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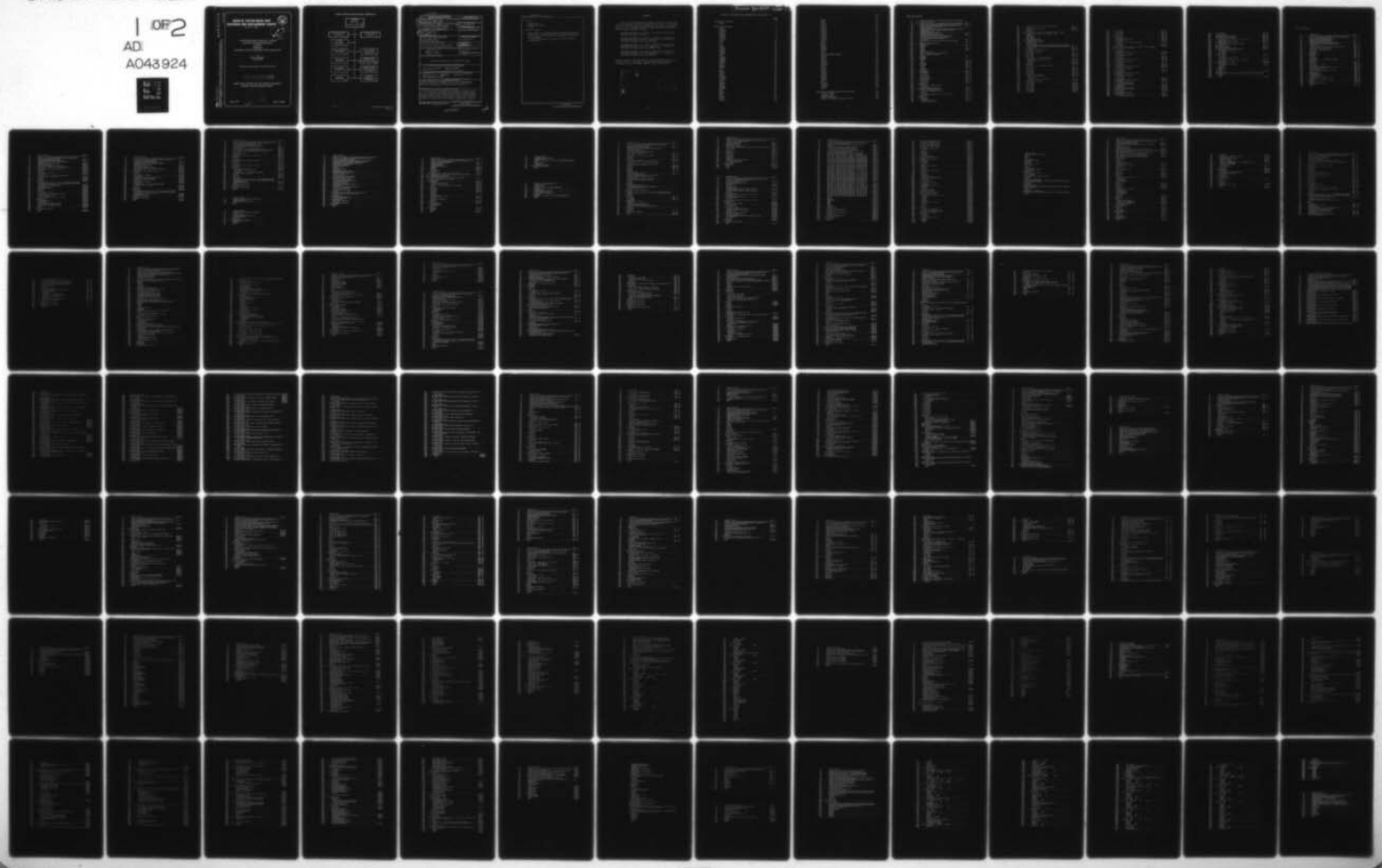

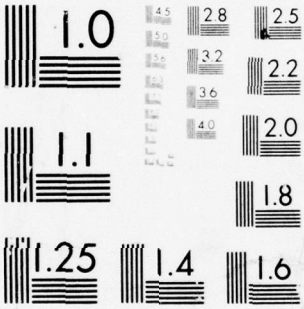

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FOR ANALYZING SESCOMP SOFTWARE
VOLUME 3
APPENDIX C
LISTINGS OF THE AUDIT SOFTWARE FOR THE UNIVAC 1108

by
Robert J. Wybraniec
Richard Regen

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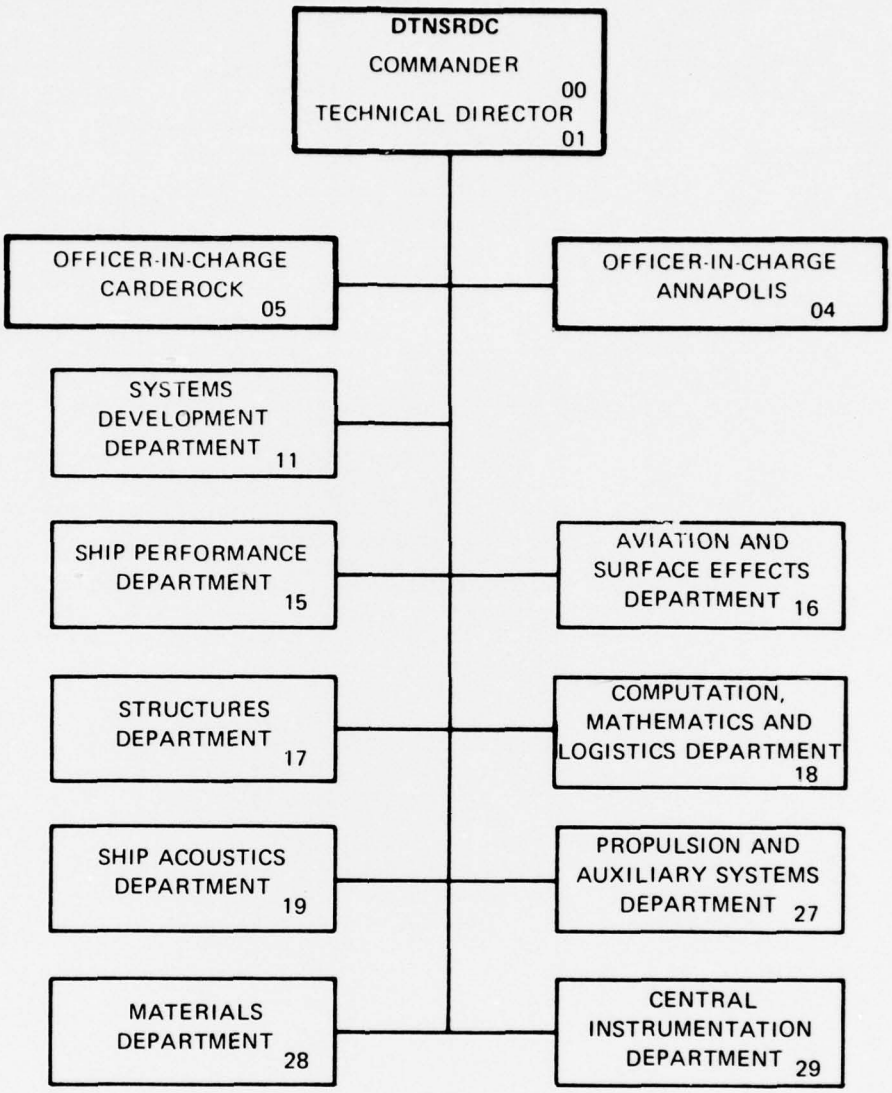

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The AUDIT documentation provides the maintenance programmer personnel with the information to effectively maintain and use the AUDIT software. The AUDIT software examines FORTRAN computer programs or modules developed under the SESCOMP system for compliance with certain prescribed standards (SESCOMPSPEC's) and produces reports detailing the deviations from those standards. The AUDIT software also examines a program unit to detect and

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report improper use of undefined variables along the program unit's possible paths. In addition, AUDIT has an option which enables the user to test the effect of changes in word length on the output of computer programs.

This report contains the listings of the AUDIT software for the UNIVAC 1108.

FOREWORD

The use and maintenance of AUDIT, a software system for analyzing SESCOMP contractor-supplied software, is documented as a set of four separately bound David W. Taylor Naval Ship Research and Development Center volumes sharing the common report number--DTNSRDC 77-0075:

- Maintenance Manual for AUDIT, a System for Analyzing SESCOMP Software, Volume 1
- Maintenance Manual for AUDIT, a System for Analyzing SESCOMP Software, Volume 2; Appendix B - Listings of the AUDIT Software for the CDC 6000
- Maintenance Manual for AUDIT, a System for Analyzing SESCOMP Software, Volume 3; Appendix C - Listings of the AUDIT Software for the UNIVAC 1108
- Maintenance Manual for AUDIT, a System for Analyzing SESCOMP Software, Volume 4; Appendix D - Listings of the AUDIT Software for the IBM 360

Volume 1 describes AUDIT and the use and maintenance of the AUDIT software. The other three volumes offer software listings for the CDC 6000, UNIVAC 1108, and IBM 360.

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AUDIT Main Program

```
C       PROGRAM MAIN(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT,TAPE7,TAPE8,
C     * TAPE9,TAPE4,TAPE99)
C****IF UNIVAC 1108 - PLACE A 'C' IN COLUMN 1 OF PREVIOUS TWO CARDS      CH34   1
        COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
      * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
      2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                   RICH   4
        DIMENSION IORD(15)
        COMMON/GLOBAL/NBLK,NREF,NSUBS,BLKTBL(200),EXTTBL(100),ISUBS(100)
        COMMON/LIST/NLIST,NINTFC,ISUBLT(3,200),INTFAC(500)
        COMMON/FLOW/IFL,IRP
        COMMON/STFUNC/NSTFNC,ISTFNC(10)
        COMMON/INPOUT/NCALL,IN,IOP                                        MAIN   7
        COMMON/LABELS/STATRA(2,200),NLABEL                                MAIN   8
        COMMON/DOLOOP/ISTACK(4,50),NSTACK,ILOOP,IOVFL#
        COMMON/BASBLK/IBLOCK(2500),NBLOCK,NB,NBRNCH
        INTEGER A,BLANK,STATRA,EXTTBL,BLKTBL
        DATA BLANK/1H /                                                   MAIN  15
        DATA IORD/29,30,31,32,25,28,19,20,21,22,23,24,26,27,35/
        IOP=8                                                             MAIN  18
        READ(5,12) MODE,IN,IFL,INTR
     12 FORMAT(I1,3I4)
        NCALL=0                                                           CH34   2
        NPROG=99
        NREF=0                                                            CH34   3
        NBLK=0                                                            CH34   4
        NSUBS=0                                                           CH34   5
        IRP=IFL-1
        READ(4) NLIST,NINTFC
        READ(4) ((ISUBLT(I,J),I=1,3),J=1,NLIST)
        READ(4) (INTFAC(I),I=1,NINTFC)
      4 ISTAT=0                                                           CH34  12
        IOVFL#=0
        MAINPR=0
        NLABEL=0
        NID=0                                                             CH34  13
        JJ=0                                                              CH34  14
        IBLKDT=0                                                          CH34  15
        NSTACK=0                                                          CH34  16
        NBLOCK=0                                                          CH34  17
        ILOOP=0                                                           CH34  18
        NB=0                                                              CH34  19
        IBLKST=0                                                          CH34  20
        NSTFNC=0
        #RITE(6,13)                                                       MAIN  38
     13 FORMAT(1H1)                                                       MAIN  39
        IFNCNM=BLANK                                                      MAIN  40
        DO 2 I=1,8                                                        MAIN  41
        DO 2 J=1,500                                                      MAIN  42
      2 IDTBL(I,J)=0                                                      MAIN  43
        DO 3 I=1,200                                                      MAIN  44
        STATRA(1,I)=0                                                     MAIN  45
      3 STATRA(2,I)=0                                                     MAIN  46
        DO 5 I=1,3                                                        MAIN  47
        INITID(I)=0                                                       MAIN  48
      5 LASTID(I)=0                                                       MAIN  49
    700 CONTINUE
        IF(NBLOCK .GT. 2500) GO TO 7000
        CALL BUILD                                                        MAIN  51
        #RITE(6,1000) (A(I),I=1,N)                                        MAIN  52
   1000 FORMAT(//6X,100A1,13(/6X,100A1))                                  MAIN  53
        IF(A(1) .EQ. 1HC) GO TO 700                                       MAIN  54
        IF(NEXT(1) .EQ. BLANK) GO TO 700                                  MAIN  55
        JJ=JJ+1                                                           MAIN  56
        CALL CLASS                                                        MAIN  57
        IF(ITYP .GT. 18 .AND. ITYP .NE. 28) GO TO 1320                    MAIN  58
        CALL STATNO                                                       MAIN  59
   1320 JPTR=7                                                            MAIN  60
        IPREC=ISTAT                                                       MAIN  61
        ISTAT=ITYP                                                        MAIN  62
        IF(JJ .EQ. 1) GO TO 7                                             MAIN  63
        IF(IBLKDT .EQ. 0) GO TO 6                                         MAIN  64
```

```
      IF(ITYP .GE. 18 .AND. ITYP .LE. 27) GO TO 8                       MAIN  65
      GO TO 220                                                         MAIN  66
    6 IF(LTYP .EQ. 9) GO TO 120                                         MAIN  67
      GO TO 8                                                           MAIN  68
    7 IPREC=29
C*****IF CDC 6700 - PLACE A :C: IN COLUMN 1 OF NEXT  4 CARDS
      IF(ITYP .GE. 29 .AND. ITYP .LE. 32) GO TO 25
      MAINPR=1
      NXTID=4HMAIN
      CALL PROG
   25 NPROG=NPROG+1
      WRITE(IOP,900) NPROG
  900 FORMAT(10H@FOR,I PRG,I3)
      IF(MAINPR .EQ. 0) GO TO 8
      WRITE(IOP,610)
      WRITE(IOP,620)
    8 GO TO (60,70,80,90,100,110,20,140,20,20,40,40,50,50,50,120,130,   MAIN  70
     1 2000,10,10,10,10,10,170,180,190,200,210,150,38,30,220,220,220,
     2 220,220),ITYP                                                    MAIN  72
   10 DO 15 I=1,11                                                      MAIN  73
      IF(IPREC .EQ. IORD(I)) GO TO 17                                   MAIN  74
   15 CONTINUE                                                          MAIN  75
      CALL ERROR(2,KDM1,KDM2)
   17 CALL TYPE                                                         MAIN  77
      GO TO 500                                                         MAIN  78
   20 CALL SIMP                                                         MAIN  79
      GO TO 500                                                         MAIN  80
   30 IF(JJ .NE. 1) CALL ERROR(2,KDM1,KDM2)
      DO 35 I=1,20                                                      MAIN  82
      IF(NEXT(JPTR) .NE. IHF) GO TO 35                                  MAIN  83
      JPTR=JPTR-1                                                       MAIN  84
      CALL SUB                                                          MAIN  85
      GO TO 500                                                         MAIN  86
   35 CONTINUE                                                          MAIN  87
   38 IF(JJ .NE. 1) CALL ERROR(2,KDM1,KDM2)
      CALL SUB                                                          MAIN  89
      GO TO 500                                                         MAIN  90
   40 CALL IO                                                           MAIN  91
      GO TO 500                                                         MAIN  92
   50 CALL AUXIO                                                        MAIN  93
      GO TO 500                                                         MAIN  94
   60 CALL INIT                                                         MAIN  95
      WRITE(6,66) (A(I),I=1,N)                                          MAIN  96
      IF(ITYP .NE. 35) GO TO 500                                        MAIN  97
      ISTAT=35                                                          MAIN  98
      DO 67 I=1,15
      IF(IPREC .EQ. IORD(I)) GO TO 500                                  MAIN 100
   67 CONTINUE                                                          MAIN 101
      CALL ERROR(2,KDM1,KDM2)
      GO TO 500                                                         MAIN 103
   70 CALL ASSIGN                                                       MAIN 104
      GO TO 500                                                         MAIN 105
   80 CALL GOTO                                                         MAIN 106
      GO TO 500                                                         MAIN 107
   90 CALL ASGOTO                                                       MAIN 108
      GO TO 500                                                         MAIN 109
  100 CALL CTGOTO                                                       MAIN 110
      GO TO 500                                                         MAIN 111
```

```
  110 CALL ARIF                                                         MAIN 112
      GO TO 500                                                         MAIN 113
  120 CALL LOGIF                                                        MAIN 114
      GO TO 500                                                         MAIN 115
  130 CALL DO                                                           MAIN 116
      GO TO 500                                                         MAIN 117
  140 CALL CALL                                                         MAIN 118
      WRITE(6,66) (A(I),I=1,N)                                          MAIN 119
   66 FORMAT(6X,72A1)                                                   MAIN 120
      GO TO 500                                                         MAIN 121
  150 IF(JJ .NE. 1) CALL ERROR(2,KDM1,KDM2)
      IBLKDT=1                                                          MAIN 123
      CALL SIMP                                                         MAIN 124
      GO TO 500                                                         MAIN 125
C*****IF UNIVAC 1108 - PLACE A :C: IN COLUMN 1 OF NEXT 3 CARDS
C 160 IF(JJ .NE. 1) CALL ERROR(2)
C     CALL PROG
C     GO TO 500
  170 DO 175 I=1,12                                                     MAIN 129
      IF(IPREC .EQ. IORD(I)) GO TO 177                                  MAIN 130
  175 CONTINUE                                                          MAIN 131
      CALL ERROR(2,KDM1,KDM2)
  177 CALL DIMEN                                                        MAIN 133
      GO TO 500                                                         MAIN 134
  180 DO 185 I=1,5                                                      MAIN 135
      IF(IPREC .EQ. IORD(I)) GO TO 187                                  MAIN 136
  185 CONTINUE                                                          MAIN 137
      CALL ERROR(2,KDM1,KDM2)
  187 CALL COM                                                          MAIN 139
      GO TO 500                                                         MAIN 140
  190 DO 195 I=1,13                                                     MAIN 141
      IF(IPREC .EQ. IORD(I)) GO TO 197                                  MAIN 142
  195 CONTINUE                                                          MAIN 143
      CALL ERROR(2,KDM1,KDM2)
  197 CALL EQUIV                                                        MAIN 145
      GO TO 500                                                         MAIN 146
  200 DO 205 I=1,14
      IF(IPREC .EQ. IORD(I)) GO TO 207
  205 CONTINUE
      CALL ERROR(2,KDM1,KDM2)
  207 CALL DATA
      GO TO 500                                                         MAIN 148
  210 DO 215 I=1,6                                                      MAIN 149
      IF(IPREC .EQ. IORD(I)) GO TO 217                                  MAIN 150
  215 CONTINUE                                                          MAIN 151
      CALL ERROR(2,KDM1,KDM2)
  217 IF(N .GT. 72) GO TO 240                                           MAIN 153
      WRITE(IOP,218) (A(I),I=1,N)                                       MAIN 154
  218 FORMAT(72A1)                                                      MAIN 155
      GO TO 250                                                         MAIN 156
  240 WRITE(IOP,245) (A(I),I=1,N)                                       MAIN 157
  245 FORMAT(72A1/(5X,1H*,66A1))                                        MAIN 158
  250 CALL FRMAT                                                        MAIN 159
      GO TO 700                                                         MAIN 160
  220 CALL ERROR(1,KDM1,KDM2)
  500 CONTINUE                                                          MAIN 162
      IF(N .GT. 72) GO TO 540                                           MAIN 163
      WRITE(IOP,520) (A(I),I=1,N)                                       MAIN 164
```

```
  520 FORMAT(72A1)                                                      MAIN 165
      GO TO 600                                                         MAIN 166
  540 WRITE(IOP,545) (A(I),I=1,N)                                       MAIN 167
  545 FORMAT(72A1/(5X,1H*,66A1))                                        MAIN 168
  600 IF(MODE .NE. 1) GO TO 700                                         MAIN 169
      IF(ITYP .LT. 30 .OR. ITYP .GT. 32) GO TO 700                      MAIN 170
      WRITE(IOP,610)                                                    MAIN 171
  610 FORMAT(5X,15H COMPLEX QICOMP)                                     MAIN 172
      WRITE(IOP,620)                                                    MAIN 173
  620 FORMAT(5X,24H DOUBLE PRECISION QIOPRE)                            MAIN 174
      GO TO 700
 2000 WRITE(IOP,2020)                                                   MAIN 176
 2020 FORMAT(6X,3HEND)                                                  MAIN 177
      IF(N .NE. 72) WRITE(6,2100)                                       MAIN 178
 2100 FORMAT(6X,22H ILLEGAL END STATEMENT)                              MAIN 179
      CALL SUBCHK
      IF(INTR .NE. 1) GO TO 3205
      CALL INTRIN
 3205 CALL SYMTAB
      CALL GRT                                                          MAIN 181
      CALL COMCHK
      IF(IOVFLW .EQ. 1) GO TO 3210
      CALL LOOPCK                                                       MAIN 182
      IF(IFL .EQ. 0 .OR. IBLKDT .EQ. 1) GO TO 3210
      CALL FLOWCK                                                       MAIN 184
 3210 IF(IERR .NE. 2) GO TO 4                                           MAIN 185
      CALL GLOTAB                                                       MAIN 186
      IF(MODE .EQ. 1) GO TO 6000
      CALL GENROL                                                       MAIN 188
      ENDFILE 9
      REWIND 9
 6000 ENDFILE 8
      REWIND 8
      STOP                                                              MAIN 200
 7000 WRITE(6,7005)
 7005 FORMAT(/////5X,54H OVERFLOW OF BASIC BLOCK TABLE - PROCESSING TERM
     *INATED)
      STOP
      END                                                               MAIN 201
```

AUDIT Subprograms

```
      SUBROUTINE ARIF                                                   ARIF   2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      COMMON/TYP/NQQ,RHSTYP,NQ2,NQ3,LHSTYP
      COMMON/STRING/NTYPE,NSTR,STR(500)                                 ARIF   5
      COMMON/LABELS/STATRA(2,200),NLABEL                                ARIF   6
      COMMON/BASBLK/IBLOCK(2500),NBLOCK,NB,NBRNCH
      INTEGER A,STATRA,STR,COMMA,BLANK,RHSTYP,AY,EF                     ARIF   8
      INTEGER BITPUT                                                    ARIF   9
      DATA LPAR/1H(/,COMMA/1H,/,BLANK/1H /,AY/1HI/,EF/1HF/              ARIF  10
      IF(NEXT(JPTR) .NE. AY) GO TO 20                                   ARIF  11
      IF(NEXT(JPTR) .NE. EF) GO TO 20                                   ARIF  12
      IF(NEXT(JPTR) .NE. LPAR) GO TO 20                                 ARIF  13
      JPTR=JPTR-1                                                       ARIF  14
      CALL EXPR                                                         ARIF  15
      NSTR=NSTR+1                                                       ARIF  16
      STR(NSTR)= -5                                                     ARIF  17
      NTYPE=1                                                           ARIF  18
      CALL PARSE                                                        ARIF  19
      CALL FNCSTR                                                       ARIF  20
      IF(RHSTYP .EQ. 1) CALL ERROR(42,KDM1,KDM2)
      CALL BLKSTR
      NBRNCH=0                                                          ARIF  22
      DO 10 I=1,3                                                       ARIF  23
      CALL GNLE                                                         ARIF  24
      IF(JTYP .NE. 5) GO TO 20                                          ARIF  25
      CALL STSRCH                                                       ARIF  26
      STATRA(2,LOC)=BITPUT(STATRA(2,LOC),1,12)                          ARIF  27
      IF( NBRNCH .EQ. 0) GO TO 5                                        ARIF  28
      DO 3 J=1,NBRNCH                                                   ARIF  29
      IF(LOC .EQ. IBLOCK(NBLOCK-J+1)) GO TO 7                           ARIF  30
    3 CONTINUE                                                          ARIF  31
    5 NBLOCK=NBLOCK+1                                                   ARIF  32
      IBLOCK(NBLOCK)=LOC                                                ARIF  33
      NBRNCH=NBRNCH+1                                                   ARIF  34
    7 IF(I .EQ. 3) GO TO 10                                             ARIF  35
      IF(NEXT(JPTR) .NE. COMMA) GO TO 20                                ARIF  36
   10 CONTINUE                                                          ARIF  37
      IF(NEXT(JPTR) .NE. BLANK) GO TO 20                                ARIF  38
      NB=1                                                              ARIF  39
      RETURN                                                            ARIF  40
   20 CALL ERROR(7,KDM1,KDM2)
      RETURN                                                            ARIF  42
      END                                                               ARIF  43
```

```
      SUBROUTINE ASGOTO                                                 ASGOTO 2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      COMMON/LABELS/STATRA(2,200),NLABEL                                ASGOTO 4
      COMMON/BASBLK/IBLOCK(2500),NBLOCK,NB,NBRNCH
      DIMENSION IALPH(4)                                                ASGOTO 6
      INTEGER STATRA,BLANK,COMMA,RPAR,A                                 ASGOTO 7
      INTEGER BITPUT,BITGET                                             ASGOTO 8
      DATA (IALPH(I),I=1,4)/1HG,1HO,1HT,1HO/                            ASGOTO 9
      DATA BLANK/1H /,COMMA/1H,/,LPAR/1H(/,RPAR/1H)/                    ASGOTO10
      DO 5 I=1,4                                                        ASGOTO11
      IF(NEXT(JPTR) .NE. IALPH(I)) GO TO 30                             ASGOTO12
    5 CONTINUE                                                          ASGOTO13
      CALL GNLE                                                         ASGOTO14
      IF(JTYP .NE. 2) GO TO 30                                          ASGOTO15
      CALL SEARCH                                                       ASGOTO16
      IF(ISRCH(2) .EQ. 1) CALL ERROR(10,NXTID,KDM2)
      IF(ISRCH(1) .EQ. 1) GO TO 10                                      ASGOTO18
      IDTYP=1                                                           ASGOTO19
      CALL STORE                                                        ASGOTO20
      LOC=NID                                                           ASGOTO21
   10 CALL IMPTYP                                                       ASGOTO22
      IF(BITGET(IDTBL(3,LOC),10,3) .NE. 4) CALL ERROR(39,NXTID,KDM2)
      IF(BITGET(IDTBL(3,LOC),1,1) .EQ. 1) CALL ERROR(14,NXTID,KDM2)
      IF(NEXT(JPTR) .NE. COMMA) GO TO 30                                ASGOTO25
      IF(NEXT(JPTR) .NE. LPAR) GO TO 30                                 ASGOTO26
      NBLOCK=NBLOCK+1                                                   ASGOTO27
      IBLOCK(NBLOCK)=5000+LOC                                           ASGOTO28
      NBRNCH=0                                                          ASGOTO29
   20 CALL GNLE                                                         ASGOTO30
      IF(JTYP .NE. 5) GO TO 30                                          ASGOTO31
      CALL STSRCH                                                       ASGOTO32
      STATRA(2,LOC)=BITPUT(STATRA(2,LOC),1,12)                          ASGOTO33
      IF(NBRNCH .EQ. 0) GO TO 25                                        ASGOTO34
      DO 22 I=1,NBRNCH                                                  ASGOTO35
      IF(LOC .EQ. IBLOCK(NBLOCK-I+1)) GO TO 27                          ASGOTO36
   22 CONTINUE                                                          ASGOTO37
   25 NBLOCK=NBLOCK+1                                                   ASGOTO38
      IBLOCK(NBLOCK)=LOC                                                ASGOTO39
      NBRNCH=NBRNCH+1                                                   ASGOTO40
   27 IF(NEXT(JPTR) .EQ. COMMA) GO TO 20                                ASGOTO41
      IF(A(JPTR-1) .NE. RPAR) GO TO 30                                  ASGOTO42
      IF(NEXT(JPTR) .NE. BLANK) GO TO 30                                ASGOTO43
      NB=1                                                              ASGOTO44
      RETURN                                                            ASGOTO45
   30 CALL ERROR(7,KDM1,KDM2)
      RETURN                                                            ASGOTO47
      END                                                               ASGOTO48
```

```
      SUBROUTINE ASSIGN                                                 ASSIGN 2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      COMMON/LABELS/STATRA(2,200),NLABEL                                ASSIGN 4
      COMMON/BASBLK/IBLOCK(2500),NBLOCK,NB,NBRNCH
      DIMENSION IALPH(6)                                                ASSIGN 6
      INTEGER BLANK,TEE,OH,STATRA                                       ASSIGN 7
      INTEGER BITPUT,BITGET                                             ASSIGN 8
      DATA BLANK/1H /,TEE/1HT/,OH/1HO/                                  ASSIGN 9
      DATA (IALPH(I),I=1,6)/1HA,1HS,1HS,1HI,1HG,1HN/                    ASSIGN10
      DO 5 I=1,6                                                        ASSIGN11
      IF(NEXT(JPTR) .NE. IALPH(I)) GO TO 20                             ASSIGN12
    5 CONTINUE                                                          ASSIGN13
      CALL GNLE                                                         ASSIGN14
      IF(JTYP .NE. 5) GO TO 20                                          ASSIGN15
      CALL STSRCH                                                       ASSIGN16
      STATRA(2,LOC)=BITPUT(STATRA(2,LOC),1,12)                          ASSIGN17
      IF(NEXT(JPTR) .NE. TEE) GOTO 20                                   ASSIGN18
      IF(NEXT(JPTR) .NE. OH) GO TO 20                                   ASSIGN19
      CALL GNLE                                                         ASSIGN20
      IF(JTYP .NE. 2) GO TO 20                                          ASSIGN21
      CALL SEARCH                                                       ASSIGN22
      IF(ISRCH(2) .EQ. 1) CALL ERROR(10,NXTID,KDM2)
      IF(ISRCH(1) .EQ. 1) GO TO 10                                      ASSIGN24
      IDTYP=1                                                           ASSIGN25
      CALL STORE                                                        ASSIGN26
      LOC=NID                                                           ASSIGN27
   10 CALL IMPTYP                                                       ASSIGN28
      IF(BITGET(IDTBL(3,LOC),10,3) .NE. 4) CALL ERROR(39,NXTID,KDM2)
      IF(BITGET(IDTBL(3,LOC),1,1) .EQ. 1) CALL ERROR(14,NXTID,KDM2)
      IF(NEXT(JPTR) .NE. BLANK) GO TO 20                                ASSIGN31
      NBLOCK=NBLOCK+1                                                   ASSIGN32
      IBLOCK(NBLOCK)=4000+LOC                                           ASSIGN33
      RETURN                                                            ASSIGN34
   20 CALL ERROR(7,KDM1,KDM2)
      RETURN                                                            ASSIGN36
      END                                                               ASSIGN37
```

```
      SUBROUTINE AUXIO                                                  AUXIO  2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      COMMON/BASBLK/IBLOCK(2500),NBLOCK,NB,NBRNCH
      DIMENSION IALPH1(6),IALPH2(9),IALPH3(7)                           AUXIO  5
      INTEGER BITGET                                                    AUXIO  6
      DATA (IALPH1(I),I=1,6)/1HR,1HE,1HW,1HI,1HN,1HD/                   AUXIO  7
      DATA (IALPH2(I),I=1,9)/1HB,1HA,1HC,1HK,1HS,1HP,1HA,1HC,1HE/       AUXIO  8
      DATA (IALPH3(I),I=1,7)/1HE,1HN,1HD,1HF,1HI,1HL,1HE/               AUXIO  9
      IT=16-ITYP                                                        AUXIO 10
      GO TO (25,15,5),IT                                                AUXIO 11
    5 DO 10 I=1,6                                                       AUXIO 12
      IF(NEXT(JPTR) .NE. IALPH1(I)) GO TO 50                            AUXIO 13
   10 CONTINUE                                                          AUXIO 14
      GO TO 40                                                          AUXIO 15
   15 DO 20 I=1,9                                                       AUXIO 16
      IF(NEXT(JPTR) .NE. IALPH2(I)) GO TO 50                            AUXIO 17
   20 CONTINUE                                                          AUXIO 18
      GO TO 40                                                          AUXIO 19
   25 DO 30 I=1,7                                                       AUXIO 20
      IF(NEXT(JPTR) .NE. IALPH3(I)) GO TO 50                            AUXIO 21
   30 CONTINUE                                                          AUXIO 22
   40 CALL GNLE                                                         AUXIO 23
      IF(JTYP .NE. 2) GO TO 60                                          AUXIO 24
      IF(NEXT(JPTR) .NE. 1H ) GO TO 50                                  AUXIO 25
      CALL SEARCH                                                       AUXIO 26
      IF(ISRCH(2) .EQ. 1) CALL ERROR(10,NXTID,KDM2)
      IF(ISRCH(1) .EQ. 1) GO TO 45                                      AUXIO 28
      IDTYP=1                                                           AUXIO 29
      CALL STORE                                                        AUXIO 30
      LOC=NID                                                           AUXIO 31
   45 CALL IMPTYP                                                       AUXIO 32
      IF(BITGET(IDTBL(3,LOC),10,3) .NE. 4) CALL ERROR(22,KDM1,KDM2)
      IF(BITGET(IDTBL(3,LOC),1,1) .EQ. 1) CALL ERROR(14,NXTID,KDM2)
      NBLOCK=NBLOCK+1                                                   AUXIO 35
      IBLOCK(NBLOCK)=2000+LOC                                           AUXIO 36
      RETURN                                                            AUXIO 37
   60 CALL ERROR(7,KDM1,KDM2)
      RETURN                                                            AUXIO 39
   60 CALL ERROR(22,KDM1,KDM2)
      RETURN                                                            AUXIO 41
      END                                                               AUXIO 42
```

```
      COMPILER(FLD=ABS)
      INTEGER FUNCTION BITGET(ILOC,IPOS,IWIDTH)
      ISTART=IPOS-IWIDTH
      BITGET=FLD(ISTART,IWIDTH,ILOC)
      RETURN
      END
```

```
      COMPILER(FLD=ABS)
      INTEGER FUNCTION BITPUT(ILOC,IVAL,IPOS)
      JLOC=ILOC
      DO 10 IWIDTH=1,36
      IF(IVAL .GE. 2**IWIDTH) GO TO 10
      IBIT=IPOS-IWIDTH
      GO TO 15
   10 CONTINUE
   15 FLD(IBIT,IWIDTH,JLOC)=IVAL
      BITPUT=JLOC
      RETURN
      END
```

```
      SUBROUTINE BLKSTR
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES
      COMMON/FUNC/IFNCRA(5,17),MARGS,IARGS(50),FNCLOC(5),NFUNC
      COMMON/LIST/NLIST,NINTFC,ISUBLT(3,200),INTFAC(500)
      COMMON/BASBLK/IBLOCK(2500),NBLOCK,NB,NBRNCH
      INTEGER BITPUT,BITGET,FNCLOC
      IF(MARGS .EQ. 0) RETURN
      DO 100 I=1,MARGS
      IOSTAT=2
      ICOL=18*MOD(I-1,2)+9
      IVR=(I+1)/2
      LOC=BITGET(IARGS(IVR),ICOL,9)
      NFNC=BITGET(IARGS(IVR),ICOL+3,3)
      IF(NFNC .EQ. 0) GO TO 60
      ILOC=FNCLOC(NFNC)
      NARG=BITGET(IARGS(IVR),ICOL+9,6)
      INDEX=BITGET(IDTBL(3,ILOC),36,9)
      IF(INDEX .EQ. 0) GO TO 60
      IPTR=ISUBLT(3,INDEX)+(NARG-1)/4
      JVAR=BITGET(ISUBLT(2,INDEX ),14,1)
      ICOL=9*MOD(NARG-1,4)+8
      IF(JVAR .EQ. 1) ICOL=8
      IOSTAT=BITGET(INTFAC(IPTR),ICOL,2)
      KPTR=(NARG+7)/4
      IEXP=BITGET(IFNCRA(NFNC,KPTR),ICOL+1,1)
      IF(IOSTAT .EQ. 2) GO TO 60
      IF(IEXP .NE. 0) GO TO 40
      IF(IOSTAT .EQ. 1) GO TO 60
      GO TO 80
   40 IF(BITGET(ISUBLT(2,INDEX),10,4) .NE. 0) GO TO 90
      INTFAC(IPTR)=BITPUT(INTFAC(IPTR),2,ICOL)
      IOSTAT=2
   60 NBLOCK=NBLOCK+1
      IBLOCK(NBLOCK)=2000+LOC
      IF(IOSTAT .EQ. 2) GO TO 100
   80 NBLOCK=NBLOCK+1
      IBLOCK(NBLOCK)=1000+LOC
      GO TO 100
   90 CALL ERROR(55,NARG,KDM2)
  100 CONTINUE
      RETURN
      END
```

```
      SUBROUTINE BUILD                                                  BUILD  2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      COMMON/INPOUT/NCALL,IN,IOP                                        BUILD  4
      INTEGER A,B,BLANK                                                 BUILD  5
      COMMON/WASTE/B(72)
      DATA BLANK/1H /,ICE/1HC/                                          BUILD  7
      IERR=0                                                            BUILD  8
      NFIRST=1                                                          BUILD  9
      NCONTU=0                                                          BUILD 10
      NCALL=NCALL+1                                                     BUILD 11
   50 CONTINUE
      IF(NFIRST .EQ. 1 .AND. NCALL .NE. 1) GO TO 1                      BUILD 13
C****IF UNIVAC 1108 - PLACE A 'C' IN COLUMN 1 OF NEXT TWO CARDS         CH34  21
C     READ(IN,100) (B(I),I=1,72)
C     IF(EOF(IN) .NE. 0) GO TO 10
C****IF CDC 6700 - PLACE A 'C' IN COLUMN 1 OF NEXT CARD                 CH34  23
      READ(IN,100,END=10) (B(I),I=1,72)
  100 FORMAT(72A1)                                                      BUILD 15
    1 CONTINUE                                                          BUILD 17
      IF(NFIRST .EQ. 1) GO TO 2                                         BUILD 18
      IF(B(1) .EQ. ICE) GO TO 9                                         BUILD 19
      IF(B(6) .NE. BLANK .AND. B(6) .NE. 0) GO TO 6                     BUILD 20
      GO TO 9                                                           BUILD 21
    2 CONTINUE                                                          BUILD 22
      DO 3 I=1,72                                                       BUILD 23
      A(I)=B(I)                                                         BUILD 24
    3 CONTINUE                                                          BUILD 25
      NFIRST=0                                                          BUILD 26
      NCHAR=72
      GO TO 50
    6 NCONTU=NCONTU+1                                                   BUILD 28
      IF(NCONTU .LE. 19) GO TO 7                                        BUILD 29
      IERR=1                                                            BUILD 30
      CALL ERROR(4,KDM1,KDM2)
      RETURN                                                            BUILD 32
    7 CONTINUE                                                          BUILD 33
      DO 8 I=1,66                                                       BUILD 34
    8 A(NCHAR+I)=B(I+6)
      NCHAR=NCHAR+66
      GO TO 50
   10 IERR=2                                                            BUILD 39
    9 CONTINUE                                                          BUILD 40
      N=NCHAR
      RETURN                                                            BUILD 42
      END                                                               BUILD 44
```

```
      COMPILER(FLD=ABS)
      SUBROUTINE CAA(ISTR,MSTR,ID)
      DIMENSION ISTR(6)
      IF(MSTR .GT. 6 .AND. ITYP .NE. 28) CALL ERROR(6,KDM1,KDM2)
      ID=1H
      DO 20 I=1,MSTR
      IBIT=6*(I-1)
      ICHAR=FLD(0,6,ISTR(I))
   20 FLD(IBIT,6,ID)=ICHAR
      RETURN
      END
```

```
      SUBROUTINE CAI(ISTR,MSTR,INTVAL)
      DIMENSION ISTR(10)
      INTEGER BITGET
      IF(MSTR .GT. 10) CALL ERROR(3,KDM1,KDM2)
      INTVAL=0
      DO 10 I=1,MSTR
      INT=BITGET(ISTR(I),6,6)-48
      IF(INT .EQ. 0) GO TO 10
      INTVAL=INTVAL+INT*10**(MSTR-I)
   10 CONTINUE
      IF(INTVAL .GT. (2**31-1)) CALL ERROR(3,KDM1,KDM2)
      RETURN
      END
```

```
      SUBROUTINE CALL                                                   CALL   2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     • JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      COMMON/STRING/NTYPE,NSTR,STR(500)                                 CALL   4
      COMMON/LIST/NLIST,NINTFC,ISUBLT(3,200),INTFAC(500)
      DIMENSION IALPH(4)
      INTEGER BLANK,BITPUT,BITGET
      DATA (IALPH(I),I=1,4)/IHC,IHA,IHL,IHL/                            CALL  11
      DATA LPAR/1H(/,BLANK/1H /
      DO 5 I=1,4                                                        CALL  14
      IF(NEXT(JPTR) .NE. IALPH(I)) GO TO 50                             CALL  15
    5 CONTINUE                                                          CALL  16
      IPTR=JPTR
    7 CALL GNLE                                                         CALL  17
      IF(JTYP .NE. 2) GO TO 50                                          CALL  18
      IF(NXTID .EQ. IFNCNM) CALL ERROR(10,NXTID,KDM1)
      CALL SEARCH                                                       CALL  20
      IF(ISRCH(1) .EQ. 1) CALL ERROR(24,NXTID,KDM2)
      IF(ISRCH(2) .EQ. 1) GO TO 8                                       CALL  22
      IDTYP=2                                                           CALL  23
      CALL STORE                                                        CALL  24
      LOC=NID                                                           CALL  25
    8 CONTINUE                                                          CALL  26
      ILOC=LOC
      NXT=NEXT(JPTR)                                                    CALL  32
      IF(NXT .EQ. LPAR) GO TO 17
      IF(NXT .NE. BLANK) GO TO 50                                       CALL  34
      IF(BITGET(IDTBL(3,LOC),18,1) .EQ. 1) GO TO 20
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),1,18)
      DO 10 I=1,NLIST
      IF(IDTBL(1,LOC) .NE. ISUBLT(1,I)) GO TO 10
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),1,36)
      LISTLC=I
      GO TO 22
   10 CONTINUE
      NLIST=NLIST+1
      ISUBLT(1,NLIST)=IDTBL(1,LOC)
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),NLIST,36)
      CALL ERROR(52,KDM1,KDM2)
      RETURN
   20 LISTLC=BITGET(IDTBL(3,LOC),36,9)
   22 CONTINUE
      IF(BITGET(ISUBLT(2,LISTLC),6,6) .NE. 0) CALL ERROR(26,KDM1,KDM2)
      RETURN
   17 JPTR=IPTR
      NTYPE=1
      CALL EXPR                                                         CALL  69
      CALL PARSE                                                        CALL  70
      CALL FNCSTR                                                       CALL  71
      CALL BLKSTR
   47 IF(MODE .EQ. 1) GO TO 48
      LOC=ILOC
      INDEX=BITGET(IDTBL(3,LOC),36,9)
      KLAS=BITGET(ISUBLT(2,INDEX),10,4)
      IF(KLAS .EQ. 1 .OR. KLAS .EQ. 2) CALL CALL2
      RETURN
   48 JPTR=IPTR-1
      CALL CNVRT
      RETURN                                                            CALL  98
   50 CALL ERROR(7,KDM1,KDM2)
      RETURN                                                            CALL 100
      END                                                               CALL 101
```

```
      SUBROUTINE CALL2                                                  CALL2  2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      INTEGER A,D,COMMA,RPAR                                            CALL2  5
      INTEGER BITPUT,BITGET                                             CALL2  6
      DIMENSION IALPH(13)                                               CALL2  7
      DATA RPAR/1H)/,COMMA/1H,/                                         CALL2  8
      DATA (IALPH(I),I=1,13)/1HC,1HA,1HL,1HL,1H ,1HR,1HO,1HL,1HC,1HH,   CALL2  9
     1 1HK,1H ,1H(/                                                     CALL2 10
      DO 15 J=1,13                                                      CALL2 11
      K=J+6                                                             CALL2 12
      A(K)=IALPH(J)                                                     CALL2 13
   15 CONTINUE                                                          CALL2 14
      DO 20 I=1,6                                                       CALL2 15
      KK=19+4*I                                                         CALL2 16
      A(KK-3)=1H1                                                       CALL2 17
      A(KK-2)=1HH                                                       CALL2 18
      IPOS=6*I                                                          CALL2 19
      IVL=BITGET(IDTBL(1,LOC),IPOS,6)
      A(KK-1)=BITPUT(0,IVL,6)                                           CH33   2
      IF(I .EQ. 6) GO TO 25                                             CALL2 22
   20 A(KK)=COMMA                                                       CALL2 23
   25 A(KK)=RPAR                                                        CALL2 24
      N=KK                                                              CALL2 25
      RETURN                                                            CALL2 26
      END                                                               CALL2 27
```

```
      SUBROUTINE CHKLST                                                 CH34  36
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      DIMENSION IQUIV(100)                                              CHKLIST4
      EQUIVALENCE (IQUIV(1),A(301))
      INTEGER BITGET                                                    CHKLIST5
      NQUIV=0                                                           CHKLIST6
      DO 30 LOC=1,NID                                                   CHKLIST7
      IDTBL(8,LOC)=0
      IF(BITGET(IDTBL(3,LOC),14,1) .EQ. 1) GO TO 20                     CHKLIST8
      IF(BITGET(IDTBL(3,LOC),16,1) .EQ. 1) GO TO 5                      CHKLIST9
      IF(BITGET(IDTBL(3,LOC),12,1) .EQ. 1) GO TO 15
      GO TO 10                                                          CHKLIS12
    5 IDTBL(8,LOC)=1                                                    CHKLIS13
   10 IF(BITGET(IDTBL(3,LOC),17,1) .NE. 1) GO TO 30                     CHKLIS14
      NQUIV=NQUIV+1                                                     CHKLIS15
      IF(NQUIV .GT. 100) GO TO 60
      IQUIV(NQUIV)=LOC                                                  CHKLIS16
      GO TO 30                                                          CHKLIS17
   15 IF(BITGET(IDTBL(3,LOC),15,1) .EQ. 0) GO TO 30
   20 IDTBL(8,LOC)=1                                                    CHKLIS18
   30 CONTINUE                                                          CHKLIS19
      IF(NQUIV .EQ. 0) RETURN                                           CHKLIS20
      DO 50 J=1,NQUIV                                                   CHKLIS21
      NXQV=IQUIV(J)                                                     CHKLIS22
   35 NXQV=IDTBL(7,NXQV)                                                CHKLIS23
      IF(NXQV .EQ. IQUIV(J)) GO TO 50                                   CHKLIS24
      IF(IDTBL(8,NXQV) .EQ. 0) GO TO 35                                 CHKLIS25
      IQV=NXQV                                                          CHKLIS26
      KTYPE=BITGET(IDTBL(3,IQV),10,3)                                   CHKLIS27
   40 NXQV=IDTBL(7,NXQV)                                                CHKLIS28
      IF(NXQV .EQ. IQV) GO TO 50                                        CHKLIS29
      IF(BITGET(IDTBL(3,NXQV),10,3) .NE. KTYPE) GO TO 40                CHKLIS30
      IDTBL(8,NXQV)=1                                                   CHKLIS31
      GO TO 40                                                          CHKLIS32
   50 CONTINUE                                                          CHKLIS33
      RETURN                                                            CHKLIS34
   60 CALL ERROR(94,IDM1,IDM2)
      RETURN
      END                                                               CHKLIS35
```

```
      SUBROUTINE CLASS                                                  CLASS  2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     • JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      DIMENSION KALP(48),KSUC(48),KFAL(48),KDEC(10),KF(8)               CLASS  4
      INTEGER A                                                         CLASS  5
      DATA KDEC(1),KDEC(2),KDEC(3),KDEC(4),KDEC(5),                     CLASS  6
     1  KDEC(6),KDEC(7),KDEC(8),KDEC(9),KDEC(10)                        CLASS  7
     2  /1H0,1H1,1H2,1H3,1H4,1H5,1H6,1H7,1H8,1H9/                       CLASS  8
      DATA KF(1),KF(2),KF(3),KF(4),KF(5),KF(6),KF(7),KF(8)              CLASS  9
     1   /1HF,1HU,1HN,1HC,1HT,1HI,1HO,1HN/                              CLASS 10
      DATA KC,KBLNK,KLPAR,KRPAR,KEQ  /1HC,1H ,1H(,1H),1H=/              CLASS 11
      DATA KH,KSLSH,KASTK,KZERO,KCMA  /1HH,1H/,1H*,1H0,1H,/             CLASS 12
      DATA KALP( 1),KALP( 2),KALP( 3),KALP( 4) /1HI,1HF,1HN,1HG/        CLASS 13
      DATA KALP( 5),KALP( 6),KALP( 7),KALP( 8) /1H0,1HT,1H0,1H(/        CLASS 14
      DATA KALP( 9),KALP(10),KALP(11),KALP(12) /1HC,1HA,1H0,1HN/        CLASS 15
      DATA KALP(13),KALP(14),KALP(15),KALP(16) /1HM,1HM,1HP,1HR/        CLASS 16
      DATA KALP(17),KALP(18),KALP(19),KALP(20) /1HE,1HA,1HD,1HL/        CLASS 17
      DATA KALP(21),KALP(22),KALP(23),KALP(24) /1HT,1H#,1HF,1H0/        CLASS 18
      DATA KALP(25),KALP(26),KALP(27),KALP(28) /1HU,1HD,1HI,1HA/        CLASS 19
      DATA KALP(29),KALP(30),KALP(31),KALP(32) /1H0,1HU,1H#,1HS/        CLASS 20
      DATA KALP(33),KALP(34),KALP(35),KALP(36) /1HT,1HU,1HE,1HN/        CLASS 21
      DATA KALP(37),KALP(38),KALP(39),KALP(40) /1HD,1HF,1HX,1HQ/        CLASS 22
      DATA KALP(41),KALP(42),KALP(43),KALP(44) /1HB,1HA,1HL,1HA/        CLASS 23
      DATA KALP(45),KALP(46),KALP(47),KALP(48)/1HL,1HP,1HR,1H0/         CLASS 24
      DATA KSUC( 1),KSUC( 2),KSUC( 3),KSUC( 4) /  2, -6,-19,  5/        CLASS 25
      DATA KSUC( 5),KSUC( 6),KSUC( 7),KSUC( 8) /  6,  7,  8, -5/        CLASS 26
      DATA KSUC( 9),KSUC(10),KSUC(11),KSUC(12) / 10, -8, 12, -7/        CLASS 27
      DATA KSUC(13),KSUC(14),KSUC(15),KSUC(16) / 14,-25,-22, 17/        CLASS 28
      DATA KSUC(17),KSUC(18),KSUC(19),KSUC(20) / 18, 19,-11,-20/        CLASS 29
      DATA KSUC(21),KSUC(22),KSUC(23),KSUC(24) / -9,-13, 24,-28/        CLASS 30
      DATA KSUC(25),KSUC(26),KSUC(27),KSUC(28) /-31, 27,-24,-27/        CLASS 31
      DATA KSUC(29),KSUC(30),KSUC(31),KSUC(32) / 30,-21,-12, 33/        CLASS 32
      DATA KSUC(33),KSUC(34),KSUC(35),KSUC(36) /-10,-30, 36, 37/        CLASS 33
      DATA KSUC(37),KSUC(38),KSUC(39),KSUC(40) / 38,-15,-34,-26/        CLASS 34
      DATA KSUC(41),KSUC(42),KSUC(43),KSUC(44) / 42,-14,-29, -2/        CLASS 35
      DATA KSUC(45),KSUC(46),KSUC(47),KSUC(48) /-23,47,48,-32/
      DATA KFAL( 1),KFAL( 2),KFAL( 3),KFAL( 4) /  4,  3,-36,  9/        CLASS 37
      DATA KFAL( 5),KFAL( 6),KFAL( 7),KFAL( 8) /-36,-36,-36, -3/        CLASS 38
      DATA KFAL( 9),KFAL(10),KFAL(11),KFAL(12) / 16, 11,-36, 13/        CLASS 39
      DATA KFAL(13),KFAL(14),KFAL(15),KFAL(16) /-36, 15,-36, 23/        CLASS 40
      DATA KFAL(17),KFAL(18),KFAL(19),KFAL(20) /-36, 21, 20,-36/        CLASS 41
      DATA KFAL(21),KFAL(22),KFAL(23),KFAL(24) / 22,-36, 26, 25/        CLASS 42
      DATA KFAL(25),KFAL(26),KFAL(27),KFAL(28) /-36, 31, 28, 29/        CLASS 43
      DATA KFAL(29),KFAL(30),KFAL(31),KFAL(32) /-36,-36, 32, 35/        CLASS 44
      DATA KFAL(33),KFAL(34),KFAL(35),KFAL(36) / 34,-36, 41, 39/        CLASS 45
      DATA KFAL(37),KFAL(38),KFAL(39),KFAL(40) /-36,-18, 40,-36/        CLASS 46
      DATA KFAL(41),KFAL(42),KFAL(43),KFAL(44) / 44, 43,-36, 45/        CLASS 47
      DATA KFAL(45),KFAL(46),KFAL(47),KFAL(48)/ 46,-36,-36,-36/         CLASS 48
      LTYP=0                                                            CLASS 49
      IPTR=7                                                            CLASS 50
    5 CONTINUE                                                          CLASS 51
      JSAVE=KBLNK                                                       CLASS 52
      JS#=0                                                             CLASS 53
      IS#=0                                                             CLASS 54
      JEQ=0                                                             CLASS 55
      JCMA=0                                                            CLASS 56
      JHOLL=0                                                           CLASS 57
      DO 26 J=IPTR,N                                                    CLASS 58
      JCH=A(J)                                                          CLASS 59
      IF(JCH .EQ. KBLNK) GO TO 26                                       CLASS 60
    6 IF(JHOLL .LE. 0) GO TO 12                                         CLASS 61
    7 DO 8 L=1,10                                                       CLASS 62
      IF(JCH .EQ. KDEC(L)) GO TO 10                                     CLASS 63
    8 CONTINUE                                                          CLASS 64
      IF(JHOLL .LE. 1) GO TO 11                                         CLASS 65
    9 IF(JCH-KH) 11,32,11                                               CLASS 66
   10 JHOLL=JHOLL+1                                                     CLASS 67
      GO TO 25                                                          CLASS 68
   11 JHOLL=0                                                           CLASS 69
```

```
   12 IF(JCH .EQ. KLPAR) GO TO 20                                   CLASS 70
   13 IF(JCH .EQ. KRPAR) GO TO 18                                   CLASS 71
   14 IF(JCH .EQ. KCMA) GO TO 22                                    CLASS 72
   15 IF(JCH .EQ. KEQ) GO TO 23                                     CLASS 73
   16 IF(JCH .EQ. KSLSH) GO TO 21                                   CLASS 74
   17 IF(JCH  -   KASTK) 25,21,25                                   CLASS 75
   18 JSW=JSW-1                                                     CLASS 76
      IF(JSW .GT. 0) GO TO 25                                       CLASS 77
   19 ISW=1                                                         CLASS 78
      GO TO 26                                                      CLASS 79
   20 JSW=JSW+1                                                     CLASS 80
   21 JHOLL=1                                                       CLASS 81
      GO TO 25                                                      CLASS 82
   22 IF(JSW) 30,30,21                                              CLASS 83
   23 IF(JSW .GT. 0) GO TO 32                                       CLASS 84
   24 JEQ=1                                                         CLASS 85
   25 IF(ISW .GT. 0) GO TO 27                                       CLASS 86
   26 CONTINUE                                                      CLASS 87
      GO TO 28                                                      CLASS 88
   27 JSAVE=JCH                                                     CLASS 89
      JP=J                                                          CLASS 90
   28 IF(JEQ .LE. 0) GO TO 32                                       CLASS 91
   29 JTP=1                                                         CLASS 92
      GO TO 55                                                      CLASS 93
   30 JCMA=1                                                        CLASS 94
      IF(JEQ .LE. 0) GO TO 32                                       CLASS 95
   31 JTP=17                                                        CLASS 96
      GO TO 55                                                      CLASS 97
   32 J=1                                                           CLASS 98
      ISW=IPTR                                                      CLASS 99
   33 JCH=A(ISW)                                                    CLASS100
      IF(JCH .EQ. KBLNK) GO TO 37                                   CLASS101
   34 IF(JCH .EQ. KALP(J)) GO TO 36                                 CLASS102
   35 J=KFAL(J)                                                     CLASS103
      IF (J) 39,39,34                                               CLASS104
   36 J=KSUC(J)                                                     CLASS105
      IF(J .LE. 0) GO TO 39                                         CLASS106
   37 ISW=ISW+1                                                     CLASS107
      IF(ISW .LE. N) GO TO 33                                       CLASS108
   38 JCH=KBLNK                                                     CLASS109
      GO TO 35                                                      CLASS110
   39 JTP=-J                                                        CLASS111
      IF(JTP-3) 55,45,40                                            CLASS112
   40 IF(JTP-6) 55,43,41                                            CLASS113
   41 IF(JTP .LT. 19) GO TO 55                                      CLASS114
   42 IF(JTP - 23) 47,47,55                                         CLASS115
   43 DO 44 L=1,10                                                  CLASS116
      IF(JSAVE .EQ. KDEC(L)) GO TO 55                               CLASS117
   44 CONTINUE                                                      CLASS118
      LTYP=9                                                        CLASS119
      JTP=16                                                        CLASS120
      IPTR=JP                                                       CLASS121
      GO TO 5                                                       CLASS122
   45 IF(JCMA .LE. 0) GO TO 55                                      CLASS123
      JTP=4                                                         CLASS124
      GO TO 55                                                      CLASS125
   47 L=11                                                          CLASS126
      GO TO 52                                                      CLASS127
   48 L=L+1                                                         CLASS128
      IF(L .GT. N) GO TO 55                                         CLASS129
   49 IF(A(L) .EQ. KBLNK) GO TO 48                                  CLASS130
   50 IF(A(L) .EQ. KF(ISW)) GO TO 53                                CLASS131
   51 IF(ISW .EQ. 1) GO TO 48                                       CLASS132
   52 ISW=1                                                         CLASS133
      GO TO 50                                                      CLASS134
   53 ISW=ISW+1                                                     CLASS135
      IF(ISW .LE. 8) GO TO 48                                       CLASS136
   54 JTP=31                                                        CLASS137
   55 ITYP=JTP                                                      CLASS138
      RETURN                                                        CLASS139
      END                                                           CLASS140
```

```
      SUBROUTINE CMPARE
      DIMENSION IROLCK(100),ISUB(100)
      REWIND 3
      NSUB=0
      NC=0
      DO 5 I=1,100
      READ(9,END=7) ISUB(I)
      NSUB=NSUB+1
    5 CONTINUE
    7 IF(NSUB .EQ. 0) RETURN
      DO 40 L=1,12
      MODE=L-1
      NROLL=0
      DO 10 I=1,100
      READ(3,END=15) IROLCK(I)
      NROLL=NROLL+1
   10 CONTINUE
   15 IF(NROLL .EQ. 0) GO TO 35
      DO 30 J=1,NSUB
      DO 20 K=1,NROLL
      IF(IROLCK(K) .EQ. ISUB(J)) GO TO 30
   20 CONTINUE
      NC=1
      WRITE(6,25) ISUB(J),MODE
   25 FORMAT(/29X,12H SUBROUTINE ,A6,53H WAS NOT CALLED IN THE ROLL CALL
     * MODE FOR MODE INDEX ,I3)
   30 CONTINUE
      GO TO 40
   35 WRITE(6,36) MODE
   36 FORMAT(/32X,65H NO SUBROUTINES WERE CALLED IN THE ROLL CALL MODE F
     *OR MODE INDEX ,I3)
      NC=1
   40 CONTINUE
      IF(NC .EQ. 0) WRITE(6,50)
   50 FORMAT(/41X,50H ALL SUBROUTINES WERE CALLED IN THE ROLL CALL MODE)
      RETURN
      END
```

```
      SUBROUTINE CNVRT                                                  CNVRT   2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH    2
     • JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH    4
      COMMON/STRING/NTYPE,NSTR,STR(500)                                 CNVRT   4
      DIMENSION IOP(8),ILOG(7,2),JLOG(2,3),IFUNC1(6),IFUNC2(6),         CNVRT   6
     1 IFUNC3(6)                                                        CNVRT   7
      INTEGER A,STR,D,DECPT
      INTEGER BITPUT,BITGET                                             CNVRT   9
      DATA (IOP(I),I=1,8)/1H+,1H-,1H/,1H(,1H),1H.,1H*,1H*/              CNVRT  10
      DATA ((ILOG(I,J),J=1,2),I=1,7)/1HL,1HT,1HL,1HE,1HG,1HT,1HG,1HE,   CNVRT  11
     1 1HE,1HQ,1HN,1HE,1HO,1HR/                                         CNVRT  12
      DATA ((JLOG(I,J),J=1,3),I=1,2)/1HA,1HN,1HD,1HN,1HO,1HT/           CNVRT  13
      DATA (IFUNC1(I),I=1,6)/1HQ,1HI,1HR,1HE,1HA,1HL/                   CNVRT  14
      DATA (IFUNC2(I),I=1,6)/1HQ,1HI,1HD,1HP,1HR,1HE/                   CNVRT  15
      DATA (IFUNC3(I),I=1,6)/1HQ,1HI,1HC,1HO,1HM,1HP/                   CNVRT  16
      DATA DECPT/1H./
      DO 5 J=1,JPTR
    5 D(J)=A(J)
      J=JPTR
      DO 100 K=1,NSTR                                                   CNVRT  27
      IF(STR(K) .GT. 0) GO TO 40
      DO 10 I=1,8                                                       CNVRT  28
      IF(STR(K) .NE. -I) GO TO 10                                       CNVRT  29
      D(J+1)=IOP(I)
      N3=1                                                              CNVRT  31
      IF(I .NE. 8) GO TO 100                                            CNVRT  32
      D(J+2)=IOP(I)
      N3=2                                                              CNVRT  34
      GO TO 100                                                         CNVRT  35
   10 CONTINUE                                                          CNVRT  36
      DO 15 I=1,7                                                       CNVRT  37
      L=I+8                                                             CNVRT  38
      IF(STR(K) .NE. -L) GO TO 15                                       CNVRT  39
      D(J+1)=DECPT
      D(J+2)=ILOG(I,1)
      D(J+3)=ILOG(I,2)
      D(J+4)=DECPT
      N3=4                                                              CNVRT  44
      GO TO 100                                                         CNVRT  45
   15 CONTINUE                                                          CNVRT  46
      DO 20 I=1,2                                                       CNVRT  47
      L=I+15                                                            CNVRT  48
      IF(STR(K) .NE. -L) GO TO 20                                       CNVRT  49
      D(J+1)=DECPT
      D(J+2)=JLOG(I,1)
      D(J+3)=JLOG(I,2)
      D(J+4)=JLOG(I,3)
      D(J+5)=DECPT
      N3=5                                                              CNVRT  55
      GO TO 100                                                         CNVRT  56
   20 CONTINUE                                                          CNVRT  57
      KL=1                                                              CNVRT  59
      IF(STR(K) .EQ. -0) KL=2                                           CNVRT  60
      IF(STR(K) .EQ. -10000) KL=4                                       CNVRT  61
      IF(STR(K) .EQ. -20000) KL=3                                       CNVRT  62
      GO TO(110,25,30,35),KL                                            CNVRT  63
   25 DO 27 I=1,6                                                       CNVRT  64
      D(J+I)=IFUNC1(I)
   27 CONTINUE                                                          CNVRT  66
      N3=6                                                              CNVRT  67
      GO TO 100                                                         CNVRT  68
   30 DO 32 I=1,6                                                       CNVRT  69
      D(J+I)=IFUNC2(I)
   32 CONTINUE                                                          CNVRT  71
      N3=6                                                              CNVRT  72
      GO TO 100                                                         CNVRT  73
   35 DO 37 I=1,6                                                       CNVRT  74
      D(J+I)=IFUNC3(I)
   37 CONTINUE                                                          CNVRT  76
      N3=6                                                              CNVRT  77
```

```
      GO TO 100                                                         CNVRT 78
   40 IF(STR(K) .LT. 1000001) GO TO 110                                 CNVRT 79
      N3=STR(K)/1.E6                                                    CNVRT 80
      NLOC=(STR(K)/10000)*10000                                         CNVRT 81
      JPTR=STR(K)-NLOC                                                  CNVRT 82
      KLOC=STR(K)-N3*1.E6                                               CNVRT 83
      IF(KLOC .LT. 400000 .OR. KLOC .GT. 500000) GO TO 50               CNVRT 84
      IHL=(KLOC-400000)/10000
      IF(IHL .EQ. 5) GO TO 60
      DO 45 I=1,N3                                                      CNVRT 85
      D(J+I)=NEXT(JPTR)
   45 CONTINUE                                                          CNVRT 87
      GO TO 100                                                         CNVRT 88
   50 DO 55 I=1,N3                                                      CNVRT 89
      IPOS=6*I                                                          CNVRT 90
      ICHAR=BITGET(IDTBL(1,JPTR),IPOS,6)                                CNVRT 91
   55 D(J+I)=BITPUT(0,ICHAR,6)
      GO TO 100
   60 KPTR=JPTR-1
      DO 65 I=1,N3
   65 D(J+I)=A(KPTR+I)
  100 J=J+N3                                                            CNVRT 93
      N=J
      DO 105 I=1,N
  105 A(I)=D(I)
      RETURN                                                            CNVRT100
  110 CALL ERROR(23,KDM1,KDM2)
      RETURN                                                            CNVRT102
      END                                                               CNVRT103
```

```
      SUBROUTINE COM                                                    COM    2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      DIMENSION IDIM(3),IALPH(6)                                        COM    4
      INTEGER SLASH,COMMA,BLANK,A,RPAR                                  COM    5
      INTEGER BITPUT,BITGET                                             COM    6
      DATA (IALPH(I),I=1,6)/1HC,1HO,1HM,1HM,1HO,1HN/                    COM    7
      DATA SLASH/1H//,COMMA/1H,/,BLANK/1H /,RPAR/1H)/,LPAR/1H(/         COM    8
      DO 10 I=1,6                                                       COM    9
      IF(NEXT(JPTR) .NE. IALPH(I)) GO TO 60                             COM   10
   10 CONTINUE                                                          COM   11
      IF(NEXT(JPTR) .EQ. SLASH) GO TO 15                                COM   12
      JPTR=JPTR-1                                                       COM   13
   12 NXTID=BLANK                                                       COM   14
      GO TO 20                                                          COM   15
   15 CALL GNLE                                                         COM   16
      IF(A(JPTR-1) .EQ. SLASH) GO TO 12                                 COM   17
      IF(JTYP .NE. 2) GO TO 60                                          COM   18
      IF(NEXT(JPTR) .NE. SLASH) GO TO 60                                COM   19
   20 CALL COMSCH                                                       COM   20
      IF(ISRCH(3) .EQ. 1) GO TO 25                                      COM   21
      IDTYP=3                                                           COM   22
      CALL STORE                                                        COM   23
      ICMLOC=NID                                                        COM   24
      GO TO 27                                                          COM   25
   25 ICMLOC=LOC                                                        COM   26
      LSTLOC=IDTBL(6,ICMLOC)                                            COM   27
   27 CALL GNLE                                                         COM   28
      IF(JTYP .NE. 2) GO TO 60                                          COM   29
      CALL SEARCH                                                       COM   30
      IF(ISRCH(2) .EQ. 1) CALL ERROR(10,NXTID,KDM2)
      IF(ISRCH(1) .EQ. 1) GO TO 28                                      COM   32
      IDTYP=1                                                           COM   33
      CALL STORE                                                        COM   34
      LOC=NID                                                           COM   35
   28 IF(BITGET(IDTBL(3,LOC),12,1) .EQ. 1) CALL ERROR(17,NXTID,KDM2)
      IF(BITGET(IDTBL(3,LOC),16,1) .EQ. 1) CALL ERROR(53,NXTID,KDM2)
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),1,16)                            COM   37
      ICMSIZ=1                                                          COM   38
      IF(NEXT(JPTR) .NE. LPAR) GO TO 40
      IF(BITGET(IDTBL(3,LOC),1,1) .NE. 0) GO TO 80
      I=0
   35 I=I+1
      CALL GNLE                                                         COM   41
      IF(JTYP .NE. 5) GO TO 60                                          COM   42
      IDIM(I)=N2                                                        COM   43
      ICMSIZ=ICMSIZ*N2                                                  COM   44
      IF(N2 .GT. (2**17-1)) CALL ERROR(8,KDM1,KDM2)
      IF(N2 .LE. 0) CALL ERROR(8,KDM1,KDM2)
      IF(NEXT(JPTR) .EQ. COMMA) GO TO 35                                COM   47
      IF(A(JPTR-1) .NE. RPAR) GO TO 60                                  COM   48
      K=NEXT(JPTR)                                                      COM   49
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),1,1)                             COM   50
      IF(I .GT. 3) GO TO 60                                             COM   51
```

```
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),I,7)                              COM   52
      GO TO (34,32,30),I                                                 COM   53
   30 IDTBL(4,LOC)=BITPUT(IDTBL(4,LOC),IDIM(3),36)                       COM   54
   32 IDTBL(4,LOC)=BITPUT(IDTBL(4,LOC),IDIM(2),18)                       COM   55
   34 IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),IDIM(1),36)                       COM   56
   40 IF(IDTBL(5,ICMLOC) .EQ. 0) GO TO 45                                COM   59
      IDTBL(5,LSTLOC)=LOC                                                COM   60
      GO TO 47                                                           COM   61
   45 IDTBL(5,ICMLOC)=LOC                                                COM   62
   47 IDTBL(4,ICMLOC)=IDTBL(4,ICMLOC)+ICMSIZ                             COM   63
      IDTBL(6,ICMLOC)=LOC                                                COM   64
      IDTBL(6,LOC)=ICMLOC                                                COM   65
      LSTLOC=LOC                                                         COM   66
      IF(A(JPTR-1) .EQ. COMMA) GO TO 27                                  COM   67
      IF(A(JPTR-1) .NE. SLASH) GO TO 50                                  COM   68
      IDTBL(5,LOC)=IDTBL(5,ICMLOC)                                       COM   69
      GO TO 15                                                           COM   70
   50 IF(NEXT(JPTR) .NE. BLANK) GO TO 60                                 COM   71
      IDTBL(5,LOC)=IDTBL(5,ICMLOC)                                       COM   72
      RETURN                                                             COM   73
   60 CALL ERROR(7,KDM1,KDM2)
      RETURN                                                             COM   75
   80 CALL ERROR(14,NXTID,KDM2)
      RETURN
      END                                                                COM   76
```

```
      SUBROUTINE COMCHK
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES
      COMMON/LIST/NLIST,NINTFC,ISUBLT(3,200),INTFAC(500)
      COMMON/GLOBAL/NBLK,NREF,NSUBS,BLKTBL(200),EXTTBL(100),ISUBS(100)
      INTEGER BITGET,CMBLK(2,20),TP,SZ,PREVTP,BLKTBL
      INTEGER SESCOM(13),SESERR
      DIMENSION ITPS(6),IORD(6)
      DATA IORD/1,2,5,4,3,6/
      DATA SESCOM/4HCASE,3HINA,3HINB,3HINC,3HIOX,5HNPAGX,4HLINX,3HIOY,
     $ 5HNPAGY,4HLINY,3HIOZ,5HNPAGZ,4HLINZ/
      SESERR=0
      NSES=0
      ICTGR2=0
      IBLK=INITID(3)
      MODCLS=0
      LC2=BITGET(IDTBL(3,1),36,9)
      IF(LC2 .EQ. 0 .OR. IBLKDT .EQ. 1) GO TO 1
      MODCLS=BITGET(ISUBLT(2,LC2),10,4)
    1 IF(IBLK .EQ. 0) GO TO 120
      IF(IDTBL(1,IBLK) .EQ. 1H ) GO TO 3
      LISTLC=BITGET(IDTBL(3,IBLK),36,9)
      KLAS=BITGET(ISUBLT(2,LISTLC),10,4)
      ISZ=BITGET(ISUBLT(2,LISTLC),36,15)
      IF(IDTBL(4,IBLK) .NE. ISZ) GO TO 70
      GO TO 5
    3 IF(MODCLS .NE. 1 .AND. MODCLS .NE. 2) GO TO 5
      IBNKSZ=BITGET(ISUBLT(2,LC2),36,15)
      IF(IDTBL(4,IBLK) .NE. IBNKSZ) CALL ERROR(58,2H//,KDM2)
    5 NBLOC=0
      ISUM=0
      NTP=0
      TP=0
      ICOMST=IDTBL(5,IBLK)
      LOC=ICOMST
   10 PREVTP=TP
      IF(BITGET(IDTBL(3,LOC),11,1) .EQ. 1) GO TO 15
      TP=1
      IFST=BITGET(IDTBL(1,LOC),6,6)
      IF(IFST .LE. 19 .AND. IFST .GE. 14) TP=4
      GO TO 18
   15 TP=BITGET(IDTBL(3,LOC),10,3)
   18 SZ=1
      NDIM=BITGET(IDTBL(3,LOC),7,6)
      IF(NDIM .EQ. 0) GO TO 22
      DO 20 I=1,NDIM
      NN=3+(I/2)
      ICOL=18*(MOD(I,2)+1)
   20 SZ=SZ*BITGET(IDTBL(NN,LOC),ICOL,17)
   22 IF(TP .NE. 2 .AND. TP .NE. 3) GO TO 25
      IF(MOD(ISUM,2) .NE. 0)CALL ERROR(69,IDTBL(1,LOC),IDTBL(1,IBLK))
      ISUM=ISUM+SZ
   25 ISUM=ISUM+SZ
      IF(IBLKDT .EQ. 1 .AND. IORD(PREVTP+1) .GT. IORD(TP+1))
     $ CALL ERROR(65,IDTBL(1,IBLK),KDM2)
      IF(KLAS .EQ. 10 .OR. IDTBL(1,IBLK) .EQ. 1H ) GO TO 38
      IF(KLAS .EQ. 9) GO TO 35
      IF(KLAS .EQ. 7) GO TO 40
      ICTGR2=1
      IF(TP .EQ. PREVTP) GO TO 35
      IF(PREVTP .EQ. 0) GO TO 32
      DO 30 I=1,NTP
      IF(TP .EQ. ITPS(I)) GO TO 110
   30 CONTINUE
   32 NTP=NTP+1
      ITPS(NTP)=TP
   35 IF(IBLKDT .EQ. 1) GO TO 38
```

```
      IF(BITGET(IDTBL(3,LOC),19,1) .EQ. 0) CALL ERROR(75,IDTBL(1,LOC),
     $ KDM2)
   38 LOC=IDTBL(5,LOC)
      IF(LOC .NE. ICOMST) GO TO 10
      GO TO 65
   40 IF(TP .EQ. PREVTP) GO TO 45
      NBLOC=NBLOC+1
      CMBLK(1,NBLOC)=TP
      CMBLK(2,NBLOC)=0
   45 CMBLK(2,NBLOC)=CMBLK(2,NBLOC)+SZ
      IF(IDTBL(1,IBLK) .NE. 6HSESCOM) GO TO 85
      NSES=NSES+1
      IF(NSES .GT. 13) GO TO 80
      IF(IDTBL(1,LOC) .EQ. SESCOM(NSES)) GO TO 85
   80 SESERR=1
   85 LOC=IDTBL(5,LOC)
      IF(LOC .NE. ICOMST) GO TO 10
      IPTR=ISUBLT(3,LISTLC)
      NDPTR=IPTR+(NBLOC-1)/2
      KOUNT=0
      NGRP=NBLOC
      DO 50 I=IPTR,NDPTR
      ICOL=0
      DO 50 J=1,2
      KOUNT=KOUNT+1
      IF(KOUNT .GT. NBLOC) GO TO 65
      ICOL=ICOL+15
      SZ=BITGET(INTFAC(I),ICOL,15)
      ICOL=ICOL+3
C** GET GROUP TYPE
      TP=BITGET(INTFAC(I),ICOL,3)
      IF(TP .NE. 0) GO TO 48
      CMBLK(2,KOUNT)=CMBLK(2,KOUNT)-SZ
      IF(CMBLK(2,KOUNT) .EQ. 0) GO TO 50
      IF(CMBLK(2,KOUNT) .LT. 0) GO TO 90
      KOUNT=KOUNT-1
      NGRP=NGRP+1
      GO TO 50
C** CHECK INTERFACE DEFINITION FOR SIZE AND TYPE
   48 IF(CMBLK(1,KOUNT) .NE. TP .OR. CMBLK(2,KOUNT) .NE. SZ) GO TO 90
   50 CONTINUE
      IF(NGRP .NE. BITGET(ISUBLT(2,LISTLC),6,6)) GO TO 90
   65 IBLK=IDTBL(2,IBLK)
      GO TO 1
   70 CALL ERROR(58,IDTBL(1,IBLK),KDM2)
      GO TO 65
   90 CALL ERROR(57,IDTBL(1,IBLK),KDM2)
      GO TO 65
  110 CALL ERROR(63,IDTBL(1,IBLK),KDM2)
      GO TO 65
C** CHECK THAT COMMON BLOCK 'SESCOM' IS WELL DEFINED
  120 IF(ICTGR2 .EQ. 0 .AND. (MODCLS .EQ. 1 .OR. MODCLS .EQ. 2))
     $ CALL ERROR(73,KDM1,KDM2)
      IF(NSES .EQ. 0) GO TO 130
      IF(SESERR .EQ. 1 .OR. NSES .LT. 13) CALL ERROR(48,KDM1,KDM2)
      RETURN
  130 CALL ERROR(66,KDM1,KDM2)
      RETURN
      END
```

```
      SUBROUTINE COMEXT                                                 COMEXT 2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      INTEGER BITGET                                                    COMEXT 4
      ICOMLC=0                                                          COMEXT 5
      ICOMNM=IDTBL(6,LOC)                                               COMEXT 6
      ICOMST=IDTBL(5,ICOMNM)                                            COMEXT 7
      ICOMND=IDTBL(6,ICOMNM)                                            COMEXT 8
      ICOMSZ=IDTBL(4,ICOMNM)                                            COMEXT 9
      NXTLOC=ICOMND                                                     COMEXT10
      DO 20 I=1,ICOMSZ                                                  COMEXT11
      NXTLOC=IDTBL(5,NXTLOC)                                            COMEXT12
      MUL=1
      ISZ=1
      ITP=BITGET(IDTBL(3,NXTLOC),10,3)
      IF(ITP .EQ. 2 .OR. ITP .EQ. 3) MUL=2
      IF(LOC .EQ. NXTLOC) GO TO 25                                      COMEXT13
      IF(BITGET(IDTBL(3,NXTLOC),1,1) .EQ. 1) GO TO 10                   COMEXT14
      GO TO 20                                                          COMEXT16
   10 NDIM=BITGET(IDTBL(3,NXTLOC),7,6)                                  COMEXT17
      DO 15 J=1,NDIM                                                    COMEXT19
      IWRD=3+J/2                                                        COMEXT20
      IPOS=MOD(J,2)*18+18
      ISZ=ISZ*BITGET(IDTBL(IWRD,NXTLOC),IPOS,18)                        COMEXT22
   15 CONTINUE                                                          COMEXT23
   20 ICOMLC=ICOMLC+ISZ*MUL
   25 ILFT=ICOMLC                                                       COMEXT26
      IRHT=ICOMSZ-ICOMLC                                                COMEXT27
      NXTLOC=LOC                                                        COMEXT28
      IOFFST=IDTBL(8,NXTLOC)                                            COMEXT29
   30 NXTLOC=IDTBL(7,NXTLOC)                                            COMEXT30
      IF(NXTLOC .EQ. LOC) RETURN                                        COMEXT31
      IOFF2=IDTBL(8,NXTLOC)                                             COMEXT32
      IF((IOFFST-IOFF2) .GT. ILFT) GO TO 50                             COMEXT33
      ITP=BITGET(IDTBL(3,NXTLOC),10,3)
      ISZ=1                                                             COMEXT34
      IF(ITP .NE. 2 .AND. ITP .NE. 3) GO TO 32
      IF(MOD((ILFT-IOFFST+IOFF2),2) .NE. 0)
     $ CALL ERROR(64,IDTBL(1,NXTLOC),IDTBL(1,ICOMNM))
      ISZ=2
   32 IF(BITGET(IDTBL(3,NXTLOC),1,1) .NE. 1) GO TO 40
      NDIM=BITGET(IDTBL(3,NXTLOC),7,6)                                  COMEXT36
      DO 35 I=1,NDIM                                                    COMEXT37
      IWRD=3+I/2                                                        COMEXT38
      IPOS=MOD(I,2)*18+18
      ISUB=BITGET(IDTBL(IWRD,NXTLOC),IPOS,18)                           COMEXT40
      ISZ=ISZ*ISUB                                                      COMEXT41
   35 CONTINUE                                                          COMEXT42
   40 IF((ISZ-(IOFFST-IOFF2)) .GT. IRHT) GO TO 50                       COMEXT43
      GO TO 30                                                          COMEXT44
   50 CALL ERROR(47,KDM1,KDM2)
      RETURN                                                            COMEXT46
      END                                                               COMEXT47
```

```
      SUBROUTINE COMSCH                                                 COMSCH 2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      J=INITID(3)                                                       COMSCH 4
      IF(J .EQ. 0) GO TO 15                                             COMSCH 5
      DO 10 I=1,NID                                                     COMSCH 6
      IF(IDTBL(1,J) .NE. NXTID) GO TO 5                                 COMSCH 7
      ISRCH(3)=1                                                        COMSCH 8
      LOC=J                                                             COMSCH 9
      RETURN                                                            COMSCH10
    5 J=IDTBL(2,J)                                                      COMSCH11
      IF(J .EQ. 0) GO TO 15                                             COMSCH12
   10 CONTINUE                                                          COMSCH13
   15 ISRCH(3) =0                                                       COMSCH14
      RETURN                                                            COMSCH15
      END                                                               COMSCH16
```

```
      SUBROUTINE CTGOTO                                                 CTGOTO 2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      COMMON/LABELS/STATRA(2,200),NLABEL                                CTGOTO 4
      COMMON/BASBLK/IBLOCK(2500),NBLOCK,NB,NBRNCH
      DIMENSION IALPH(4)                                                CTGOTO 6
      INTEGER STATRA,A,BLANK,RPAR,COMMA                                 CTGOTO 7
      INTEGER BITPUT,BITGET                                             CTGOTO 8
      DATA BLANK/1H /,COMMA/1H,/,LPAR/1H(/,RPAR/1H)/                    CTGOTO 9
      DATA (IALPH(I),I=1,4)/1HG,1HO,1HT,1HO/                            CTGOTO10
      DO 5 I=1,4                                                        CTGOTO11
      IF(NEXT(JPTR) .NE. IALPH(I)) GO TO 30                             CTGOTO12
    5 CONTINUE                                                          CTGOTO13
      IF(NEXT(JPTR) .NE. LPAR) GO TO 30                                 CTGOTO14
      NBLOCK=NBLOCK+1                                                   CTGOTO15
      JBLOCK=NBLOCK                                                     CTGOTO16
      NBRNCH=0                                                          CTGOTO17
   10 CALL GNLE                                                         CTGOTO18
      IF(JTYP .NE. 5) GO TO 30                                          CTGOTO19
      CALL STSRCH                                                       CTGOTO20
      STATRA(2,LOC)=BITPUT(STATRA(2,LOC),1,12)                          CTGOTO21
      IF(NBRNCH .EQ. 0) GO TO 15                                        CTGOTO22
      DO 12 I=1,NBRNCH                                                  CTGOTO23
      IF(LOC .EQ. IBLOCK(NBLOCK-I+1)) GO TO 17                          CTGOTO24
   12 CONTINUE                                                          CTGOTO25
   15 NBLOCK=NBLOCK+1                                                   CTGOTO26
      IBLOCK(NBLOCK)=LOC                                                CTGOTO27
      NBRNCH=NBRNCH+1                                                   CTGOTO28
   17 IF(NEXT(JPTR) .EQ. COMMA) GO TO 10                                CTGOTO29
      IF(A(JPTR-1) .NE. RPAR) GO TO 30                                  CTGOTO30
      IF(NEXT(JPTR) .NE. COMMA) GO TO 30                                CTGOTO31
      CALL GNLE                                                         CTGOTO32
      IF(JTYP .NE. 2) GO TO 30                                          CTGOTO33
      CALL SEARCH                                                       CTGOTO34
      IF(ISRCH(2) .EQ. 1) CALL ERROR(10,NXTID,KDM2)
      IF(ISRCH(1) .EQ. 1) GO TO 20                                      CTGOTO36
      IDTYP=1                                                           CTGOTO37
      CALL STORE                                                        CTGOTO38
      LOC=NID                                                           CTGOTO39
   20 CALL IMPTYP                                                       CTGOTO40
      IF(BITGET(IDTBL(3,LOC),10,3) .NE. 4) CALL ERROR(39,NXTID,KDM2)
      IF(BITGET(IDTBL(3,LOC),1,1) .EQ. 1) CALL ERROR(19,NXTID,KDM2)
      IF(NEXT(JPTR) .NE. BLANK) GO TO 30                                CTGOTO43
      IBLOCK(JBLOCK)=2000+LOC                                           CTGOTO44
      NB=1                                                              CTGOTO45
      RETURN                                                            CTGOTO46
   30 CALL ERROR(7,KDM1,KDM2)
      RETURN                                                            CTGOTO48
      END                                                               CTGOTO49
```

```
      SUBROUTINE DATA                                                   DATA   2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      DIMENSION IALPH(4)                                                DATA   4
      INTEGER A,RPAR,COMMA,SLASH,BLANK,ASTRIK,PLUS                      DATA   5
      INTEGER BITPUT,BITGET                                             DATA   6
      DATA LPAR/1H(/,RPAR/1H)/,COMMA/1H,/,SLASH/1H//,BLANK/1H /,        DATA   7
     1   ASTRIK/1H*/,PLUS/1H+/,MINUS/1H-/                               DATA   8
      DATA (IALPH(I),I=1,4)/1HD,1HA,1HT,1HA/                            DATA   9
      DO 5 I=1,4                                                        DATA  10
      IF(NEXT(JPTR) .NE. IALPH(I)) GO TO 60                             DATA  11
    5 CONTINUE                                                          DATA  12
    6 LST1SZ=0                                                          DATA  13
      LST2SZ=0                                                          DATA  14
    8 ISZ=1
      CALL GNLE
      IF(JTYP .NE. 2) GO TO 60                                          DATA  16
      CALL SEARCH                                                       DATA  17
      IF(ISRCH(2) .EQ. 1) CALL ERROR(10,NXTID,KDM2)
      IF(ISRCH(1) .EQ. 1) GO TO 9                                       DATA  19
      IDTYP=1                                                           DATA  20
      CALL STORE                                                        DATA  21
      LOC=NID                                                           DATA  22
    9 IF(BITGET(IDTBL(3,LOC),12,1) .EQ. 1) CALL ERROR(30,NXTID,KDM2)
      CALL IMPTYP                                                       DATA  24
      IF(BITGET(IDTBL(3,LOC),16,1) .EQ. 0) GOTO 10                      DATA  25
      ICOMLC=IDTBL(6,LOC)                                               DATA  27
      IF(IBLKDT .EQ. 0 .OR. IDTBL(1,ICOMLC) .EQ. BLANK)
     $ CALL ERROR(28,NXTID,KDM2)
   10 IF(NEXT(JPTR) .NE. LPAR) GO TO 25                                 DATA  29
      IF(BITGET(IDTBL(3,LOC),1,1) .EQ. 0) GO TO 90                      DATA  31
      NDIM=BITGET(IDTBL(3,LOC),7,6)                                     DATA  32
      I=0
   15 I=I+1
      CALL GNLE                                                         DATA  34
      IF(JTYP .NE. 5) GO TO 60                                          DATA  35
      IF(N2 .LE. 0) CALL ERROR(8,KDM1,KDM2)
      IWRD=3+I/2                                                        DATA  37
      IPOS=18*MOD(I,2)+18
      IF(N2 .GT. BITGET(IDTBL(IWRD,LOC),IPOS,17))CALL ERROR(18,KD1,KD2)
      IF(NEXT(JPTR) .EQ. COMMA) GO TO 15                                DATA  40
      IF(I .NE. NDIM) GO TO 80
      IF(A(JPTR-1) .NE. RPAR) GO TO 80                                  DATA  42
      GO TO 35                                                          DATA  43
   25 JPTR=JPTR-1
      IF(BITGET(IDTBL(3,LOC),1,1) .EQ. 0) GO TO 35
      NDIM=BITGET(IDTBL(3,LOC),7,6)
      DO 30 I=1,NDIM
      IWRD=3+I/2
      IPOS=18*MOD(I,2)+18
   30 ISZ=ISZ*BITGET(IDTBL(IWRD,LOC),IPOS,17)
      IF(BITGET(IDTBL(3,LOC),14,1) .EQ. 1) CALL ERROR(29,IDTBL(1,LOC),K)
   35 LST1SZ=LST1SZ+ISZ
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),1,14)
      IF(NEXT(JPTR) .EQ. COMMA) GO TO 8                                 DATA  50
      IF(A(JPTR-1) .NE. SLASH) GO TO 60                                 DATA  51
```

```
   40 NRPEAT=1                                                          DATA  52
      CALL GNLE                                                         DATA  53
      IF(JTYP .EQ. 3) GO TO 47                                          DATA  54
      IF(JTYP .NE. 5) GO  TO 45                                         DATA  55
      IF(NEXT(JPTR) .NE. ASTRIK) GO TO 50                               DATA  56
      NRPEAT=N2                                                         DATA  57
      CALL GNLE                                                         DATA  58
   45 IF(A(JPTR-1) .NE. PLUS .AND. A(JPTR-1) .NE. MINUS) GO TO 47       DATA  59
      CALL GNLE                                                         DATA  60
   47 KK=NEXT(JPTR)                                                     DATA  61
   50 IF(JTYP .GE. 3.AND. JTYP .LE. 6) GO TO 55                         DATA  62
      IF(JTYP .EQ. 7 .AND. LOGID .EQ. 10) GO TO 55                      DATA  63
      IF(JTYP .EQ. 7 .AND. LOGID .EQ. 11) GO TO 55                      DATA  64
      GO TO 70                                                          DATA  65
   55 LST2SZ=LST2SZ+NRPEAT                                              DATA  66
      IF(A(JPTR-1) .EQ. COMMA) GO TO 40                                 DATA  67
      IF(A(JPTR-1) .NE. SLASH) GO TO 60                                 DATA  68
      IF(LST1SZ .NE. LST2SZ) CALL ERROR(31,KDM1,KDM2)
      IF(NEXT(JPTR) .EQ. COMMA) GO TO 6                                 DATA  70
      IF(A(JPTR-1) .NE. BLANK) GO TO 60                                 DATA  71
      RETURN                                                            DATA  72
   60 CALL ERROR(7,KDM1,KDM2)
      RETURN                                                            DATA  74
   70 CALL ERROR(23,KDM1,KDM2)
      RETURN                                                            DATA  76
   80 CALL ERROR(19,KDM1,KDM2)
      RETURN                                                            DATA  78
   90 CALL ERROR(13,IDTBL(1,LOC),KDM2)
      RETURN                                                            DATA  80
      END                                                               DATA  81
```

```
      SUBROUTINE DESCRP                                                 DESCRP 2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      COMMON/FORMAT/IDESST,IDESND,IGPST,IGPND,IGRP,SEPST,SEPND,
     1 DIR,ICOM,ISEP                                                    DESCRP 5
      DIMENSION FORMT(7)                                                DESCRP 6
      INTEGER A,FORMT,DECPT,BLANK,PEE,EX,AICH                           DESCRP 7
      DATA (FORMT(I),I=1,7)/1HF,1HE,1HG,1HD,1HI,1HL,1HA/                DESCRP 8
      DATA DECPT/1H./,BLANK/1H /,PEE/1HP/,EX/1HX/,AICH/1HH/,MINUS/1H-/  DESCRP 9
      ISCLFC=0                                                          DESCRP10
      INT=0                                                             DESCRP11
      IMINUS=0                                                          DESCRP12
      IDES=1                                                            DESCRP13
      IF(NEXT(IDESST) .NE. MINUS) GO TO 5                               DESCRP14
      IMINUS=1                                                          DESCRP15
      GO TO 6                                                           DESCRP16
    5 JPTR=IDESST                                                       DESCRP17
    6 CONTINUE                                                          DESCRP18
      CALL GNLE
      IF(JTYP .EQ. 3) GO TO 80
      IF(JTYP .EQ. 5) GO TO 10
      IF(JTYP .NE. 2) GO TO 15
      IF(NXTID .EQ. PEE .AND. ISCLFC .EQ. 0) GO TO 20
      IF(INT .EQ. 1 .AND. N2 .LT. 1) GO TO 15
      IF(ISCLFC .EQ. 0 .AND. IMINUS .EQ. 1) GO TO 15
      GO TO 25
   10 INT=1                                                             DESCRP24
      GO TO 6                                                           DESCRP25
   15 IDES=0                                                            DESCRP26
      RETURN                                                            DESCRP27
   20 IF(INT .EQ. 0) GO TO 15
      ISCLFC=1
      INT=0
      GO TO 6
   25 DO 30 I=1,7
      IF(NXTID .EQ. FORMT(I)) GO TO 45
   30 CONTINUE                                                          DESCRP36
      IF(NXTID .NE. EX .OR. ISCLFC .EQ. 1 .OR. INT .EQ. 0) GO TO 15
      GO TO 80
   45 CALL GNLE                                                         DESCRP41
      IF(JTYP .NE. 5) GO TO 15                                          DESCRP42
      NWIDTH=N2                                                         DESCRP43
      IF(I .LE. 4) GO TO 60
      IF(ISCLFC .EQ. 1 .OR. NWIDTH .LT. 1) GO TO 15
      IF(I .EQ. 7 .AND. NWIDTH .GT. 4) GO TO 15
      IDESND=JPTR-1                                                     DESCRP47
      RETURN                                                            DESCRP48
   60 IF(NEXT(JPTR) .NE. DECPT) GO TO 15                                DESCRP49
      IF(NWIDTH .LT. 2) GO TO 15                                        DESCRP50
      CALL GNLE                                                         DESCRP51
      IF(JTYP .NE. 5) GO TO 15                                          DESCRP52
      NDCPLS=N2                                                         DESCRP53
      IDESND=JPTR-1                                                     DESCRP54
      IF(I .EQ. 1) GO TO 65                                             DESCRP55
      IF(NWIDTH .LT. (NDCPLS+6)) GO TO 15                               DESCRP56
      RETURN                                                            DESCRP57
   65 IF(NWIDTH .LT. NDCPLS) GO TO 15                                   DESCRP58
      RETURN                                                            DESCRP59
   80 IDESND=JPTR-1                                                     DESCRP60
      RETURN                                                            DESCRP61
      END                                                               DESCRP67
```

```
      SUBROUTINE DIMEN                                                  DIMEN  2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      DIMENSION IALPH(9),IDIM(3)                                        DIMEN  4
      INTEGER A,D,RPAR,COMMA                                            DIMEN  5
      INTEGER BITPUT,BITGET,COMLOC                                      DIMEN  6
      DATA (IALPH(I),I=1,9)/1HD,1HI,1HM,1HE,1HN,1HS,1HI,1HO,1HN/        DIMEN  7
      DATA LPAR/1H(/,RPAR/1H)/,COMMA/1H,/                               DIMEN  8
      DO 10 I=1,9                                                       DIMEN  9
      IF(NEXT(JPTR) .NE. IALPH(I)) GO TO 110                            DIMEN 10
   10 CONTINUE                                                          DIMEN 11
   12 CALL GNLE                                                         DIMEN 12
      IF(JTYP .NE. 2) GO TO 110                                         DIMEN 13
      CALL SEARCH                                                       DIMEN 14
      IF(ISRCH(2) .EQ. 1) CALL ERROR(10,NXTID,KDM2)
      IF(ISRCH(1) .EQ. 1) GO TO 5                                       DIMEN 16
      IDTYP=1                                                           DIMEN 17
      CALL STORE                                                        DIMEN 18
      LOC=NID                                                           DIMEN 19
    5 IF(BITGET(IDTBL(3,LOC),1,1) .NE. 0) CALL ERROR(11,NXTID,KDM1)
      CALL IMPTYP                                                       DIMEN 21
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),1,1)                             DIMEN 22
      IE=LOC                                                            DIMEN 23
      IF(NEXT(JPTR) .NE. LPAR) GO TO 110                                DIMEN 24
      INCR=1                                                            DIMEN 25
      I=0
   15 I=I+1
      CALL GNLE                                                         DIMEN 27
      IF(JTYP .NE. 5) GO TO 13                                          DIMEN 28
      IDIM(I)=N2                                                        DIMEN 29
      IF(N2 .GT. (2**17-1)) CALL ERROR(8,KDM1,KDM2)
      IF(N2 .LE. 0) CALL ERROR(8,KDM1,KDM2)
      INCR=INCR*N2                                                      DIMEN 32
      GO TO 14                                                          DIMEN 33
   13 IF(JTYP .NE. 2) GO TO 110                                         DIMEN 34
      IDTYP=1                                                           DIMEN 35
      CALL SEARCH                                                       DIMEN 36
      IF(ISRCH(2) .EQ. 1) CALL ERROR(10,NXTID,KDM2)
      IF(ISRCH(1) .EQ. 1) GOTO 25                                       DIMEN 38
      IDTYP=1                                                           DIMEN 39
      CALL STORE                                                        DIMEN 40
      LOC=NID                                                           DIMEN 41
   25 IF(BITGET(IDTBL(3,LOC),12,1) .NE. 1) CALL ERROR(9,KDM1,KDM2)
      IF(BITGET(IDTBL(3,LOC),1,1) .NE. 0) GO TO 120
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),1,13)                            DIMEN 44
      CALL IMPTYP                                                       DIMEN 45
      IF(BITGET(IDTBL(3,LOC),10,3) .NE. 4) CALL ERROR(9,KDM1,KDM2)
      IDIM(1)=2**17+LOC                                                 DIMEN 47
   14 IF(NEXT(JPTR) .EQ. COMMA) GO TO 15                                DIMEN 48
      IF(A(JPTR-1) .NE. RPAR) GO TO 110
      LOC=IE
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),1,7)                             DIMEN 53
      IF(I .GT. 3) GO TO 110                                            DIMEN 54
      GO TO (35,30,24),I                                                DIMEN 55
   24 IDTBL(4,LOC)=BITPUT(IDTBL(4,LOC),IDIM(3),36)                      DIMEN 56
   30 IDTBL(4,LOC)=BITPUT(IDTBL(4,LOC),IDIM(2),18)                      DIMEN 57
   35 IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),IDIM(1),36)                      DIMEN 58
      IF(BITGET(IDTBL(3,LOC),16,1) .NE. 1) GO TO 50                     DIMEN 59
      COMLOC=IDTBL(6,LOC)                                               DIMEN 60
      IT=1                                                              DIMEN 61
      ITP=BITGET(IDTBL(3,LOC),10,3)                                     DIMEN 62
      IF(ITP .EQ. 2 .OR. ITP .EQ. 3) IT=2
      IDTBL(4,COMLOC)=IDTBL(4,COMLOC)+IT*(INCR-1)                       DIMEN 64
   50 CONTINUE                                                          DIMEN 65
      IF(NEXT(JPTR) .EQ. COMMA) GO TO 12                                DIMEN 66
      IF(JPTR .GT. N) RETURN                                            DIMEN 67
  110 CALL ERROR(7,KDM1,KDM2)
      RETURN                                                            DIMEN 69
  120 CALL ERROR(14,NXTID,KDM2)
      RETURN
      END                                                               DIMEN 70
```

```
      SUBROUTINE DO                                                     DO      2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH    2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH    4
      COMMON/LABELS/STATRA(2,200),NLABEL                                DO      4
      COMMON/DOLOOP/ISTACK(4,50),NSTACK,ILOOP,IOVFL#
      COMMON/BASBLK/IBLOCK(2500),NBLOCK,NB,NBRNCH
      DIMENSION PARAM(3)                                                DO      7
      INTEGER A,BLANK,COMMA,EQUALS,DEE,OH,PARAM,STATRA                  DO      8
      INTEGER BITPUT,BITGET                                             DO      9
      DATA BLANK/1H /,COMMA/1H,/,EQUALS/1H=/,DEE/1HD/,OH/1HO/           DO     10
      IF(NEXT(JPTR) .NE. DEE) GO TO 50                                  DO     11
      IF(NEXT(JPTR) .NE. OH) GO TO 50                                   DO     12
      CALL GNLE                                                         DO     13
      IF(JTYP .NE. 5) GOTO 50                                           DO     14
      CALL STSRCH                                                       DO     15
      STATRA(2,LOC)=BITPUT(STATRA(2,LOC),1,12)                          DO     16
      STATRA(2,LOC)=BITPUT(STATRA(2,LOC),1,15)                          DO     17
      IF(IOVFL# .EQ. 1) GO TO 2
      NSTACK=NSTACK+1                                                   DO     18
      IF(NSTACK .GT. 50) GO TO 1
      ISTACK(1,NSTACK)=LOC                                              DO     19
      ISTACK(2,NSTACK)=0                                                DO     20
      ISTACK(3,NSTACK)=ILOOP                                            DO     21
      ILOOP=NSTACK                                                      DO     22
      GO TO 2
    1 IOVFL#=1
      #RITE(6,60)
   60 FORMAT(///5X,50H DO STACK OVERFLO# - DO LOOP PROCESSING TERMINATED
     •)
    2 CALL GNLE
      IF(JTYP .NE. 2) GO TO 50                                          DO     24
      CALL SEARCH                                                       DO     25
      IF(ISRCH(2) .EQ. 1) CALL ERROR(10,NXTID,KDM2)
      IF(ISRCH(1) .EQ. 1) GO TO 5                                       DO     27
      IDTYP=1                                                           DO     28
      CALL STORE                                                        DO     29
      LOC=NID                                                           DO     30
    5 CALL IMPTYP                                                       DO     31
      IF(BITGET(IDTBL(3,LOC),10,3) .NE. 4) CALL ERROR(40,NXTID,KDM2)
      IF(BITGET(IDTBL(3,LOC),1,1) .EQ. 1) CALL ERROR(19,NXTID,KDM2)
      IF(NEXT(JPTR) .NE. EQUALS) GO TO 50                               DO     34
      IF(IOVFL# .EQ. 1) GO TO 8
      NBLOCK=NBLOCK+1                                                   DO     35
      IBLOCK(NBLOCK)=3000+LOC                                           DO     36
      ISTACK(4,NSTACK)=LOC                                              DO     37
    8 PARAM(3)=1
      DO 30 I=1,3                                                       DO     39
      CALL GNLE                                                         DO     40
      IF(JTYP .NE. 5) GO TO 10                                          DO     41
      PARAM(I)=N2                                                       DO     42
      IF(N2 .LE. 0) CALL ERROR(41,KDM1,KDM2)
      GO TO 20                                                          DO     44
   10 IF(JTYP .NE. 2) GO TO 50                                          DO     45
      CALL SEARCH                                                       DO     46
      IF(ISRCH(2) .EQ. 1) CALL ERROR(10,NXTID,KDM2)
      IF(ISRCH(1) .EQ. 1) GO TO 15                                      DO     48
      IDTYP=1                                                           DO     49
      CALL STORE                                                        DO     50
      LOC=NID                                                           DO     51
   15 CALL IMPTYP                                                       DO     52
      IF(BITGET(IDTBL(3,LOC),10,3) .NE. 4) CALL ERROR(40,NXTID,KDM2)
      IF(BITGET(IDTBL(3,LOC),1,1) .EQ. 1) CALL ERROR(19,NXTID,KDM2)
      NBLOCK=NBLOCK+1                                                   DO     55
      IBLOCK(NBLOCK)=7000+LOC
```

```
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),ILOOP,36)
      PARAM(I)=0                                                        DO    57
   20 IF(I .EQ. 3) GO TO 30                                             DO    58
      IF(I .EQ. 1) GO TO 25                                             DO    59
      IF(NEXT(JPTR) .EQ. BLANK) GO TO 35                                DO    60
      JPTR=JPTR-1                                                       DO    61
   25 IF(NEXT(JPTR) .NE. COMMA) GO TO 50                                DO    62
   30 CONTINUE                                                          DO    63
      IF(NEXT(JPTR) .NE. BLANK) GO TO 50                                DO    64
   35 IF(PARAM(1) .EQ. 0 .OR. PARAM(2) .EQ. 0) GO TO 40                 DO    65
      IF(PARAM(2) .LT. PARAM(1)) CALL ERROR(41,KDM1,KDM2)
      IF(PARAM(3) .EQ. 0) GO TO 40                                      DO    67
      IF((PARAM(2)+PARAM(3)-1) .GT. (2**17-1)) CALL ERROR(41,KDM1,KDM2)
   40 NBLOCK=NBLOCK+1                                                   DO    69
      IBLOCK(NBLOCK)=998                                                DO    70
      NBRNCH=1                                                          DO    71
      NB=1                                                              DO    72
      RETURN                                                            DO    73
   50 CALL ERROR(7,KDM1,KDM2)
      RETURN                                                            DO    75
      END                                                               DO    76
```

```
      SUBROUTINE EQUIV                                                  EQUIV  2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      DIMENSION IALPH(11),IDIM(3),ISUB(3)                               EQUIV  4
      INTEGER BITPUT,BITGET                                             EQUIV  5
      INTEGER A,RPAR,COMMA,BOFFST,BLANK                                 EQUIV  6
      DATA (IALPH(I),I=1,11)/1HE,1HQ,1HU,1HI,1HV,1HA,1HL,1HE,1HN,1HC,   EQUIV  7
     1 1HE/                                                             EQUIV  8
      DATA LPAR/1H(/,RPAR/1H)/,COMMA/1H,/,BLANK/1H /                    EQUIV  9
      DO 5 I=1,11                                                       EQUIV 10
      IF(NEXT(JPTR) .NE. IALPH(I)) GO TO 130                            EQUIV 11
    5 CONTINUE                                                          EQUIV 12
    8 IF(NEXT(JPTR) .NE. LPAR) GO TO 130                                EQUIV 13
      LSTLOC=0                                                          EQUIV 14
      BOFFST=0                                                          EQUIV 15
      J=0
  120 J=J+1
      CALL GNLE                                                         EQUIV 17
      ILOC=1                                                            EQUIV 18
      IF(JTYP .NE. 2) GO TO 130                                         EQUIV 19
      CALL SEARCH                                                       EQUIV 20
      IF(ISRCH(2) .EQ. 1) CALL ERROR(10,NXTID,KDM2)
      IF(ISRCH(1) .EQ. 1) GO TO 9                                       EQUIV 22
      IDTYP=1                                                           EQUIV 23
      CALL STORE                                                        EQUIV 24
      LOC=NID                                                           EQUIV 25
    9 CALL IMPTYP                                                       EQUIV 26
      IF(BITGET(IDTBL(3,LOC),12,1) .EQ. 1) CALL ERROR(20,NXTID,KDM2)
      IF(NEXT(JPTR) .NE. LPAR) GO TO 30                                 EQUIV 28
      IF(BITGET(IDTBL(3,LOC),1,1) .NE. 1) GO TO 150                     EQUIV 29
      NDIM=BITGET(IDTBL(3,LOC),7,6)                                     EQUIV 30
      DO 10 I=1,NDIM                                                    EQUIV 31
      CALL GNLE                                                         EQUIV 32
      IF(JTYP .NE. 5) GO TO 130                                         EQUIV 33
      IDIM(I)=N2                                                        EQUIV 34
      IF(N2 .LE. 0) CALL ERROR(8,KDM1,KDM2)
      IWRD=3+I/2                                                        EQUIV 36
      IPOS=18*MOD(I,2)+18
      ISUB(I)=BITGET(IDTBL(IWRD,LOC),IPOS,17)
      IF(N2 .GT. ISUB(I)) CALL ERROR(18,KDM1,KDM2)
      IF(NEXT(JPTR) .EQ. COMMA) GO TO 10                                EQUIV 40
      IF(A(JPTR-1) .NE. RPAR) GO TO 130                                 EQUIV 41
      GO TO 15                                                          EQUIV 42
   10 CONTINUE                                                          EQUIV 43
      GO TO 140                                                         EQUIV 44
   15 NDIM=I                                                            EQUIV 45
      ILOC=IDIM(1)                                                      EQUIV 46
      IF(NDIM .EQ. 1) GO TO 25                                          EQUIV 47
      ILOC=ILOC+(IDIM(2)-1)*ISUB(1)                                     EQUIV 48
      IF(NDIM .EQ. 2) GO TO 25                                          EQUIV 49
      ILOC=ILOC+(IDIM(3)-1)*ISUB(1)*ISUB(2)                             EQUIV 50
   25 IT=BITGET(IDTBL(3,LOC),10,3)                                      EQUIV 51
      IF(IT .EQ. 2 .OR. IT .EQ. 3) ILOC=2*ILOC
      IOFFST=1-ILOC-BOFFST                                              EQUIV 53
      GO TO 45                                                          EQUIV 54
   30 IF(BITGET(IDTBL(3,LOC),1,1) .NE. 0) CALL ERROR(14,NXTID,KDM2)
      IOFFST=BOFFST                                                     EQUIV 56
      JPTR=JPTR-1                                                       EQUIV 57
   45 IF(BITGET(IDTBL(3,LOC),17,1) .EQ. 1) GO TO 57                     EQUIV 58
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),1,17)                            EQUIV 59
      IF(LSTLOC .EQ. 0) GO TO 50                                        EQUIV 60
      IDTBL(7,LSTLOC)=LOC                                               EQUIV 61
      GO TO 55                                                          EQUIV 62
   50 IFSTLC=LOC                                                        EQUIV 63
   55 IDTBL(8,LOC)=IOFFST                                               EQUIV 64
      LSTLOC=LOC                                                        EQUIV 65
      IF(J .NE. 1) GO TO 100                                            EQUIV 66
```

```
      GO TO 98                                                          EQUIV 67
   57 LOC3=LOC                                                          EQUIV 68
   58 LOC3=IDTBL(7,LOC3)                                                EQUIV 69
      IF(LOC3 .EQ. 0) GO TO 59                                          EQUIV 70
      IF(LOC3 .EQ. LOC) GO TO 60                                        EQUIV 71
      GO TO 58                                                          EQUIV 72
   59 JLOC=ILOC+IDTBL(8,LOC)                                            EQUIV 73
      IF(JLOC .NE. IDIS) CALL ERROR(20,IDTBL(1,LOC),KDM2)
      GO TO 100                                                         EQUIV 75
   60 IF(LSTLOC .NE. 0) GO TO 63                                        EQUIV 76
      IFSTLC=LOC                                                        EQUIV 77
      GO TO 65                                                          EQUIV 78
   63 IDTBL(7,LSTLOC)=LOC                                               EQUIV 79
   65 LOC2=LOC                                                          EQUIV 80
   70 NXTLOC=IDTBL(7,LOC2)
      IF(NXTLOC .EQ. LOC) GO TO 75                                      EQUIV 83
      LOC2=NXTLOC                                                       EQUIV 84
      GO TO 70
   75 IDTBL(7,LOC2)=0                                                   EQUIV 86
      LSTLOC=LOC2                                                       EQUIV 87
      IOFFDF=IOFFST-IDTBL(8,LOC)                                        EQUIV 88
      IF(IOFFDF) 80,98,90                                               EQUIV 89
   80 LOC2=LOC                                                          EQUIV 90
   85 IDTBL(8,LOC2)=IDTBL(8,LOC2)+IOFFDF
      LOC2=IDTBL(7,LOC2)                                                EQUIV 93
      IF(LOC2 .EQ. 0) GO TO 98                                          EQUIV 94
      GO TO 85
   90 LOC2=IFSTLC                                                       EQUIV 96
   95 IF(LOC2 .EQ. LOC) GO TO 97
      IDTBL(8,LOC2)=IDTBL(8,LOC2)-IOFFDF                                EQUIV 99
      LOC2=IDTBL(7,LOC2)                                                EQUIV100
      GO TO 95
   97 BOFFST=BOFFST-IOFFDF                                              EQUIV102
   98 IDIS=ILOC+IDTBL(8,LOC)                                            EQUIV103
  100 IF(NEXT(JPTR) .EQ. COMMA) GO TO 120                               EQUIV104
      IF(A(JPTR-1) .NE. RPAR) GO TO 130                                 EQUIV105
      IF(J .EQ. 1) GO TO 130                                            EQUIV106
      IDTBL(7,LSTLOC)=IFSTLC                                            EQUIV107
      JK=0                                                              EQUIV108
      LOC3=IFSTLC                                                       EQUIV109
      I=0
  110 I=I+1
      LOC3=IDTBL(7,LOC3)                                                EQUIV111
      IF(BITGET(IDTBL(3,LOC3),16,1) .EQ. 0) GO TO 105                   EQUIV112
      JK=JK+1                                                           EQUIV113
      IF(JK .GT. 1) CALL ERROR(21,IDTBL(1,LOC3),IDTBL(1,LOC1))
      LOC1=LOC3
      LOC=LOC3                                                          EQUIV115
      CALL COMEXT                                                       EQUIV116
  105 IF(LOC3 .NE. IFSTLC) GO TO 110
      IF(NEXT(JPTR) .EQ. BLANK) RETURN                                  EQUIV120
      IF(A(JPTR-1) .EQ. COMMA) GO TO 8
  130 CALL ERROR(7,KDM1,KDM2)
      RETURN                                                            EQUIV125
  140 CALL ERROR(19,KDM1,KDM2)
      RETURN                                                            EQUIV127
  150 CALL ERROR(13,NXTID,KDM2)
      RETURN                                                            EQUIV129
      END                                                               EQUIV130
```

```
      SUBROUTINE ERROR(IERROR,INUM,INUM2)
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES
      COMMON/FLOW/IFL,IRP
      WRITE(6,1)                                                        ERROR  3
    1 FORMAT(1X,100H*****************************************************ERROR  4
     1*********************************************)                    ERROR  5
      GO TO (5,15,25,35,45,55,65,75,85,95,105,115,125,135,145,155,165,  ERROR  6
     A175,185,195,205,215,225,235,245,255,265,275,285,295,305,315,325,  ERROR  7
     * 335,345,355,365,375,385,395,405,415,425,435,445,455,465,475,485,
     * 495,505,515,525,535,545,555,565,575,585,595,605,615,625,635,645,
     $ 655,665,675,685,695,705,715,725,735,745,755,765,775,785,795,805,
     $815,825,835,845,855,865,875,885,895,905,915,925,935,945),IERROR
    5 WRITE(6, 10)                                                      ERROR 10
   10 FORMAT(6X,26H THIS STATEMENT IS ILLEGAL)                          ERROR 11
      GO TO 1000                                                        ERROR 12
   15 WRITE(6, 20)                                                      ERROR 13
   20 FORMAT(6X,31H THIS STATEMENT IS OUT OF ORDER)                     ERROR 14
      GO TO 1000                                                        ERROR 15
   25 WRITE(6, 30)                                                      ERROR 16
   30 FORMAT(6X,39H VALUE OF INTEGER CONSTANT IS TOO LARGE)             ERROR 17
      GO TO 1000                                                        ERROR 18
   35 WRITE(6, 40)                                                      ERROR 19
   40 FORMAT(6X,28H TOO MANY CONTINUATION CARDS)                        ERROR 20
      GO TO 1000                                                        ERROR 21
   45 WRITE(6, 50)                                                      ERROR 22
   50 FORMAT(6X,30H HOLLERITH STRING IS TOO LARGE)                      ERROR 23
      GO TO 1000                                                        ERROR 24
   55 WRITE(6, 60)                                                      ERROR 25
   60 FORMAT(6X,26H VARIABLE NAME IS TOO LONG)                          ERROR 26
      GO TO 1000                                                        ERROR 27
   65 WRITE(6, 70)                                                      ERROR 28
   70 FORMAT(6X,31H SYNTAX ERROR IN THIS STATEMENT)                     ERROR 29
      IF(ITYP .LE. 18 .AND. IFL .GT. 0) IFL=-1
      GO TO 1000                                                        ERROR 30
   75 WRITE(6, 80)                                                      ERROR 31
   80 FORMAT(6X,46H ARRAY DIMENSION IS OUTSIDE OF ALLOWABLE RANGE)      ERROR 32
      GO TO 1000                                                        ERROR 33
   85 WRITE(6, 90)                                                      ERROR 34
   90 FORMAT(6X,45H ILLEGAL VARIABLE DIMENSION IN THIS STATEMENT)       ERROR 35
      GO TO 1000                                                        ERROR 36
   95 WRITE(6,100) INUM
  100 FORMAT(6X,33H THE FUNCTION OR SUBROUTINE NAME ,A6,18H IS USED ILLE
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```
     *GALLY)
      GO TO 1000
  105 WRITE(6,110) INUM
  110 FORMAT(6X,14H THE VARIABLE ,A6,32H HAS BEEN PREVIOUSLY DIMENSIONED
     *)
      GO TO 1000
  115 WRITE(6,120) INUM
  120 FORMAT(6X,14H THE VARIABLE ,A6,26H HAS BEEN PREVIOUSLY TYPED)
      GO TO 1000
  125 WRITE(6,130) INUM
  130 FORMAT(6X,14H THE VARIABLE ,A6,38H IS ILLEGALLY FOLLOWED BY A LEFT
     * PAREN)
      GO TO 1000
  135 WRITE(6,140) INUM
  140 FORMAT(6X,26H THE DIMENSIONED VARIABLE ,A6,18H IS USED ILLEGALLY)
      GO TO 1000
  145 WRITE(6,150) INUM
  150 FORMAT(6X,18H STATEMENT NUMBER ,I5,15H IS NOT DEFINED)
      IF(IFL .GT. 0) IFL=-1
      GO TO 1000
  155 WRITE(6,160) INUM
  160 FORMAT(6X,18H STATEMENT NUMBER ,I5,18H IS NOT REFERENCED)
      GO TO 1000
  165 WRITE(6,170) INUM
  170 FORMAT(6X,18H ILLEGAL VARIABLE ,A6,10H IN COMMON)
      GO TO 1000                                                    ERROR 60
  175 WRITE(6,180)                                                  ERROR 61
  180 FORMAT(6X,43H VALUE OF ARRAY SUBSCRIPT EXCEEDS DIMENSION)     ERROR 62
      GO TO 1000                                                    ERROR 63
  185 WRITE(6,190)                                                  ERROR 64
  190 FORMAT(6X,25H ERROR IN ARRAY SUBSCRIPT)                       ERROR 65
      GO TO 1000                                                    ERROR 66
  195 WRITE(6,200) INUM
  200 FORMAT(6X,18H ILLEGAL VARIABLE ,A6,16H IS EQUIVALENCED)
      GO TO 1000
  205 WRITE(6,210) INUM,INUM2
  210 FORMAT(6X,22H THE COMMON VARIABLES ,A6,5H AND ,A6,17H ARE EQUIVALE
     *NCED)
      GO TO 1000                                                    ERROR 72
  215 WRITE(6,220)                                                  ERROR 73
  220 FORMAT(6X,19H ILLEGAL I/O DEVICE)                             ERROR 74
      GO TO 1000                                                    ERROR 75
  225 WRITE(6,230)                                                  ERROR 76
  230 FORMAT(6X,37H ILLEGAL CHARACTER IN THIS EXPRESSION)           ERROR 77
      GO TO 1000                                                    ERROR 78
  235 WRITE(6,240) INUM
  240 FORMAT(6X,25H ILLEGAL SUBROUTINE NAME ,A6)
      GO TO 1000
  245 WRITE(6,250)
  250 FORMAT(6X,50H SUBROUTINE TABLE OVERFLOW - PROCESSING TERMINATED)
      GO TO 1000
  255 WRITE(6,260) INUM
  260 FORMAT(6X,77H INCORRECT NUMBER OF ARGUMENTS IN CALLING SEQUENCE OF
     $ FUNCTION OR SUBROUTINE ,A6)
      GO TO 1000                                                    ERROR 87
  265 WRITE(6,270)                                                  ERROR 88
  270 FORMAT(6X,19H ILLEGAL ASSIGNMENT)                             ERROR 89
      GO TO 1000                                                    ERROR 90
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275 WRITE(6,280) INUM
280 FORMAT(6X,14H THE VARIABLE ,A6,42H APPEARS IN A DATA STATEMENT AND
   * IN COMMON)
    GO TO 1000
285 WRITE(6,290) INUM
290 FORMAT(6X,14H THE VARIABLE ,A6,44H HAS PREVIOUSLY APPEARED IN A DA
   *TA STATEMENT)
    GO TO 1000
295 WRITE(6,300) INUM
300 FORMAT(6X,22H THE FORMAL PARAMETER ,A6,31H APPEARS IN THIS DATA ST
   *ATEMENT)
    GO TO 1000                                                          ERROR 99
305 WRITE(6,310)                                                        ERROR100
310 FORMAT(6X,24H LIST SIZES DO NOT MATCH)                              ERROR101
    GO TO 1000                                                          ERROR102
315 WRITE(6,320)                                                        ERROR103
320 FORMAT(6X,24H ILLEGAL STATEMENT LABEL)                              ERROR104
    IF(IFL .GT. 0) IFL=-1
    GO TO 1000                                                          ERROR105
325 WRITE(6,330)                                                        ERROR106
330 FORMAT(6X,26H DUPLICATE STATEMENT LABEL)                            ERROR107
    IF(IFL .GT. 0) IFL=-1
    GO TO 1000                                                          ERROR108
335 WRITE(6,340)                                                        ERROR109
340 FORMAT(6X,34H THIS STATEMENT CAN NOT BE REACHED)                    ERROR110
    GO TO 1000                                                          ERROR111
345 WRITE(6,350)                                                        ERROR112
350 FORMAT(6X,31H DO LOOPS ARE IMPROPERLY NESTED)                       ERROR113
    GO TO 1000                                                          ERROR114
355 WRITE(6,360)                                                        ERROR115
360 FORMAT(6X,32H FORMAT STATEMENT IS NOT LABELED)                      ERROR116
    GO TO 1000                                                          ERROR117
365 WRITE(6,370)                                                        ERROR118
370 FORMAT(6X,20H ILLEGAL DO TERMINAL)                                  ERROR119
    GO TO 1000                                                          ERROR120
375 WRITE(6,380)                                                        ERROR121
380 FORMAT(6X,37H LAST EXECUTABLE STATEMENT IS ILLEGAL)                 ERROR122
    IF(IFL .GT. 0) IFL=-1
    GO TO 1000                                                          ERROR123
385 WRITE(6,390) INUM
390 FORMAT(6X,24H THE VARIABLE REFERENCE ,A6,18H IS NOT AN INTEGER)
    GO TO 1000
395 WRITE(6,400) INUM
400 FORMAT(6X,27H THE DO PARAMETER OR INDEX ,A6,18H IS NOT AN INTEGER)
    GO TO 1000                                                          ERROR129
405 WRITE(6,410)                                                        ERROR130
410 FORMAT(6X,52H VALUE OF DO PARAMETER IS OUTSIDE OF ALLOWABLE RANGE,  ERROR131
    GO TO 1000                                                          ERROR132
415 WRITE(6,420)                                                        ERROR133
420 FORMAT(6X,32H COMPLEX EXPRESSIONS ARE ILLEGAL)                      ERROR134
    GO TO 1000                                                          ERROR135
425 WRITE(6,430)                                                        ERROR136
430 FORMAT(6X,24H ILLEGAL VARIABLE FORMAT)                              ERROR137
    GO TO 1000                                                          ERROR138
435 WRITE(6,440)                                                        ERROR139
440 FORMAT(6X,39H THIS STATEMENT SHOULD HAVE AN I/O LIST)               ERROR140
    GO TO 1000                                                          ERROR141
445 WRITE(6,450)                                                        ERROR142
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450 FORMAT(6X,50H STATEMENT FOLLOWING LOGICAL EXPRESSION IS ILLEGAL)  ERROR143
    GO TO 1000                                                        ERROR144
455 WRITE(6,460)                                                      ERROR145
460 FORMAT(6X,44H REAL NUMBER LIES OUTSIDE OF ALLOWABLE RANGE)        ERROR146
    GO TO 1000                                                        ERROR147
465 WRITE(6,470)                                                      ERROR148
470 FORMAT(6X,42H THIS EQUIVALENCE STATEMENT EXTENDS COMMON)          ERROR149
    GO TO 1000                                                        ERROR150
475 WRITE(6,480)
480 FORMAT(6X,40H ILLEGAL VARIABLE IN COMMON BLOCK SESCOM)
    GO TO 1000
485 WRITE(6,490) INUM
490 FORMAT(6X,12H SUBPROGRAM ,A6,19H HAS INCORRECT TYPE)
    GO TO 1000
495 WRITE(6,500) INUM
500 FORMAT(6X,23H WARNING - ARGUMENT NO.,I3,34H MAY HAVE INCORRECT DIM
   *ENSIONALITY)
    GO TO 1000
505 WRITE(6,510) INUM
510 FORMAT(6X,13H ARGUMENT NO.,I3,19H HAS INCORRECT TYPE)
    GO TO 1000
515 WRITE(6,520)
520 FORMAT(6X,49H WARNING - THIS MODULE IS NOT IN THE SESCOMP LIST)
    GO TO 1000
525 WRITE(6,530) INUM
530 FORMAT(6X,14H THE VARIABLE ,A6,29H PREVIOUSLY APPEARS IN COMMON)
    GO TO 1000
535 WRITE(6,540) INUM
540 FORMAT(6X,13H ARGUMENT NO.,I3,11H IS INVALID)
    GO TO 1000
545 WRITE(6,550) INUM
550 FORMAT(6X,13H ARGUMENT NO.,I3,29H IS DESIGNATED LOGICAL OUTPUT)
    GO TO 1000
555 WRITE(6,560) INUM
560 FORMAT(6X,29H ILLEGAL COMMON BLOCK NAME - ,A6)
    GO TO 1000
565 WRITE(6,570) INUM
570 FORMAT(6X,41H WARNING - VARIABLE TYPE IN COMMON BLOCK ,A6,41H DOES
   $ NOT AGREE WITH INTERFACE DEFINITION)
    GO TO 1000
575 WRITE(6,580) INUM
580 FORMAT(6X,14H COMMON BLOCK ,A6,19H HAS INCORRECT SIZE)
    GO TO 1000
585 WRITE(6,590)
590 FORMAT(6X,58H EXTERNAL REFERENCE TABLE OVERFLOW - PROCESSING TERMI
   $NATED)
    GO TO 1000
595 WRITE(6,600)
600 FORMAT(6X,52H COMMON BLOCK TABLE OVERFLOW - PROCESSING TERMINATED)
    GO TO 1000
605 WRITE(6,610) INUM
610 FORMAT(6X,29H ILLEGAL COMMON BLOCK NAME - ,A6)
    GO TO 1000
615 WRITE(6,620) INUM
620 FORMAT(6X,14H COMMON BLOCK ,A6,27H IS NOT IN THE SESCOMP LIST)
    GO TO 1000
625 WRITE(6,630) INUM
630 FORMAT(6X,25H CATEGORY 2 COMMON BLOCK ,A6,23H IS NOT GROUPED BY TY
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     $PE)
      GO TO 1000
635 WRITE(6,640) INUM,INUM2
640 FORMAT(6X,38H DOUBLE PRECISION OR COMPLEX VARIABLE ,A6,56H DOES NO
    $T BEGIN ON AN EVEN LOCATION WITHIN COMMON BLOCK ,A6)
      GO TO 1000
645 WRITE(6,650) INUM
650 FORMAT(6X,26H VARIABLE IN COMMON BLOCK ,A6,16H IS OUT OF ORDER)
      GO TO 1000
655 WRITE(6,660)
660 FORMAT(6X,56H THE COMMON BLOCK SESCOM DOES NOT APPEAR IN THIS PROG
    $RAM)
      GO TO 1000
665 WRITE(6,670) INUM
670 FORMAT(6X,14H THE DO INDEX ,A6,13H IS REDEFINED)
      RETURN
675 WRITE(6,680) INUM
680 FORMAT(6X,24H THE VARIABLE DIMENSION ,A6,13H IS REDEFINED)
      RETURN
685 WRITE(6,690) INUM
690 FORMAT(6X,23H THE ASSIGNED VARIABLE ,A6,24H IS ILLEGALLY REFERENCE
    $D)
      RETURN
695 WRITE(6,700) INUM
700 FORMAT(6X,14H THE VARIABLE ,A6,30H IS REFERENCED BUT NOT DEFINED)
      RETURN
705 WRITE(6,710) INUM
710 FORMAT(6X,14H THE VARIABLE ,A6,45H IS REFERENCED ILLEGALLY BY AN A
    $SSIGNED GO TO)
      RETURN
715 WRITE(6,720) INUM
720 FORMAT(6X,18H THE DO PARAMETER ,A6,13H IS REDEFINED)
      RETURN
725 WRITE(6,730)
730 FORMAT(6X,49H THIS MODULE CONTAINS NO CATEGORY 2 COMMON BLOCKS)
      GO TO 1000
735 WRITE(6,740) INUM
740 FORMAT(6X,24H THE ANSI FUNCTION NAME ,A6,27H IS MISUSED IN THIS PR
    $OGRAM)
      GO TO 1000
745 WRITE(6,750) INUM
750 FORMAT(6X,14H THE VARIABLE ,A6,60H APPEARS IN A CATEGORY 2 OR 3 CO
    $MMON BLOCK BUT IS NEVER USED)
      GO TO 1000
755 WRITE(6,760)
760 FORMAT(6X,75H ARRAY SUBSCRIPT OR IMPLIED DO PARAMETER MAY LIE OUTS
    $IDE OF ALLOWABLE RANGE)
      GO TO 1000
765 WRITE(6,770) INUM,INUM2
770 FORMAT(6X,22H MIXED MODE COMBINING ,A6,6H WITH ,A6)
      GO TO 1000
775 WRITE(6,780) INUM
780 FORMAT(6X,33H INCORRECT EXPONENT AT CHAR. NO. ,I3)
      GO TO 1000
785 WRITE(6,790) INUM
790 FORMAT(6X,47H VAR-CONST CONFUSION IN SUBSCRIPT AT CHAR. NO. ,I3)
      GO TO 1000
795 WRITE(6,800) INUM,INUM2
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  800 FORMAT(6X,40H SUBSCRIPT CONSTANT OR VARIABLE OF TYPE ,A6,19H AT CH
     $AR. NO. ,I3)
      GO TO 1000
  805 WRITE(6,810) INUM
  810 FORMAT(6X,52H TOO MANY SUBSCRIPTS FOR THIS VARIABLE AT CHAR. NO. ,
     $I3)
      GO TO 1000
  815 WRITE(6,820) INUM
  820 FORMAT(6X,51H TOO FEW SUBSCRIPTS FOR THIS VARIABLE AT CHAR. NO. ,
     $I3)
      GO TO 1000
  825 WRITE(6,830) INUM
  830 FORMAT(6X,52H ILLEGAL TYPE IN RELATIONAL EXPRESSION AT CHAR. NO. ,
     $I3)
      GO TO 1000
  835 WRITE(6,840) INUM
  840 FORMAT(6X,40H TOO MANY ARGUMENTS IN CALLING SEQUENCE ,I3)
      GO TO 1000
  845 WRITE(6,850)
  850 FORMAT(6X,41H TOO MANY FUNCTION REFS IN THIS STATEMENT)
      GO TO 1000
  855 WRITE(6,860) INUM
  860 FORMAT(6X,26H INVALID FORMAL PARAMETER ,A6)
      GO TO 1000
  865 WRITE(6,870) INUM
  870 FORMAT(6X,19H THE FUNCTION NAME ,A6,33H MAY HAVE BEEN PREVIOUSLY M
     *ISUSED)
      GO TO 1000
  875 WRITE(6,880) INUM
  880 FORMAT(6X,39H ILLEGAL FIELD DESCRIPTOR AT CHAR. NO. ,I4)
      GO TO 1000
  885 WRITE(6,890)
  890 FORMAT(6X,38H TOO MANY FUNCTION DEFINING STATEMENTS)
      GO TO 1000
  895 WRITE(6,900)
  900 FORMAT(6X,71H TOO MANY EXTERNAL REFERENCES IN THIS STATEMENT - PRO
     $CESSING TERMINATED)
      GO TO 1000
  905 WRITE(6,910)
  910 FORMAT(6X,46H STATEMENT IS TOO LONG - PROCESSING TERMINATED)
      GO TO 1000
  915 WRITE(6,920)
  920 FORMAT(6X,46H SESCOMP LIST OVERFLOW - PROCESSING TERMINATED)
      GO TO 1000
  925 WRITE(6,930)
  930 FORMAT(6X,63H OVERFLOW OF INTERFACE DEFINITION TABLE - PROCESSING
     $TERMINATED)
      GO TO 1000
  935 WRITE(6,940)
  940 FORMAT(6X,32H TOO MANY EQUIVALENCED VARIABLES)
      GO TO 1000
  945 WRITE(6,950)
  950 FORMAT(6X,61H TOO MANY VARIABLES IN THIS STATEMENT - PROCESSING TE
     $RMINATED)
 1000 WRITE(6,1)                                                    ERROR153
      RETURN                                                        ERROR154
      END                                                           ERROR155
```

```
      SUBROUTINE EXPR                                                   EXPR   2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      COMMON/FUNC/IFNCRA(5,17),MARGS,IARGS(50),FNCLOC(5),NFUNC
      COMMON/STRING/NTYPE,NSTR,STR(500)                                 EXPR   5
      COMMON/LIST/NLIST,NINTFC,ISUBLT(3,200),INTFAC(500)
      COMMON/BASBLK/IBLOCK(2500),NBLOCK,NB,NBRNCH
      INTEGER FNCLOC,OPRA(6),BITPUT,BITGET
      INTEGER D,ASTRIK,DEE,EQUALS,STR,A,COMMA,RPAR,BLANK                EXPR  10
      DATA (OPRA(I),I=1,6)/1H+,1H-,1H/,1H(,1H),1H,/,ASTRIK/1H*/,DEE/1HD/EXPR  11
     1 ,EQUALS/1H=/,COMMA/1H,/,RPAR/1H)/,LPAR/1H(/,BLANK/1H /           EXPR  12
      LP=0                                                              CH34  29
      NFUNC=0                                                           CH34  30
      K=0
      IEXPST=NBLOCK+1                                                   EXPR  14
      MARGS=0                                                           EXPR  15
  200 K=K+1
      CALL GNLE                                                         EXPR  17
      IF(JTYP .EQ. 0) RETURN                                            EXPR  18
      IF(JTYP .NE. 1) GO TO 20                                          EXPR  19
      IF(LTYP .EQ. 9 .OR. ITYP .EQ. 6) GO TO 2
      IF(ITYP .EQ. 1 .OR. ITYP .EQ. 35) GO TO 1
      GO TO 5
    1 IF(D(1) .EQ. EQUALS) RETURN                                       EXPR  22
      GO TO 5                                                           EXPR  23
    2 IF(D(1) .EQ. RPAR .AND. LP .EQ. 1) RETURN                         EXPR  24
    5 DO 10 I=1,6                                                       EXPR  29
      IF(D(1) .NE. OPRA(I)) GO TO 10                                    EXPR  30
      STR(K)=-I                                                         EXPR  31
      IF(I .EQ. 4) GO TO 6                                              EXPR  32
      IF(I .EQ. 5) GO TO 7                                              EXPR  33
      GO TO 100                                                         EXPR  34
    6 LP=LP+1                                                           EXPR  35
      GO TO 100                                                         EXPR  41
    7 LP=LP-1                                                           EXPR  42
      GO TO 100                                                         EXPR  46
   10 CONTINUE                                                          EXPR  47
      IF(D(1) .NE. EQUALS) GO TO 12                                     EXPR  48
      STR(K)=-18                                                        EXPR  56
      GO TO 100                                                         EXPR  57
   12 IF(D(1) .NE. ASTRIK) GO TO 110                                    EXPR  58
      IF(D(2) .EQ. ASTRIK .AND. M .GT. 1) GO TO 15                      EXPR  59
      STR(K)=-7                                                         EXPR  60
      GO TO 100                                                         EXPR  61
   15 STR(K)=-8                                                         EXPR  62
      GO TO 100                                                         EXPR  63
   20 IF(JTYP .NE. 7) GO TO 30                                          EXPR  64
      IF(LOGID .GT. 9) GO TO 25                                         EXPR  65
      STR(K)=-(LOGID+8)                                                 EXPR  66
      GO TO 100                                                         EXPR  67
   25 STR(K)=LSTART+440000+M*1000000                                    EXPR  68
      GO TO 100                                                         EXPR  69
   30 IF(JTYP .NE. 4) GO TO 40                                          EXPR  70
      IF(IDES .EQ. 0) GO TO 35                                          EXPR  71
      STR(K)=LSTART+420000+M*1000000                                    EXPR  72
      GO TO 100                                                         EXPR  73
   35 CONTINUE                                                          EXPR  74
      STR(K)=LSTART+400000+M*1000000                                    EXPR  75
```

```
      GO TO 100                                                         EXPR  76
   40 IF(JTYP .NE. 6) GO TO 50                                          EXPR  77
      STR(K)=LSTART+410000+M*1000000                                    EXPR  78
      GO TO 100                                                         EXPR  79
   50 IF(JTYP .NE. 5) GO TO 55
      STR(K)=LSTART+430000+M*1000000                                    EXPR  81
      GO TO 100                                                         EXPR  82
   55 IF(JTYP .NE. 3) GO TO 60
      STR(K)=LSTART+450000+M*1000000
      IF(ITYP .NE. 8) CALL ERROR(23,IDM1,IDM2)
      GO TO 100
   60 IF(JTYP .NE. 2) GO TO 110                                         EXPR  83
      CALL SEARCH                                                       EXPR  84
      IBETA=0                                                           EXPR  85
      IF(NEXT(JPTR) .NE. LPAR) GO TO 64                                 EXPR  86
      IF(ISRCH(1) .EQ. 0) GO TO 62                                      EXPR  87
      IF(BITGET(IDTBL(3,LOC),1,1) .EQ. 1) GO TO 67
      CALL SWITCH                                                       EXPR  89
      IBETA=5                                                           EXPR  90
      GO TO 63
   62 IBETA=5                                                           EXPR  92
      IF(ISRCH(2) .EQ. 1) GO TO 63                                      EXPR  93
      IDTYP=2                                                           EXPR  94
      CALL STORE                                                        EXPR  95
      LOC=NID                                                           EXPR  96
      DO 70 I=1,NLIST
      IF(ISUBLT(1,I) .NE. IDTBL(1,LOC)) GO TO 70
      IF(BITGET(ISUBLT(2,I),10,4) .NE. 4) GO TO 63
      ITP=BITGET(ISUBLT(2,I),13,3)
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),ITP,10)
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),1,11)
      GO TO 63                                                          EXPR 101
   70 CONTINUE                                                          EXPR 102
   63 NFUNC=NFUNC+1                                                     EXPR 103
      IF(NFUNC .GT. 5) GO TO 120
      FNCLOC(NFUNC)=LOC                                                 EXPR 104
      GO TO 68                                                          EXPR 105
   64 IF(ISRCH(2) .NE. 1) GO TO 65                                      EXPR 106
      IF(NXTID .NE. IFNCNM) CALL ERROR(10,NXTID,KDM2)
   65 IF(ISRCH(1) .EQ. 1) GO TO 67
      IDTYP=1                                                           EXPR 109
      CALL STORE                                                        EXPR 110
      LOC=NID                                                           EXPR 111
      GO TO 68                                                          EXPR 112
   67 IBETA=BITGET(IDTBL(3,LOC),7,6)
      IF(NXTID .NE. IFNCNM) GO TO 68
      IBETA=0
      LOC=IDES
   68 CALL IMPTYP                                                       EXPR 116
      IALPH=BITGET(IDTBL(3,LOC),10,3)-1
      JPTR=JPTR-1                                                       EXPR 118
      STR(K)=LOC+10000*IALPH+100000*IBETA+1000000*M                     EXPR 119
  100 NSTR=K                                                            EXPR 138
      IF(NSTR .GT. 500) GO TO 130
      GO TO 200
  110 CALL ERROR(23,KDM1,KDM2)
      RETURN
  120 CALL ERROR(90,IDM1,IDM2)
      STOP
  130 CALL ERROR(91,IDM1,IDM2)
      STOP
      END                                                               EXPR 141
```

```
      SUBROUTINE EXPRCK                                                 EXPRCK 2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      COMMON/TYP/NQQ,RHSTYP,NQ2,NQ3,LHSTYP
      DIMENSION IA(5,5)                                                 EXPRCK 5
      INTEGER RHSTYP                                                    EXPRCK 6
      DATA ((IA(I,J),I=1,5),J=1,5)/1,0,0,1,0,0,1,0,0,0,1,0,1,1,0,       EXPRCK 7
     1   1,0,1,1,0,0,0,0,0,1/                                           EXPRCK 8
      IF(IA(LHSTYP,RHSTYP+1) .EQ. 0) CALL ERROR(27,KDM1,KDM2)
      RETURN                                                            EXPRCK10
      END                                                               EXPRCK11
```

```
      SUBROUTINE FLOWCK                                                 FLOWCK 2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      COMMON/BASBLK/IBLOCK(2500),NBLOCK,NB,NBRNCH
      COMMON/DOLOOP/ISTACK(4,50),NSTACK,ILOOP,IOVFLW
      COMMON/LABELS/STATRA(2,200),NLABEL                                FLOWCK 6
      COMMON/FLOW/IFL,IRP
      DIMENSION IPATH(100),ISTCK(100)                                   FLOWCK 7
      INTEGER FLWLST(100),BRANCH,STATRA                                 FLOWCK 8
      INTEGER BITPUT,BITGET                                             FLOWCK 9
      EQUIVALENCE (IPATH(1),A(1)),(ISTCK(1),A(101)),(FLWLST(1),A(201))
      IF(IFL .EQ. -1) GO TO 3000
      IRX=0
      NSTCK=0
      NFLOW=0
      NOC=0
      NPTHS=0
      IBLKST=1                                                          FLOWCK11
      CALL CHKLST                                                       CH34  35
      WRITE(6,8)
    8 FORMAT(1H1,38H****** RESULTS OF FLOW ANALYSIS ******//)
    5 DO 10 I=1,NID                                                     FLOWCK13
   10 IDTBL(2,I)=IDTBL(8,I)                                             FLOWCK14
   12 IF(NFLOW .EQ. 0) GO TO 20                                         FLOWCK15
      NOC=0                                                             FLOWCK16
      DO 15 I=1,NFLOW                                                   FLOWCK17
      IF(IABS(FLWLST(I)) .NE. IBLKST) GO TO 15
      NOC=NOC+1                                                         FLOWCK19
   15 CONTINUE                                                          FLOWCK20
      IF(NOC .GT. IRP) GO TO 1500
   20 NFLOW=NFLOW+1                                                     FLOWCK22
      IF(NFLOW .GT. 100) GO TO 4000
      FLWLST(NFLOW)=IBLKST                                              FLOWCK23
      IEND=BITGET(IBLOCK(IBLKST),28,16)-1                               FLOWCK24
      IF(IEND .EQ. -1) IEND=NBLOCK                                      FLOWCK25
      NBR=BITGET(IBLOCK(IBLKST),6,6)                                    FLOWCK26
      ISTART=IEND-NBR+1                                                 FLOWCK27
      IBLKST=NXTBLK(ISTART,IEND)                                        FLOWCK28
      IF(NBR .EQ. 1) GO TO 25                                           FLOWCK29
      FLWLST(NFLOW)=-FLWLST(NFLOW)                                      FLOWCK30
      NSTCK=NSTCK+1                                                     FLOWCK31
      IF(NSTCK .GT. 100) GO TO 5000
      ISTCK(NSTCK)=-NXTBLK(IEND,IEND)                                   FLOWCK32
      IF(NBR .EQ. 2) GO TO 25                                           FLOWCK33
      DO 22 J=3,NBR                                                     FLOWCK34
      NSTCK=NSTCK+1                                                     FLOWCK35
      IF(NSTCK .GT. 100) GO TO 5000
   22 ISTCK(NSTCK)=NXTBLK(IEND-J+2,IEND)                                FLOWCK36
   25 IF(IBLKST .NE. 0) GO TO 12                                        FLOWCK37
      NPATH=0                                                           FLOWCK38
      NPTHS=NPTHS+1                                                     FLOWCK39
      DO 1000 I=1,NFLOW                                                 FLOWCK40
      BRANCH=IABS(FLWLST(I))                                            FLOWCK41
      ISTART=BRANCH+1                                                   FLOWCK42
      NXBLOK=BITGET(IBLOCK(BRANCH),28,16)                               FLOWCK43
      IF(NXBLOK .EQ. 0) NXBLOK=NBLOCK+1                                 FLOWCK44
```

```
      ISL=BITGET(IBLOCK(BRANCH),36,8)                                   FLOWCK45
      ILOOP=BITGET(IBLOCK(BRANCH),12,6)                                 FLOWCK46
      NBR=BITGET(IBLOCK(BRANCH),6,6)                                    FLOWCK47
      IEND=NXBLOK-NBR-1                                                 FLOWCK48
      IF(ISL .EQ. 0) GO TO 45                                           FLOWCK49
      NPATH=NPATH+1                                                     FLOWCK50
      IPATH(NPATH)=STATRA(1,ISL)                                        FLOWCK51
      STATRA(2,ISL)=BITPUT(STATRA(2,ISL),1,18)                          FLOWCK52
   45 IF(IBLOCK(ISTART) .LT. 1000) GO TO 1000                           FLOWCK53
      DO 500 J=ISTART,IEND                                              FLOWCK54
      IT=IBLOCK(J)/1000                                                 FLOWCK55
      LOC=IBLOCK(J)-IT*1000                                             FLOWCK56
      GO TO(50,60,70,80,90,100,200),IT
   50 IF(BITGET(IDTBL(3,LOC),13,1) .EQ. 1) GO TO 120                    FLOWCK58
      IF(IDTBL(2,LOC) .EQ. 2) GO TO 55                                  FLOWCK59
      IF(IDTBL(2,LOC) .EQ. 4) GO TO 180
   52 IDTBL(2,LOC)=1                                                    FLOWCK60
   30 IF(BITGET(IDTBL(3,LOC),17,1) .EQ. 0) GO TO 500
      KTYPE=BITGET(IDTBL(3,LOC),10,3)                                   FLOWCK62
      NXQV=LOC                                                          FLOWCK63
   53 NXQV=IDTBL(7,NXQV)                                                FLOWCK64
      IF(NXQV .EQ. LOC) GO TO 500                                       FLOWCK65
      IF(BITGET(IDTBL(3,NXQV),10,3) .EQ. KTYPE) GO TO 54                FLOWCK66
      IDTBL(2,NXQV)=0                                                   FLOWCK67
      GO TO 53                                                          FLOWCK68
   54 IDTBL(2,NXQV)=1                                                   FLOWCK69
      GO TO 53                                                          FLOWCK70
   55 IF(ILOOP .EQ. 0) GO TO 52                                         FLOWCK71
   57 IF(LOC .EQ. ISTACK(4,ILOOP)) GO TO 110                            FLOWCK72
      IF(ISTACK(3,ILOOP) .EQ. 0) GO TO 52                               FLOWCK73
      ILOOP=ISTACK(3,ILOOP)                                             FLOWCK74
      GO TO 57                                                          FLOWCK75
   60 IF(IDTBL(2,LOC) .EQ. 0) GO TO 140                                 FLOWCK76
      IF(IDTBL(2,LOC) .EQ. 3) GOTO 130                                  FLOWCK77
      GO TO 500                                                         FLOWCK78
   70 IF(BITGET(IDTBL(3,LOC),13,1) .EQ. 1) GO TO 120                    FLOWCK79
      IF(IDTBL(2,LOC) .EQ. 2) GO TO 75                                  FLOWCK80
   72 IDTBL(2,LOC)=2                                                    FLOWCK81
      GO TO 500                                                         FLOWCK82
   75 IF(ILOOP .EQ. 0) GO TO 72                                         FLOWCK83
   77 IF(LOC .EQ. ISTACK(4,ILOOP)) GO TO 110                            FLOWCK84
      IF(ISTACK(3,ILOOP) .EQ. 0) GO TO 72                               FLOWCK85
      ILOOP=ISTACK(3,ILOOP)                                             FLOWCK86
      GO TO 77                                                          FLOWCK87
   80 IF(BITGET(IDTBL(3,LOC),13,1) .EQ. 1) GO TO 120                    FLOWCK88
      IF(IDTBL(2,LOC) .EQ. 2) GO TO 85                                  FLOWCK89
   82 IDTBL(2,LOC)=3                                                    FLOWCK90
      GO TO 500                                                         FLOWCK91
   85 IF(ILOOP .EQ. 0) GO TO 82                                         FLOWCK92
   87 IF(LOC .EQ. ISTACK(4,ILOOP)) GO TO 110                            FLOWCK93
      IF(ISTACK(3,ILOOP) .EQ. 0) GO TO 82                               FLOWCK94
      ILOOP=ISTACK(3,ILOOP)                                             FLOWCK95
      GO TO 87                                                          FLOWCK96
   90 IF(IDTBL(2,LOC) .NE. 3) GO TO 150                                 FLOWCK97
      GO TO 500                                                         FLOWCK98
  100 IDTBL(2,LOC)=0                                                    FLOWCK99
      GO TO 500                                                         FLOWC100
  180 JLOOP=BITGET(IDTBL(3,LOC),36,17)
```

```
  185 IF(ILOOP .EQ. JLOOP) GO TO 160
      ILOOP=ISTACK(3,ILOOP)
      IF(ILOOP .EQ. 0) GO TO 30
      GO TO 185
  200 IF(IDTBL(2,LOC) .EQ. 0) GO TO 140
      IF(IDTBL(2,LOC) .EQ. 3) GO TO 130
      IDTBL(2,LOC)=4
      GO TO 500
  110 IERC=67
      GO TO 400
  120 IERC=68
      GO TO 400
  130 IERC=69
      GO TO 400
  140 IERC=70
      GO TO 400
  150 IERC=71
      GO TO 400
  160 IERC=72
  400 IRX=1
      IF(IDTBL(6,LOC) .EQ. 1) GO TO 500
      IDTBL(6,LOC)=1
      CALL ERROR(IERC,IDTBL(1,LOC),KDM2)
      IF(IERC .NE. 70 .OR. NPATH .EQ. 0) GO TO 500
      WRITE(6,142) (IPATH(K),K=1,NPATH)                                 FLOWC116
  142 FORMAT(6X,15H ALONG THE PATH,(10I6))                              FLOWC117
  500 CONTINUE                                                          FLOWC122
 1000 CONTINUE                                                          FLOWC123
 1500 IF(FLWLST(NFLOW) .GT. 0) GO TO 1600                               FLOWC124
      IBLKST=IABS(ISTCK(NSTCK))                                         FLOWC125
      IF(ISTCK(NSTCK) .LT. 0) FLWLST(NFLOW)=-FLWLST(NFLOW)              FLOWC126
      NSTCK=NSTCK-1                                                     FLOWC127
      NOC=0                                                             FLOWC128
      GO TO 5                                                           FLOWC129
 1600 NFLOW=NFLOW-1                                                     FLOWC130
      IF(NFLOW .GT. 0) GO TO 1500                                       FLOWC131
      IF(NLABEL .EQ. 0) GO TO 2010
      DO 2000 J=1,NLABEL                                                FLOWC133
      IF(BITGET(STATRA(2,J),6,6) .EQ. 28) GO TO 2000                    FLOWC134
      IF(BITGET(STATRA(2,J),18,3) .EQ. 1) GO TO 2000
      WRITE(6,1800) STATRA(1,J)
      IRX=1
 1800 FORMAT(6X,57H THERE IS NO COMPLETE PATH THAT CONTAINS STATEMENT NUFLOWC136
     1MBER,I6)                                                          FLOWC137
 2000 CONTINUE                                                          FLOWC138
 2010 IF(IRX .EQ. 0) WRITE(6,2020)
 2020 FORMAT(//6X,16H NO ERRORS FOUND)
      WRITE(6,2100) NPTHS
 2100 FORMAT(//////6X,25H NUMBER OF PATHS CHECKED-,I6)                  FLOWC140
      RETURN                                                            FLOWC141
 3000 WRITE(6,3001)
 3001 FORMAT(//31X,57H FLOW ANALYSIS WAS NOT PERFORMED DUE TO ERRORS IN
     *PROGRAM)
      IFL=IRP+1
      RETURN
 4000 WRITE(6,4001)
 4001 FORMAT(//29X,63H TABLE OVERFLOW DURING FLOW ANALYSIS - FLOW ANALYS
     $IS TERMINATED)
      RETURN
 5000 WRITE(6,5001)
 5001 FORMAT(//29X,63H STACK OVERFLOW DURING FLOW ANALYSIS - FLOW ANALYS
     $IS TERMINATED)
      RETURN
      END                                                               FLOWC142
```

```
      SUBROUTINE FNCSTR                                                 FNCSTR 2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      COMMON/FUNC/IFNCRA(5,17),MARGS,IARGS(50),FNCLOC(5),NFUNC
      COMMON/LIST/NLIST,NINTFC,ISUBLT(3,200),INTFAC(500)
      INTEGER FNCLOC,BITPUT,BITGET                                      FNCSTR 6
      IF(NFUNC .EQ. 0) RETURN                                           FNCSTR 7
      DO 40 I=1,NFUNC                                                   FNCSTR 8
      LOC=FNCLOC(I)                                                     FNCSTR 9
      IF(BITGET(IDTBL(3,LOC),20,1) .EQ. 1) GO TO 50
      NARG=IFNCRA(I,1)                                                  FNCSTR10
      IVAR=0
      ITP=BITGET(IDTBL(3,LOC),10,3)
      IF(BITGET(IDTBL(3,LOC),18,1) .EQ. 1) GO TO 20                     FNCSTR11
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),1,18)                            FNCSTR12
      DO 5 J=1,NLIST
      IF(IDTBL(1,LOC) .NE. ISUBLT(1,J)) GO TO 5
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),J,36)
      LISTLC=J
      GO TO 21
    5 CONTINUE
      CALL ERROR(52,KDM1,KDM2)
      NLIST=NLIST+1
      IF(NLIST .GT. 200) GO TO 60
      ISUBLT(1,NLIST)=IDTBL(1,LOC)
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),NLIST,36)
      IPTR=NINTFC+1
      IF(ITYP .EQ. 8 .AND. I .EQ. 1) ITP=0
      ISUBLT(2,NLIST)=BITPUT(0,ITP,13)
      ISUBLT(2,NLIST)=BITPUT(ISUBLT(2,NLIST),NARG,6)
      ISUBLT(3,NLIST)=IPTR
      NINTFC=IPTR+(NARG-1)/4
      IF(NINTFC .GT. 500) GO TO 70
      DO 10 J=IPTR,NINTFC
   10 INTFAC(J)=IFNCRA(I,J-IPTR+2)
      GO TO 40
   20 LISTLC=BITGET(IDTBL(3,LOC),36,9)
   21 IPTR=ISUBLT(3,LISTLC)
      IF(BITGET(ISUBLT(2,LISTLC),14,1) .EQ. 1) GO TO 22
      NAR2=BITGET(ISUBLT(2,LISTLC),6,6)
      IF(NARG .NE. NAR2) CALL ERROR(26,IDTBL(1,LOC),KDM2)
      NARGS=MIN0(NARG,NAR2)
      GO TO 24
   22 IVAR=1
      IF(NARG .LT. 2) CALL ERROR(26,IDTBL(1,LOC),KDM2)
      NARGS=NARG
      ITP1=BITGET(INTFAC(IPTR),3,3)
      NDIM1=BITGET(INTFAC(IPTR),6,3)
   24 IF(ITYP .EQ. 8 .AND. I .EQ. 1) GO TO 25
      IF(BITGET(ISUBLT(2,LISTLC),10,4) .EQ. 4) GO TO 25
      JTP=BITGET(ISUBLT(2,LISTLC),13,3)
      IF(JTP .NE. ITP) CALL ERROR(49,IDTBL(1,LOC),KDM2)
   25 NDPTR=IPTR+(NARGS-1)/4
      KOUNT=0
      DO 32 K=IPTR,NDPTR
      ICOL1=-6
      ICOL2=-3
      DO 32 J=1,4
      KOUNT=KOUNT+1
      IF(KOUNT .GT. NARGS) GO TO 40
      ICOL1=ICOL1+9
      ICOL2=ICOL2+9
      IF(IVAR .EQ. 1) GO TO 26
      ITP1=BITGET(INTFAC(K),ICOL1,3)
      NDIM1=BITGET(INTFAC(K),ICOL2,3)
   26 ITP2=BITGET(IFNCRA(I,K-IPTR+2),ICOL1,3)
      NDIM2=BITGET(IFNCRA(I,K-IPTR+2),ICOL2,3)
      IF(NDIM1 .NE. NDIM2) CALL ERROR(50,KOUNT,KDM2)
```

```
      IF(ITP2 .EQ. 0) GO TO 32
      IF(ITP1 .EQ. 0) GO TO 28
      IF(ITP1 .NE. ITP2) CALL ERROR(51,KOUNT,KDM2)
      GO TO 32
   28 INTFAC(K)=BITPUT(INTFAC(K),ITP2,ICOL1)
   32 CONTINUE
      GO TO 40
   50 CALL STFNC(I)
   40 CONTINUE
      RETURN                                                            FNCSTR48
   60 CALL ERROR(92,IDM1,IDM2)
      STOP
   70 CALL ERROR(93,IDM1,IDM2)
      STOP
      END                                                               FNCSTR49
```

```
      SUBROUTINE FORM
      COMMON/LVARGS/LVFUNC,LVVARG,LVVAD,LVVPOS,LVVTYP,LVVAL,
     +LVHEAD,LVVNVL,LVDEST,LVVALS(10),LVTYPE(10),LVSKIP
      COMMON/LVTABL/LVTSIZ,LVMAP(     1)/LVVSEQ/LVSIZE,LVSQSP(     1)
      COMMON /HL/ HOL,ACTION,FUNC1,FUNC2,FUNC3,LEFT,RIGHT,STRING
      COMMON /VAR/ VFOR,NCHAR,NCHARP,CHAR,NDICT
      COMMON /TYP/ NARRAY,TYPE1,TYPE2,ERRFLG
      COMMON /STRING/ NTYPE,NSTR,STR
      INTEGER BITPUT,BITGET
      INTEGER VFOR(15),CHAR,STR(1)
      LOGICAL ERRFLG
C     EXECUTE
      IF(CHAR .NE. 1HX) NDICT=-NDICT
      NCHARP=NCHARP+1
      STR(NCHARP)=NDICT
      IF(.NOT. ERRFLG) RETURN
      NCHAR=NCHAR+1
      NC=1+(NCHARP-1)/8
      ICHAR=BITGET(CHAR,6,6)
      VFOR(NC)=BITPUT(VFOR(NC),ICHAR,6*NCHAR)
      IF(NCHAR .EQ. 8) NCHAR=0
      RETURN
      END
```

```
      SUBROUTINE FORMEL                                                 FORM   2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      INTEGER D,BITGET
      DIMENSION ILCHAR(16)
      DATA ILCHAR/1,2,3,4,35,37,38,42,43,44,45,47,58,59,62,63/
      GO TO(100,10,20,100,40,100,100,100),JTYP
   10 CALL CAA(D,M,NXTID)                                               FORM   6
      RETURN                                                            FORM   7
   20 DO 25 I=1,10                                                      FORM   8
      IF(D(I) .NE. IHH) GO TO 25                                        FORM   9
      CALL CAI(D,I-1,N2)                                                FORM  10
      IF(N2 .LT. 1) GO TO 110
      M=N2+1                                                            FORM  11
      IF(M .GT. 500) CALL ERROR(5,KDM1,KDM2)
      JPTR=LSTART+M                                                     FORM  12
      IST=I+1
      DO 22 J=IST,M
      ICHAR=BITGET(D(J),6,6)
      DO 22 K=1,16
      IF(ICHAR .EQ. ILCHAR(K)) GO TO 120
   22 CONTINUE
      IF(ITYP .EQ. 28) RETURN                                           FORM  13
      IF(N2 .GT. 4) CALL ERROR(5,KDM1,KDM2)
      RETURN                                                            FORM  15
   25 CONTINUE                                                          FORM  16
      CALL ERROR(3,KDM1,KDM2)
      RETURN                                                            FORM  18
   40 CALL CAI(D,M,N2)                                                  FORM  21
  100 RETURN                                                            FORM  31
  110 CALL ERROR(7,KDM1,KDM2)
      RETURN
  120 CALL ERROR(23,KDM1,KDM2)
      RETURN
      END                                                               FORM  32
```

```
      SUBROUTINE FRMAT                                                  FRMAT  2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      COMMON/FORMAT/IDESST,IDESND,IGPST,IGPND,IGRP,SEPST,SEPND,
     1 DIR,ICOM,ISEP                                                    FRMAT  5
      DIMENSION RPLOC(20),IALPH(6)                                      FRMAT  6
      INTEGER A,RPLOC,AICH,RPAR,BLANK,SEPST,SEPND,DIR                   FRMAT  7
      DATA BLANK/1H /,AICH/1HH/,LPAR/1H(/,RPAR/1H)/                     FRMAT  8
      DATA (IALPH(I),I=1,6)/1HF,1HO,1HR,1HM,1HA,1HT/                    FRMAT  9
      IFRMT=0                                                           FRMAT 10
      DO 4 I=1,6                                                        FRMAT 11
      IF(NEXT(JPTR) .NE. IALPH(I)) GO TO 70                             FRMAT 12
    4 CONTINUE                                                          FRMAT 13
      NSTART=JPTR                                                       FRMAT 14
      IF(NEXT(JPTR) .NE. LPAR) GO TO 70                                 FRMAT 15
      DO 10 I=1,N                                                       FRMAT 16
      IF(ITYPE(JPTR) .EQ. 2) GO TO 1
      IF(JPTR .GT. N) GO TO 12
      GO TO 10
    1 JPTR=JPTR-1
      CALL GNLE                                                         FRMAT 17
      IF(JTYP .NE. 3) GO TO 10                                          FRMAT 19
      J1=JPTR-1                                                         FRMAT 20
      IH=0                                                              FRMAT 21
      DO 5 J=LSTART,J1                                                  FRMAT 22
      IF(IH .EQ. 1) GO TO 3                                             FRMAT 23
      IF(A(J) .EQ. AICH) IH=1                                           FRMAT 24
      GO TO 5                                                           FRMAT 25
    3 A(J)=BLANK                                                        FRMAT 26
    5 CONTINUE                                                          FRMAT 27
   10 CONTINUE                                                          FRMAT 28
   12 NPAR=0                                                            FRMAT 29
      NRP=0                                                             FRMAT 30
      DO 20 I=NSTART,N                                                  FRMAT 31
      IF(A(I) .NE. LPAR) GO TO 15                                       FRMAT 32
      NPAR=NPAR+1                                                       FRMAT 33
      IF(NPAR .GT. 3) GO TO 70                                          FRMAT 34
      GO TO 20                                                          FRMAT 35
   15 IF(A(I) .NE. RPAR) GO TO 20                                       FRMAT 36
      NPAR=NPAR-1                                                       FRMAT 37
      NRP=NRP+1                                                         FRMAT 38
      RPLOC(NRP)=I                                                      FRMAT 39
      IF(NPAR .LT. 0) GO TO 70                                          FRMAT 40
   20 CONTINUE                                                          FRMAT 41
      IF(NPAR .NE. 0) GO TO 70                                          FRMAT 42
      IF(NEXT(RPLOC(NRP)+1) .NE. BLANK) GO TO 70                        FRMAT 43
      DO 60 I=1,NRP                                                     FRMAT 44
      IGPND=RPLOC(I)                                                    FRMAT 45
      DO 25 J=1,N                                                       FRMAT 46
      K=IGPND-J                                                         FRMAT 47
      IF(A(K) .NE. LPAR) GO TO 25                                       FRMAT 48
      IGPST=K                                                           FRMAT 49
      GO TO 30                                                          FRMAT 50
   25 CONTINUE                                                          FRMAT 51
   30 CALL GROUP                                                        FRMAT 52
      IF(IGRP .EQ. 0) RETURN                                            FRMAT 53
      IF(I .EQ. NRP) GO TO 65                                           FRMAT 54
      JPTR=IGPST-1                                                      FRMAT 55
   31 CONTINUE
      IF(IPREV(JPTR) .EQ. 2) GO TO 31
      IGPST=JPTR+2                                                      FRMAT 57
      GO TO 35                                                          FRMAT 58
   35 SEPST=IGPND+1                                                     FRMAT 60
      DIR=1
      CALL SEPAR                                                        FRMAT 62
      IF(ISEP .NE. 1) GO TO 40                                          FRMAT 63
      IGPND=SEPND                                                       FRMAT 64
```

```
      GO TO 50                                                          FRMAT 65
   40 IF(NEXT(SEPST) .NE. RPAR) GO TO 70                                FRMAT 66
      SEPST=IGPST-1                                                     FRMAT 67
      DIR=-1
      CALL SEPAR                                                        FRMAT 69
      IF(ISEP .NE. 1) GO TO 45                                          FRMAT 70
      IGPST=SEPND                                                       FRMAT 71
      GO TO 50                                                          FRMAT 72
   45 IF(A(SEPND) .NE. LPAR) GO TO 70                                   FRMAT 73
   50 DO 55 J=IGPST,IGPND                                               FRMAT 74
      A(J)=BLANK                                                        FRMAT 75
   55 CONTINUE                                                          FRMAT 76
   60 CONTINUE                                                          FRMAT 77
   65 IFRMT=1                                                           FRMAT 78
      RETURN                                                            FRMAT 79
   70 CALL ERROR(7,KDM1,KDM2)
      RETURN                                                            FRMAT 81
      END                                                               FRMAT 82
```

```
      SUBROUTINE GENROL                                                 GENROL 2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      COMMON/GLOBAL/NBLK,NREF,NSUBS,BLKTBL(200),EXTTBL(100),ISUBS(100)
      COMMON/LIST/NLIST,NINTFC,ISUBLT(3,200),INTFAC(500)
      COMMON/INPOUT/NCALL,IN,IOP                                        GENROL 6
      COMMON/WASTE/IDUM(63)
      INTEGER BLKTBL,EXTTBL,BITGET
      WRITE(6,2)                                                        GENROL 9
    2 FORMAT(1H1)                                                       GENROL10
C*****IF CDC 6700 - PLACE A :C: IN COLUMN 1 OF NEXT CARD
      WRITE(IOP,50)
   50 FORMAT(19H@FOR,IS ROLCAL)
C     IF UNIVAC 1108 - PLACE A 'C' IN COLUMN ONE OF NEXT CARD
C     WRITE(IOP,4)
    4 FORMAT(5X,48H PROGRAM ROLCAL(OUTPUT,TAPE6=OUTPUT,TAPE3,TAPE9))    GENROL12
      IF(NBLK .EQ. 0) GO TO 6                                           GENROL13
      K=-1                                                              GENROL14
      DO 5 I=1,NBLK                                                     GENROL15
      K=K+1                                                             GENROL17
      INDEX=BLKTBL(I)
      ISZ=BITGET(ISUBLT(2,INDEX),36,15)
      WRITE(IOP,3) ISUBLT(1,INDEX),K,ISZ
    3 FORMAT(5X,8H COMMON/,A6,3H/IX,I2,1H(,I6,1H))                      GENROL19
    5 CONTINUE                                                          GENROL20
    6 WRITE(IOP,7) MODE
    7 FORMAT(5X,4H J=I/5X,6H MODE=,I1/5X,13H DO 10 I=1,I3/5X,6H J=J-1)
      IF(NBLK .EQ. 0) GO TO 22                                          GENROL27
      K=-1                                                              GENROL28
      DO 20 I=1,NBLK                                                    GENROL29
      K=K+1                                                             GENROL31
      KK=1000*K                                                         GENROL32
      INDEX=BLKTBL(I)
      ISZ=BITGET(ISUBLT(2,INDEX),36,15)
      WRITE(IOP,10) KK,ISZ,K,KK
   10 FORMAT(5X,4H DO ,I4,5H K=1,,I6/5X,3H IX,I2,5H(K)=1/1X,I4,
     $ 9H CONTINUE)
      IF(ISUBLT(1,INDEX) .NE. 6HSESCOM) GO TO 20
      WRITE(IOP,15) K,K,K
   15 FORMAT(5X,3H IX,I2,7H(17)=10/5X,3H IX,I2,7H(20)=11/
     * 5X,3H IX,I2,7H(23)=12)
   20 CONTINUE                                                          GENROL39
   22 NARG=BITGET(IDTBL(3,I),7,6)
      DO 30 I=1,NARG                                                    GENROL41
      IF(I .EQ. NARG) GO TO 25                                          GENROL42
      IDUM(I)=2HD,                                                      GENROL43
      GO TO 30                                                          GENROL44
   25 IDUM(I)=2HJ)                                                      GENROL45
   30 CONTINUE                                                          GENROL46
      WRITE(IOP,35) IDTBL(1,1),(IDUM(I),I=1,NARG)
   35 FORMAT(5X,6H CALL ,A6,1H(,41A2/5X,1H1,1X,22A2)                    GENROL48
      WRITE(IOP,38)
   38 FORMAT(5X,24H IF(MODE .EQ. 3) GO TO 5)
      WRITE(IOP,40)
   40 FORMAT(5X,14H CALL MODID(J)/3X,12H 5 ENDFILE 3/2X,12H 10 CONTINUE/
     * 5X,12H CALL CMPARE/5X,11H ENDFILE 13/5X,11H ENDFILE 14/
     * 5X,11H ENDFILE 15/5X,10H REWIND 13/5X,10H REWIND 14/
     * 5X,10H REWIND 15/5X,5H STOP/5X,4H END)
      RETURN                                                            GENROL59
      END                                                               GENROL60
```

```
      SUBROUTINE GLOTAB                                                 GLOTAB 2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES
      COMMON/GLOBAL/NBLK,NREF,NSUBS,BLKTBL(200),EXTTBL(100),ISUBS(100)
      COMMON/LIST/NLIST,NINTFC,ISUBLT(3,200),INTFAC(500)
      INTEGER BITGET,BLKTBL,EXTTBL,KLAS(4,7)
      DATA KLAS/6HUSER S,6HUPPLIE,1HD,1H ,6HSUBROU,6HTINE M,5HODULE,1H ,
     $ 6HFUNCTI,6HON MOD,3HULE,1H ,6HANCILL,6HARY SU,6HBPROGR,2HAM,
     $ 6HANSI F,6HUNCTIO,1HN,1H ,6HMAIN P,6HROGRAM,1H ,1H ,6HEXTRAO,
     $ 6HRDINAR,6HY SUBP,6HROGRAM/
      WRITE(6,1)                                                        GLOTAB 8
    1 FORMAT(1H1,48X,23H GLOBAL REFERENCE TABLE)                        GLOTAB 9
      IF(NREF .EQ. 0) GO TO 25                                          GLOTAB10
      WRITE(6,2)                                                        GLOTAB11
    2 FORMAT(//50X,20H EXTERNAL REFERENCES)                             GLOTAB12
      DO 20 I=1,NREF                                                    GLOTAB13
      INDEX=EXTTBL(I)
      J=BITGET(ISUBLT(2,INDEX),10,4)
      WRITE(6,10) ISUBLT(1,INDEX),(KLAS(K,J+1),K=1,4)
   10 FORMAT(45X,A6,4X,4A6)
   20 CONTINUE
   25 IF(NBLK .EQ. 0) GO TO 40
      INDEX=BLKTBL(1)
      IF(NBLK .EQ. 1 .AND. ISUBLT(1,INDEX) .EQ. 1H ) GO TO 40
      WRITE(6,30)
   30 FORMAT(//49X,23H LABELLED COMMON BLOCKS/43X,11H BLOCK NAME,7X,
     $ 5H SIZE,7X,6H CLASS)
      DO 38 J=1,NBLK
      INDEX=BLKTBL(J)
      ICAT=BITGET(ISUBLT(2,INDEX),10,4)-6
      ISZ=BITGET(ISUBLT(2,INDEX),36,15)
   35 FORMAT(46X,A6,5X,I8,5X,9HCATEGORY ,I2)
      WRITE(6,35) ISUBLT(1,INDEX),ISZ,ICAT
   38 CONTINUE
   40 WRITE(6,45)                                                       GLOTAB34
   45 FORMAT(///48X,24H SUBROUTINES ENCOUNTERED)                        GLOTAB35
      DO 60 I=1,NSUBS
C** GET SUBROUTINE CLASS
      INDEX=ISUBS(I)
      J=BITGET(ISUBLT(2,INDEX),10,4)
      WRITE(6,10) ISUBLT(1,INDEX),(KLAS(K,J+1),K=1,4)
   60 CONTINUE
      RETURN                                                            GLOTAB38
      END                                                               GLOTAB39
```

```
      SUBROUTINE GNLE                                                   GNLE  2
      COMMON A(1326),D(500),DTBL(8,500),INITID(3),LASTID(3),ISRCH(3),   RICH  2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH  4
      COMMON/LOGIC/LOG,LOGST                                            GNLE  4
      COMMON/REALNO/IREAL,IRELND,IP                                     GNLE  5
      INTEGER A,D,BLANK,PLUS,EQUALS,SLASH,RPAR,COMMA,ASTRIK,            GNLE  6
     1 AICH,DECPT                                                       GNLE  7
      DATA BLANK/1H /,PLUS/1H+/,MINUS/1H-/,EQUALS/1H=/,SLASH/1H//,      GNLE  8
     1 RPAR/1H)/,COMMA/1H,/,ASTRIK/1H*/,AICH/1HH/,LPAR/1H(/,DECPT/1H./  GNLE  9
      JTYP=0                                                            GNLE 10
      NXT=NEXT(JPTR)                                                    GNLE 11
      IF(NXT .EQ. BLANK) RETURN                                         GNLE 12
      LSTART=JPTR-1                                                     GNLE 13
      IF(NXT .EQ. PLUS) GO TO 1                                         GNLE 14
      IF(NXT .EQ. RPAR) GO TO 1                                         GNLE 15
      IF(NXT .EQ. MINUS) GO TO 1                                        GNLE 16
      IF(NXT .EQ. SLASH) GO TO 1                                        GNLE 17
      IF(NXT .EQ. COMMA) GO TO 1                                        GNLE 18
      IF(NXT .EQ. EQUALS) GO TO 1                                       GNLE 19
      GO TO 2                                                           GNLE 20
    1 JTYP=1                                                            GNLE 21
      M=1                                                               GNLE 22
      GO TO 90                                                          GNLE 23
    2 IF(NXT .NE. ASTRIK) GO TO 4                                       GNLE 24
      IF(NEXT(JPTR) .NE. ASTRIK) GO TO 1                                GNLE 25
      M=2                                                               GNLE 26
      JTYP=1                                                            GNLE 27
      GO TO 90                                                          GNLE 28
    4 IF(NXT .NE. LPAR) GO TO 40                                        GNLE 29
      IF(LSTART .EQ. 1) GO TO 10                                        GNLE 30
      IM1=LSTART-1                                                      GNLE 31
      IF(IPREV(IM1) .NE. 3) GO TO 1                                     GNLE 32
   10 CONTINUE                                                          GNLE 33
      NXT=NEXT(LSTART+1)                                                GNLE 34
      IF(NXT .EQ. BLANK) GO TO 120                                      GNLE 35
      IF(NXT .NE. PLUS .AND. NXT .NE. MINUS) GO TO 22                   GNLE 36
      IP=JPTR                                                           GNLE 37
      GO TO 24                                                          GNLE 38
   22 IP=JPTR-1                                                         GNLE 39
   24 CALL REALCK                                                       GNLE 40
      IF(IREAL .EQ. 0) GO TO 1                                          GNLE 41
      IF(IDES .EQ. 1) GO TO 1                                           GNLE 42
      IF(NEXT(IRELND+1) .NE. COMMA) GO TO 1                             GNLE 43
      NXT=NEXT(JPTR)                                                    GNLE 44
      IF( NXT .NE. PLUS .AND. NXT .NE. MINUS) GO TO 30                  GNLE 45
      IP=JPTR                                                           GNLE 46
      GO TO 35                                                          GNLE 47
   30 IP=JPTR-1                                                         GNLE 48
   35 CALL REALCK                                                       GNLE 49
      IF(IREAL .EQ. 0) GO TO 120                                        GNLE 50
      IF(IDES .EQ. 1) GO TO 120                                         GNLE 51
      IF(NEXT(IRELND+1) .NE. RPAR) GO TO 120                            GNLE 52
      JTYP=6                                                            GNLE 53
      M=JPTR-LSTART                                                     GNLE 54
      GO TO 90                                                          GNLE 55
   40 IF(NXT .NE. DECPT) GO TO 50                                       GNLE 56
      ITP=ITYPE(JPTR)                                                   GNLE 57
      GO TO (42,44,120),ITP                                             GNLE 58
   42 LOGST=LSTART+1                                                    GNLE 59
      CALL LOGCHK                                                       GNLE 60
      IF(LOG .EQ. 0) GO TO 120                                          GNLE 61
      JTYP=7                                                            GNLE 62
      M=JPTR-LSTART                                                     GNLE 63
      GO TO 90                                                          GNLE 64
   44 IP=LSTART                                                         GNLE 65
```

```
      CALL REALCK                                                       GNLE  66
      IF(IREAL .EQ. 0) GO TO 120                                        GNLE  67
      JTYP=4                                                            GNLE  68
      M=IRELND-LSTART+1                                                 GNLE  69
      GO TO 90                                                          GNLE  70
   50 CONTINUE                                                          GNLE  71
      IF(ITYPE(LSTART) .NE. 2) GO TO 85                                 GNLE  72
      IF(ITYP .EQ. 28) GO TO 54                                         GNLE  73
      IP=LSTART                                                         GNLE  74
      CALL REALCK                                                       GNLE  75
      IF(IREAL .EQ. 0) GO TO 54                                         GNLE  76
      JTYP=4                                                            GNLE  77
      M=IRELND-LSTART+1                                                 GNLE  78
      GO TO 90                                                          GNLE  79
   54 JPTR=LSTART+1                                                     GNLE  80
   55 IF(ITYPE(JPTR) .EQ. 2) GO TO 57                                   GNLE  81
      GO TO 65                                                          GNLE  82
   57 IF(JPTR .GT. N) GO TO 60                                          GNLE  83
      GO TO 55                                                          GNLE  84
   60 M=N-LSTART+1                                                      GNLE  85
      JTYP=5                                                            GNLE  86
      GO TO 90                                                          GNLE  87
   65 IF(A(JPTR-1) .NE. AICH) GO TO 67                                  GNLE  88
      IF(ITYP .EQ. 8 .OR. ITYP .EQ. 28 .OR. ITYP .EQ. 27) GO TO 70      GNLE  89
   67 M=JPTR-LSTART-1                                                   GNLE  90
      JTYP=5                                                            GNLE  91
      GO TO 90                                                          GNLE  92
   70 IF(JPTR .GT. N) GO TO 120                                         GNLE  93
      M=N-LSTART+1                                                      GNLE  94
      IF(M .GT. 500) M=500
      JTYP=3                                                            GNLE  95
      GO TO 90                                                          GNLE  96
   85 CONTINUE                                                          GNLE  97
      IF(ITYPE(LSTART) .NE. 1) GO TO 120                                GNLE  98
      IF(ITYP .EQ. 28) GO TO 100
   88 CONTINUE                                                          GNLE  99
      IF(ITYPE(JPTR) .NE. 3) GO TO 86                                   GNLE 100
      M=JPTR-LSTART-1                                                   GNLE 101
      JTYP=2                                                            GNLE 102
      GO TO 90                                                          GNLE 103
   86 IF(JPTR .GT. N) GO TO 87                                          GNLE 104
      GO TO 88                                                          GNLE 105
  100 M=1
      JTYP=2
      GO TO 90
   87 M=N-LSTART+1                                                      GNLE 106
      JTYP=2                                                            GNLE 107
   90 CONTINUE                                                          GNLE 108
      DO 91 L=1,M                                                       GNLE 109
      LL=LSTART+L-1                                                     GNLE 110
      D(L)=A(LL)                                                        GNLE 111
   91 CONTINUE                                                          GNLE 112
      JPTR=LSTART+M                                                     GNLE 113
      CALL SQUEEZ
      CALL FORMEL                                                       GNLE 115
      RETURN                                                            GNLE 116
  120 CONTINUE                                                          GNLE 117
      JTYP=8                                                            GNLE 118
      RETURN                                                            GNLE 119
      END                                                               GNLE 120
```

```
      SUBROUTINE GOTO                                                   GOTO   2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      COMMON/LABELS/STATRA(2,200),NLABEL                                GOTO   4
      COMMON/BASBLK/IBLOCK(2500),NBLOCK,NB,NBRNCH
      DIMENSION IALPH(4)                                                GOTO   6
      INTEGER STATRA,BLANK                                              GOTO   7
      INTEGER BITPUT                                                    GOTO   8
      DATA (IALPH(I),I=1,4)/1HG,1HO,1HT,1HO/                            GOTO   9
      DATA BLANK/1H /                                                   GOTO  10
      DO 5 I=1,4                                                        GOTO  11
      IF(NEXT(JPTR) .NE. IALPH(I)) GO TO 10                             GOTO  12
    5 CONTINUE                                                          GOTO  13
      CALL GNLE                                                         GOTO  14
      IF(JTYP .NE. 5) GO TO 10                                          GOTO  15
      CALL SISRCH                                                       GOTO  16
      STATRA(2,LOC)=BITPUT(STATRA(2,LOC),1,12)                          GOTO  17
      IF(NEXT(JPTR) .NE. BLANK) GO TO 10                                GOTO  18
      NBLOCK=NBLOCK+1                                                   GOTO  19
      IBLOCK(NBLOCK)=LOC                                                GOTO  20
      NBRNCH=1                                                          GOTO  21
      NB=1                                                              GOTO  22
      RETURN                                                            GOTO  23
   10 CALL ERROR(7,KDM1,KDM2)
      RETURN                                                            GOTO  25
      END                                                               GOTO  26
```

```
      SUBROUTINE GROUP                                                  GROUP  2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      COMMON/FORMAT/IDESST,IDESND,IGPST,IGPND,IGRP,SEFST,SEPND,
     1 DIR,ICOM,ISEP                                                    GROUP  5
      INTEGER A,RPAR,SEPST,SEPND,DIR                                    GROUP  6
      DATA RPAR/1H)/                                                    GROUP  7
      IF(NEXT(IGPST+1) .EQ. RPAR) GO TO 20                              GROUP  8
      SEPST=JPTR-1                                                      GROUP  9
      DIR=1
      CALL SEPAR                                                        GROUP 11
      IF(ISEP .EQ. -1 .OR. ICOM .EQ. 1) GO TO 30                        GROUP 12
      IF(ISEP .EQ. 0) IDESST=SEPST                                      GROUP 13
      IF(ISEP .EQ. 1) IDESST=SEPND+1                                    GROUP 14
      IF(NEXT(IDESST) .EQ. RPAR) GO TO 20                               GROUP 15
      SEPST=IGPND-1                                                     GROUP 16
      DIR=-1
      CALL SEPAR                                                        GROUP 18
      IF(ISEP .EQ. -1 .OR. ICOM .EQ. 1) GO TO 30                        GROUP 19
      DIR=1
   10 CONTINUE                                                          GROUP 21
      CALL DESCRP                                                       GROUP 22
      IF(IDES .EQ. 0) GO TO 40
      SEPST=IDESND+1                                                    GROUP 24
      IF(NEXT(SEPST) .EQ. RPAR) GO TO 20                                GROUP 25
      CALL SEPAR                                                        GROUP 26
      IF(ISEP .EQ. 0 .OR. ISEP .EQ. -1) GO TO 30                        GROUP 27
      IDESST=SEPND+1                                                    GROUP 28
      IF(NEXT(IDESST) .NE. RPAR) GO TO 10                               GROUP 29
   20 IGRP=1                                                            GROUP 30
      RETURN                                                            GROUP 31
   30 IGRP=0                                                            GROUP 32
      CALL ERROR(7,KDM1,KDM2)
      RETURN                                                            GROUP 34
   40 CALL ERROR(88,IDESST,KDM2)
      IGRP=0
      RETURN
      END                                                               GROUP 35
```

```
      SUBROUTINE GRT                                                    GRT    2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      COMMON/GLOBAL/NBLK,NREF,NSUBS,BLKTBL(200),EXTTBL(100),ISUBS(100)
      COMMON/LIST/NLIST,NINTFC,ISUBLT(3,200),INTFAC(500)
      INTEGER EXTTBL,BLKTBL,BLANK,BITPUT,BITGET
      DATA BLANK/1H /
      WRITE(6,1)
    1 FORMAT(//)
      ISUB=INITID(2)                                                    GRT   10
      IF(ISUB .EQ. 0) GO TO 15                                          GRT   11
   10 ISUB=IDTBL(2,ISUB)
      IF(ISUB .EQ. 0) GO TO 15
      IF(BITGET(IDTBL(3,ISUB),20,1) .EQ. 1) GO TO 10
      IF(NREF .EQ. 0) GO TO 4                                           GRT   16
      DO 3 K=1,NREF                                                     GRT   17
      INDEX=EXTTBL(K)
      IF(IDTBL(1,ISUB) .EQ. ISUBLT(1,INDEX)) GO TO 10
    3 CONTINUE                                                          GRT   41
    4 NREF=NREF+1                                                       GRT   42
      IF(NREF .GT. 100) GO TO 50
      EXTTBL(NREF)=BITGET(IDTBL(3,ISUB),36,9)
      IF(MODE .EQ. 1) GO TO 10
      INDEX=EXTTBL(NREF)
      KLAS=BITGET(ISUBLT(2,INDEX),10,4)
      IF(KLAS .EQ. 1 .OR. KLAS .EQ. 2) WRITE(9) IDTBL(1,ISUB)
      GO TO 10
   15 IBLK=INITID(3)
   20 IF(IBLK .EQ. 0) RETURN
      IF(IDTBL(1,IBLK) .EQ. 1H ) GO TO 45
      DO 25 I=1,NLIST
      IF(IDTBL(1,IBLK) .NE. ISUBLT(1,I)) GO TO 25
      LISTLC=I
      IF(BITGET(ISUBLT(2,I),10,4) .EQ. 7) GO TO 30
      IF(BITGET(ISUBLT(2,I),36,15) .NE. 0) GO TO 30
      ISZ=IDTBL(4,IBLK)
      ISUBLT(2,I)=BITPUT(ISUBLT(2,I),ISZ,36)
      GO TO 30
   25 CONTINUE
      CALL ERROR(62,IDTBL(1,IBLK),KDM2)
      NLIST=NLIST+1
      ISUBLT(1,NLIST)=IDTBL(1,IBLK)
      ISZ=IDTBL(4,IBLK)
      ISUBLT(2,NLIST)=BITPUT(ISZ,10,10)
      LISTLC=NLIST
   30 IDTBL(3,IBLK)=BITPUT(IDTBL(3,IBLK),LISTLC,36)
      IF(NBLK .EQ. 0) GO TO 40
      DO 35 K=1,NBLK
      IF(LISTLC .EQ. BLKTBL(K)) GO TO 45
   35 CONTINUE
   40 NBLK=NBLK+1
      IF(NBLK .GT. 200) GO TO 60
      BLKTBL(NBLK)=LISTLC
   45 IBLK=IDTBL(2,IBLK)
      GO TO 20
   50 CALL ERROR(59,KDM1,KDM2)
      STOP
   60 CALL ERROR(60,KDM1,KDM2)
      STOP
      END                                                               GRT   65
```

```
      SUBROUTINE IMPTYP                                                 IMPTYP 2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      DIMENSION IALPH(6)                                                IMPTYP 4
      INTEGER D,BITPUT,BITGET                                           IMPTYP 5
      DATA (IALPH(I),I=1,6)/1HI,1HJ,1HK,1HL,1HM,1HN/                    IMPTYP 6
      IF(BITGET(IDTBL(3,LOC),11,1) .EQ. 1) GO TO 20
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),1,11)                            IMPTYP 8
      DO 10 I=1,6                                                       IMPTYP 9
      IF(D(1) .NE. IALPH(I)) GO TO 10                                   IMPTYP10
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),4,10)
      GO TO 20
   10 CONTINUE                                                          IMPTYP13
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),1,10)
   20 IF(ITYP .LE. 18) IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),1,19)
      RETURN                                                            IMPTYP14
      END                                                               IMPTYP15
```

```
      SUBROUTINE INIT                                                   INIT   2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      COMMON/FUNC/IFNCRA(5,17),MARGS,IARGS(50),FNCLOC(5),NFUNC
      COMMON/STRING/NTYPE,NSTR,STR(500)                                 INIT   5
      COMMON/TYP/NQQ,RHSTYP,NQ2,NQ3,LHSTYP
      COMMON/LIST/NLIST,NINTFC,ISUBLT(3,208),INTFAC(500)
      COMMON/BASBLK/IBLOCK(2500),NBLOCK,NB,NBRNCH
      COMMON/STFUNC/NSTFNC,ISTFNC(10)
      INTEGER RHSTYP
      INTEGER A,EQUALS,COMMA,RPAR,STR                                   INIT  10
      INTEGER BITPUT,BITGET,FNCLOC                                      INIT  11
      DATA EQUALS/1H=/,LPAR/1H(/,COMMA/1H,/,RPAR/1H)/                   INIT  12
      IFN=0                                                             INIT  13
      NTYPE=1                                                           INIT  14
      IPTR=JPTR                                                         INIT  15
      CALL GNLE                                                         INIT  16
      IF(JTYP .NE. 2) GO TO 40                                          INIT  17
      CALL SEARCH                                                       INIT  18
      IF(NEXT(JPTR) .NE. EQUALS) GO TO 6                                INIT  19
      LOC2=0                                                            INIT  20
      IF(ISRCH(2) .NE. 1) GO TO 2                                       INIT  21
      IF(NXTID .NE. IFNCNM) CALL ERROR(10,NXTID,KDM2)
      IFN=1                                                             INIT  23
      CALL IMPTYP                                                       INIT  24
      LOC2=LOC                                                          INIT  25
    2 IF(ISRCH(1) .NE. 1) GO TO 18
      IF(LOC2 .EQ. 0) GO TO 4
      LOC=IDES
      GO TO 5
   18 IDTYP=1
      CALL STORE                                                        INIT  28
      LOC=NID                                                           INIT  29
      IF(LOC2 .EQ. 0) GO TO 4
      IDTBL(3,LOC)=IDTBL(3,LOC2)                                        INIT  31
      GO TO 5                                                           INIT  32
    4 CALL IMPTYP                                                       INIT  33
    5 LHSTYP=BITGET(IDTBL(3,LOC),10,3)                                  INIT  34
      IF(LHSTYP .EQ. 5) NTYPE=2
      GO TO 30                                                          INIT  36
    6 IF(A(JPTR-1) .NE. LPAR) GO TO 40                                  INIT  37
      IF(ISRCH(1) .EQ. 1) GO TO 12                                      INIT  38
      IF(ISRCH(2) .NE. 1) GO TO 15                                      INIT  39
      CALL ERROR(10,NXTID,KDM2)
      GO TO 8                                                           INIT  41
   15 IDTYP=2                                                           INIT  42
      CALL STORE                                                        INIT  43
      LOC=NID                                                           INIT  44
      GO TO 8                                                           INIT  45
    7 CALL SWITCH                                                       INIT  46
```

```
    8 CALL IMPTYP                                                       INIT  47
      LHSTYP=BITGET(IDTBL(3,LOC),10,3)                                  INIT  48
      IF(LHSTYP .EQ. 5) NTYPE=2
      NARG=0                                                            INIT  50
      ITYP=35                                                           INIT  51
      NSTFNC=NSTFNC+1
      IF(NSTFNC .GT. 10) GO TO 60
      ISTFNC(NSTFNC)=LOC
      LOC1=LOC
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),1,20)
   10 CALL GNLE                                                         INIT  52
      IF(JTYP .NE. 2) GO TO 50                                          INIT  53
      NARG=NARG+1                                                       INIT  54
      CALL SEARCH
      IF(ISRCH(2) .EQ. 1) CALL ERROR(54,NARG,KDM2)
      IF(ISRCH(1) .EQ. 1) GO TO 20
      IDTYP=1
      CALL STORE
      LOC=NID
      GO TO 25
   20 IF(BITGET(IDTBL(3,LOC),1,1) .EQ.    CALL ERR[illegible],NARG,KDM2)
   25 CALL IMPTYP
      IF(NEXT(JPTR) .EQ. COMMA) GO TO 10                                INIT  55
      IF(A(JPTR-1) .NE. RPAR) GO TO 40                                  INIT  57
      IDTBL(3,LOC1)=BITPUT(IDTBL(3,LOC1),NARG,7)
      IF(NEXT(JPTR) .EQ. EQUALS) GO TO 32                               INIT  58
      GO TO 40                                                          INIT  59
   12 IF(BITGET(IDTBL(3,LOC),1,1) .NE. 1) GO TO 7                       INIT  60
      CALL IMPTYP                                                       INIT  61
      LHSTYP=BITGET(IDTBL(3,LOC),10,3)                                  INIT  62
      IF(LHSTYP .EQ. 5) NTYPE=2
      JPTR=IPTR                                                         INIT  64
      JBLOCK=NBLOCK+1                                                   INIT  65
      CALL EXPR                                                         INIT  66
      CALL PARSE                                                        INIT  67
      CALL BLKSTR
      IBLOCK(JBLOCK)=IBLOCK(JBLOCK) - 1000                              INIT  68
      GO TO 32                                                          INIT  69
   30 NBLOCK=NBLOCK+1                                                   INIT  70
      JBLOCK=NBLOCK                                                     INIT  71
      IBLOCK(NBLOCK)=1000+LOC                                           INIT  72
   32 NTMS=0                                                            INIT  73
      IPTR=JPTR
      CALL EXPR                                                         INIT  74
      IF(JPTR .LE. N) CALL ERROR(7,KDM1,KDM2)
      CALL PARSE                                                        INIT  75
      CALL FNCSTR                                                       INIT  76
      CALL EXPRCK                                                       INIT  77
      IF(ITYP .EQ. 35) GO TO 36                                         INIT  78
      CALL BLKSTR
      IBLOCK(NBLOCK+1)=IBLOCK(JBLOCK)                                   INIT  79
      DO 34 K=JBLOCK,NBLOCK                                             INIT  80
   34 IBLOCK(K)=IBLOCK(K+1)                                             INIT  81
      IF(LTYP .EQ. 1) RETURN
   36 IF(MODE .NE. 1) GO TO 35
      IF(RHSTYP .EQ. 3 .OR. RHSTYP .EQ. 4) RETURN
      IF(NSTR .LT. 6) RETURN
      JPTR=IPTR-1
```

```
      CALL CNVRT                                                        INIT  84
      RETURN                                                            INIT  85
   35 IF(NFUNC .EQ. 0) RETURN                                           INIT  86
      IF(IFN .EQ. 1) RETURN                                             INIT  87
      DO 38 J=1,NFUNC                                                   INIT  88
      LOC=FNCLOC(J)
      INDEX=BITGET(IDTBL(3,LOC),36,9)
      KLAS=BITGET(ISUBLT(2,INDEX),10,4)
      IF(KLAS .NE. 1 .AND. KLAS .NE. 2) GO TO 38
      CALL CALL2                                                        INIT  92
      RETURN                                                            INIT  93
   38 CONTINUE                                                          INIT  95
      RETURN                                                            INIT  96
   40 CALL ERROR(7,KDM1,KDM2)
      RETURN                                                            INIT  98
   50 CALL ERROR(15,KDM1,KDM2)
      RETURN                                                            INIT 100
   60 CALL ERROR(89,IDM1,IDM2)
      RETURN
      END                                                               INIT 101
```

```
      SUBROUTINE INTRIN
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES
      COMMON/LIST/NLIST,NINTFC,ISUBLT(3,200),INTFAC(500)
      INTEGER BITGET
      DO 100 I=1,NLIST
      IF(BITGET(ISUBLT(2,I),10,4) .NE. 4) GO TO 100
      NXTID=ISUBLT(1,I)
      CALL SEARCH
      CALL COMSCH
      IF(ISRCH(1) .EQ. 1 .OR. ISRCH(3) .EQ. 1) CALL ERROR(74,NXTID,KDM2)
  100 CONTINUE
      RETURN
      END
```

```
      SUBROUTINE IO                                                     IO      2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH    2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH    4
      COMMON/STRING/NTYPE,NSTR,STR(500)                                 IO      4
      COMMON/LABELS/STATRA(2,200),NLABEL                                IO      5
      COMMON/BASBLK/IBLOCK(2500),NBLOCK,NB,NBRNCH
      COMMON/INPOUT/NCALL,IN,IOP                                        IO      7
      DIMENSION IALPH1(4),IALPH2(5),IALPH3(8)                           IO      8
      INTEGER A,STATRA,RPAR,COMMA,BLANK                                 IO      9
      INTEGER BITPUT,BITGET                                             IO     10
      DATA LPAR/1H(/,RPAR/1H)/,COMMA/1H,/,BLANK/1H /                    IO     11
      DATA (IALPH1(I),I=1,4)/1HR,1HE,1HA,1HD/                           IO     12
      DATA (IALPH2(I),I=1,5)/1HW,1HR,1HI,1HT,1HE/                       IO     13
      DATA (IALPH3(I),I=1,8)/1HC,1HO,1HN,1HT,1HI,1HN,1HU,1HE/           IO     14
      IFRMT=0                                                           IO     15
      IF(ITYP .EQ. 12) GO TO 10                                         IO     16
      DO 5 I=1,4                                                        IO     17
      IF(NEXT(JPTR) .NE. IALPH1(I)) GO TO 50                            IO     18
    5 CONTINUE                                                          IO     19
      GO TO 20                                                          IO     20
   10 DO 15 I=1,5                                                       IO     21
      IF(NEXT(JPTR) .NE. IALPH2(I)) GO TO 50                            IO     22
   15 CONTINUE                                                          IO     23
   20 IF(NEXT(JPTR) .NE. LPAR) GO TO 50                                 IO     24
      CALL GNLE                                                         IO     25
      IF(JTYP .EQ. 2) GO TO 22                                          IO     26
      CALL ERROR(22,KDM1,KDM2)
      GO TO 28                                                          IO     28
   22 CALL SEARCH                                                       IO     29
      IF(ISRCH(2) .EQ. 1) CALL ERROR(10,NXTID,KDM2)
      IF(ISRCH(1) .EQ. 1) GO TO 25                                      IO     31
      IDTYP =1                                                          IO     32
      CALL STORE                                                        IO     33
      LOC=NID                                                           IO     34
   25 CALL IMPTYP                                                       IO     35
      IF(BITGET(IDTBL(3,LOC),10,3) .NE. 4) CALL ERROR(22,KDM1,KDM2)
      IF(BITGET(IDTBL(3,LOC),1,1) .EQ. 1) CALL ERROR(14,NXTID,KDM2)
      NBLOCK=NBLOCK+1                                                   IO     38
      IBLOCK(NBLOCK)=2000+LOC                                           IO     39
   28 IF(NEXT(JPTR) .EQ. COMMA) GO TO 40                                IO     40
      JPTR=JPTR-1                                                       IO     41
      GO TO 30                                                          IO     42
   40 CALL GNLE                                                         IO     43
      IF(JTYP .NE. 5) GO TO 26                                          IO     44
      CALL STSRCH                                                       IO     45
      STATRA(2,LOC)=BITPUT(STATRA(2,LOC),1,12)                          IO     46
      GO TO 29                                                          IO     47
   26 IF(JTYP .NE. 2) GO TO 50                                          IO     48
      CALL SEARCH                                                       IO     49
      IF(ISRCH(2) .EQ. 1) CALL ERROR(10,NXTID,KDM2)
      IF(ISRCH(1) .EQ. 1) GO TO 27                                      IO     51
      IDTYP=1                                                           IO     52
      CALL STORE                                                        IO     53
      LOC=NID                                                           IO     54
   27 CALL IMPTYP                                                       IO     55
      IF(BITGET(IDTBL(3,LOC),1,1) .NE. 1) CALL ERROR(43,KDM1,KDM2)
```

```
   29 IFRMT=1                                                          IO   57
   30 IF(NEXT(JPTR) .NE. RPAR) GO TO 50                                IO   58
      IF(NEXT(JPTR) .NE. BLANK) GO TO 35                               IO   59
      IF(ITYP .EQ. 12 .AND. IFRMT .EQ. 0) CALL ERROR(44,KDM1,KDM2)
      GO TO 36
   35 JPTR=JPTR-1                                                      IO   63
      CALL EXPR                                                        IO   64
      NTYPE=3                                                          IO   65
      CALL PARSE                                                       IO   66
      CALL IOSTR
   36 IF(MODE .NE. 1 .AND. ITYP .EQ. 11) GO TO 37
      RETURN
   37 IF(ITYPE(1) .EQ. 2) GO TO 42                                     IO   68
      A(1)=1HC                                                         IO   69
      RETURN                                                           IO   70
   42 WRITE(IOP,45) (A(I),I=1,6),(IALPH3(I),I=1,8)                     IO   71
   45 FORMAT(72A1)                                                     IO   72
      A(1)=1HC                                                         IO   73
      DO 47 I=2,6                                                      IO   74
   47 A(I)=1H                                                          IO   75
      RETURN                                                           IO   76
   50 CALL ERROR(7,KDM1,KDM2)
      RETURN                                                           IO   78
      END                                                              IO   79
```

```
      SUBROUTINE IOSTR
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES
      COMMON/FUNC/IFNCRA(5,17),MARGS,IARGS(50),FNCLOC(5),NFUNC
      COMMON/BASBLK/IBLOCK(2500),NBLOCK,NB,NBRNCH
      INTEGER BITGET
      DO 100 I=1,MARGS
      NBLOCK=NBLOCK+1
      ICOL=18*MOD(I-1,2)+9
      IVR=(I+1)/2
      LOC=BITGET(IARGS(IVR),ICOL,9)
      ISUB=BITGET(IARGS(IVR),ICOL+3,3)
      IF(ISUB .EQ. 1) GO TO 90
      IF(ISUB .EQ. 2) GO TO 20
      IF(ITYP .EQ. 11) GO TO 80
      IF(ITYP .EQ. 12) GO TO 90
   20 IDEF=BITGET(IARGS(IVR),ICOL+9,6)
      NMOVE=I-IDEF-1
      DO 30 J=1,NMOVE
      ITEMP=NBLOCK-J
   30 IBLOCK(ITEMP+1)=IBLOCK(ITEMP)
      IBLOCK(ITEMP)=1000+LOC
      NBLOCK=NBLOCK+1
      IBLOCK(NBLOCK)=6000+LOC
      GO TO 100
   80 IBLOCK(NBLOCK)=1000+LOC
      GO TO 100
   90 IBLOCK(NBLOCK)=2000+LOC
  100 CONTINUE
      RETURN
      END
```

```
      FUNCTION IPREV(IA)                                                IPREV  2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      INTEGER A,BLANK                                                   IPREV  4
      DATA BLANK/1H /                                                   IPREV  5
      DO 10 I=1,N                                                       IPREV  6
      J=IA-I+1                                                          IPREV  7
      IF(J .EQ. 0) GO TO 20                                             IPREV  8
      IF(A(J) .EQ. BLANK) GO TO 10                                      IPREV  9
      IPREV=ITYPE(J)                                                    IPREV 10
      JPTR=J-1                                                          IPREV 11
      RETURN                                                            IPREV 12
   10 CONTINUE                                                          IPREV 13
   20 IPREV=3                                                           IPREV 14
      JPTR=0                                                            IPREV 15
      RETURN                                                            IPREV 16
      END                                                               IPREV 17
```

```
      FUNCTION ITYPE(ID)                                                ITYPE  2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      INTEGER BITGET                                                    ITYPE  4
      NXT=NEXT(ID)                                                      ITYPE  5
      IVAL=BITGET(NXT,6,6)                                              ITYPE  6
C****IF UNIVAC 1108 - PLACE A 'C' IN COLUMN 1 OF NEXT TWO CARDS         CH34  25
C     IF( IVAL .GE. IRA .AND. IVAL .LE. IRZ) GO TO 10
C     IF(IVAL .GE. IR0 .AND. IVAL .LE. IR9) GO TO 20
C****IF CDC 6700 - PLACE A 'C' IN COLUMN 1 OF NEXT TWO CARDS            CH34  26
      IF(IVAL .GE. 6 .AND. IVAL .LE. 31) GO TO 10
      IF(IVAL .GE. 48 .AND. IVAL .LE. 57) GO TO 20
      ITYPE=3                                                           ITYPE  9
      RETURN                                                            ITYPE 10
   10 ITYPE=1                                                           ITYPE 11
      RETURN                                                            ITYPE 12
   20 ITYPE=2                                                           ITYPE 13
      RETURN                                                            ITYPE 14
      END                                                               ITYPE 15
```

```
      SUBROUTINE LOGCHK                                                 LOGCHK 2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      COMMON/LOGIC/LOG,LOGST                                            LOGCHK 4
      DIMENSION LOGOP(11),LOGRA(5)                                      LOGCHK 5
      DATA (LOGOP(I),I=1,11)/2HLT,2HLE,2HGT,2HGE,2HEQ,2HNE,2HOR,3HAND,  LOGCHK 6
     * 3HNOT,4HTRUE,5HFALSE/                                            LOGCHK 7
      JPTR=LOGST                                                        LOGCHK 8
      DO 10 I=1,6                                                       LOGCHK 9
      NXT=NEXT(JPTR)                                                    LOGCHK10
      IF(NXT .EQ. 1H.) GO TO 12                                         LOGCHK11
   10 LOGRA(I)=NXT                                                      LOGCHK12
      GO TO 20                                                          LOGCHK13
   12 IF(I .LT. 3) GO TO 20                                             LOGCHK14
      CALL CAA(LOGRA,I-1,LOG)                                           LOGCHK15
      DO 15 I=1,11                                                      LOGCHK16
      IF(LOG .EQ. LOGOP(I)) GO TO 30                                    LOGCHK17
   15 CONTINUE                                                          LOGCHK18
   20 LOG=0                                                             LOGCHK19
      RETURN                                                            LOGCHK20
   30 LOG=I                                                             LOGCHK21
      LOGID=I                                                           LOGCHK22
      RETURN                                                            LOGCHK23
      END                                                               LOGCHK24
```

```
      SUBROUTINE LOGIF                                                  LOGIF   2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH    2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH    4
      COMMON/STRING/NTYPE,NSTR,STR(500)                                 LOGIF   4
      COMMON/BASBLK/IBLOCK(2500),NBLOCK,NB,NBRNCH
      INTEGER A,STR,BLANK,AY,EF                                         LOGIF   6
      DATA LPAR/1H(/,BLANK/1H /,AY/1HI/,EF/1HF/                         LOGIF   7
      IF(NEXT(JPTR) .NE. AY) GO TO 110                                  LOGIF   8
      IF(NEXT(JPTR) .NE. EF) GO TO 110                                  LOGIF   9
      IF(NEXT(JPTR) .NE. LPAR) GO TO 110                                LOGIF  10
      JPTR=JPTR-1                                                       LOGIF  11
      CALL EXPR                                                         LOGIF  12
      NSTR=NSTR+1                                                       LOGIF  13
      STR(NSTR)= -5                                                     LOGIF  14
      NTYPE=2                                                           LOGIF  15
      CALL PARSE                                                        LOGIF  16
      CALL FNCSTR                                                       LOGIF  17
      CALL BLKSTR
      IF(ITYP .GT. 15) GO TO 130                                        LOGIF  18
      LTYP=1                                                            LOGIF  19
      GO TO (10,20,30,40,50,60,70,80,70,70,90,90,100,100,100),ITYP      LOGIF  20
   10 CALL INIT                                                         LOGIF  21
      RETURN                                                            LOGIF  22
   20 CALL ASSIGN                                                       LOGIF  23
      RETURN                                                            LOGIF  24
   30 CALL GOTO                                                         LOGIF  25
      NBLOCK=NBLOCK+1                                                   LOGIF  26
      IBLOCK(NBLOCK)=998                                                LOGIF  27
      NBRNCH=2                                                          LOGIF  28
      RETURN                                                            LOGIF  29
   40 CALL ASGOTO                                                       LOGIF  30
      NBLOCK=NBLOCK+1                                                   LOGIF  31
      IBLOCK(NBLOCK)=998                                                LOGIF  32
      NBRNCH=NBRNCH+1                                                   LOGIF  33
      RETURN                                                            LOGIF  34
   50 CALL CTGOTO                                                       LOGIF  35
      NBLOCK=NBLOCK+1                                                   LOGIF  36
      IBLOCK(NBLOCK)=998                                                LOGIF  37
      NBRNCH=NBRNCH+1                                                   LOGIF  38
      RETURN                                                            LOGIF  39
   60 CALL ARIF                                                         LOGIF  40
      NBLOCK=NBLOCK+1                                                   LOGIF  41
      IBLOCK(NBLOCK)=998                                                LOGIF  42
      NBRNCH=NBRNCH+1                                                   LOGIF  43
      RETURN                                                            LOGIF  44
   70 CALL SIMP                                                         LOGIF  45
      IF(ITYP .EQ. 7) RETURN                                            LOGIF  46
      NBLOCK=NBLOCK+1                                                   LOGIF  47
      IBLOCK(NBLOCK)=998                                                LOGIF  48
      NBRNCH=2                                                          LOGIF  49
      RETURN                                                            LOGIF  50
   80 CALL CALL                                                         LOGIF  51
      RETURN                                                            LOGIF  52
   90 CALL IO                                                           LOGIF  53
      RETURN                                                            LOGIF  54
  100 CALL AUXIO                                                        LOGIF  55
      RETURN                                                            LOGIF  56
  110 CALL ERROR(7,KDM1,KDM2)
      RETURN                                                            LOGIF  58
  130 CALL ERROR(45,KDM1,KDM2)
      RETURN                                                            LOGIF  60
      END                                                               LOGIF  61
```

```
      SUBROUTINE LOOPCK                                                 LOOPCK 2
      COMMON/LABELS/STATRA(2,200),NLABEL                                LOOPCK 3
      COMMON/DOLOOP/ISTACK(4,50),NSTACK,ILOOP                           LOOPCK 4
      COMMON/BASBLK/IBLOCK(2500),NBLOCK,NB,NBRNCH
      INTEGER STATRA,BITGET
      IF(NSTACK .EQ. 0) RETURN                                          LOOPCK 6
      IBLKST=1                                                          LOOPCK 7
   10 IBLKND=BITGET(IBLOCK(IBLKST),28,16)-1                             LOOPCK 8
      LOOPZ=BITGET(IBLOCK(IBLKST),12,6)                                 LOOPCK 9
      NBR=BITGET(IBLOCK(IBLKST),6,6)                                    LOOPCK10
      IF(IBLKND .EQ. -1) IBLKND=NBLOCK                                  LOOPCK11
      IST=IBLKND-NBR+1                                                  LOOPCK12
      DO 100 I=IST,IBLKND                                               LOOPCK13
      JLOOP=LOOPZ                                                       LOOPCK14
      IF(IBLOCK(I) .GE. 998) GO TO 100                                  LOOPCK15
      IBLK=IBLOCK(I)                                                    LOOPCK16
      NXTBLK=BITGET(STATRA(2,IBLK),36,18)
      KLOOP=BITGET(IBLOCK(NXTBLK),12,6)                                 LOOPCK18
      IF(KLOOP .EQ. 0) GO TO 100                                        LOOPCK19
      IF(JLOOP .EQ. 0) GO TO 200                                        LOOPCK20
   50 IF(JLOOP .EQ. KLOOP) GO TO 100                                    LOOPCK21
      JLOOP=ISTACK(3,JLOOP)                                             LOOPCK22
      IF(JLOOP .EQ. 0) GO TO 200                                        LOOPCK23
      GO TO 50                                                          LOOPCK24
  200 IBLK=IBLOCK(I)
      WRITE(6,201) STATRA(1,IBLK)
  201 FORMAT(6X,65H ILLEGAL TRANSFER INTO THE RANGE OF A DO LOOP AT STATLOOPCK26
     1EMENT NUMBER,I6)                                                  LOOPCK27
  100 CONTINUE                                                          LOOPCK28
      IF(IBLKND .EQ. NBLOCK) RETURN                                     LOOPCK29
      IBLKST=IBLKND+1                                                   LOOPCK30
      GO TO 10                                                          LOOPCK31
      END                                                               LOOPCK32
```

```
      SUBROUTINE LVDLET                                                 IZ05177
      COMMON/LVARGS/IFUNC,IARG,IADD,IPOS,ITYP,IVAL,LSTHED,NVAL,
     + IDSTRY,IVALS(10),ITYPI(10),NSKIP                                 IZ05177
      INTEGER FLGSPC,FLDMSK,FL1MSK,FL2MSK,FL5MSK,FLG67,REGASP,THIS      IZ08251
     + ,FL3MSK,FL4MSK,SEQSPC                                            COMPAND
      COMMON/LVVTR1/MEMSZE,REGASP,NODSPC(    1)/LVVTR2/LSTSPC(    1)/  GIRDLET
     *LVVTR3/LNKSPC(    1)/LVVTR4/FLGSPC(    1)                        GIRDLET
      COMMON/LVFLAG/FLDMSK,FL1MSK,FL2MSK,FL3MSK,FL4MSK,FL5MSK,FLG67     IZ05177
      COMMON /LVTABL/ MAPSZE,MAP(1) /LVVSEQ/ ISEQSZ,SEQSPC(1)           IZ05177
      DATA NFLGD2/95/                                                   RR1
      KONFLC=0                                                          GIRDLET
C     DETERMINE DIRECTION TO PROCEED FOR MULTIVALUE LISTS               IZ04127
      JPOS=IPOS
      IPOS=IABS(IPOS)                                                   IZ05032
      IF(IADD.NE.-1)  GO TO  74                                         GIRDLET
      IF(IARG.EQ.-1) GO TO 66                                           GIRDLET
      IADD=IFUNC+IARG                                                   IZ07261
      IF(IADD.GT.MEMSZE) IADD=IADD-MEMSZE                               IZ07261
      ILOG=FLGSPC(IADD) .AND. FL5MSK
      IF(ILOG .EQ. 0) GO TO 99
    1 IF(NODSPC(IADD).EQ.IARG) GO TO 4                                  GIRDLET
C     SEARCH CONFLICT LIST FOR THE FUNCTION                             IZ04127
      IADD=LNKSPC(IADD)                                                 GIRDLET
      ILOG=FLGSPC(IADD) .AND. FL5MSK
      IF(ILOG .NE. 0) GO TO 99
      GO TO 1                                                           GIRDLET
   66 IADD=IFUNC                                                        GIRDLET
C     TO DELETE A SPECIFIC TYPE OF NODE (INDEXED DELETE), GO TO 72      IZ04127
    4 IF(ITYP.NE.-1) GO TO 72                                           GIRDLET
      ILOG=FLGSPC(IADD) .AND. FLDMSK
      IF(ILOG .EQ. 0) GO TO 6
      ISADD=LSTSPC(IADD)                                                GIRDLET
C     DELETE ENTIRE MULTIVALUED FUNCTION, RETRIEVE FIRST VALUE          IZ04127
      IVAL=NODSPC(ISADD)                                                IZ04127
    5 NXTADD=LSTSPC(ISADD)                                              GIRDLET
      NODSPC(ISADD)=NODSPC(REGASP)                                      GIRDLET
      LSTSPC(ISADD)=REGASP                                              GIRDLET
      LNKSPC(ISADD)=0                                                   GIRDLET
      FLGSPC(ISADD)=0                                                   IZ08251
      ISUB=NODSPC(REGASP)
      LSTSPC(ISUB)=ISADD
      NODSPC(REGASP)=ISADD                                              GIRDLET
      ILOG=FLGSPC(NXTADD) .AND. FLDMSK
      IF(ILOG .NE. 0) GO TO 2
      ISADD=NXTADD                                                      GIRDLET
      GO TO 5                                                           GIRDLET
C     FUNCTION IS SINGLE VALUED, RETRIEVE VALUE                         IZ04127
    6 IVAL=LSTSPC(IADD)                                                 IZ04127
    2 ILOG=FLGSPC(IADD) .AND. FL5MSK
      IF(ILOG .EQ. 0) GO TO 68
      NXFUNC=LNKSPC(IADD)                                               GIRDLET
      ILOG=FLGSPC(NXFUNC) .AND. FL5MSK
      IF(ILOG .NE. 0) GO TO 10
      NODSPC(IADD)=NODSPC(NXFUNC)                                       GIRDLET
      LSTSPC(IADD)=LSTSPC(NXFUNC)                                       GIRDLET
      LNKSPC(IADD)=LNKSPC(NXFUNC)                                       GIRDLET
      FLGSPC(IADD)=FLGSPC(NXFUNC)                                       IZ08251
      FLGSPC(IADD)=FLGSPC(IADD).OR.FL5MSK                               GIRDLET
      ILOG=FLGSPC(IADD) .AND. FLDMSK
      IF(ILOG .EQ. 0) GO TO 9
      KVAL=LSTSPC(IADD)                                                 IZ12021
    8 KVAL=LSTSPC(KVAL)                                                 GIRDLET
      ISUB=LSTSPC(KVAL)
      ILOG=FLGSPC(ISUB) .AND. FLDMSK
      IF(ILOG .EQ. 0) GO TO 8
      LSTSPC(KVAL)=IADD                                                 GIRDLET
    9 IADD=NXFUNC                                                       GIRDLET
   10 NODSPC(IADD)=NODSPC(REGASP)                                       GIRDLET
```

```
   11 LSTSPC(IADD)=REGASP                                          GIRDLET
      LNKSPC(IADD)=0                                               GIRDLET
      FLGSPC(IADD)=0                                               IZ08251
      ISUB=LSTSPC(IADD)
      NODSPC(ISUB)=IADD
      ISUB=NODSPC(IADD)
      LSTSPC(ISUB)=IADD
      RETURN                                                       GIRDLET
   72 ILOG=FLGSPC(IADD) .AND. FLOMSK
      IF(ILOG .NE. 0) GO TO 20
      IF(IPOS.NE.1) GO TO 99                                       IZ05052
      IF(ITYP.EQ.3) GO TO 6                                        IZ04272
      ISTYP=(FLGSPC(IADD).AND.FLG67)                               IZ04272
      IF(ISTYP.EQ.ITYP) GO TO 6                                    GIRDLET
   99 IVAL=-1                                                      IZ07287
      RETURN                                                       GIRDLET
   20 IND=0                                                        GIRDLET
      FLGSPC(IADD)=FLGSPC(IADD).OR.FL4MSK                          COMPAND
      LAST=IADD                                                    GIRDLET
      IF(JPOS)121,99,21                                            IZ04272
  121 ISUB=LSTSPC(IADD)
      LAST1=LNKSPC(ISUB)
      THIS=LAST1                                                   IZ04272
      GO TO 27                                                     IZ04272
   21 IF(JPOS.LT.0) GO TO 80                                       IZ04272
      THIS=LSTSPC(LAST)                                            IZ04272
      ILOG=FLGSPC(THIS) .AND. FLOMSK
      IF(ILOG .NE. 0) GO TO 99
      GO TO 27                                                     IZ04272
   80 THIS=LNKSPC(LAST)                                            IZ04272
      IF(THIS.EQ.LAST1) GO TO 99                                   IZ04272
   27 IF(ITYP.EQ.3) GO TO 23                                       IZ04272
      ISTYP=(FLGSPC(THIS).AND.FLG67)                               IZ04272
      IF(ISTYP.EQ.ITYP)   GO TO 23                                 GIRDLET
   22 LAST=THIS                                                    GIRDLET
      GO TO 21                                                     GIRDLET
   23 IND=IND+1                                                    GIRDLET
      IF(IND.NE.IPOS)     GO TO 22                                 IZ02092
C     RETRIEVE THE IPOS@TH OF THE KTYP@TH VALUE BEFORE DELETING    IZ04127
      IVAL=NODSPC(THIS)                                            IZ04127
      MADD=IADD                                                    IZ05032
      IF(JPOS.GT.0) GO TO 55                                       IZ05032
      NEXT=LNKSPC(THIS)                                            IZ05032
      IF(THIS.EQ.LAST1) GO TO 82                                   IZ05032
      LNKSPC(LAST)=NEXT                                            IZ05032
      GO TO 83                                                     IZ05032
   82 ISUB=LSTSPC(IADD)
      LNKSPC(ISUB)=NEXT
   83 IF(NEXT.EQ.LAST1) GO TO 84                                   IZ05032
      LSTSPC(NEXT)=LAST                                            IZ05032
      GO TO 85                                                     IZ05032
   84 LSTSPC(IADD)=LAST                                            IZ05032
   85 IADD=THIS                                                    IZ05032
      GO TO 86                                                     IZ05032
   55 NEXT=LSTSPC(THIS)                                            IZ05032
      ILOG=FLGSPC(NEXT) .AND. FLOMSK
      IF( ILOG .NE. 0) GO TO 50
      LNKSPC(NEXT)=LAST                                            IZ04272
```

```
      GO TO 24                                                          IZ04272
   50 ISUB=LSTSPC(IADD)
      LNKSPC(ISUB)=LAST
   24 IADD=THIS                                                         IZ02092
      JLAST=LNKSPC(THIS)                                                IZ02092
      ISUB=LSTSPC(JLAST)
      ILOG=FLGSPC(ISUB) .AND. FLOMSK
      IF(ILOG .NE. 0) LNKSPC(NEXT)=JLAST
      LSTSPC(LAST)=NEXT                                                 IZ03032
   86 KLAST=LSTSPC(MADD)                                                IZ05032
      IF(LNKSPC(KLAST).NE.KLAST) GO TO 10                               IZ02292
C                                                                       IZ02292
C     CONVERT TO SINGLE VALUE LIST                                      IZ02292
C                                                                       IZ02292
      LSTSPC(MADD)=NODSPC(KLAST)                                        IZ02292
      ILOG=FLGSPC(MADD) .OR. FLGSPC(KLAST)
      FLGSPC(MADD)=ILOG .AND. NFLGO2
      FLGSPC(KLAST)=0                                                   IZ02292
      LNKSPC(KLAST)=0                                                   IZ02292
      NODSPC(KLAST)=NODSPC(REGASP)                                      IZ02292
      LSTSPC(KLAST)=REGASP                                              IZ02292
      ISUB=LSTSPC(KLAST)
      NODSPC(ISUB)=KLAST
      ISUB=NODSPC(KLAST)
      LSTSPC(ISUB)=KLAST
      GO TO 10                                                          GIRDLET
   74 ILOG=FLGSPC(IADD) .AND. FLOMSK
      IF(ILOG .NE. 0) GO TO 99
      ILOG=FLGSPC(IADD) .AND. FL2MSK
      IF(ILOG .EQ. 0) GO TO 99
      LAST=LNKSPC(IADD)                                                 GIRDLET
      NEXT=LSTSPC(IADD)                                                 GIRDLET
      LSTSPC(LAST)=NEXT                                                 GIRDLET
      ILOG=FLGSPC(NEXT) .AND. FLOMSK
      IF(ILOG .NE. 0) GO TO 10
      LNKSPC(NEXT)=LAST                                                 GIRDLET
      GO TO 10                                                          GIRDLET
   68 NEXT=LNKSPC(IADD)                                                 GIRDLET
      NEXT1=NEXT                                                        GIRDLET
   25 IF(LNKSPC(NEXT1).EQ.IADD)  GO TO 26                               GIRDLET
      NEXT1=LNKSPC(NEXT1)                                               GIRDLET
      GO TO 25                                                          GIRDLET
   26 LNKSPC(NEXT1)=NEXT                                                GIRDLET
      KONFLC=1                                                          GIRDLET
      GO TO 10                                                          GIRDLET
      END                                                               GIRDLET
```

```
      SUBROUTINE LVEXIT(N)
      COMMON/LVARGS/LVFUNC,LVVARG,LVVAD,LVVPOS,LVVTYP,LVVAL,
     +LVHEAD,LVVNVL,LVDEST,LVVALS(10),LVTYPE(10),LVSKIP
      COMMON/LVTABL/LVTSIZ,LVMAP(     1)/LVVSEQ/LVSIZE,LVSQSP(     1)
      COMMON /TYP/ NN(3),ERRFLG
      COMMON /STRING/ NTYPE,NSTR
      COMMON /NEED/ START,ASSOC,LEVEL,STOP
      COMMON/NEEDS/STJ,JSTACK,R,JAS,J,JLAST,RTEMP,STACK(400,4)
      INTEGER R,RTEMP,STJ,STACK,ASSOC,START,STOP
      COMMON /GIRL/ MM(19),OPRAND
      COMMON /HL/ HOL,ACTION,FUNC1,FUNC2,FUNC3,LEFT,RIGHT,STRING,MAXJ
      COMMON /NTIMES/ NTIMES,MAXI
      INTEGER STRING,HOL,ACTION,RIGHT,FUNC1,FUNC2,FUNC3,OPRAND
      LOGICAL ERRFLG
C     EXECUTE
      GO TO 25000
25000 CONTINUE
      IF(MAXJ .NE. 0) PRINT 100,MAXJ
  100 FORMAT(1X,44H STATEMENT IS TOO COMPLEX. CORRECT TO CHAR. ,I3)
      IF(MAXJ .EQ. 0) PRINT 200,MAXI,NSTR
  200 FORMAT(1X,29H STATEMENT TOO LONG AT CHAR. ,I3,3H OF,I3)
C COMMENTS USED IN CASE OF GIRS PROBLEMS WHEN MEMORY USED UP
C     GO TO 10
C     IF(MAXJ .EQ. 0) GO TO 50
      IF(MAXJ .EQ. 0) GO TO 10
      DO 30 NCHAR=1,MAXJ
C     STRING+HOL.NCHAR(-LEFT,-RIGHT,-HOL,-STRING)
C****     STRING            +          HOL
      LVVPOS =       NCHAR
      LVVTYP =    3
      LVFUNC=         HOL
      LVVARG=      STRING
      CALL LVFIND(LV2       A,LV2       B,LV2       C,LV2       D)
      LVIAAD=STRING
      IF(LVVAL .NE. -1) LVIAAD=LVVAL
      LVIAAI=LVIAAD
C**** LVI     AAX            -         LEFT
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
      LVFUNC=       LEFT
      LVVARG=LVIAAI
      CALL LVDLET
      LVIAAI=LVIAAD
C**** LVI     AAX            -        RIGHT
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
      LVFUNC=      RIGHT
      LVVARG=LVIAAI
      CALL LVDLET
      LVIAAI=LVIAAD
C**** LVI     AAX            -          HOL
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
      LVFUNC=         HOL
      LVVARG=LVIAAI
      CALL LVDLET
      LVIAAI=LVIAAD
C**** LVI     AAX            -       STRING
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
```

```
      LVFUNC=     STRING
      LVVARG=LV1AA1
      CALL LVDLET
   30 CONTINUE
C     STRING-STRING
C**** STRING                -       STRING
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
      LVFUNC=     STRING
      LVVARG=     STRING
      CALL LVDLET
C     OPRAND(-OPRAND,-STRING,-ACTION,-FUNC1)
      LV1AAD=OPRAND
C**** LV1     AAT           -       OPRAND
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
      LVFUNC=     OPRAND
      LVVARG=LV1AAD
      CALL LVDLET
C**** LV1     AAT           -       STRING
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
      LVFUNC=     STRING
      LVVARG=LV1AAD
      CALL LVDLET
C**** LV1     AAT           -       ACTION
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
      LVFUNC=     ACTION
      LVVARG=LV1AAD
      CALL LVDLET
C**** LV1     AAT           -       FUNC1
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
      LVFUNC=     FUNC1
      LVVARG=LV1AAD
      CALL LVDLET
   10 CONTINUE
      REWIND 19
      NTIMES=0
C  10 CONTINUE
C     REWIND 99
C     NTIMES=0
      J=NSTR+1
      R=STOP
      STJ=R
      ERRFLG=.TRUE.
      JSTACK=1
      STACK(JSTACK,1)=STOP
      STACK(JSTACK,2)=100
      STACK(JSTACK,3)=J
      STACK(JSTACK,4)=0
C     NSTR=0
      NSTR=MAXJ
C     COMPLETE
      RETURN
25000 CONTINUE
      LV2A=0
      LV2B=0
      LV2C=0
      LV2D=0
      LV2E=0
      LV2F=0
      LV2G=0
      LV2H=0
      GO TO 25001
      END
```

```
      SUBROUTINE LVFECH(N)                                              IZ05177
      INTEGER FLGSPC,SEQSPC,REGASP                                      COMPAND
      COMMON /LVTABL/ MAPSZE,MAP(1) /LVVSEQ/ ISEQSZ,SEQSPC(1)           IZ05177
      COMMON/LVVTR1/MEMSZE,REGASP,NODSPC(    1)/LVVTR2/LSTSPC(    1)/  IZ07081
     *LVVTR3/LNKSPC(    1)/LVVTR4/FLGSPC(    1)                        IZ07081
      COMMON/LVRAND/KPRIME,KS,KX,KDY,KDX,KTEMP
      READ(N) MEMSZE,REGASP,KPRIME,KS,KX,KTEST,KDY,KTEMP,KDX,KNUM       IZ02147
     +,ISEQSZ                                                           IZ05177
      READ(N)(NODSPC(I),I=1,MEMSZE)                                     IZ07081
      READ(N)(LSTSPC(I),I=1,MEMSZE)                                     IZ07081
      READ(N)(LNKSPC(I),I=1,MEMSZE)                                     IZ07081
      READ(N)(FLGSPC(I),I=1,MEMSZE)                                     IZ07081
      READ(N)(SEQSPC(I),I=1,ISEQSZ)                                     IZ05177
      PRINT 10                                                          COMPAND
   10 FORMAT(////1X,34H GRAPH HAS BEEN PLACED INTO MEMORY//)
      RETURN                                                            IZ07081
      END                                                               IZ07081
```

```
      SUBROUTINE LVFIND(INDEX,INDXAD,KFUNC,KARG)                        IZ05177
      COMMON/LVARGS/IFUNC,IARG,IADD,IPOS,ITYP,IVAL,LSTHED,NVAL,
     +  IDSTRY,IVALS(10),ITYP1(10),NSKIP                                IZ05177
      INTEGER FLGSPC,REGASP,FL0MSK,FL1MSK,FL2MSK,FL3MSK,FL4MSK,FL5MSK,  COMPAND
     + FLG67,SEQSPC                                                     COMPAND
      COMMON/LVFLAG/FL0MSK,FL1MSK,FL2MSK,FL3MSK,FL4MSK,FL5MSK,FLG67     IZ05177
      COMMON /LVTABL/ MAPSZE,MAP(1) /LVVSEQ/ ISEQSZ,SEQSPC(1)           IZ05177
      COMMON/LVVTR1/MEMSZE,REGASP,NODSPC(    1)/LVVTR2/LSTSPC(    1)/  GIRFIND
     *LVVTR3/LNKSPC(    1)/LVVTR4/FLGSPC(    1)                        GIRFIND
      DATA NFLAG4/247/                                                  RR1
      IADD=IFUNC+IARG                                                   IZ07261
      IF(IADD.GT.MEMSZE) IADD=IADD-MEMSZE                               IZ07261
      LSTHED=0                                                          GIRFIND
      ILOG=FLGSPC(IADD) .AND. FL5MSK
      IF(ILOG .EQ. 0) GO TO 99
    1 IF(NODSPC(IADD).EQ.IARG)  GO TO 4                                 GIRFIND
      IADD=LNKSPC(IADD)                                                 GIRFIND
      ILOG=FLGSPC(IADD) .AND. FL5MSK
      IF(ILOG .NE. 0) GO TO 99
      GO TO 1                                                           GIRFIND
    4 ILOG=FLGSPC(IADD) .AND. FL0MSK
      IF(ILOG .NE. 0) GO TO 14
      ISTYP=(FLGSPC(IADD).AND.FLG67)                                    GIRFIND
      IF(ITYP.EQ.3) GO TO 11                                            GIRFIND
      IF(ISTYP.EQ.3)ISTYP=2                                             GIRFIND
      IF(ISTYP.NE.ITYP)  GO TO 99                                       IZ01042
   11 IVAL=LSTSPC(IADD)                                                 GIRFIND
      IF((IPOS.NE.1).AND.(IPOS.NE.-1))  GO TO 99                        IZ02042
      ITYP=(FLGSPC(IADD).AND.FLG67)                                     GIRFIND
      LSTHED=-1                                                         GIRFIND
      RETURN                                                            GIRFIND
   14 LSTHED=IADD                                                       GIRFIND
      IND=0                                                             IZ12271
      KNDEX=IABS(INDEX)                                                 IZ12271
      JPOS=IABS(IPOS)                                                   IZ12271
      IF(NSKIP.EQ.1) GO TO 50                                           COMPAND
      IF((KFUNC.NE.IFUNC).OR.(KARG.NE.IARG)) GO TO 50                   IZ01107
      ILOG=FLGSPC(LSTHED) .AND. FL4MSK
      IF(ILOG .NE. 0) GO TO 50
      IF((IPOS+INDEX) .LE. 0) GO TO 50
      IF(JPOS.LT.2) GO TO 50                                            IZ08237
      NDX=FLGSPC(INDXAD)                                                IZ05177
      ILOG=NDX .AND. FL5MSK
      IF(ILOG .NE. 0) GO TO 50
      ILOG=NDX .AND. FL1MSK
      IF(ILOG .EQ. 0) GO TO 50
      IF(JPOS.GE.KNDEX)  GO TO 25                                       IZ12271
      IF((JPOS+JPOS).LE.KNDEX)  GO TO 50                                IZ12271
      IF(IPOS) 30,99,40
   50 FLGSPC(LSTHED)=FLGSPC(LSTHED).AND.NFLAG4                          COMPAND
      IF(IPOS) 20,99,10
C                                                                       IZ12271
COUNT DOWN FROM THE TOP  OF THE LIST                                    IZ12271
C                                                                       IZ12271
   10 IADD=LSTSPC(IADD)                                                 IZ12271
      ILOG=FLGSPC(IADD) .AND. FL0MSK
      IF(ILOG .NE. 0) GO TO 99
      ISTYP=(FLGSPC(IADD).AND.FLG67)                                    IZ12271
      IF(ITYP.EQ.3) GO TO 22                                            IZ12271
      IF(ISTYP.EQ.3)ISTYP=2                                             IZ12271
```

```
      IF(ISTYP.NE.ITYP) GO TO 10                                        IZ12271
   22 IND=IND+1                                                         IZ12271
      IF(IND.NE.JPOS) GO TO 10                                          IZ12271
   28 IVAL=NODSPC(IADD)                                                 IZ12271
      ITYP=(FLGSPC(IADD).AND.FLG67)                                     IZ12271
   55 INDEX=IPOS
      INDXAD=IADD                                                       IZ05177
      KFUNC=IFUNC                                                       IZ01107
      KARG=IARG                                                         IZ01107
      RETURN                                                            IZ12271
C                                                                       IZ12271
COUNT UP FROM THE BOTTOM OF THE LIST                                    IZ12271
C                                                                       IZ12271
   20 IADD=LSTSPC(IADD)                                                 IZ12271
      KTEST=0                                                           IZ01042
   23 IADD=LNKSPC(IADD)                                                 IZ12271
      IF(KTEST.EQ.0) GO TO 24                                           IZ01042
      ISUB=LSTSPC(IADD)
      ILOG=FLGSPC(ISUB) .AND. FLOMSK
      IF(ILOG .NE. 0) GO TO 99
   24 KTEST=1                                                           IZ01042
      ISTYP=(FLGSPC(IADD).AND.FLG67)                                    IZ12271
      IF(ITYP.EQ.3) GO TO 21                                            IZ12271
      IF(ISTYP.EQ.3)ISTYP=2                                             IZ12271
      IF(ISTYP.NE.ITYP) GO TO 23                                        IZ12271
   21 IND=IND+1                                                         IZ12271
      IF(IND.NE.JPOS) GO TO 23                                          IZ12271
   29 IVAL=NODSPC(IADD)                                                 IZ12271
      ITYP=(FLGSPC(IADD).AND.FLG67)                                     IZ12271
      GO TO 55                                                          IZ12271
   25 IF(IPOS) 40,99,30
C                                                                       IZ12271
COUNT DOWN FROM INDXADD                                                 IZ12271
C                                                                       IZ12271
   30 JPOS=IABS(JPOS-KNDEX)                                             IZ08037
      IADD=INDXAD                                                       IZ05177
      IF(JPOS.EQ.0) GO TO 28                                            IZ12271
      GO TO 10                                                          IZ12271
C                                                                       IZ12271
COUNT UP FROM INDXADD                                                   IZ12271
C                                                                       IZ12271
   40 JPOS=IABS(JPOS-KNDEX)                                             IZ08037
      IADD=INDXAD                                                       IZ05177
      IF(JPOS.EQ.0) GO TO 29                                            IZ12271
      KTEST=1
      GO TO 23                                                          IZ12271
   99 IVAL=-1                                                           GIRFIND
      INDEX=0                                                           RR1
      INDXAD=0                                                          RR1
      KFUNC=0                                                           RR1
      KARG=0                                                            RR1
      RETURN                                                            GIRFIND
      END                                                               GIRFIND
```

```
      SUBROUTINE LVGRN(NODE)
      INTEGER FLGSPC,REGASP                                             IZ08251
      COMMON/LVVTR1/MEMSZE,REGASP,NODSPC(    1)/LVVTR2/LSTSPC(    1)/  IZ06161
     *LVVTR3/LNKSPC(    1)/LVVTR4/FLGSPC(    1)                        IZ06161
      COMMON/LVRAND/KPRIME,KSEED,NROW,KDNODE,KDROW,KTEMP
      NODE=KTEMP+KDNODE
      KTEMP=NODE
      KDNODE=KDNODE+1
      IF(NODE .GT. MEMSZE) GO TO 5
      RETURN
    5 IF(NROW .GT. KPRIME) GO TO 10
      NROW=NROW+KSEED
      IF(NROW .GT. KPRIME) NROW=NROW-KPRIME
      NODE=NROW
      KTEMP=NODE
      KDNODE=KPRIME+1
      IF(NODE .NE. KSEED) RETURN
      NROW=0
      KDROW=KPRIME
   10 KDROW=KDROW+1
      NROW=NROW+KDROW
      NODE=NROW
      KTEMP=NODE
      KDNODE=KDROW
      IF(NODE .GT. MEMSZE) GO TO 20
      RETURN                                                            IZ06161
   20 PRINT 15                                                          COMPAND
   15 FORMAT(1H ,1X,47H ERROR...NUMBER OF NODES EXCEEDS REQUEST MEMORY/ RR1
     *27H THE PROGRAM IS TERMINATED.)                                   RR1
      STOP                                                              IZ06161
      END                                                               IZ06161
```

```
      SUBROUTINE LVNSRT                                                 IZ05177
      COMMON/LVARGS/IFUNC,IARG,IADD,IPOS,ITYP2,IVAL,LSTHED,NVAL,
     +  IDSTRY,IVALS(10),ITYP(10),NSKIP                                IZ05177
      INTEGER FLGSPC,FL0MSK,FL1MSK,FL2MSK,FL5MSK,FLG67,REGASP,TEMP,THIS, IZ08251
     + FLGTMP,TWO,THREE,HEAD,OLDLOC,ASPREG,SEQSPC,FL3MSK,FL4MSK        COMPAND
      COMMON/LVVTR1/MEMSZE,REGASP,NODSPC(    1)/LVVTR2/LSTSPC(    1)/ GIRNSRT
     *LVVTR3/LNKSPC(    1)/LVVTR4/FLGSPC(    1)                       GIRNSRT
      COMMON/LVFLAG/FL0MSK,FL1MSK,FL2MSK,FL3MSK,FL4MSK,FL5MSK,FLG67     IZ05177
      COMMON /LVTABL/ MAPSZE,MAP(1) /LVVSEQ/ ISEQSZ,SEQSPC(1)           IZ05177
      DATA TWO/2/,THREE/3/,NFLG67/252/                                  RR1
C                                                                       IZ06097
      FLGTMP=FL1MSK                                                     IZ06097
C                                                                       IZ03302
      IF(REGASP.EQ.LSTSPC(REGASP)) GO TO 98                             IZ03302
C                                                                       GIRNSRT
C   FORM FIRST WORD OF SINGLE OR MULTIVALUED FUNCTION                   GIRNSRT
      IF(NVAL.EQ.1)GO TO 20                                             GIRNSRT
      LSTTMP=REGASP                                                     GIRNSRT
      FLGTMP=(FLGTMP.OR.FL2MSK)                                         GIRNSRT
      FLGTMP=(FLGTMP.OR.FL0MSK)                                         GIRNSRT
      GO TO 21                                                          GIRNSRT
   20 LSTTMP=IVALS(1)                                                   GIRNSRT
   21 FLGTMP=(FLGTMP.OR.ITYP(1))                                        GIRNSRT
C                                                                       GIRNSRT
C-----------------------------------------------------------------------GIRNSRT
C-DETERMINE ADDRESS FOR FUNCTION                                        GIRNSRT
      IADD=IFUNC+IARG                                                   GIRNSRT
      IF(IADD.GT.MEMSZE) IADD=IADD-MEMSZE                               IZ07261
C                                                                       GIRNSRT
C   IF THAT ADDRESS IS ALREADY IN WORKING SPACE, GO TO 25               GIRNSRT
      IF(IDSTRY-1) 125,300,350                                          IZ05177
  125 ILOG=FL1MSK .AND. FLGSPC(IADD)
      IF(ILOG .NE. 0) GO TO 25
C                                                                       GIRNSRT
C    UPDATE REGASP(IF NECESSARY)                                        GIRNSRT
   23 IF(IADD.EQ.REGASP)REGASP=LSTSPC(IADD)                             GIRNSRT
C                                                                       GIRNSRT
C   UPDATE AVAILABLE SPACE                                              GIRNSRT
      ISUB=NODSPC(IADD)
      LSTSPC(ISUB)=LSTSPC(IADD)
      ISUB=LSTSPC(IADD)
      NODSPC(ISUB)=NODSPC(IADD)
C                                                                       GIRNSRT
C    INSERT FUNCTION                                                    GIRNSRT
   24 NODSPC(IADD)=IARG                                                 GIRNSRT
      LSTSPC(IADD)=LSTTMP                                               GIRNSRT
      LNKSPC(IADD)=IADD                                                 GIRNSRT
      FLGSPC(IADD)=FLGSPC(IADD) .OR. FLGTMP
      FLGSPC(IADD)=FLGSPC(IADD) .OR. FL4MSK
      FLGSPC(IADD)=FLGSPC(IADD) .OR. FL5MSK
C                                                                       GIRNSRT
C   INSERT ANY ADDITIONAL FUNCTION VALUES                               GIRNSRT
      HEAD=IADD                                                         GIRNSRT
      OLDLOC=IADD                                                       GIRNSRT
      IF(NVAL.GT.1)GO TO 50                                             GIRNSRT
C                                                                       GIRNSRT
C   IF LAST CELL OF AVAILABLE SPACE WAS USED, WRITE MESSAGE             GIRNSRT
      IF(REGASP.EQ.LSTSPC(REGASP)) GO TO 909                            IZ03302
```

```
      IVAL=IABS(IVALS(I))                                               IZ11217
      RETURN                                                            GIRNSRT
C                                                                       GIRNSRT
C   IF THAT ADDRESS CONTAINS THE HEAD OF A CONFLICT LIST, GO TO 41      GIRNSRT
   25 ILOG=FL5MSK .AND. FLGSPC(IADD)
      IF(ILOG .GT. 0) GO TO 41
C                                                                       GIRNSRT
C   IF THAT ADDRESS CONTAINS A VALUE ON A MULTIVALUE LIST, GO TO 35     GIRNSRT
      ILOG=FL2MSK .AND. FLGSPC(IADD)
      ILOG2=FLOMSK .AND. FLGSPC(IADD)
      IF(ILOG .GT. 0 .AND. ILOG2 .EQ. 0) GO TO 35
C                                                                       GIRNSRT
C-----------------------------------------------------------------------GIRNSRT
C-THE ADDRESS CONTAINS A FUNCTION ON A CONFLICT LIST,BUT NOT THE HEAD OF GIRNSRT
      THIS=IADD                                                         GIRNSRT
C                                                                       GIRNSRT
C   FIND THE PRECEDING FUNCTION ON THE CONFLICT LIST                    GIRNSRT
   26 ISUB=LNKSPC(THIS)
      IF(LNKSPC(ISUB) .EQ. IADD) GO TO 27
      THIS=LNKSPC(THIS)                                                 GIRNSRT
      GO TO 26                                                          GIRNSRT
   27 LAST=LNKSPC(THIS)                                                 GIRNSRT
      NEWLOC=REGASP                                                     GIRNSRT
      IF(REGASP.EQ.LSTSPC(REGASP)) GO TO 98                             IZ03302
C                                                                       GIRNSRT
C   UPDATE AVAILABLE SPACE AND REGASP                                   GIRNSRT
   28 ISUB=NODSPC(REGASP)
      LSTSPC(ISUB)=LSTSPC(REGASP)
      ISUB=LSTSPC(REGASP)
      NODSPC(ISUB)=NODSPC(REGASP)
      REGASP=LSTSPC(REGASP)                                             GIRNSRT
                                                                        GIRNSRT
C   MOVE THE FUNCTION ON A CONFLICT LIST TO THE FIRST CELL OF AVAILABLE GIRNSRT
   29 NODSPC(NEWLOC)=NODSPC(IADD)                                       GIRNSRT
      LSTSPC(NEWLOC)=LSTSPC(IADD)                                       GIRNSRT
      LNKSPC(NEWLOC)=LNKSPC(IADD)                                       GIRNSRT
      FLGSPC(NEWLOC)=FLGSPC(IADD)                                       IZ08251
      FLGSPC(IADD)=0                                                    IZ08251
      LNKSPC(LAST)=NEWLOC                                               GIRNSRT
C                                                                       GIRNSRT
C   INSERT THIS FUNCTION AS THE HEAD OF A CONFLICT LIST                 GIRNSRT
      NODSPC(IADD)=IARG                                                 GIRNSRT
      LNKSPC(IADD)=IADD                                                 GIRNSRT
      LSTSPC(IADD)=LSTTMP                                               GIRNSRT
      FLGSPC(IADD)=(FLGTMP.OR.FLGSPC(IADD))                             GIRNSRT
      FLGSPC(IADD)=(FL5MSK.OR.FLGSPC(IADD))                             GIRNSRT
      FLGSPC(IADD)=FL4MSK .OR. FLGSPC(IADD)
      ILOG=FLGSPC(NEWLOC) .AND. FLOMSK
      IF(ILOG .EQ. 0) GO TO 34
C                                                                       GIRNSRT
C   IF THE FUNCTION THAT W.S MOVED IS THE HEAD OF A MULTIVALUE LIST,FIX GIRNSRT
      NEXT=LSTSPC(NEWLOC)                                               GIRNSRT
   30 NEXT=LSTSPC(NEXT)                                                 GIRNSRT
      IF(LSTSPC(NEXT).NE.IADD)GO TO 30                                  GIRNSRT
      LSTSPC(NEXT)=NEWLOC                                               GIRNSRT
C                                                                       GIRNSRT
C   INSERT ANY ADDITIONAL FUNCTION VALUES                               GIRNSRT
   34 HEAD=IADD                                                         GIRNSRT
```

```
      OLDLOC=IADD                                                       GIRNSRT
      IF(NVAL.GT.1)GO TO 50                                             GIRNSRT
      IF(REGASP.EQ.LSTSPC(REGASP)) GO TO 909                            IZ03302
      IVAL=IABS(IVALS(I))                                               IZ11217
      RETURN                                                            GIRNSRT
C                                                                       GIRNSRT
C-----------------------------------------------------------------------GIRNSRT
C-THE ADDRESS CONTAINS A VALUE ON A MULTIVALUE LIST                     GIRNSRT
   35 NEWLOC=REGASP                                                     GIRNSRT
      IF(REGASP.EQ.LSTSPC(REGASP)) GO TO 98                             IZ03302
C                                                                       GIRNSRT
C   UPDATE AVAILABLE SPACE AND REGASP                                   GIRNSRT
   36 ISUB=NODSPC(REGASP)
      LSTSPC(ISUB)=LSTSPC(REGASP)
      ISUB=LSTSPC(REGASP)
      NODSPC(ISUB)=NODSPC(REGASP)
      REGASP=LSTSPC(REGASP)                                             GIRNSRT
C                                                                       GIRNSRT
C   MOVE THE VALUE ON A MULTIVALUE LIST TO THE FIRST CELL OF AVAILABLE S GIRNSRT
   37 NODSPC(NEWLOC)=NODSPC(IADD)                                       GIRNSRT
      LSTSPC(NEWLOC)=LSTSPC(IADD)                                       GIRNSRT
      LNKSPC(NEWLOC)=LNKSPC(IADD)                                       GIRNSRT
      FLGSPC(NEWLOC)=FLGSPC(IADD)                                       IZ08251
      FLGSPC(IADD)=0                                                    IZ08251
C                                                                       IZ03272
C     RESET POINTERS                                                    IZ03272
C                                                                       IZ03272
      LI=LSTSPC(NEWLOC)                                                 IZ03272
      ILOG=FLOMSK .AND. FLGSPC(LI)
      IF(ILOG .EQ. 0) GO TO 200
      ISUB=LSTSPC(LI)
      LNKSPC(ISUB)=NEWLOC
      GO TO 201                                                         IZ03272
  200 LNKSPC(LI)=NEWLOC                                                 IZ03272
  201 ISUB=LNKSPC(NEWLOC)
      KZVAL=LSTSPC(ISUB)
      ILOG=FLGSPC(KZVAL) .AND. FLOMSK
      IF(ILOG .NE. 0) GO TO 38
      ISUB=LNKSPC(NEWLOC)
      LSTSPC(ISUB)=NEWLOC
      GO TO 39                                                          IZ11301
   38 LSTSPC(KZVAL)=NEWLOC                                              IZ11301
   39 NODSPC(IADD)=IARG                                                 IZ11301
C   INSERT THIS FUNCTION AS THE HEAD OF A CONFLICT LIST                 GIRNSRT
      LNKSPC(IADD)=IADD                                                 GIRNSRT
      LSTSPC(IADD)=LSTTMP                                               GIRNSRT
      FLGSPC(IADD)=(FLGTMP.OR.FLGSPC(IADD))                             GIRNSRT
      FLGSPC(IADD)=(FL5MSK.OR.FLGSPC(IADD))                             GIRNSRT
      FLGSPC(IADD)=FL4MSK .OR. FLGSPC(IADD)
      IF(REGASP.EQ.LSTSPC(REGASP)) GO TO 909                            IZ03302
      IVAL=IABS(IVALS(I))                                               IZ11217
      RETURN                                                            GIRNSRT
C                                                                       GIRNSRT
C-----------------------------------------------------------------------GIRNSRT
C-THE ADDRESS CONTAINS THE HEAD OF A CONFLICT LIST                      GIRNSRT
   41 THIS=IADD                                                         GIRNSRT
C                                                                       GIRNSRT
C   IF THE FUNCTION TO BE INSERTED IS NOT ON THE CONFLICT LIST, GO TO 60 GIRNSRT
```

```
175*        42  IF(NODSPC(THIS).EQ.IARG)GO TO 43                          GIRNSRT
176*            ISUB=LNKSPC(THIS)
177*            ILOG=FLGSPC(ISUB) .AND. FL5MSK
178*            IF(ILOG .NE. 0) GO TO 60
179*            THIS=LNKSPC(THIS)                                          GIRNSRT
180*            GO TO 42                                                   GIRNSRT
181*      C                                                                GIRNSRT
182*      C------------------------------------------------------------- GIRNSRT
183*      C-THE FUNCTION TO BE INSERTED IS ON THE CONFLICT LIST            GIRNSRT
184*        43  HEAD=THIS                                                  GIRNSRT
185*            ILOG=FLOMSK .AND. FLGSPC(THIS)
186*            IF(ILOG .EQ. 0) GO TO 51
187*            NEXT=LSTSPC(THIS)                                          IZ06097
188*      C                                                                IZ04197
189*      C     OLDLOC IS THE LOCATION OF THE LAST VALUE ON THE MULTIVALUE LIST  IZ04197
190*      C                                                                IZ04197
191*            OLDLOC=LNKSPC(NEXT)                                        IZ04197
192*      C                                                                GIRNSRT
193*      C------------------------------------------------------------- GIRNSRT
194*      C-INSERT ADDITIONAL FUNCTION VALUES                              GIRNSRT
195*       50   LSTASP=NODSPC(REGASP)                                      GIRNSRT
196*            IN=0                                                       GIRNSRT
197*            GO TO 56                                                   GIRNSRT
198*      C                                                                GIRNSRT
199*      C------------------------------------------------------------- GIRNSRT
200*      C-FORM MULTIVALUE LIST TO ADD VALUE(S) TO SINGLE-VALUED FUNCTION GIRNSRT
201*       51   IN=0                                                       GIRNSRT
202*            IF(REGASP.EQ.LSTSPC(REGASP))GO TO 98                       GIRNSRT
203*            LSTASP=NODSPC(REGASP)                                      GIRNSRT
204*            NEWLOC=REGASP                                              GIRNSRT
205*            REGASP=LSTSPC(REGASP)                                      GIRNSRT
206*            NODSPC(NEWLOC)=LSTSPC(THIS)                                IZ06097
207*            TEMP=(FLGSPC(THIS).AND.FLG67)                              IZ07021
208*            FLGSPC(NEWLOC)=(TEMP.OR.FLGSPC(NEWLOC))                    GIRNSRT
209*            FLGSPC(THIS)=(FLGSPC(THIS).AND.NFLG67)                     IZ07021
210*            FLGSPC(THIS)=(FL2MSK.OR.FLGSPC(THIS))                      GIRNSRT
211*            FLGSPC(THIS)=(FLOMSK.OR.FLGSPC(THIS))                      GIRNSRT
212*            OLDLOC=THIS                                                GIRNSRT
213*      C                                                                GIRNSRT
214*      C------------------------------------------------------------- GIRNSRT
215*      C    INSERT ANOTHER VALUE ON MULTIVALUE LIST                     GIRNSRT
216*       52   FLGSPC(NEWLOC)=(FL2MSK.OR.FLGSPC(NEWLOC))                  GIRNSRT
217*            FLGSPC(NEWLOC)=(FL1MSK.OR.FLGSPC(NEWLOC))                  GIRNSRT
218*            LSTSPC(OLDLOC)=NEWLOC                                      GIRNSRT
219*            LNKSPC(NEWLOC)=OLDLOC                                      GIRNSRT
220*       55   OLDLOC=NEWLOC                                              GIRNSRT
221*       56   NEWLOC=REGASP                                              GIRNSRT
222*            IF(IN.GT.0)GO TO 57                                        GIRNSRT
223*      C                                                                GIRNSRT
224*      C    NO VALUES HAVE BEEN INSERTED YET                            GIRNSRT
225*            IN=1                                                       GIRNSRT
226*            GO TO 58                                                   GIRNSRT
227*      C                                                                GIRNSRT
228*      C    SOME VALUES HAVE BEEN INSERTED                              GIRNSRT
229*       57   IF(IN.EQ.NVAL)GO TO 67                                     GIRNSRT
230*            IN=IN+1                                                    GIRNSRT
231*      C                                                                GIRNSRT
232*        58 IF(REGASP.EQ.LSTSPC(REGASP)) GO TO 909                      IZ11277
```

```
  581 REGASP=LSTSPC(REGASP)                                          GIRNSRT
  582 NODSPC(NEWLOC)=IVALS(IN)                                       GIRNSRT
      FLGSPC(NEWLOC)=(ITYP(IN).OR.FLGSPC(NEWLOC))                    GIRNSRT
      GO TO 52                                                       GIRNSRT
C                                                                    GIRNSRT
C   END MULTIVALUE LIST AND UPDATE AVAILABLE SPACE                   GIRNSRT
 67   LSTSPC(OLDLOC)=HEAD                                            GIRNSRT
      NODSPC(REGASP)=LSTASP                                          GIRNSRT
      LSTSPC(LSTASP)=REGASP                                          GIRNSRT
      IVAL=IABS(IVALS(I))                                            IZ11217
      ISUB=LSTSPC(HEAD)
      LNKSPC(ISUB)=OLDLOC
      NVAL=IN                                                        GIRNSRT
      IF(REGASP.EQ.LSTSPC(REGASP)) GO TO 909                         IZ11277
      RETURN                                                         GIRNSRT
C                                                                    GIRNSRT
C-------------------------------------------------------------------- GIRNSRT
C-THE FUNCTION TO BE INSERTED IS NOT ON THE CONFLICT LIST            GIRNSRT
 60   ASPREG=REGASP                                                  GIRNSRT
      LSTASP=NODSPC(REGASP)                                          GIRNSRT
      IF(REGASP.EQ.LSTSPC(REGASP)) GO TO 98                          IZ03302
C                                                                    GIRNSRT
C   UPDATE AVAILABLE SPACE AND REGASP                                GIRNSRT
  601 ISUB=NODSPC(REGASP)
      LSTSPC(ISUB)=LSTSPC(REGASP)
      ISUB=LSTSPC(REGASP)
      NODSPC(ISUB)=NODSPC(REGASP)
      REGASP=LSTSPC(REGASP)                                          GIRNSRT
C                                                                    GIRNSRT
C   INSERT FUNCTION IN FIRST CELL OF AVAILABLE SPACE                 GIRNSRT
 61   NODSPC(ASPREG)=IARG                                            GIRNSRT
      IF(NVAL.EQ.1)GO TO 611                                         GIRNSRT
      LSTSPC(ASPREG)=REGASP                                          GIRNSRT
      FLGSPC(ASPREG)=(FL2MSK.OR.FLGSPC(ASPREG))                      GIRNSRT
      FLGSPC(ASPREG)=(FL0MSK.OR.FLGSPC(ASPREG))                      GIRNSRT
      GO TO 612                                                      GIRNSRT
 611  LSTSPC(ASPREG)=IVALS(I)                                        GIRNSRT
 612  FLGSPC(ASPREG)=(ITYP(I).OR.FLGSPC(ASPREG))                     GIRNSRT
      FLGSPC(ASPREG)=(FL1MSK.OR.FLGSPC(ASPREG))                      GIRNSRT
      FLGSPC(ASPREG)=FL4MSK .OR. FLGSPC(ASPREG)
      LNKSPC(ASPREG)=LNKSPC(THIS)                                    GIRNSRT
      LNKSPC(THIS)=ASPREG                                            GIRNSRT
      IF(NVAL.EQ.1)GO TO 613                                         GIRNSRT
C                                                                    GIRNSRT
C   INSERT ADDITIONAL VALUES                                         GIRNSRT
      LSTASP=NODSPC(REGASP)                                          GIRNSRT
      OLDLOC=ASPREG                                                  GIRNSRT
      HEAD=ASPREG                                                    GIRNSRT
      IN=0                                                           GIRNSRT
      GO TO 56                                                       GIRNSRT
 613  IF(REGASP.EQ.LSTSPC(REGASP)) GO TO 909                         IZ03302
      IVAL=IABS(IVALS(I))                                            IZ11217
      RETURN                                                         GIRNSRT
C                                                                    IZ09142
C     DESTRUCTIVE INSERTION                                          IZ09142
C                                                                    IZ09142
 350  IADD1=IADD                                                     IZ09142
      INDEX=0                                                        IZ09142
```

```
      CALL LVFIND(INDEX,INDEX,INDEX,INDEX)                              IZ05177
      FLGSPC(IADD)=FLGSPC(IADD).OR.FL4MSK                               COMPAND
      IF(IVAL.EQ.-1) GO TO 90                                           IZ04142
      IF(LSTHED) 354,90,356                                             IZ04142
  354 LSTSPC(IADD)=IVALS(1)                                             IZ04142
      GO TO 365                                                         IZ04142
  356 NODSPC(IADD)=IVALS(1)                                             IZ04142
  365 FLGSPC(IADD)=FLGSPC(IADD).AND.NFLG67                              IZ04142
      FLGSPC(IADD)=FLGSPC(IADD).OR.ITYP(1)                              IZ04142
      GO TO 360                                                         IZ04142
   90 IF(IPOS)91,99,92                                                  IZ04142
   91 IPOS=IPOS+1                                                       IZ06287
      GO TO 93                                                          IZ06287
   92 IPOS=IPOS-1                                                       IZ06287
   93 IADD=IADD1                                                        IZ06287
      IF(IPOS.EQ.0) GO TO 125                                           IZ06287
      INDEX=0                                                           IZ04142
      CALL LVFIND(INDEX,INDEX,INDEX,INDEX)                              IZ05177
      IF(IVAL.EQ.-1) GO TO 99                                           IZ04142
      IF(IPOS .LT. 0) GO TO 370
      IADD=IADD1                                                        IZ04142
      GO TO 125                                                         IZ04142
  370 NEWLOC=REGASP                                                     IZ04142
      IF(LSTHED) 325,99,375                                             IZ04142
C     UPDATE AVAILABLE SPACE                                            IZ04142
  375 ISUB=NODSPC(REGASP)
      LSTSPC(ISUB)=LSTSPC(REGASP)
      ISUB=LSTSPC(REGASP)
      NODSPC(ISUB)=NODSPC(REGASP)
      REGASP=LSTSPC(REGASP)                                             IZ04142
      GO TO 377                                                         IZ04142
C                                                                       IZ04142
C     NONDESTRUCTIVE INSERTION                                          IZ04142
C                                                                       IZ04142
  300 IADD1=IADD                                                        IZ04142
      NEWLOC=REGASP                                                     IZ04142
      INDEX=0                                                           IZ04142
      CALL LVFIND(INDEX,INDEX,INDEX,INDEX)                              IZ05177
      FLGSPC(IADD)=FLGSPC(IADD).OR.FL4MSK                               COMPAND
      IF(IVAL.EQ.-1) GO TO 90                                           IZ04142
      IF(LSTHED) 344,90,346                                             IZ04142
  344 IF(IPOS .GT. 0) GO TO 325
      IADD=IADD1                                                        IZ04142
      GO TO 125                                                         IZ04142
C     CREATE MULTIVALUE LIST                                            IZ04142
  325 ISUB=NODSPC(REGASP)
      LSTSPC(ISUB)=LSTSPC(REGASP)
      ISUB=LSTSPC(REGASP)
      NODSPC(ISUB)=NODSPC(REGASP)
      REGASP=LSTSPC(REGASP)                                             IZ04142
      IF(REGASP.EQ.LSTSPC(REGASP)) GO TO 909                            IZ04142
      NWLOC2=REGASP                                                     IZ05177
C     UPDATE AVAILABLE SPACE                                            IZ04142
      ISUB=NODSPC(REGASP)
      LSTSPC(ISUB)=LSTSPC(REGASP)
      ISUB=LSTSPC(REGASP)
      NODSPC(ISUB)=NODSPC(REGASP)
      REGASP=LSTSPC(REGASP)                                             IZ04142
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      NODSPC(NEWLOC)=IVALS(1)                                           IZ04172
      LSTSPC(NEWLOC)=NWLOC2                                             IZ05177
      LNKSPC(NEWLOC)=NWLOC2                                             IZ05177
      FLGSPC(NEWLOC)=FLGTMP.OR.FL2MSK                                   IZ05177
      NODSPC(NWLOC2)=LSTSPC(IADD)                                       IZ05177
      LSTSPC(NWLOC2)=IADD                                               IZ05177
      LNKSPC(NWLOC2)=NEWLOC                                             IZ05177
      KLGTEP=FLGSPC(IADD).AND.FLG67                                     IZ05177
      FLGSPC(NWLOC2)=(FL1MSK.OR.FL2MSK).OR.KLGTEP                       IZ05177
      LSTSPC(IADD)=NEWLOC                                               IZ04172
      FLGSPC(IADD)=(FLGSPC(IADD).OR.FLOMSK).OR.FL2MSK                   IZ04172
  320 IF(REGASP.EQ.LSTSPC(REGASP)) GO TO 909                            IZ04142
  360 IVAL=IABS(IVALS(1))                                               IZ11217
      RETURN                                                            IZ04142
C     UPDATE AVAILABLE SPACE                                            IZ04142
  346 ISUB=NODSPC(REGASP)
      LSTSPC(ISUB)=LSTSPC(REGASP)
      ISUB=LSTSPC(REGASP)
      NODSPC(ISUB)=NODSPC(REGASP)
      REGASP=LSTSPC(REGASP)                                             IZ04142
      IF(IPOS .LT. 0) GO TO 347
  377 ISTLOC=LNKSPC(IADD)                                               IZ04142
      NODSPC(NEWLOC)=IVALS(1)                                           IZ04142
      LSTSPC(NEWLOC)=IADD                                               IZ04142
      LNKSPC(NEWLOC)=ISTLOC                                             IZ04142
      FLGSPC(NEWLOC)=FLGTMP.OR.FL2MSK                                   IZ04142
      ISUB=LSTSPC(ISTLOC)
      ILOG=FLGSPC(ISUB) .AND. FLOMSK
      IF(ILOG .EQ. 0) GO TO 321
      ISUB=LSTSPC(ISTLOC)
      LSTSPC(ISUB)=NEWLOC
      GO TO 322                                                         IZ04142
  321 LSTSPC(ISTLOC)=NEWLOC                                             IZ04142
  322 LNKSPC(IADD)=NEWLOC                                               IZ04142
      GO TO 320                                                         IZ04142
  347 NODSPC(NEWLOC)=IVALS(1)                                           IZ04142
      LSTSPC(NEWLOC)=LSTSPC(IADD)                                       IZ04142
      LNKSPC(NEWLOC)=IADD                                               IZ04142
      FLGSPC(NEWLOC)=FLGTMP.OR.FL2MSK                                   IZ04142
      ISUB=LSTSPC(IADD)
      ILOG=FLGSPC(ISUB) .AND. FLOMSK
      IF(ILOG .EQ. 0) GO TO 323
      KZVAL=LSTSPC(IADD)                                                IZ04142
      ISUB=LSTSPC(KZVAL)
      LNKSPC(ISUB)=NEWLOC
      GO TO 324                                                         IZ04142
  323 ISUB=LSTSPC(IADD)
      LNKSPC(ISUB)=NEWLOC
  324 LSTSPC(IADD)=NEWLOC                                               IZ04142
      GO TO 320                                                         IZ04142
   98 IVAL=-3                                                           IZ06287
      PRINT 20001                                                       IZ03302
20001 FORMAT(1X,78H ERROR...THERE IS NO ADDITIONAL SPACE FOR THE GRAPH, RR1
     *THE PROGRAM IS TERMINATED)                                        RR1
      STOP                                                              GIRNSRT
   99 IVAL=-1                                                           IZ06287
    2 FORMAT(6H ONLY ,I4,28H VALUE(S) HAVE BEEN INSERTED)               GIRNSRT
   22 FORMAT(1X,I5,1H(,I5,35H) USED LAST CELL OF AVAILABLE SPACE)       GIRNSRT
      RETURN                                                            GIRNSRT
  909 PRINT 22,IFUNC,IARG                                               IZ03302
C    THIS INSERTION HAS FILLED GIRS MEMORY - CALL A USER SUPPLIED       IZ11137
C    PROGRAM - LVEXIT.                                                  IZ11137
      IVAL=-1                                                           IZ11137
      RETURN                                                            IZ08121
      END                                                               GIRNSRT
```

```
      SUBROUTINE LVSETP                                                 IZ05177
      INTEGER FLGSPC,FLAGSP,REGASP,BINFIL,FLOMSK,FL1MSK,FL2MSK,FL5MSK,  IZ05177
     + FL3MSK,FL4MSK,FLG67,SEQSPC                                       IZ05177
      COMMON/LVFLAG/FLOMSK,FL1MSK,FL2MSK,FL3MSK,FL4MSK,FL5MSK,FLG67     IZ05177
      COMMON/LVVTR5/BINFIL,KOMPAN,NODESP(1)/LVVTR6/LISTSP(1)            IZ05177
     + /LVVTR7/LINKSP(1)/LVVTR8/FLAGSP(1)                               IZ05177
      COMMON /LVTABL/ MAPSZE,MAP(1) /LVVSEQ/ ISEQSZ,SEQSPC(1)           IZ05177
      COMMON/LVVTR1/MEMSZE,REGASP,NODSPC(    1)/LVVTR2/LSTSPC(    1)/  GIRSETP
     *LVVTR3/LNKSPC(    1)/LVVTR4/FLGSPC(    1)                        GIRSETP
      COMMON/LVRAND/KPRIME,KSEED,NROW,KDNODE,KDROW,KTEMP
      DATA FLOMSK/128/,FL1MSK/64/,FL2MSK/32/,FL5MSK/4/,FLG67/3/,        RR1
     *FL3MSK/16/,FL4MSK/8/                                              RR1
      KSEED=KPRIME/2
      NROW=KSEED
      KTEMP=KSEED-KPRIME
      KDNODE=KPRIME
      REGASP=1                                                          GIRSETP
      DO 10 I=2,MEMSZE                                                  GIRSETP
      LNKSPC(I)=0                                                       GIRSETP
      FLGSPC(I)=0                                                       GIRSETP
      NODSPC(I)=I-1                                                     GIRSETP
   10 LSTSPC(I-1)=I                                                     GIRSETP
      FLGSPC(1)=0                                                       GIRSETP
      LNKSPC(1)=0                                                       GIRSETP
      NODSPC(1)=MEMSZE                                                  GIRSETP
      LSTSPC(MEMSZE)=1                                                  GIRSETP
      RETURN                                                            GIRSETP
      END                                                               GIRSETP
```

```
      SUBROUTINE MODID(MODE)
      DIMENSION IBUF(80),IEND(3)
      IF(MODE .NE. 0) GO TO 5
      WRITE(13,1)
    1 FORMAT(5X,16H OUTPUT DEVICE X)
      WRITE(14,2)
    2 FORMAT(5X,16H OUTPUT DEVICE Y)
      WRITE(15,3)
    3 FORMAT(5X,16H OUTPUT DEVICE Z)
      WRITE(6,6)
    6 FORMAT(1H1,52X,27H RESULTS OF ROLL CALL CHECK)
    5 DO 10 I=10,12
      ENDFILE I
      REWIND I
      IEND(I-9)=0
      READ(I,7,END=8) ICHAR
    7 FORMAT(A1)
      GO TO 10
    8 IEND(I-9)=1
   10 CONTINUE
      IEOF=0
      DO 15 I=1,3
      IF(IEND(I) .NE. 0) GO TO 15
      IF(IEOF .EQ. 1) GO TO 40
      IEOF=1
      IOUT=9+I
   15 CONTINUE
      IF(IEOF .EQ. 0) GO TO 50
      REWIND IOUT
      IOUT2=IOUT+3
      WRITE(IOUT2,20) MODE
   20 FORMAT(//20X,12H MODE INDEX=,I3)
      DO 30 I=1,100
      READ(IOUT,25,END=60) (IBUF(J),J=1,80)
   25 FORMAT(80A1)
   30 WRITE(IOUT2,25) (IBUF(J),J=1,80)
   40 WRITE(6,45) MODE
   45 FORMAT(//21X,86H **ERROR IN ROLL CALL CHECK - MORE THAN 1 OUTPUT D
     *EVICE WAS WRITTEN ON FOR MODE INDEX ,I3,2H**)
      GO TO 60
   50 WRITE(6,55) MODE
   55 FORMAT(//25X,79H **ERROR IN ROLL CALL CHECK - NO OUTPUT DEVICES WE
     *RE WRITTEN ON FOR MODE INDEX ,I3,2H**)
   60 ENDFILE 10
      ENDFILE 11
      ENDFILE 12
      REWIND 10
      REWIND 11
      REWIND 12
      RETURN
      END
```

```
      FUNCTION NEXT(IA)                                                 NEXT    2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH    2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH    4
      INTEGER A,BLANK                                                   NEXT    4
      DATA BLANK/1H /                                                   NEXT    5
      IF(IA .GT. N) GO TO 15                                            NEXT    6
      DO 10 I=IA,N                                                      NEXT    7
      IF(A(I) .EQ. BLANK) GO TO 10                                      NEXT    8
      NEXT=A(I)                                                         NEXT    9
      JPTR=I+1                                                          NEXT   10
      RETURN                                                            NEXT   11
   10 CONTINUE                                                          NEXT   12
      NEXT=BLANK
      JPTR=N+1                                                          NEXT   14
      RETURN                                                            NEXT   15
   15 NEXT=BLANK
      JPTR=IA+1
      RETURN
      END                                                               NEXT   16
```

```
      FUNCTION NXTBLK(ILOC,IEND)                                        NXTBLK 2
      COMMON/BASBLK/IBLOCK(2500),NBLOCK,NB,NBRNCH
      COMMON/LABELS/STATRA(2,200),NLABEL                                NXTBLK 4
      INTEGER STATRA,BITGET                                             NXTBLK 5
      I=IBLOCK(ILOC)                                                    NXTBLK 6
      IF(I .EQ. 999) GO TO 10                                           NXTBLK 7
      IF(I .EQ. 998) GO TO 5                                            NXTBLK 8
      NXTBLK=BITGET(STATRA(2,I),36,18)                                  NXTBLK 9
      RETURN                                                            NXTBLK10
    5 NXTBLK=IEND+1                                                     NXTBLK11
      IF(NXTBLK .GT. NBLOCK) CALL ERROR(38,KDM1,KDM2)
      RETURN                                                            NXTBLK13
   10 NXTBLK=0                                                          NXTBLK14
      RETURN                                                            NXTBLK15
      END                                                               NXTBLK16
```

```
      SUBROUTINE PARSE
      COMMON/LVARGS/LVFUNC,LVVARG,LVVAD,LVVPOS,LVVTYP,LVVAL,
     +LVHEAD,LVVNVL,LVDEST,LVVALS(10),LVTYPE(10),LVSKIP
      COMMON/LVTABL/LVTSIZ,LVMAP(     1)/LVVSEQ/LVSIZE,LVSQSP(     1)
      COMMON/NEEDS/STJ,JSTACK,R,JAS,J,JLAST,RTEMP,STACK(400,4)
      COMMON/FUNC/NARY(5,17),MARGS,IARGS(50),FNCLOC(5),NFUNC
      COMMON /STRING/ NTYPE,NSTR,STR
      COMMON /GIRL/NTERMS,PLUS,MINUS,SLASH,LPAR,RPAR,COMMA,STAR,EXP,LT,
     +LE,GT,GE,EQ,NE,OR,AND,NOT,EQUALS,OPRAND
      COMMON /HL/ HOL,ACTION,FUNC1,FUNC2,FUNC3,LEFT,RIGHT,STRING,MAXJ
      COMMON /NEED/ START,ASSOC,LEVEL,STOP
      COMMON /TYP/ NARRAY,TYPE1,TYPE2,ERRFLG
      COMMON/NOPAR/NOPAR,NDEP,NDEPTH,NFLAG
      COMMON /NTIMES/ NTIMES,I
      COMMON/VAR/VFOR(15),NUMCHR,NCHRP,CHAR,NDICT
      INTEGER TYPE1,TYPE2,START,TYP(3)
      LOGICAL ERRFLG,FAIL
      INTEGER STR(1),STEMP,ST,DICT(19)
      EQUIVALENCE(DICT(1),PLUS)
      INTEGER PLUS,MINUS,SLASH,LPAR,RPAR,COMMA,STAR,EXP,LT,LE,GT,GE,EQ,
     +NE,OR,AND,NOT,EQUALS,OPRAND,ASSOC,LEVEL,STOP,ACTION,HOL,LEFT,RIGHT
     +,STRING,FUNC1,FUNC2,FUNC3
      DATA NTIMES /0/
      IF(NTIMES .GT. 0) GO TO 3
      NTIMES=1
C     EXECUTE
      GO TO 25000
25001 CONTINUE
      CALL PHONEY
      CALL LVFECH(19)
      READ(19)PLUS,MINUS,SLASH,LPAR,RPAR,COMMA,STAR,EXP,LT,LE,GT,GE,EQ,
     +NE,OR,AND,NOT,EQUALS,OPRAND,ASSOC,LEVEL,STOP,ACTION,HOL,LEFT,RIGHT
     +,STRING,FUNC1,FUNC2,FUNC3,NTERMS,(TYP(I),I=1,3)
    3 IF(NSTR .LE. 0) RETURN
      ERRFLG=.FALSE.
      START=TYP(NTYPE)
      NARGS=0
      MAXJ=0
      NOPAR=0
      TYPE1=-1
      TYPE2=-1
      NARRAY=-1
```

```
      NDEPTH=0
      NDEP=0
      NFLAG=0
      DO 20 I=1,50
   20 IARGS(I)=0
      DO 22 I=1,85
   22 NARY(I)=0
      DO 10 I=1,NSTR
C     STRING(+HOL.I @NTEMP//4,HOL $ @NTEMP)
      LVI     AAB =      STRING
C**** LVI     AAB            +           HOL
      LVVPOS =            I
      LVVTYP =    3
      LVFUNC=          HOL
      LVVARG= LVI     AAB
      CALL LVFIND(LV2       A,LV2       B,LV2       C,LV2       D)
      LVI     AAC = LVI     AAB
      IF (LVVAL.NE.-1) LVI     AAC = LVVAL
C**** LVI     AAC            @         NTEMP
           NTEMP = LVI     AAC
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.NE.-1) GO TO          4
      CALL LVGRN(LVI     AAC)
C**** LVI     AAB          HOL  LVI     AAC
      LVDEST=  0
      LVTYPE(1) =  0
      LVVALS(1) = LVI     AAC
      LVVNVL =  1
      LVFUNC =          HOL
      LVVARG=LVI     AAB
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
C**** LVI     AAC            @         NTEMP
           NTEMP = LVI     AAC
    4 CONTINUE
      IF(ERRFLG) GO TO 25
      ST=IABS(STR(I))
      IF(STR(I) .LT. 0) GO TO 6
C     NTEMP HOL @@ST@@
C****      NTEMP          HOL           @@
      LVDEST=  0
      LVI     AAB = ST
      LVTYPE(1) =  1
      LVVALS(1) = LVI     AAB
      LVDEST=  0
      LVVNVL =  1
      LVFUNC =          HOL
      LVVARG=     NTEMP
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
      IF(ERRFLG) GO TO 25
C     STRING STRING OPRAND//10
C****      STRING       STRING       OPRAND
      LVDEST=  0
      LVTYPE(1) =  0
```

```
      LVVALS(1) =      OPRAND
      LVVNVL =  1
      LVFUNC =      STRING
      LVVARG=     STRING
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.NE.-1) GO TO          10
      IF(ERRFLG) GO TO 25
    6 STEMP=DICT(ST)
C     STRING STRING @@STEMP@@
C****     STRING       STRING          @@
      LVDEST=  0
      LV1     AAC = STEMP
      LVTYPE(1) =  1
      LVVALS(1) = LV1     AAC
      LVDEST=  0
      LVVNVL =  1
      LVFUNC =      STRING
      LVVARG=     STRING
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
      IF(ERRFLG) GO TO 25
   10 CONTINUE
      LV1     AAD =      OPRAND
      LVDEST=  0
      LV1     AAE = 0
      LVTYPE(1) =  1
      LVVALS(1) = LV1     AAE
      LVDEST=  0
      LVVNVL =  1
      LVFUNC =       FUNC2
      LVVARG=LV1     AAD
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
      LVDEST=  0
      LV1     AAF = 0
      LVTYPE(1) =  1
      LVVALS(1) = LV1     AAF
      LVDEST=  0
      LVVNVL =  1
      LVFUNC =       FUNC3
      LVVARG=LV1     AAD
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
      LVDEST=  0
      LV1     AAG = 0
      LVTYPE(1) =  1
      LVVALS(1) = LV1     AAG
      LVDEST=  0
      LVVNVL =  1
      LVFUNC =       LEVEL
      LVVARG=LV1     AAD
```

```
159•          CALL LVNSRT
160•          IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
161•          IF(LVVAL.LT.0) RETURN
162•          CALL RECOG(FAIL)
163•          IF(FAIL) GO TO 40
164•       25 CONTINUE
165•          IF(ERRFLG) PRINT 100
166•      100 FORMAT(/)
167•          CALL PRNTS
168•          NCHAR=0
169•       30 NCHAR=NCHAR+1
170•    C     STRING+HOL,NCHAR/35(-LEFT,-RIGHT,-HOL,-STRING/30/30)
171•    C**** STRING          +          HOL
172•          LVVPOS =      NCHAR
173•          LVVTYP =    3
174•          LVFUNC=        HOL
175•          LVVARG=      STRING
176•          CALL LVFIND(LV2      E,LV2      F,LV2      G,LV2      H)
177•          LV1     AAD =      STRING
178•          IF (LVVAL.NE.-1) LV1     AAD = LVVAL
179•          LVVTR = LVVAL
180•          LVVAL = -100
181•          IF (LVVTR.EQ.-1) GO TO          35
182•          LV1     AAH = LV1     AAD
183•    C**** LV1     AAE           -          LEFT
184•          LVVAD=-1
185•          LVVTYP=-1
186•          LVVPOS=1
187•          LVFUNC=       LEFT
188•          LVVARG=LV1     AAH
189•          CALL LVDLET
190•          LV1     AAH = LV1     AAD
191•    C**** LV1     AAE           -          RIGHT
192•          LVVAD=-1
193•          LVVTYP=-1
194•          LVVPOS=1
195•          LVFUNC=      RIGHT
196•          LVVARG=LV1     AAH
197•          CALL LVDLET
198•          LV1     AAH = LV1     AAD
199•    C**** LV1     AAE           -          HOL
200•          LVVAD=-1
201•          LVVTYP=-1
202•          LVVPOS=1
203•          LVFUNC=        HOL
204•          LVVARG=LV1     AAH
205•          CALL LVDLET
206•          LV1     AAH = LV1     AAD
207•    C**** LV1     AAE           -       STRING
208•          LVVAD=-1
209•          LVVTYP=-1
210•          LVVPOS=1
211•          LVFUNC=     STRING
212•          LVVARG=LV1     AAH
213•          CALL LVDLET
214•          LVVTR = LVVAL
215•          LVVAL = -100
216•          IF (LVVTR.EQ.-1) GO TO          30
```

```
      IF (LVVTR.NE.-1) GO TO          30
   35 CONTINUE
C     STRING-STRING
C**** STRING              -       STRING
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
      LVFUNC=     STRING
      LVVARG=     STRING
      CALL LVDLET
C     OPRAND(-OPRAND,-STRING,-ACTION,-FUNC1)
      LV1     AAD =       OPRAND
C**** LV1     AAD               -       OPRAND
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
      LVFUNC=     OPRAND
      LVVARG=LV1     AAD
      CALL LVDLET
C**** LV1     AAD               -       STRING
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
      LVFUNC=     STRING
      LVVARG=LV1     AAD
      CALL LVDLET
C**** LV1     AAD               -       ACTION
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
      LVFUNC=     ACTION
      LVVARG=LV1     AAD
      CALL LVDLET
C**** LV1     AAD               -       FUNC1
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
      LVFUNC=     FUNC1
      LVVARG=LV1     AAD
      CALL LVDLET
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
      LVFUNC=     FUNC2
      LVVARG=LV1     AAD
      CALL LVDLET
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
      LVFUNC=     FUNC3
      LVVARG=LV1     AAD
      CALL LVDLET
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
      LVFUNC=     LEVEL
      LVVARG=LV1     AAD
      CALL LVDLET
```

```
      NSTR=NCHRP
      RETURN
   90 PRINT 300,MAXJ
  300 FORMAT(1X,34H PARSE FAILED AFTER CHARACTER NO. ,I3)
      ERRFLG=.TRUE.
      GO TO 25
C     COMPLETE
25000 CONTINUE
      LV2A=0
      LV2B=0
      LV2C=0
      LV2D=0
      LV2E=0
      LV2F=0
      LV2G=0
      LV2H=0
      GO TO 25001
      END
```

```
      SUBROUTINE PHONEY
      INTEGER FLGSPC,FLAGSP
      COMMON/LVVTR1/LVVSZE,LVVGSP,NODSPC(1000)/LVVTR2/LSTSPC(1000)
      COMMON/LVVTR3/LNKSPC(1000)/LVVTR4/FLGSPC(1000)
      COMMON/LVVTR5/LVFILE,LVCMPR,NODESP(      1)
     +/LVVTR6/LISTSP(      1)/LVVTR7/LINKSP(      1)
     +/LVVTR8/FLAGSP(      1)
      COMMON/LVRAND/LNKPRM,LVKS,LVKX,LVKDY,LVKDX,LVTEMP
      COMMON/LVARGS/LVFUNC,LVVARG,LVVAD,LVVPOS,LVVTYP,LVVAL,
     +LVHEAD,LVVNVL,LVDEST,LVVALS(10),LVTYPE(10),LVSKIP
      COMMON/LVTABL/LVTSIZ,LVMAP(      1)/LVVSEQ/LVSIZE,LVSQSP(      1)
C     EXECUTE
      LVVSZE=1000
      LVFILE=  0
      LVCMPR= 0
      LVSIZE=      1
      LVSKIP=1
      LNKPRM=17
      CALL LVSETP
      RETURN
      END
```

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2 OF 2
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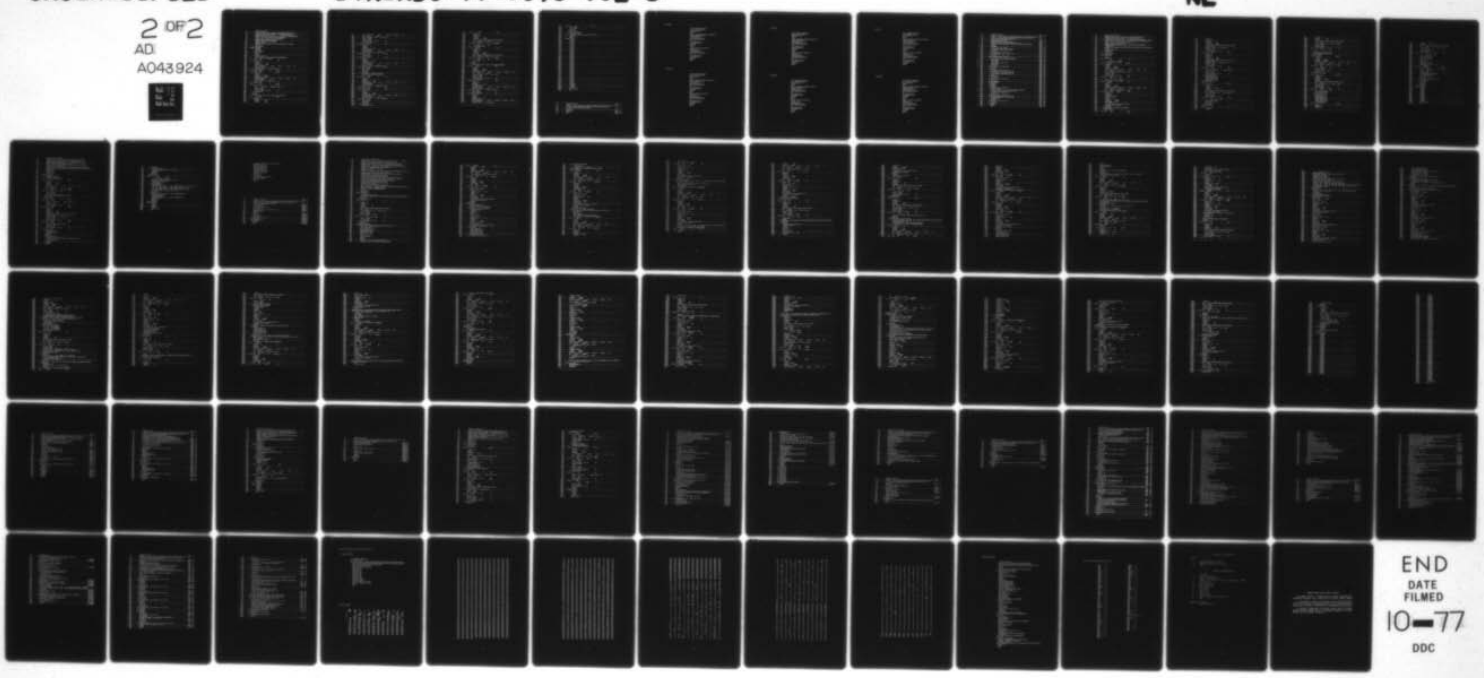

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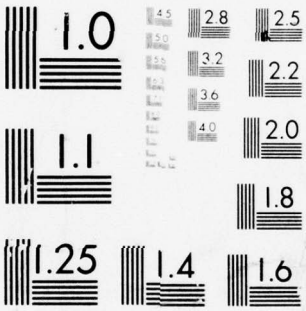

MICROCOPY RESOLUTION TEST CHART
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```
      SUBROUTINE PRNTS
      COMMON/LVARGS/LVFUNC,LVVARG,LVVAD,LVVPOS,LVVTYP,LVVAL,
     +LVHEAD,LVVNVL,LVDEST,LVVALS(10),LVTYPE(10),LVSKIP
      COMMON/LVTABL/LVTSIZ,LVMAP(     1)/LVVSEQ/LVSIZE,LVSQSP(      1)
      COMMON /HL/ HOL,ACTION,FUNC1,FUNC2,FUNC3,LEFT,RIGHT,STRING
      COMMON /VAR/ VFOR,NCHAR,NCHARP,CHAR,NDICT
      COMMON /TYP/ NARRAY,TYPE1,TYPE2,ERRFLG
      COMMON /STRING/ NTYPE,NSTR,STR
      COMMON /GIRL/ NNN(19),OPRAND
      LOGICAL ERRFLG
      INTEGER VFOR(15),CHAR,STRING,HOL,RIGHT,STR(1),OPRAND
C     EXECUTE
      GO TO 25000
25001 CONTINUE
      NCHAR=0
      NCHARP=0
      DO 5 I=1,15
    5 VFOR(I)=0
      NINT=1
      NTMP=1
      DO 10 I=1,NSTR
C     STRING(+HOL,I @NODE,+STRING,I @N1=OPRAND/16)
      LV1     AAD =      STRING
C**** LV1     AAD            +          HOL
      LVVPOS =            I
      LVVTYP =    3
      LVFUNC=          HOL
      LVVARG= LV1     AAD
      CALL LVFIND(LV2       A,LV2       B,LV2       C,LV2       D)
      LV1AAI=LV1AAD
      IF(LVVAL .NE. -1) LV1AAI=LVVAL
C**** LV1     AAE            @          NODE
      NODE=LV1AAI
C**** LV1     AAD            +        STRING
      LVVPOS =            1
      LVVTYP =    3
      LVFUNC=      STRING
      LVVARG= LV1     AAD
      CALL LVFIND(LV2       E,LV2       F,LV2       G,LV2       H)
      LV1AAI=LV1AAD
      IF(LVVAL .NE. -1) LV1AAI=LVVAL
C**** LV1     AAE            @           N1
      N1=LV1AAI
C****          N1            =        OPRAND
      LVVAL = -100
      IF (         N1.NE.     OPRAND) LVVAL = -1
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.EQ.-1) GO TO          16
      NINT=NINT+1
   16 J=0
   20 J=J+1
C     NODE+LEFT.J/30 (+HOL.1 @CHAR,+HOL.2 @NDICT)
C****        NODE            +          LEFT
      LVVPOS =            J
      LVVTYP =    3
      LVFUNC=        LEFT
      LVVARG=        NODE
```

```
      CALL LVFIND(LV2      I,LV2      J,LV2      K,LV2      L)
      LVI    AAD =        NODE
      IF (LVVAL.NE.-1) LVI     AAD = LVVAL
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.EQ.-1) GO TO          30
      LVIAAI=LVIAAD
C**** LVI    AAE            +          HOL
      LVVPOS =          1
      LVVTYP =   3
      LVFUNC=        HOL
      LVVARG=LVIAAI
      CALL LVFIND(LV2      M,LV2      N,LV2      O,LV2      P)
      LVIAAJ=LVIAAI
      IF(LVVAL .NE. -1) LVIAAJ=LVVAL
C**** LVI    AAF            @          CHAR
      CHAR=LVIAAJ
      LVIAAJ=LVIAAD
C**** LVI    AAF            +          HOL
      LVVPOS =          2
      LVVTYP =   3
      LVFUNC=        HOL
      LVVARG=LVIAAJ
      CALL LVFIND(LV2      Q,LV2      R,LV2      S,LV2      T)
      LVIAAI=LVIAAJ
      IF(LVVAL .NE. -1) LVIAAI=LVVAL
C**** LVI    AAE            @        NDICT
      NDICT=LVIAAI
      CALL FORM
      GO TO 20
   30 CONTINUE
      IF(NINT .GT. NTMP) GO TO 35
C     NI(+HOL.1 @CHAR,+HOL.2 @NDICT)
      LVI    AAD =          NI
C**** LVI    AAD            +          HOL
      LVVPOS =          1
      LVVTYP =   3
      LVFUNC=        HOL
      LVVARG= LVI    AAD
      CALL LVFIND(LV2      U,LV2      V,LV2      W,LV2      X)
      LVIAAI=LVIAAD
      IF(LVVAL .NE. -1) LVIAAI=LVVAL
C**** LVI    AAE            @          CHAR
      CHAR=LVIAAI
C**** LVI    AAD            +          HOL
      LVVPOS =          2
      LVVTYP =   3
      LVFUNC=        HOL
      LVVARG= LVI    AAD
      CALL LVFIND(LV2      Y,LV2      Z,LV2      0,LV2      1)
      LVIAAI=LVIAAD
      IF(LVVAL .NE. -1) LVIAAI=LVVAL
C**** LVI    AAE            @        NDICT
      NDICT=LVIAAI
      CALL FORM
      GO TO 37
   35 NTMP=NINT
C     NODE+HOL @NDICT
```

```
C****        NODE              +          HOL
      LVVTYP = 3
      LVVPOS = 1
      LVINDX = 0
      LVFUNC=        HOL
      LVVARG=       NODE
      CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
      LV1    AAD =        NODE
      IF (LVVAL.NE.-1) LV1    AAD = LVVAL
C**** LV1    AAD            @        NDICT
            NDICT = LV1    AAD
C     OPRAND+HOL @CHAR
C****     OPRAND             +          HOL
      LVVTYP = 3
      LVVPOS = 1
      LVINDX = 0
      LVFUNC=        HOL
      LVVARG=     OPRAND
      CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
      LV1    AAD =      OPRAND
      IF (LVVAL.NE.-1) LV1    AAD = LVVAL
C**** LV1    AAD            @        CHAR
            CHAR = LV1    AAD
      CALL FORM
   37 J=0
   40 J=J+1
C     NODE+RIGHT.J/10 (+HOL.1 @CHAR,+HOL.2 @NDICT)
C****        NODE              +        RIGHT
      LVVPOS =          J
      LVVTYP =   3
      LVFUNC=      RIGHT
      LVVARG=       NODE
      CALL LVFIND(LV2      2,LV2      3,LV2      4,LV2      5)
      LV1    AAD =       NODE
      IF (LVVAL.NE.-1) LV1    AAD = LVVAL
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.EQ.-1) GO TO          10
      LV1AAI=LV1AAD
C**** LV1    AAE            +          HOL
      LVVPOS =          1
      LVVTYP =   3
      LVFUNC=        HOL
      LVVARG=LV1AAI
      CALL LVFIND(LV2      6,LV2      7,LV2      8,LV2      9)
      LV1AAJ=LV1AAI
      IF(LVVAL .NE. -1) LV1AAJ=LVVAL
C**** LV1    AAF            @        CHAR
      CHAR=LV1AAJ
      LV1AAJ=LV1AAD
C**** LV1    AAF            +          HOL
      LVVPOS =          2
      LVVTYP =   3
      LVFUNC=        HOL
      LVVARG=LV1AAJ
      CALL LVFIND(LV2     AA,LV2     AB,LV2     AC,LV2     AD)
      LV1AAI=LV1AAJ
      IF(LVVAL .NE. -1) LV1AAI=LVVAL
```

```
C**** LVI     AAE              @        NDICT
      NDICT=LVIAAI
      CALL FORM
      GO TO 40
   10 CONTINUE
      NC=1+(NCHARP-1)/8
  100 FORMAT(1X,15A8)
      IF(ERRFLG) PRINT 100,(VFOR(I),I=1,NC)
C     COMPLETE
      RETURN
25000 CONTINUE
      LV2A=0
      LV2B=0
      LV2C=0
      LV2D=0
      LV2E=0
      LV2F=0
      LV2G=0
      LV2H=0
      LV2I=0
      LV2J=0
      LV2K=0
      LV2L=0
      LV2M=0
      LV2N=0
      LV2O=0
      LV2P=0
      LV2Q=0
      LV2R=0
      LV2S=0
      LV2T=0
      LV2U=0
      LV2V=0
      LV2W=0
      LV2X=0
      LV2Y=0
      LV2Z=0
      LV20=0
      LV21=0
      LV22=0
      LV23=0
      LV24=0
      LV25=0
      LV26=0
      LV27=0
      LV28=0
      LV29=0
      LV2AA=0
      LV2AB=0
      LV2AC=0
      LV2AD=0
      GO TO 25001
      END
```

```
      SUBROUTINE PROG                                                   PROG   2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     9 JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      IDTYP=2
      CALL STORE                                                        PROG  14
      RETURN                                                            PROG  21
      END                                                               PROG  22
```

35 Bits

```
REAL FUNCTION Q1REAL(X)
DATA R/0777777777776/
Q1REAL=AND(X,R)
RETURN
END
DOUBLE PRECISION FUNCTION Q1DPRE(X)
DOUBLE PRECISION X,T
DIMENSION W(2)
EQUIVALENCE(T,W(1))
DATA R/0777777777776/
T=X
W(1)=AND(W(1),R)
W(2)=AND(W(2),R)
Q1DPRE=T
RETURN
END
COMPLEX FUNCTION Q1COMP(X)
COMPLEX X,T
DIMENSION W(2)
EQUIVALENCE(T,W(1))
DATA R/0777777777776/
T=X
W(1)=AND(W(1),R)
W(2)=AND(W(2),R)
Q1COMP=T
RETURN
END
```

34 Bits

```
REAL FUNCTION Q1REAL(X)
DATA R/0777777777774/
Q1REAL=AND(X,R)
RETURN
END
DOUBLE PRECISION FUNCTION Q1DPRE(X
DOUBLE PRECISION X,T
DIMENSION W(2)
EQUIVALENCE(T,W(1))
DATA R/0777777777774/
T=X
W(1)=AND(W(1),R)
W(2)=AND(W(2),R)
Q1DPRE=T
RETURN
END
COMPLEX FUNCTION Q1COMP(X)
COMPLEX X,T
DIMENSION W(2)
EQUIVALENCE(T,W(1))
DATA R/0777777777774/
T=X
W(1)=AND(W(1),R)
W(2)=AND(W(2),R)
Q1COMP=T
RETURN
END
```

33 Bits

```
REAL FUNCTION Q1REAL(X)
DATA R/07777777777770/
Q1REAL=AND(X,R)
RETURN
END
DOUBLE PRECISION FUNCTION Q1DPRE(X)
DOUBLE PRECISION X,T.
DIMENSION W(2)
EQUIVALENCE(T,W(1))
DATA R/07777777777770/
T=X
W(1)=AND(W(1),R)
W(2)=AND(W(2),R)
Q1DPRE=T
RETURN
END
COMPLEX FUNCTION Q1COMP(X)
COMPLEX X,T
DIMENSION W(2)
EQUIVALENCE(T,W(1))
DATA R/07777777777770/
T=X
W(1)=AND(W(1),R)
W(2)=AND(W(2),R)
Q1COMP=T
RETURN
END
```

32 Bits

```
REAL FUNCTION Q1REAL(X)
DATA R/0777777777760/
Q1REAL=AND(X,R)
RETURN
END
DOUBLE PRECISION FUNCTION Q1DPRE(X)
DOUBLE PRECISION X,T
DIMENSION W(2)
EQUIVALENCE(T,W(1))
DATA R/0777777777760/
T=X
W(1)=AND(W(1),R)
W(2)=AND(W(2),R)
Q1DPRE=T
RETURN
END
COMPLEX FUNCTION Q1COMP(X)
COMPLEX X,T
DIMENSION W(2)
EQUIVALENCE(T,W(1))
DATA R/0777777777760/
T=X
W(1)=AND(W(1),R)
W(2)=AND(W(2),R)
Q1COMP=T
RETURN
END
```

31 Bits

```
REAL FUNCTION Q1REAL(X)
DATA R/O7777777777740/
Q1REAL=AND(X,R)
RETURN
END
DOUBLE PRECISION FUNCTION Q1DPRE(X)
DOUBLE PRECISION X,T
DIMENSION W(2)
EQUIVALENCE(T,W(1))
DATA R/O7777777777740/
T=X
W(1)=AND(W(1),R)
W(2)=AND(W(2),R)
Q1DPRE=T
RETURN
END
COMPLEX FUNCTION Q1COMP(X)
COMPLEX X,T
DIMENSION W(2)
EQUIVALENCE(T,W(1))
DATA R/O7777777777740/
T=X
W(1)=AND(W(1),R)
W(2)=AND(W(2),R)
Q1COMP=T
RETURN
END
```

30 Bits

```
REAL FUNCTION Q1REAL(X)
DATA R/O7777777777700/
Q1REAL=AND(X,R)
RETURN
END
DOUBLE PRECISION FUNCTION Q1DPRE(X)
DOUBLE PRECISION X,T
DIMENSION W(2)
EQUIVALENCE(T,W(1))
DATA R/O7777777777700/
T=X
W(1)=AND(W(1),R)
W(2)=AND(W(2),R)
Q1DPRE=T
RETURN
END
COMPLEX FUNCTION Q1COMP(X)
COMPLEX X,T
DIMENSION W(2)
EQUIVALENCE(T,W(1))
DATA R/O7777777777700/
T=X
W(1)=AND(W(1),R)
W(2)=AND(W(2),R)
Q1COMP=T
RETURN
END
```

```
      SUBROUTINE REALCK                                                 REAL   2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      COMMON/LOGIC/LOG,LOGST                                            REAL   4
      COMMON/REALND/IREAL,IRELND,IP                                     REAL   5
      INTEGER A,DECPT,EEE,PLUS,MINUS,DEE,ELOC                           REAL   6
      DATA DECPT/1H./,EEE/1HE/, PLUS/1H+/, MINUS/1H-/,DEE/1HD/          REAL   7
      IDES=0                                                            REAL   8
      IRELND=0                                                          REAL   9
      IF(IP .GE. N) GO TO 90                                            REAL  10
      IF(NEXT(IP) .EQ. DECPT) GO TO 5                                   REAL  11
      IF(ITYPE(IP) .EQ. 2) GO TO 10                                     REAL  12
      GO TO 90                                                          REAL  13
    5 IF(JPTR .GT. N) GO TO 90                                          REAL  14
      IF(ITYPE(JPTR) .NE. 2) GO TO 90                                   REAL  15
      GO TO 20                                                          REAL  16
   10 IF(JPTR .GT. N) GO TO 90                                          REAL  17
   12 IF(ITYPE(JPTR) .EQ. 2) GO TO 15                                   REAL  18
      IF(A(JPTR-1) .NE. DECPT) GO TO 90                                 REAL  19
      LOGST=JPTR                                                        REAL  20
      CALL LOGCHK                                                       REAL  21
      IF(LOG .EQ. 1) GO TO 90                                           REAL  22
      JPTR=LOGST                                                        REAL  23
      GO TO 20                                                          REAL  24
   15 IF(JPTR .GT. N) GO TO 90                                          REAL  25
      GO TO 12                                                          REAL  26
   20 IREAL=1                                                           REAL  27
      IF(JPTR .GT. N) GO TO 35                                          REAL  28
   22 IF(ITYPE(JPTR) .EQ. 2) GO TO 25                                   REAL  29
      IF(A(JPTR-1) .EQ. EEE) GO TO 24                                   REAL  30
      IF(A(JPTR-1) .NE. DEE) GO TO 30                                   REAL  31
      IDES=1                                                            REAL  32
   24 ELOC=JPTR-2                                                       REAL  33
      GO TO 40                                                          REAL  34
   25 IF(JPTR .GT. N) GO TO 35                                          REAL  35
      GO TO 22                                                          REAL  36
   30 ELOC=JPTR-2                                                       REAL  37
   32 IRELND=ELOC                                                       REAL  38
      RETURN                                                            REAL  39
   35 IRELND=N                                                          REAL  40
      RETURN                                                            REAL  41
   40 IF(JPTR .GT. N) GO TO 32                                          REAL  42
      NXT=NEXT(JPTR)                                                    REAL  43
      IF(NXT .EQ. PLUS .OR. NXT .EQ. MINUS) GO TO 45                    REAL  44
      IF(ITYPE(JPTR-1) .NE. 2) GO TO 32                                 REAL  45
      IF(JPTR .GT. N) GO TO 35                                          REAL  46
      GO TO 47                                                          REAL  47
   45 IF(JPTR .GT. N) GO TO 32                                          REAL  48
      IF(ITYPE(JPTR) .NE. 2) GO TO 32                                   REAL  49
   47 IF(ITYPE(JPTR) .EQ. 2) GO TO 50                                   REAL  50
      IRELND=JPTR-2                                                     REAL  51
      RETURN                                                            REAL  52
   50 IF(JPTR .GT. N) GO TO 35                                          REAL  53
      GO TO 47                                                          REAL  54
   90 IREAL=0                                                           REAL  55
      RETURN                                                            REAL  56
      END                                                               REAL  57
```

```
      SUBROUTINE RECOG(FIN)
      COMMON/LVARGS/LVFUNC,LVVARG,LVVAD,LVVPOS,LVVTYP,LVVAL,
     +LVHEAD,LVVNVL,LVDEST,LVVALS(10),LVTYPE(10),LVSKIP
      COMMON/LVTABL/LVTSIZ,LVMAP(     1)/LVVSEQ/LVSIZE,LVSQSP(     1)
      COMMON /HL/ HOL,ACTION,FUNC1,FUNC2,FUNC3,LEFT,RIGHT,STRING,MAXJ
      COMMON /NEED/ START,ASSOC,LEVEL,STOP
      COMMON /STRING/ NNN(2),STR
      COMMON/NEEDS/STJ,JSTACK,R,JAS,J,JLAST,RTEMP,STACK(900,4)
      INTEGER HOL
      INTEGER START,ASSOC,STOP,RETRN,R,STJ,STACK,STR(1),ACTION,STRING,
     + RTEMP
      LOGICAL FAIL,FIN
      FIN=.FALSE.
C     EXECUTE
      GO TO 25000
25001 CONTINUE
      JSTACK=0
      J=1
C     START @R
C****     START          @          R
                R =      START
C     STRING+STRING,J/70 @STJ
C****     STRING          +      STRING
      LVVPOS =          J
      LVVTYP =   3
      LVFUNC=     STRING
      LVVARG=     STRING
      CALL LVFIND(LV2      A,LV2      B,LV2      C,LV2      D)
      LV1    AAD =     STRING
      IF (LVVAL.NE.-1) LV1    AAD = LVVAL
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.EQ.-1) GO TO          70
C**** LV1    AAD          @          STJ
                STJ = LV1    AAD
      M=-1
C     STRING+HOL,1 STRING @@M@@
C****     STRING          +          HOL
      LVVPOS =          1
      LVVTYP =   3
      LVFUNC=        HOL
      LVVARG=     STRING
      CALL LVFIND(LV2      E,LV2      F,LV2      G,LV2      H)
      LV1    AAD =     STRING
      IF (LVVAL.NE.-1) LV1    AAD = LVVAL
C**** LV1    AAD      STRING          @@
      LVDEST=  0
      LV1AAH=M
      LVTYPE(1) =  1
      LVVALS(1)=LV1AAH
      LVDEST=  0
      LVVNVL =  1
      LVFUNC =     STRING
      LVVARG=LV1    AAD
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
    6 CONTINUE
C   10 R(+ASSOC//15,+STOP//15,=STOP/20)
   10 CONTINUE
      LV1    AAD =          R
C**** LV1    AAD          +        ASSOC
```

```
      LVVTYP = 3
      LVVPOS = 1
      LVINDX = 0
      LVFUNC=       ASSOC
      LVVARG= LVI     AAD
      CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
      LVIAAI=LVIAAD
      IF(LVVAL .NE. -1) LVIAAI=LVVAL
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.NE.-1) GO TO          15
C**** LVI     AAD             +         STOP
      LVVTYP = 3
      LVVPOS = 1
      LVINDX = 0
      LVFUNC=       STOP
      LVVARG= LVI     AAD
      CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
      LVIAAI=LVIAAD
      IF(LVVAL .NE. -1) LVIAAI=LVVAL
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.NE.-1) GO TO          15
C**** LVI     AAD             =         STOP
      LVVAL = -100
      IF (LVI     AAD.NE.       STOP) LVVAL = -1
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.EQ.-1) GO TO          20
   15 JSTACK=JSTACK+1
      STACK(JSTACK,1)=R
      STACK(JSTACK,2)=0
      STACK(JSTACK,3)=J
      STACK(JSTACK,4)=0
C  20 R+ACTION/22 @N
   20 CONTINUE
C****          R             +       ACTION
      LVVTYP = 3
      LVVPOS = 1
      LVINDX = 0
      LVFUNC=     ACTION
      LVVARG=           R
      CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
      LVI     AAD =           R
      IF (LVVAL.NE.-1) LVI     AAD = LVVAL
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.EQ.-1) GO TO          22
C**** LVI     AAD             @             N
                N = LVI     AAD
      CALL SEMANT(N,FAIL)
      IF(FAIL) GO TO 99
      GO TO 25
C  22 R+STJ/99 @R
   22 CONTINUE
C****          R             +         STJ
      LVVTYP = 3
      LVVPOS = 1
```

```
      LVINDX = 0
      LVFUNC=          STJ
      LVVARG=            R
      CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
      LVI     AAD =            R
      IF (LVVAL.NE.-1) LVI     AAD = LVVAL
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.EQ.-1) GO TO           99
C**** LVI     AAD            @            R
                R = LVI     AAD
   25 J=J+1
      IF(J .GT. MAXJ) MAXJ=J
C  30 STRING+STRING.J @STJ//6
   30 CONTINUE
C***      STRING            +       STRING
      LVVPOS =            J
      LVVTYP =    S
      LVFUNC=      STRING
      LVVARG=      STRING
      CALL LVFIND(LV2       I,LV2       J,LV2       K,LV2       L)
      LVI     AAD =      STRING
      IF (LVVAL.NE.-1) LVI     AAD = LVVAL
C**** LVI     AAD            @           STJ
                STJ = LVI     AAD
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.NE.-1) GO TO           6
   40 STJ=-1
C     R+ACTION/42 @N
C***            R                    ACTION
      LVVTYP = 3
      LVVPOS = 1
      LVINDX = 0
      LVFUNC=      ACTION
      LVVARG=            R
      CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
      LVI     AAD =            R
      IF (LVVAL.NE.-1) LVI     AAD = LVVAL
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.EQ.-1) GO TO           42
C**** LVI     AAD            @            N
                N = LVI     AAD
      CALL SEMANT(N,FAIL)
      IF(FAIL) GO TO 99
   42 CALL SSTOP(FAIL)
      IF(FAIL) GO TO 99
      JSTACK=JSTACK+1
      STACK(JSTACK,1)=R
      STACK(JSTACK,2)=0
      STACK(JSTACK,3)=J
      STACK(JSTACK,4)=0
C     R+ACTION/99 @N
C***            R            +       ACTION
      LVVTYP = 3
      LVVPOS = 1
      LVINDX = 0
```

```
      LVFUNC=      ACTION
      LVVARG=            R
      CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
      LVI     AAD =            R
      IF (LVVAL.NE.-1) LVI     AAD = LVVAL
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.EQ.-1) GO TO          . 44
C**** LVI     AAD            @            N
                N = LVI     AAD
      CALL SEMANT(N,FAIL)
      IF(FAIL) GO TO 99
   44 CALL SLEVEL(FAIL)
      IF(FAIL) RETURN
      GO TO 40
   99 CONTINUE
      CALL RECOV(RETRN)
      IF(RETRN .LT. 0) GO TO 70
C     RETRN=ASSOC//30
C****       RETRN            =        ASSOC
      LVVAL = -100
      IF (      RETRN.NE.      ASSOC) LVVAL = -1
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.NE.-1) GO TO          30
      IF(RETRN .EQ. 0) GO TO 10
      CALL SLEVEL(FAIL)
      IF(FAIL) GO TO 65
      GO TO 30
   65 IF(JSTACK .LE. 1) GO TO 70
      JSTACK=JSTACK-1
      GO TO 99
   70 FIN=.TRUE.
      RETURN
C     COMPLETE
25000 CONTINUE
      LV2A=0
      LV2B=0
      LV2C=0
      LV2D=0
      LV2E=0
      LV2F=0
      LV2G=0
      LV2H=0
      LV2I=0
      LV2J=0
      LV2K=0
      LV2L=0
      GO TO 25001
      END
```

```
      SUBROUTINE RECOV(RETRN)
      COMMON/LVARGS/LVFUNC,LVVARG,LVVAD,LVVPOS,LVVTYP,LVVAL,
     +LVHEAD,LVVNVL,LVDEST,LVVALS(10),LVTYPE(10),LVSKIP
      COMMON/LVTABL/LVTSIZ,LVMAP(     1)/LVVSEQ/LVSIZE,LVSQSP(      1)
      COMMON /NEED/ START,ASSOC,LEVEL,STOP
      COMMON/NEEDS/STJ,JSTACK,R,JAS,J,JLAST,RTEMP,STACK(400,4)
      COMMON /STRING/ NNN(2),STR
      COMMON /HL/ HOL,ACTION,FUNC1,FUNC2,FUNC3,LEFT,RIGHT,STRING
      INTEGER START,ASSOC,STOP,STACK,STR(1),STJ,R,STRING,RETRN,TEMP
     +,RIGHT,HOL
      LOGICAL FAIL
C     EXECUTE
      GO TO 25000
25001 CONTINUE
   10 R=STACK(JSTACK,1)
      JAS=STACK(JSTACK,2)+1
C     R+ASSOC.JAS @TEMP//30
C****          R            +        ASSOC
      LVVPOS =          JAS
      LVVTYP =   3
      LVFUNC=       ASSOC
      LVVARG=          R
      CALL LVFIND(LV2       A,LV2       B,LV2       C,LV2       D)
      LV1     AAD =          R
      IF (LVVAL.NE.-1) LV1     AAD = LVVAL
C**** LV1     AAD            @          TEMP
                TEMP = LV1     AAD
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.NE.-1) GO TO          30
C   15 R(=STOP//40,+STOP/16=STOP//40 @R)
   15 CONTINUE
      LV1     AAD =          R
C**** LV1     AAD            =          STOP
      LVVAL = -100
      IF (LV1     AAD.NE.       STOP) LVVAL = -1
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.NE.-1) GO TO          40
C**** LV1     AAD            +          STOP
      LVVTYP = 3
      LVVPOS = 1
      LVINDX = 0
      LVFUNC=        STOP
      LVVARG= LV1     AAD
      CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
      LV1AAH=LV1AAD
      IF(LVVAL .NE. -1) LV1AAH=LVVAL
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.EQ.-1) GO TO          16
C**** LV1     AAF            =          STOP
      LVVAL = -100
      IF(LV1AAH .NE. STOP) LVVAL=-1
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.NE.-1) GO TO          40
C**** LV1     AAF            @            R
      R=LV1AAH
      J=STACK(JSTACK,3)
      JSTACK=JSTACK-1
      RETRN=0
      RETURN
   16 JSTACK=JSTACK-1
      IF(JSTACK .LE. 0) GO TO 20
      IF(STACK(JSTACK,3) .LT. J) CALL SEMANT(0,FAIL)
      J=STACK(JSTACK,3)
      GO TO 10
   20 RETRN=-1
      RETURN
```

```
   40 CONTINUE
      J=STACK(JSTACK,3)
      IF(STACK(JSTACK,4) .GT. 0) GO TO 16
      RETRN=STOP
      RETURN
C  30 TEMP QR
   30 CONTINUE
C****        TEMP            Q            R
                R =        TEMP
      IF(JSTACK .EQ. 1) GO TO 35
      IF( R .NE. STACK(JSTACK,1)) GO TO 35
      NTEMP=STACK(JSTACK-1,1)
      JMARK=JSTACK
   31 STACK(JMARK,4)=-1
      JMARK=JMARK-1
      IF(R .EQ. STACK(JMARK,1) .AND. STACK(JMARK,4) .LT. 0) GO TO 15
      IF(R .EQ. STACK(JMARK,1) .AND. JMARK .NE. 0) GO TO 31
      IF(R .NE. NTEMP .OR. JAS .NE. STACK(JSTACK-1,2) .OR.
     + STACK(JSTACK-1,4) .GE. 0) GO TO 35
      GO TO 15
   35 CONTINUE
      IF(STACK(JSTACK,3) .LT. J) CALL SEMANT(0,FAIL)
      STACK(JSTACK,2)=JAS
      J=STACK(JSTACK,3)
      IF(STACK(JSTACK,4) .GT. 0) STACK(JSTACK,4)=0
      RETRN=ASSOC
      RETURN
C     COMPLETE
25000 CONTINUE
      LV2A=0
      LV2B=0
      LV2C=0
      LV2D=0
      GO TO 25001
      END
```

```
      SUBROUTINE ROLCHK(I1,I2,I3,I4,I5,I6)
      DIMENSION IARG(6)
      IARG(1)=FLD(0,6,I1)
      IARG(2)=FLD(0,6,I2)
      IARG(3)=FLD(0,6,I3)
      IARG(4)=FLD(0,6,I4)
      IARG(5)=FLD(0,6,I5)
      IARG(6)=FLD(0,6,I6)
      ISUBNM=0
      DO 10 I=1,6
      IBIT=6*(I-1)
   10 FLD(IBIT,6,ISUBNM)=IARG(I)
      WRITE(3) ISUBNM
      RETURN
      END
```

```
      SUBROUTINE SEARCH                                                 SEARCH 2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      DO 20 IDTYP=1,2                                                   SEARCH 4
      J=INITID(IDTYP)                                                   SEARCH 5
      IF(J .EQ. 0) GO TO 15                                             SEARCH 6
      DO 10 I=1,NID                                                     SEARCH 7
      IF(IDTBL(1,J) .NE. NXTID) GO TO 5                                 SEARCH 8
      ISRCH(IDTYP)=1                                                    SEARCH 9
      IDES=LOC
      LOC=J                                                             SEARCH10
      GO TO 20                                                          SEARCH11
    5 J=IDTBL(2,J)                                                      SEARCH12
      IF(J .EQ. 0) GO TO 15                                             SEARCH13
   10 CONTINUE                                                          SEARCH14
   15 ISRCH(IDTYP)=0                                                    SEARCH15
   20 CONTINUE                                                          SEARCH16
      RETURN                                                            SEARCH17
      END                                                               SEARCH18
```

```
      SUBROUTINE SEMANT(N,FAIL)
      COMMON/LVARGS/LVFUNC,LVVARG,LVVAD,LVVPOS,LVVTYP,        LVVAL,
     +LVHEAD,LVVNVL,LVDEST,LVVALS(10),LVTYPE(10),LVSKIP
      COMMON/LVTABL/LVTSIZ,LVMAP(     1)/LVVSEQ/LVSIZE,LVSQSP(      1)
      COMMON/FUNC/  NARY(5,17),MARGS,IARGS(50),FNCLOC(5),NFUNC
      COMMON/HL/HOL,ACTION,FUNC1,FUNC2,FUNC3,LEFT,RIGHT,STRING,MAXJ
      COMMON /TYP/ NARRAY,TYPE1,TYPE2,ERRFLG
      COMMON /STRING/ NTYPE,NSTR,STR
      COMMON /JL/ JSTOP
      COMMON /GIRL/NTERMS,PLUS,MINUS,SLASH,LPAR,RPAR,COMMA,STAR,EXP,LT,
     +LE,GT,GE,EQ,NE,OR,AND,NOT,EQUALS,OPRAND
      COMMON/NEEDS/STJ,JSTACK,R,JAS,J,JLAST,RTEMP,STACK(400,4)
      COMMON /NEED/ START,ASSOC,LEVEL,STOP
      COMMON/NOPAR/NOPAR,NDEP,NDEPTH,NFLAG
      INTEGER HOL,ACTION,FUNC,LEFT,RIGHT,STRING,RPAR,STJ,R,STACK
     +,EXP,FUNC1,FUNC2,FUNC3,TYPE1,TYPE2,TYPE(5),STR(1),STOP
     $ ,ALPHA,BETA,GAMMA,OPRAND,EQUALS,AND,OR,COMMA
      LOGICAL SKIP,FLAG,ERRFLG,FAIL,NOTFLG
      INTEGER FUNCRF,ZERO,BITPUT,PLUS,FL(3)
      INTEGER GETTYP,GETDIM
      DATA FLAG/.FALSE./,FUNCRF/86/,ZERO/0/
      DATA (TYPE(I),I=1,5)/4HREAL,6HCOMPLX,6HDOUBLE,6HINTEGR,6HLOGICL/
      GETTYP(II)=MOD(II,100000)/10000
      GETDIM(II)=MOD(II,1000000)/100000
C     EXECUTE
      GO TO 25000
25001 CONTINUE
      FAIL=.FALSE.
      IF(N .EQ. 0) GO TO 999
      GO TO(10,20,30,40,50,60,70,80,90,1000,1100,1200,1300,1400,1500,
     $ 1600),N
C  10 R+STJ/11 @R//12
   10 CONTINUE
C****          R            +          STJ
      LVVTYP = 3
      LVVPOS = 1
      LVINDX = 0
      LVFUNC=         STJ
      LVVARG=          R
      CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
      LVI    AAD =          R
      IF (LVVAL.NE.-1) LVI     AAD = LVVAL
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.EQ.-1) GO TO          11
C**** LVI     AAD            @            R
                R = LVI     AAD
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.NE.-1) GO TO          12
   11 FAIL=.TRUE.
      RETURN
C PRIMARY RECOGNIZED
   12 IF(STJ .EQ. PLUS .OR. STJ .EQ. MINUS) GO TO 126
      IF(STJ .NE. RPAR) GO TO 121
      JSTACK=JSTACK+1
      STACK(JSTACK,1)=STOP
      STACK(JSTACK,2)=0
      STACK(JSTACK,3)=J
      STACK(JSTACK,4)=0
      NTMP=R
      CALL SLEVEL(SKIP)
      JSTACK=JSTACK-1
      R=NTMP
      JLAST=1
      IF(JSTOP .GT. 0) JLAST=STACK(JSTOP,3)
C     STRING+HOL,JLAST(-STRING,STRING @@TYPE1@@)
```

```
C****     STRING            +          HOL
          LVVPOS =      JLAST
          LVVTYP =   3
          LVFUNC=        HOL
          LVVARG=     STRING
          CALL LVFIND(LV2       A,LV2       B,LV2       C,LV2       D)
          LV1     AAD =      STRING
          IF (LVVAL.NE.-1) LV1     AAD = LVVAL
          LV1     AAH = LV1     AAD
C**** LV1     AAF            =       STRING
          LVVAD=-1
          LVVTYP=-1
          LVVPOS=1
          LVFUNC=    STRING
          LVVARG=LV1     AAH
          CALL LVDLET
          LV1     AAH = LV1     AAD
C**** LV1     AAF       STRING            BB
          LVDEST=  0
          LV1     AA1 = TYPE1
          LVTYPE(1) =  1
          LVVALS(1) = LV1     AA1
          LVDEST=  0
          LVVNVL =  1
          LVFUNC =      STRING
          LVVARG=LV1     AAH
          CALL LVNSRT
          IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
          IF(LVVAL.LT.0) RETURN
          RETURN
      121 CONTINUE
C  GET TYPE
          BETA=GETDIM(STR(J))
          IF(BETA .NE. 5) GO TO 125
C  OPERAND IS A FUNCTION REFERENCE
          IF(NDEP .EQ. 0) GO TO 18
          LVVPOS=-LVVPOS
          LVVTYP=  3
          LVVPOS=          1
          LVDEST=  2
          LV1     AAD = 1
          LVTYPE(1) =  1
          LVVALS(1) = LV1     AAD
          LVDEST=  2
          LVVNVL =  1
          LVFUNC =       FUNC1
          LVVARG=    OPRAND
          CALL LVNSRT
          IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
          IF(LVVAL.LT.0) RETURN
       18 R=FUNCRF
          JSTACK=JSTACK+1
          STACK(JSTACK,1)=R
          STACK(JSTACK,2)=0
          STACK(JSTACK,3)=J+1
          STACK(JSTACK,4)=0
      125 ALPHA=GETTYP(STR(J))
          IF(TYPE1 .GE. 0) GO TO 13
```

```
C  SET TYPE OF STATEMENT
      TYPE1=ALPHA
      IF(NTYPE .EQ. 3) TYPE1=-1
C 126 STRING+HOL.J(-STRING,STRING @@TYPE1@@)
  126 CONTINUE
C****     STRING            +          HOL
      LVVPOS =          J
      LVVTYP =   3
      LVFUNC=         HOL
      LVVARG=     STRING
      CALL LVFIND(LV2       E,LV2       F,LV2       G,LV2       H)
      LV1    AAH =     STRING
      IF (LVVAL.NE.-1) LV1    AAH = LVVAL
      LV1    AAJ = LV1    AAH
C**** LV1    AAF                    STRING
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
      LVFUNC=    STRING
      LVVARG=LV1    AAJ
      CALL LVDLET
      LV1    AAJ = LV1    AAH
C**** LV1    AAF       STRING           @@
      LVDEST=  0
      LV1    AAK = TYPE1
      LVTYPE(1) =  1
      LVVALS(1) = LV1    AAK
      LVDEST=  0
      LVVNVL =  1
      LVFUNC =     STRING
      LVVARG=LV1    AAJ
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
      RETURN
   13 IF(FLAG) GO TO 15
C  CHECK FOR MIXED MODE EXPRESSION
      IF(TYPE1 .EQ. ALPHA .OR. ALPHA .EQ. 5) GO TO 16
   14 N1=TYPE1+1
      N2=ALPHA+1
      ERRFLG=.TRUE.
      CALL ERROR(77,TYPE(N1),TYPE(N2))
C     STRING+HOL.J(-STRING,STRING @@TYPE1@@)
C****     STRING            +          HOL
      LVVPOS =          J
      LVVTYP =   3
      LVFUNC=         HOL
      LVVARG=     STRING
      CALL LVFIND(LV2       I,LV2       J,LV2       K,LV2       L)
      LV1    AAH =     STRING
      IF (LVVAL.NE.-1) LV1    AAH = LVVAL
      LV1    AAJ = LV1    AAH
C**** LV1    AAF            -       STRING
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
      LVFUNC=    STRING
      LVVARG=LV1    AAJ
```

```
      CALL LVDLET
      LVI     AAJ = LVI     AAH
C**** LVI     AAF       STRING            @@
      LVDEST=  0
      LVI     AAL = TYPEI
      LVTYPE(1) =  1
      LVVALS(1) = LVI     AAL
      LVDEST=  0
      LVVNVL =  1
      LVFUNC =      STRING
      LVVARG=LVI     AAJ
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
      RETURN
C  PARSING  AN EXPONENT
   15 IF((ALPHA .EQ. 3 .AND. TYPEI .EQ. 3).OR.((TYPEI .EQ. 0 .OR. TYPEI
     + .EQ. 2) .AND.
     +(ALPHA .EQ. 0 .OR. ALPHA .EQ. 2))) GO TO 16
      CALL ERROR(78,J,KDM2)
      ERRFLG=.TRUE.
C     STRING+HOL.J(-STRING,STRING @@TYPEI@@)
C****     STRING                          HOL
      LVVPOS =           J
      LVVTYP =    3
      LVFUNC=          HOL
      LVVARG=      STRING
      CALL LVFIND(LV2       M,LV2       N,LV2       O,LV2       P)
      LVI     AAH =      STRING
      IF (LVVAL.NE.-1) LVI     AAH = LVVAL
      LVI     AAJ = LVI     AAH
C**** LVI     AAF             =       STRING
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
      LVFUNC=     STRING
      LVVARG=LVI     AAJ
      CALL LVDLET
      LVI     AAJ = LVI     AAH
C**** LVI     AAF       STRING            @@
      LVDEST=  0
      LVI     AAM = TYPEI
      LVTYPE(1) =  1
      LVVALS(1) = LVI     AAM
      LVDEST=  0
      LVVNVL =  1
      LVFUNC =      STRING
      LVVARG=LVI     AAJ
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
      RETURN
   16 IF((.NOT. FLAG .AND. TYPEI .LT. ALPHA).OR.(FLAG .AND. ALPHA .NE. 3
     + .AND. TYPEI .LT. ALPHA)) TYPEI=ALPHA
C     STRING+HOL.J(-STRING,STRING @@TYPEI@@)
C****     STRING             +           HOL
      LVVPOS =           J
      LVVTYP =    3
```

```
      LVFUNC=          HOL
      LVVARG=      STRING
      CALL LVFIND(LV2       Q,LV2       R,LV2       S,LV2       T)
      LVI     AAH =      STRING
      IF (LVVAL.NE.-1) LVI     AAH = LVVAL
      LVI     AAJ = LVI     AAH
C**** LVI     AAF            -       STRING
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
      LVFUNC=     STRING
      LVVARG=LVI     AAJ
      CALL LVDLET
      LVI     AAJ = LVI     AAH
C**** LVI     AAF       STRING            @@
      LVDEST=  0
      LVI     AAN = TYPE1
      LVTYPE(1) =  1
      LVVALS(1) = LVI     AAN
      LVDEST=  0
      LVVNVL =  1
      LVFUNC =      STRING
      LVVARG=LVI     AAJ
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
      RETURN
C  WILL SCAN AN EXPONENT
   20 IF(STJ .LT. 0) RETURN
C     R+STJ/11 @R
C****          R            +          STJ
      LVVTYP = 3
      LVVPOS = 1
      LVINDX = 0
      LVFUNC=         STJ
      LVVARG=           R
      CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
      LVI     AAH =           R
      IF (LVVAL.NE.-1) LVI     AAH = LVVAL
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.EQ.-1) GO TO          11
C**** LVI     AAD            @            R
                R = LVI     AAH
      FLAG=.TRUE.
      RETURN
C  RECOGNIZED A TERM,PRODUCT OR PRIMARY PERHAPS NEEDING PARENTHESIZATION
   30 CONTINUE
      KTMP=R
      IF(NDEP .EQ. 0) GO TO 39
      LVVPOS=-LVVPOS
      LVVTYP=  3
      LVVPOS=          1
      LVDEST=  2
      LVI     AAH = 1
      LVTYPE(1) =  1
      LVVALS(1) = LVI     AAH
      LVDEST=  2
```

```
      LVVNVL =  1
      LVFUNC =       FUNC1
      LVVARG=    OPRAND
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
   39 CONTINUE
      ITEST=0
      IF(STJ .LT. 0) GO TO 31
C     R+STJ @R//32
C****          R            +          STJ
      LVVTYP = 3
      LVVPOS = 1
      LVINDX = 0
      LVFUNC=         STJ
      LVVARG=           R
      CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
      LVI    AAJ =          R
      IF (LVVAL.NE.-1) LVI    AAJ = LVVAL
C**** LVI    AAF            @            R
                R = LVI    AAJ
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.NE.-1) GO TO          32
C  31 R+STOP/39 @R
   31 CONTINUE
C****          R            +         STOP
      LVVTYP = 3
      LVVPOS = 1
      LVINDX = 0
      LVFUNC=        STOP
      LVVARG=           R
      CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
      LVI    AAJ =          R
      IF (LVVAL.NE.-1) LVI    AAJ = LVVAL
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.EQ.-1) GO TO          39
C**** LVI    AAF            @            R
                R = LVI    AAJ
      IF(STJ .LT. 0 .AND. KTMP .EQ. 889) GO TO 38
      ITEST=-1
   32 CONTINUE
C IF UNARY PLUS OR MINUS RETURN
      IF(STACK(JSTOP,1) .NE. 288 .AND. STACK(JSTOP,1) .NE. 110) GO TO 33
      JLAST=STACK(JSTOP,3)-1
      IF(STACK(JSTOP,1) .EQ. 288) JLAST=JLAST-1
C     STRING+HOL.JLAST(-STRING,STRING @@TYPE1@@)
C****     STRING            +          HOL
      LVVPOS =       JLAST
      LVVTYP =   3
      LVFUNC=         HOL
      LVVARG=      STRING
      CALL LVFIND(LV2       U,LV2       V,LV2       W,LV2       X)
      LVI    AAJ =      STRING
      IF (LVVAL.NE.-1) LVI    AAJ = LVVAL
      LVI    AAO = LVI    AAJ
C**** LVI    AAL            -        STRING
```

```
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
      LVFUNC=     STRING
      LVVARG=LV1     AAO
      CALL LVDLET
      LV1     AAO = LV1     AAJ
C**** LV1     AAL       STRING            QQ
      LVDEST=  0
      LV1     AAP = TYPE1
      LVTYPE(1) =  1
      LVVALS(1) = LV1     AAP
      LVDEST=  0
      LVVNVL =  1
      LVFUNC =      STRING
      LVVARG=LV1     AAO
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
C     STRING+HOL,J(-STRING,STRING QQTYPE1QQ)
C****     STRING            +          HOL
      LVVPOS =           J
      LVVTYP =    3
      LVFUNC=         HOL
      LVVARG=      STRING
      CALL LVFIND(LV2       Y,LV2       Z,LV2       0,LV2       1)
      LV1     AAJ =      STRING
      IF (LVVAL.NE.-1) LV1     AAJ = LVVAL
      LV1     AAO = LV1     AAJ
C**** LV1     AAL            -       STRING
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
      LVFUNC=     STRING
      LVVARG=LV1     AAO
      CALL LVDLET
      LV1     AAO = LV1     AAJ
C**** LV1     AAL       STRING            QQ
      LVDEST=  0
      LV1     AAQ = TYPE1
      LVTYPE(1) =  1
      LVVALS(1) = LV1     AAQ
      LVDEST=  0
      LVVNVL =  1
      LVFUNC =      STRING
      LVVARG=LV1     AAO
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
      IF(ITEST .LT. 0) J=J-1
      RETURN
   33 CONTINUE
      IF(ITEST .LT. 0) J=J-1
      JSTACK=JSTACK+1
      STACK(JSTACK,1)=STOP
      STACK(JSTACK,2)=0
      STACK(JSTACK,3)=J
      STACK(JSTACK,4)=0
```

```
      NTMP=R
      CALL SLEVEL(SKIP)
      JSTACK=JSTACK-1
      R=NTMP
      JLAST=1
      IF(JSTOP .GT. 0) JLAST=STACK(JSTOP,3)
      NTMP=TYPE1
      JJ=JLAST
      IF(STACK(JSTACK,1) .EQ. 418 .AND. JLAST .GT. 1) JJ=JLAST-1
C     STRING+HOL.JJ+STRING @TYPE1
C**** STRING              +          HOL
      LVVPOS =          JJ
      LVVTYP =    3
      LVFUNC=         HOL
      LVVARG=      STRING
      CALL LVFIND(LV2       2,LV2       3,LV2       4,LV2       5)
      LV1     AAJ =      STRING
      IF (LVVAL.NE.-1) LV1     AAJ = LVVAL
C**** LV1     AAF             +       STRING
      LVVTYP = 3
      LVVPOS = 1
      LVINDX = 0
      LVFUNC=      STRING
      LVVARG= LV1     AAJ
      CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
      LV1     AAO = LV1     AAJ
      IF (LVVAL.NE.-1) LV1     AAO = LVVAL
C**** LV1     AAL             @        TYPE1
            TYPE1 = LV1     AAO
      IF(.NOT. FLAG .OR. NTMP .EQ. 3) GO TO 35
      IF((NTMP.EQ.0.OR.NTMP.EQ.2).AND.(TYPE1.EQ.0.OR.TYPE1.EQ.2))GOTO 35
      ERRFLG=.TRUE.
      CALL ERROR(78,J,KDM2)
   35 CONTINUE
      IF(TYPE1 .GT. 2 .OR. NTYPE .GT. 1) GO TO 38
      FUNC=FUNC1
      IF(TYPE1 .EQ. 1) FUNC=FUNC2
      IF(TYPE1 .EQ. 2) FUNC=FUNC3
C     STRING+HOL.JLAST LEFT(.1 LPAR,.1 FUNC)
C**** STRING              +          HOL
      LVVPOS =       JLAST
      LVVTYP =    3
      LVFUNC=         HOL
      LVVARG=      STRING
      CALL LVFIND(LV2       6,LV2       7,LV2       8,LV2       9)
      LV1     AAO =      STRING
      IF (LVVAL.NE.-1) LV1     AAO = LVVAL
      LV1     AAJ = LV1     AAO
      LV1     AAR =        LEFT
C**** LV1     AAO                          1
      LVVTYP=  3
      LVVPOS=          1
C**** LV1     AAF  LV1     AAO         LPAR
      LVDEST=  1
      LVTYPE(1) =  0
      LVVALS(1) =        LPAR
      LVVNVL =  1
      LVFUNC = LV1     AAR
```

```
474.          LVVARG=LVI     AAJ
475.          CALL LVNSRT
476.          IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
477.          IF(LVVAL.LT.0) RETURN
478.          LVI     AAJ = LVI     AAO
479.    C**** LVI     AAO            .            I
480.          LVVTYP=  3
481.          LVVPOS=          I
482.    C**** LVI     AAF  LVI     AAO          FUNC
483.          LVDEST=  1
484.          LVTYPE(I) =  0
485.          LVVALS(I) =        FUNC
486.          LVVNVL =  I
487.          LVFUNC = LVI     AAR
488.          LVVARG=LVI     AAJ
489.          CALL LVNSRT
490.          IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
491.          IF(LVVAL.LT.0) RETURN
492.    C     STRING+HOL.J RIGHT RPAR
493.    C****     STRING            +           HOL
494.          LVVPOS =           J
495.          LVVTYP =   3
496.          LVFUNC=         HOL
497.          LVVARG=      STRING
498.          CALL LVFIND(LV2      AA,LV2      AB,LV2      AC,LV2      AD)
499.          LVI     AAO =      STRING
500.          IF (LVVAL.NE.-1) LVI     AAO = LVVAL
501.    C**** LVI     AAL        RIGHT         RPAR
502.          LVDEST=  0
503.          LVTYPE(I) =  0
504.          LVVALS(I) =        RPAR
505.          LVVNVL =  1
506.          LVFUNC =       RIGHT
507.          LVVARG=LVI     AAO
508.          CALL LVNSRT
509.          IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
510.          IF(LVVAL.LT.0) RETURN
511.       38 IF(ITEST .LT. 0 .AND. STJ .LT. 0) J=J+1
512.          FLAG=.FALSE.
513.          RETURN
514.       39 FLAG=.FALSE.
515.          GO TO 11
516.    C  CHECK FOR CORRECTNESS OF SUBSCRIPTS
517.       40 NR=R
518.    C     R+STJ/11 OR
519.    C****          R            +           STJ
520.          LVVTYP = 3
521.          LVVPOS = 1
522.          LVINDX = 0
523.          LVFUNC=          STJ
524.          LVVARG=            R
525.          CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
526.          LVI     AAO =           R
527.          IF (LVVAL.NE.-1) LVI     AAO = LVVAL
528.          LVVTR = LVVAL
529.          LVVAL = -100
530.          IF (LVVTR.EQ.-1) GO TO          11
531.    C**** LVI     AAL            @            R
```

```
                R = LVI     AAO
      NBETA=GETDIM(STR(J))
      IF(NR .EQ. 359 .AND. NBETA .NE. 4) GO TO 47
      ALPHA=GETTYP(STR(J))
      GAMMA=STR(J)/1000000
      IF(NTYPE .EQ. 3) GO TO 45
      IF(NR .EQ. 839 .AND. NBETA .EQ. 0) GO TO 45
      IF(NR .EQ. 359) GO TO 45
      IF(NR .EQ. 21 .AND. NBETA .EQ. 4) GO TO 45
      IF(NBETA .EQ. 0 .AND. NR .EQ. 935) GO TO 45
      IF(NTYPE .EQ. 2 .AND. NR .EQ. 935 .AND. STR(J-1) .NE. -7) GO TO 45
      IF(NTYPE .EQ. 2 .AND. NR .EQ. 359 .AND. NBETA .EQ. 0) GO TO 11
      CALL ERROR(79,J,KDM2)
      ERRFLG=.TRUE.
   45 CONTINUE
      IF(GAMMA .GE. 6 .AND. NBETA .EQ. 4) CALL ERROR(76,KDM1,KDM2)
      IF(ALPHA .EQ. 3) GO TO 46
      N1=ALPHA+1
      ERRFLG=.TRUE.
      CALL ERROR(80,TYPE(N1),J)
   46 IF(NBETA .EQ. 4) RETURN
      MARGS=MARGS+1
      LVI     AAO =      OPRAND
      LVDEST=  0
      LVI     AAR = MARGS
      LVTYPE(1) =  1
      LVVALS(1) = LVI     AAR
      LVDEST=  0
      LVVNVL =  1
      LVFUNC =       FUNC2
      LVVARG=LVI     AAO
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
      LVDEST=  0
      LVI     AAJ = J
      LVTYPE(1) =  1
      LVVALS(1) = LVI     AAJ
      LVDEST=  0
      LVVNVL =  1
      LVFUNC =       FUNC3
      LVVARG=LVI     AAO
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
      LVDEST=  0
      LVI     AAS = NDEPTH
      LVTYPE(1) =  1
      LVVALS(1) = LVI     AAS
      LVDEST=  0
      LVVNVL =  1
      LVFUNC =       LEVEL
      LVVARG=LVI     AAO
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
      IVR=(MARGS+1)/2
      IF(IVR .GT. 50) GO TO 1610
```

```
      ICOL=18*MOD(MARGS-1,2)+9
      IVAL=MOD(STR(J),10000)
      IARGS(IVR)=BITPUT(IARGS(IVR),IVAL,ICOL)
      IF(NR .EQ. 839) GO TO 49
      IF(NTYPE .NE. 3) RETURN
C  FLAG SUBSCRIPT IN I/O LIST
      IARGS(IVR)=BITPUT(IARGS(IVR),1,ICOL+3)
      RETURN
C FLAG DO INDEX IN I/O LIST
   49 IARGS(IVR)=BITPUT(IARGS(IVR),2,ICOL+3)
      IF(NFLAG .LT. 1) RETURN
      IARGS(IVR)=BITPUT(IARGS(IVR),FL(NFLAG),ICOL+9)
      RETURN
   47 NR=R
C   SUBSCRIPT DOES NOT BEGIN WITH CONSTANT, FORCE SEARCH FOR VARIABLE
      GO TO 11
C  CHECK FOR PROPER NUMBER OF SUBSCRIPTS
   50 IF( BETA .EQ. 4 .OR. R .NE. 452) GO TO 52
      MARGS=MARGS+1
      LV1     AAO =      OPRAND
      LVDEST=  0
      LV1     AAT = MARGS
      LVTYPE(1) =  1
      LVVALS(1) = LV1     AAT
      LVDEST=  0
      LVVNVL =  1
      LVFUNC =       FUNC2
      LVVARG=LV1     AAO
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
      LVDEST=  0
      LV1     AAU = J-1
      LVTYPE(1) =  1
      LVVALS(1) = LV1     AAU
      LVDEST=  0
      LVVNVL =  1
      LVFUNC =       FUNC3
      LVVARG=LV1     AAO
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
      LVDEST=  0
      LV1     AAV = NDEPTH
      LVTYPE(1) =  1
      LVVALS(1) = LV1     AAV
      LVDEST=  0
      LVVNVL =  1
      LVFUNC =       LEVEL
      LVVARG=LV1     AAO
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
      IVR=(MARGS+1)/2
      IF(IVR .GT. 50) GO TO 1610
      ICOL=18*MOD(MARGS-1,2)+9
      IVAL=MOD(STR(J-1),10000)
      IARGS(IVR)=BITPUT(IARGS(IVR),IVAL,ICOL)
```

```
      IF(NOPAR .LE. 0) GO TO 52
      LVVPOS =          1
      LVVTYP =   3
      LVVPOS=-LVVPOS
      LVFUNC=      ACTION
      LVVARG=      OPRAND
      CALL LVFIND(LV2      AE,LV2      AF,LV2      AG,LV2      AH)
      LVI     AAO =      OPRAND
      IF (LVVAL.NE.-1) LVI     AAO = LVVAL
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.EQ.-1) GO TO          52
           MFUNC = LVI     AAO
      IARGS(IVR)=BITPUT(IARGS(IVR),MFUNC ,ICOL+3)
      IARGS(IVR)=BITPUT(IARGS(IVR),NARGS,ICOL+9)
C IF NO STRING LEFT, RETURN IF CONSTANT,VARIABLE OR I/O LIST
   52 IF(STJ .LT. 0 .AND. (BETA .EQ. 0 .OR. BETA .EQ. 4
     $ .OR. NTYPE .EQ. 3)) RETURN
      IF(BETA .GT. NARRAY) GO TO 55
      ERRFLG=.TRUE.
      CALL ERROR(81,J)
   55 IF(R .EQ. 452) NARRAY=0
      IF(R .EQ. 318) NARRAY=1
      IF(R .EQ.  60) NARRAY=2
      IF(R .EQ. 103) NARRAY=3
      IF(STJ .LT. 0) GO TO 58
C     R+STJ @R//56
C**** R + STJ
      LVVTYP = 3
      LVVPOS = 1
      LVINDX = 0
      LVFUNC=          STJ
      LVVARG=          R
      CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
      LVI     AAO =          R
      IF (LVVAL.NE.-1) LVI     AAO = LVVAL
C**** LVI     AAL          @          R
                R = LVI     AAO
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.NE.-1) GO TO          56
   58 IF(NTYPE .EQ. 3 .AND. NARRAY .EQ. 0) GO TO 57
      IF(BETA .GE. 1 .AND. BETA .LE. 3 .AND. NOPAR .EQ. 0)
     $ CALL ERROR(82,J,KDM2)
   57 NARRAY=-1
      GO TO 11
   56 IF(NTYPE .EQ. 3 .AND. NARRAY .EQ. 0) RETURN
      IF(STJ .EQ. RPAR .AND. NARRAY .LT.  BETA .AND. J .EQ. MAXJ)
     $ CALL ERROR(82,J,KDM2)
      IF(STJ .EQ. RPAR) NARRAY=-1
      RETURN
C  RESET TYPE OF STATEMENT IN ANTICIPATION OF SEARCH FOR BOOLEAN PRIMARY
   60 CONTINUE
      NOTFLG=.FALSE.
      IF(STR(J-1) .EQ. -17) NOTFLG=.TRUE.
      TYPEI=-1
C     STRING+HOL.J(-STRING,STRING @@TYPEI@@)
C**** STRING + HOL
```

```
706•          LVVPOS =           J
707•          LVVTYP =   3
708•          LVFUNC=         HOL
709•          LVVARG=      STRING
710•          CALL LVFIND(LV2      AI,LV2      AJ,LV2      AK,LV2      AL)
711•          LVI     AAO =      STRING
712•          IF (LVVAL.NE.-1) LVI     AAO = LVVAL
713•          LVI     AAW = LVI     AAO
714•     C•••• LVI     AAO            -       STRING
715•          LVVAD=-1
716•          LVVTYP=-1
717•          LVVPOS=1
718•          LVFUNC=     STRING
719•          LVVARG=LVI     AAW
720•          CALL LVDLET
721•          LVI     AAW = LVI     AAO
722•     C•••• LVI     AAO       STRING            @@
723•          LVDEST=  0
724•          LVI     AAX = TYPEI
725•          LVTYPE(1) =  1
726•          LVVALS(1) = LVI     AAX
727•          LVDEST=  0
728•          LVVNVL =  1
729•          LVFUNC =      STRING
730•          LVVARG=LVI     AAW
731•          CALL LVNSRT
732•          IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
733•          IF(LVVAL.LT.0) RETURN
734•          IF(STJ .NE. OPRAND) GO TO 65
735•          ALPHA=GETTYP(STR(J))
736•          BETA=GETDIM(STR(J))
737•          IF(ALPHA .NE. 4) GO TO 11
738•       65 CONTINUE
739•     C    R+STJ/11 @R
740•     C••••          R            +          STJ
741•          LVVTYP = 3
742•          LVVPOS = 1
743•          LVINDX = 0
744•          LVFUNC=         STJ
745•          LVVARG=           R
746•          CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
747•          LVI     AAO =          R
748•          IF (LVVAL.NE.-1) LVI     AAO = LVVAL
749•          LVVTR = LVVAL
750•          LVVAL = -100
751•          IF (LVVTR.EQ.-1) GO TO          11
752•     C•••• LVI     AAL            @            R
753•                    R = LVI     AAO
754•          RETURN
755•     C  IF BOOLEAN PRIMARY IS AN ARETHMETIC COMPARE CONTINUE PARSING PRIMARY
756•       70 IF(STJ .LT. 0) RETURN
757•          IF(TYPEI .EQ. 4) GO TO 75
758•     C    R+STJ @R/11
759•     C••••          R            +          STJ
760•          LVVTYP = 3
761•          LVVPOS = 1
762•          LVINDX = 0
763•          LVFUNC=         STJ
```

```
      LVVARG=          R
      CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
      LVI     AAO =          R
      IF (LVVAL.NE.-1) LVI     AAO = LVVAL
C**** LVI     AAL          @          R
                R = LVI     AAO
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.EQ.-1) GO TO          11
C  RELATIONAL OPERATOR FOUND
      IF(NDEP .EQ. 0) RETURN
      LVVPOS=-LVVPOS
      LVVTYP=  3
      LVVPOS=          1
      LVDEST=  2
      LVI     AAO = 1
      LVTYPE(1) =  1
      LVVALS(1) = LVI     AAO
      LVDEST=  2
      LVVNVL =  1
      LVFUNC =       FUNC1
      LVVARG=     OPRAND
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
      RETURN
C  IF BOOLEAN VARIABLE OR CONSTANT, SET STATE TO STOP
   75 R=STOP
      JSTACK=JSTACK+1
      STACK(JSTACK,1)=R
      STACK(JSTACK,2)=0
      STACK(JSTACK,3)=J
      STACK(JSTACK,4)=0
      GO TO 11
C  COMPARE TYPES ON BOTH SIDES OF RELATIONAL EXPRESSION
   80 IF(TYPE1 .EQ. 0 .OR. TYPE1 .EQ. 2 .OR. TYPE1 .EQ. 3) GO TO 85
      ERRFLG=.TRUE.
      CALL ERROR(83,J,KDM2)
      TYPE1=-1
C     STRING+HOL.J(-STRING,STRING @@TYPE1@@)
C****     STRING                    HOL
      LVVPOS =          J
      LVVTYP =    3
      LVFUNC=         HOL
      LVVARG=      STRING
      CALL LVFIND(LV2      AM,LV2      AN,LV2      AO,LV2      AP)
      LVI     AA@ =      STRING
      IF (LVVAL.NE.-1) LVI     AA@ = LVVAL
      LVI     AAY = LVI     AA@
C**** LVI     AAO          -       STRING
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
      LVFUNC=     STRING
      LVVARG=LVI     AAY
      CALL LVDLET
      LVI     AAY = LVI     AA@
C**** LVI     AAO       STRING          @@
```

```
      LVDEST=  0
      LVI     AAZ = TYPEI
      LVTYPE(1) =  1
      LVVALS(1) = LVI     AAZ
      LVDEST=  0
      LVVNVL =  1
      LVFUNC =      STRING
      LVVARG=LVI     AAY
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
   85 TYPE2=TYPEI
      GO TO 11
C  BOOLEAN PRIMARY RECOGNIZED-SET TYPE TO BOOLEAN AND CONTINUE PARSE
   90 IF(TYPEI .EQ. TYPE2 .OR. TYPEI+TYPE2 .EQ. 2 .OR.
     + TYPE2 .LT. 0) GO TO 95
      N1=TYPEI+1
      N2=TYPE2+1
      CALL ERROR(77,TYPE(N1),TYPE(N2))
      ERRFLG=.TRUE.
   95 TYPEI=9
      TYPE2=-1
      IF(STJ .LT. 0) RETURN
C     STRING+HOL,J1-STRING,STRING @@TYPEI@@)
C****     STRING            +          HOL
      LVVPOS =          J
      LVVTYP =    3
      LVFUNC=         HOL
      LVVARG=      STRING
      CALL LVFIND(LV2     AQ,LV2     AR,LV2     AS,LV2     AT)
      LVI     AA# =      STRING
      IF (LVVAL.NE.-1) LVI     AA# = LVVAL
      LVI     AAY = LVI     AA#
C**** LVI     AAO            -       STRING
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
      LVFUNC=     STRING
      LVVARG=LVI     AAY
      CALL LVDLET
      LVI     AAY = LVI     AA#
C**** LVI     AAO       STRING           @@
      LVDEST=  0
      LVI     AAO = TYPEI
      LVTYPE(1) =  1
      LVVALS(1) = LVI     AAO
      LVDEST=  0
      LVVNVL =  1
      LVFUNC =      STRING
      LVVARG=LVI     AAY
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
      GO TO 11
C  PARSE REACHED BLIND ALLEY-MUST BACK UP AND REMOVE PARENTHESES CREATED
  999 JM=STACK(JSTACK,3)
      K=JM
      DO 996 KK=JM,J
```

```
C      STRING+HOL.K/995+STRING.I/996 @TYPE1
C****      STRING            +          HOL
           LVVPOS =            K
           LVVTYP =    3
           LVFUNC=         HOL
           LVVARG=      STRING
           CALL LVFIND(LV2      AU,LV2      AV,LV2      AW,LV2      AX)
           LV1     AAW =      STRING
           IF (LVVAL.NE.-1) LV1     AAW = LVVAL
           LVVTR = LVVAL
           LVVAL = -100
           IF (LVVTR.EQ.-1) GO TO          995
C**** LV1     AAL            +       STRING
           LVVPOS =            1
           LVVTYP =    3
           LVFUNC=      STRING
           LVVARG= LV1     AAW
           CALL LVFIND(LV2      AY,LV2      AZ,LV2      AD,LV2      A1)
           LV1     AAY = LV1     AAW
           IF (LVVAL.NE.-1) LV1     AAY = LVVAL
           LVVTR = LVVAL
           LVVAL = -100
           IF (LVVTR.EQ.-1) GO TO          996
C**** LV1     AAO            @        TYPE1
                TYPE1 = LV1     AAY
           GO TO 995
       996 K=K-1
       995 CONTINUE
           DO 998 I=JM,J
C      STRING+HOL.I(-LEFT,-RIGHT)
C****      STRING            +          HOL
           LVVPOS =            1
           LVVTYP =    3
           LVFUNC=         HOL
           LVVARG=      STRING
           CALL LVFIND(LV2      A2,LV2      A3,LV2      A4,LV2      A5)
           LV1     AAY =      STRING
           IF (LVVAL.NE.-1) LV1     AAY = LVVAL
           LV1     AAW = LV1     AAY
C**** LV1     AAL            -        LEFT
           LVVAD=-1
           LVVTYP=-1
           LVVPOS=1
           LVFUNC=       LEFT
           LVVARG=LV1     AAW
           CALL LVDLET
           LV1     AAW = LV1     AAY
C**** LV1     AAL            -        RIGHT
           LVVAD=-1
           LVVTYP=-1
           LVVPOS=1
           LVFUNC=      RIGHT
           LVVARG=LV1     AAW
           CALL LVDLET
       998 CONTINUE
       980 CONTINUE
           LVVPOS =            1
           LVVTYP =    3
```

```
      LVVPOS=-LVVPOS
      LVFUNC=      FUNC3
      LVVARG=      OPRAND
      CALL LVFIND(LV2      A6,LV2      A7,LV2      A8,LV2      A9)
      LV1     AAY =      OPRAND
      IF (LVVAL.NE.-1) LV1     AAY = LVVAL
            JN = LV1     AAY
      IF(JN .LT. JM) GO TO 985
      LV1     AAY =      OPRAND
      LVVPOS =            1
      LVVTYP =    3
      LVVPOS=-LVVPOS
      LVFUNC=      FUNC2
      LVVARG= LV1     AAY
      LVVAD=-1
      CALL LVDLET
      LVVPOS =            1
      LVVTYP =    3
      LVVPOS=-LVVPOS
      LVFUNC=      FUNC3
      LVVARG= LV1     AAY
      LVVAD=-1
      CALL LVDLET
      LVVPOS =            1
      LVVTYP =    3
      LVVPOS=-LVVPOS
      LVFUNC=      LEVEL
      LVVARG= LV1     AAY
      LVVAD=-1
      CALL LVDLET
      GO TO 980
  985 CONTINUE
      LVVPOS =            1
      LVVTYP =    3
      LVVPOS=-LVVPOS
      LVFUNC=      FUNC2
      LVVARG=      OPRAND
      CALL LVFIND(LV2      BA,LV2      BB,LV2      BC,LV2      BD)
      LV1     AAY =      OPRAND
      IF (LVVAL.NE.-1) LV1     AAY = LVVAL
            NARGS = LV1     AAY
      LVVPOS =            1
      LVVTYP =    3
      LVVPOS=-LVVPOS
      LVFUNC=      LEVEL
      LVVARG=      OPRAND
      CALL LVFIND(LV2      BE,LV2      BF,LV2      BG,LV2      BH)
      LV1     AAY =      OPRAND
      IF (LVVAL.NE.-1) LV1     AAY = LVVAL
            NDEPTH = LV1     AAY
      RETURN

C     RECOGNIZED FUNCTION-PREPARE TO SET TYPE OF ARGUMENTS FOR THE @NDEPTH@
C                FUNCTION IN THIS STMT
 1000 CONTINUE
      NDEPTH=NDEPTH+1
      NDEP=NDEP+1
      NARGS=0
```

```
C      R+STJ/II @R
C****          R            +          STJ
       LVVTYP = 3
       LVVPOS = 1
       LVINDX = 0
       LVFUNC=          STJ
       LVVARG=            R
       CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
       LVI     AAY =            R
       IF (LVVAL.NE.-1) LVI     AAY = LVVAL
       LVVTR = LVVAL
       LVVAL = -100
       IF (LVVTR.EQ.-1) GO TO           II
C**** LVI     AAO            @            R
                R = LVI     AAY
       NARGS=1
C      OPRAND(OPRAND @@TYPE1@@,STRING@@NARGS@@,ACTION @@NDEPTH@@)
       LVI     AAY =      OPRAND
C**** LVI     AAO       OPRAND            @@
       LVDEST=  0
       LVI     AA# = TYPE1
       LVTYPE(1) =  1
       LVVALS(1) = LVI     AA#
       LVDEST=  0
       LVVNVL =  1
       LVFUNC =      OPRAND
       LVVARG=LVI     AAY
       CALL LVNSRT
       IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
       IF(LVVAL.LT.0) RETURN
C**** LVI     AAO       STRING            @@
       LVDEST=  0
       LVI     AA1 = NARGS
       LVTYPE(1) =  1
       LVVALS(1) = LVI     AA1
       LVDEST=  0
       LVVNVL =  1
       LVFUNC =      STRING
       LVVARG=LVI     AAY
       CALL LVNSRT
       IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
       IF(LVVAL.LT.0) RETURN
C**** LVI     AAO       ACTION            @@
       LVDEST=  0
       LVI     AA2 = NDEPTH
       LVTYPE(1) =  1
       LVVALS(1) = LVI     AA2
       LVDEST=  0
       LVVNVL =  1
       LVFUNC =      ACTION
       LVVARG=LVI     AAY
       CALL LVNSRT
       IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
       IF(LVVAL.LT.0) RETURN
C      OPRAND FUNC1 @@J+1@@
C****      OPRAND        FUNC1            @@
       LVDEST=  0
       LVI     AAY = 0
```

```
1054.          LVTYPE(I) =  I
1055.          LVVALS(I) = LVI     AAY
1056.          LVDEST=  0
1057.          LVVNVL =  1
1058.          LVFUNC =       FUNCI
1059.          LVVARG=     OPRAND
1060.          CALL LVNSRT
1061.          IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
1062.          IF(LVVAL.LT.0) RETURN
1063.          TYPEI=-1
1064.    C     NOPAR=NOPAR+1
1065.          NOPAR=NOPAR+1
1066.          RETURN
1067.
1068.    C KEEP TRACK OF THE NUMBER AND TYPES OF ARGUMENTS IN FUNCTION CALLS
1069.    C   MUST USE STACK FOR POSSIBLE RECURSIVE FUNCTION USE
1070.     1100 CONTINUE
1071.          LVVTYP = 3
1072.          LVVPOS = 1
1073.          LVINDX = 0
1074.          LVFUNC=          STJ
1075.          LVVARG=            R
1076.          CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
1077.          LVI     AA3 =            R
1078.          IF (LVVAL.NE.-1) LVI     AA3 = LVVAL
1079.          LVVTR = LVVAL
1080.          LVVAL = -100
1081.          IF (LVVTR.EQ.-1) GO TO          11
1082.                   R = LVI     AA3
1083.          LVI     AA3 =      OPRAND
1084.          LVVPOS =            I
1085.          LVVTYP =   3
1086.          LVVPOS=-LVVPOS
1087.          LVFUNC=      STRING
1088.          LVVARG= LVI     AA3
1089.          CALL LVFIND(LV2      BI,LV2      BJ,LV2      BK,LV2      BL)
1090.          LVI     AA4 = LVI     AA3
1091.          IF (LVVAL.NE.-1) LVI     AA4 = LVVAL
1092.          LVVTR = LVVAL
1093.          LVVAL = -100
1094.          IF (LVVTR.EQ.-1) GO TO         1103
1095.    C**** LVI     AAU            @        NARGS
1096.                NARGS = LVI     AA4
1097.    C**** LVI     AAT            +       STRING
1098.          LVVPOS =            I
1099.          LVVTYP =   3
1100.          LVVPOS=-LVVPOS
1101.          LVFUNC=      STRING
1102.          LVVARG= LVI     AA3
1103.          LVVAD=-1
1104.          CALL LVDLET
1105.    C**** LVI     AAT            +       ACTION
1106.          LVVPOS =            I
1107.          LVVTYP =   3
1108.          LVVPOS=-LVVPOS
1109.          LVFUNC=      ACTION
1110.          LVVARG= LVI     AA3
1111.          CALL LVFIND(LV2      BM,LV2      BN,LV2      BO,LV2      BP)
```

```
1112*          LVI     AA4 = LVI     AA3
1113*          IF (LVVAL.NE.-1) LVI     AA4 = LVVAL
1114*     C**** LVI     AAU              @*      NDEPTH
1115*               MFUNC = LVI     AA4
1116*          LVVPOS =            1
1117*          LVVTYP =    3
1118*          LVVPOS=-LVVPOS
1119*          LVFUNC=       FUNCI
1120*          LVVARG=      OPRAND
1121*          CALL LVFIND(LV2      BQ,LV2      BR,LV2      BS,LV2      BT)
1122*          LVI     AA3 =      OPRAND
1123*          IF (LVVAL.NE.-1) LVI     AA3 = LVVAL
1124*               IEXP = LVI     AA3
1125*     C1103 R+STJ/11 BR
1126*      1103 CONTINUE
1127*     C  STORE ARGUMENT TYPES
1128*          IF(NDEPTH .GT. 5) CALL ERROR(85)
1129*          IF(NDEPTH .GT. 5) GO TO 1130
1130*          IF(NARGS .LE. 63) GO TO 1104
1131*          ERRFLG=.TRUE.
1132*          CALL ERROR(84,NDEPTH,KDM2)
1133*          GO TO 11
1134*      1104 CONTINUE
1135*          MM=(7+NARGS)/4
1136*          ITEMP=NARGS-4*(MM-2)
1137*          ICOL=9*ITEMP-6
1138*          NARY(MFUNC,MM)=BITPUT(NARY(MFUNC,MM),MOD((TYPEI+1),6),ICOL)
1139*          IF(STR(J-2) .NE. =6 .AND. STR(J-2) .NE. =4) GO TO 1130
1140*          NDIM=GETDIM(STR(J-1))
1141*          IF(NDIM .GE. 4) GO TO 1130
1142*     C  STORE DIMENSIONALITY OF ARGUMENTS
1143*          NARY(MFUNC ,MM)=BITPUT(NARY(MFUNC ,MM),NDIM,ICOL+3)
1144*      1130 CONTINUE
1145*          NARY(MFUNC,MM)=BITPUT(NARY(MFUNC,MM),IEXP,ICOL+6)
1146*          IF(STJ .EQ. COMMA) GO TO 1105
1147*          NARY(MFUNC,1)=NARGS
1148*          LVI     AA3 =      OPRAND
1149*          LVVPOS =            1
1150*          LVVTYP =    3
1151*          LVVPOS=-LVVPOS
1152*          LVFUNC=      ACTION
1153*          LVVARG= LVI     AA3
1154*          LVVAD=-1
1155*          CALL LVDLET
1156*          LVVPOS =            1
1157*          LVVTYP =    3
1158*          LVVPOS=-LVVPOS
1159*          LVFUNC=      OPRAND
1160*          LVVARG= LVI     AA3
1161*          CALL LVFIND(LV2      BU,LV2      BV,LV2      BW,LV2      BX)
1162*          LVI     AA4 = LVI     AA3
1163*          IF (LVVAL.NE.-1) LVI     AA4 = LVVAL
1164*          LVVTR = LVVAL
1165*          LVVAL = -100
1166*          IF (LVVTR.EQ.-1) GO TO        1135
1167*               TYPEI = LVI     AA4
1168*          LVI     AA3 =      OPRAND
1169*          LVVPOS =            1
```

```
1170•          LVVTYP =   3
1171•          LVVPOS=-LVVPOS
1172•          LVFUNC=      FUNCI
1173•          LVVARG= LVI     AA3
1174•          LVVAD=-1
1175•          CALL LVDLET
1176•          LVVPOS =            I
1177•          LVVTYP =   3
1178•          LVVPOS=-LVVPOS
1179•          LVFUNC=      OPRAND
1180•          LVVARG= LVI     AA3
1181•          LVVAD=-1
1182•          CALL LVDLET
1183•     1135 NOPAR=NOPAR-1
1184•          NDEP=NDEP-1
1185•          RETURN
1186•     1105 TYPEI=-1
1187•     C    STRING+HOL.J(-STRING,STRING @@TYPE(@@)
1188•     C**** STRING            +          HOL
1189•          LVVPOS =            J
1190•          LVVTYP =   3
1191•          LVFUNC=         HOL
1192•          LVVARG=      STRING
1193•          CALL LVFIND(LV2     BY,LV2     BZ,LV2     BO,LV2     BI)
1194•          LVI     AA3 =      STRING
1195•          IF (LVVAL.NE.-1) LVI     AA3 = LVVAL
1196•          LVI     AA4 = LVI     AA3
1197•     C**** LVI     AAU            -       STRING
1198•          LVVAD=-1
1199•          LVVTYP=-1
1200•          LVVPOS=1
1201•          LVFUNC=    STRING
1202•          LVVARG=LVI     AA4
1203•          CALL LVDLET
1204•          LVI     AA4 = LVI     AA3
1205•     C**** LVI     AAU       STRING           @@
1206•          LVDEST=  0
1207•          LVI     AA5 = TYPEI
1208•          LVTYPE(1) =  1
1209•          LVVALS(1) = LVI     AA5
1210•          LVDEST=  0
1211•          LVVNVL =  1
1212•          LVFUNC =      STRING
1213•          LVVARG=LVI     AA4
1214•          CALL LVNSRT
1215•          IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
1216•          IF(LVVAL.LT.0) RETURN
1217•          NARGS=NARGS+1
1218•     C**** LVI     AAT       STRING           @@
1219•          LVDEST=  0
1220•          LVI     AA3 = NARGS
1221•          LVTYPE(1) =  1
1222•          LVVALS(1) = LVI     AA3
1223•          LVDEST=  0
1224•          LVVNVL =  1
1225•          LVFUNC =      STRING
1226•          LVVARG=    OPRAND
1227•          CALL LVNSRT
```

```
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
C****      FUNC1                          1
      LVVPOS=-LVVPOS
      LVVTYP=  3
      LVVPOS=          1
C**** LV1     AAT        FUNC1            @@
      LVDEST=  2
      LV1     AA4 = 0
      LVTYPE(1) =  1
      LVVALS(1) = LV1     AA4
      LVDEST=  2
      LVVNVL =  1
      LVFUNC =       FUNC1
      LVVARG=     OPRAND
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
      RETURN
C  SAVE TYPE OF STAEMENT WHILE PARSING EXPONENT
 1200 CONTINUE
C     STRING=HOL.J(=STRING,STRING @@TYPE1@@)
C****      STRING            +          HOL
      LVVPOS =           J
      LVVTYP =    3
      LVFUNC=         HOL
      LVVARG=      STRING
      CALL LVFIND(LV2     B2,LV2     B3,LV2     B4,LV2     B5)
      LV1     AA6 =      STRING
      IF (LVVAL.NE.-1) LV1     AA6 = LVVAL
      LV1     AA7 = LV1     AA6
C**** LV1     AAX            =       STRING
      LVVAD=-1
      LVVTYP=-1
      LVVPOS=1
      LVFUNC=     STRING
      LVVARG=LV1     AA7
      CALL LVDLET
      LV1     AA7 = LV1     AA6
C**** LV1     AAX       STRING            @@
      LVDEST=  0
      LV1     AA8 = TYPE1
      LVTYPE(1) =  1
      LVVALS(1) = LV1     AA8
      LVDEST=  0
      LVVNVL =  1
      LVFUNC =      STRING
      LVVARG=LV1     AA7
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
      TYPE1=-1
C     R+STJ/11 @R
C****          R            +          STJ
      LVVTYP = 3
      LVVPOS = 1
      LVINDX = 0
      LVFUNC=         STJ
```

```
      LVVARG=          R
      CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
      LVI     AA6 =          R
      IF (LVVAL.NE.-1) LVI     AA6 = LVVAL
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.EQ.-1) GO TO          11
C**** LVI     AA7          R          R
                R = LVI     AA6
C     COMPLETE
      RETURN
 1300 CONTINUE
      IF(STJ .LT. 0) RETURN
      IF(STJ .NE. AND .AND. STJ .NE. OR .AND. STJ .NE. NOT) GO TO 11
      LVVTYP = 3
      LVVPOS = 1
      LVINDX = 0
      LVFUNC=         STJ
      LVVARG=          R
      CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
      LVI     AA6 =          R
      IF (LVVAL.NE.-1) LVI     AA6 = LVVAL
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.EQ.-1) GO TO          11
                R = LVI     AA6
      IF(NDEP .EQ. 0) RETURN
C  LOGICAL OPERATOR FOUND
      LVVPOS=-LVVPOS
      LVVTYP=  3
      LVVPOS=          1
      LVDEST=  2
      LVI     AA6 = 1
      LVTYPE(1) =  1
      LVVALS(1) = LVI     AA6
      LVDEST=  2
      LVVNVL =  1
      LVFUNC =       FUNC1
      LVVARG=     OPRAND
      CALL LVNSRT
      IF(LVVAL.LT.0) CALL LVEXIT(LVVAL)
      IF(LVVAL.LT.0) RETURN
      RETURN
 1400 CONTINUE
      LVVTYP = 3
      LVVPOS = 1
      LVINDX = 0
      LVFUNC=         STJ
      LVVARG=          R
      CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
      LVI     AA7 =          R
      IF (LVVAL.NE.-1) LVI     AA7 = LVVAL
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.EQ.-1) GO TO          11
                R = LVI     AA7
C  LEFT PAREN FOUND IN I/O LIST
      NFLAG=NFLAG+1
```

```
      FL(NFLAG)=MARGS
      RETURN
 1500 CONTINUE
      LVVTYP = 3
      LVVPOS = 1
      LVINDX = 0
      LVFUNC=          STJ
      LVVARG=            R
      CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
      LVI     AA7 =            R
      IF (LVVAL.NE.-1) LVI     AA7 = LVVAL
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.EQ.-1) GO TO          11
                R = LVI     AA7
      IF(STJ .EQ. COMMA) RETURN
C  RIGHT PAREN FOUND IN I/O LIST
      NFLAG=NFLAG-1
      RETURN
 1600 CONTINUE
      TYPE1=4
      RETURN
 1610 CALL ERROR(95,IDM1,IDM2)
      STOP
25000 CONTINUE
      LV2A=0
      LV2B=0
      LV2C=0
      LV2D=0
      LV2E=0
      LV2F=0
      LV2G=0
      LV2H=0
      LV2I=0
      LV2J=0
      LV2K=0
      LV2L=0
      LV2M=0
      LV2N=0
      LV2O=0
      LV2P=0
      LV2Q=0
      LV2R=0
      LV2S=0
      LV2T=0
      LV2U=0
      LV2V=0
      LV2W=0
      LV2X=0
      LV2Y=0
      LV2Z=0
      LV2D=0
      LV21=0
      LV22=0
      LV23=0
      LV24=0
      LV25=0
      LV26=0
```

```
1402.    LV27=0
1403.    LV28=0
1404.    LV29=0
1405.    LV2AA=0
1406.    LV2AB=0
1407.    LV2AC=0
1408.    LV2AD=0
1409.    LV2AE=0
1410.    LV2AF=0
1411.    LV2AG=0
1412.    LV2AH=0
1413.    LV2AI=0
1414.    LV2AJ=0
1415.    LV2AK=0
1416.    LV2AL=0
1417.    LV2AM=0
1418.    LV2AN=0
1419.    LV2AO=0
1420.    LV2AP=0
1421.    LV2AQ=0
1422.    LV2AR=0
1423.    LV2AS=0
1424.    LV2AT=0
1425.    LV2AU=0
1426.    LV2AV=0
1427.    LV2AW=0
1428.    LV2AX=0
1429.    LV2AY=0
1430.    LV2AZ=0
1431.    LV2A0=0
1432.    LV2A1=0
1433.    LV2A2=0
1434.    LV2A3=0
1435.    LV2A4=0
1436.    LV2A5=0
1437.    LV2A6=0
1438.    LV2A7=0
1439.    LV2A8=0
1440.    LV2A9=0
1441.    LV2BA=0
1442.    LV2BB=0
1443.    LV2BC=0
1444.    LV2BD=0
1445.    LV2BE=0
1446.    LV2BF=0
1447.    LV2BG=0
1448.    LV2BH=0
1449.    LV2BI=0
1450.    LV2BJ=0
1451.    LV2BK=0
1452.    LV2BL=0
1453.    LV2BM=0
1454.    LV2BN=0
1455.    LV2BO=0
1456.    LV2BP=0
1457.    LV2BQ=0
1458.    LV2BR=0
1459.    LV2BS=0
1460.    LV2BT=0
1461.    LV2BU=0
1462.    LV2BV=0
1463.    LV2BW=0
1464.    LV2BX=0
1465.    LV2BY=0
1466.    LV2BZ=0
1467.    LV2B1=0
1468.    LV2B2=0
1469.    LV2B3=0
1470.    LV2B4=0
1471.    LV2B5=0
1472.    GO TO 25001
1473.    END
```

```
      SUBROUTINE SEPAR                                                  SEPAR  2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      COMMON/FORMAT/IDESST,IDESND,IGPST,IGPND,IGRP,SEPST,SEPND,
     1 DIR,ICOM,ISEP                                                    SEPAR  5
      INTEGER A,SEPST,SEPND,DIR,BLANK,SLASH,COMMA                       SEPAR  6
      DATA BLANK/1H /,SLASH/1H//,COMMA/1H,/                             SEPAR  7
      ICOM=0                                                            SEPAR  8
      ISLASH=0                                                          SEPAR  9
      DO 20 I=1,N                                                       SEPAR 10
      JJ=SEPST+DIR*(I-1)
      IF(A(JJ) .EQ. BLANK) GO TO 20                                     SEPAR 12
      IF(A(JJ) .EQ. SLASH) GO TO 5                                      SEPAR 13
      IF(A(JJ) .EQ. COMMA) GO TO 10                                     SEPAR 14
      GO TO 30                                                          SEPAR 15
    5 CONTINUE                                                          SEPAR 16
      ISLASH=1                                                          SEPAR 17
      IF(ICOM .EQ. 1) GO TO 40                                          SEPAR 18
      GO TO 20                                                          SEPAR 19
   10 IF(ISLASH .EQ. 1 .OR. ICOM .EQ. 1) GO TO 40                       SEPAR 20
      ICOM=1                                                            SEPAR 21
   20 CONTINUE                                                          SEPAR 22
      GO TO 40                                                          SEPAR 23
   30 IF(ISLASH .EQ. 0 .AND. ICOM .EQ. 0) GO TO 35                      SEPAR 24
      ISEP=1                                                            SEPAR 25
      SEPND=JJ-DIR
      RETURN                                                            SEPAR 27
   35 CONTINUE                                                          SEPAR 28
      ISEP=0                                                            SEPAR 29
      SEPND=JJ                                                          SEPAR 30
      RETURN                                                            SEPAR 31
   40 ISEP=-1                                                           SEPAR 32
      RETURN                                                            SEPAR 33
      END                                                               SEPAR 34
```

```
      SUBROUTINE SIMP                                                   SIMP   2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      COMMON/BASBLK/IBLOCK(2500),NBLOCK,NB,NBRNCH
      DIMENSION IALPH1(7),IALPH2(9),IALPH3(5),IALPH4(10)                SIMP   5
      DATA (IALPH1(I),I=1,7)/1HR,1HE,1HT,1HU,1HR,1HN,1H /,              SIMP   6
     1 (IALPH2(I),I=1,9)/1HC,1HO,1HN,1HT,1HI,1HN,1HU,1HE,1H /,          SIMP   7
     2 (IALPH3(I),I=1,5)/1HS,1HT,1HO,1HP,1H /                           SIMP   8
     3 ,(IALPH4(I),I=1,10)/1HB,1HL,1HO,1HC,1HK,1HD,1HA,1HT,1HA,1H /     SIMP   9
      IF(ITYP .EQ. 10) GO TO 25                                         SIMP  10
      IF(ITYP .EQ. 7) GOTO 15                                           SIMP  11
      IF(ITYP .EQ. 29) GO TO 35                                         SIMP  12
      DO 10 I=1,7                                                       SIMP  13
      IF(NEXT(JPTR) .NE. IALPH1(I)) GO TO 50                            SIMP  14
   10 CONTINUE                                                          SIMP  15
      NB=1                                                              SIMP  16
      NBRNCH=1                                                          SIMP  17
      NBLOCK=NBLOCK+1                                                   SIMP  18
      IBLOCK(NBLOCK)=999                                                SIMP  19
      RETURN                                                            SIMP  20
   15 DO 20 I=1,9                                                       SIMP  21
      IF(NEXT(JPTR) .NE. IALPH2(I)) GO TO 50                            SIMP  22
   20 CONTINUE                                                          SIMP  23
      RETURN                                                            SIMP  24
   25 DO 30 I=1,5                                                       SIMP  25
      IF(NEXT(JPTR) .NE. IALPH3(I)) GO TO 50                            SIMP  26
   30 CONTINUE                                                          SIMP  27
      NB=1                                                              SIMP  28
      NBRNCH=1                                                          SIMP  29
      NBLOCK=NBLOCK+1                                                   SIMP  30
      IBLOCK(NBLOCK)=999                                                SIMP  31
      RETURN                                                            SIMP  32
   35 DO 40 I=1,10                                                      SIMP  33
      IF(NEXT(JPTR) .NE. IALPH4(I)) GO TO 50                            SIMP  34
   40 CONTINUE                                                          SIMP  35
      RETURN                                                            SIMP  36
   50 CALL ERROR(7,KDM1,KDM2)
      RETURN                                                            SIMP  38
      END                                                               SIMP  39
```

```
      SUBROUTINE SLEVEL(FAIL)
      COMMON/LVARGS/LVFUNC,LVVARG,LVVAD,LVVPOS,LVVTYP,LVVAL,
     +LVHEAD,LVVNVL,LVDEST,LVVALS(10),LVTYPE(10),LVSKIP
      COMMON/LVTABL/LVTSIZ,LVMAP(     1)/LVVSEQ/LVSIZE,LVSQSP(     1)
      COMMON /NEED/ START,ASSOC,LEVEL,STOP
      COMMON/NEEDS/STJ,JSTACK,R,JAS,J,JLAST,RTEMP,STACK(400,4)
      COMMON /STRING/ NNN(2),STR
      COMMON /JL/ JSTOP
      INTEGER START,STOP,ASSOC,STACK,STR(1),STJ,R,RTEMP
      LOGICAL FAIL
C     EXECUTE
      GO TO 25000
25001 CONTINUE
      RTEMP=0
      JSTOP=JSTACK
   10 IF(JSTOP .EQ. 0) GO TO 40
      NPNTR=STACK(JSTOP,4)
      IF(NPNTR .GT. 0) GO TO 20
      IF(STACK(JSTOP,2) .NE. 0) GO TO 30
      JSTOP=JSTOP-1
      GO TO 10
   20 JSTOP=NPNTR-1
      GO TO 10
   30 STACK(JSTACK,4)=JSTOP
      JAS=STACK(JSTOP,2)
      R=STACK(JSTOP,1)
      RTEMP=R
C     R+LEVEL.JAS @R
C**** R + LEVEL
      LVVPOS = JAS
      LVVTYP = 3
      LVFUNC= LEVEL
      LVVARG= R
      CALL LVFIND(LV2 A,LV2 B,LV2 C,LV2 D)
      LV1 AAD = R
      IF (LVVAL.NE.-1) LV1 AAD = LVVAL
C**** LV1 AAD @ R
      R = LV1 AAD
      FAIL=.FALSE.
      IF(STACK(JSTOP,4) .LT. 0) STACK(JSTOP,4)=0
      RETURN
   40 FAIL=.TRUE.
      RETURN
C     COMPLETE
25000 CONTINUE
      LV2A=0
      LV2B=0
      LV2C=0
      LV2D=0
      GO TO 25001
      END
```

```
      SUBROUTINE SQUEEZ
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     • JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      INTEGER A,D,BLANK,AICH                                            SQUEEZE4
      DATA BLANK/1H /,AICH/1HH/                                         SQUEEZE5
      J=0                                                               SQUEEZE6
      DO 10 I=1,M                                                       SQUEEZE7
      IF(D(I) .EQ. BLANK) GO TO 10                                      SQUEEZE8
      J=J+1                                                             SQUEEZE9
      D(J)=D(I)                                                         SQUEEZ10
      IF(D(J) .NE. AICH) GO TO 10                                       SQUEEZ11
      IF(JTYP .NE. 3) GO TO 10                                          SQUEEZ12
      M=M+J-1                                                           SQUEEZ13
      RETURN                                                            SQUEEZ14
   10 CONTINUE                                                          SQUEEZ15
      M=J                                                               SQUEEZ16
      RETURN                                                            SQUEEZ17
      END                                                               SQUEEZ18
```

```
      SUBROUTINE SSTOP(FAIL)
      COMMON/LVARGS/LVFUNC,LVVARG,LVVAD,LVVPOS,LVVTYP,LVVAL,
     +LVHEAD,LVVNVL,LVDEST,LVVALS(10),LVTYPE(10),LVSKIP
      COMMON/LVTABL/LVTSIZ,LVMAP(     1)/LVVSEQ/LVSIZE,LVSQSP(     1)
      COMMON /NEED/ START,ASSOC,LEVEL,STOP
      COMMON/NEEDS/STJ,JSTACK,R,JAS,J,JLAST,RTEMP,STACK(400,4)
      COMMON /STRING/ NNN(2),STR
      INTEGER START,STOP,ASSOC,STACK,STR(1),STJ,R,TEMP
      LOGICAL FAIL
C     EXECUTE
      GO TO 25000
25001 CONTINUE
      JSTOPS=JSTACK
C   5 R+ASSOC/10
    5 CONTINUE
C****          R            +        ASSOC
      LVVTYP = 3
      LVVPOS = 1
      LVINDX = 0
      LVFUNC=       ASSOC
      LVVARG=          R
      CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
      LV1     AAD =          R
      IF (LVVAL.NE.-1) LV1     AAD = LVVAL
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.EQ.-1) GO TO          10
      JSTOPS=JSTOPS+1
      STACK(JSTOPS,1)=R
      STACK(JSTOPS,2)=0
      STACK(JSTOPS,4)=0
C  10 R(=STOP//20,+STOP/30 @R/5/5)
   10 CONTINUE
      LV1     AAD =          R
C**** LV1     AAD            =         STOP
      LVVAL = -100
      IF (LV1     AAD.NE.       STOP) LVVAL = -1
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.NE.-1) GO TO          20
C**** LV1     AAD            +         STOP
      LVVTYP = 3
      LVVPOS = 1
      LVINDX = 0
      LVFUNC=        STOP
      LVVARG= LV1     AAD
      CALL LVFIND(LVINDX,LVINDX,LVINDX,LVINDX)
      LV1AAI=LV1AAD
      IF(LVVAL .NE. -1) LV1AAI=LVVAL
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.EQ.-1) GO TO          30
C**** LV1     AAF            @           R
      R=LV1AAI
      LVVTR = LVVAL
      LVVAL = -100
      IF (LVVTR.EQ.-1) GO TO           5
      IF (LVVTR.NE.-1) GO TO           5
   20 FAIL=.FALSE.
      RETURN
```

```
C  30 JSTACK=JSTOPS/40
   30 CONTINUE
C****     JSTACK              =       JSTOPS
          LVVAL = -100
          IF (     JSTACK.NE.     JSTOPS) LVVAL = -1
          LVVTR = LVVAL
          LVVAL = -100
          IF (LVVTR.EQ.-1) GO TO          40
          FAIL=.TRUE.
          RETURN
      40  R=STACK(JSTOPS,1)
          JAS=STACK(JSTOPS,2)+1
C         R+ASSOC.JAS @TEMP//50
C****           R              +        ASSOC
          LVVPOS =          JAS
          LVVTYP =    3
          LVFUNC=       ASSOC
          LVVARG=           R
          CALL LVFIND(LV2       A.LV2       B.LV2       C.LV2       D)
          LV1     AAD =           R
          IF (LVVAL.NE.-1) LV1     AAD = LVVAL
C**** LV1     AAD             @         TEMP
                TEMP = LV1     AAD
          LVVTR = LVVAL
          LVVAL = -100
          IF (LVVTR.NE.-1) GO TO          50
          JSTOPS=JSTOPS-1
C         //30
          LVVTR = LVVAL
          LVVAL = -100
          IF (LVVTR.NE.-1) GO TO          30
      50  STACK(JSTOPS,2)=JAS
C         R=TEMP//40
C****           R              =         TEMP
          LVVAL = -100
          IF (          R.NE.       TEMP) LVVAL = -1
          LVVTR = LVVAL
          LVVAL = -100
          IF (LVVTR.NE.-1) GO TO          40
C         TEMP @R//5
C****          TEMP            @           R
                R =        TEMP
          LVVTR = LVVAL
          LVVAL = -100
          IF (LVVTR.NE.-1) GO TO           5
C         COMPLETE
          RETURN
25000     CONTINUE
          LV2A=0
          LV2B=0
          LV2C=0
          LV2D=0
          GO TO 25001
          END
```

```
      SUBROUTINE STATNO                                                 STATNO 2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      COMMON/LABELS/STATRA(2,200),NLABEL                                STATNO 4
      COMMON/DOLOOP/ISTACK(4,50),NSTACK,ILOOP,IOVFL#
      COMMON/BASBLK/IBLOCK(2500),NBLOCK,NB,NBRNCH
      INTEGER A,BLANK,STATRA                                            STATNO 7
      INTEGER BITPUT,BITGET                                             STATNO 8
      DATA BLANK/1H /                                                   STATNO 9
      LOC=0                                                             STATN010
      DO 5 I=1,5                                                        STATN011
      IF(A(I) .NE. BLANK) GO TO 10                                      STATN012
    5 CONTINUE                                                          STATN013
      IF(ITYP .NE. 18) GO TO 7                                          STATN014
      IF(IBLKDT .EQ. 1) RETURN                                          STATN015
      IF(NBRNCH .EQ. 0) GO TO 110                                       STATN016
      IBLOCK(IBLKST)=BITPUT(IBLOCK(IBLKST),NBRNCH,6)                    STATN017
      RETURN                                                            STATN018
    7 IF(ITYP .EQ. 28) GO TO 90                                         STATN019
      IF(NBLOCK .EQ. 0) GO TO 8                                         STATN020
      IF(IBLOCK(NBLOCK) .EQ. 998) GO TO 32                              STATN021
      IF(NB .EQ. 2) GO TO 31                                            STATN022
      IF(NB .EQ. 1) GO TO 70                                            STATN023
      RETURN                                                            STATN024
    8 NBLOCK=1                                                          STATN025
      GO TO 34                                                          STATN026
   10 IF(ITYP .EQ. 18) GO TO 50                                         STATN027
      JPTR=1                                                            STATN028
      CALL GNLE                                                         STATN029
      IF(JTYP .NE. 5) GO TO 50                                          STATN030
      IF(A(6) .NE. BLANK) GO TO 50                                      STATN031
      IF(JPTR .LT. 6) GO TO 50                                          STATN032
      CALL STSRCH                                                       STATN033
      IF(BITGET(STATRA(2,LOC),9,3) .EQ. 1) GO TO 60                     STATN034
      STATRA(2,LOC)=BITPUT(STATRA(2,LOC),1,9)                           STATN035
      IF(LTYP .EQ. 9) GO TO 20                                          STATN036
      STATRA(2,LOC)=BITPUT(STATRA(2,LOC),ITYP,6)                        STATN037
      GO TO 30                                                          STATN038
   20 STATRA(2,LOC)=BITPUT(STATRA(2,LOC),9,6)                           STATN039
   30 IF(ITYP .EQ. 28) RETURN                                           STATN040
      IF(NBLOCK .EQ. 0) GO TO 8                                         STATN041
      IF(NB .EQ. 1) GO TO 32                                            STATN042
   31 NBLOCK=NBLOCK+1                                                   STATN043
      IBLOCK(NBLOCK)=998                                                STATN044
      NBRNCH=1                                                          STATN045
   32 NB=0                                                              STATN046
      NBLOCK=NBLOCK+1                                                   STATN047
      IBLOCK(IBLKST)=BITPUT(IBLOCK(IBLKST),NBLOCK,28)                   STATN048
      IBLOCK(IBLKST)=BITPUT(IBLOCK(IBLKST),NBRNCH,6)                    STATN049
      J1=IBLKST+1                                                       STATN050
      J2=NBLOCK-NBRNCH-1                                                STATN051
      IF(IBLOCK(J2) .GT. 6000) GO TO 34                                 STATN052
      J21=J2-1                                                          STATN053
   21 IF(IBLOCK(J1) .LT. 6000) GO TO 34                                 STATN054
      IRES=IBLOCK(J1)                                                   STATN055
      DO 22 K2=J1,J21                                                   STATN056
   22 IBLOCK(K2)=IBLOCK(K2+1)                                           STATN057
      IBLOCK(J2)=IRES                                                   STATN058
      GO TO 21                                                          STATN059
```

```
   34 IBLKST=NBLOCK                                                     STATN060
      NBRNCH=0                                                          STATN061
      IBLOCK(IBLKST)=BITPUT(LOC,ILOOP,12)                               STATN062
      IF(LOC .EQ. 0) RETURN                                             STATN063
      STATRA(2,LOC)=BITPUT(STATRA(2,LOC),IBLKST,36)                     STATN064
      IF(BITGET(STATRA(2,LOC),15,3) .NE. 1) RETURN                      STATN065
      IF(IOVFL# .EQ. 1) RETURN
      IF(LOC .NE. ISTACK(1,ILOOP)) GO TO 80                             STATN066
      IF(ITYP .GE. 3 .AND. ITYP .LE. 6) GO TO 100                       STATN067
      IF( ITYP .EQ. 9 .OR. ITYP .EQ. 10 .OR. ITYP .EQ. 17) GO TO 100    STATN068
      NB=2                                                              STATN069
      ISTACK(2,ILOOP)=1                                                 STATN070
      NBLOCK=NBLOCK+1                                                   STATN071
      IBLOCK(NBLOCK)=6000+ISTACK(4,ILOOP)                               STATN072
      KLOOP=ILOOP-1                                                     STATN073
      DO 40 J=1,KLOOP                                                   STATN074
      LOOP=ILOOP-J                                                      STATN075
      IF(ISTACK(2,LOOP) .EQ. 1) GO TO 40                                STATN076
      IF(ISTACK(1,LOOP) .EQ. LOC) GO TO 35                              STATN077
      ILOOP=LOOP                                                        STATN078
      RETURN                                                            STATN079
   35 ISTACK(2,LOOP)=1                                                  STATN080
      NBLOCK=NBLOCK+1                                                   STATN081
      IBLOCK(NBLOCK)=6000+ISTACK(4,LOOP)                                STATN082
   40 CONTINUE                                                          STATN083
      ILOOP=0                                                           STATN084
      RETURN                                                            STATN085
   50 IERC=32
      GO TO 200
   60 IERC=33
      GO TO 200
   70 IERC=34
      GO TO 200
   80 IERC=35
      GO TO 200
   90 IERC=36
      GO TO 200
  100 IERC=37
      GO TO 200
  110 IERC=38
  200 CALL ERROR(IERC,KDM1,KDM2)
      RETURN                                                            STATN100
      END                                                               STATN101
```

```
      SUBROUTINE STFNC(NFNC)
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES
      COMMON/FUNC/IFNCRA(5,17),MARGS,IARGS(50),FNCLOC(5),NFUNC
      INTEGER BITGET
      NARG=BITGET(IDTBL(3,LOC),7,6)
      NAR2=IFNCRA(NFNC,1)
      IF(NARG .NE. NAR2) CALL ERROR(26,IDTBL(1,LOC),KDM2)
      NARGS=MIND(NARG,NAR2)
      KOUNT=0
      NT=1+(NARG-1)/4
      DO 10 I=1,NT
      ICOL1=-6
      ICOL2=-3
      DO 10 J=1,4
      KOUNT=KOUNT+1
      IF(KOUNT .GT. NARGS) RETURN
      ICOL1=ICOL1+9
      ICOL2=ICOL2+9
      IF(BITGET(IFNCRA(NFNC,I+1),ICOL2,3) .NE. 0) CALL ERROR(50,KOUNT,K)
      ITP1=BITGET(IFNCRA(NFNC,I+1),ICOL1,3)
      IF(ITP1 .EQ. 0) GO TO 10
      ITP2=BITGET(IDTBL(3,LOC+KOUNT),10,3)
      IF(ITP1 .NE. ITP2) CALL ERROR(51,KOUNT,KDM2)
   10 CONTINUE
      RETURN
      END
```

```
      SUBROUTINE STORE                                                  STORE  2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      NID=NID+1                                                         STORE  4
      IF(NID .GT. 500) GO TO 20
      IF(INITID(IDTYP) .NE. 0) GO TO 5                                  STORE  5
      INITID(IDTYP)=NID                                                 STORE  6
    5 CONTINUE                                                          STORE  7
      IDTBL(1,NID)=NXTID                                                STORE  8
      IDTBL(2,NID)=0                                                    STORE  9
      IF(LASTID(IDTYP) .EQ. 0) GO TO 10                                 STORE 10
      LAST=LASTID(IDTYP)
      IDTBL(2,LAST)=NID
   10 LASTID(IDTYP)=NID                                                 STORE 12
      RETURN                                                            STORE 13
   20 WRITE(6,25)
   25 FORMAT(/////5X,46H SYMBOL TABLE OVERFLOW - PROCESSING TERMINATED)
      STOP
      END                                                               STORE 14
```

```
      SUBROUTINE STSRCH                                                 STSRCH 2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      COMMON/LABELS/STATRA(2,200),NLABEL                                STSRCH 4
      INTEGER STATRA                                                    STSRCH 5
      IF(NLABEL .EQ. 0) GO TO 15                                        STSRCH 6
      DO 10 I=1,NLABEL                                                  STSRCH 7
      IF(STATRA(1,I) .NE. N2) GO TO 10                                  STSRCH 8
      LOC=I                                                             STSRCH 9
      RETURN                                                            STSRCH10
   10 CONTINUE                                                          STSRCH11
   15 NLABEL=NLABEL+1                                                   STSRCH12
      IF(NLABEL .GT. 200) GO TO 20
      LOC=NLABEL                                                        STSRCH13
      STATRA(1,LOC)=N2                                                  STSRCH14
      RETURN                                                            STSRCH15
   20 WRITE(6,25)
   25 FORMAT(/////5X,53H STATEMENT NO. TABLE OVERFLOW - PROCESSING TERMI
     *NATED)
      STOP
      END                                                               STSRCH16
```

```
      SUBROUTINE SUB                                                    SUB    2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      DIMENSION IALPH(10),IALPH2(8),KT(5)                               SUB    4
      COMMON /SUBS/ISUBS(3,100),NSUBS                                   SUB    5
      INTEGER BLANK,COMMA,RPAR,A,D                                      SUB    6
      INTEGER BITPUT                                                    SUB    7
      DATA (IALPH(I),I=1,10)/1HS,1HU,1HB,1HR,1HO,1HU,1HT,1HI,1HN,1HE/   SUB    8
      DATA (IALPH2(I),I=1,8)/1HF,1HU,1HN,1HC,1HT,1HI,1HO,1HN/           SUB    9
      DATA (KT(I),I=1,5)/1HR,1HC,1HD,1HI,1HL/                           SUB   10
      DATA BLANK/1H /,LPAR/1H(/,RPAR/1H)/,COMMA/1H,/                    SUB   11
      NARG=0                                                            SUB   12
      ISTATE=0
      IT=32-ITYP                                                        SUB   15
      GO TO (2,5),IT                                                    SUB   16
    2 DO 3 I=1,8                                                        SUB   17
      IF(NEXT(JPTR) .NE. IALPH2(I)) GO TO 50                            SUB   18
    3 CONTINUE                                                          SUB   19
      GO TO 12                                                          SUB   21
    5 DO 10 I=1,10                                                      SUB   22
      IF(NEXT(JPTR) .NE. IALPH(I)) GO TO 50                             SUB   23
   10 CONTINUE                                                          SUB   24
      GO TO 17                                                          SUB   26
   12 IPTR=JPTR                                                         SUB   27
      IFRST=NEXT(1)                                                     SUB   28
      IF(IFRST .EQ. 1HF) GO TO 14                                       SUB   29
      DO 13 I=1,5                                                       SUB   30
      IF(IFRST .NE. KT(I)) GO TO 13                                     SUB   31
      ISTATE=1
      GO TO 14                                                          SUB   33
   13 CONTINUE                                                          SUB   34
   14 JPTR=IPTR                                                         SUB   35
   17 CALL GNLE                                                         SUB   36
      IF(JTYP .NE. 2) GO TO 50                                          SUB   37
      IDTYP=2                                                           SUB   39
      CALL STORE                                                        SUB   40
      IE=D(1)
      IF(ITYP .NE. 31) GO TO 15                                         SUB   42
      IF(NEXT(JPTR) .NE. LPAR) GO TO 50                                 SUB   43
      IFNCNM=NXTID                                                      SUB   44
      GO TO 20                                                          SUB   45
   15 IF(NEXT(JPTR) .EQ. BLANK) GO TO 30                                SUB   46
      IF(A(JPTR-1) .NE. LPAR) GO TO 50                                  SUB   47
   20 CALL GNLE                                                         SUB   48
      IF(JTYP .NE. 2) GO TO 60                                          SUB   49
      CALL SEARCH                                                       SUB   50
      IF(ISRCH(1) .NE. 0 .OR. ISRCH(2) .NE. 0) CALL ERROR(86,NXTID,KDM2)
      IDTYP=1                                                           SUB   52
      CALL STORE                                                        SUB   53
      IDTBL(3,NID)=BITPUT(IDTBL(3,NID),1,12)                            SUB   54
      NARG=NARG+1                                                       SUB   55
      IF(NEXT(JPTR) .EQ. RPAR) GO TO 30                                 SUB   56
      IF(A(JPTR-1) .NE. COMMA) GO TO 50                                 SUB   57
      GO TO 20                                                          SUB   58
   30 LOC=1
      D(1)=IE
      IF(NARG .GT. 63) CALL ERROR(83,KDM1,KDM2)
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),NARG,7)                          SUB   61
      IF(ITYP .EQ. 30) RETURN
      IF(ISTATE .EQ. 0) GO TO 55
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),ISTATE,10)                       SUB   66
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),1,11)                            SUB   67
      RETURN                                                            SUB   68
   55 CALL IMPTYP
      RETURN
   50 CALL ERROR(7,KDM1,KDM2)
      RETURN                                                            SUB   70
   60 CALL ERROR(86,NXTID,KDM2)
      RETURN                                                            SUB   72
      END                                                               SUB   73
```

```
      SUBROUTINE SUBCHK
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES
      COMMON/GLOBAL/NBLK,NREF,NSUBS,BLKTBL(200),EXTTBL(100),ISUBS(100)
      COMMON/LIST/NLIST,NINTFC,ISUBLT(3,200),INTFAC(500)
      INTEGER BITPUT,BITGET
      IF(IBLKDT .EQ. 1) RETURN
      NSUBS=NSUBS+1
      IF(NSUBS .GT. 100) GO TO 50
      NARG=BITGET(IDTBL(3,1),7,6)
      ITP=BITGET(IDTBL(3,1),10,3)
      IF(BITGET(IDTBL(3,1),18,1) .EQ. 1) GO TO 15
      IDTBL(3,1)=BITPUT(IDTBL(3,1),1,18)
      DO 5 I=1,NLIST
      IF(IDTBL(1,1) .NE. ISUBLT(1,I)) GO TO 5
      LISTLC=I
      IDTBL(3,1)=BITPUT(IDTBL(3,1),LISTLC,36)
      GO TO 20
    5 CONTINUE
      CALL ERROR(52,KDM1,KDM2)
      NLIST=NLIST+1
      ISUBLT(1,NLIST)=IDTBL(1,1)
      ISUBS(NSUBS)=NLIST
      ISUBLT(2,NLIST)=0
      ISUBLT(3,NLIST)=0
      IDTBL(3,1)=BITPUT(IDTBL(3,1),NLIST,36)
      IF(NARG .EQ. 0) RETURN
      IPTR=NINTFC+1
      ISUBLT(2,NLIST)=BITPUT(0,NARG,6)
      ISUBLT(2,NLIST)=BITPUT(ISUBLT(2,NLIST),ITP,13)
      ISUBLT(3,NLIST)=IPTR
      NINTFC=IPTR+(NARG-1)/4
      KOUNT=0
      DO 10 I=IPTR,NINTFC
      INTFAC(I)=0
      ICOL1=-6
      ICOL2=-3
      DO 10 J=1,4
      KOUNT=KOUNT+1
      IF(KOUNT .GT. NARG) RETURN
      ICOL1=ICOL1+9
      ICOL2=ICOL2+9
      ITP=BITGET(IDTBL(3,KOUNT+1),10,3)
      NDIM=BITGET(IDTBL(3,KOUNT+1),7,6)
      IDTBL(3,KOUNT+1)=BITPUT(IDTBL(3,KOUNT+1),1,15)
      INTFAC(I)=BITPUT(INTFAC(I),ITP,ICOL1)
   10 INTFAC(I)=BITPUT(INTFAC(I),NDIM,ICOL2)
      RETURN
   15 LISTLC=BITGET(IDTBL(3,1),36,9)
   20 ISUBS(NSUBS)=LISTLC
      KLAS=BITGET(ISUBLT(2,LISTLC),10,4)
      NAR2=BITGET(ISUBLT(2,LISTLC),6,6)
      IF(NARG .NE. NAR2) CALL ERROR(26,IDTBL(1,1),KDM2)
      NARGS=MIN0(NARG,NAR2)
      IF(ITP .NE. BITGET(ISUBLT(2,LISTLC),13,3))
     $ CALL ERROR(49,IDTBL(1,1),KDM2)
      IF(NARGS .EQ. 0) RETURN
      IPTR=ISUBLT(3,LISTLC)
      NDPTR=IPTR+(NARGS-1)/4
```

```
      KOUNT=0
      DO 25 I=IPTR,NDPTR
      ICOL1=-6
      ICOL2=-3
      DO 25 J=1,4
      KOUNT=KOUNT+1
      IF(KOUNT .GT. NARGS) RETURN
      ICOL1=ICOL1+9
      ICOL2=ICOL2+9
      ITP=BITGET(INTFAC(I),ICOL1,3)
      NDIM=BITGET(INTFAC(I),ICOL2,3)
      ITP2=BITGET(IDTBL(3,KOUNT+1),10,3)
      NDIM2=BITGET(IDTBL(3,KOUNT+1),7,6)
      IOSTAT=BITGET(INTFAC(I),ICOL2+2,2)
      IF(IOSTAT .EQ. 2 .OR. KLAS .EQ. 0) IOSTAT=1
      IDTBL(3,KOUNT+1)=BITPUT(IDTBL(3,KOUNT+1),IOSTAT,15)
      IF(NDIM .NE. NDIM2) CALL ERROR(50,KOUNT,KDM2)
      IF(ITP2 .NE. 0) GO TO 23
      ITP2=1
      IFST=BITGET(IDTBL(1,KOUNT+1),6,6)
      IF(IFST .LE. 19 .AND. IFST .GE. 14) ITP2=4
   23 IF(ITP .NE. ITP2) CALL ERROR(51,KOUNT,KDM2)
   25 CONTINUE
      RETURN
   50 CALL ERROR(25,KDM1,KDM2)
      STOP
      END
```

```
      SUBROUTINE SWITCH                                                 SWITCH 2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,NZ,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      DO 20 I=1,NID                                                     SWITCH 4
      IF(IDTBL(2,I) .NE. LOC) GO TO 20                                  SWITCH 5
      IDTBL(2,I)=IDTBL(2,LOC)                                           SWITCH 6
      IF(LASTID(1) .EQ. LOC) LASTID(1)=I                                SWITCH 7
      GO TO 30                                                          SWITCH 8
   20 CONTINUE                                                          SWITCH 9
      INITID(1)=IDTBL(2,LOC)                                            SWITCH10
   30 LAST=LASTID(2)
      IDTBL(2,LAST)=LOC
      IDTBL(2,LOC)=0                                                    SWITCH12
      LASTID(2)=LOC                                                     SWITCH13
      CALL ERROR(87,IDTBL(1,LOC),KDM2)
      RETURN                                                            SWITCH14
      END                                                               SWITCH15
```

```
      SUBROUTINE SYMTAB                                                 SYMTAB 2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     • JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      COMMON/LABELS/STATRA(2,200),NLABEL                                SYMTAB 4
      COMMON/LIST/NLIST,NINTFC,ISUBLT(3,200),INTFAC(500)
      COMMON/STFUNC/NSTFNC,ISTFNC(10)
      DIMENSION ITABEL(5)                                               SYMTAB 5
      INTEGER TYPE(5),DIMS(3),BITGET,STATRA                             SYMTAB 6
      DATA (TYPE(I),I=1,5)/4HREAL,6HCOMPLX,6HDOUBLE,6HINTEGR,6HLOGICL/  SYMTAB 7
      DATA (DIMS(I),I=1,3)/1H1,1H2,1H3/                                 SYMTAB 8
      IF(NID .LE. 1) RETURN                                             SYMTAB 9
      IEXT=0                                                            SYMTAB10
      IF(IBLKDT .EQ. 1) GO TO 2                                         SYMTAB11
      INTL=INITID(2)
      WRITE(6,1) IDTBL(1,INTL)
    1 FORMAT(//////45X,25H SYMBOL TABLE FOR MODULE ,A6)                 SYMTAB13
      GO TO 4                                                           SYMTAB14
    2 WRITE(6,3)                                                        SYMTAB15
    3 FORMAT(//////46X,28H SYMBOL TABLE FOR BLOCK DATA)                 SYMTAB16
    4 LOC=INITID(1)                                                     SYMTAB17
      IF(LOC .EQ. 0) GO TO 28                                           SYMTAB18
      WRITE(6,5)                                                        SYMTAB19
    5 FORMAT(//56X,9HVARIABLES/30X,4HNAME,12X,4HTYPE,31X,10HRELOCATION) SYMTAB20
  100 ITABEL(1)=IDTBL(1,LOC)                                            SYMTAB21
      IF(BITGET(IDTBL(3,LOC),11,1) .EQ. 0) GO TO 27
      I=BITGET(IDTBL(3,LOC),10,3)
      ITABEL(2)=TYPE(I)                                                 SYMTAB23
   12 IF(BITGET(IDTBL(3,LOC),1,1) .EQ. 0) GO TO 16
      ITABEL(3)=5HARRAY                                                 SYMTAB26
      I=BITGET(IDTBL(3,LOC),7,6)                                        SYMTAB27
      ITABEL(4)=DIMS(I)                                                 SYMTAB28
      GO TO 18                                                          SYMTAB29
   16 ITABEL(3)=1H                                                      SYMTAB30
      ITABEL(4)=1H                                                      SYMTAB31
   18 IF(BITGET(IDTBL(3,LOC),12,1) .EQ. 0) GO TO 20                     SYMTAB32
      ITABEL(5)=5HF. P.                                                 SYMTAB33
      GO TO 25                                                          SYMTAB34
   20 IF(BITGET(IDTBL(3,LOC),16,1) .EQ. 1) GO TO 22                     SYMTAB35
      ITABEL(5)=1H                                                      SYMTAB36
      GO TO 25                                                          SYMTAB37
   22 ICOMNM=IDTBL(6,LOC)                                               SYMTAB38
      ITABEL(5)=IDTBL(1,ICOMNM)                                         SYMTAB39
      IF(ITABEL(5) .EQ. 1H ) ITABEL(5)=2H//                             SYMTAB40
   25 WRITE(6,26) (ITABEL(I),I=1,5)                                     SYMTAB41
   26 FORMAT(30X,A6,11X,A6,14X,A5,1X,A1,7X,A6)                          SYMTAB42
   27 LOC=IDTBL(2,LOC)
      IF(LOC .NE. 0) GO TO 100                                          SYMTAB44
   28 IF(IBLKDT .EQ. 1) GO TO 60
      LOC=IDTBL(2,INTL)
      IF(LOC .EQ. 0) GO TO 60
      WRITE(6,31)                                                       SYMTAB48
   31 FORMAT(//55X,10H EXTERNALS/44X,4HNAME,10X,4HTYPE,10X,4HARGS)      SYMTAB49
   30 ITABEL(1)=IDTBL(1,LOC)
      LISTLC=BITGET(IDTBL(3,LOC),36,9)
      IF(LISTLC .EQ. 0) GO TO 39
      ITP=BITGET(ISUBLT(2,LISTLC),13,3)
      IF(ITP .EQ. 0) GO TO 32
      ITABEL(2)=TYPE(ITP)
      GO TO 35
```

```
   32 ITABEL(2)=1H
   35 IF(BITGET(ISUBLT(2,LISTLC),14,1) .EQ. 1) GO TO 37
      ITABEL(3)=BITGET(ISUBLT(2,LISTLC),6,6)
      WRITE(6,36) (ITABEL(I),I=1,3)                                    SYMTAB55
   36 FORMAT(44X,A6,8X,A6,8X,I2)                                       SYMTAB56
      GO TO 39
   37 WRITE(6,38) ITABEL(1),ITABEL(2)
   38 FORMAT(44X,A6,8X,A6,8X,2H I)
   39 LOC=IDTBL(2,LOC)
      IF(LOC .NE. 0) GO TO 30                                          SYMTAB58
   60 IF(NSTFNC .EQ. 0) GO TO 40
      WRITE(6,62)
   62 FORMAT(//50X,20H STATEMENT FUNCTIONS/
     $ 44X,4HNAME,10X,4HTYPE,10X,4HARGS)
      DO 70 I=1,NSTFNC
      LC=ISTFNC(I)
      ITP=BITGET(IDTBL(3,LC),10,3)
      NRG=BITGET(IDTBL(3,LC),7,6)
   70 WRITE(6,36) IDTBL(1,LC),TYPE(ITP),NRG
   40 IF(NLABEL .EQ. 0) GO TO 50                                       SYMTAB59
      WRITE(6,42)                                                      SYMTAB60
   42 FORMAT(//51X,17H STATEMENT LABELS)                               SYMTAB61
      WRITE(6,45) (STATRA(1,I),I=1,NLABEL)                             SYMTAB62
   45 FORMAT(40X,5I8)                                                  SYMTAB63
      DO 47 I=1,NLABEL                                                 SYMTAB64
      IF(BITGET(STATRA(2,I),9,3) .NE. 1) CALL ERROR(15,STATRA(1,I),KDM2)
      IF(BITGET(STATRA(2,I),12,3) .NE. 1)CALL ERROR(16,STATRA(1,I),KDM2)
   47 CONTINUE                                                         SYMTAB67
   50 LOC=INITIO(3)                                                    SYMTAB70
      IF(LOC .EQ. 0) RETURN                                            SYMTAB71
      WRITE(6,52)                                                      SYMTAB72
   52 FORMAT(//53X,14H COMMON BLOCKS/50X,4HNAME,10X,6HLENGTH)          SYMTAB73
   51 ITABEL(1)=IDTBL(1,LOC)                                           SYMTAB74
      IF(ITABEL(1) .EQ. 1H ) ITABEL(1)=2H//                            SYMTAB75
      WRITE(6,55) ITABEL(1),IDTBL(4,LOC)                               SYMTAB76
   55 FORMAT(50X,A6,8X,I8)                                             SYMTAB77
      LOC=IDTBL(2,LOC)                                                 SYMTAB78
      IF(LOC .NE. 0) GO TO 51                                          SYMTAB79
      RETURN                                                           SYMTAB80
      END                                                              SYMTAB81
```

```
      SUBROUTINE TYPE                                                   TYPE   2
      COMMON A(1326),D(500),IDTBL(8,500),INITID(3),LASTID(3),ISRCH(3),  RICH   2
     * JPTR,N,M,JTYP,LSTART,N2,IFNCNM,LOGID,NXTID,IDTYP,NID,LOC,
     2 LTYP,ITYP,IBLKDT,MODE,IERR,IDES                                  RICH   4
      DIMENSION IALPH1(7),IALPH2(7),IALPH3(4),IALPH4(7),IALPH5(15),     TYPE   4
     1 IDIM(3)                                                          TYPE   5
      INTEGER A,RPAR,COMMA,BLANK                                        TYPE   6
      INTEGER BITPUT,BITGET,COMLOC                                      TYPE   7
      DATA (IALPH1(I),I=1,7)/1HL,1HO,1HG,1H1,1HC,1HA,1HL/,              TYPE   8
     1 (IALPH2(I),I=1,7) /1HI,1HN,1HT,1HE,1HG,1HE,1HR/,                 TYPE   9
     2 (IALPH3(I),I=1,4)/1HR,1HE,1HA,1HL/,                              TYPE  10
     3 (IALPH4(I),I=1,7)/1HC,1HO,1HM,1HP,1HL,1HE,1HX/,                  TYPE  11
     4 (IALPH5(I),I=1,15)/1HO,1HO,1HU,1HB,1HL,1HE,1HP,1HR,1HE,1HC,      TYPE  12
     5 1HI,1HS,1HI,1HO,1HN/                                             TYPE  13
      DATA LPAR/1H(/,RPAR/1H)/,COMMA/1H,/,BLANK/1H /                    TYPE  14
      MUL=1                                                             TYPE  15
      IT=ITYP-18                                                        TYPE  16
      GO TO (10,20,30,40,50),IT                                         TYPE  17
   10 DO 15 I=1,7                                                       TYPE  18
      IF(NEXT(JPTR) .NE. IALPH2(I)) GO TO 110                           TYPE  19
   15 CONTINUE                                                          TYPE  20
      ISTATE=3                                                          TYPE  21
      ISTATE=4
      GO TO 60                                                          TYPE  22
   20 DO 25 I=1,4                                                       TYPE  23
      IF(NEXT(JPTR) .NE. IALPH3(I)) GO TO 110                           TYPE  24
   25 CONTINUE                                                          TYPE  25
      ISTATE=1
      GO TO 60                                                          TYPE  27
   30 DO 35 I=1,15                                                      TYPE  28
      IF(NEXT(JPTR) .NE. IALPH5(I)) GO TO 110                           TYPE  29
   35 CONTINUE                                                          TYPE  30
      MUL=2                                                             TYPE  31
      ISTATE=3
      GO TO 60                                                          TYPE  33
   40 DO 45 I=1,7                                                       TYPE  34
      IF(NEXT(JPTR) .NE. IALPH4(I)) GO TO 110                           TYPE  35
   45 CONTINUE                                                          TYPE  36
      MUL=2                                                             TYPE  37
      ISTATE=2
      GO TO 60                                                          TYPE  39
   50 DO 55 I=1,7                                                       TYPE  40
      IF(NEXT(JPTR) .NE. IALPH1(I)) GO TO 110                           TYPE  41
   55 CONTINUE                                                          TYPE  42
      ISTATE=5
   60 ISUB=0                                                            TYPE  44
      INCR=MUL                                                          TYPE  45
      CALL GNLE                                                         TYPE  46
      IF(JTYP .NE. 2) GO TO 110                                         TYPE  47
      CALL SEARCH                                                       TYPE  48
      IF(ISRCH(2) .EQ. 1) CALL ERROR(10,NXTID,KDM2)
      IF(ISRCH(1) .EQ. 1) GO TO 62                                      TYPE  50
      IDTYP=1                                                           TYPE  51
      CALL STORE                                                        TYPE  52
      LOC=NID                                                           TYPE  53
   62 IF(BITGET(IDTBL(3,LOC),11,1) .NE. 0) GO TO 120
      IF(NEXT(JPTR) .NE. LPAR) GO TO 87                                 TYPE  55
      ISUB=1                                                            TYPE  56
      IE=LOC                                                            TYPE  57
      I=0
```

```
   68 I=I+1
      CALL GNLE                                                          TYPE  59
      IF(JTYP .NE. 5) GO TO 65                                           TYPE  60
      IDIM(I)=N2                                                         TYPE  61
      IF(N2 .GT. (2**17-1)) CALL ERROR(8,KDM1,KDM2)
      IF(N2 .LE. 0) CALL ERROR(8,KDM1,KDM2)
      INCR=INCR*N2                                                       TYPE  64
      GO TO 67                                                           TYPE  65
   65 IF(JTYP .NE. 2) GO TO 110                                          TYPE  66
      CALL SEARCH                                                        TYPE  67
      IF(ISRCH(2) .EQ. 1) CALL ERROR(10,NXTID,KDM2)
      IF(ISRCH(1) .EQ. 1) GO TO 66                                       TYPE  69
      IDTYP=1                                                            TYPE  70
      CALL STORE                                                         TYPE  71
      LOC=NID                                                            TYPE  72
   66 IF(BITGET(IDTBL(3,LOC),12,1) .NE. 1) CALL ERROR(9,KDM1,KDM2)
      IF(BITGET(IDTBL(3,LOC),1,1) .NE. 0) GO TO 130
      CALL IMPTYP                                                        TYPE  75
      IF(BITGET(IDTBL(3,LOC),10,3) .NE. 4) CALL ERROR(9,KDM1,KDM2)
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),1,13)                             TYPE  77
      IDIM(I)=2**17+LOC                                                  TYPE  78
   67 IF(NEXT(JPTR) .EQ. COMMA) GO TO 68                                 TYPE  79
      IF(A(JPTR-1) .NE. RPAR) GO TO 110                                  TYPE  80
      K=NEXT(JPTR)                                                       TYPE  81
      LOC=IE
      IF(BITGET(IDTBL(3,LOC),1,1) .NE. 0)
     $ CALL ERROR(11,IDTBL(1,LOC),KDM2)
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),1,1)                              TYPE  86
      IF(I .GT. 3) GO TO 110                                             TYPE  87
      GO TO (85,80,75),I                                                 TYPE  88
   75 IDTBL(4,LOC)=BITPUT(IDTBL(4,LOC),IDIM(3),36)                       TYPE  89
   80 IDTBL(4,LOC)=BITPUT(IDTBL(4,LOC),IDIM(2),18)                       TYPE  90
   85 IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),IDIM(1),36)                       TYPE  91
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),I,7)                              TYPE  92
   87 IF(INCR .EQ. 1) GO TO 90                                           TYPE  93
      IF(BITGET(IDTBL(3,LOC),16,1) .NE. 1) GO TO 90                      TYPE  94
      COMLOC=IDTBL(6,LOC)                                                TYPE  95
      IDTBL(4,COMLOC)=IDTBL(4,COMLOC)+INCR-1                             TYPE  96
   90 IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),ISTATE,10)                        TYPE  97
      IDTBL(3,LOC)=BITPUT(IDTBL(3,LOC),1,11)                             TYPE  98
      IF(A(JPTR-1) .EQ. COMMA) GO TO 60                                  TYPE  99
      IF(NEXT(JPTR) .EQ. BLANK) RETURN                                   TYPE 100
  110 CALL ERROR(7,KDM1,KDM2)
      RETURN                                                             TYPE 102
  120 CALL ERROR(12,NXTID,KDM2)
      RETURN
  130 CALL ERROR(14,NXTID,KDM2)
      RETURN
      END                                                                TYPE 103
```

Auxiliary Programs and Associated Data

Program GRAPH

```
      DIMENSION INT(1000)
   10 FORMAT(12I6)
   20 FORMAT(2I6,A6,I6,A6,7I6/A6,2I6,A6,3I6,A6,I6,A6,2I6/A6,4I6,A6,3I6,
     $ A6,2I6/A6,2I6,A6,8I6/A6,I6,A6,I6,A6,I6,A6,3I6,2A6/3I6,A6,3I6,A6,
     $ 3I6,A6/7I6,A6,4I6/5I6,A6,6I6/(12I6))
      READ 10,(INT(I),I=1,11)
      WRITE(4) (INT(I),I=1,11)
      READ 20,INT
      WRITE(4) INT
      READ 10,INT
      WRITE(4) INT
      READ 10,INT
      WRITE(4) INT
      READ 10,INT
      WRITE(4) INT
      READ 10,INT(1)
      WRITE(4) INT(1)
      READ 10,(INT(I),I=1,34)
      WRITE(4) (INT(I),I=1,34)
      STOP
      END
```

Syntax Graph

```
 1000    99    17     8    17     0    21    74     0     0     1
  359    60+          1-           2   103   103    67     3     3     4
*        72    5RL          0   669   483,         10CP      10000   349
*         7   480   795   795DP      20000    21     8)          9    42
         18   480'        930    10   935     6   103   935   480   256
C        12@         235          13'            14   346    47C     OR
   15   795   795>         16   391   411NT         17   322   359X
   19    28    47   359    29   935   977>        110    67   318   318
   29   228   359    40   935/         130     3    72    11    72    60
   29    60   999    99   100   101   102   103   104   105   106    40
  107    62   109   111   112   113   114   115   116   117   118   119
   10   120   122   123   124   125   126   127    81    62   128    21
  131   133   134   135   136   137   157   138    93   140   142   143
  144   145   146   147    81   480   148   151   152   153   154   155
  156   110   157   159    93   114   160   163   164   165   166   167
  168   285    60   169   172   173    86   174    88   130   176   179
  133   114    72   180   184   185   186   187   188   189   516   190
  192   193   194   195    86   130   196   199   133   200   202   203
  204   205   206   207   208   209   210   211   212   103   126   208
```

213	217	208	218	220	221	222	223	224	710	225	553
227	182	229	231	480	292	232	235	126	236	150	238
566	240	242	243	244	157	245	247	248	182	249	251
252	253	254	255	256	257	258	318	150	259	262	175
263	591	265	593	267	269	270	271	272	273	274	228
275	277	278	279	280	281	282	283	284	175	285	287
288	289	290	291	292	293	294	228	295	297	298	299
300	301	302	256	630	303	306	307	378	308	263	310
312	313	314	315	316	317	208	480	318	321	322	346
323	325	326	327	328	329	263	330	332	333	334	288
335	337	338	339	340	341	342	343	670	235	344	347
348	349	350	351	352	353	354	288	355	357	358	418
359	361	315	362	364	365	366	367	368	322	369	371
372	285	373	375	376	377	378	379	380	381	315	382
384	711	385	387	388	322	389	391	392	3	393	285
395	397	398	399	353	400	292	402	404	405	406	407
408	409	410	411	412	346	413	415	416	417	418	419
353	420	422	423	424	425	426	753	318	427	430	431
385	432	86	434	436	437	438	439	440	441	442	443
444	445	446	447	896	448	450	451	385	452	454	455
346	456	110	458	460	461	462	463	464	465	378	466
468	359	796	469	472	473	474	475	476	477	411	478
480	133	481	483	484	485	486	487	378	488	490	491
445	492	494	495	555	496	498	499	500	501	502	503
504	505	506	507	508	509	510	511	445	512	840	514
516	517	518	519	520	521	522	523	524	525	519	526
418	528	483	530	532	533	487	534	536	537	538	539
452	540	542	28	543	545	546	547	548	549	483	550
552	553	487	445	554	557	558	885	559	561	452	562
564	565	566	567	568	569	570	571	572	573	574	60
529	575	578	579	580	581	582	583	584	585	586	72
587	589	480	590	592	483	593	595	529	596	208	598
600	601	602	88	603	931	605	519	607	609	610	611
612	613	614	615	942	616	618	619	620	621	622	623
624	625	626	627	628	629	630	631	632	633	634	635
636	527	637	639	640	641	642	643	644	645	646	647
648	649	650	651	978	652	654	655	982	656	658	659
660	661	662	663	664	665	666	667	668	669	322	670
672	673	674	675	676	677	678	679	680	681	8	682
684	11	685	687	688	689	690	603	691	693	694	695
696	697	698	699	700	701	702	703	704	705	706	707
708	157	709	711	712	603	713	715	669	716	718	719
720	721	722	723	724	725	726	727	728	729	730	731
732	733	734	735	669	736	738	739	740	741	742	743
744	745	746	747	748	749	750	751	752	753	754	755
756	757	758	759	760	761	762	763	764	765	766	767
768	769	770	771	772	773	774	775	776	777	778	779
780	781	108	782	784	785	786	787	788	789	790	791
792	445	793	795	796	797	710	752	452	798	802	803
804	805	806	807	808	809	810	811	812	813	814	815
816	817	818	752	819	821	822	823	824	235	825	827
828	829	830	483	831	318	833	835	836	837	838	839
840	841	842	843	844	845	846	847	848	839	849	851
852	853	854	855	856	857	858	859	860	861	862	863
864	865	866	867	868	869	870	871	872	873	874	875
876	877	878	879	880	881	882	883	884	885	886	887
888	889	890	891	892	893	894	895	896	897	898	899
900	901	902	903	904	795	905	907	908	519	909	911
912	913	914	915	916	917	918	919	920	921	922	923
924	884	925	927	928	929	930	931	932	933	934	935
936	937	938	939	930	940	942	943	944	935	945	947
948	839	949	951	952	953	954	955	956	957	958	959
960	961	962	963	964	965	966	967	968	28	969	971
972	973	974	975	976	889	977	979	980	981	982	983
896	984	986	987	988	989	990	991	992	993	994	995
996	997	998	889								

43	69	4	683	6	66	8	149	710	657	21	24
12	89	617	17	268	19	800	44	28	23	783	13
26	228	130	29	820	31	241	89	266	35	305	37
38	36	130	15	4	345	129	191	89	4	130	378
50	428	94	89	54	471	56	515	445	67	42	61
560	710	839	65	606	5	346	69	653	12	896	73
686	15	4	78	93	535	10	33	889	15	84	555
86	577	89	87	88	10	8	89	597	386	93	98
519	108	100	101	102	103	104	105	106	107	109	96
111	93	112	113	114	115	116	117	118	119	120	122
4	123	124	125	126	127	128	131	1	175	133	4
134	135	136	137	138	140	182	142	133	143	144	145
146	147	148	151	7	130	152	153	154	155	156	157
159	208	160	163	157	228	164	165	166	167	168	169
172	315	5	173	174	176	89	179	89	29	180	184
208	555	11	185	186	187	188	189	190	192	20	193
194	195	196	199	10	603	200	202	235	203	204	205
206	207	208	209	210	211	212	213	217	5	89	110
218	220	452	221	222	223	224	225	227	483	229	25
231	133	232	235	130	235	236	238	3	240	157	242
30	243	244	245	247	89	248	249	251	150	252	253
254	255	256	257	258	259	262	89	3	263	265	519
267	80	269	16	270	271	272	273	274	275	277	256
278	279	280	281	282	283	284	285	287	3	288	289
290	291	292	293	294	295	297	285	298	299	300	301
302	303	306	346	34	307	308	310	411	312	29	313
314	315	316	317	318	321	1	130	322	323	325	445
326	327	328	329	330	332	292	333	334	335	337	263
338	339	340	341	342	343	344	347	59	2	348	349
350	351	352	353	354	355	357	889	358	359	361	89
362	364	256	365	366	367	368	369	371	208	372	373
375	89	376	377	378	379	380	381	382	384	285	385
387	51	388	389	391	126	392	393	395	21	397	13
398	399	400	402	208	404	1	405	406	407	408	409
410	411	412	413	415	89	416	417	418	419	420	422
89	423	424	425	426	427	430	49	5	431	432	434
29	436	529	437	438	439	440	441	442	443	444	445
446	447	448	450	935	451	452	454	418	455	456	458
13	460	288	461	462	463	464	465	466	468	89	469
472	4	53	473	474	475	476	477	478	480	378	481
483	263	484	485	486	487	488	490	13	491	492	494
29	495	496	498	603	499	500	501	502	503	504	505
506	507	508	509	510	511	512	514	480	516	55	517
518	519	520	521	522	523	524	525	526	528	62	530
3	532	669	533	534	536	76	537	538	539	540	542
89	543	545	47	546	547	548	549	550	552	710	553
554	557	83	6	558	559	561	60	562	564	5	565
566	567	568	569	570	571	572	573	574	575	578	81
85	579	580	581	582	583	584	585	586	587	589	529
590	592	7	593	595	14	596	598	95	600	110	601
602	603	605	669	607	64	609	89	610	611	612	613
614	615	616	618	40	619	620	621	622	623	624	625
626	627	628	629	630	631	632	633	634	635	636	637
639	5	640	641	642	643	644	645	646	647	648	649
650	651	652	654	68	655	656	658	90	659	660	661
662	663	664	665	666	667	668	669	670	672	385	673
674	675	676	677	678	679	680	681	682	684	3	685
687	72	688	689	690	691	693	89	694	695	696	697
698	699	700	701	702	703	704	705	706	707	708	709
711	182	712	713	715	9	716	718	208	719	720	721
722	723	724	725	726	727	728	729	730	731	732	733
734	735	736	738	88	739	740	741	742	743	744	745
746	747	748	749	750	751	752	753	754	755	756	757
758	759	760	761	762	763	764	765	766	767	768	769
770	771	772	773	774	775	776	777	778	779	780	781
782	784	22	785	786	787	788	789	790	791	792	793

795	114	796	797	798	802	89	18	487	803	804	805
806	807	808	809	810	811	812	813	814	815	816	817
818	819	821	28	822	823	824	825	827	322	828	829
830	831	833	752	835	40	836	837	838	839	840	841
842	843	844	845	846	847	848	849	851	884	852	853
854	855	856	857	858	859	860	861	862	863	864	865
866	867	868	869	870	871	872	873	874	875	876	877
878	879	880	881	882	883	884	885	886	887	888	889
890	891	892	893	894	895	896	897	898	899	900	901
902	903	904	905	907	15	908	909	911	62	912	913
914	915	916	917	918	919	920	921	922	923	924	925
927	930	928	929	930	931	932	933	934	935	936	937
938	939	940	942	977	943	944	945	947	3	948	949
951	4	952	953	954	955	956	957	958	959	960	961
962	963	964	965	966	967	968	969	971	710	972	973
974	975	976	977	979	89	980	981	982	983	984	986
89	987	988	989	990	991	992	993	994	995	996	997
998	999	99	3								
43	2	4	3	6	5	8	7	9	90	11	13
12	14	40	17	16	19	18	44	21	23	22	24
26	25	110	29	28	31	30	32	80	35	34	717
38	37	191	15	41	59	1	20	45	46	276	52
50	49	94	324	54	53	56	55	394	58	42	61
60	737	311	65	64	66	459	69	68	433	370	73
72	139	158	78	77	76	493	33	82	178	84	83
86	85	89	88	87	10	241	92	95	51	93	98
97	96	0	0	0	0	0	0	0	0	0	108
0	27	0	0	0	0	0	0	0	0	0	0
121	0	0	0	0	0	0	0	129	130	0	132
0	0	0	0	0	0	74	0	141	0	0	0
0	0	0	0	149	150	0	0	0	0	0	0
0	75	0	0	161	162	0	0	0	0	0	0
0	170	171	0	0	0	175	0	177	81	0	0
181	182	183	0	0	0	0	0	0	0	39	0
0	0	0	0	197	198	0	0	201	0	0	0
0	0	0	0	0	0	0	0	0	214	215	216
0	0	219	0	0	0	0	0	0	226	0	228
0	230	0	0	233	234	0	0	237	0	239	0
91	0	0	0	0	246	0	0	0	250	0	0
0	0	0	0	0	0	0	260	261	0	0	264
0	266	0	268	0	0	0	0	0	0	0	47
0	0	0	0	0	0	0	0	0	286	0	0
0	0	0	0	0	0	0	296	0	0	0	0
0	0	0	304	305	0	0	0	309	0	63	0
0	0	0	0	0	0	319	320	0	0	0	48
0	0	0	0	0	0	331	0	0	0	0	336
0	0	0	0	0	0	0	0	345	346	0	0
0	0	0	0	0	0	0	356	0	0	0	360
0	0	363	0	0	0	0	0	0	71	0	0
0	374	0	0	0	0	0	0	0	0	383	0
0	386	0	0	0	390	0	0	0	57	0	396
0	0	0	0	401	0	403	0	0	0	0	0
0	0	0	0	0	414	0	0	0	0	0	0
421	0	0	0	0	0	0	428	429	0	0	0
70	0	435	0	0	0	0	0	0	0	0	0
0	0	0	0	449	0	0	0	453	0	0	0
457	0	67	0	0	0	0	0	0	0	467	0
0	470	471	0	0	0	0	0	0	0	479	0
0	482	0	0	0	0	0	0	489	0	0	0
79	0	0	0	497	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	513	0	515	0
0	0	0	0	0	0	0	0	0	0	527	0
529	0	531	0	0	0	535	0	0	0	0	0
541	0	0	544	0	0	0	0	0	0	551	0
0	0	555	556	0	0	0	560	0	0	563	0
0	0	0	0	0	0	0	0	0	0	0	576

577	0	0	0	0	0	0	0	0	0	0	588
0	0	591	0	0	594	0	0	597	0	599	0
0	0	0	604	0	606	0	608	0	0	0	0
0	0	0	0	617	0	0	0	0	0	0	0
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0	638	0	0	0	0	0	0	0	0	0	0
0	0	0	0	653	0	0	0	657	0	0	0
0	0	0	0	0	0	0	0	0	0	671	0
0	0	0	0	0	0	0	0	0	0	683	0
0	686	0	0	0	0	0	692	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	710	0	0	0	714	0	0	36	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	62	0	0	0	0	0	0	0
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0	0	0	0	0	0	0	0	0	0	0	0
0	0	783	0	0	0	0	0	0	0	0	0
0	794	0	0	0	0	799	800	801	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	820	0	0	0	0	0	826	0	0
0	0	0	832	0	834	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	850	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	906	0	0	0	910	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	926	0	0	0	0	0	0	0	0	0	0
0	0	0	0	941	0	0	0	0	946	0	0
0	950	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	970	0	0
0	0	0	0	0	978	0	0	0	0	0	0
985	0	0	0	0	0	0	0	0	0	0	0
0	0	0	1000								
96	76	99	97	99	97	96	96	76	97	76	97
99	76	97	99	97	96	96	99	76	99	97	236
99	97	72	96	96	99	97	76	97	99	97	232
99	97	72	99	77	97	96	97	76	77	72	72
99	97	99	72	99	97	99	97	72	76	99	99
97	72	72	99	97	236	72	99	97	73	72	99
97	73	73	96	76	96	72	99	72	73	96	96
96	96	96	236	96	99	73	76	96	97	96	96
76	96	0	0	0	0	0	0	0	0	0	236
0	76	0	0	0	0	0	0	0	0	0	0
77	0	0	0	0	0	0	0	236	76	0	77
0	0	0	0	0	0	76	0	76	0	0	0
0	0	0	0	236	76	0	0	0	0	0	0
0	76	0	0	76	76	0	0	0	0	0	0
0	76	77	0	0	0	76	0	76	76	0	0
76	76	77	0	0	0	0	0	0	0	236	0
0	0	0	0	77	76	0	0	76	0	0	0
0	0	0	0	0	0	0	0	0	77	76	76
0	0	76	0	0	0	0	0	0	76	0	236
0	76	0	0	76	76	0	0	77	0	76	0
236	0	0	0	0	76	0	0	0	76	0	0
0	0	0	0	0	0	0	76	77	0	0	76
0	236	0	236	0	0	0	0	0	0	0	76
0	0	0	0	0	0	0	0	0	77	0	0
0	0	0	0	0	0	0	76	0	0	0	0
0	0	0	76	236	0	0	0	76	0	76	0
0	0	0	0	0	0	77	76	0	0	0	76
0	0	0	0	0	0	76	0	0	0	0	76
0	0	0	0	0	0	0	0	236	77	0	0
0	0	0	0	0	0	0	76	0	0	0	76

0	0	76	0	0	0	0	0	0	76	0	0
0	76	0	0	0	0	0	0	0	0	76	0
0	236	0	0	0	76	0	0	0	76	0	77
0	0	0	0	76	0	77	0	0	0	0	0
0	0	0	0	0	76	0	0	0	0	0	0
76	0	0	0	0	0	0	236	77	0	0	0
76	0	76	0	0	0	0	0	0	0	0	0
0	0	0	0	76	0	0	0	76	0	0	0
77	0	76	0	0	0	0	0	0	0	76	0
0	77	236	0	0	0	0	0	0	0	76	0
0	76	0	0	0	0	0	0	77	0	0	0
76	0	0	0	76	0	0	0	0	0	0	0
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77	0	76	0	0	0	236	0	0	0	0	0
76	0	0	76	0	0	0	0	0	0	76	0
0	0	236	77	0	0	0	236	0	0	77	0
0	0	0	0	0	0	0	0	0	0	0	76
236	0	0	0	0	0	0	0	0	0	0	76
0	0	77	0	0	77	0	0	236	0	76	0
0	0	0	76	0	236	0	76	0	0	0	0
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0	0	0	0	0	0	0	0	0	0	76	0
0	0	0	0	0	0	0	0	0	0	236	0
0	236	0	0	0	0	0	76	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	76	0	0	0	77	0	0	76	0	0	0
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0	0	0	76	0	76	0	0	0	0	0	0
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0	0	0	0	0	77	0	0	0	76	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	76	0	0	0	0	0	0	0	0	0	0
0	0	0	0	76	0	0	0	0	76	0	0
0	77	0	0	0	0	0	0	0	0	0	0
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0	0	0	0	0	76	0	0	0	0	0	0
76	0	0	0	0	0	0	0	0	0	0	0
0	0	0	77								
0											
8	391	982	349	942	516	553	591	630	670	711	753
796	840	885	931	978	42	11	48	68	89	111	675
154	642	137	593	108	566	19	29	228	483		

Program SESLIST

```
      COMPILER(FLD=ABS)
      INTEGER TYPE,CLASS,BLKTYP(100),BLKSIZ(100)
      DIMENSION ISUBLT(3,200),INTFAC(500),IARGS(200)
      EQUIVALENCE (BLKTYP(1),IARGS(1)),(BLKSIZ(1),IARGS(101))
      NLIST=0
      IPTR=1
    1 READ(5,5,END=40) NAME,NARGS,TYPE,CLASS,ISIZE
    5 FORMAT(A6,1X,3I2,1X,I6)
      IF(ISIZE .LT. 1) ISIZE=0
      NLIST=NLIST+1
      IVAR=0
      ISUBLT(1,NLIST)=NAME
      IF(NARGS .NE. -1) GO TO 7
      NARGS=1
      IVAR=1
    7 ITEMP=ISIZE
      FLD(0,6,ITEMP)=NARGS
      FLD(6,4,ITEMP)=CLASS
      FLD(10,3,ITEMP)=TYPE
      ISUBLT(2,NLIST)=ITEMP
      ISUBLT(3,NLIST)=0
      IF(NARGS .EQ. 0) GO TO 1
      FLD(13,1,ISUBLT(2,NLIST))=IVAR
      ISUBLT(3,NLIST)=IPTR
      IF(CLASS .EQ. 7) GO TO 25
      JPTR=IPTR
      INC=1+(NARGS-1)/4
      IPTR=IPTR+INC
      NDPTR=IPTR-1
      NPARAM=3*NARGS
      READ(5,10) (IARGS(I),I=1,NPARAM)
   10 FORMAT(20(3I1,1X))
      KOUNT=0
      DO 20 I=JPTR,NDPTR
      INTFAC(I)=0
      IBIT=-3
      DO 20 K=1,12
      KOUNT=KOUNT+1
      IF(KOUNT .GT. NPARAM) GO TO 1
      IWIDTH=3
      IBIT=IBIT+3
      IF(MOD(KOUNT,3) .EQ. 0) IWIDTH=2
   20 FLD(IBIT,IWIDTH,INTFAC(I))=IARGS(KOUNT)
      GO TO 1
   25 JPTR=IPTR
      INC=1+(NARGS-1)/2
      IPTR=IPTR+INC
      NDPTR=IPTR-1
      READ(5,27) (BLKSIZ(I),BLKTYP(I),I=1,NARGS)
   27 FORMAT(10(I6,1X,I1))
      KOUNT=0
      DO 30 I=JPTR,NDPTR
      INTFAC(I)=0
      IBIT=-3
      DO 30 K=1,2
      KOUNT=KOUNT+1
      IF(KOUNT .GT. NARGS) GO TO 1
      IBIT=IBIT+3
      FLD(IBIT,15,INTFAC(I))=BLKSIZ(KOUNT)
      IBIT=IBIT+15
   30 FLD(IBIT,3,INTFAC(I))=BLKTYP(KOUNT)
      GO TO 1
   40 WRITE(4) NLIST,NDPTR
      WRITE(4) ((ISUBLT(I,J),I=1,3),J=1,NLIST)
      WRITE(4) (INTFAC(I),I=1,NDPTR)
      WRITE(6,50) NLIST
   50 FORMAT(///42X,37H NEW LIST HAS BEEN CREATED CONTAINING,I4,
     $ 6H NAMES)
      STOP
      END
```

Basic Interface Definition File

```
ABS      1 1 4
102
AINT     1 1 4
102
ALOG     1 1 4
102
ALOG10   1 1 4
102
AMAX0   -1 1 4
402
AMAX1   -1 1 4
102
AMIN0   -1 1 4
402
AMIN1   -1 1 4
102
AMOD     2 1 4
102 102
AIMAG    1 1 4
202
ATAN     1 1 4
102
ATAN2    2 1 4
102 102
CABS     1 1 4
202
CCOS     1 2 4
202
CEXP     1 2 4
202
CLOG     1 2 4
202
CMPLX    2 2 4
102 102
CONJG    1 2 4
202
COS      1 1 4
102
CSIN     1 2 4
202
CSQRT    1 2 4
202
DABS     1 3 4
302
DATAN    1 3 4
302
DATAN2   2 3 4
302 302
DBLE     1 3 4
102
DCOS     1 3 4
302
DEXP     1 3 4
302
DIM      2 1 4
102 102
DLOG     1 3 4
302
DLOG10   1 3 4
302
DMAX1   -1 3 4
302
DMIN1   -1 3 4
302
DMOD     2 3 4
302 302
DSIGN    2 3 4
302 302
DSIN     1 3 4
302
DSQRT    1 3 4
302
EXP      1 1 4
102
FLOAT    1 1 4
402
IABS     1 4 4
402
IDIM     2 4 4
402 402
IDINT    1 4 4
302
IFIX     1 4 4
102
INT      1 4 4
102
ISIGN    2 4 4
402 402
MAX0    -1 4 4
402
MAX1    -1 4 4
102
MIN0    -1 4 4
402
MIN1    -1 4 4
102
MOD      2 4 4
402 402
REAL     1 1 4
202
SESCOM   2 0 7      25
    13 0     12 4
SIGN     2 1 4
102 102
SIN      1 1 4
102
SNGL     1 1 4
302
SQRT     1 1 4
102
TAN      1 1 4
102
TANH     1 1 4
102
```

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