APPENDIX

```
      LISTING OF SLIP SYMBOLIC DECK
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      SUBROUTINE INITAS(M,N)                                              001
C                                                          4/1/63           002
      COMMON AVSL,X(100)                                                  003
      DIMENSION W(200),M(2)                                               004
      DO 1 I=1,100                                                        005
         J=2*I-1                                                          006
      CALL STRDIR(STRDIR(STRDIR(0,X(I)),W(J)),W(J+1))                     007
      CALL SETDIR(0,MADOV(W(J)),MADOV(W(J)),X(I))                         008
      CALL SETDIR(2,MADOV(W(J)),MADOV(W(J)),W(J))                         009
    1 CALL SETDIR(-1,-1,4095,W(J+1))                                      010
      DO 2 I=1,N                                                          011
    2    M(I) = 0                                                         012
         K = N-2                                                          013
      DO 3 I=1,K,2                                                        014
    3 CALL SETDIR(-1,-1,MADOV(M(I+2)),M(I))                               015
      CALL SETDIR(0,MADOV(M(N-1)),MADOV(M(1)),AVSL)                       016
      RETURN                                                              017
      END                                                                 018
      FUNCTION NUCELL(X)                                                  019
C                                                          4/1/63           020
      COMMON AVSL                                                         021
         M = LNKR(AVSL)                                                   022
         IF (M)1,2,1                                                      023
    2 PRINT 901                                                           024
      STOP                                                                025
    1 IF (ID(CONT(M))-1)3,4,3                                             026
    4     CALL IRALST(CONT(M+1))                                          027
    3     CALL SETDIR(-1,-1,LNKR(CONT(M)),AVSL)                           028
          CALL STRIND(0,M)                                                029
          CALL STRIND(0,M+1)                                              030
         NUCELL = M                                                       031
      RETURN                                                              032
  901 FORMAT (1H1,6X,55HLIST OF AVAILABLE SPACE EXHAUSTED - PROGRAM TERM  033
     1INATED  )                                                           034
      END                                                                 035
      SUBROUTINE RCELL(CELL)                                              036
C                                                          4/1/63           037
      COMMON AVSL                                                         038
      CALL SETIND(-1,-1,CELL,LNKL(AVSL))                                  039
      CALL SETDIR(-1,CELL,-1,AVSL)                                        040
      CALL SETIND(-1,-1,0,CELL)                                           041
      RETURN                                                              042
      END                                                                 043
      FUNCTION LIST(K)                                                    044
C                                                          4/1/63           045
C                                                          4/1/63           046
         LIST = NUCELL(Z)                                                 047
      CALL SETDIR(0,LIST,LIST,LIST)                                       048
      CALL SETIND(2,LIST,LIST,LIST)                                       049
         IF (K-9)2,1,2                                                    050
    2 CALL SETIND(-1,-1,1,LIST+1)                                         051
         K = LIST                                                         052
    1 RETURN                                                              053
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      END                                                                 054
      FUNCTION MTLIST(P)                                                  055
C                                                          4/1/63           056
      COMMON AVSL                                                         057
         M = LOCT(P)                                                      058
         IF (LISTMT(P))3,4,3                                              059
    3    LR = LNKR(CONT(M))                                               060
         LL = LNKL(CONT(M))                                               061
         CALL SETIND(-1,M,M,M)                                            062
         CALL SETIND(-1,-1,LR,LNKL(AVSL))                                 063
      CALL SETDIR(-1,LL,-1,AVSL)                                          064
         CALL SETIND(-1,-1,0,LNKL(AVSL))                                  065
    4    MTLIST = M                                                       066
      RETURN                                                              067
      END                                                                 068
      FUNCTION IRALST(P)                                                  069
C                                                          4/1/63           070
        L = LOCT(P)                                                       071
      CALL SETIND(-1,-1,LCNTR(L)-1,L+1)                                   072
         IRALST = LCNTR(L)                                                073
        IF(IRALST)1,2,1                                                   074
    2 CALL MTLIST(P)                                                      075
         N = LNKL(CONT(L+1))
           IF(N)3,4,3
    3      NEW = NUCELL(Z)
      CALL SETIND(1,-1,-1,NEW)
      CALL SETIND(-1,N,N,NEW+1)
      CALL RCELL(NEW)
    4 CALL RCELL(L)                                                       076
    1 RETURN                                                              077
      END                                                                 078
      FUNCTION NULSTL(LNKP,LNKH)                                          079
C                                                          4/1/63           080
      NULSTL = LIST(9)                                                    081
      IF (ID(CONT(LNKP))-2)1,2,1                                          082
    2    CALL SETIND(2,NULSTL,NULSTL,NULSTL)                              083
      RETURN                                                              084
    1 LTOP = LNKR(CONT(LNKH))                                             085
      LSUC = LNKR(CONT(LNKP))                                             086
         CALL SETIND(-1,-1,LSUC,LNKH)                                     087
         CALL SETIND(-1,LNKH,-1,LSUC)                                     088
         CALL SETIND(2,LNKP,LTOP,NULSTL)                                  089
         CALL SETIND(-1,-1,NULSTL,LNKP)                                   090
         CALL SETIND(-1,NULSTL,-1,LTOP)                                   091
      RETURN                                                              092
      END                                                                 093
      FUNCTION NULSTR(LNKP,LNKH)                                          094
C                                                          4/1/63           095
      NULSTR = LIST(9)                                                    096
      IF (ID(CONT(LNKP))-2)1,2,1                                          097
    2    CALL SETIND(2,NULSTR,NULSTR,NULSTR)                              098
      RETURN                                                              099
    1 LBOT = LNKL(CONT(LNKH))                                             100
      LPRE = LNKL(CONT(LNKP))                                             101
         CALL SETIND(-1,LPRE,-1,LNKH)                                     102
         CALL SETIND(-1,-1,LNKH,LPRE)                                     103
         CALL SETIND(2,LBOT,LNKP,NULSTR)                                  104
         CALL SETIND(-1,NULSTR,-1,LNKP)                                   105
         CALL SETIND(-1,-1,NULSTR,LBOT)                                   106
      RETURN                                                              107
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      END                                                                  108
      FUNCTION NEWTOP(P,Q)                                                 109
C                                                          4/1/63         110
         NEWTOP = NXTRGT(P,LOCT(Q))                                        111
      RETURN                                                               112
      END                                                                  113
      FUNCTION NEWBOT(P,Q)                                                 114
C                                                          4/1/63         115
         NEWBOT = NXTLFT(P,LOCT(Q))                                        116
      RETURN                                                               117
      END                                                                  118
      FUNCTION NXTLFT(M,A)                                                 119
C                                                          4/1/63         120
         IL = NUCELL(Z)                                                    121
      NXTLFT = IL                                                          122
        LL = LNKL(CONT(A))                                                 123
      CALL SETIND(-1,-1,IL,LL)                                             124
      CALL SETIND(-1,IL,-1,A)                                              125
      CALL SETIND(0,LL,A,IL)                                               126
         IF(NAMTST(M))1,2,1                                                127
    2 CALL SETIND(1,-1,-1,IL)                                              128
      CALL SETIND(-1,-1,LCNTR(M)+1,M+1)                                    129
    1 CALL STRIND(M,IL+1)                                                  130
      RETURN                                                               131
      END                                                                  132
      FUNCTION NXTRGT(M,A)                                                 133
C                                                          4/1/63         134
         IR = NUCELL(Z)                                                    135
      NXTRGT = IR                                                          136
        LR = LNKR(CONT(A))                                                 137
      CALL SETIND(-1,IR,-1,LR)                                             138
      CALL SETIND(-1,-1,IR,A)                                              139
      CALL SETIND (0,A,LR,IR)                                              140
         IF (NAMTST(M))1,2,1                                               141
    2 CALL SETIND(1,-1,-1,IR)                                              142
      CALL SETIND(-1,-1,LCNTR(M)+1,M+1)                                    143
    1 CALL STRIND(M,IR+1)                                                  144
      RETURN                                                               145
      END                                                                  146
      FUNCTION INLSTL(M,N)                                                 147
C                                                          4/1/63         148
         L = LOCT(M)                                                       149
         ITOP = LNKR(CONT(L))                                              150
         IBOT = LNKL(CONT(L))                                              151
      INLSTL = L                                                           152
      CALL SETIND(-1,L,L,L)                                                153
         IPRE = LNKR(CONT(N))                                              154
      CALL SETIND(-1,IBOT,-1,N)                                            155
      CALL SETIND(-1,-1,ITOP,IPRE)                                         156
      CALL SETIND(-1,IPRE,-1,ITOP)                                         157
      CALL SETIND(-1,-1,N,IBOT)                                            158
      RETURN                                                               159
      END                                                                  160
      FUNCTION INLSTR(M,N)                                                 161
C                                                          4/1/63         162
         L = LOCT(M)                                                       163
         ITOP = LNKR(CONT(L))                                              164
         IBOT = LNKL(CONT(L))                                              165
      INLSTR = L                                                           166
      CALL SETIND(-1,L,L,L)                                                167
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         ISUC = LNKR(CONT(N))                                              168
      CALL SETIND(-1,-1,ITOP,N)                                            169
      CALL SETIND(-1,IBOT,-1,ISUC)                                         170
      CALL SETIND(-1,N,-1,ITOP)                                            171
      CALL SETIND(-1,-1,ISUC,IBOT)                                         172
      RETURN                                                               173
      END                                                                  174
      FUNCTION SUBST(D,N)                                                  175
C                                                          4/1/63         176
         LBACK = LNKL(CONT(N))                                             177
         SUBST = DELETE(N)                                                 178
         CALL NXTRGT(D,LBACK)                                              179
      RETURN                                                               180
      END                                                                  181
      FUNCTION SUBSTP(DAT,LST)                                             182
C                                                          4/1/63         183
         SUBSTP = SUBST(DAT,LNKR(CONT(LST)))                               184
      RETURN                                                               185
      END                                                                  186
      FUNCTION SUBSBT(DAT,LST)                                             187
C                                                          4/1/63         188
         SUBSBT = SUBST(DAT,LNKL(CONT(LST)))                               189
      RETURN                                                               190
      END                                                                  191
      FUNCTION TOP(P)                                                      192
C                                                          4/1/63         193
      TOP = CONT( LNKR(CONT(LOCT(P)))+1)                                   194
      RETURN                                                               195
      END                                                                  196
      FUNCTION BOT(P)                                                      197
C                                                          4/1/63         198
      BOT = CONT( LNKL(CONT(LOCT(P)))+1)                                   199
      RETURN                                                               200
      END                                                                  201
      FUNCTION  POPTOP(P)                                                  202
C                                                          4/1/63         203
      POPTOP =  DELETE(LNKR(CONT(LOCT(P))))                                204
        RETURN                                                             205
        END                                                                206
      FUNCTION  POPBOT(P)                                                  207
C                                                          4/1/63         208
      POPBOT =  DELETE(LNKL(CONT(LOCT(P))))                                209
      RETURN                                                               210
      END                                                                  211
      FUNCTION ADVLL(LR,J,K)                                               212
C                                                          4/1/63         213
       CLR = CONT(LR)                                                      214
    5    LK = LNKL(CONT(LNKL(CLR)))                                       215
         CAND = CONT(LK)                                                   216
      CALL SETDIR(-1,LK,-1,CLR)                                            217
        IF (ID(CAND)-2)1,2,1                                               218
    1   IF (ID(CAND)-J)3,4,3                                               219
    3   IF (ID(CAND)-K)5,4,5                                               220
    4 ADVLL = 0.                                                           221
      GOTO 6                                                               222
    2 ADVLL = -1.0                                                         223
    6 CALL STRIND(CLR,LR)                                                  224
      RETURN                                                               225
      END                                                                  226
      FUNCTION ADVLR(LR,J,K)                                               227
```

```
      CLR = CONT(LR)
    5 LK = LNKR(CONT(LNKL(CLR)))
      CAND = CONT(LK)
      CALL SETDIR(-1,LK,-1,CLR)
        IF (ID(CAND)-2)1,2,1
    1   IF (ID(CAND)-J)3,4,3
    3   IF (ID(CAND)-K)5,4,5
    4 ADVLR = 0.
      GOTO 6
    2 ADVLR = -1.0
    6 CALL STRIND(CLR,LR)
      RETURN
      END
      FUNCTION ADVSR(L,J,K)
        R = CONT(L)
        CAND = CONT(LNKL(R))
        IF (ID(CAND)-1)1,6,1
    1 LCP = LNKR(CAND)
      CALL SETDIR(-1,LCP,-1,R)
      CAND = CONT(LCP)
        IF (ID(CAND)-2)3,4,3
    3     IF(ID(CAND)-J)7,8,7
    7     IF(ID(CAND)-K)5,8,5
    5     IF(ID(CAND)-1)1,6,1
    6 M=NUCELL(Z)
      CALL STRIND(R,M)
      CALL STRIND(CONT(L+1),M+1)
      CALL SETIND(-1,INHALT(LCP+1),LCNTR(L)+1,L+1)
      CALL SETDIR(-1,-1,M,R)
      CAND = CONT(INHALT(LNKL(R)+1))
      GOTO 1
    4 IF (LCNTR(L))9,10,9
   10 ADVSR = -1.0
      GOTO 12
    9 LK = LNKR(R)
        R = CONT(LK)
      CALL STRIND(CONT(LK+1),L+1)
      CAND = CONT(LNKL(R))
      CALL RCELL(LK)
      GOTO 1
    8 ADVSR = 0.
   12 CALL STRIND(R,L)
      RETURN
      END
      FUNCTION ADVSL(L,J,K)
        R = CONT(L)
        CAND = CONT(LNKL(R))
        IF(ID(CAND)-1)1,6,1
    1 LCP = LNKL(CAND)
      CALL SETDIR(-1,LCP,-1,R)
      CAND = CONT(LCP)
        IF(ID(CAND)-2)3,4,3
    3     IF(ID(CAND)-J)7,8,7
    7     IF(ID(CAND)-K)5,8,5
    5     IF(ID(CAND)-1)1,6,1
    6 M = NUCELL(Z)
      CALL STRIND(R,M)
      CALL STRIND(CONT(L+1),M+1)
      CALL SETIND(-1,INHALT(LCP+1),LCNTR(L)+1,L+1)
      CALL SETDIR(-1,-1,M,R)
```



```
      CAND = CONT(INHALT(LNKL(R)+1))
      GOTO 1
    4 IF (LCNTR(L))9,10,9
   10 ADVSL = -1.0
      GOTO 12
    9 LK = LNKR(R)
        R = CONT(LK)
      CALL STRIND(CONT(LK+1),L+1)
      CAND = CONT(LNKL(R))
      CALL RCELL(LK)
      GOTO 1
    8 ADVSL = 0.
   12 CALL STRIND(R,L)
      RETURN
      END
      FUNCTION ADVLNR(LR,A)
      A = ADVLR(LR,1,1)
      IF(A)1,2,1
    2 ADVLNR = REED(LR)
    1 RETURN
      END
      FUNCTION ADVLER(LR,A)
      A = ADVLR(LR,0,0)
      IF(A)1,2,1
    2 ADVLER = REED(LR)
    1 RETURN
      END
      FUNCTION ADVLWR(LR,A)
      A = ADVLR(LR,1,0)
      IF(A)1,2,1
    2 ADVLWR = REED(LR)
    1 RETURN
      END
      FUNCTION ADVSNR(LR,A)
      A = ADVSR(LR,1,1)
      IF(A)1,2,1
    2 ADVSNR = REED(LR)
    1 RETURN
      END
      FUNCTION ADVSER(LR,A)
      A = ADVSR(LR,0,0)
      IF(A)1,2,1
    2 ADVSER = REED(LR)
    1 RETURN
      END
      FUNCTION ADVSWR(LR,A)
      A = ADVSR(LR,1,0)
      IF(A)1,2,1
    2 ADVSWR = REED(LR)
    1 RETURN
      END
      FUNCTION ADVLNL(LR,A)
      A = ADVLL(LR,1,1)
      IF(A)1,2,1
    2 ADVLNL = REED(LR)
    1 RETURN
      END
      FUNCTION ADVLEL(LR,A)
      A = ADVLL(LR,0,0)
      IF(A)1,2,1
```

```
      2 ADVLEL = REED(LR)                                                    348
      1 RETURN                                                               349
        END                                                                  350
        FUNCTION ADVLWL(LR,A)                                                351
        A = ADVLL(LR,1,0)                                                    352
        IF(A)1,2,1                                                           353
      2 ADVLWL = REED(LR)                                                    354
      1 RETURN                                                               355
        END                                                                  356
        FUNCTION ADVSNL(LR,A)                                                357
        A = ADVSL(LR,1,1)                                                    358
        IF(A)1,2,1                                                           359
      2 ADVSNL = REED(LR)                                                    360
      1 RETURN                                                               361
        END                                                                  362
        FUNCTION ADVSEL(LR,A)                                                363
        A = ADVSL(LR,0,0)                                                    364
        IF(A)1,2,1                                                           365
      2 ADVSEL = REED(LR)                                                    366
      1 RETURN                                                               367
        END                                                                  368
        FUNCTION ADVSWL(LR,A)                                                369
        A = ADVSL(LR,1,0)                                                    370
        IF(A)1,2,1                                                           371
      2 ADVSWL = REED(LR)                                                    372
      1 RETURN                                                               373
        END                                                                  374
        FUNCTION REED(K)                                                     375
C                                                          4/1/63            376
        REED = CONT(LNKL(CONT(K))+1)                                         377
        RETURN                                                               378
        END                                                                  379
        FUNCTION DELETE(K)                                                   380
C                                                          4/1/63            381
          IF(ID(CONT(K))-2)1,2,1                                             382
      2 PRINT 901                                                            383
          DELETE = 0.                                                        384
        RETURN                                                               385
  901 FORMAT (1H1,98HAN ATTEMPT HAS BEEN MADE TO DELETE A HEADER - ZERO      386
     1HAS BEEN DELIVERED AND THE PROGRAM CONTINUED. )                        387
      1  DELETE = CONT(K+1)                                                  388
           LL = LNKL(CONT(K))                                                389
           LR = LNKR(CONT(K))                                                390
        CALL RCELL(K)                                                        391
        CALL SETIND(-1,-1,LR,LL)                                             392
        CALL SETIND(-1,LL,-1,LR)                                             393
        RETURN                                                               394
        END                                                                  395
        FUNCTION LRDROV(P)                                                   396
C                                                          4/1/63            397
           LRDROV = NUCELL(Z)                                                398
        CALL SETIND(3,LOCT(P),0,LRDROV)                                      399
        CALL SETIND(0,P,0,LRDROV+1)                                          400
        RETURN                                                               401
        END                                                                  402
        FUNCTION LOFRDR(K)                                                   403
C                                                          4/1/63            404
        L = LNKL(CONT(K+1))                                                  405
        CALL SETDIR(0,L,L,L)                                                 406
        LOFRDR = L                                                           407
```



```
        RETURN                                                               408
        END                                                                  409
        FUNCTION LCNTR(K)                                                    410
C                                                          4/1/63            411
        LCNTR = LNKR(CONT(K+1))                                              412
        RETURN                                                               413
        END                                                                  414
        FUNCTION LPNTR(K)                                                    415
C                                                          4/1/63            416
        LPNTR =  LNKL(CONT(K))                                               417
        RETURN                                                               418
        END                                                                  419
        FUNCTION LVLRVT(K)                                                   420
C                                                          4/1/63            421
           LVLRVT = K                                                        422
      1    IF (CONT(LVLRVT+1))2,3,2                                         423
      3 RETURN                                                               424
      2    L = LNKR(CONT(LVLRVT))                                           425
        CALL     STRIND(CONT(L),LVLRVT)                                      426
        CALL     STRIND(CONT(L+1),LVLRVT+1)                                  427
        CALL     RCELL(L)                                                    428
        GOTO 1                                                               429
        END                                                                  430
        FUNCTION LVLRV1(K)                                                   431
C                                                          4/1/63            432
           LVLRV1 = K                                                        433
           IF (CONT(LVLRV1+1))2,3,2                                          434
      3 RETURN                                                               435
      2    L = LNKR(CONT(LVLRV1))                                           436
        CALL     STRIND(CONT(L),LVLRV1)                                      437
        CALL     STRIND(CONT(L+1),LVLRV1+1)                                  438
        CALL     RCELL(L)                                                    439
        RETURN                                                               440
        END                                                                  441
        FUNCTION INITRD(K)                                                   442
C                                                          4/1/63            443
        CALL SETIND(-1,LNKL(K+1),-1,K)                                       444
        INITRD = K                                                           45
        RETURN                                                               446
        END                                                                  447
        FUNCTION IRARDR(K)                                                   448
C                                                          4/1/63            449
        IRARDR = LCNTR(K)                                                    450
           M = K                                                             451
      3    N = LNKR(CONT(M))                                                452
           CALL RCELL(M)                                                     453
           IF (N)1,2,1                                                       454
      1    M = N                                                            455
           GOTO 3                                                            456
      2 RETURN                                                               457
        END                                                                  458
        FUNCTION LRDRCP(K)                                                   459
C                                                          4/1/63            460
           LRDRCP = NUCELL(Z)                                                461
           NEWR = LRDRCP                                                     462
           NOW  = K                                                          463
      3 CALL STRIND(CONT(NOW),NEWR)                                          464
        CALL STRIND(CONT(NOW+1),NEWR+1)                                      465
           NOW = LNKR(CONT(NOW))                                             466
             IF (NOW)1,2,1                                                   467
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```
    1     NEW = NUCELL(Z)
      CALL SETIND(-1,-1,NEW,NEWR)
         NEWR = NEW
         GOTO 3
    2 RETURN
      END
      FUNCTION MADNTP(P,N)
C                                                          4/1/63
         L = LOCT(P)
      DO 1 I=1,N
    1 L = LNKR(CONT(L))
      IF(ID(CONT(L))-2)2,3,2
    3 CALL SETDIR(0,L,L,L)
    2 MADNTP = L
      RETURN
      END
      FUNCTION MADNBT(P,N)
C                                                          4/1/63
         L = LOCT(P)
      DO 1 I=1,N
    1 L = LNKL(CONT(L))
      IF(ID(CONT(L))-2)2,3,2
    3 CALL SETDIR(0,L,L,L)
    2 MADNBT=L
      RETURN
      END
      FUNCTION MADLFT(K)
C                                                          4/1/63
      MADLFT = LNKL(CONT(K))
      IF(ID(CONT(MADLFT))-2)1,2,1
    2 CALL SETDIR(0,MADLFT,MADLFT,MADLFT)
    1 RETURN
      END
      FUNCTION MADRGT(K)
C                                                          4/1/63
      MADRGT = LNKR(CONT(K))
      IF(ID(CONT(MADRGT))-2)1,2,1
    2 CALL SETDIR(0,MADRGT,MADRGT,MADRGT)
    1 RETURN
      END
      FUNCTION NAMTST(K)
C                                                          4/1/63
      IF (LNKL(K)-LNKR(K))1,4,1
    4 IF (ID(CONT(K))-2)1,2,1
    2 IF(CONT(LNKR(CONT(LNKL(CONT(K)))))-CONT(K))1,3,1
    3   NAMTST = 0
        RETURN
    1   NAMTST = -1
        RETURN
      END
      FUNCTION LISTMT(P)
C                                                          4/1/63
       L = LOCT(P)
      IF (EQUAL(CONT(L),CONT(LNKR(CONT(L)))))3,4,3
    4  LISTMT = 0
       RETURN
    3  LISTMT = -1
       RETURN
       END
      FUNCTION LSTEQL(LA,LB)
```



```
C                                                          4/1/63
      COMMON A,W(100)
      ASSIGN 100 TO LOCO
      LSTEQL = INTGER(VISIT(LOCO,PARMT2(LRDROV(LA),LRDROV(LB))))
      RETURN
  100   LRA = INTGER(TOP(W(1)))
      LRB = INTGER(TOP(W(2)))
    8   XA =  ADVLWR(LRA,KA)
        XB =  ADVLWR(LRB,KB)
          IF (KA)1,2,1
    1     IF (KB)3,4,3
    2     IF (KB)4,6,4
    6   IF(EQUAL(XA,XB))7,8,7
    7   IF (NAMTST(XA))4,9,4
    9   IF (NAMTST(XB))4,10,4
   10 LSTEQL = INTGER(VISIT(LOCO,PARMT2(LRDROV(XA),LRDROV(XB))))
        IF (LSTEQL)4,100,4
    3 CALL RCELL(LRA)
      CALL RCELL(LRB)
      CALL TERM(0,RESTOR(2))
    4 CALL RCELL(LRA)
      CALL RCELL(LRB)
      CALL TERM(-1,RESTOR(2))
      END
      FUNCTION LSSCPY(LA)
C                                                          4/1/63
      COMMON A,W(100)
      ASSIGN 100 TO LOCO
      LSSCPY = INTGER(VISIT(LOCO,PARMT2(LRDROV(LA),LIST(9))))
      RETURN
  100   LC = INTGER (TOP(W(2)))
        LR = INTGER(TOP(W(1)))
    5   X = ADVLWR(LR,K)
          IF (K)1,2,1
    1 CALL RCELL(LR)
      CALL TERM(LC,RESTOR(2))
    2     IF(NAMTST(X))3,4,3
    3       CALL NEWBOT(X,LC)
            GOTO 5
    4 CALL NEWBOT(VISIT(LOCO,PARMT2(LRDROV(X),LIST(9))),TOP(W(2)))
          GOTO 100
      END
      FUNCTION LSTPRO(L,K)
C                                                          4/1/63
        NEXT = K
    3   IF(LNKL(NEXT+1)-LNKR(L))1,2,1
    1   NEXT = LNKL(NEXT)
        IF (NEXT)3,4,3
    2   LSTPRO = 0
      RETURN
    4   LSTPRO = -1
      RETURN
      END
      FUNCTION LPURGE(LST)
C                                                          4/1/63
      K = LRDROV(LST)
        LPURGE = 0
    3 X = ADVSWR(K,J)
    6   IF(J)1,2,1
    1 IF (NAMTST(X))3,4,3
```

```
    4 IF (LSTPRO(X,K))3,5,3
    5    L = LPNTR(K)
      X = ADVLWR(K,J)
      CALL DELETE(L)
         LPURGE = LPURGE+1
      GOTO 6
    2 CALL IRARDR(K)
      RETURN
      END
      SUBROUTINE PRESRV(N)
C                                                              4/1/63
      COMMON AVSL,W(100)
      DO 1 I=1,N
    1 CALL NEWTOP(TOP(W(I)),W(I))
      RETURN
      END
      SUBROUTINE RESTOR(N)
C                                                              4/1/63
      COMMON AVSL,W(100)
      DO 1 I=1,N
    1 CALL POPTOP(W(I))
      RETURN
      END
      FUNCTION LOCT(K)
C                                                              4/1/63
         IF(NAMTST(K))1,2,1
    2    LOCT = K
         RETURN
    1    PRINT 901
         STOP
  901 FORMAT (1H1,94HA LIST WAS REQUIRED AS AN OPERAND BUT WAS NOT FOUND
     1- THE PROGRAM WAS REGRETFULLY TERMINATED .  )
      END
      FUNCTION PARMT2(A,B)
C                                                              4/1/63
      COMMON X,W(100)
      CALL NEWTOP(A,W(1))
      CALL NEWTOP(B,W(2))
      PARMT2 = A
      RETURN
      END
      FUNCTION NOATVL(AT,LST)
         M = MADATR(AT,LST)
         IF(M+1)2,1,2
    2 NOATVL = INTGER(DELETE(LNKR(CONT(M))))
      CALL DELETE(M)
      RETURN
    1 NOATVL = 0
      RETURN
      END
      FUNCTION NEWVAL(AT,VAL,LST)
         M = MADATR(AT,LST)
         IF(M+1)2,1,2
    2 NEWVAL = INTGER(SUBST(VAL,LNKR(CONT(M))))
      RETURN
    1 CALL LDATVL(AT,VAL,LST)
      NEWVAL = 0
      RETURN
      END
      FUNCTION ITSVAL(AT,LST)
```



```
         IF(LNKL(CONT(LST+1)))3,4,3
    3    M = MADATR(AT,LST)
         IF (M+1)1,2,1
    1 ITSVAL = INHALT(LNKR(CONT(M))+1)
      RETURN
    4 CALL DERROR(LST)
    2 ITSVAL = 0
      RETURN
      END
      FUNCTION MTDLST(LST)
         MTDLST = LST
      K = LNKL(CONT(LOCT(LST)+1))
         IF(K)1,2,1
    1 CALL SETDIR(0,K,K,X)
      CALL MTLIST(X)
    2 RETURN
      END
      FUNCTION MAKEDL(L,M)
      CALL MTDLST(M)
      MAKEDL = M
      N = LOCT(M)
      K = LOCT(L)
      CALL SETIND(-1,K,-1,N+1)
      CALL SETIND(-1,-1,LCNTR(L)+1,K+1)
      RETURN
      END
      FUNCTION NAMEDL(L)
      NAMEDL = LNKL(LOCT(L)+1)
      RETURN
      END
      FUNCTION LDATVL(AT,VL,LST)
         IF(LNKL(CONT(LST+1)))1,2,1
    2       LDATVL = LISTAV(LST)
    1 CALL NXTRGT(VL,NXTLFT(AT,LNKL(CONT(LST+1))))
      RETURN
      END
      FUNCTION LISTAV(LST)
      LISTAV = LIST(0)
      CALL SETIND(-1,LNKR(LISTAV),-1,LST+1)
      RETURN
      END
      FUNCTION MADATR(AT,LST)
         LSTDES = LNKL(CONT(LST+1))
         IF(LSTDES)1,4,1
    1    MADATR =  LNKR(CONT(LSTDES))
    8    IF (ID(CONT(MADATR))-2)3,4,3
    3    IF (EQUAL(CONT(MADATR+1) ,AT))5,6,5
    5    M = LNKR(CONT(MADATR))
         IF (ID(CONT(M))-2)7,4,7
    7    MADATR = LNKR(CONT(M))
         GOTO 8
    4 MADATR = -1
    6 RETURN
      END
      SUBROUTINE DERROR(LST)
      PRINT 900,LST
      PRINT 901
      RETURN
  900 FORMAT (1H1,20X,05)
  901 FORMAT (20X,44HATTRIBUTE-VALUE LIST REQUIRED BUT NOT FOUND )
```

```
      END
      FUNCTION MRKLST(M,LST)
      MRKLST = LST
      CALL SETIND(M,-1,-1,LOCT(LST)+1)
      RETURN
      END
      FUNCTION MRKLSS(M,LST)
      MRKLSS = LST
      LR = LRDROV(MRKLST(M,LST))
    3    X = ADVSNR(LR,K)
         IF(K)1,2,1
    2 CALL SETIND(M,-1,-1,LNKR(X)+1)
      GOTO 3
    1 CALL RCELL(LR)
      RETURN
      END
      FUNCTION RDLSTA(Z)                                          629
C                                                      4/1/63     630
      DIMENSION CRDBUF(10)                                        631
      COMMON /XTRCT/ CP(8),BLANK,NULL,ZERO,LP,RP                  632
   80 FORMAT (10A8)                                               633
      ASSIGN 13 TO START                                          634
      ASSIGN 20 TO NEWLST                                         635
      CALL LIST(STACK)                                            636
      IS = 1                                                      637
      WORD  = BLANK                                               638
      KOUNT = 0                                                   639
      PLACE = BLANK                                               640
   12 READ 80,CRDBUF                                              641
      PRINT 80,(CRDBUF(J),J=1,9)                                  642
      IW = 1                                                      643
   10 IC = 1                                                      644
    9 SYMBOL = SQIN(CP(8),SQOUT(CP(IC),CRDBUF(IW)),PLACE)         645
      IF (EQUAL(SYMBOL,BLANK))1,2,1                               646
    1 IF (EQUAL(SYMBOL,LP))3,4,3                                  647
    3 IF (EQUAL(SYMBOL,RP))5,6,5                                  648
   13    IF (IC - 8) 7,8,7                                        649
    7    IC = IC + 1                                              650
         GOTO 9                                                   651
    8    IF (IW - 9) 11,12,11                                     652
   11    IW = IW + 1                                              653
         GOTO 10                                                  654
    4 IF (KOUNT)40,44,40                                          655
   44 CALL NXTRGT(LIST(NEW),STACK)                                656
      KOUNT = 1                                                   657
      CALL VISIT(START)                                           658
      RDLSTA = POPTOP(STACK)                                      659
      CALL MTLIST(STACK)                                          660
      CALL RCELL(STACK)                                           661
      RETURN                                                      662
   40 IF (EQUAL(WORD,BLANK))41,42,41                              663
   41    CALL NXTLFT(LANORM(WORD),TOP(STACK))                     664
         WORD = BLANK                                             665
      IS = 1                                                      666
   42 CALL VISIT(NEWLST)                                          667
      CALL POPTOP(STACK)                                          668
      GOTO 13                                                     669
C     NEWLST                                                      670
   20    CALL NXTLFT(LIST(NEW),TOP(STACK))                        671
      CALL NXTRGT(NEW,STACK)                                      672
```



```
      GOTO 13                                                     673
C     NON-BLANK SYMBOL NOT LP OR RP                               674
    5 CALL  SHIN(6,SYMBOL,WORD)                                   675
         IF (IS - 8)51,52,51                                      676
   51    IS = IS + 1                                              677
         GOTO 13                                                  678
   52    IS = 1                                                   679
   21    CALL NXTLFT(LANORM(WORD),TOP(STACK))                     680
         WORD = BLANK                                             681
      IS = 1                                                      682
         GOTO 13                                                  683
    2 IF (EQUAL(WORD,BLANK))21,13,21                              684
C     RIGHT PARENTHESIS                                           685
    6 IF (EQUAL(WORD,BLANK))61,62,61                              686
   61    CALL NXTLFT(LANORM(WORD),TOP(STACK))                     687
         WORD = BLANK                                             688
      IS = 1                                                      689
   62 CALL TERM(Z)                                                690
      END                                                         691
      SUBROUTINE PRLSTS(OUTLST,I)                                 692
C                                                      4/1/63     693
      EQUIVALENCE (KOUT,OUT)                                      694
  900 FORMAT (1H1,20X,10HBEGIN LIST)                              695
  901    FORMAT (21X,8HEND LIST)                                  696
  902 FORMAT (21X,I14)                                            697
  903 FORMAT (21X,13HBEGIN SUBLIST)                               698
  904    FORMAT(21X,13HEND SUBLIST    )                           699
  905 FORMAT (21X,A8)                                             700
  906 FORMAT (21X,F10.4)                                          701
  907    FORMAT (21X,13HEMPTY SUBLIST)                            702
         PRINT 900                                                703
        LR = LRDROV(OUTLST)                                       704
        LEVEL = 0                                                 705
    7   X = ADVSWR(LR,K)                                          706
         IF(K)1,2,1                                               707
    2   IF(LEVEL - LCNTR(LR))21,22,23                            708
   22   IF(NAMTST(X))3,4,3                                       709
    4   IF(LISTMT(X))5,6,5                                       710
    6 PRINT 907                                                   711
        GOTO 7                                                    712
    5 PRINT 903                                                   713
        LEVEL = LEVEL+1                                           714
      GOTO 7                                                      715
    3 GOTO(11,12,13)I                                             716
   11 OUT = X                                                     717
      PRINT 902,KOUT                                              718
      GOTO 7                                                      719
   12 OUT = X                                                     720
      PRINT 905,KOUT                                              721
      GOTO 7                                                      722
   13 PRINT 906,X                                                 723
      GOTO 7                                                      724
   23 PRINT 904                                                   725
      LEVEL = LEVEL - 1                                           726
      GOTO 2                                                      727
    1 IF (LEVEL - LCNTR(LR))21,32,33                              728
   33 PRINT 904                                                   729
      LEVEL = LEVEL - 1                                           730
      GOTO 1                                                      731
   32 PRINT 901                                                   732
```