

001543 IDENT ASSMBLR  
PROGRAM LENGTH

BLOCKS

000000 002064 ABSOLUTE\* ABSOLUTE  
000000 001543 PROGRAM\* LOCAL

ENTRY POINTS

000000 ASSMBL

000000 H.BEGIN

EXTERNAL SYMBOLS

| CALLP1 | SAVEREG | RESTREG | CNTERS  | CWDESCR | FORCE   | OD.FIL | R.COND |
|--------|---------|---------|---------|---------|---------|--------|--------|
| R.EXPR | R.SO    | SD.EXPR | SD.IFDO | SD.SYMT | SP15    | SP30   | SP60   |
| STAR   | STARL   | STARO   | STARP   | SV.SPST | TOKENIZ |        |        |

|       |                  |
|-------|------------------|
| EXT   | CALLP1           |
| ENTRY | ASSMBL           |
| EXT   | SAVEREG, RESTREG |

0000002  
0000001

STARLP  
STAROP

|       |         |
|-------|---------|
| EQ    | 2       |
| EQ    | 1       |
| ENTRY | H.BEGIN |

\*\* COMPASS KLUDGE \*\*\*\*\*  
\*\* COMPASS KLUDGE \*\*\*\*\*

```

SYS      MACRO      P
          XJ         P
          VFD        30/0
          ENDM

#
CALL     MACRO ADDR,RET,REG
XX       MICRO 1,,SREGS
          IFC EQ,SREGS$,1
XX       MICRO 1,,SB7$
          IFC NE,SRET$$,2
          S*XX# RET
          IFPP
          IFEQ $,59,2
          S*XX# *+1
          IFPP
          IFLT $,29,2
          S*XX# *+1
          IFPP
          S*XX# *+2
          ENDF
          JP ADDR
          ENDM

```

|        |              |        |     |            |                           |
|--------|--------------|--------|-----|------------|---------------------------|
| 000000 | 5100000000   | ASSMRL | SA0 | R4STMT     | .. INITIAL STATE          |
|        | 5110000000 X |        | SA1 | SD.IF00    |                           |
| 000001 | 5211777776   |        | SA1 | X1-1       |                           |
|        | 0321000622 + |        | PL  | X1.SM100P1 | .. NO PENDING THEN ACTION |
| 000002 | 5100000247   |        | SA0 | H4ELSE     |                           |
|        | 0200000622 + |        | JP  | SML00P1    |                           |

|        |                      |          |
|--------|----------------------|----------|
| 000003 | 00000000000000000000 | EF4      |
| 000004 | 00000000000000000000 | E.ABS    |
| 000005 | 00000000000000000000 | E.ABS2   |
| 000006 | 00000000000000000000 | E.ABS4   |
| 000007 | 00000000000000000000 | E.ABS3   |
| 000010 | 00000000000000000000 | E.ABS5   |
| 000011 | 00000000000000000000 | E.NEG1   |
| 000012 | 00000000000000000000 | E.BLK1   |
| 000013 | 00000000000000000000 | E.BLK2   |
| 000014 | 00000000000000000000 | E.BLK3   |
| 000015 | 00000000000000000000 | E.LBR    |
| 000016 | 00000000000000000000 | E.LNGSTR |
| 000017 | 00000000000000000000 | E.MISSND |
| 000020 | 00000000000000000000 | E.MISSTR |
| 000021 | 00000000000000000000 | E.NOSEMI |
| 000022 | 00000000000000000000 | E.RBR    |
| 000023 | 00000000000000000000 | E.REL    |
| 000024 | 00000000000000000000 | E.SYN1   |
| 000025 | 00000000000000000000 | E.SYN2   |
| 000026 | 00000000000000000000 | E.SYN3   |
| 000027 | 00000000000000000000 | E.SYN4   |
| 000030 | 00000000000000000000 | E.SYN5   |
| 000031 | 00000000000000000000 | E.SYN6   |
| 000032 | 00000000000000000000 | E.TRUNC  |
| 000033 | 00000000000000000000 | E.TRUNC4 |
| 000034 | 00000000000000000000 | E.TRUNC5 |
| 000035 | 00000000000000000000 | E.TRUNC6 |
| 000036 | 00000000000000000000 | E.TRUNC7 |
| 000037 | 00000000000000000000 | E.EXTRA  |
| 000040 | 00000000000000000000 | E.ENDO   |
| 000041 | 00000000000000000000 | ST1      |
| 000042 | 00000000000000000000 | ST2      |
| 000043 | 00000000000000000000 | ST3      |
| 000044 | 00000000000000000000 | ST4      |
| 000045 | 00000000000000000000 | ST5      |
| 000046 | 00000000000000000000 | ST6      |
| 000047 | 00000000000000000000 | ST7      |
| 000050 | 00000000000000000000 | ST8      |
| 000051 | 00000000000000000000 | ST9      |

.. DO INCREMENT EXPR NOT ABSOLUTE

.. BYTE WIDTH SPECIFIER NOT ABSOLUTE

.. BYTE WIDTH SPECIFIER NEGATIVE

.. XI=J, J.NE.0

.. BAD X-REG COND

.. +IJK+ EXPR TOO LARGE

.. DO INCREMENT EXPR TOO LARGE

.. BYTE WIDTH SPECIFIER > 60

.. BYTE WIDTH > ITS SPECIFIER

.. JUNK ON END

.. UNBALANCED ENDO



```

ST1      MACRO  TOKEN,NXTST,ACTION,OP,PRIOR
          VFD    12/TOKEN,12/NXTST+2000B,12/ACTION-ACTION0+2000B,12/PRIOR,
          ,12/OP=OPRTR0+2000B
          ENDM
*
ST2      MACRO  TOKEN,NXTST,ACTION,P
          VFD    12/TOKEN,12/NXTST+2000B,12/ACTION-ACTION0+2000B,24/P
          ENDM
*
ST3      MACRO  KEY,NXTST,ACTION,P
          KEYWORD KEY
          VFD    12/NXTST+2000B,18/P,30/ACTION
          ENDM
*
KEYWORD  MACRO  C1,C2,C3,C4,C5,C6,C7,C8
          IFC    NE,SC4SS,2
          VFD    4/0,7/1R,C1+40B,7/1R,C2+40B,7/1R,C3+40B,7/1R,C4+40B,7/1
          ,R,C5+40B,7/1R,C6+40B,7/1R,C7+40B,7/1R,C8+40B
          IFPP
          IFC    NE,SC7SS,2
          VFD    4/0,7/1R,C1+40B,7/1R,C2+40B,7/1R,C3+40B,7/1R,C4+40B,7/1
          ,R,C5+40B,7/1R,C6+40B,7/1R,C7+40B,7/0
          IFPP
          IFC    NE,SC6SS,2
          VFD    4/0,7/1R,C1+40B,7/1R,C2+40B,7/1R,C3+40B,7/1R,C4+40B,7/1
          ,R,C5+40B,7/1R,C6+40B,14/0
          IFPP
          IFC    NE,SC5SS,2
          VFD    4/0,7/1R,C1+40B,7/1R,C2+40B,7/1R,C3+40B,7/1R,C4+40B,7/1
          ,R,C5+40B,21/0
          IFPP
          IFC    NE,SC4SS,2
          VFD    4/0,7/1R,C1+40B,7/1R,C2+40B,7/1R,C3+40B,7/1R,C4+40B,28/
          ,0
          IFPP
          IFC    NE,SC3SS,2
          VFD    4/0,7/1R,C1+40B,7/1R,C2+40B,7/1R,C3+40B,35/0
          IFPP
          IFC    NE,SC2SS,2
          VFD    4/0,7/1R,C1+40B,7/1R,C2+40B,42/0
          IFPP
          VFD    4/0,7/1R,C1+40B,49/0
          ENDIF
          ENDM
*
S        MACRO  STATE,S
          EQU    *-STATE0
          ENDM
*
K        MACRO  KEYSTATE,K
          EQU    *
          ENDM
*

```

```

MACRO ACTION,A
A      BSS      0
      ENDM

*
MACRO OPRTR,0
0      BSS      0
      ENDM

*
MACRO ESCAPE,A,B
BSS    0
IFC    EQ,SBSS,2
A      EQU      *
IFNE   1,1
A      EQU      B
      ENDM

*
STENO  MACRO X
      IFC      EQ,SBSS
      VFD      12/2000B,48/0
      ELSE
      VFD      12/2000B,48/X
      ENDF
      ENDM

*
KYENO  MACRO X
      IFC      EQ,SBSS
      DATA    -0
      ELSE
      VFD      1/1,59/X
      ENDF
      ENDM

*
CTAB   MACRO NOTB,B,NOTX,X
      VFD      15/NOTB*000B,15/B*000B,15/NOTX*00B,15/X*00B
      ENDM

```

```

0000027  ASCII$C EQU      27B
0000020  ASCII0 EQU      16
0000155  ASCII$CR EQU     155B * CARRIAGE RETURN
0000173  ASCII$ESC EQU     173B

```

# HIERARCHIES FOR EXPRESSION OPERATORS

|        |          |     |   |
|--------|----------|-----|---|
| 000000 | ORG      | 0   |   |
| 000000 | H.BEGIN  | BSS | 1 |
| 000001 | H.LBRACK | BSS | 1 |
| 000002 | H.END    | BSS | 1 |
| 000003 | H.RBRACK | BSS | 1 |
| 000004 | H.LIT    | BSS | 1 |
| 000005 | H.OR     | BSS | 1 |
| 000006 | H.AND    | BSS | 1 |
| 000007 | H.NOT    | BSS | 1 |

\* A BEGIN IS PUT IN THE STACK INITIALLY  
\* [  
\* TERMINATORS  
\* ]  
\* UNARY =  
.. < >  
.. ^  
.. UNARY >

000010  
000011  
000012  
000013  
000014

H.RELAT BSS 1  
H.SUM BSS 1  
H.TERM BSS 1  
H.EXP BSS 1  
H.MINUS BSS 1  
USE

.. < <= = = >= >  
# + -  
.. \* / --  
# ↑  
# UNARY+, -

|        | TOKENS   | LIST | X     |                                                | TOKENS    |
|--------|----------|------|-------|------------------------------------------------|-----------|
| 000052 | PRETOK   | BSS  | 0     |                                                | TOKENS .1 |
| 002001 |          | ORG  | 2001B |                                                | TOKENS .1 |
| 002001 | T.LSTELM | BSS  | 1     | * VALUE IS TOKEN BOX FOR ELEMENT               | TOKENS .1 |
| 002002 | T.LIST   | BSS  | 1     | * VALUE IS TOKEN BOX FOR LIST                  | TOKENS .1 |
| 002003 | T.BOX    | BSS  | 1     | * VALUE IS TOKEN BOX TO SCAN NOW               | TOKENS .1 |
| 002004 | T.ID     | BSS  | 1     | * VALUE IS HASH TABLE ADDRESS                  | TOKENS .1 |
| 002005 | T.STB    | BSS  | 1     | * VALUE IS NUMBER OF CHARS IN FOLLOWING STRING | TOKENS .1 |
| 002006 | T.INT    | BSS  | 0     | * VALUE IS IN NEXT WORD OF TOKEN STRING        | TOKENS .1 |
| 002006 | T.FLOAT  | BSS  | 0     | * VALUE IS IN NEXT WORD                        | TOKENS .1 |
| 002006 | T.NUM    | BSS  | 1     | .. CURRENTLY INTEGERS AND REALS ARE THE SAME   | TOKENS .1 |
| 002007 | T.AREG   | BSS  | 1     | * VALUE IS REGISTER NUMBER                     | TOKENS .1 |
| 002010 | T.BREG   | BSS  | 1     | * VALUE IS REGISTER NUMBER                     | TOKENS .1 |
| 002011 | T.XREG   | BSS  | 1     | * VALUE IS REGISTER NUMBER                     | TOKENS .1 |
| 002012 | T.PLUS   | BSS  | 1     |                                                | TOKENS .1 |
| 002013 | T.MINUS  | BSS  | 1     |                                                | TOKENS .1 |
| 002014 | T.STAR   | BSS  | 1     |                                                | TOKENS .1 |
| 002015 | T.SLASH  | BSS  | 1     |                                                | TOKENS .1 |
| 002016 | T.FADD   | BSS  | 1     |                                                | TOKENS .1 |
| 002017 | T.FSUB   | BSS  | 1     |                                                | TOKENS .1 |
| 002020 | T.FMULT  | BSS  | 1     |                                                | TOKENS .1 |
| 002021 | T.FDIV   | BSS  | 1     |                                                | TOKENS .1 |
| 002022 | T.DADD   | BSS  | 1     |                                                | TOKENS .1 |
| 002023 | T.DSUB   | BSS  | 1     |                                                | TOKENS .1 |
| 002024 | T.DMULT  | BSS  | 1     |                                                | TOKENS .1 |
| 002025 | T.DDIV   | BSS  | 1     | * KLUDGE FOR TOKEN PROCESSOR                   | TOKENS .1 |
| 002026 | T.RADD   | BSS  | 1     |                                                | TOKENS .1 |
| 002027 | T.RSUB   | BSS  | 1     |                                                | TOKENS .1 |
| 002030 | T.RMULT  | BSS  | 1     |                                                | TOKENS .1 |
| 002031 | T.RDIV   | BSS  | 1     |                                                | TOKENS .1 |
| 002032 | T.MOD    | BSS  | 1     |                                                | TOKENS .1 |
| 002033 | T.LBRACK | BSS  | 1     |                                                | TOKENS .1 |
| 002034 | T.RBRACK | BSS  | 1     |                                                | TOKENS .1 |
| 002035 | T.BKSLSH | BSS  | 1     |                                                | TOKENS .1 |
| 002036 | T.EQ     | BSS  | 1     |                                                | TOKENS .1 |
| 002037 | T.NE     | BSS  | 1     |                                                | TOKENS .1 |
| 002040 | T.GT     | BSS  | 1     |                                                | TOKENS .1 |
| 002041 | T.GE     | BSS  | 1     |                                                | TOKENS .1 |
| 002042 | T.LT     | BSS  | 1     |                                                | TOKENS .1 |
| 002043 | T.LE     | BSS  | 1     |                                                | TOKENS .1 |
| 002044 | T.AMPER  | BSS  | 1     |                                                | TOKENS .1 |
| 002045 | T.EXCLAM | BSS  | 1     |                                                | TOKENS .1 |
| 002046 | T.QUEST  | BSS  | 1     |                                                | TOKENS .1 |
| 002047 | T.UARROW | BSS  | 1     |                                                | TOKENS .1 |
| 002050 | T.LARROW | BSS  | 1     |                                                | TOKENS .1 |
| 002051 | T.COLON  | BSS  | 1     |                                                | TOKENS .1 |
| 002052 | T.COMMA  | BSS  | 1     | .. ↑,↑ OUTSIDE OF A LIST                       | TOKENS .1 |
| 002053 | T.SEMI   | BSS  | 1     |                                                | TOKENS .1 |
| 002054 | T.QUAL   | BSS  | 1     |                                                | TOKENS .1 |
| 002055 | T.BLOCK  | BSS  | 1     |                                                | TOKENS .1 |
| 002056 | T.LP     | BSS  | 1     | .. STARTS A LITERAL LIST                       | TOKENS .1 |

002057  
 002060  
 002061  
 002062  
 002063  
 000052

T.PP BSS  
 T.PERCNT BSS  
 T.POINT BSS  
 T.UKNWN BSS  
 T.UKNWN BSS  
 ORG

1  
 1  
 1  
 1  
 1  
 PRETOK

.. ENDS A LITERAL LIST

TOKENS .1  
 TOKENS .1  
 TOKENS .1  
 TOKENS .1  
 TOKENS .1  
 TOKENS .1

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000052      STATE0 BSS 0
000052      B4STMT STATE
000052      ST2 T.ID,,SCAN2,L.ASTMT
000053      ST2 T.AREG,B4LARROW,IFLD1,50000B
000054      ST2 T.BREG,B4LARROW,IFLD1,60000B
000055      ST2 T.XREG,B4EQORLA,IFLD,0
000056      ST2 T.UARROW,B4META,NOP,0
000057      ST2 T.QUEST,B4CONDAS,NOP,0
000060      ST2 T.SEMI,B4STMT,NOP,0
000061      STEND
000062      B4LARROW STATE
000062      ST2 T.LARROW,B4SETOPR,CALLS0,B4SEMI
000063      STEND
*
000064      B4SETOPR STATE
000064      ST2 T.AREG,B4BORK,JFLD1,4000B
000065      ST2 T.BREG,B4ABXORK,SAVJORK,0
000066      ST2 T.XREG,B4BORK1,JFLD2,2000B
000067      ST2 T.NUM,B4OPRND,CALLEXP,RESUME1
000070      ST2 T.STR,B4OPRND,CALLEXP,RESUME1
000071      ST2 T.ID,B4OPRND,CALLEXP,RESUME1
000072      ST2 T.MINUS,AFTRMN,NOP,0
000073      ST2 T.PLUS,B4SETOPR,NOP,0
000074      ST2 T.LBRACK,B4OPRND,CALLEXP,RESUME1
000075      ST2 T.EQ,B4OPRND,CALLEXP,RESUME1
000076      ST2 T.QUEST,B4OPRND,CALLEXP,RESUME1
000077      STEND
*
000100      B4BORK STATE
000100      ST2 T.SEMI,0,SPIT1,0
000101      ST2 T.PLUS,B4BORKA,SAVE,0
000102      ST2 T.MINUS,B4BORKA,SAVE,1000B
000103      STEND SPIT2
*
000104      B4ABXORK STATE
000104      ST2 T.SEMI,0,JFLD3,0
000105      ST2 T.PLUS,B4ABXK1,NOP,0
000106      ST2 T.MINUS,B4BORKA,SAVE2,5000B
000107      STEND SPIT4
*
000110      B4BORK1 STATE
000110      ST2 T.SEMI,0,SPIT5,0
000111      ST2 T.PLUS,B4BORKA,SAVE5,1000B
000112      ST2 T.MINUS,B4OPRND,CALLEX6,SPIT12
000113      STEND SPIT5F
*
000114      AFTRMN STATE
000114      ST2 T.BREG,B4AORB,KFLD,0
000115      STEND CALLEX2
*
000116      B4BORKA STATE
000116      ST2 T.BREG,0,KFLD1,0
000117      ST2 T.NUM,B4OPRND,CALLEX7,SPIT3
000120      ST2 T.STR,B4OPRND,CALLEX7,SPIT3

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000121      ST2  T.ID,B4OPRND,CALLEX7,SPIT3
000122      ST2  T.LBRACK,B4OPRND,CALLEX7,SPIT3
000123      ST2  T.QUEST,B4OPRND,CALLEX7,SPIT3
000124      ST2  T.PLUS,B4OPRND,CALLEX7,SPIT3
000125      ST2  T.MINUS,B4OPRND,CALLEX7,SPIT3
000126      ST2  T.EQ,B4OPRND,CALLEX7,SPIT3
000127      STEND

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*
000130      B4ABYK1 STATE
000130      ST2  T.BREG,0,JKFLDS,6000B
000131      ST2  T.AREG,0,JKFLDS,4000B
000132      ST2  T.XREG,0,JKFLDS,3000B
000133      ST2  T.NUM,B4OPRND,CALLEX1,SPIT3
000134      ST2  T.STR,B4OPRND,CALLEX1,SPIT3
000135      ST2  T.ID,B4OPRND,CALLEX1,SPIT3
000136      ST2  T.LBRACK,B4OPRND,CALLEX1,SPIT3
000137      ST2  T.QUEST,B4OPRND,CALLEX1,SPIT3
000140      ST2  T.PLUS,B4OPRND,CALLEX1,SPIT3
000141      ST2  T.MINUS,B4OPRND,CALLEX1,SPIT3
000142      ST2  T.EQ,B4OPRND,CALLEX1,SPIT3
000143      STEND

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*
000144      OPTREG STATE
000144      ST2  T.SEMI,B4STMT,SPIT13,1000B
000145      ST2  T.PLUS,B4REG,NOP,
000146      STEND

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*
000147      B4REG STATE
000147      ST2  T.AREG,B4SEMI,JFLD6,0
000150      ST2  T.BREG,B4SEMI,JFLD6,1000B
000151      ST2  T.XREG,B4SEMI,JFLD6,2000B
000152      STEND

```

```

*
000153      B4OPRND STATE
000153      ST1  T.ID,B4OPRTR,STKID,OPRTR0,0      * SYMBOL
000154      ST1  T.NUM,B4OPRTR,STKNUM,OPRTR0,0      * NUMBER
000155      ST1  T.MINUS,B4OPRND,STKUN,MINUS,H.MINUS * UNARY -
000156      ST1  T.PLUS,B4OPRND,NOP,OPRTR0,0      * UNARY +
000157      ST1  T.EQ,B4OPRND,STKFUN,LIT,H.LIT      * LITERAL
000160      ST1  T.STAR,AFTRSTAR,NOP,OPRTR0,0      * COUNTER
000161      ST1  T.LBRACK,B4OPRND,STKUN,OPRTR0,H.LBRACK * [
000162      ST1  T.QUEST,B4OPRND,STKFUN,NOT,H.NOT * UNARY QUEST
000163      ST1  T.STR,AFTRSTR,SAVE4,OPRTR0,0      * STRING
000164      ST1  T.BREG,,ENDEX2,OPRTR0
000165      ST1  T.AREG,,ENDEX2,OPRTR0
000166      ST1  T.XREG,,ENDEX2,OPRTR0
000167      STEND E.MISSND * MISSING OPERAND

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*
000170      B4OPRTR STATE
000170      ST1  T.PLUS,B4OPRND,STKBIN,ADD,H.SUM * +
000171      ST1  T.MINUS,B4OPRND,STKBIN,SUB,H.SUM * -
000172      ST1  T.STAR,B4OPRND,STKBIN,MULT,H.TERM * *

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000173 ST1 T.SLASH,B4OPRND,STKBIN,DIV,H,TERM * /
000174 ST1 T.MOD,B4OPRND,STKBIN,MOD,H,TERM * DOUBLE BKSLSH
000175 ST1 T.RBRACK,B4OPRTR,RBRACK,OPRTR0,0 * ]
000176 ST1 T.EQ,B4OPRND,STKREL,Eq,H,RELAT * =
000177 ST1 T.NE,B4OPRND,STKREL,NE,H,RELAT * .NE.
000200 ST1 T.GT,B4OPRND,STKREL,GT,H,RELAT * .GT.
000201 ST1 T.GE,B4OPRND,STKREL,GE,H,RELAT * .GE.
000202 ST1 T.LT,B4OPRND,STKREL,LT,H,RELAT * .LT.
000203 ST1 T.LE,B4OPRND,STKREL,LE,H,RELAT * .LE.
000204 ST1 T.AMPER,B4OPRND,STKBIN,AND,H,AND
000205 ST1 T.EXCLAM,B4OPRND,STKBIN,OR,H,OR
000206 ST1 T.QUEST,B4OPRND,STKBIN,XOR,H,OR
000207 ST1 T.UARROW,B4OPRND,STKRTOL,EXP,H,EXP * ^
000210 STEND ENDEXPR

*
B4EQORLA STATE
000211 ST2 T.EQ,XREGINST,NOP,0
000211 ST2 T.LARROW,B4SETOPR,CALLS01,70000B
000212 STEND

*
XREGINST STATE
000214 ST2 T.ID,0,SCAN1,L,INSH3
000214 ST2 T.MINUS,B4BOOL,NOP,0
000215 ST2 T.BREG,INSHIFT,JFLD,0
000216 ST2 T.XREG,XREG1,SAVJORK,0
000217 ST2 T.NUM,B4SEMI,SPIT14,
000220 STEND

*
B4BOOL STATE
000222 ST2 T.XREG,B4AOX,KFLD,0
000222 STEND

*
INSHIFT STATE
000224 ST2 T.ID,0,SCAN1,L,INSH1
000224 STEND

*
XREG1 STATE
000226 ST2 T.AMPER,B4XK,OP2,11000B
000226 ST2 T.EXCLAM,B4XK,OP2,12000B
000227 ST2 T.QUEST,B4XK,OP2,13000B
000230 ST2 T.SEMI,B4STMT,OP1,10000B
000231 ST2 T.ID,0,SCAN1,L,INSH2
000232 ST2 T.PLUS,B4XK,OP2,36000B
000233 ST2 T.MINUS,B4XK,OP2,37000B
000234 ST2 T.FADD,B4XK,OP2,30000B
000235 ST2 T.FSUB,B4XK,OP2,31000B
000236 ST2 T.FMULT,B4XK,OP2,40000B
000237 ST2 T.FDIV,B4XK,OP2,44000B
000240 ST2 T.DADD,B4XK,OP2,32000B
000241 ST2 T.DSUB,B4XK,OP2,33000B
000242 ST2 T.DMULT,B4XK,OP2,42000B
000243 ST2 T.RADD,B4XK,OP2,34000B
000244 ST2 T.RSUB,B4XK,OP2,35000B
000245

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|        |           |       |                                |
|--------|-----------|-------|--------------------------------|
| 000246 |           | ST2   | T.RMULT,B4XK,OP2,41000B        |
| 000247 |           | ST2   | T.RDIV,B4XK,OP2,45000B         |
| 000250 |           | STEND |                                |
|        | *         |       |                                |
| 000251 | B4XK      | STATE |                                |
| 000251 |           | ST2   | T.XREG,B4SEMI,KFLD2,0          |
| 000252 |           | STEND |                                |
|        | *         |       |                                |
| 000253 | B4A0X     | STATE |                                |
| 000253 |           | ST2   | T.SEMI,B4STMT,OP3,14000B       |
| 000254 |           | ST2   | T.AMPER,B4XJ,OP,15000B         |
| 000255 |           | ST2   | T.EXCLAM,B4XJ,OP,16000B        |
| 000256 |           | ST2   | T.QUEST,B4XJ,OP,17000B         |
| 000257 |           | STEND |                                |
|        | *         |       |                                |
| 000260 | B4XJ      | STATE |                                |
| 000260 |           | ST2   | T.XREG,B4SEMI,JFLD5,0          |
| 000261 |           | STEND |                                |
|        | *         |       |                                |
| 000262 | B4XORK    | STATE |                                |
| 000262 |           | ST2   | T.XREG,B4SEMI,KFLD2,0          |
| 000263 |           | STEND | JKEXPR                         |
|        | *         |       |                                |
| 000264 | B4A0RB    | STATE |                                |
| 000264 |           | ST2   | T.SEMI,0,SPIT6,7000B           |
| 000265 |           | ST2   | T.PLUS,B4A0RB1,NOP,0           |
| 000266 |           | STEND | SPIT7                          |
|        | *         |       |                                |
| 000267 | B4A0RB1   | STATE |                                |
| 000267 |           | ST2   | T.BREG,0,JFLD4,7000B           |
| 000270 |           | ST2   | T.AREG,0,JFLD4,5000B           |
| 000271 |           | STEND |                                |
|        | *         |       |                                |
| 000272 | OPTIJK    | STATE |                                |
| 000272 |           | ST2   | T.SEMI,B4STMT,SPIT10,0         |
| 000273 |           | STEND | IJKEXPR                        |
|        | *         |       |                                |
| 000274 | OPTPIUS   | STATE |                                |
| 000274 |           | ST2   | T.PLUS,B4OPRND,CALLEX6,SPIT9   |
| 000275 |           | ST2   | T.MINUS,B4OPRND,CALLEX6,SPIT11 |
| 000276 |           | ST2   | T.SEMI,B4STMT,SPIT8,0          |
| 000277 |           | STEND |                                |
|        | *         |       |                                |
| 000300 | AFTIRSTAR | STATE |                                |
| 000300 |           | ST2   | T.ID,0,SCAN1,L.COUNTR          |
| 000301 |           | STEND | BACKUP                         |
|        | *         |       |                                |
| 000302 | AFTRSTR   | STATE |                                |
| 000302 |           | ST2   | T.ID,0,SCAN1,L.L               |
| 000303 |           | STEND | STKSTR1                        |
|        | *         |       |                                |
| 000304 | B4BJ      | STATE |                                |
| 000304 |           | ST2   | T.BREG,B4SEMI,JFLD5,0          |

|        |          |       |                                   |
|--------|----------|-------|-----------------------------------|
| 000305 |          | STEND |                                   |
|        | *        |       |                                   |
| 000306 | B4RK     | STATE |                                   |
| 000306 |          | ST2   | T.BREG,OPTPLUS,IJFLD,0            |
| 000307 |          | STEND | CALLEX8                           |
|        | *        |       |                                   |
| 000310 | OPTBREG  | STATE |                                   |
| 000310 |          | ST2   | T.SEMI,B4STMT,SPIT15,             |
| 000311 |          | ST2   | T.PLUS,B4BREG,NOP,0               |
| 000312 |          | STEND |                                   |
|        | *        |       |                                   |
| 000313 | B4BREG   | STATE |                                   |
| 000313 |          | ST2   | T.BREG,B4SEMI,IJFLD2,0            |
| 000314 |          | STEND |                                   |
|        | *        |       |                                   |
| 000315 | OPTEXPR  | STATE |                                   |
| 000315 |          | ST2   | T.SEMI,B4STMT,SPIT8,0             |
| 000316 |          | STEND | CALLEX5                           |
|        | *        |       |                                   |
| 000317 | B4META   | STATE |                                   |
|        | *        |       |                                   |
| 000317 | B4CONDAS | STATE |                                   |
|        | *        |       |                                   |
| 000317 | B4THEN   | STATE |                                   |
| 000317 |          | ST2   | T.ID,,SCAN1,L.THEN                |
| 000320 |          | STEND |                                   |
|        | *        |       |                                   |
| 000321 | B4ELSE   | STATE |                                   |
| 000321 |          | ST2   | T.ID,,SCAN1,L.ELSE                |
| 000322 |          | STEND | ELSE0                             |
|        | *        |       |                                   |
| 000323 | INDO     | STATE |                                   |
| 000323 |          | ST2   | T.BREG,B4LARW2,IFLD2,60000B       |
| 000324 |          | ST2   | T.XREG,B4LARW2,IFLD2,70000B       |
| 000325 |          | ST2   | T.AREG,B4LARW2,IFLD2,50000B       |
| 000326 |          | ST2   | T.ID,,SCAN1,L.WHILE               |
| 000327 |          | ST2   | T.SEMI,B4STMT,NOP,                |
| 000330 |          | STEND |                                   |
|        | *        |       |                                   |
| 000331 | B4LARW2  | STATE |                                   |
| 000331 |          | ST2   | T.LARROW,B4SETOPR,CALLS02         |
| 000332 |          | STEND |                                   |
|        | *        |       |                                   |
| 000333 | B4COND   | STATE |                                   |
| 000333 |          | ST2   | T.XREG,B4RELX,J2FLD,              |
| 000334 |          | ST2   | T.BREG,B4RELB,SAVIORJ             |
| 000335 |          | ST2   | T.NUM,B4RELZ,TEST0                |
| 000336 |          | ST2   | T.ID,,SCAN1,L.XRTEST              |
| 000337 |          | STEND |                                   |
|        | *        |       |                                   |
| 000340 | B4RELX   | STATE |                                   |
| 000340 |          | ST2   | T.LT,B4ZER,02P,C.GT .. X<0 -> 0>X |
| 000341 |          | ST2   | T.EQ,B4ZER,02P,C.EQ               |

```

000342          ST2  T.NE,B4ZER,02P,C.NE
000343          ST2  T.GE,B4ZER,02P,C.LE  .. X>=0 -> 0<=X
000344          STEND

*
000345          B4RELB STATE
000345          ST2  T.LT,B4BORZ,02P2,C.LT
000346          ST2  T.LE,B4BORZ,02P3,C.LE  .. MUST REVERSE I, J FIELDS
000347          ST2  T.EQ,B4BORZ,02P2,C.EQ
000350          ST2  T.NE,B4BORZ,02P2,C.NE
000351          ST2  T.GE,B4BORZ,02P2,C.GE
000352          ST2  T.GT,B4BORZ,02P3,C.GT  .. MUST REVERSE I, J FIELDS

*
000353          B4RELZ STATE
000353          ST2  T.LT,B4XORB,02P4,C.LT
000354          ST2  T.LE,B4XORB,02P4,C.LE
000355          ST2  T.EQ,B4XORB,02P4,C.EQ
000356          ST2  T.NE,B4XORB,02P4,C.NE
000357          ST2  T.GE,B4XORB,02P4,C.GE
000360          ST2  T.GT,B4XORB,02P4,C.GT
000361          STEND

*
000362          B4ZER  STATE
000362          ST2  T.NUM,B4THEN,ENDCOND1,
000363          STEND

*
000364          B4BORZ STATE
000364          ST2  T.BREG,B4THEN,IJ2FLD,
000365          ST2  T.NUM,B4THEN,ENDCOND1,
000366          STEND

*
000367          B4XORB STATE
000367          ST2  T.BREG,B4THEN,IJ2FLD2,
000370          ST2  T.XREG,B4THEN,J2FLD2,
000371          STEND

*
000372          B4XREG STATE
000372          ST2  T.XREG,B4THEN,J2FLD2,
000373          STEND

*
000374          B4RY  STATE
000374          ST2  T.ID,SCAN1,L.BY
000375          ST2  T.SEMI,B4STMT,ZROINC

*
000376          B4RINC STATE
000376          ST2  T.MINUS,AFTERMIN2,NOP,
000377          ST2  T.BREG,OPTWHIL,SAVINCK,6000B
000400          ST2  T.AREG,OPTWHIL,SAVINCK,4000B
000401          ST2  T.XREG,OPTWHIL,SAVINCK,3000B
000402          STEND CALLEX10

*
000403          AFTERMIN2 STATE
000403          ST2  T.BREG,OPTWHIL,SAVINCK,7000B
000404          STEND CALLEX9

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*
000405      R4XINC  STATE
000405      ST2     T.BREG,OPTWHIL,SAVINCK,3000B
000406      STEND   CALLEX11

*
000407      R4AINC  STATE
000407      ST2     T.MINUS,AFTRMING,NOP,
000410      ST2     T.BREG,OPTWHIL,SAVINCK,4000B
000411      STEND   CALLEX13

*
000412      AFTRMING STATE
000412      ST2     T.BREG,OPTWHIL,SAVINCK,5000B
000413      STEND   CALLEX12

*
000414      OPTWHIL STATE
000414      ST2     T.ID,SCAN1,L.WHILE
000415      ST2     T.SEMI,B4STMT,NOP,
000416      STEND

*
000417      B4STR   STATE
000417      ST2     T.STR,B4SEMI,SPITSTR,0
000420      STEND

*
000421      B4SEMI  STATE
000421      ST2     T.SEMI,B4STMT,NOP,0
000422      STEND   E.NOSEMI

*
000423      L.ASTMT  KEYSTATE
000423      ST3     (I,F),B4COND,CALLCOND,SMLLOOP
000425      ST3     (P,S),OPTEXPR,OP8,00000B
000427      ST3     (N,O),OPTIJK,OP4,46000B
000431      ST3     (R,J),B4OPRND,CALLEX4,01000B
000433      ST3     (R,E),B4BK,OP5,01100B
000435      ST3     (W,E),B4BK,OP5,01200B
000437      ST3     (X,J),B4BK,OP9,01300B
000441      ST3     (J,P),B4BK,OP6,02000B
000443      ST3     (S,T,R,I,N,G),B4STR,SAVE,0
000445      ST3     (L,I,N,E),B4STR,SAVE,11B
000447      ST3     (D,O),INDO,STKDO,5
000451      ST3     (R,P,T),INDO,STKDO,3
000453      ST3     (E,N,D,O),B4SEMI,ENDO,
000455      KYEND

*
000456      L.INSH1  KEYSTATE
000456      ST3     (L,C,Y),B4XK,OP,22000B
000460      ST3     (R,S,H),B4XK,OP,23000B
000462      ST3     (N,O,R,M),B4XK,OP,24000B
000464      ST3     (R,N,O,R,M),B4XK,OP,25000B
000466      ST3     (U,N,P,A,C,K),B4XK,OP,26000B
000470      ST3     (P,A,C,K),B4XK,OP,27000B
000472      KYEND

*
000473      L.INSH3  KEYSTATE

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```

000473      ST3      (L,C,Y),B4XORK,OP,22000B
000475      ST3      (R,C,Y),,JKEXPR2,20000B
000477      ST3      (M,A,S,K),,JKEXPR1,43000B
000501      ST3      (H,O,L,E),,JKEXPR2,43000B
000503      ST3      (R,S,H),B4XORK,OP,23000B
000505      ST3      (N,O,R,M),B4XK,OP,24000B
000507      ST3      (R,N,O,R,M),B4XK,OP,25000B
000511      ST3      (U,N,P,A,C,K),B4XK,OP,26000B
000513      ST3      (P,A,C,K),B4XK,OP,27000B
000515      ST3      (C,O,I),N,T),B4XK,OP,47000B
000517      KYEND

*
000520      L.COUNTR KEYSTATE
000520      ST3      (L),B4OPRTR,STKOL,STARLP
000522      ST3      (O),B4OPRTR,STKOL,STAROP
000524      ST3      (P),B4OPRTR,STKP,0
000526      KYEND E.MISSTR

*
000527      L.L      KEYSTATE
000527      ST3      (L),B4OPRTR,STKSTR,0
000531      KYEND E.MISSTR

*
000532      L.INSH2 KEYSTATE
000532      ST3      (L,C,Y),B4BJ,OP7,22000B
000534      ST3      (R,S,H),B4BJ,OP7,23000B
000536      ST3      (N,O,R,M),B4BJ,OP7,24000B
000540      ST3      (R,N,O,R,M),B4BJ,OP7,25000B
000542      ST3      (U,N,P,A,C,K),B4BJ,OP7,26000B
000544      ST3      (P,A,C,K),B4BJ,OP7,27000B
000546      KYEND

*
000547      L.THEN KEYSTATE
000547      ST3      (G,O,T,O),B4OPRND,CALLEX6,SPIT9
000551      ST3      (T,H,E,N),B4STMT,STKIF,
000553      KYEND

*
000554      L.ELSE KEYSTATE
000554      ST3      (E,L,S,E),B4STMT,ELSE1
000556      KYEND

*
000557      L.WHILE KEYSTATE
000557      ST3      (W,H,I,L,E),B4COND,CALLCOND2,
000561      KYEND

*
000562      L.XRTEST KEYSTATE
000562      ST3      (F,I,N,I,T,E),B4XREG,02P4,C,IR
000564      ST3      (I,N,F,I,N,I,T,E),B4XREG,02P4,C,OR
000566      ST3      (D,E,F,I,N,I,T,E),B4XREG,02P4,C,DF
000570      ST3      (I,N,D,E,F),B4XREG,02P4,C,ID
000572      KYEND

*
000573      L.BY KEYSTATE
000573      ST3      (B,Y),B4BINC,RESUME3,

```

000575

000577

000600

000601

000602

000602

000603

000604

000605

000606

000607

000610

000611

\*

C.LE

C.ST

C.REV

C.LT

C.EQ

C.NE

C.GE

\*

C.IR

C.OR

C.DF

C.ID

\*

ST3  
KYEND

(W,H,T,L,E),B4COND,CALLCND2,

CTAB 07,06,033,032 .. LT, GE, NG, PL

CTAB 06,07,032,033 .. GE, LT, PL, NG

BSS 0

CTAB 06,07, .. GE, LT, -, -

CTAB 05,04,031,030 .. NE, EQ, NZ, ZR

CTAB 04,05,030,031 .. EQ, NE, ZR, NZ

CTAB 07,06, .. LT, GE, -, -

CTAB \*,035,034 .. OR, IR

CTAB \*,034,035 .. IR, OR

CTAB \*,037,036 .. ID, DF

CTAB \*,036,037 .. DF, ID

|        |              |          |        |                |                              |
|--------|--------------|----------|--------|----------------|------------------------------|
| 000612 | 602077777    | POPBOX   | SB2    | A0-B4STMT      |                              |
|        | 0520000037 + |          | NZ     | B2,E.EXTRA     | .. JUNK ON END               |
| 000613 | 5120000000 X |          | SA2    | SD,IFD0        |                              |
|        | 5212777776   |          | SA1    | X2-1           |                              |
| 000614 | 20103        |          | LX1    | 3              |                              |
|        | 0321000000 X |          | PL     | X1,TOKENIZ     | .. NO PENDING ELSE ACTION    |
|        | 76710        |          | SX7    | B1             | .. =1                        |
| 000615 | 37727        |          | IX7    | X2-X7          |                              |
|        | 54720        |          | SA7    | A2             | .. POP ENTRY                 |
|        | 43001        |          | MX0    | 1              |                              |
|        | 15710        |          | BX7    | -X0*X7         | .. CLEAR ELSE FLAG           |
| 000616 | 20771        |          | LX7    | 60-3           |                              |
|        | 5110000000 X |          | SA1    | STARL          |                              |
|        | 12707        |          | BX7    | X0+X7          | .. DIRECT BIT FOR FILL ENTRY |
| 000617 | 20144        |          | LX1    | 18+18          |                              |
|        | 12717        |          | BX7    | X1+X7          |                              |
|        | 6170000000 X |          | SB7    | TOKENIZ        |                              |
| 000620 | 0200001002 + |          | JP     | SPFILL         | .. OUTPUT FILL ENTRY         |
| 000621 |              | *        |        |                |                              |
| 000621 |              | ACTION0  | BSS    | 0              |                              |
| 000621 |              | NOP      | ACTION |                |                              |
| 000621 | 5055000001   | SML00P   | SA5    | A5+1           | * NEXT TOKEN                 |
|        | 0305000012 + |          | ZR     | A5,POPBOX      | * END OF A TOKEN BOX         |
| 000622 | 26225        | SML00P1  | UX2    | B2,X5          | * TOKEN TYPE TO B2           |
|        | 5010000052 + |          | SA1    | A0+STATE0      | * FIRST WORD FOR THIS STATE  |
|        | 26631        |          | UX6    | B3,X1          |                              |
| 000623 | 0423000626 + | FTL00P   | EQ     | B2,B3,NAVSTATE |                              |
|        | 54111        |          | SA1    | A1+B1          | * TRY NEXT TOKEN-WORD        |
|        | 26631        |          | UX6    | B3,X1          |                              |
| 000624 | 0530000623 + |          | NZ     | B3,FTL00P      |                              |
|        | 63360        |          | SB3    | X6             |                              |
| 000625 | 0430000024 + |          | ZR     | B3,E.SYN1      | * SYNTAX ERROR               |
|        | 0230000000   |          | JP     | B3             |                              |
| 000626 | 20614        | *        |        |                |                              |
|        | 26626        | NAVSTATE | LX6    | 12             |                              |
|        | 56020        |          | UX6    | B2,X6          |                              |
|        | 20614        |          | SA0    | B2             | * NEW STATE                  |
| 000627 | 26626        |          | LX6    | 12             |                              |
|        | 0220000421 + |          | UX6    | B2,X6          |                              |
|        |              |          | JP     | B2+ACTION0     |                              |
| 000630 | 73510        | *        |        |                |                              |
|        | 73020        | SCAN2A   | SX5    | X1             | .. SAVE LIST ADDRESS         |
|        | 73630        |          | SX0    | X2             | .. SAVE IDENTIFIER POINTER   |
|        | 54630        |          | SX6    | X3             |                              |
|        |              |          | SA6    | A3             |                              |
| 000631 |              |          | LIST   | G              |                              |
| 000631 | 6170000632 + |          | CALL   | FORCE          |                              |
|        | 0200000000 X |          | S,*XX# | *+1            | CALLI .1                     |
|        |              |          | JP     | FORCE          | CALLI .1                     |
|        |              |          | LIST   | -G             |                              |
| 000632 | 73150        |          | SX1    | X5             | .. UNSAVE LIST               |
|        | 73200        |          | SX2    | X0             | .. UNSAVE IDENTIFIER         |
|        | 0200000634 + |          | JP     | SCAN1          |                              |

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000633          000633 5130000000 X
                                0333000630 +
                                *
                                * SCAN2 MUST DO SCAN1
                                *
000634          000634 5130000000 X
                                21344
                                36223
000635 5222000002
                                5217000000
000636 13312
                                0303000642 +
000637 5011000002
                                0307000027 +
000640 0321000636 +
                                63210
000641 0220000000
                                *
000642 54111
                                26121
                                56020
                                63210
000643 21136
                                0220000000
                                *
                                STKNUM ACTION
                                SB5 B5+2 * STACK INTEGER OR FLOATING NUMBER
                                GE B5,B6,SF4 * INCREMENT STACK POINTER
                                SA5 A5+B1 * STACK IS FULL
                                BX6 X5 * VALUE OF NUMBER
                                SA6 B5
                                BX6 X6-X5
                                SA6 B5-B1 * BLOCK IS ABSOLUTE
                                JP SKLOOP
                                *
                                BACKUP ACTION
                                SA5 A5-B1
                                SA0 B4OPRTR
                                SX1 STARLP
                                *
                                * BACKUP MUST DO STKOL...
                                *
                                STKOL ACTION
                                SB5 B5+2 * STACK *L: *0
                                GE B5,B6,SF5 * STACK IS FULL
                                SA1 X1+CNTERS
                                SA2 STARB * CURRENT BLOCK
                                BX6 X1
                                BX7 X2
                                SA6 B5

```

.. UPPER TWO BITS ARE THE FORCE FLAG  
.. FORCE UPPER

.. RCD OF IDENTIFIER

\* SYNTAX ERROR

.. RETREIVE NEXT STATE

.. ACTION

\* INCREMENT STACK POINTER  
\* STACK IS FULL  
\* VALUE OF NUMBER

\* BLOCK IS ABSOLUTE

\* STACK \*L: \*0

\* STACK IS FULL

\* CURRENT BLOCK



|        |              |       |           |                 |                             |
|--------|--------------|-------|-----------|-----------------|-----------------------------|
| 000654 | 0200000621 + | 57751 | SA7<br>JP | B5-B1<br>SMLoop |                             |
| 000655 | 5110000000 X |       | * STKP    | ACTION          | * STACK *P                  |
|        | 63210        |       | SA1       | CWDESCR         |                             |
| 000656 | 0220000657 + |       | SB2       | X1              | * STATE                     |
| 000657 | 5110000000 X |       | JP        | B2+STKP0        |                             |
|        | 0200000664 + | STKP0 | SA1       | STARP           |                             |
| 000660 | 7110000074   |       | JP        | STKP1           |                             |
|        | 0200000664 + | +     | SX1       | 60              |                             |
| 000661 | 7110000055   |       | JP        | STKP1           |                             |
|        | 0200000664 + | +     | SX1       | 45              |                             |
| 000662 | 7110000036   |       | JP        | STKP1           |                             |
|        | 0200000664 + | +     | SX1       | 30              |                             |
| 000663 | 7110000017   |       | JP        | STKP1           |                             |
| 000664 | 6155000002   |       | SX1       | 15              |                             |
|        | 0656000046 + | STKP1 | SB5       | B5+2            |                             |
| 000665 | 73610        |       | GE        | B5,B6,SF6       |                             |
|        | 56650        |       | SX6       | X1              |                             |
|        | 13666        |       | SA6       | B5              |                             |
|        | 57651        |       | SX6       | X6-X6           |                             |
| 000666 | 0200000621 + |       | SA6       | B5-B1           | * BLOCK IS ABSOLUTE         |
|        |              |       | JP        | SMLoop          |                             |
| 000667 | 6155000002   |       | STRID     | ACTION          |                             |
|        | 0656000050 + |       | SB5       | B5+2            | .. INCREMENT STACK POINTER  |
| 000670 | 5110000000 X |       | GE        | B5,B6,SF8       |                             |
|        | 21144        |       | SA1       | SD.SYMT         |                             |
|        | 63211        |       | AX1       | 36              |                             |
| 000671 | 53152        |       | SB2       | X1+B1           | .. BASE OF SYMT + 1         |
|        | 73610        |       | SA1       | B2+X5           | .. GET SECOND WORD OF ENTRY |
|        | 56650        |       | SX6       | X1              |                             |
|        | 21122        |       | SA6       | B5              | .. STACK OFFSET             |
| 000672 | 43761        |       | AX1       | 18              |                             |
|        | 15717        |       | MX7       | 60-11           |                             |
|        | 20157        |       | SX7       | -X7*X1          |                             |
|        | 43601        |       | LX1       | 18+29           | .. BLOCK SIGN TO TOP        |
| 000673 | 11161        |       | MX6       | 1               |                             |
|        | 12771        |       | BX1       | X6*X1           |                             |
|        | 5175777776   |       | BX7       | X7*X1           |                             |
| 000674 | 0200000621 + |       | SA7       | B5-1            | .. STORE BLOCK WORD         |
|        |              |       | JP        | SMLoop          |                             |
| 000675 | 5110000000 X |       | INITEXPR  | SA1             | SD.EXPR                     |
|        | 6257777776   |       | SB5       | X1-1            | * TOP                       |
| 000676 | 21122        |       | AX1       | 18              |                             |
|        | 63610        |       | SB6       | X1              | * END                       |
|        | 0200000621 + |       | JP        | SMLoop          |                             |
| 000677 | 5110000000 X |       | INITEX2   | SA1             | SD.EXPR                     |
|        | 6257777776   |       | SB5       | X1-1            | * TOP                       |
| 000700 | 21122        |       | AX1       | 18              |                             |
|        | 63610        |       | SB6       | X1              | * END                       |

```

0200000622 +
000701 66551 0656000041 + 20630
000702 56650 0200000621 +

000703 66551 0656000042 + 20630
000704 63260 57151 63310
000705 0723000025 + 56650
000706 0200000621 +

000707 20630 63360
000710 511577775 63210 26141
000711 0632000713 + 6120000710 +
000712 0240001415 +
000713 66551 0656000043 + 56650
000714 0200000621 +

000715 20630 63360
000716 511577775 63210 26141
000717 0723000713 + 6120000716 +
000720 0240001415 +

000721 20004 10600 0200000725 +
000722 5100000116 55551
000723 7244777767

```

JP SML00P1 \* RE-EXAMINE LAST TOKEN

\* STKUN ACTION \* STACK I OR UNARY =

SB5 B5+B1 \* INCREMENT STACK PTR

GE B5,B6,SF1 \* STACK IS FULL

LX6 12+12 \* LEFT JUSTIFY ACTION

SA6 B5

JP SML00P

\* STKFUN ACTION \* STACK UNAY QUEXT AND =

SB5 B5+B1

GE B5,B6,SF2 \* STACK IS FULL

LX6 12+12 \* RIGHT JUSTIFY PRORITY

SB2 X6

SA1 B5-B1

SB3 X1 \* PRIORITY(TOP(STACK))

GT B3,B2,E.SYN2

SA6 B5

JP SML00P

\* STKRTOL ACTION \* STACK + AND :

LX6 12+12

SB3 X6 \* PRIOR(NEWOP)

SA1 B5-2 \* PR(TOP(STACK))

SB2 X1

UX1 B4,X1

LE B2,B3,STKRTOL2 \* NOW STACK NEWOP

SB2 STKRTOL1

JP B4+OPRTRO \* APPLY OPERATOR

STKRTOL2 SB5 B5+B1

GE B5,B6,SF3 \* STACK IS FULL

SA6 B5

JP SML00P

\* STKREL ACTION \* STACK RELATIONAL AND BKSLSH

LX6 12+12

SB3 X6 \* RIGHT ADJUST PRIORITY

SA1 B5-2 \* PR(NEWOP)

SB2 X1 \* PR(TOP())

UX1 B4,X1

LT B2,B3,STKRTOL2 \* STACK NEWOP

SB2 STKREL1

JP B4+OPRTRO \* APPLY TOP()

\* STKSTR ACTION

LX0 4 \* LEFT JUSTIFY STRING

BX6 X0

JP STKSTR2 \* PUT ON STACK

\* STKSTR1 ESCAPE

SA0 B4OPRTRO

SA5 A5-B1

SX4 X4-8 \* (NO. OF CHARS) - 8

|        |              |          |        |                |                                             |
|--------|--------------|----------|--------|----------------|---------------------------------------------|
|        | 10344        |          | BX3    | X4             |                                             |
|        | 20303        |          | LX3    | 3              |                                             |
| 000724 | 37334        |          | IX3    | X3-X4          | * ((NO. OF CHARS)-8)*7                      |
|        | 63230        |          | SB2    | X3             |                                             |
|        | 22620        |          | LX6    | B2,X0          | * RIGHT JUSTIFY CHARACTERS                  |
| 000725 | 6155000002   | STKSTR2  | SB5    | B5+2           |                                             |
|        | 0656000047 + |          | GE     | B5,B6,SF7      | * STACK IS FULL                             |
| 000726 | 5165000000   |          | SA6    | B5+0           |                                             |
|        | 13666        |          | BX6    | X6-X6          |                                             |
|        | 57651        |          | SA6    | B5-B1          |                                             |
| 000727 | 0200000621 + |          | JP     | SMLOOP         |                                             |
|        |              |          |        |                |                                             |
|        |              | RBRACK   | ACTION |                | * PROCESS RIGHT BRACKET                     |
| 000730 | 6130000003   |          | SB3    | H.RBRACK       |                                             |
| 000731 | 5115777775   | RBRACK1  | SA1    | B5-2           |                                             |
|        | 63210        |          | SB2    | X1             | * PR(TOP())                                 |
|        | 26141        |          | UX1    | B4,X1          |                                             |
| 000732 | 0723000734 + |          | LT     | B2,B3,RBRACK2  | * DOWN TO [ OR +BEGIN+                      |
|        | 6120000731 + |          | SB2    | RBRACK1        |                                             |
| 000733 | 0240001415 + |          | JP     | B4+OPRTR0      | * APPLY TOP()                               |
| 000734 | 6122777776   | RBRACK2  | SB2    | B2-H.LBRACK    |                                             |
|        | 0520000022 + |          | NZ     | B2,E.RBR       | * ERROR: UNBALANCED ]                       |
| 000735 | 57151        |          | SA1    | B5-B1          | * BLOCK NO., ETC.                           |
|        | 56250        |          | SA2    | B5             | * VALUE                                     |
|        | 43022        |          | MX0    | 18             |                                             |
|        | 20044        |          | LX0    | 18+18          |                                             |
| 000736 | 15610        |          | BX6    | -X0*X1         | * LENGTH ATTRIBUTE = 60-60                  |
|        | 10722        |          | BX7    | X2             |                                             |
|        | 67551        |          | SB5    | B5-B1          |                                             |
|        | 57651        |          | SA6    | B5-B1          |                                             |
| 000737 | 56750        |          | SA7    | B5             |                                             |
|        | 0200000621 + |          | JP     | SMLOOP         |                                             |
|        |              |          |        |                |                                             |
|        |              | ENDEX2   | ACTION |                |                                             |
| 000740 | 6155777776   |          | SB5    | B5-1           | .. SKIP OPERATOR (HOPEFULLY A PLUS)         |
|        | 3055777776   |          | SA5    | A5-1           | .. SKIP OVER ONE TOKEN (ENDEXPR ALSO WILL)  |
|        |              |          |        |                |                                             |
|        |              |          |        |                | * ENDEX2 MUST DO ENDEXPR...                 |
|        |              |          |        |                |                                             |
|        |              | ENDEXPR  | ESCAPE |                |                                             |
| 000741 | 5055777776   |          | SA5    | A5-1           | * BACK UP SO LAST TOKEN WILL BE REPROCESSED |
|        | 6130000002   |          | SB3    | H.END          |                                             |
| 000742 | 5115777775   | ENDEXPR1 | SA1    | B5-2           |                                             |
|        | 63210        |          | SB2    | X1             | * PR(TOP())                                 |
|        | 26141        |          | UX1    | B4,X1          |                                             |
| 000743 | 0723000745 + |          | LT     | B2,B3,ENDEXPR2 | * DOWN TO +BEGIN+ OF [                      |
|        | 6120000742 + |          | SB2    | ENDEXPR1       |                                             |
| 000744 | 0240001415 + |          | JP     | B4+OPRTR0      | * APPLY TOP()                               |
| 000745 | 6122777777   | ENDEXPR2 | SB2    | B2-H.BEGIN     |                                             |
|        | 0520000015 + |          | NZ     | B2,E.LBR       | * ERROR: UNBALANCED [                       |
| 000746 | 5110000000 X |          | SA1    | R.EXPR         |                                             |
|        | 63210        |          | SB2    | X1             |                                             |
| 000747 | 0220000000   |          | JP     | B2             | * RETURN                                    |

|         |              | * STKBIN | ACTION            | * STACK + - * / MOD AND OR XOR                    |
|---------|--------------|----------|-------------------|---------------------------------------------------|
| 000750  | 20630        |          | LX6 12+12         |                                                   |
|         | 63360        |          | SB3 X6            | * PR(NEWOP)                                       |
| 000751  | 511577775    | STKBIN1  | SA1 B5-2          |                                                   |
|         | 63210        |          | SB2 X1            | * PR(TOP())                                       |
|         | 26141        |          | UX1 B4,X1         |                                                   |
| 000752  | 0723000713 + |          | LT B2,B3,STKRTOL2 | * STACK NEWOP                                     |
|         | 6120000751 + |          | SB2 STKBIN1       |                                                   |
| 000753  | 0240001415 + |          | JP B4+OPPTR0      | * APPLY TOP()                                     |
| * STKDO |              |          |                   |                                                   |
| 000754  | 5120000000 X |          | SA2 SD.IFDO       | .. STACK DESCRIPTOR                               |
|         | 63221        |          | SB2 X2+B1         | .. DO/RPT ENTRY WILL REQUIRE 2 INCREMENTS         |
|         | 21222        |          | AX2 18            | .. RIGHT JUSTIFY END POINTER                      |
| 000755  | 63320        |          | SB3 X2            |                                                   |
|         | 0623000050 + |          | GE B2,B3,SF8      | .. NEW TOP>END -> STACK IS FULL                   |
|         | 20222        |          | LX2 18            |                                                   |
| 000756  | 76321        |          | SX3 B2+B1         | .. [TOP+1]+1                                      |
|         | 12723        |          | BX7 X2+X3         | .. UPDATED STACK DESCRIPTOR                       |
|         | 54720        |          | SA7 A2            |                                                   |
|         | 10611        |          | BX6 X1            | .. STATE WORD PARAMETER IS DO/RPT FLAG BITS       |
| 000757  | 20665        |          | LX6 60-4-3        |                                                   |
|         | 57621        |          | SA6 B2-B1         | .. STORE ON TOP OF STACK                          |
|         | 0200000621 + |          | JP SML00P         |                                                   |
| * ENDO  |              |          |                   |                                                   |
| 000760  | 5120000000 X |          | SA2 SD.IFDO       |                                                   |
|         | 5232777776   |          | SA3 X2-1          |                                                   |
| 000761  | 73730        |          | SX7 X3            | .. LOWER 18 BITS OF INCREMENT INSTRUCTION FIELD   |
|         | 20306        |          | LX3 6             | .. LEFT JUSTIFY (DO OR RPT) FLAG BITS             |
|         | 0323000040 + |          | PL X3,E.ENDO      | .. ERROR - UNBALANCED ENDO                        |
| 000762  | 20330        |          | LX3 60-30-6       | .. LEFT JUSTIFY HIGH ORDER BIT OF INCREMENT FIELD |
|         | 6170000747 + |          | SB7 ENDOX         | .. RETURN FROM SP15: SP30                         |
|         | 73730        |          | SX7 X3            |                                                   |
| 000763  | 0323000766 + |          | PL X3,END015      | .. SA,SB,SX INSTRUCTIONS ALL HAVE HIGH BIT SET    |
|         | 5110000000 X |          | SA1 SD.EXPR       |                                                   |
| 000764  | 53711        |          | SA7 X1+B1         | .. INCREMENT EXPR : VALUE                         |
|         | 13666        |          | BX6 X6-X6         |                                                   |
|         | 53610        |          | SA6 X1            | : BLOCK = ABSOLUTE                                |
|         | 21717        |          | AX7 15            | .. POSITION THE INSTRUCTION AS SP30 EXPECTS       |
| 000765  | 0200000000 X |          | JP SP30           |                                                   |
| 000766  | 0317000000 X | END015   | NZ X7,SP15        | .. X7 CONTAINS A 15 BIT INSTRUCTION               |
| 000767  | 5110000000 X | END0X    | SA1 SD.IFDO       |                                                   |
|         | 5227777775   |          | SA2 X1-2          |                                                   |
| 000770  | 76711        |          | SX7 B1+B1         | .. =2                                             |
|         | 37717        |          | IX7 X1-X7         | .. DECREMENT STACK POINTER                        |
|         | 54710        |          | SA7 A1            |                                                   |
|         | 73720        |          | SX7 X2            |                                                   |
| 000771  | 0302000621 + |          | ZR X2,SM100P      | .. NO LOOPING INSTRUCTION                         |
|         | 5130000000 X |          | SA3 SD.EXPR       |                                                   |
| 000772  | 53731        |          | SA7 X3+B1         | .. EXP: : VALUE                                   |
|         | 20222        |          | LX2 18            |                                                   |

|        |              |                                                                       |             |                                                      |
|--------|--------------|-----------------------------------------------------------------------|-------------|------------------------------------------------------|
|        | 73720        | SX7                                                                   | X2          |                                                      |
|        | 53730        | SA7                                                                   | X3          | .. : BLOCK                                           |
| 000773 | 20233        | LX2                                                                   | 27          |                                                      |
|        | 73720        | SX7                                                                   | X2          | .. INSTRUCTION                                       |
|        | 6170000021 + | SB7                                                                   | SML00P      |                                                      |
| 000774 | 55121        | SA1                                                                   | A2-B1       |                                                      |
|        | 20104        | LX1                                                                   | 4           | .. LEFT JUSTIFY DO-FLAG BIT                          |
|        | 0321000000 X | PL                                                                    | X1,SP30     | .. THIS IS A REPEAT LOOP                             |
| 000775 | 6170000776 + | SB7                                                                   | END0Y       | .. FOR DO LOOPS, MUST FORCE UPPER AND FILL TEST JUMP |
|        | 0200000000 X | JP                                                                    | SP30        |                                                      |
| 000776 | 6170000777 + | SB7                                                                   | END0Z       |                                                      |
|        | 0200000000 X | JP                                                                    | FORCE       | .. FORCE UPPER                                       |
| 000777 | 43702        | MX7                                                                   | 2           |                                                      |
|        | 5110000000 X | SA1                                                                   | SD.IFDO     |                                                      |
|        | 53110        | SA1                                                                   | X1          | .. GET LOOPING INSTRUCTION FOR FIXUP ADDR, BLOCK     |
| 001000 | 20122        | LX1                                                                   | 18          |                                                      |
|        | 43030        | MX0                                                                   | 60-2*18     |                                                      |
|        | 5120000000 X | SA2                                                                   | STARO       | .. FIXUP AMOUNT                                      |
| 001001 | 15610        | BX6                                                                   | -X0*X1      | .. CLEAR FIJ OF INSTRUCTION                          |
|        | 20244        | LX2                                                                   | 18+18       |                                                      |
|        | 12626        | BX6                                                                   | X2+X6       |                                                      |
|        | 12776        | BX7                                                                   | X7+X6       | .. COMPLETE FILL ENTRY                               |
|        |              | *                                                                     |             |                                                      |
|        |              | * ENDOZ MUST DO SPFILL                                                |             |                                                      |
|        |              | *                                                                     |             |                                                      |
| 001002 | 5110000000 X | SPFILL SA1                                                            | OD.FIL      |                                                      |
|        | 53210        | SA2                                                                   | X1          |                                                      |
|        | 76610        | SX6                                                                   | B1          |                                                      |
| 001003 | 0352000003 + | OR                                                                    | X2-EF4      | .. BUFFER IS FULL                                    |
|        | 53710        | SA7                                                                   | X1          |                                                      |
|        | 36716        | IX7                                                                   | X1+X6       | .. INCREMENT BUFFER POINTER                          |
| 001004 | 54710        | SA7                                                                   | A1          |                                                      |
|        | 0270000000   | JP                                                                    | B7          |                                                      |
|        |              | *                                                                     |             |                                                      |
|        |              | STKIF ACTION                                                          |             |                                                      |
| 001005 | 21717        | AX7                                                                   | 15          | .. SELECT COMPLEMENT OF GIVEN CONDITION              |
|        | 6170001010 + | SB7                                                                   | STKIFx      |                                                      |
|        | 13666        | BX6                                                                   | X6-X6       |                                                      |
| 001006 | 5110000000 X | SA1                                                                   | SD.EXPR     |                                                      |
|        | 53611        | SA6                                                                   | X1+B1       | .. ZERO EXPR : VALUE                                 |
|        | 53610        | SA6                                                                   | X1          | .. AND : BLOCK                                       |
| 001007 | 0200000000 X | JP                                                                    | SP30        |                                                      |
| 001010 | 5110000000 X | STKIFX SA1                                                            | CWDESCR     |                                                      |
|        | 63210        | SB2                                                                   | X1          | .. STATE OF CURRENT WORD                             |
|        | 76710        | SX7                                                                   | B1          | .. =1                                                |
| 001011 | 5120000000 X | SA2                                                                   | STARO       | .. *0                                                |
|        | 0220001011 + | JP                                                                    | B2+STRIFY-1 |                                                      |
|        |              | *                                                                     |             |                                                      |
|        |              | * THE ADDRESS AND POSITION OF THE CONDITIONAL JUMP JUST ISSUED MAY BE |             |                                                      |
|        |              | * DETERMINED BY THE NEW *0 AND STATE.                                 |             |                                                      |
|        |              | *                                                                     |             |                                                      |
| 001012 | 37227        | STKIFY IX2                                                            | X2-X7       | .. STATE=1, ADDR=NEW *0-1                            |
|        | 13777        | BX7                                                                   | X7-X7       | .. LOWER FLAG=0B57                                   |

|        |                      |        |        |             |                                                    |
|--------|----------------------|--------|--------|-------------|----------------------------------------------------|
| 001013 | 00000000000000000000 | +      | JP     | STKIF7      |                                                    |
| 001014 | 20772                | +      | DATA   | 0           | .. STATE=2, NO WAY                                 |
|        | 0200001016 +         |        | LX7    | 60-2        | .. STATE=3, UPPER FLAG=2B57                        |
| 001015 | 20771                | +      | JP     | STKIF7      |                                                    |
| 001016 | 5130000000 X         | STKIFZ | LX7    | 60-3        | .. STATE=4, MIDDLE FLAG=1B57                       |
|        | 20222                |        | SA3    | STAR8       | .. BLOCK FOR FIXUP                                 |
|        | 12772                |        | LX2    | 18          | .. ADDRESS                                         |
| 001017 | 12773                |        | BX7    | X7+X2       |                                                    |
|        | 43601                |        | BX7    | X7+X3       |                                                    |
|        | 5110000000 X         |        | MX6    | 1           | .. AFTER THEN FLAG (WILL BECOME DIRECT FLAG LATER) |
| 001020 | 12767                |        | SA1    | SD.IFDO     |                                                    |
|        | 63210                |        | BX7    | X6+X7       |                                                    |
|        | 21122                |        | SB2    | X1          |                                                    |
|        | 63310                |        | AX1    | 18          |                                                    |
| 001021 | 0623000051 +         |        | SB3    | X1          |                                                    |
|        | 20122                |        | GE     | B2,B3,SF9   | .. IF-DO STACK IS FULL                             |
|        | 76321                |        | LX1    | 18          |                                                    |
| 001022 | 12613                |        | SX3    | B2+B1       |                                                    |
|        | 54610                |        | BX6    | X1+X3       |                                                    |
|        | 56720                |        | SA6    | A1          | .. UPDATED STACK POINTER                           |
| 001023 | 0200000621 +         |        | SA7    | B2          |                                                    |
|        |                      |        | JP     | SML00P      |                                                    |
|        |                      | *      |        |             |                                                    |
|        |                      | ELSE0  | ESCAPE |             |                                                    |
| 001024 | 5100000000           |        | SA0    | B4STMT      |                                                    |
|        | 6170001026 +         |        | SB7    | ELSE0A      |                                                    |
| 001025 | 0200000000 X         |        | JP     | FORCE       |                                                    |
| 001026 | 5110000000 X         | ELSE0A | SA1    | SD.IFDO     |                                                    |
|        | 5221777776           |        | SA2    | X1-1        |                                                    |
| 001027 | 76710                |        | SX7    | B1          | .. =1                                              |
|        | 37717                |        | IX7    | X1-X7       | .. DECREMENT STACK POINTER                         |
|        | 54710                |        | SA7    | A1          |                                                    |
| 001030 | 5110000000 X         |        | SA1    | STARL       |                                                    |
|        | 20144                |        | LX1    | 18+18       |                                                    |
|        | 12721                |        | BX7    | X2+X1       |                                                    |
| 001031 | 6170000621 +         |        | SB7    | SML00P      |                                                    |
|        | 0200001002 +         |        | JP     | SPFILL      |                                                    |
|        |                      | *      |        |             |                                                    |
|        |                      | ELSE1  | ACTION |             |                                                    |
| 001032 | 7170004000           |        | SX7    | 040008      | .. IF B0=B0                                        |
|        | 5110000000 X         |        | SA1    | SD.EXPR     |                                                    |
| 001033 | 13666                |        | BX6    | X6-X6       |                                                    |
|        | 53610                |        | SA6    | X1          |                                                    |
|        | 5261000001           |        | SA6    | X1+1        |                                                    |
| 001034 | 6170001035 +         |        | SB7    | ELSE1A      |                                                    |
|        | 0200000000 X         |        | JP     | SP30        |                                                    |
| 001035 | 5110000000 X         | ELSE1A | SA1    | CWDESCR     |                                                    |
|        | 63210                |        | SB2    | X1          |                                                    |
|        | 76710                |        | SX7    | B1          | .. =1                                              |
| 001036 | 5120000000 X         |        | SA2    | STAR0       | .. *0 = ORIGIN COUNTER                             |
|        | 0220001036 +         |        | JP     | B2+ELSE1B-1 |                                                    |
| 001037 | 37227                | ELSE1B | IX2    | X2-X7       | .. STATE=1, ADDR=NEW *0-1                          |
|        | 13777                |        | BX7    | X7-X7       | .. LOWER FLAG = 0B57                               |

```

0200001043 +
001040 0000000000 +
001041 20772 +
0200001043 +
001042 20771 +
001043 5130000000 X ELSEIC
20222
12773
001044 12772
43601
20671
12776
001045 5110000000 X
5211777776
001046 54710
10511
6170001050 +
001047 0200000000 X
001050 5120000000 X ELSEID
20244
12752
001051 6170000621 +
0200001002 +
*
001052 OP
001052 12771
0200000621 +
*
001053 OP1
20003
12770
12771
001054 6170000621 +
0200000000 X
*
001055 OP2
001055 12771
20003
12770
001056 0200000621 +
*
001057 OP3
12771
6170000621 +
001060 0200000000 X
*
001061 OP4
73710
0200000621 +
*
001062 OP5
5120000000 X
20201

```

```

JP ELSEIC
PS
LX7 60-2
JP ELSEIC
LX7 60-3
SA3 STARB
LX2 18
BX7 X7+X3
BX7 X7+X2
MX6 1
LX6 60-3
BX7 X7+X6
SA1 SD.IFNO
SA1 X1-1
SA7 A1
BX5 X1
SB7 ELSEID
JP FORCE
SA2 STARB
LX2 18+18
BX7 X5+X2
SB7 SML00P
JP SPFILL

```

```

.. STATE=2, NO WAY
.. STATE=3, UPPER FLAG=2B57
.. STATE=4, MIDDLE FLAG=1B57
.. BLCOK FOR FILL ENTRY
.. ADDRESS

```

.. AFTER ELSE FLAG

.. OLD STACK ENTRY  
.. NEW

.. SAVE FILL SKELETON DURING CALL TO FORCE

.. ADD FIXUP AMOUNT TO SAVED FILL ENTRY

\* POSITION SAVED J-REGISTER

\* OP CODE  
\* SAVED J-REGISTER

```

ACTION
BX7 X7+X1
JP SML00P

```

```

ACTION
LX0 3
BX7 X7+X0
BX7 X7+X1
SB7 SML00P
JP SP15

```

```

ACTION
BX7 X7+X1
LX0 3
BX7 X7+X0
JP SML00P

```

```

ACTION
BX7 X7+X1
SB7 SML00P
JP SP15

```

```

ACTION
SX7 X1
JP SML00P

```

```

ACTION
SA2 STARB
LX2 1

```

|        |              |      |        |         |                                    |
|--------|--------------|------|--------|---------|------------------------------------|
| 001063 | 0322001065 + |      | PL     | X2,OP5A | .. FORCE UPPER                     |
|        | 73710        |      | SX7    | X1      | * OPCODE                           |
| 001064 | 6140000003   |      | SB4    | 3       | * LSHIFT 3 FOR J-REGISTER          |
|        | 0200000621 + |      | JP     | SML00P  |                                    |
| 001065 | 73510        | OP5A | SX5    | X1      | .. SAVE OPCODE                     |
|        |              |      | CALL   | FORCE   | .. FORCE UPPER                     |
| 001067 | 73750        |      | SX7    | X5      | .. UNSAVE OPCODE                   |
|        | 6140000003   |      | SB4    | 3       | .. LSH 3 FOR J-REGISTER            |
| 001070 | 0200000621 + |      | JP     | SML00P  |                                    |
|        |              | *    |        |         |                                    |
|        |              | OP6  | ACTION |         |                                    |
| 001071 | 73710        |      | SX7    | X1      |                                    |
|        | 5110000000 X |      | SA1    | STARP   | MX6 1                              |
|        | 73110        |      | SX1    | X1      | .. DELETE OLD FORCE FLAG           |
| 001072 | 12661        |      | BX6    | X6+X1   | .. FORCE FLAG := +YES+             |
|        | 5061000000   |      | SA6    | A1+0    |                                    |
| 001073 | 6140000006   |      | SB4    | 3+3     | * LSHIFT 6 FOR I-REGISTER          |
|        | 0200000621 + |      | JP     | SML00P  |                                    |
|        |              | *    |        |         |                                    |
| 001074 |              | OP7  | ACTION |         |                                    |
| 001074 | 12770        |      | BX7    | X7+X0   |                                    |
|        | 12771        |      | BX7    | X7+X1   | * OPCODE                           |
|        | 0200000621 + |      | JP     | SML00P  |                                    |
|        |              | *    |        |         |                                    |
| 001075 |              | OP8  | ACTION |         |                                    |
| 001075 | 10511        |      | BX5    | X1      | .. SAVE OPCODE                     |
|        | 5110000000 X |      | SA1    | STARP   |                                    |
|        | 73610        |      | SX6    | X1      |                                    |
| 001076 | 43201        |      | MX2    | 1       | .. FORCE FLAG := +YES+             |
|        | 12626        |      | BX6    | X2+X6   |                                    |
|        | 54610        |      | SA6    | A1      |                                    |
|        | 20101        |      | LX1    | 1       |                                    |
| 001077 | 0331001101 + |      | NG     | X1,OP8A | .. FORCE FLAG = +NO+, DO NOT FORCE |
|        |              |      | CALL   | FORCE   |                                    |
| 001101 | 73750        | OP8A | SX7    | X5      | .. UNSAVE THE OPCODE               |
|        | 0200000621 + |      | JP     | SML00P  |                                    |
|        |              | *    |        |         |                                    |
|        |              | OP9  | ACTION |         |                                    |
| 001102 | 10511        |      | BX5    | X1      | .. SAVE THE OPCODE                 |
|        | 5110000000 X |      | SA1    | STARP   |                                    |
|        | 73610        |      | SX6    | X1      |                                    |
| 001103 | 43201        |      | MX2    | 1       | .. FORCE FLAG := +YES+             |
|        | 12626        |      | BX6    | X2+X6   |                                    |
|        | 54610        |      | SA6    | A1      |                                    |
|        | 20101        |      | LX1    | 1       |                                    |
| 001104 | 0331001106 + |      | NG     | X1,OP9A | .. FORCE FLAG = +NO+               |
|        |              |      | CALL   | FORCE   |                                    |
| 001106 | 73750        | OP9A | SX7    | X5      | .. UNSAVE THE OPCODE               |
|        | 6140000003   |      | SB4    | 3       | .. LSH 3 FOR J-REGISTER            |
| 001107 | 0200000621 + |      | JP     | SML00P  |                                    |
|        |              | *    |        |         |                                    |
|        |              | IFLD | ACTION |         |                                    |
| 001110 | 20206        |      | LX2    | 3+3     |                                    |



|        |              |        |             |                                           |
|--------|--------------|--------|-------------|-------------------------------------------|
| 10722  | 0200001112 + | Bx7    | X2          | * POSITION I-REGISTER ALONE IN X7         |
|        |              | JP     | IFLD1A      |                                           |
| 001111 |              |        |             |                                           |
| 001111 | 20206        | ACTION |             |                                           |
|        | 12712        | LX2    | 3+3         | * POSITION I-REGISTER NUMBER              |
| 001112 | 5110000000 X | BX7    | X1+X2       | * COMBINE WITH OPCODE                     |
|        | 0321000621 + | SA1    | STARP       |                                           |
| 001113 | 73570        | PL     | X1,SMLOOP   | .. DO NOT FORCE UPPER                     |
|        | 73610        | SX5    | X7          | .. SAVE INSTRUCTION                       |
|        | 54610        | SX6    | X1          | .. CLEAR FORCE FLAG                       |
|        |              | SA6    | A1          |                                           |
| 001115 | 73750        | CALL   | FORCE       |                                           |
|        | 0200000621 + | SX7    | X5          |                                           |
|        |              | JP     | SMLOOP      |                                           |
| 001116 | 20206        |        |             |                                           |
|        | 12712        | ACTION |             |                                           |
|        | 5110000000 X | LX2    | 3+3         | .. POSITION I-FIELD                       |
| 001117 | 5211777776   | BX7    | X1+X2       | .. COMBINE OPCODE, I-FIELD                |
|        | 73770        | SA1    | SD-IFD0     | .. STACK DESCRIPTOR FOR IF-DO STACK       |
|        | 12771        | SA1    | X1-1        |                                           |
| 001120 | 54710        | SX7    | X7          |                                           |
|        | 0200000621 + | BX7    | X7+X1       |                                           |
|        |              | SA7    | A1          | .. SAVE SKELETON OF INCREMENT INSTRUCTION |
|        |              | JP     | SMLOOP      |                                           |
| 001121 | 22242        |        |             |                                           |
|        | 12772        | ACTION |             |                                           |
|        | 0200000621 + | LX2    | B4,X2       | * POSITION I OR J REGISTER                |
|        |              | BX7    | X7+X2       |                                           |
|        |              | JP     | SMLOOP      |                                           |
| 001122 |              |        |             |                                           |
| 001122 | 22242        |        |             |                                           |
|        | 12772        | ACTION |             |                                           |
|        | 6170000621 + | LX2    | B4,X2       | .. POSITION I OR J REGISTER               |
| 001123 | 0200000000 X | BX7    | X7+X2       | .. COMBINE WITH INSTRUCTION               |
|        |              | SB7    | SMLOOP      |                                           |
|        |              | JP     | SP30        |                                           |
| 001124 | 22242        |        |             |                                           |
|        | 12772        | ACTION |             |                                           |
|        | 20217        | LX2    | B4,X2       | .. POSITION J OR I REGISTER               |
|        | 12772        | BX7    | X7+X2       |                                           |
| 001125 | 5110000000 X | LX2    | 15          |                                           |
|        | 63710        | BX7    | X7+X2       |                                           |
| 001126 | 0270000000   | SA1    | R.COND      |                                           |
|        |              | SB7    | X1          |                                           |
|        |              | JP     | B7          | .. RETURN FROM CONDITION RECOGNIZER       |
| 001127 | 6024777175 - |        |             |                                           |
|        | 5110000000 X | ACTION |             |                                           |
| 001130 | 63710        | SB2    | A4-C.REV    |                                           |
|        | 0620001131 + | SA1    | R.COND      |                                           |
|        | 20203        | SB7    | X1          |                                           |
| 001131 | 20203        | PL     | B2,IJ2FLD2A | .. FOR ,= AND >, MUST SWITCH I, J FIELDS  |
|        | 21436        | LX2    | 3           |                                           |
|        | 12742        | LX2    | 3           | .. RIGHT JUSTIFY B-REG JUMPS              |
|        |              | AX4    | 30          |                                           |
|        |              | BX7    | X4+X2       |                                           |

|        |              |         |              |                                |
|--------|--------------|---------|--------------|--------------------------------|
| 001132 | 12772        | 20217   | LX2 15       |                                |
|        | 0270000000   |         | BX7 X7+X2    |                                |
|        |              |         | JP B7        | .. RETURN FROM COND RECOGNIZER |
| 001133 | 20203        | * JFLD  | ACTION       |                                |
|        | 12772        |         | LX2 3        | * POSITION J-REGISTER NUMBER   |
|        | 0200000621 + |         | BX7 X7+X2    | * COMBINE WITH OP CODE         |
|        |              |         | JP SML00P    |                                |
| 001134 | 20203        | * JFLD1 | ACTION       |                                |
|        | 12772        |         | LX2 3        |                                |
|        | 73410        |         | BX7 X7+X2    | * J-REGISTER                   |
| 001135 | 0200000621 + |         | SX4 X1       | * SAVE SUB-OPCODE              |
|        |              |         | JP SML00P    |                                |
| 001136 | 20203        | * JFLD2 | ACTION       |                                |
|        | 12772        |         | LX2 3        |                                |
|        | 12771        |         | BX7 X7+X2    | * J-REGISTER                   |
| 001137 | 0200000621 + |         | BX7 X7+X1    | * SUB-OPCODE                   |
|        |              |         | JP SML00P    |                                |
| 001140 | 20003        | * JFLD3 | ACTION       |                                |
|        | 12770        |         | LX0 3        | * SAVED J-REGISTER             |
|        | 7277006000   |         | BX7 X7+X0    |                                |
| 001141 | 6170001355 + |         | SX7 X7+6000B | * SUB-OPCODE FOR BJ+BK         |
|        | 0200000000 X |         | SB7 SPIT1A   |                                |
|        |              |         | JP SP15      |                                |
| 001142 | 20203        | * JFLD4 | ACTION       |                                |
|        | 12772        |         | LX2 3        | * J-REGISTER                   |
|        | 12771        |         | BX7 X7+X2    |                                |
| 001143 | 6170001357 + |         | BX7 X7+X1    | * SUB-OPCODE                   |
|        | 0200000000 X |         | SB7 SPIT1B   |                                |
|        |              |         | JP SP15      |                                |
| 001144 | 20203        | * JFLD5 | ACTION       |                                |
|        | 12772        |         | LX2 3        | * J-REGISTER                   |
|        | 6170000621 + |         | BX7 X7+X2    |                                |
| 001145 | 0200000000 X |         | SB7 SML00P   |                                |
|        |              |         | JP SP15      |                                |
| 001146 | 12771        | * JFLD6 | ACTION       |                                |
|        | 20203        |         | BX7 X7+X1    |                                |
|        | 12772        |         | LX2 3        | .. J-REGISTER                  |
| 001147 | 6170000621 + |         | BX7 X7+X2    |                                |
|        | 0200000000 X |         | SB7 SML00P   |                                |
|        |              |         | JP SP30      |                                |
| 001150 | 20203        | J2FLD   | ACTION       |                                |
|        | 10722        |         | LX2 3        | .. POSITION J-REGISTER NUMBER  |
|        | 20217        |         | BX7 X2       | .. FOR NORMAL AND              |
|        | 12727        |         | LX2 15       |                                |
| 001151 | 0200000621 + |         | BX7 X2+X7    | .. COMPLEMENTED INSTRUCTIONS   |
|        |              |         | JP SML00P    |                                |

|        |                                         |             |                                                                                                                                       |                                                                              |
|--------|-----------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 001152 | 63240                                   | *<br>J2FLN2 | ACTION<br>SB2 X4<br>ZR B2.E.SYN6<br>LX2 3<br>BX7 X4+X2<br>LX2 15<br>SAL R.COND<br>BX7 X7+X2<br>MX0 30<br>BX7 X0+X7<br>SB7 X1<br>JP B7 | .. LOWER 18 BITS OF OPCODES<br>.. ILLEGAL RELATION<br>.. POSITION J-FLD      |
|        | 0420000031 +<br>20203                   |             |                                                                                                                                       |                                                                              |
| 001153 | 12742                                   |             |                                                                                                                                       |                                                                              |
|        | 20217                                   |             |                                                                                                                                       |                                                                              |
| 001154 | 12772                                   |             |                                                                                                                                       |                                                                              |
|        | 5110000000 X<br>43036<br>15770<br>63710 |             |                                                                                                                                       |                                                                              |
| 001155 | 0270000000                              |             |                                                                                                                                       | .. RETURN FROM COND RECOGNIZER                                               |
| 001156 | 53110                                   | *<br>02P    | ACTION<br>SAL X1<br>BX7 X1+X7<br>JP SML00P                                                                                            | .. PICK UP OPCODES (REGULAR AND COMPLEMENTED)<br>.. COMBINE WITH J-REGISTERS |
|        | 12717<br>0200000621 +                   |             |                                                                                                                                       |                                                                              |
| 001157 | 53110                                   | *<br>02P2   | ACTION<br>SAL X1<br>AX1 30<br>LX0 3+3<br>BX7 X1+X0<br>LX0 15<br>BX7 X7+X0<br>SB4 3<br>JP SML00P                                       | .. OPCODES<br>.. RIGHT JUSTIFY B-REG JUMPS<br>.. POSITION SAVED I-FLD        |
|        | 21136<br>20006<br>12710                 |             |                                                                                                                                       |                                                                              |
| 001160 | 20017                                   |             |                                                                                                                                       |                                                                              |
|        | 12770<br>6140000003                     |             |                                                                                                                                       | .. NEXT B-REG WILL BE J-FLD                                                  |
| 001161 | 0200000621 +                            |             |                                                                                                                                       |                                                                              |
| 001162 | 53110                                   | *<br>02P3   | ACTION<br>SAL X1<br>AX1 30<br>LX0 3<br>BX7 X1+X0<br>LX0 15<br>BX7 X7+X0<br>SB4 6<br>JP SML00P                                         | .. OPCODES<br>.. B-REG JUMPS<br>.. POSITION SAVED J-REGISTER                 |
|        | 21136<br>20003<br>12710                 |             |                                                                                                                                       |                                                                              |
| 001163 | 20017                                   |             |                                                                                                                                       |                                                                              |
|        | 12770<br>6140000006                     |             |                                                                                                                                       | .. NEXT B-REG WILL BE I-FLD                                                  |
| 001164 | 0200000621 +                            |             |                                                                                                                                       |                                                                              |
| 001165 | 53410                                   | *<br>02P4   | ACTION<br>SAL X1<br>JP SML00P                                                                                                         | .. PICK UP OPCODE TABLE WORD                                                 |
|        | 0200000621 +                            |             |                                                                                                                                       |                                                                              |
| 001166 | 12772                                   | *<br>KFLD   | ACTION<br>BX7 X7+X2<br>JP SML00P                                                                                                      | * K-REGISTER                                                                 |
|        | 0200000621 +                            |             |                                                                                                                                       |                                                                              |
| 001167 | 12772                                   | *<br>KFLD1  | ACTION<br>BX7 X7+X2<br>IX7 X7+X4<br>IX7 X7+X0<br>SB7 SPIT1R                                                                           | * K-REGISTER<br>* ADD SUB-OPCODE<br>* SUB-SUB-OPCODE                         |
|        | 36774<br>36770                          |             |                                                                                                                                       |                                                                              |
| 001170 | 6170001357 +                            |             |                                                                                                                                       |                                                                              |

|        |              |           |                  |                                                  |
|--------|--------------|-----------|------------------|--------------------------------------------------|
|        | 0200000000 X | JP        | SP15             | * ISSUE INSTRUCTION                              |
| 001171 |              | * KFLD2   | ACTION           |                                                  |
| 001171 | 12772        |           | Bx7 X7+X2        |                                                  |
|        | 6170000621 + |           | SB7 SML00P       |                                                  |
| 001172 | 0200000000 X |           | JP SP15          |                                                  |
|        |              | * SAVE    | ACTION           |                                                  |
| 001173 | 73010        |           | SX0 X1           | * SAVE STATE-WORD PARAM                          |
|        | 0200000621 + |           | JP SML00P        |                                                  |
|        |              | * SAVE1   | ACTION           |                                                  |
| 001174 | 10011        |           | Bx0 X1           | * SAVE SUB-SUB-OPCODE                            |
|        | 7140005000   |           | SX4 5000B        | * SUB-OPCODE FOR BREG+, -BREG                    |
| 001175 | 7277001000   |           | SX7 X7+1000B     |                                                  |
|        | 0200000621 + |           | JP SML00P        |                                                  |
|        |              | * SAVE2   | ACTION           |                                                  |
| 001176 | 20003        |           | LX0 3            | * POSITION J-REGISTER                            |
|        | 12770        |           | Bx7 X7+X0        |                                                  |
|        | 7100001000   |           | SX0 1000B        |                                                  |
| 001177 | 36770        |           | IX7 X7+X0        |                                                  |
|        | 73410        |           | SX4 X1           | * SUB-SUB-OPCODE                                 |
|        | 0200000621 + |           | JP SML00P        |                                                  |
|        |              | * SAVJORK | ACTION           |                                                  |
| 001200 |              |           | EQU SAVJORK      |                                                  |
|        | 0001200 +    |           | EQU SAVJORK      |                                                  |
|        | 0001200 +    |           | EQU SAVJORK      |                                                  |
| 001200 | 73020        |           | SX0 X2           | * SAVE VALUE OF TOKEN WORD                       |
|        | 0200000621 + |           | JP SML00P        |                                                  |
|        |              | * SAVE4   | ACTION           |                                                  |
| 001201 | 6222777766   |           | SB2 X2-9         | * STRING IN EXPR MUST BE SHORTER THAN 9 CHARS    |
|        | 0620000016 + |           | PL B2,E, LINGSTR |                                                  |
| 001202 | 73420        |           | SX4 X2           | * SAVE NUMBER OF CHARACTERS                      |
|        | 54551        |           | SA5 A5+B1        | * CHARACTERS OF STRING                           |
|        | 10055        |           | BX0 X5           | * SAVE THEM                                      |
| 001203 | 0200000621 + |           | JP SML00P        |                                                  |
|        |              | * SAVE5   | ACTION           |                                                  |
| 001204 | 13000        |           | BX0 X0-X0        |                                                  |
|        | 73410        |           | SX4 X1           |                                                  |
|        | 0200000621 + |           | JP SML00P        |                                                  |
|        |              | * SAVINC  | ACTION           |                                                  |
| 001205 | 43052        |           | MX0 60-18        |                                                  |
|        | 11701        |           | BX7 X0*X1        | .. CLEAR RETURN ADDRESS, LEAVE SAVED INSTRUCTION |
|        | 56150        |           | SA1 B5           | .. EXPR : VALUE                                  |
|        | 57251        |           | SA2 B5-B1        | .. : BLOCK                                       |
| 001206 | 0312000006 + |           | NZ X2,E,ABS4     | .. MUST BE ABSOLUTE EXPR                         |
|        | 15210        |           | BX2 -X0*X1       | .. TRUNCATE TO 18 BITS                           |
|        | 21122        |           | Ax1 18           |                                                  |
| 001207 | 0311000034 + |           | NZ X1,E,TRUNC5   | .. X1 SHOULD BE ALL SIGN BITS                    |

|        |              |              |                   |           |                                         |
|--------|--------------|--------------|-------------------|-----------|-----------------------------------------|
| 001210 | 12772        | 5110000000 X | SA1               | SD.IF00   |                                         |
|        |              | 5211777776   | BX7               | X7+X2     |                                         |
|        |              | 11101        | SA1               | X1-1      |                                         |
| 001211 | 12717        |              | BX1               | X0*X1     | .. CLEAR SKELETON                       |
|        |              | 54710        | BX7               | X1+X7     | .. ADD COMPLETE INSTRUCTION             |
|        |              | 0200000621 + | SA7               | A1        |                                         |
|        |              |              | JP                | SML00P    |                                         |
| 001212 |              |              |                   |           |                                         |
| 001212 | 12710        |              | * SAVINCU ACTION  |           |                                         |
|        |              | 20203        | BX7               | X1+X0     | .. SAVED REGISTER IS BK=BI              |
|        |              | 5110000000 X | LX2               | 3         |                                         |
| 001213 | 12772        |              | SA1               | SD.IF00   |                                         |
|        |              | 5211777776   | BX7               | X7+X2     | .. J-REGISTER                           |
|        |              | 73770        | SA1               | X1-1      |                                         |
| 001214 | 12717        |              | SX7               | X7        |                                         |
|        |              | 54710        | BX7               | X1+X7     |                                         |
|        |              | 0200000621 + | SA7               | A1        |                                         |
|        |              |              | JP                | SML00P    |                                         |
| 001215 |              |              |                   |           |                                         |
| 001215 | 12712        |              | * SAVINCK ACTION  |           |                                         |
|        |              | 20003        | BX7               | X1+X2     | .. K-REGISTER                           |
|        |              | 5110000000 X | LX0               | 3         |                                         |
| 001216 | 12770        |              | SA1               | SD.IF00   |                                         |
|        |              | 5211777776   | BX7               | X7+X0     | .. SAVED REGISTER IS J-FLD              |
|        |              | 73770        | SA1               | X1-1      |                                         |
| 001217 | 12717        |              | SX7               | X7        |                                         |
|        |              | 54710        | BX7               | X1+X7     |                                         |
|        |              | 0200000621 + | SA7               | A1        |                                         |
|        |              |              | JP                | SML00P    |                                         |
| 001220 |              |              |                   |           |                                         |
| 001220 | 54551        |              | * TESTA ACTION    |           |                                         |
|        |              | 0315000030 + | SA5               | A5+B1     | .. GET VALUE WORD OF NUMBER TOKEN       |
| 001221 | 0200000621 + |              | NZ                | X5,E.SYN5 | .. MUST BE 0                            |
|        |              |              | JP                | SML00P    |                                         |
| 001222 | 54551        |              |                   |           |                                         |
|        |              | 0315000030 + | * ENDCONDI ACTION |           |                                         |
|        |              | 43036        | SA5               | A5+B1     |                                         |
| 001223 | 15770        |              | NZ                | X5,E.SYN5 |                                         |
|        |              | 5110000000 X | MX0               | 30        |                                         |
|        |              | 63710        | BX7               | -X0*X7    |                                         |
| 001224 | 0270000000   |              | SA1               | R.CON0    |                                         |
|        |              |              | SB7               | X1        |                                         |
|        |              |              | JP                | B7        | .. RETURN                               |
| 001225 | 5110000000 X |              |                   |           |                                         |
|        |              | 5211777776   | * ZROINC ACTION   |           |                                         |
| 001226 | 43011        |              | SA1               | SD.IF00   |                                         |
|        |              | 20017        | SA1               | X1-1      |                                         |
|        |              | 15710        | MX0               | 9         |                                         |
|        |              | 54710        | LX0               | 9+3+3     |                                         |
| 001227 | 0200000621 + |              | BX7               | -X0*X1    | .. CLEAR SKELETON INCREMENT INSTRUCTION |
|        |              |              | SA7               | A1        |                                         |
|        |              |              | JP                | SML00P    |                                         |

|                                    |              |                 |        |                                               |
|------------------------------------|--------------|-----------------|--------|-----------------------------------------------|
| 001230                             | 73610        | CALLCOND ACTION | SX6 X1 |                                               |
|                                    | 5160000000 X | SA6 R.COND      |        | .. RETURN ACTION FOR CONDITION RECOGNIZER     |
| 001231                             | 0200000621 + | JP SMLoop       |        |                                               |
| * CALLCND2 ACTION                  |              |                 |        |                                               |
| 001232                             | 7170001340 + | SX7 RESUME4     |        | .. RETURN ACTION                              |
|                                    | 5170000000 X | SA7 R.COND      |        |                                               |
| 001233                             | 0200000621 + | JP SMLoop       |        |                                               |
| * CALLSO ACTION                    |              |                 |        |                                               |
| 001234                             | 73610        | SX6 X1          |        | * RETURN-STATE                                |
|                                    | 5160000000 X | SA6 R.SO        |        |                                               |
| 001235                             | 0200000621 + | JP SMLoop       |        | * ENTER SET OPERAND STATES                    |
| * CALLSO1 ACTION                   |              |                 |        |                                               |
| 001236                             | 12771        | BX7 X7+X1       |        | * OPCODE                                      |
|                                    | 7160000347   | SX6 B4SEM1      |        | * RETURN STATE                                |
| 001237                             | 5160000000 X | SA6 R.SO        |        |                                               |
|                                    | 0200000621 + | JP SMLoop       |        |                                               |
| * CALLSO2 ACTION                   |              |                 |        |                                               |
| 001240                             | 7160000322   | SX6 B4BY        |        |                                               |
|                                    | 5160000000 X | SA6 R.SO        |        | .. RETURN STATE FOR SET-RIGHT-PART RECOGNIZER |
| 001241                             | 0200000621 + | JP SMLoop       |        |                                               |
| * CALLEX2 ESCAPE                   |              |                 |        |                                               |
| 001242                             | 7110001326 + | SX1 RESUME1     |        | * RETURN ACTION                               |
|                                    | 5100000101   | SA0 B4OPRND     |        |                                               |
| 001243                             | 5055777776   | SA5 A5-1        |        | .. BACK UP OVER MINUS SIGN                    |
|                                    | 7277001000   | SX7 X7+1000B    |        | .. SUB-OPCODE FOR B*K                         |
| * CALLEX2 MUST ALSO DO CALLEXPR... |              |                 |        |                                               |
| CALLEXPR ACTION                    |              |                 |        |                                               |
| 001244                             | 73770        | SX7 X7          |        | * INSTRUCTION SO FAR                          |
|                                    | 20722        | LX7 18          |        |                                               |
|                                    | 73610        | SX6 X1          |        | * RETURN ACTION                               |
|                                    | 12667        | BX6 X6+X7       |        |                                               |
| 001245                             | 5160000000 X | SA6 R.EXPR      |        |                                               |
|                                    | 0200000677 + | JP INITEX2      |        |                                               |
| * CALLEX1 ACTION                   |              |                 |        |                                               |
| 001246                             | 7277001000   | SX7 X7+1000B    |        | * SUB-OPCODE FOR BU*K                         |
|                                    | 20003        | LX0 3           |        | * POSITION SAVED J-REGISTER                   |
|                                    | 12770        | BX7 X7+X0       |        |                                               |
| 001247                             | 20722        | LX7 18          |        |                                               |
|                                    | 73610        | SX6 X1          |        | * RETURN-ACTION                               |
|                                    | 12667        | BX6 X6+X7       |        |                                               |
| 001250                             | 5160000000 X | SA6 R.EXPR      |        |                                               |
|                                    | 0200000677 + | JP INITEX2      |        |                                               |
| * CALLEX3 ACTION                   |              |                 |        |                                               |
| 001251                             | 73110        | SX1 X1          |        | * RETURN-ACTION                               |
|                                    | 20022        | LX0 18          |        | * LEFT OPERAND OF EQUATE                      |

|        |              |              |                            |             |                                               |
|--------|--------------|--------------|----------------------------|-------------|-----------------------------------------------|
| 001252 | 5160000000 X | 12601        | BX6                        | X0+X1       |                                               |
|        |              | 0200000675 + | SA0                        | R.EXPR      |                                               |
| 001253 | 20122        |              | JP                         | INITEXPR    |                                               |
|        |              | 7160001374 + | ACTION                     |             |                                               |
| 001254 | 5160000000 X | 12661        | LX1                        | 18          |                                               |
|        |              | 5110000000 X | SX6                        | SPIT9       |                                               |
| 001255 | 73610        |              | BX6                        | X6+X1       |                                               |
|        |              | 43101        | SA0                        | R.EXPR      | .. GET FORCE FLAG                             |
|        |              | 12616        | SA1                        | STARP       |                                               |
| 001256 | 0200000675 + | 54610        | SX6                        | X1          |                                               |
|        |              |              | MX1                        | 1           |                                               |
|        |              |              | BX6                        | X1+X6       | .. FORCE FLAG := +YES+                        |
|        |              |              | SA0                        | A1          |                                               |
|        |              |              | JP                         | INITEXPR    |                                               |
| 001257 | 5100000101   |              | * CALLEX5                  | ESCAPE      |                                               |
|        |              | 73770        | SA0                        | B4OPRND     |                                               |
|        |              | 20722        | SX7                        | X7          |                                               |
| 001260 | 7160001374 + |              | LX7                        | 18          |                                               |
|        |              | 12667        | SX6                        | SPIT9       | * RETURN ACTION                               |
| 001261 | 5160000000 X |              | BX6                        | X6+X7       |                                               |
|        |              | 0200000677 + | SA0                        | R.EXPR      |                                               |
|        |              |              | JP                         | INITEX2     |                                               |
| 001262 | 73610        |              | * CALLEX6                  | ACTION      |                                               |
|        |              | 73770        | SX6                        | X1          | * RETURN ACTION                               |
|        |              | 20722        | SX7                        | X7          | * INSTRUCTION SO FAR                          |
|        |              | 12667        | LX7                        | 18          |                                               |
| 001263 | 5160000000 X |              | BX6                        | X6+X7       |                                               |
|        |              | 0200000675 + | SA0                        | R.EXPR      |                                               |
|        |              |              | JP                         | INITEXPR    |                                               |
| 001264 | 0300001244 + |              | * CALLEX7                  | ACTION      |                                               |
|        |              | 7110001413 + | ZR                         | X0.CALLEXPR |                                               |
| 001265 | 0200001244 + |              | SX1                        | SPIT12      | * RETURN ACTION TO INVERT RESULT              |
|        |              |              | JP                         | CALLEXPR    |                                               |
| 001266 | 5100000101   |              | * CALLEX8                  | ACTION      |                                               |
|        |              | 73770        | SA0                        | B4OPRND     |                                               |
|        |              | 20722        | SX7                        | X7          |                                               |
| 001267 | 7160001330 + |              | LX7                        | 18          |                                               |
|        |              | 12667        | SX6                        | RESUME2     |                                               |
|        |              | 76740        | BX6                        | X6+X7       |                                               |
| 001270 | 20744        |              | SX7                        | B4          |                                               |
|        |              | 12667        | LX7                        | 18+18       |                                               |
|        |              | 5160000000 X | BX6                        | X6+X7       | .. SAVE I-J INDICATOR FOR POSSIBLE BREG LATER |
| 001271 | 0200000677 + |              | SA0                        | R.EXPR      |                                               |
|        |              |              | JP                         | INITEX2     |                                               |
| 001272 | 5055777776   |              | * CALLEX9                  | ACTION      |                                               |
|        |              |              | SA5                        | A5-1        | .. BACK UP OVER MINUS SIGN                    |
|        |              |              | * CALLEX9 MUST DO CALLEX10 |             |                                               |

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*
001273 7110001205 +          CALLEX10 ACTION
                                SX1  SAVING
001274 0200001244 +          7277001000  SX7  X7+1000B
                                JP    CALLEXPR
*
001275 7110001205 +          CALLEX11 ACTION
                                SX1  SAVING
001276 0200001244 +          7277002000  SX7  X7+2000B
                                JP    CALLEXPR
*
001277 5055777776          CALLEX12 ACTION
                                SAS  A5-1          .. BACK UP OVER THE MINUS SIGN
*
* CALLEX12 MUST DO CALLEX13
*
001300 7110001205 +          CALLEX13 ACTION
                                0200001244 +      SX1  SAVING
                                JP    CALLEXPR
*
001301 73610          CALLEX14 ACTION
001301 5160000000 X      SX6  X1          .. RETURN ACTION
001302 0200000675 +      SAB  R.EXPR
                                JP    INITEXPR
*
001303 20203          JKFLDS ACTION
                                LX2  3          * POSITION J-REGISTER
                                BX7  X7+X0      * SAVED K-REGISTER
                                BX7  X7+X1      * SUB-OPCODE
                                BX7  X7+X2
001304 6170001357 +      SB7  SPIT1R
                                0200000000 X      JP    SP15
*
001305 7160001000          IJKEXP ESCAPE
001305 0200001307 +      SX6  S12          .. MAXIMUM SIZE OF EXPR
                                JP    IJKEXP0
*
001306 7277775777          JKEXPR ESCAPE
001306 7160000074          SX7  X7-2000B
                                SX6  60          .. MAXIMUM SIZE OF EXPR
001307 20622          JKEXPR0 LX6  18          * POSITION EXPR-LENGTH
                                5100000101      SA0  R40PRND      * STATE
                                20744
001310 12667          LX7  18+18
                                7170001312 +      BX6  X6+X7
                                12676          SX7  JK          * RETURN ACTION FOR EXPR PROCESSOR
001311 5160000000 X      BX6  X7+X6
                                0200000677 +      SA6  R.EXPR
                                55321          JP    INITEX2
                                73330          SA2  B5          .. EXPR : VALUE
                                10022          SA3  A2-B1
001313 0313000023 +      SX3  X3
                                BX0  X2
                                NZ    X3,E.REL      * ERROR: MUST BE ABSOLUTE

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|        |              |              |        |             |                                                  |
|--------|--------------|--------------|--------|-------------|--------------------------------------------------|
| 001314 | 21122        | 0332000032 + | NG     | X2,E,TRUNC  | * ERROR: MUST BE POSITIVE                        |
|        | 73310        |              | AX1    | 18          | * LENGTH OF EXPR                                 |
|        | 37032        |              | SX3    | X1          | .. MAXIMUM VALUE PERMISSIBLE                     |
|        | 21122        |              | IX0    | X3-X2       |                                                  |
| 001315 | 0330000033 + |              | AX1    | 18          | .. SAVED INSTRUCTION                             |
|        | 0321001317 + |              | NG     | X0,E,TRUNC4 | .. ERROR: TOO LARGE                              |
| 001316 | 10200        |              | PL     | X1,JK1      | * COMPLEMENT FLAG NOT SET                        |
| 001317 | 12712        | JK1          | Bx2    | X0          | .. COMPLEMENT OF EXPR : VALUE                    |
|        | 5100000347   |              | Bx7    | X1+X2       |                                                  |
| 001320 | 6170000621 + |              | SA0    | B4SEMI      |                                                  |
|        | 0200000000 X |              | SB7    | SMLOOP      |                                                  |
|        |              |              | JP     | SP15        |                                                  |
| 001321 |              |              |        |             |                                                  |
| 001321 | 54551        | JKEXPR1      | ACTION |             |                                                  |
|        | 12771        |              | SA5    | A5+B1       | .. ADVANCE TOKEN POINTER SINCE JKEXPR0 DOES NOT  |
|        | 7160000074   |              | Bx7    | X7+X1       | * OP CODE                                        |
| 001322 | 0200001307 + |              | SX6    | 60          | .. MAXIMUM SIZE                                  |
|        |              |              | JP     | JKEXPR0     |                                                  |
| 001323 | 12771        | JKEXPR2      | ACTION |             |                                                  |
|        | 7150000074   |              | Bx7    | X7+X1       | * OP CODE                                        |
|        | 43601        |              | SX6    | 60          | .. MAXIMUM SIZE OF EXPR                          |
| 001324 | 20652        |              | MX6    | 1           |                                                  |
|        | 12665        |              | LX6    | 2*18+6      | * COMPLEMENT FLAG                                |
|        | 54551        |              | Bx6    | X6+X5       |                                                  |
| 001325 | 0200001307 + |              | SA5    | A5+B1       | .. ADVANCE TOKEN POINTER, JKEXPR0 DOES NOT DO IT |
|        |              |              | JP     | JKEXPR0     |                                                  |
| 001326 | 21122        | RESUME1      | ACTION |             |                                                  |
|        | 73710        |              | AX1    | 18          |                                                  |
|        | 5100000072   |              | SX7    | X1          | .. SAVED INSTRUCTION                             |
| 001327 | 0200000621 + |              | SA0    | OPTREG      | .. WE ARE BEFORE [+(BREGVXREGVAREG)]             |
|        |              |              | JP     | SMLOOP      |                                                  |
| 001330 | 21122        | RESUME2      | ACTION |             |                                                  |
|        | 73710        |              | AX1    | 18          |                                                  |
|        | 21122        |              | SX7    | X1          | .. SAVED INSTRUCTION                             |
|        | 63410        |              | AX1    | 18          |                                                  |
| 001331 | 5100000236   |              | SB4    | X1          | .. I-J INDICATOR                                 |
|        | 0200000621 + |              | SA0    | OPTBRFG     |                                                  |
|        |              |              | JP     | SMLOOP      |                                                  |
| 001332 |              | RESUME3      | ACTION |             |                                                  |
| 001332 | 5110000000 X |              | SA1    | SD,IFDO     |                                                  |
|        | 5211777776   |              | SA1    | X1-1        |                                                  |
| 001333 | 73710        |              | SX7    | X1          | .. SKELETON INCREMENT INSTRUCTION                |
|        | 21106        |              | AX1    | 6           |                                                  |
|        | 43071        |              | MX0    | 60-3        |                                                  |
|        | 15010        |              | Bx0    | -X0*X1      |                                                  |
| 001334 | 21106        |              | AX1    | 6           |                                                  |
|        | 6221777771   |              | SB2    | X1-6        |                                                  |
| 001335 | 0420000621 + |              | ZR     | B2,SMLOOP   | .. INDEX REG IS A B-REG, WE ARE IN RIGHT STATE   |
|        | 5100000335   |              | SA0    | B4AINC      |                                                  |

|        |              |              |           |                   |                                                 |
|--------|--------------|--------------|-----------|-------------------|-------------------------------------------------|
| 001336 | 0720000621 + |              | NG        | B2,SML00P         | .. INDEX IS AN A-REG                            |
| 001337 | 0200000621 + | 5100000333   | SA0<br>JP | B4XINC<br>SML00P  | .. INDEX IS X-REG                               |
| *      |              |              |           |                   |                                                 |
| 001340 | 10177        |              | RESUME4   | ACTION            |                                                 |
|        |              |              | BX1       | X7                | .. SAVE COND INSTRUCTIONS                       |
| 001341 | 0200000000 X | 6170001342 + | SB7<br>JP | RESUME4A<br>FORCE | .. FORCE UPPER                                  |
| 001342 | 5120000000 X |              | RESUME4A  | SA2               | SD.IFDO                                         |
| 001343 | 5140000000 X | 5130000000 X | SA3       | STARL             |                                                 |
|        |              | 5222777776   | SA4       | STARB             |                                                 |
| 001344 | 20204        |              | SA2       | X2-1              |                                                 |
|        | 20452        |              | LX2       | 4                 | .. LEFT JUSTIFY DO-FLAG BIT                     |
|        |              | 0332001347 + | LX4       | 60-18             |                                                 |
| 001345 | 73710        |              | NG        | X2,RESUME4B       | .. DO                                           |
|        | 20717        |              | SX7       | X1                |                                                 |
|        | 12773        |              | LX7       | 15                |                                                 |
|        |              | 12747        | BX7       | X7+X3             | .. COMBINE OPCODE WITH CURRENT LOCATION COUNTER |
| 001346 | 55721        |              | BX7       | X4+X7             |                                                 |
|        |              | 0200000621 + | SA7       | A2-B1             |                                                 |
| 001347 | 7170004000   |              | JP        | SML00P            |                                                 |
|        | 12773        |              | RESUME4B  | SX7               | 04000B                                          |
|        |              | 12747        | BX7       | X7+X3             | .. IF R0=80                                     |
| 001350 | 55721        |              | BX7       | X4+X7             |                                                 |
|        | 73710        |              | SA7       | A2-B1             |                                                 |
|        | 21722        |              | SX7       | X1                |                                                 |
|        |              | 13666        | AX7       | 18                |                                                 |
| 001351 | 5110000000 X |              | BX6       | X6-X6             |                                                 |
|        | 53610        |              | SA1       | SD.EXPR           |                                                 |
|        |              | 53611        | SA6       | X1                | .. ZERO EXPR : BLOCK                            |
| 001352 | 6170000621 + |              | SA6       | X1+B1             | .. AND : VALUE                                  |
|        | 0200000000 X |              | SB7       | SML00P            |                                                 |
|        |              |              | JP        | SP30              | .. ISSUE BYPASS JUMP INSTRUCTION                |
| *      |              |              |           |                   |                                                 |
| 001353 | 12774        |              | SPIT1     | ACTION            |                                                 |
| 001353 |              | 6170001355 + | BX7       | X7+X4             | * INSERT SAVED SUB-OPCODE                       |
| 001354 | 0200000000 X |              | SB7       | SPIT1A            | * RETURN ADDRESS                                |
| 001355 | 5110000000 X |              | JP        | SP15              | * ISSUE 15-BIT INSTRUCTION                      |
|        | 53010        |              | SA1       | R.S0              |                                                 |
|        |              | 55551        | SA0       | X1                | * NEXT STATE                                    |
| 001356 | 0200000621 + |              | SA5       | A5-B1             | * BACK UP TOKEN POINTER                         |
|        |              |              | JP        | SML00P            |                                                 |
| *      |              |              |           |                   |                                                 |
| 001357 | 5110000000 X |              | SPIT1B    | SA1               | R.S0                                            |
|        | 5201000000   |              | SA0       | X1+0              |                                                 |
| 001360 | 0200000621 + |              | JP        | SML00P            |                                                 |
| *      |              |              |           |                   |                                                 |
|        |              |              | SPIT2     | ESCAPE SPIT1      |                                                 |
| *      |              |              |           |                   |                                                 |
| 001361 | 21122        |              | SPIT3     | ESCAPE            |                                                 |
| 001361 |              | 73710        | AX1       | 18                |                                                 |
|        |              | 6170001357 + | SX7       | X1                | * SAVED INSTRUCTION                             |
|        |              |              | SB7       | SPIT1B            |                                                 |

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001362 0200000000 X          JP      SP30
                                *
                                SPIT4  ESCAPE JFLD3
                                *
001363 7277001000          SPIT5  ACTION
                                SX7    X7+1000B  * SUB-OPCODE FOR XJ+B0
001363 6170001355 +        SB7    SPIT1A
001364 0200000000 X          JP      SP15
                                *
                                SPIT6  ESCAPE SPIT5
                                *
001365 12771          SPIT4  ACTION
                                BX7    X7+X1
001365 6170001355 +        SB7    SPIT1A
001366 0200000000 X          JP      SP15
                                *
                                SPIT7  ESCAPE
                                SX7    X7+7000B
001367 7277007000          SB7    SPIT1A
                                JP      SP15
                                *
                                SPIT8  ACTION
001371 13666          BX6    X6-X6
                                SAI    SD.EXPR
                                *
001372 5261000000          SAG    X1+B1  .. ZERO EXPR 1 VALUE
                                SAG    X1+0  .. AND... 1 BLOCK
                                SB7    SML00P
001373 0200000000 X          JP      SP30
                                *
                                SPIT9  ESCAPE
                                SA0    B4SEM1
                                AX1    10
                                SX7    X1
001375 6170000621 +        SB7    SML00P
                                JP      SP30
                                *
                                SPIT10 ACTION
001376 6170000621 +        SB7    SML00P
                                JP      SP15
                                *
                                SPIT11 ESCAPE
001377 5100000101          SA0    B4OPRND  * NEXT STATE
001400 21122          AX1    10
                                *
                                SPIT12A SX7    X1  * SAVED INSTRUCTION
                                SAI    B5  * EXPR 1 VALUE
                                SA2    B5-B1  * 1 BLOCK
                                BX6    -X1
                                SAG    A1
                                *
                                SX3    X2+0
                                ZR     X3,SPIT11A  * ABS, DO NOT COMPLEMENT
                                MX6    1
                                BX2    X6-X2
001401 14611          BX6    X2
                                *
                                SPIT11A
001402 0303001403 +
                                *
                                SPIT11A
001403 10622

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|        |                              |              |                                                                                      |
|--------|------------------------------|--------------|--------------------------------------------------------------------------------------|
| 001404 | 54620<br>0200000000 X        | 6170000621 + | SA6 A2<br>SB7 SML00p<br>JP SP30                                                      |
| 001405 | 12771                        | 6170000621 + | SPIT13 ACTION<br>BX7 X7+X1<br>SB7 SML00p<br>JP SP30                                  |
| 001406 | 0200000000 X                 | 6170000621 + | SPIT14 ACTION<br>SA5 A5+B1<br>NZ X5,E.SYN3<br>SX7 X7+13000B<br>SB7 SML00p<br>JP SP15 |
| 001407 | 54551                        | 0315000026 + | .. GET THE VALUE WORD OF A NUMBER TOKEN                                              |
| 001410 | 7277013000                   | 6170000621 + | .. XI=X02X0                                                                          |
| 001411 | 0200000000 X                 | 6170000621 + | SPIT15 ACTION<br>SB7 SML00p<br>JP SP30                                               |
| 001412 | 6170000621 +<br>0200000000 X | 6170000621 + | SPIT12 ESCAPE<br>SA5 R.S0<br>SA0 X2<br>JP SPIT12A                                    |
| 001413 | 5120000000 X                 | 53020        | DEFEN ESCAPE                                                                         |
| 001414 | 0200001400 +                 |              | DEFLA ESCAPE                                                                         |
| 001415 |                              |              |                                                                                      |

|        |              |        |       |           |                                             |
|--------|--------------|--------|-------|-----------|---------------------------------------------|
| 001415 |              | OPRTR0 | BSS   | 0         |                                             |
| 001415 |              | MINUS  | OPRTR |           | * UNARY -                                   |
| 001415 | 56150        |        | SA1   | B5        | * VALUE                                     |
|        | 57251        |        | SA2   | B5-B1     | * BLOCK                                     |
|        | 14711        |        | BX7   | -X1       |                                             |
|        | 54720        |        | SA7   | A2        | * COMPLEMENTED VALUE                        |
| 001416 | 0302001417 + |        | ZR    | X2,MINUS1 | * IF ABS, DO NOT COMPLEMENT BASE BLOCK      |
|        | 43701        |        | MX7   | 1         |                                             |
|        | 13272        |        | BX2   | X7-X2     |                                             |
| 001417 | 10722        | MINUS1 | BX7   | X2        |                                             |
|        | 67551        |        | SB5   | B5-B1     |                                             |
|        | 5175777776   |        | SA7   | B5-1      |                                             |
| 001420 | 0220000000   |        | JP    | B2        |                                             |
|        |              | *      |       |           |                                             |
| 001421 | 56150        | NOT    | OPRTR |           | * UNARY NEGATION                            |
|        | 57251        |        | SA1   | B5        |                                             |
|        | 0312000004 + |        | SA2   | B5-B1     |                                             |
| 001422 | 13777        |        | NZ    | X2,E,ABS  | * ERROR: OPERAND MUST BE ABSLOUTE           |
|        | 0311001423 + |        | BX7   | X7-X7     |                                             |
|        | 76710        |        | NZ    | X1,NOT1   | * OPERAND WAS +TRUE+                        |
| 001423 | 57751        | NOT1   | SX7   | B1        |                                             |
|        | 67551        |        | SA7   | B5-B1     | * STORE RESULT VALUE                        |
|        | 10722        |        | SB5   | B5-B1     |                                             |
|        | 57751        |        | BX7   | X2        |                                             |
| 001424 | 0220000000   |        | SA7   | B5-B1     | * SOTE BLOCK                                |
|        |              |        | JP    | B2        |                                             |
|        |              | *      |       |           |                                             |
| 001425 | 56150        | ADD    | OPRTR |           | * +                                         |
|        | 57351        |        | SA1   | B5        | * R VAL                                     |
|        | 6195777774   |        | SA2   | B5-B1     | * R BLOCK                                   |
|        |              |        | SB5   | B5-3      |                                             |
| 001426 | 56250        |        | SA2   | B5        | * L VALUE                                   |
|        | 57451        |        | SA4   | B5-B1     | * L BLOCK                                   |
|        | 0303001432 + |        | ZR    | X3,ADD1   | * R OPERAND IS ABS                          |
| 001427 | 0304001432 + |        | ZR    | X4,ADD1   | * L OPERAND IS ABS                          |
|        | 13334        |        | BX3   | X3-X4     | * COMPARE BLOCKS                            |
|        | 63430        |        | SB4   | X3        |                                             |
| 001430 | 0540000012 + |        | NZ    | B4,E,BLK1 | * ERROR: BLOCKS MUST BE SAME                |
|        | 0323000013 + |        | PL    | X3,E,BLK2 | * ERROR: SIGNS MUST DIFFER                  |
| 001431 | 10433        |        | BX4   | X3        |                                             |
| 001432 | 36721        | ADD1   | IX7   | X2+X1     | * SUM OF VALUES                             |
|        | 56750        |        | SA7   | B5        |                                             |
|        | 13734        |        | BX7   | X3-X4     | * BLOCK                                     |
|        | 57751        |        | SA7   | B5-B1     |                                             |
| 001433 | 0220000000   |        | JP    | B2        |                                             |
|        |              | *      |       |           |                                             |
| 001434 | 56150        | SUR    | OPRTR |           | * -                                         |
|        | 14711        |        | SA1   | B5        |                                             |
|        | 54710        |        | BX7   | -X1       | * COMPLEMENT R VALUE                        |
|        | 57251        |        | SA7   | A1        |                                             |
| 001435 | 0302001425 + |        | SA2   | B5-B1     |                                             |
|        | 43701        |        | ZR    | X2,ADD    | * R OPERAND IS ABS, DO NOT COMPLEMENT BLOCK |
|        |              |        | MX7   | 1         |                                             |

|        |              |       |       |            |                                              |
|--------|--------------|-------|-------|------------|----------------------------------------------|
| 001436 | 54720        | 13727 | BX7   | X2-X7      | * TOGGLE BLOCK SIGN                          |
|        | 0200001425 + |       | SA7   | A2         |                                              |
|        |              |       | JP    | ADD        |                                              |
|        |              |       |       |            |                                              |
| 001437 | 6140001446 + |       | OPRTR |            | * *                                          |
| 001440 | 56150        |       | SB4   | MULT1      |                                              |
|        | 57351        |       | SA1   | B5         | * R VALUE                                    |
|        |              |       | SA3   | B5-B1      | * R BLOCK                                    |
| 001441 | 56250        |       | SB5   | B5-3       | * POP STACK                                  |
|        | 57451        |       | SA2   | B5         | * L VALUE                                    |
|        |              |       | SA4   | B5-B1      | * L BLOCK                                    |
|        | 12334        |       | BX3   | X3+X4      |                                              |
| 001442 | 0313000005 + |       | NZ    | X3,E.ABS2  | * ERROR: BOTH OPERANDS FOR * / AND MOD MUST  |
|        |              |       |       |            | MUST BE ABSOLUTE                             |
|        | 0321001444 + |       | PL    | X1,CHKTRM1 | * R I +                                      |
| 001443 | 14333        |       | BX3   | -X3        |                                              |
|        | 14111        |       | BX1   | -X1        |                                              |
| 001444 | 0322001445 + |       | PL    | X2,CHKTRM2 | * L IS +                                     |
|        | 14333        |       | BX3   | -X3        |                                              |
|        | 14222        |       | BX2   | -X2        |                                              |
| 001445 | 0240000000   |       | JP    | B4         |                                              |
| 001446 | 27402        |       | PX4   | X2         | * L(L)                                       |
|        | 21260        |       | AX2   | 48         |                                              |
|        | 27702        |       | PX7   | X2         | * U(L)                                       |
|        | 27201        |       | PX2   | X1         | * L(R)                                       |
| 001447 | 21160        |       | AX1   | 48         |                                              |
|        | 27101        |       | PX1   | X1         | * U(R)                                       |
|        | 42114        |       | DX1   | X1*X4      | * L(U(R)*L(L))                               |
|        | 42727        |       | DX7   | X2*X7      | * L(L(R)*U(L))                               |
| 001450 | 30117        |       | FX1   | X1*X7      | * U(L(U*L)+L(L*U))                           |
|        | 40724        |       | FX7   | X2*X4      | * U(L(R)*L(L))                               |
|        | 30117        |       | FX1   | X1*X7      |                                              |
|        | 42224        |       | DX2   | X2*X4      | * L(L*L)                                     |
| 001451 | 26202        |       | UX2   | X2         |                                              |
|        | 26101        |       | UX1   | X1         |                                              |
|        | 20160        |       | LX1   | 48         |                                              |
|        | 43014        |       | MX0   | 12         |                                              |
| 001452 | 11101        |       | BX1   | X0*X1      |                                              |
|        | 12212        |       | BX2   | X1*X2      |                                              |
|        | 13732        |       | BX7   | X3-X2      | * SIGN * PRODUCT                             |
|        | 56750        |       | SA7   | B5         |                                              |
| 001453 | 0220000000   |       | JP    | B2         |                                              |
|        |              |       |       |            |                                              |
|        |              |       |       |            |                                              |
| 001454 | 6170001463 + |       | OPRTR |            | * /                                          |
| 001455 | 6140001456 + |       | SB7   | DIV1       |                                              |
|        | 0200001440 + |       | SB4   | DIVMOD1    |                                              |
|        |              |       | JP    | CHKTRM     | * GET ABS(R), ABS(L), SIGN IN X1, X2, AND X3 |
| 001456 | 77001        |       | SX0   | -B1        | * =-1                                        |
|        | 6140000074   |       | SB4   | 60         | SHIFT COUNT                                  |
|        | 13777        |       | BX7   | X7-X7      | * REMAINDER                                  |
| 001457 | 20201        |       | LX2   | 1          | * DIVIDEND                                   |
|        | 15420        |       | BX4   | -X0*X2     | * HIGH BIT OF MO...                          |
|        | 20701        |       | LX7   | 1          |                                              |

|        |              |            |         |       |            |                                        |
|--------|--------------|------------|---------|-------|------------|----------------------------------------|
| 001460 | 37471        | 12774      |         | BX7   | X7+X4      | * ... TO LOW POSITION OF AC            |
|        | 11202        |            |         | IX4   | X7-X1      | * AC = DIVISOR                         |
|        |              | 6144777776 |         | BX2   | X0*X2      | * CLEAR LOW BIT OF MQ                  |
| 001461 | 0334001462 + |            |         | SB4   | R4=1       |                                        |
|        | 16220        |            |         | NG    | X4,DIVMOD3 | * WILL NOT DIVIDE                      |
|        |              | 10744      |         | BX2   | -X0+X2     | * SET LOW BIT                          |
| 001462 | 0540001457 + |            | DIVMOD3 | BX7   | X4         | * NEW AC                               |
|        | 0270000000   |            |         | NZ    | B4,DIVMOD2 |                                        |
| 001463 | 13732        |            | DIV1    | JP    | B7         |                                        |
|        | 56750        |            |         | BX7   | X3-X2      | * SIGN * QUOTIENT                      |
|        | 0220000000   |            |         | SA7   | B5         |                                        |
|        |              |            |         | JP    | B2         |                                        |
| 001464 |              |            | * MOD   | OPRTR |            | * DOUBLE BKSLSH                        |
| 001464 | 6170001465 + |            |         | SB7   | MOD1       |                                        |
|        | 0200001455 + |            |         | JP    | DIVMOD     |                                        |
| 001465 | 56150        |            | MOD1    | SA1   | B5         | * L OPERAND                            |
|        | 21173        |            |         | AX1   | S9         |                                        |
|        | 13717        |            |         | BX7   | X1-X7      | * SIGN OF DIVIDEND * REMAINDER         |
|        | 54710        |            |         | SA7   | A1         |                                        |
| 001466 | 0220000000   |            |         | JP    | B2         |                                        |
|        |              |            | * AND   | OPRTR |            |                                        |
| 001467 | 6140001473 + |            |         | SB4   | AND1       |                                        |
| 001470 | 56150        |            | CHKABS  | SA1   | B5         |                                        |
|        | 57351        |            |         | SA3   | B5-B1      |                                        |
|        |              | 6155777774 |         | SB5   | B5-3       |                                        |
| 001471 | 56250        |            |         | SA2   | B5         |                                        |
|        | 57451        |            |         | SA4   | B5-B1      |                                        |
|        |              | 12334      |         | BX3   | X3+X4      |                                        |
| 001472 | 0313000007 + |            |         | NZ    | X3-E:ABS3  | * ERROR: OPERANDS MUST BE IN ABS BLOCK |
|        | 0240000000   |            |         | JP    | B4         |                                        |
|        |              |            | * AND1  | BX7   | X2+X1      |                                        |
| 001473 | 11721        |            |         | SA7   | B5         |                                        |
|        | 56750        |            |         | JP    | B2         |                                        |
|        | 0220000000   |            |         |       |            |                                        |
|        |              |            | * OR    | OPRTR |            |                                        |
| 001474 |              |            |         | SB4   | OR1        |                                        |
| 001474 | 6140001475 + |            |         | JP    | CHKABS     |                                        |
|        | 0200001470 + |            |         | BX7   | X2+X1      |                                        |
| 001475 | 12721        |            | OR1     | SA7   | B5         |                                        |
|        | 56750        |            |         | JP    | B2         |                                        |
|        | 0220000000   |            |         |       |            |                                        |
|        |              |            | * XOR   | OPRTR |            |                                        |
| 001476 |              |            |         | SB4   | XOR1       |                                        |
| 001476 | 6140001477 + |            |         | JP    | CHKABS     |                                        |
|        | 0200001470 + |            |         | BX7   | X2-X1      |                                        |
| 001477 | 13721        |            | XOR1    | SA7   | B5         |                                        |
|        | 56750        |            |         | JP    | B2         |                                        |
|        | 0220000000   |            |         |       |            |                                        |
|        |              |            | * LT    | OPRTR |            |                                        |
| 001500 |              |            |         | SB4   | LT1        |                                        |
| 001500 | 6140001504 + |            |         |       |            |                                        |

|        |              |        |       |           |                                 |
|--------|--------------|--------|-------|-----------|---------------------------------|
| 001501 | 56250        | CHKREL | SA2   | B5        | * R VALUE                       |
|        | 57451        |        | SA4   | B5-B1     | * R BLOCK                       |
|        | 6155777774   |        | SB5   | B5-3      |                                 |
| 001502 | 56150        |        | SA1   | B5        | * L VALUE                       |
|        | 57351        |        | SA3   | B5-B1     | * L BLOCK                       |
|        | 13734        |        | BX7   | X3-X4     |                                 |
|        | 54730        |        | SA7   | A3        |                                 |
| 001503 | 0317000014 + |        | NZ    | X7,E,BLK3 | * ERROR: BLOCKS OR SIGNS DIFFER |
|        | 0240000000   |        | JP    | B4        |                                 |
| 001504 | 37412        | LT1    | IX4   | X1-X2     | * L - R                         |
|        | 0324001505 + |        | PL    | X4,LT2    | * FALSE                         |
|        | 76710        |        | SX7   | B1        | * TRUE                          |
| 001505 | 56750        | LT2    | SA7   | B5        |                                 |
|        | 0220000000   |        | JP    | B2        |                                 |
| 001506 | 6140001507 + | LE     | OPRTR |           |                                 |
|        | 0200001501 + |        | SB4   | LE1       |                                 |
| 001507 | 37421        | LE1    | JP    | CHKREL    |                                 |
|        | 0334001510 + |        | IX4   | X2-X1     | * R - L                         |
|        | 76710        |        | NG    | X4,LE2    | * FALSE                         |
| 001510 | 56750        | LE2    | SX7   | B1        | * TRUE                          |
|        | 0220000000   |        | SA7   | B5        |                                 |
|        |              |        | JP    | B2        |                                 |
| 001511 | 6140001512 + | EQ     | OPRTR |           |                                 |
|        | 0200001501 + |        | SB4   | EQ1       |                                 |
| 001512 | 37412        | EQ1    | JP    | CHKREL    |                                 |
|        | 0314001513 + |        | IX4   | X1-X2     | * L - R                         |
|        | 76710        |        | NZ    | X4,EQ2    | * FALSE                         |
| 001513 | 56750        | EQ2    | SX7   | B1        | * TRUE                          |
|        | 0220000000   |        | SA7   | B5        |                                 |
|        |              |        | JP    | B2        |                                 |
| 001514 | 6140001515 + | NE     | OPRTR |           |                                 |
|        | 0200001501 + |        | SB4   | NE1       |                                 |
| 001515 | 37412        | NE1    | JP    | CHKREL    |                                 |
|        | 0304001516 + |        | IX4   | X1-X2     | * L - R                         |
|        | 76710        |        | ZR    | X4,NE2    | * FALSE                         |
| 001516 | 56750        | NE2    | SX7   | B1        | * TRUE                          |
|        | 0220000000   |        | SA7   | B5        |                                 |
|        |              |        | JP    | B2        |                                 |
| 001517 | 6140001520 + | GE     | OPRTR |           |                                 |
|        | 0200001501 + |        | SB4   | GE1       |                                 |
| 001520 | 37412        | GE1    | JP    | CHKREL    |                                 |
|        | 0334001521 + |        | IX4   | X1-X2     | * L - R                         |
|        | 76710        |        | NG    | X4,GE2    | * FALSE                         |
| 001521 | 56750        | GE2    | SX7   | B1        | * TRUE                          |
|        | 0220000000   |        | SA7   | B5        |                                 |
|        |              |        | JP    | B2        |                                 |
| 001522 | 6140001523 + | GT     | OPRTR |           |                                 |
|        |              |        | SB4   | GT1       |                                 |



|        |            |              |        |       |        |                         |
|--------|------------|--------------|--------|-------|--------|-------------------------|
| 001523 | 37421      | 0200001501 + | GT1    | JP    | CHKREL |                         |
|        |            | 0324001524 + |        | IX4   | X2-X1  | # R - L                 |
|        |            | 76710        |        | PL    | X4,GT2 | # FALSE                 |
| 001524 | 56750      |              | GT2    | SX7   | B1     | # TRUE                  |
|        |            | 0220000000   |        | SA7   | B5     |                         |
|        |            |              |        | JP    | B2     |                         |
| 001525 |            |              | LIT    | OPNIR |        |                         |
|        |            |              | *      |       |        |                         |
| 001525 |            |              | LEN    | OPNIR |        |                         |
|        |            |              | *      |       |        |                         |
| 001525 |            |              | EXP    | OPNIR |        |                         |
|        |            |              | *      |       |        |                         |
| 001525 |            |              | CONCAT | OPNIR |        |                         |
|        |            |              | *      |       |        |                         |
| 001525 | 5170777776 |              |        | SA7   | -1     | .. NOT YET IMPLEMENTEDV |

|        |              | SPITSTR | ACTION        |                             |
|--------|--------------|---------|---------------|-----------------------------|
| 001526 | 6225777767   |         | SB2 X5-8      | * NUMBER OF CHARS IN STRING |
|        | 54551        |         | SA5 A5+B1     | * FIRST WORD OF STRING      |
|        | 10600        |         | BX6 X0        | * SAVED STRING/LINE FLAG    |
| 001527 | 5160000000 X |         | SA6 SV.SPST   |                             |
|        | 20670        |         | LX6 60-4      |                             |
|        | 12665        |         | BX6 X6+X5     |                             |
| 001530 | 6160001531 + |         | SB6 SPSTR1    |                             |
|        | 0200001532 + |         | JP SPSTR2     |                             |
| 001531 | 54551        | SPSTR1  | SA5 A5+B1     |                             |
|        | 10055        |         | BX0 X5        |                             |
|        | 6122777767   |         | SB2 B2-8      |                             |
| 001532 | 0702000000 X | SPSTR2  | GT B2+B0.SP60 |                             |
|        | 5110000000 X |         | SA1 SV.SPST   |                             |
| 001533 | 0301001542 + |         | ZR X1.SPSTR5  | * NO CR NEEDED              |
|        | 0420001540 + |         | ZR B2.SPSTR3  | * NO ROOM THIS WORD FOR CR  |
| 001534 | 76121        |         | SX1 B2+B1     | * CHAR COUNT - 7            |
|        | 10211        |         | BX2 X1        |                             |
|        | 20203        |         | LX2 3         |                             |
|        | 37221        |         | IX2 X2-X1     | * C(CHAR COUNT - 7) * 7     |
| 001535 | 63220        |         | SB2 X2        |                             |
|        | 7170000155   |         | SX7 ASCII CR  |                             |
|        | 23727        |         | AX7 B2.X7     |                             |
| 001536 | 12667        |         | BX6 X6+X7     |                             |
|        | 6160000621 + |         | SB6 SMLoop    |                             |
| 001537 | 0200000000 X |         | JP SP60       |                             |
| 001540 | 6160001541 + | SPSTR3  | SB6 SPSTR4    |                             |
|        | 0200000000 X |         | JP SP60       |                             |
| 001541 | 7160000155   | SPSTR4  | SX6 ASCII CR  |                             |
|        | 20661        |         | LX6 60-4-7    |                             |
| 001542 | 6160000621 + | SPSTR5  | SB6 SMLoop    |                             |
|        | 0200000000 X |         | JP SP60       |                             |

001543

|     |                         |
|-----|-------------------------|
| EXT | INTERS,CWDESCR          |
| EXT | FORCE                   |
| EXT | OD.FIL                  |
| EXT | R.COND,R.EXPR,R.SO      |
| EXT | SD.EXPR,SD.IFDO,SD.SYMT |
| EXT | SP15,SP30,SP60          |
| EXT | STARB,STARL,STARO,STARP |
| EXT | SV.SPST,TOKENIZ         |
| END |                         |

5156 STATEMENTS 437 SYMBOLS

|           |         |          |                                                                                           |
|-----------|---------|----------|-------------------------------------------------------------------------------------------|
| ACTION0   | 0000021 | PROGRAM* | 10-00052, 10-00053, 10-00054, 10-00055, 10-00056, 10-00057, 10-00060, 10-00062, 10-00064, |
|           |         |          | 10-00065, 10-00066, 10-00067, 10-00070, 10-00071, 10-00072, 10-00073, 10-00074, 10-00075, |
|           |         |          | 10-00076, 10-00100, 10-00101, 10-00102, 10-00104, 10-00105, 10-00106, 10-00110, 10-00111, |
|           |         |          | 10-00112, 10-00114, 10-00116, 11-00117, 11-00120, 11-00121, 11-00122, 11-00123, 11-00124, |
|           |         |          | 11-00125, 11-00126, 11-00130, 11-00131, 11-00132, 11-00133, 11-00134, 11-00135, 11-00136, |
|           |         |          | 11-00137, 11-00140, 11-00141, 11-00142, 11-00144, 11-00145, 11-00147, 11-00150, 11-00151, |
|           |         |          | 11-00153, 11-00154, 11-00155, 11-00156, 11-00157, 11-00160, 11-00161, 11-00162, 11-00163, |
|           |         |          | 11-00164, 11-00165, 11-00166, 11-00170, 12-00171, 12-00172, 12-00173, 12-00174, 12-00175, |
|           |         |          | 12-00176, 12-00177, 12-00200, 12-00201, 12-00202, 12-00203, 12-00204, 12-00205, 12-00206, |
|           |         |          | 12-00207, 12-00211, 12-00212, 12-00214, 12-00215, 12-00216, 12-00217, 12-00220, 12-00222, |
|           |         |          | 12-00224, 12-00226, 12-00227, 12-00230, 12-00231, 12-00232, 12-00233, 12-00234, 12-00235, |
|           |         |          | 12-00236, 12-00237, 12-00240, 12-00241, 12-00242, 12-00243, 12-00244, 13-00245, 13-00246, |
|           |         |          | 13-00247, 13-00251, 13-00253, 13-00254, 13-00255, 13-00256, 13-00260, 13-00262, 13-00264, |
|           |         |          | 13-00265, 13-00267, 13-00270, 13-00272, 13-00274, 13-00275, 13-00276, 13-00300, 13-00302, |
|           |         |          | 14-00304, 14-00306, 14-00310, 14-00311, 14-00313, 14-00315, 14-00317, 14-00321, 14-00323, |
|           |         |          | 14-00324, 14-00325, 14-00326, 14-00327, 14-00331, 14-00333, 14-00334, 14-00335, 14-00336, |
|           |         |          | 14-00340, 15-00341, 15-00342, 15-00343, 15-00345, 15-00346, 15-00347, 15-00350, 15-00351, |
|           |         |          | 15-00352, 15-00353, 15-00354, 15-00355, 15-00356, 15-00357, 15-00360, 15-00362, 15-00364, |
|           |         |          | 15-00365, 15-00367, 15-00370, 15-00372, 15-00374, 15-00375, 15-00376, 15-00377, 15-00400, |
|           |         |          | 15-00401, 16-00403, 16-00405, 16-00407, 16-00410, 16-00412, 16-00414, 16-00415, 16-00417, |
|           |         |          | 16-00421, 19-00627                                                                        |
| ADD       | 0001425 | PROGRAM* | 11-00170, 41-01435, 42-01436                                                              |
| ADD1      | 0001432 | PROGRAM* | 41-01426, 41-01427                                                                        |
| AFTERMIN  | 0000042 |          | 10-00072                                                                                  |
| AFTERMIN2 | 0000331 |          | 15-00376                                                                                  |
| AFTERMIN3 | 0000340 |          | 16-00407                                                                                  |
| AFTERSTAR | 0000226 |          | 11-00160                                                                                  |
| AFTERSTR  | 0000230 |          | 11-00163                                                                                  |
| AND       | 0001467 | PROGRAM* | 12-00204                                                                                  |
| AND1      | 0001473 | PROGRAM* | 43-01467                                                                                  |
| ASCIIOR   | 0000155 |          | 46-01535, 46-01541                                                                        |
| BACKUP    | 0000647 | PROGRAM* | 13-00301                                                                                  |
| B4ARXK1   | 0000056 |          | 10-00105                                                                                  |
| B4ARXURK  | 0000032 |          | 10-00065                                                                                  |
| B4AINC    | 0000335 |          | 37-01335                                                                                  |
| B4AORB    | 0000212 |          | 10-00114                                                                                  |
| B4AORB1   | 0000215 |          | 13-00265                                                                                  |
| B4AOX     | 0000201 |          | 12-00222                                                                                  |
| B4BINC    | 0000324 |          | 18-00574                                                                                  |
| B4BJ      | 0000232 |          | 17-00533, 17-00535, 17-00537, 17-00541, 17-00543, 17-00545                                |
| B4BK      | 0000234 |          | 16-00434, 16-00436, 16-00440, 16-00442                                                    |
| B4B00L    | 0000150 |          | 12-00215                                                                                  |
| B4BORK    | 0000026 |          | 10-00064                                                                                  |
| B4BORKA   | 0000044 |          | 10-00101, 10-00102, 10-00106, 10-00111                                                    |
| B4BORK1   | 0000036 |          | 10-00066                                                                                  |
| B4BORZ    | 0000312 |          | 15-00345, 15-00346, 15-00347, 15-00350, 15-00351, 15-00352                                |
| B4BREG    | 0000241 |          | 14-00311                                                                                  |
| B4BY      | 0000322 |          | 34-01240                                                                                  |
| B4COND    | 0000261 |          | 16-00424, 17-00560, 18-00576                                                              |
| B4CONDAS  | 0000245 |          | 10-00057                                                                                  |
| B4ELSE    | 0000247 |          | 3-00002                                                                                   |
| B4EQORLA  | 0000137 |          | 10-00055                                                                                  |
| B4LARROW  | 0000010 |          | 10-00053, 10-00054                                                                        |

|          |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| B4LARW2  | 0000257 | 14-00323, 14-00324, 14-00325                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| B4META   | 0000245 | 10-00056                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| B4OPRND  | 0000101 | 10-00067, 10-00070, 10-00071, 10-00074, 10-00075, 10-00076, 10-00112, 11-00117, 11-00120, 11-00121, 11-00122, 11-00123, 11-00124, 11-00125, 11-00126, 11-00133, 11-00134, 11-00135, 11-00136, 11-00137, 11-00140, 11-00141, 11-00142, 11-00155, 11-00156, 11-00157, 11-00161, 11-00162, 11-00170, 12-00171, 12-00172, 12-00173, 12-00174, 12-00176, 12-00177, 12-00200, 12-00201, 12-00202, 12-00203, 12-00204, 12-00205, 12-00206, 12-00207, 13-00274, 13-00275, 16-00432, 17-00550, 34-01242, 35-01257, 35-01266, 36-01307, 39-01377 |
| B4OPRTR  | 0000116 | 11-00153, 11-00154, 12-00175, 17-00521, 17-00523, 17-00525, 17-00530, 20-00647, 22-00722                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| B4REG    | 0000075 | 11-00145                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| B4RELB   | 0000273 | 14-00334                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| B4RFLA   | 0000266 | 14-00333                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| B4RELZ   | 0000301 | 14-00335                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| B4SEMI   | 0000347 | 10-00062, 11-00147, 11-00150, 11-00151, 12-00220, 13-00251, 13-00260, 13-00262, 14-00304, 14-00313, 16-00417, 16-00454, 34-01236, 37-01317, 39-01374                                                                                                                                                                                                                                                                                                                                                                                   |
| B4SETOPR | 0000012 | 10-00062, 10-00073, 12-00212, 14-00331                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| B4STMT   | 0000000 | 3-00000, 10-00060, 11-00144, 12-00231, 13-00253, 13-00272, 13-00276, 14-00310, 14-00315, 14-00327, 15-00375, 16-00415, 16-00421, 17-00552, 17-00555, 19-00612, 26-01024                                                                                                                                                                                                                                                                                                                                                                |
| B4STR    | 0000345 | 16-00444, 16-00446                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| B4THEN   | 0000245 | 15-00362, 15-00364, 15-00365, 15-00367, 15-00370, 15-00372                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| B4XINC   | 0000333 | 38-01336                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| B4XJ     | 0000206 | 13-00254, 13-00255, 13-00256                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| B4XK     | 0000177 | 12-00226, 12-00227, 12-00230, 12-00233, 12-00234, 12-00235, 12-00236, 12-00237, 12-00240, 12-00241, 12-00242, 12-00243, 12-00244, 13-00245, 13-00246, 13-00247, 16-00457, 16-00461, 16-00463, 16-00465, 16-00467, 16-00471, 17-00506, 17-00510, 17-00512, 17-00514, 17-00516                                                                                                                                                                                                                                                           |
| B4XORB   | 0000315 | 15-00353, 15-00354, 15-00355, 15-00356, 15-00357, 15-00360                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| B4XORK   | 0000210 | 17-00474, 17-00504                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| B4XREG   | 0000320 | 17-00563, 17-00565, 17-00567, 17-00571                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| B4ZER    | 0000310 | 14-00340, 15-00341, 15-00342, 15-00343                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| CALLCND2 | 0001232 | 17-00560, 18-00576                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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| CALLEXP  | 0001244 | PROGRAM*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| CALLEX1  | 0001244 | PROGRAM*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| CALLEX10 | 0001273 | PROGRAM*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| CALLEX11 | 0001275 | PROGRAM*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| CALLEX12 | 0001277 | PROGRAM*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| CALLEX13 | 0001300 | PROGRAM*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| CALLEX2  | 0001242 | PROGRAM*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| CALLEX4  | 0001253 | PROGRAM*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| CALLEX5  | 0001257 | PROGRAM*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| CALLEX6  | 0001262 | PROGRAM*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| CALLEX7  | 0001264 | PROGRAM*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| CALLEX8  | 0001266 | PROGRAM*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| CALLEX9  | 0001272 | PROGRAM*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| CALLS0   | 0001234 | PROGRAM*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| CALLS01  | 0001236 | PROGRAM*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| CALLS02  | 0001240 | PROGRAM*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| CHKABS   | 0001470 | PROGRAM*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| CHKREL   | 0001501 | PROGRAM*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| CHKTRM   | 0001440 | PROGRAM*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| CHKTRM1  | 0001444 | PROGRAM*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| CHKTRM2  | 0001445 | PROGRAM*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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|          |         | 11-00133, 11-00134, 11-00135, 11-00136, 11-00137, 11-00140, 11-00141, 11-00142                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|          |         | 15-00402                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|          |         | 16-00406                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|          |         | 16-00413                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|          |         | 16-00411                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|          |         | 10-00115                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|          |         | 16-00432                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|          |         | 14-00316                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|          |         | 10-00112, 13-00274, 13-00275, 17-00550                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| CWDESCR  | 0000000 | EXTERNAL* | 21-00655, 25-01010, 26-01035 |
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| C.EQ     | 0000603 | PROGRAM*  | 15-00341, 15-00347, 15-00355 |
| C.GE     | 0000605 | PROGRAM*  | 15-00351, 15-00357           |
| C.GT     | 0000601 | PROGRAM*  | 14-00340, 15-00352, 15-00360 |
| C.ID     | 0000611 | PROGRAM*  | 17-00571                     |
| C.IR     | 0000606 | PROGRAM*  | 17-00563                     |
| C.LE     | 0000600 | PROGRAM*  | 15-00343, 15-00346, 15-00354 |
| C.LT     | 0000602 | PROGRAM*  | 15-00345, 15-00353           |
| C.NE     | 0000604 | PROGRAM*  | 15-00342, 15-00350, 15-00356 |
| C.OR     | 0000607 | PROGRAM*  | 17-00565                     |
| C.REV    | 0000602 | PROGRAM*  | 29-01127                     |
| DIV      | 0001454 | PROGRAM*  | 12-00173                     |
| DIVMOD   | 0001455 | PROGRAM*  | 43-01464                     |
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| DIVMOD2  | 0001457 | PROGRAM*  | 43-01462                     |
| DIVMOD3  | 0001462 | PROGRAM*  | 43-01461                     |
| DIV1     | 0001463 | PROGRAM*  | 42-01454                     |
| EF4      | 0000003 | PROGRAM*  | 25-01003                     |
| ELSE0    | 0001024 | PROGRAM*  | 14-00322                     |
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| ELSE1    | 0001032 | PROGRAM*  | 17-00555                     |
| ELSE1A   | 0001036 | PROGRAM*  | 26-01034                     |
| ELSE1B   | 0001037 | PROGRAM*  | 26-01036                     |
| ELSE1C   | 0001043 | PROGRAM*  | 27-01037, 27-01041           |
| ELSE1D   | 0001050 | PROGRAM*  | 27-01046                     |
| ENDCOND1 | 0001222 | PROGRAM*  | 15-00362, 15-00365           |
| ENDEXPR  | 0000741 | PROGRAM*  | 12-00210                     |
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| END0     | 0000760 | PROGRAM*  | 16-00454                     |
| END0X    | 0000767 | PROGRAM*  | 24-00762                     |
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| END0Z    | 0000777 | PROGRAM*  | 25-00776                     |
| END015   | 0000766 | PROGRAM*  | 24-00763                     |
| EQ       | 0001511 | PROGRAM*  | 12-00176                     |
| EQ1      | 0001512 | PROGRAM*  | 44-01511                     |
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| EXP      | 0001525 | PROGRAM*  | 12-00207                     |
| E.ABS    | 0000004 | PROGRAM*  | 41-01421                     |
| E.ABS2   | 0000005 | PROGRAM*  | 42-01442                     |
| E.ABS3   | 0000007 | PROGRAM*  | 43-01472                     |
| E.ABS4   | 0000006 | PROGRAM*  | 32-01206                     |
| E.BLK1   | 0000012 | PROGRAM*  | 41-01430                     |
| E.BLK2   | 0000013 | PROGRAM*  | 41-01430                     |
| E.BLK3   | 0000014 | PROGRAM*  | 44-01503                     |
| E.END0   | 0000040 | PROGRAM*  | 24-00761                     |
| E.EXTRA  | 0000037 | PROGRAM*  | 19-00612                     |
| E.LBR    | 0000015 | PROGRAM*  | 23-00745                     |
| E.LNGSTR | 0000016 | PROGRAM*  | 32-01201                     |
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| E.NOSEMI | 0000021 | PROGRAM*  | 16-00422                                                                                 |
| E.RBR    | 0000022 | PROGRAM*  | 23-00734                                                                                 |
| E.REL    | 0000023 | PROGRAM*  | 36-01313                                                                                 |
| E.SYN1   | 0000024 | PROGRAM*  | 19-00625                                                                                 |
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| E.SYN3   | 0000026 | PROGRAM*  | 40-01407                                                                                 |
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| JK       | 0001312 | PROGRAM*  | 36-01310                                                                                                                                                                           |
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| J2FLD    | 0001150 | PROGRAM*  | 14-00333                                                                                                                                                                           |
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| LE2      | 0001510 | PROGRAM*  | 44-01507                                                                                                                                                                           |
| LIT      | 0001525 | PROGRAM*  | 11-00157                                                                                                                                                                           |
| LT       | 0001500 | PROGRAM*  | 12-00202                                                                                                                                                                           |
| LT1      | 0001504 | PROGRAM*  | 43-01500                                                                                                                                                                           |
| LT2      | 0001505 | PROGRAM*  | 44-01504                                                                                                                                                                           |
| L.ASTMT  | 0000423 | PROGRAM*  | 10-00052                                                                                                                                                                           |
| L.BY     | 0000573 | PROGRAM*  | 15-00374                                                                                                                                                                           |
| L.COUNT  | 0000520 | PROGRAM*  | 13-00300                                                                                                                                                                           |
| L.ELSE   | 0000554 | PROGRAM*  | 14-00321                                                                                                                                                                           |
| L.INSH1  | 0000456 | PROGRAM*  | 12-00224                                                                                                                                                                           |
| L.INSH2  | 0000532 | PROGRAM*  | 12-00232                                                                                                                                                                           |
| L.INSH3  | 0000473 | PROGRAM*  | 12-00214                                                                                                                                                                           |
| L.L      | 0000527 | PROGRAM*  | 13-00302                                                                                                                                                                           |
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| MINUS1   | 0001417 | PROGRAM*  | 41-01416                                                                                                                                                                           |
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| MULT1    | 0001446 | PROGRAM*  | 42-01437                                                                                                                                                                           |
| NE       | 0001514 | PROGRAM*  | 12-00177                                                                                                                                                                           |
| NE1      | 0001515 | PROGRAM*  | 44-01514                                                                                                                                                                           |
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| NOP      | 0000621 | PROGRAM*  | 10-00056, 10-00057, 10-00060, 10-00072, 10-00073, 10-00105, 11-00145, 11-00156, 11-00160, 12-00211, 12-00215, 13-00265, 14-00311, 14-00327, 15-00376, 16-00407, 16-00415, 16-00421 |
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| NOT1     | 0001423 | PROGRAM*  | 41-01422                                                                                                                                                                           |
| OD.FIL   | 0000000 | EXTERNAL* | 25-01002                                                                                                                                                                           |
| OP       | 0001052 | PROGRAM*  | 13-00254, 13-00255, 13-00256, 16-00457, 16-00461, 16-00463, 16-00465, 16-00467, 16-00471, 17-00474, 17-00504, 17-00506, 17-00510, 17-00512, 17-00514, 17-00516                     |



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| OPTEXPR  | 0000243 |           | 16-00426                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| OPTIJK   | 0000220 |           | 16-00430                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| OPTWHIL  | 0000342 |           | 15-00377, 15-00400, 15-00401, 16-00403, 16-00405, 16-00410, 16-00412                                                                                                                                                                                                                                                                                                                                                                                     |
| OP1      | 0001053 | PROGRAM*  | 12-00231                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| OP2      | 0001055 | PROGRAM*  | 12-00226, 12-00227, 12-00230, 12-00233, 12-00234, 12-00235, 12-00236, 12-00237, 12-00240,<br>12-00241, 12-00242, 12-00243, 12-00244, 13-00245, 13-00246, 13-00247                                                                                                                                                                                                                                                                                        |
| OP3      | 0001057 | PROGRAM*  | 13-00253                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| OP4      | 0001061 | PROGRAM*  | 16-00430                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| OP5      | 0001062 | PROGRAM*  | 16-00434, 16-00436                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| OP5A     | 0001065 | PROGRAM*  | 28-01063                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| OP6      | 0001071 | PROGRAM*  | 16-00442                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| OP7      | 0001074 | PROGRAM*  | 17-00533, 17-00535, 17-00537, 17-00541, 17-00543, 17-00545                                                                                                                                                                                                                                                                                                                                                                                               |
| OP8      | 0001075 | PROGRAM*  | 16-00426                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| OP8A     | 0001101 | PROGRAM*  | 28-01077                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| OP9      | 0001102 | PROGRAM*  | 16-00440                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| OP9A     | 0001106 | PROGRAM*  | 28-01104                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| OR1      | 0001475 | PROGRAM*  | 43-01474                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| O2P      | 0001156 | PROGRAM*  | 14-00340, 15-00341, 15-00342, 15-00343                                                                                                                                                                                                                                                                                                                                                                                                                   |
| O2P2     | 0001157 | PROGRAM*  | 15-00345, 15-00347, 15-00350, 15-00351                                                                                                                                                                                                                                                                                                                                                                                                                   |
| O2P3     | 0001162 | PROGRAM*  | 15-00346, 15-00352                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| O2P4     | 0001165 | PROGRAM*  | 15-00353, 15-00354, 15-00355, 15-00356, 15-00357, 15-00360, 17-00563, 17-00565, 17-00567,<br>17-00571                                                                                                                                                                                                                                                                                                                                                    |
| POPROX   | 0000612 | PROGRAM*  | 19-00621                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| PRETOK   | 0000052 | PROGRAM*  | 9-02064                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| RBRACK   | 0000730 | PROGRAM*  | 12-00175                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| RBRACK1  | 0000731 | PROGRAM*  | 23-00732                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| RBRACK2  | 0000734 | PROGRAM*  | 23-00732                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| RESUME1  | 0001326 | PROGRAM*  | 10-00067, 10-00070, 10-00071, 10-00074, 10-00075, 10-00076, 34-01242                                                                                                                                                                                                                                                                                                                                                                                     |
| RESUME2  | 0001330 | PROGRAM*  | 35-01267                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| RESUME3  | 0001332 | PROGRAM*  | 18-00574                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| RESUME4  | 0001340 | PROGRAM*  | 34-01232                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| RESUME4A | 0001342 | PROGRAM*  | 38-01340                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| RESUME4B | 0001347 | PROGRAM*  | 38-01344                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| R.COND   | 0000000 | EXTERNAL* | 29-01125, 29-01127, 31-01153, 33-01223, 34-01230, 34-01232                                                                                                                                                                                                                                                                                                                                                                                               |
| R.EXPR   | 0000000 | EXTERNAL* | 23-00746, 34-01245, 34-01250, 35-01252, 35-01254, 35-01261, 35-01263, 35-01270, 36-01301,<br>36-01311                                                                                                                                                                                                                                                                                                                                                    |
| R.SO     | 0000000 | EXTERNAL* | 34-01234, 34-01237, 34-01240, 38-01355, 38-01357, 40-01413                                                                                                                                                                                                                                                                                                                                                                                               |
| SAVE     | 0001173 | PROGRAM*  | 10-00101, 10-00102, 16-00444, 16-00446                                                                                                                                                                                                                                                                                                                                                                                                                   |
| SAVE2    | 0001176 | PROGRAM*  | 10-00106                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| SAVE4    | 0001201 | PROGRAM*  | 11-00163                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| SAVE5    | 0001204 | PROGRAM*  | 10-00111                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| SAVINC   | 0001205 | PROGRAM*  | 36-01273, 36-01275, 36-01300                                                                                                                                                                                                                                                                                                                                                                                                                             |
| SAVINCK  | 0001215 | PROGRAM*  | 15-00377, 15-00400, 15-00401, 16-00403, 16-00405, 16-00410, 16-00412                                                                                                                                                                                                                                                                                                                                                                                     |
| SAVIORJ  | 0001200 | PROGRAM*  | 14-00334                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

|         |         |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------|---------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SAVJORK | 0001200 | PROGRAM*  | 10-00065, 12-00217, 32-01200, 32-01200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| SCAN1   | 0000634 | PROGRAM*  | 12-00214, 12-00224, 12-00232, 13-00300, 13-00302, 14-00317, 14-00321, 14-00326, 14-00336,<br>15-00374, 16-00414, 19-00632                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| SCAN2   | 0000633 | PROGRAM*  | 10-00052                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SCAN2A  | 0000630 | PROGRAM*  | 20-00633                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SD.EXPR | 0000000 | EXTERNAL* | 21-00675, 21-00677, 24-00763, 24-00771, 25-01006, 26-01032, 38-01351, 39-01371                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| SD.IFDO | 0000000 | EXTERNAL* | 3-00000, 19-00613, 24-00754, 24-00760, 24-00767, 25-00777, 26-01017, 26-01026, 27-01045,<br>29-01116, 33-01207, 33-01212, 33-01215, 33-01225, 37-01332, 38-01342                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| SD.SYMT | 0000000 | EXTERNAL* | 20-00634, 21-00670                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| SF1     | 0000041 | PROGRAM*  | 22-00701                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SF2     | 0000042 | PROGRAM*  | 22-00703                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SF3     | 0000043 | PROGRAM*  | 22-00713                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SF4     | 0000044 | PROGRAM*  | 20-00644                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SF5     | 0000045 | PROGRAM*  | 20-00651                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SF6     | 0000046 | PROGRAM*  | 21-00664                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SF7     | 0000047 | PROGRAM*  | 23-00725                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SF8     | 0000050 | PROGRAM*  | 21-00667, 24-00755                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| SF9     | 0000051 | PROGRAM*  | 24-01021                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SML00P  | 0000621 | PROGRAM*  | 16-00424, 20-00646, 21-00654, 21-00666, 21-00674, 21-00676, 22-00702, 22-00706, 22-00714,<br>23-00727, 23-00737, 24-00757, 24-00771, 25-00773, 26-01023, 26-01031, 27-01051, 27-01052,<br>27-01054, 27-01056, 27-01057, 27-01061, 28-01064, 28-01070, 28-01073, 28-01074, 28-01101,<br>28-01107, 29-01112, 29-01115, 29-01120, 29-01121, 29-01122, 30-01133, 30-01135, 30-01137,<br>30-01144, 30-01147, 30-01151, 31-01156, 31-01161, 31-01164, 31-01165, 31-01166, 32-01171,<br>32-01173, 32-01175, 32-01177, 32-01200, 32-01203, 32-01204, 33-01211, 33-01214, 33-01217,<br>33-01221, 33-01227, 34-01231, 34-01233, 34-01235, 34-01237, 34-01241, 37-01320, 37-01327,<br>37-01331, 37-01335, 38-01336, 38-01337, 38-01346, 38-01352, 38-01356, 38-01360, 39-01372,<br>39-01375, 39-01376, 40-01403, 40-01405, 40-01410, 40-01412, 46-01536, 46-01542 |
| SML00P1 | 0000622 | PROGRAM*  | 3-00001, 3-00002, 22-00700                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| SPFILL  | 0001002 | PROGRAM*  | 19-00620, 26-01031, 27-01051                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| SPITSTR | 0001526 | PROGRAM*  | 16-00417                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SPI71   | 0001353 | PROGRAM*  | 10-00100, 38-01361                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| SPI71A  | 0001355 | PROGRAM*  | 30-01141, 38-01353, 39-01363, 39-01365, 39-01367                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| SPI71B  | 0001357 | PROGRAM*  | 30-01143, 31-01170, 36-01304, 38-01361                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| SPI710  | 0001376 | PROGRAM*  | 13-00272                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SPI711  | 0001377 | PROGRAM*  | 13-00275                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SPI711A | 0001403 | PROGRAM*  | 39-01402                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SPI712  | 0001413 | PROGRAM*  | 10-00112, 35-01264                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| SPI712A | 0001400 | PROGRAM*  | 40-01414                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SPI713  | 0001405 | PROGRAM*  | 11-00144                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SPI714  | 0001407 | PROGRAM*  | 12-00220                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SPI715  | 0001412 | PROGRAM*  | 14-00310                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SPI72   | 0001353 | PROGRAM*  | 10-00103                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SPI73   | 0001361 | PROGRAM*  | 11-00117, 11-00120, 11-00121, 11-00122, 11-00123, 11-00124, 11-00125, 11-00126, 11-00133,<br>11-00134, 11-00135, 11-00136, 11-00137, 11-00140, 11-00141, 11-00142                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| SPI74   | 0001140 | PROGRAM*  | 10-00107                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SPI75   | 0001363 | PROGRAM*  | 10-00110, 39-01365                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| SPI75E  | 0001363 | PROGRAM*  | 10-00113                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SPI76   | 0001365 | PROGRAM*  | 13-00264                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SPI77   | 0001367 | PROGRAM*  | 13-00266                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SPI78   | 0001371 | PROGRAM*  | 13-00276, 14-00315                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| SPI79   | 0001374 | PROGRAM*  | 13-00274, 17-00550, 35-01253, 35-01260                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| SPSTR1  | 0001531 | PROGRAM*  | 46-01530                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SPSTR2  | 0001532 | PROGRAM*  | 46-01530                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

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| SPSTR3   | 0001540 | PROGRAM*  | 46-01533                                                                                  |
| SPSTR4   | 0001541 | PROGRAM*  | 46-01540                                                                                  |
| SPSTR5   | 0001542 | PROGRAM*  | 46-01533                                                                                  |
| SP15     | 0000000 | EXTERNAL* | 24-00766, 27-01054, 27-01060, 30-01141, 30-01143, 30-01145, 32-01170, 32-01172, 36-01304, |
|          |         |           | 37-01320, 38-01354, 39-01364, 39-01366, 39-01370, 39-01376, 40-01411                      |
| SP30     | 0000000 | EXTERNAL* | 24-00765, 25-00774, 25-00775, 25-01007, 26-01034, 29-01123, 30-01147, 38-01352, 39-01362, |
|          |         |           | 39-01373, 39-01375, 40-01404, 40-01406, 40-01412                                          |
| SP60     | 0000000 | EXTERNAL* | 46-01532, 46-01537, 46-01540, 46-01542                                                    |
| STAR8    | 0000000 | EXTERNAL* | 20-00652, 26-01016, 27-01043, 38-01343                                                    |
| STARL    | 0000000 | EXTERNAL* | 19-00616, 26-01030, 27-01050, 38-01342                                                    |
| STARLP   | 0000002 |           | 17-00521, 20-00650                                                                        |
| STAR0    | 0000000 | EXTERNAL* | 25-01000, 25-01011, 26-01036                                                              |
| STAROP   | 0000001 |           | 17-00523                                                                                  |
| STARP    | 0000000 | EXTERNAL* | 20-00633, 21-00657, 27-01062, 28-01071, 28-01075, 28-01102, 29-01112, 35-01254            |
| STATE0   | 0000052 | PROGRAM*  | 10-00052, 10-00062, 10-00064, 10-00100, 10-00104, 10-00110, 10-00114, 10-00116, 11-00130, |
|          |         |           | 11-00144, 11-00147, 11-00153, 11-00170, 12-00211, 12-00214, 12-00222, 12-00224, 12-00226, |
|          |         |           | 13-00251, 13-00253, 13-00260, 13-00262, 13-00264, 13-00267, 13-00272, 13-00274, 13-00300, |
|          |         |           | 13-00302, 13-00304, 14-00306, 14-00310, 14-00313, 14-00315, 14-00317, 14-00317, 14-00317, |
|          |         |           | 14-00321, 14-00323, 14-00331, 14-00333, 14-00340, 15-00345, 15-00353, 15-00362, 15-00364, |
|          |         |           | 15-00367, 15-00372, 15-00374, 15-00376, 15-00403, 16-00405, 16-00407, 16-00412, 16-00414, |
|          |         |           | 16-00417, 16-00421, 19-00622                                                              |
| STKRIN   | 0000750 | PROGRAM*  | 11-00170, 12-00171, 12-00172, 12-00173, 12-00174, 12-00204, 12-00205, 12-00206            |
| STKRIN1  | 0000751 | PROGRAM*  | 24-00752                                                                                  |
| STKDO    | 0000754 | PROGRAM*  | 16-00450, 16-00452                                                                        |
| STKFUN   | 0000703 | PROGRAM*  | 11-00157, 11-00162                                                                        |
| STKID    | 0000667 | PROGRAM*  | 11-00153                                                                                  |
| STKIF    | 0001005 | PROGRAM*  | 17-00552                                                                                  |
| STKIFX   | 0001010 | PROGRAM*  | 25-01005                                                                                  |
| STKIFY   | 0001012 | PROGRAM*  | 25-01011                                                                                  |
| STKIFZ   | 0001016 | PROGRAM*  | 26-01012, 26-01014                                                                        |
| STKNUM   | 0000644 | PROGRAM*  | 11-00154                                                                                  |
| STKOL    | 0000651 | PROGRAM*  | 17-00521, 17-00523                                                                        |
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| STKP1    | 0000664 | PROGRAM*  | 21-00657, 21-00660, 21-00661, 21-00662                                                    |
| STKREL   | 0000715 | PROGRAM*  | 12-00176, 12-00177, 12-00200, 12-00201, 12-00202, 12-00203                                |
| STKREL1  | 0000716 | PROGRAM*  | 22-00717                                                                                  |
| STKRTOL  | 0000707 | PROGRAM*  | 12-00207                                                                                  |
| STKRTOL1 | 0000710 | PROGRAM*  | 22-00711                                                                                  |
| STKRTOL2 | 0000713 | PROGRAM*  | 22-00711, 22-00717, 24-00752                                                              |
| STKSTR   | 0000721 | PROGRAM*  | 17-00530                                                                                  |
| STKSTR1  | 0000722 | PROGRAM*  | 13-00303                                                                                  |
| STKSTR2  | 0000725 | PROGRAM*  | 22-00721                                                                                  |
| STKUN    | 0000701 | PROGRAM*  | 11-00155, 11-00161                                                                        |
| SUB      | 0001434 | PROGRAM*  | 12-00171                                                                                  |
| SV.SPST  | 0000000 | EXTERNAL* | 46-01527, 46-01532                                                                        |
| TEST0    | 0001220 | PROGRAM*  | 14-00335                                                                                  |
| TOKENIZ  | 0000000 | EXTERNAL* | 19-00614, 19-00617                                                                        |
| T.AMPER  | 0002044 |           | 12-00204, 12-00226, 13-00254                                                              |
| T.AREG   | 0002007 |           | 10-00053, 10-00064, 11-00131, 11-00147, 11-00165, 13-00270, 14-00325, 15-00400            |
| T.BREG   | 0002010 |           | 10-00054, 10-00065, 10-00114, 10-00116, 11-00130, 11-00150, 11-00164, 12-00216, 13-00267, |
|          |         |           | 14-00304, 14-00306, 14-00313, 14-00323, 14-00334, 15-00364, 15-00367, 15-00377, 16-00403, |
|          |         |           | 16-00405, 16-00410, 16-00412                                                              |

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| T.DADD   | 0002022 | 12-00241                                                                                                                                                       |          |
| T.DMULT  | 0002024 | 12-00243                                                                                                                                                       |          |
| T.DSUB   | 0002023 | 12-00242                                                                                                                                                       |          |
| T.EQ     | 0002036 | 10-00075, 11-00126, 11-00142, 11-00157, 12-00176, 12-00211, 15-00341, 15-00347, 15-00355                                                                       |          |
| T.EXCLAM | 0002045 | 12-00205, 12-00227, 13-00255                                                                                                                                   |          |
| T.FADD   | 0002016 | 12-00235                                                                                                                                                       |          |
| T.FDIV   | 0002021 | 12-00240                                                                                                                                                       |          |
| T.FMULT  | 0002020 | 12-00237                                                                                                                                                       |          |
| T.FSUB   | 0002017 | 12-00236                                                                                                                                                       |          |
| T.GE     | 0002041 | 12-00201, 15-00343, 15-00351, 15-00357                                                                                                                         |          |
| T.GT     | 0002040 | 12-00200, 15-00352, 15-00360                                                                                                                                   |          |
| T.ID     | 0002004 | 10-00052, 10-00071, 11-00121, 11-00135, 11-00153, 12-00214, 12-00224, 12-00232, 13-00300, 13-00302, 14-00317, 14-00321, 14-00326, 14-00336, 15-00374, 16-00414 |          |
| T.LARROW | 0002050 | 10-00062, 12-00212, 14-00331                                                                                                                                   |          |
| T.LBRACK | 0002033 | 10-00074, 11-00122, 11-00136, 11-00161                                                                                                                         |          |
| T.LE     | 0002043 | 12-00203, 15-00346, 15-00354                                                                                                                                   |          |
| T.LT     | 0002042 | 12-00202, 14-00340, 15-00345, 15-00353                                                                                                                         |          |
| T.MINUS  | 0002013 | 10-00072, 10-00102, 10-00106, 10-00112, 11-00125, 11-00141, 11-00155, 12-00171, 12-00215, 12-00234, 13-00275, 15-00376, 16-00407                               |          |
| T.MOD    | 0002032 | 12-00174                                                                                                                                                       |          |
| T.NE     | 0002037 | 12-00177, 15-00342, 15-00350, 15-00356                                                                                                                         |          |
| T.NUM    | 0002006 | 10-00067, 11-00117, 11-00133, 11-00154, 12-00220, 14-00335, 15-00362, 15-00365                                                                                 |          |
| T.PLUS   | 0002012 | 10-00073, 10-00101, 10-00105, 10-00111, 11-00124, 11-00140, 11-00145, 11-00156, 11-00170, 12-00233, 13-00265, 13-00274, 14-00311                               |          |
| T.QUEST  | 0002046 | 10-00057, 10-00076, 11-00123, 11-00137, 11-00162, 12-00206, 12-00230, 13-00256                                                                                 |          |
| T.RADU   | 0002026 | 12-00244                                                                                                                                                       |          |
| T.RBRACK | 0002034 | 12-00175                                                                                                                                                       |          |
| T.RDIV   | 0002031 | 13-00247                                                                                                                                                       |          |
| T.RMULT  | 0002030 | 13-00246                                                                                                                                                       |          |
| T.RSUB   | 0002027 | 13-00245                                                                                                                                                       |          |
| T.SEMI   | 0002053 | 10-00060, 10-00100, 10-00104, 10-00110, 11-00144, 12-00231, 13-00253, 13-00264, 13-00272, 13-00276, 14-00310, 14-00315, 14-00327, 15-00375, 16-00415, 16-00421 |          |
| T.SLASH  | 0002015 | 12-00173                                                                                                                                                       |          |
| T.STAR   | 0002014 | 11-00160, 12-00172                                                                                                                                             |          |
| T.STR    | 0002005 | 10-00070, 11-00120, 11-00134, 11-00163, 16-00417                                                                                                               |          |
| T.UARROW | 0002047 | 10-00056, 12-00207                                                                                                                                             |          |
| T.XREG   | 0002011 | 10-00055, 10-00066, 11-00132, 11-00151, 11-00166, 12-00217, 12-00222, 13-00251, 13-00260, 13-00262, 14-00324, 14-00333, 15-00370, 15-00372, 15-00401           |          |
| XOR      | 0001476 | 12-00206                                                                                                                                                       | PROGRAM* |
| XORI     | 0001477 | 43-01476                                                                                                                                                       | PROGRAM* |
| XREGINST | 0000142 | 12-00211                                                                                                                                                       |          |
| XREGI    | 0000154 | 12-00217                                                                                                                                                       |          |
| ZROINC   | 0001225 | 15-00375                                                                                                                                                       | PROGRAM* |