1626    1628
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@@E713   001  00B8 1632    1634
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@@E715   001  00BA 1636    1638
@@E716   001  00BB 1638    1640
@@E717   001  00BC 1640    1642
@@E718   001  00BD 1642    1644
@@E720   001  00BE 1644    1646
@@E721   001  00BF 1646    1648
@@E723   001  00C0 1648    1650
@@E724   001  00C1 1650    1652
@@E725   001  00C2 1652    1654
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@@E727   001  00C4 1656    1658
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@@E764   001  00D5 1690    1692
@@E765   001  00D6 1692    1694
@@E766   001  00D7 1694    1696
@@E767   001  00D8 1696    1698
@@E768   001  00D9 1698    1700
@@E769   001  00DA 1700    1702
@@E770   001  00DB 1702    1704
@@E771   001  00DC 1704    1706
@@E772   001  00DD 1706    1708
@@E773   001  00DE 1708    1710
@@E774   001  00DF 1710    1712
@@E775   001  00E0 1712    1714
@@E776   001  00E1 1714    1716
@@E777   001  00E2 1716    1718
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SYMBOL	LEN	VALUE	DEFN	REFERENCES										
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@@E782	001	00E7	1726	1728										
@@E783	001	00E8	1728	1730										
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@@E785	001	00EA	1732	1734										
@@E786	001	00EB	1734	1736										
@@E790	001	00EC	1736	1738										
@@E791	001	00ED	1738	1740										
@@E792	001	00EE	1740	1742										
@@E793	001	00EF	1742	1744										
@@E794	001	00F0	1744	1746										
@@E795	001	00F1	1746	1748										
@@E796	001	00F2	1748	1750										
@@E797	001	00F3	1750	1752										
@@E798	001	00F4	1752	1754										
@@E800	001	FFFF	1782											
@@E801	001	FFFF	1784											
@@E802	001	FFFF	1786											
@@E803	001	FFFF	1788											
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@@E901	001	00F6	1756	1758										
@@E902	001	00F7	1758	1760										
@@E903	001	00F8	1760	1762										
@@E905	001	00F9	1762	1764										
@@E906	001	00FA	1764	1766										
@@E910	001	00FB	1766											
@ARR	001	0008	0016	3102	3109	3379	3391	3414	3436	3486	3528	3568	3573* 3574	3583
				3600	3786	3913	4717	4731	4740					
@ASIGN	001	007C	0071											
@ASTER	001	005C	0069											
@BCRDL	001	0050	0088											
@BE	001	0081	0043											
@BF	001	0090	0052											
@BH	001	0084	0041											
@BL	001	0082	0042											
@BLANK	001	0040	0065	2971	3381	3585								
@BM	001	0082	0054											
@BNE	001	0001	0046											
@BNH	001	0004	0044											
@BNL	001	0002	0045											
@BNM	001	0002	0057											
@BNOL	001	0020	0050											
@BNOZ	001	0008	0049											
@BNP	001	0004	0056											
@BNZ	001	0001	0058											
@BOL	001	00A0	0048											
@BOZ	001	0088	0047											
@BP	001	0084	0053											
@BR	001	0001	0013	2962*	2964	2970	2972	2983	2995	2999	3000	3003	3003	3004 3005
				3008	3009	3010	3112	3113*	3114	3115	3116	3116	3148	3150 3151
				3161	3163	3168	3169	3171	3173	3178	3182	3182	3189	3189 3191
				3192	3192	3193	3197	3221	3226	3233*	3240	3249	3267	3269 3287

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                             3292  3292  3294  3294  3295  3296  3297  3311  3580  3599* 3600  3611
                             3619  3619  3620  3641  3647* 3648  3649  3650  3659  3673* 3679  3680
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                             4146  4147  4157  4199  4200* 4204  4205  4206  4207  4219  4222* 4223
                             4232  4245  4263  4272  4281  4292  4303  4304  4406  4407* 4409  4417
                             4436  4529  4530* 4534  4535  4545  4546  4547  4581  4588  4607  4612
                             4622  4623  4624  4626  4646  4653  4744
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@BZ      001  0081 0055
@B1      001  0001 0063    2968  3256* 3380  3529  3536  3541  3581* 3584  3604  3608  3616  3621
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@CARDL   001  0060 0087    0642
@CHARA   001  00C1 0072
@CHARF   001  00C6 0073
@CHARR   001  00D9 0074
@CHARZ   001  00E9 0075
@CLOFF   001  0010 0094
@CLON    001  0011 0093
@COMMA   001  006B 0066
@CPLUS   001  004E 0079
@DADDR   001  0002 0139
@DBFR1   001  0004 0128
@DBFR2   001  0005 0129
@DCALK   001  0001 0081
@DCBCY   001  0009 0114    2467
@DCBT1   001  0050 0116    2470
@DCNT    001  0003 0127
@DCST1   001  0040 0115    2468
@DCTRL   001  0000 0124
@DCYL    001  0001 0125
@DD2     001  0003 0030
@DGET    001  0001 0133    3024
@DOLAR   001  005B 0068
@DOP2    001  0004 0028    4581*
@DPLNG   001  0006 0131
@DPOS    001  0000 0132
@DPUT    001  0002 0134
@DSAD    001  0002 0126
@DSBCY   001  0004 0105    2405
@DSCS1   001  0000 0106    2406
@DSIVF   001  0003 0137
@DSPIN   001  0002 0130
@DTRSZ   001  0018 0085
@DVBCY   001  0007 0107    2464
@DVRFY   001  0031 0135
@DWAIT   001  00FF 0136
@DWBCY   001  0005 0102    2461
@DWSIZ   001  00C0 0104
@DWTB1   001  0003 0103    2462
@DZERO   001  00F0 0064
@D1      001  0002 0026    3000* 3003* 3008  3308* 3311* 4207*
@EOF     001  001C 0077
@EOFTC   001  0075 0160
@EOS     001  001E 0076    2477  3118  3152  3532  3587  3690  3732  3756  3974  4019  4028  4158
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@FDE1	001	000C	0198	
@FDFNA	001	000B	0196	
@FDHLN	001	0002	0206	
@FDLNC	001	0002	0191	
@FDNSC	001	0003	0208	
@FDSD	001	0000	0204	
@FLACE	001	0009	0195	
@FLDBC	001	0001	0194	
@FLENT	001	0004	0199	
@FLFNA	001	0002	0197	
@FLHLN	001	0002	0207	
@FLLNC	001	0002	0192	
@FLNSC	001	0001	0209	
@FLSD	001	0001	0205	
@HDRLN	001	0007	0092	0670
@IAR	001	0010	0017	
@INDEX	001	0001	0154	0155
@INST3	001	0003	0032	
@INST4	001	0004	0033	
@INST5	001	0005	0034	
@INST6	001	0006	0035	
@I1IAR	001	00C0	0020	
@LINSZ	001	00F4	0084	0644
@MAPEN	001	0005	0089	
@MINCR	001	2000	0083	
@MINUS	001	0060	0080	
@NOP	001	0080	0040	3101 3103 3227 3243 3418 3428 3437 3438 3453 3615 3782 3852
				4204 4205 4267 4303 4546 4547 4568 4623 4624
@NUMBR	001	007B	0070	
@OPD2	001	0004	0029	
@OP1	001	0003	0027	2983* 2984* 2995* 3005 3010* 3102* 3109* 3112* 3191* 3257* 3286* 3300
				3306* 3318* 3321* 3379* 3391* 3414* 3436* 3486* 3528* 3568* 3574* 3583*
				3600* 3786* 3858* 3862 3947* 4009* 4039* 4117* 4138* 4232* 4233* 4292*
				4421* 4468* 4485* 4534* 4535* 4583* 4630* 4717* 4719* 4731* 4740*
@OP2	001	0005	0031	3913*
@PCTRL	001	0000	0147	
@PDATA	001	0003	0149	
@PGCSZ	001	0020	0082	0083
@PPLNG	001	0004	0146	
@PRCNT	001	0001	0148	
@PRETR	001	00C0	0152	
@PRINT	001	0040	0150	0152
@PSR	001	0004	0015	
@PWAIT	001	00FF	0156	
@P1IAR	001	0020	0018	
@P2IAR	001	0040	0019	
@Q	001	0001	0024	3096* 3101* 3103* 3110* 3111* 3194* 3225* 3227 3243* 3288 3290* 3291*
				3522 3523 3615* 3622* 3775* 3782* 3852 4204* 4205* 4206* 4263* 4303*
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B@LETH  001  00C8 2522
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B@LETQ  001  00D8 2531
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B@LL09  001  0100 2755   2756
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B@LSB1   001  0003 2232
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SFSUPD  004  1411 3906   2979   3678   3691   3704   3714   3757   3826   3976   4021   4029   4061   4072
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SFS004  003  0C0F 2968   2962   2964   2970   2972
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SFS008  004  0C4A 2992   2983*  2989   3005
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SFS048   004  0D34 3129    3151
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SFS110   004  0E25 3234    3102*  3109*
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SFS126   004  0EBD 3286    3146   3244   3268
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SFS152  001 0042 3344    3308
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SFS182  003 0FEE 3403    3505
SFS184  001 0FEF 3404    3422  3441  3461
SFS186  001 0FF0 3405    3489  3493
SFS188  003 0FF3 3409    3422* 3441* 3489* 3493* 3498* 3499* 3505  3507
SFS190  002 0FF5 3410    3461* 3467* 3470* 3475  3475* 3476* 3498
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SFS196  004 102E 3429    3427
SFS198  004 1035 3431    3419
SFS200  004 103A 3436    3134  4382
SFS202  006 104D 3441    3439
SFS204  004 1057 3443    3430  3455
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SFS208  004 107C 3454    3452
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SFS214  004 10A4 3468    3464
SFS216  003 10A8 3469    3466
SFS218  004 10D2 3480    3471
SFS220  004 10D7 3486    3423  3429  3442  3454
SFS222  003 10DB 3487    3523
SFS224  003 10DE 3488    3522
SFS226  004 10EA 3491    3487
SFS228  004 10F7 3494    3486* 3488  3490  3492
SFS230  006 10FB 3498    3474  3479
SFS232  006 1101 3499    3460
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SFS238  004 112B 3513    3414* 3436* 3501  3510
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SFS248   003 10DF 3522    3415*  3438*  3446   3448*  3491
SFS250   003 10DC 3523    3418*  3421*  3428*  3437*  3440*  3453*  3500
SFS252   004 1134 3528    4027   4280   4367   4613   4652
SFS254   003 1138 3529    3533   3538
SFS256   003 114D 3536    3531
SFS258   003 1157 3539    3542
SFS260   004 1164 3543    3528*  3540
SFS262   003 1168 3554    2985   3129   3259   3272   3609   3617   3737   3856   3860   3948   3987   4010
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SFS270   004 118A 3569    3568*
SFS272   004 118E 3573    3555   3560   3562   3564
SFS274   004 1196 3575    3574*
SFS276   006 119A 3581    3331   3334   3580   3599   3641   3647   3649   3659   3673   3680   4078   4174
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SFS286   004 11C2 3592    3588
SFS288   001 11C6 3594    3319*
SFS290   004 11C7 3599    3687   4181   4192
SFS291   003 11E4 3608    3603
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SFS294   004 1209 3622    3618
SFS296   004 1213 3625    3610
SFS298   004 1218 3627    3606   3624
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SFS306   001 1226 3635    3611*  3619*
SFS308   002 1228 3636    3573
SFS310   003 122B 3645    3650
SFS313   003 124F 3665    3708
SFS314   003 1249 3663    3681
SFS316   003 124C 3664    3697
SFS320   002 1251 3666    3701
SFS322   002 1253 3667    3719
SFS324   002 1255 3671    3255*  3256*  3267   3332   3581   3581*  3582*
SFS326   001 1256 3672    3001   3117*  3256   3264   3269   3309   3335   3378*  3589*  3650   3681   3697
                         3701   3708   3719   3859   3871   4079   4175   4223   4245   4321   4359   4409
                         4436   4489   4506   4588
SFS330   003 126C 3679    3676
SFS332   004 127D 3687    3652   3689
SFS334   004 1294 3697    3682
SFS336   004 12B0 3708    3698
SFS338   003 12C8 3718    3675
SFS340   004 12D2 3721    3702   3709   3712
SFS342   004 12D7 3723    3720
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                        CROSS REFERENCE

SYMBOL   LEN VALUE DEFN   REFERENCES                          VER 15, MOD 00  11/05/20  PAGE 110

SFS344   004  12DB 3731   4178  4184
SFS346   004  12EA 3736   3760
SFS348   004  12EE 3737   3733
SFS350   003  1306 3744   3741
SFS352   003  131D 3751   3745
SFS354   003  1324 3756   3743  3748  3750
SFS356   004  1335 3761   3759
SFS358   004  133A 3763   3738
SFS360   001  133F 3774   4253  4412  4439  4592
SFS362   001  1346 3781   4415
SFS364   004  134A 3786   3776
SFS366   004  1361 3803   3793  3810
SFS368   003  137A 3820   3805
SFS370   004  137D 3821   3786*
SFS372   004  1381 3826   3775* 3782*
SFS374   001  138A 3839   3809
SFS376   001  138B 3844   3787* 3809*
SFS378   004  138C 3852   3153  3228  3975  4344  4431  4483  4494  4579  4601
SFS380   004  1398 3856   3853
SFS382   004  13B7 3865   3858* 3861  3862
SFS384   004  13C0 3871   3857
SFS386   004  13CC 3875   3872
SFS388   003  13D8 3882   3876
SFS390   004  13EA 3888   3883  3885
SFS392   003  13EF 3890   3887
SFS394   004  140C 3900   3891  3893  3895  3897
SFS408   006  1421 3914   3913*
SFS410   001  0001 3920   3150  3377  3875
SFS412   001  0007 3921   3611
SFS414   001  0606 3922   2978* 2993* 3651* 3677* 3686* 3703* 3713* 3723* 3938* 3979  3981  3983*
                         3985* 4000  4002* 4004* 4060* 4071* 4081* 4162* 4177* 4182* 4193* 4229*
                         4252* 4345* 4393* 4411* 4413* 4438* 4476* 4512* 4544* 4550* 4625* 4635*
                         4664* 4668  4670  4674* 4676* 4686* 4688* 4696*
SFS418   004  143E 3947   2994
SFS420   003  1457 3957   3992
SFS422   003  1464 3964   3958
SFS424   003  146E 3970   3960  3965
SFS426   003  1487 3977   3971
SFS428   004  14A3 3985   3980
SFS430   004  14A7 3986   3982  3984
SFS432   004  14C0 3993   4663
SFS434   004  14C5 3995   3949  3988
SFS436   004  14CA 4000   3953
SFS438   004  14D8 4004   4001
SFS440   004  14DC 4005   4003  4044
SFS442   003  14E0 4006   4037  4665  4687  4689  4697
SFS443   003  150E 4019   4669  4671  4675  4677
SFS444   003  1518 4025   4011
SFS446   003  1522 4028   4017
SFS448   004  1529 4030   4020
SFS450   003  152E 4032   4007
SFS452   004  1542 4038   4033
SFS454   004  1560 4046   3991  4683
SFS456   004  1565 4048   4041  4730
SFS458   004  156A 4050   4026
SFS460   004  156F 4052   4035
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                                          CROSS REFERENCE

SYMBOL   LEN VALUE DEFN    REFERENCES                          VER 15, MOD 00  11/05/20  PAGE 111

SFS468   003  15B6 4083    4079
SFS472   003  15BB 4093    4088   4089
SFS474   004  15C1 4095    3937   4059   4070   4080   4693
SFS476   004  15C6 4100    4094   4157
SFS478   004  15EB 4114    4102   4110
SFS480   004  15F0 4116    4108
SFS482   003  15F8 4118    4125
SFS484   003  1608 4126    4123
SFS486   004  160B 4127    4133
SFS488   003  1622 4134    4131
SFS490   003  1628 4136    4113
SFS492   004  162B 4137    4142
SFS494   004  163F 4143    4141   4147
SFS496   003  1650 4148    4145
SFS498   004  1656 4150    4119   4135   4140
SFS500   004  165B 4155    4129   4149
SFS502   004  1670 4162    4159
SFS504   001  0004 4166    4126   4136
SFS506   001  1678 4167    4132   4146
SFS508   001  1679 4168    4126*  4132*  4136*  4146*
SFS516   004  16C6 4198    4195
SFS518   003  16CE 4204    4259
SFS520   004  16DD 4209    4176   4180   4191
SFS522   003  16E4 4211    4175
SFS526   004  172C 4247    4224
SFS528   004  1731 4252    4246
SFS530   004  1744 4258    4255
SFS532   003  174C 4263    4199   4200   4204*  4219   4222   4231   4272   4281
SFS534   003  174F 4264    4304
SFS536   003  1755 4267    4206*
SFS538   004  175E 4270    4265
SFS540   003  1766 4272    4205*
SFS542   003  1769 4276    4208   4269
SFS544   003  176C 4278    4207*
SFS546   004  176F 4279    4207
SFS548   003  177A 4282    4267   4278
SFS550   003  1781 4284    4263*  4303*
SFS552   004  1789 4290    4207   4284
SFS554   003  1797 4294    4236
SFS556   004  17AE 4301    4232*  4292*  4295
SFS558   004  17B2 4302    4291
SFS560   003  17B6 4303    4298   4300
SFS562   003  17BE 4308    4245
SFS564   003  17C1 4309    4223
SFS568   003  1807 4336    4334
SFS570   004  182E 4347    4322   4325   4328
SFS572   004  1833 4349    4331   4337
SFS574   004  1838 4351    4340
SFS576   002  183E 4353    4321
SFS580   004  184C 4361    4392
SFS582   003  185D 4369    4366
SFS584   004  1869 4373    4370
SFS586   003  186D 4374    4372
SFS588   004  1884 4382    4375
SFS590   004  188B 4384    4377
SFS592   004  1892 4386    4379
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                                    CROSS REFERENCE

SYMBOL   LEN VALUE DEFN   REFERENCES                        VER 15, MOD 00  11/05/20  PAGE 112

SFS594   004 1896 4387    4400
SFS596   003 189A 4391    4368    4383    4385
SFS598   004 18B1 4398    4318    4360
SFS600   002 18B7 4400    3318
SFS602   002 18B9 4401    4359
SFS606   004 18D9 4415    4406    4407    4417
SFS608   003 18DD 4416    4414
SFS610   004 190A 4435    4410
SFS612   004 191E 4440    4423    4426
SFS614   002 1924 4442    4409
SFS616   003 1927 4443    4436
SFS620   003 1947 4460    4458
SFS622   004 19B8 4496    4461
SFS624   003 19BF 4498    4489
SFS626   004 19C0 4499    4470    4473
SFS630   003 19EF 4516    4514
SFS632   004 19FB 4520    4455    4510
SFS634   004 1A00 4522    4437    4449    4507
SFS636   002 1A06 4524    4506
SFS640   004 1A26 4539    4529    4530    4534* 4581
SFS642   004 1A4B 4549    4535*   4542
SFS643   004 1A4F 4550    4612
SFS644   003 1A57 4555    4548    4626
SFS646   003 1A73 4564    4607
SFS648   004 1A79 4566    4556    4558    4563
SFS650   003 1A7D 4568    4545*   4565    4622*
SFS652   003 1A88 4574    4636    4646    4653
SFS654   004 1A94 4579    4546*   4623*
SFS656   003 1A9B 4581    4577
SFS658   004 1A9E 4582    4575
SFS660   005 1AB2 4588    4581*
SFS662   004 1ABA 4590    4490    4580
SFS664   004 1ABF 4592    4589
SFS666   003 1AC8 4598    4560
SFS668   004 1ACE 4601    4547*   4624*
SFS670   004 1ADD 4606    4599
SFS672   003 1AE4 4611    4533
SFS674   004 1AF1 4615    4538
SFS676   003 1AFF 4622    4614    4617
SFS678   004 1B0F 4630    4568
SFS680   003 1AD9 4604    4588
SFS681   004 1B2C 4637    4630*   4633
SFS682   003 1ADC 4605    4581
SFS684   003 1B4F 4650    4639
SFS686   004 1B55 4652
SFS688   004 1B5C 4654    4642    4651
SFS700   004 1B61 4659    3978
SFS710   004 1B74 4664    4662
SFS720   004 1B7C 4667    4014
SFS730   004 1B9F 4676    4673
SFS740   004 1BA7 4679    4045
SFS745   004 1BBA 4684    4682
SFS750   004 1BC9 4688    4685
SFS760   004 1BD1 4691    4067
SFS788   003 1BF1 4707    4541    4632    4721
SFS790   002 1BF3 4708
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                              CROSS REFERENCE

SYMBOL   LEN VALUE DEFN    REFERENCES                    VER 15, MOD 00  11/05/20  PAGE 113

SFS797   002 1BF5 4709
SFS798   002 1BF7 4710
SFS799   002 1BF9 4711
SFS800   004 1BFC 4717    4660  4667  4680
SFS805   004 1C00 4718    3947* 4009* 4039*
SFS810   004 1C19 4724    4717* 4729
SFS820   004 1C1D 4725    4719* 4722
SFS830   004 1C30 4730    4727
SFS850   004 1C34 4731    4540  4631  4720
SFS860   004 1C53 4738    4731*
SFS865   003 1C59 4739    4541  4632  4721  4732* 4734* 4736*
SFS880   004 1C5A 4740    4543  4634  4695  4723
SFS882   006 1C78 4748    4746
SFS884   004 1C80 4752    4742
SFS888   004 1C84 4753    4740* 4751
STRNTR   001 160F 4754    4752
TEMPR1   002 1BFB 4712    4744*


TOTAL STATEMENTS IN ERROR IN THIS ASSEMBLY =       0

OL105 I  THE CODE LENGTH OF #SFSYN IS  7424 DECIMAL.
OL103 I  TOTAL NUMBER OF LIBRARY SECTORS REQUIRED IS    20
         NAME-#SFSYN,PACK-R1R1R1,UNIT-R1,RETAIN-P,LIBRARY-R,CATEGORY-000
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       OVERLAY LINKAGE EDITOR CORE USAGE MAP     11/05/20


  START      CATEGORY   NAME AND        CODE LENGTH
 ADDRESS                  ENTRY      HEXADECIMAL DECIMAL

  0C00          0      #SFSYN            1D00    7424


OL100 I   THE TOTAL CORE USED BY #SFSYN IS  7424 DECIMAL.
OL101 I   THE START CONTROL ADDRESS OF THIS MODULE IS 0C00.
OL104 I   TOTAL NUMBER OF LIBRARY SECTORS REQUIRED IS   30
          NAME-#SFSYN,PACK-R1R1R1,UNIT-R1,RETAIN-P,LIBRARY-O
```