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DATA ENTRY SOFTWARE FOR

MICROWAVE LANDING SYSTEM MATH MODELING PROJECT

by

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ACT-100B.4

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AVAILABLE IN ELECTRONIC FORMAT

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
TECHNICAL CENTER
Atlantic City Airport, N.J. 08405

ABSTRACT

This letter report describes a data entry software program written for the Microwave Landing System (MLS) project. It contains a brief background and the purpose for this program. In addition, the report includes a flowchart, listing of the program, and output. The software is designed to be run on the Honeywell 66/60 computer. The author of this report is Melvin Buster, Jr., ACT-100B.4 and can be contacted at extension 3892 until August 6, 1982.

Project Number 076-320-430

Key Words

MLS

Honeywell 66/60

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PURPOSE

The purpose for the data entry software is to create a block data file, allowing the user to input data and write the data on a new file in the Technical Center's Honeywell 66/60 computer. This procedure speeds up file editing and reduces the amount of time normally consumed in the data entry process.

BACKGROUND

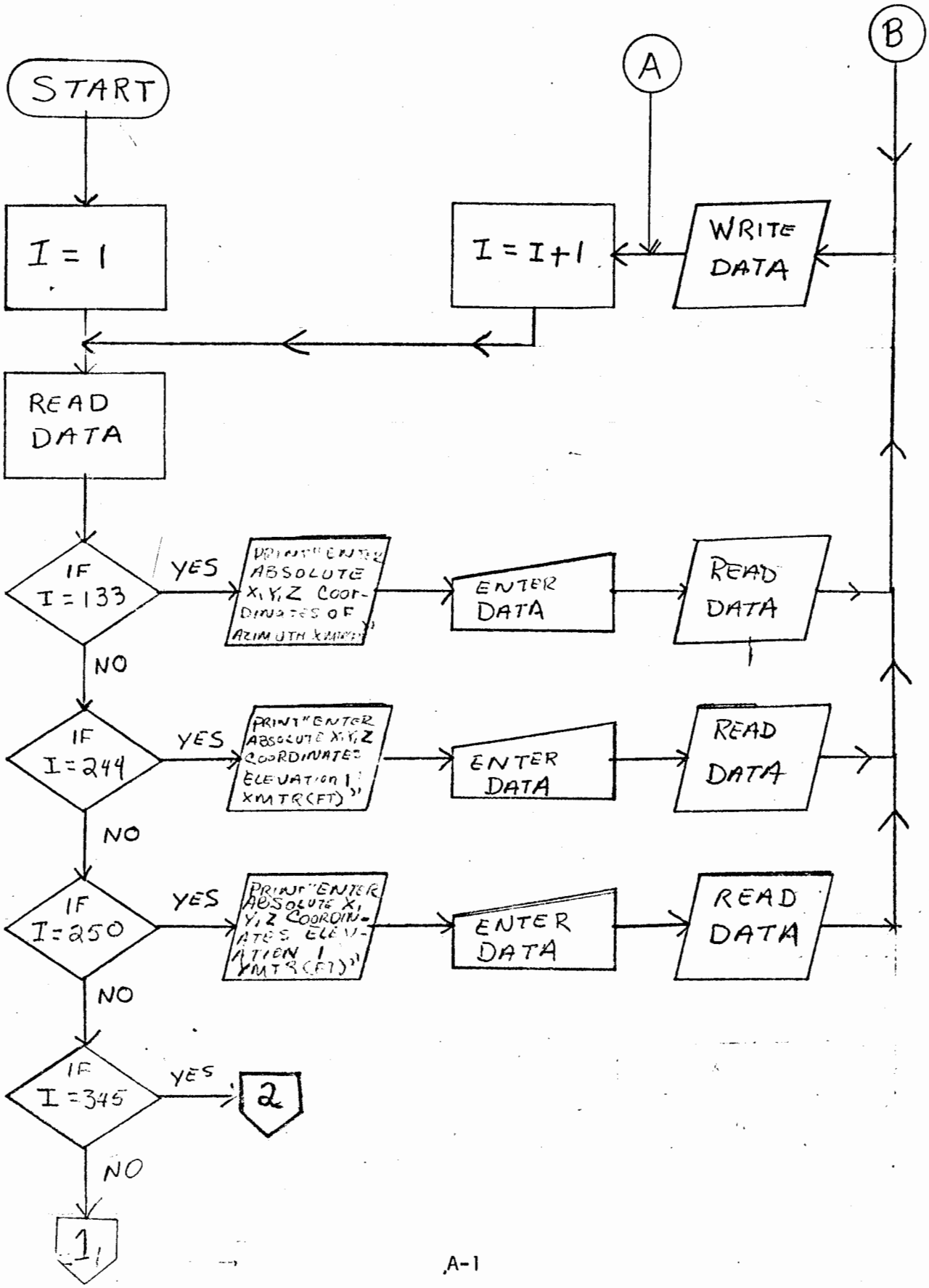
Data entry into the MLS multipath and receiver mathematical models is accomplished by the use of a block data subprogram. The block data is different for each modeling situation since it contains transmitter and building coordinates and other data inputs describing that particular modeling situation. Since a majority of the data remains constant, a considerable amount of time is saved by taking the previous block data and revising the appropriate data to apply to the current situation. To avoid human errors in entering the data in the proper columns, etc., it is desirable to have a program to allow the user to input the appropriate data and create a block data file accordingly.

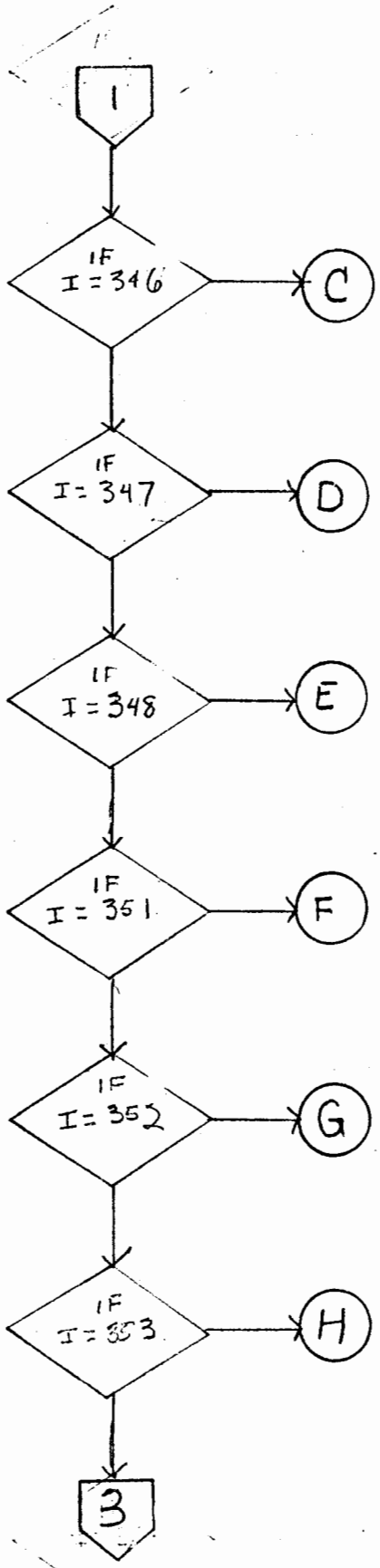
DISCUSSION

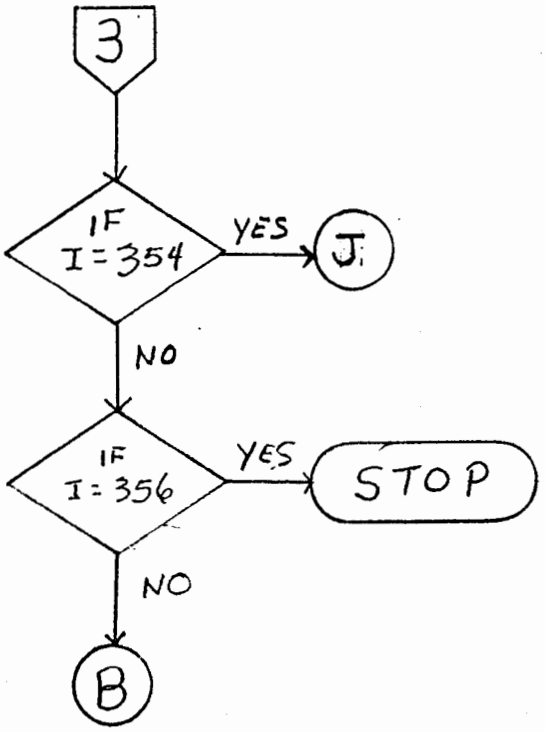
This particular program benefits the MLS math modeling project in that it reads from existing block data files and writes constant or standard data into a new block data file. When the program comes to data that is variable (or site dependent), the program asks the user to enter the characteristic data, such as surface elements or buildings. The site dependent data is then written into the new block data file by the program. This method is more efficient than the former one because it requires much less time to enter the data. Also, this method prevents the user from editing the block data file each time new data is entered. A flow chart of the program, program listing, and sample output are provided in appendices A, B, and C, respectively.

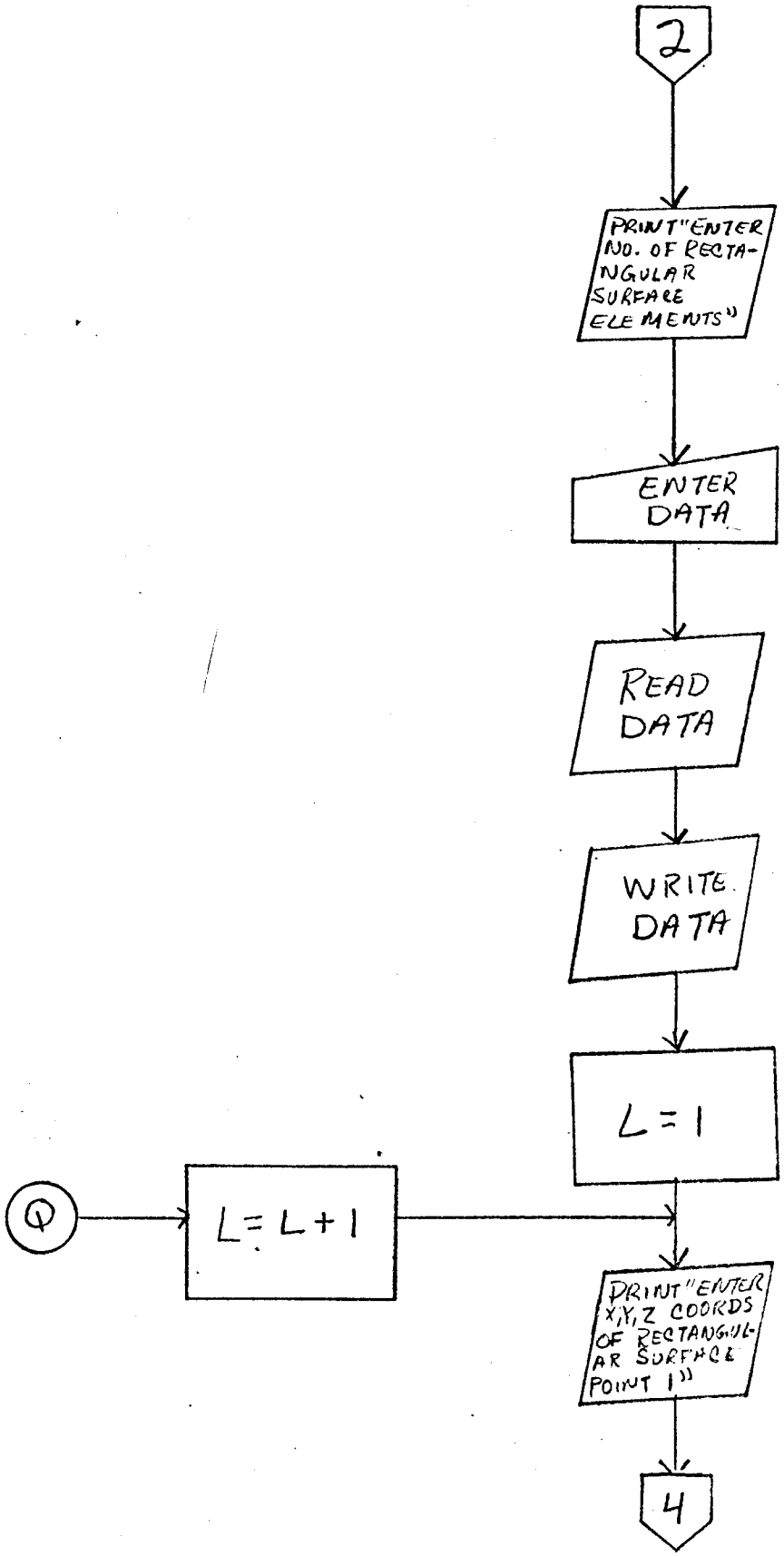
APPENDIX A

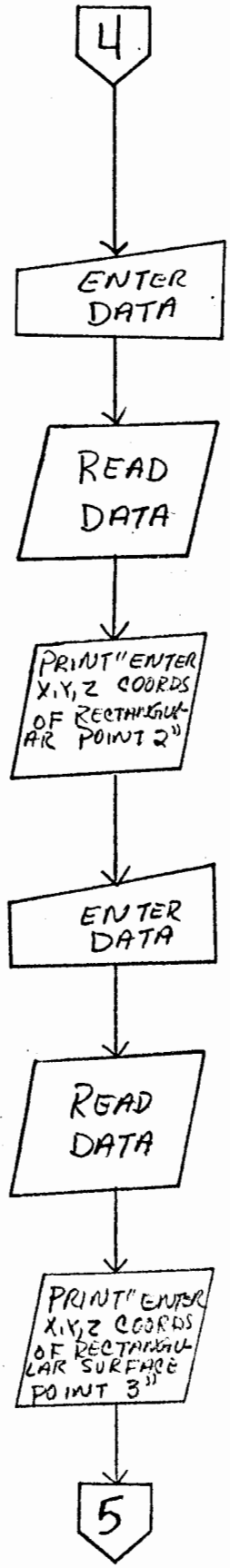
FLOW CHART OF PROGRAM

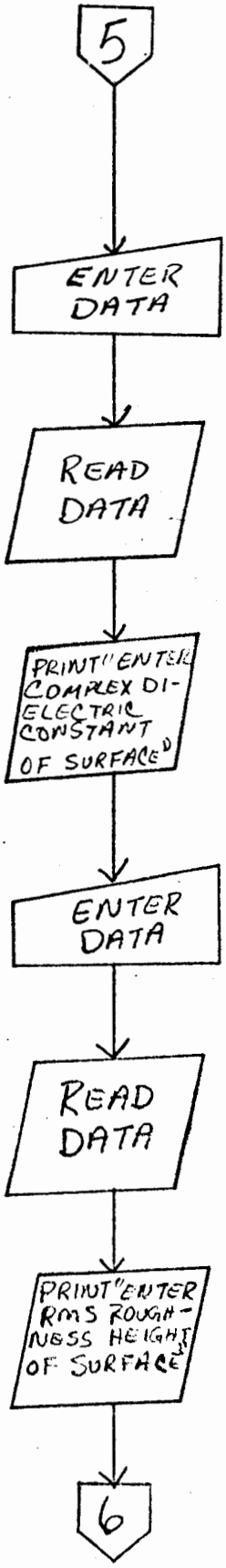

START
I = 1
READ DATA
IF I = 133
YES
PRINT "ENTER ABSOLUTE X, Y, Z COORDINATES OF AZIMUTH XMTR"
ENTER DATA
READ DATA
NO
IF I = 244
YES
PRINT "ENTER ABSOLUTE X, Y, Z COORDINATES ELEVATION 1 XMTR (FT)"
ENTER DATA
READ DATA
NO
IF I = 250
YES
PRINT "ENTER ABSOLUTE X, Y, Z COORDINATES ELEVATION 1 XMTR (FT)"
ENTER DATA
READ DATA
NO
IF I = 345
YES
2
NO
1
A
B
I = I + 1
WRITE DATA

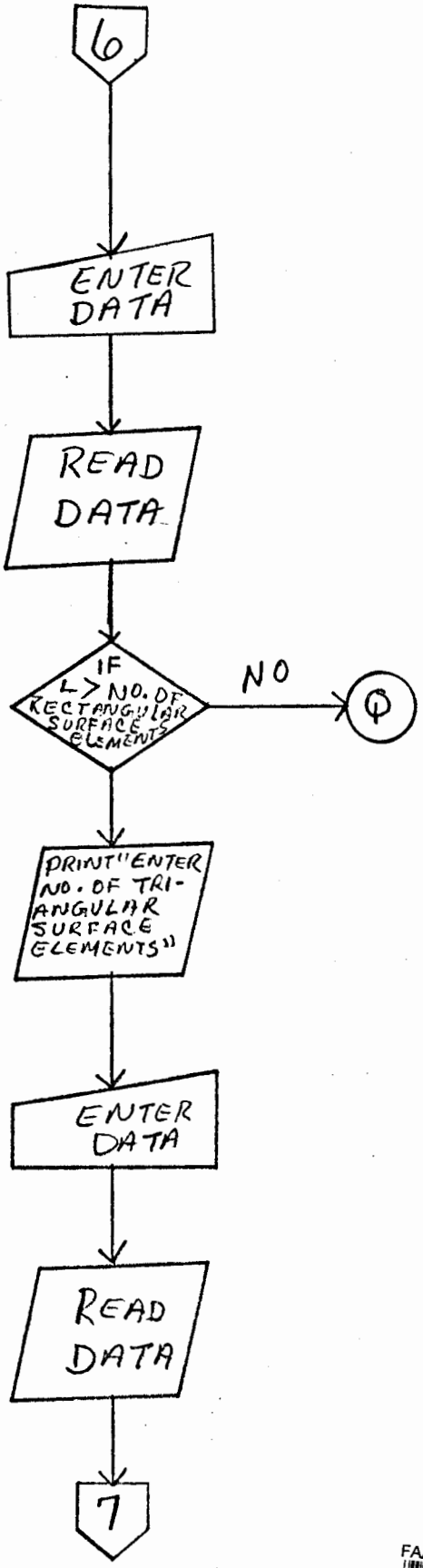

1
IF
I = 346
C
IF
I = 347
D
IF
I = 348
E
IF
I = 351
F
IF
I = 352
G
IF
I = 353
H
3


3
IF
I = 354
YES
J
NO
IF
I = 356
YES
STOP
NO
B


2
PRINT "ENTER NO. OF RECTANGULAR SURFACE ELEMENTS"
ENTER DATA
READ DATA
WRITE DATA
L=1
Q
L=L+1
PRINT "ENTER X,Y,Z COORDS OF RECTANGULAR SURFACE POINT 1"
4


4
ENTER DATA
READ DATA
PRINT "ENTER X,Y,Z COORDS OF RECTANGULAR POINT 2"
ENTER DATA
READ DATA
PRINT "ENTER X,Y,Z COORDS OF RECTANGULAR SURFACE POINT 3"
5


5
ENTER DATA
READ DATA
PRINT "ENTER COMPLEX DIELECTRIC CONSTANT OF SURFACE"
ENTER DATA
READ DATA
PRINT "ENTER RMS ROUGHNESS HEIGHT OF SURFACE"
6



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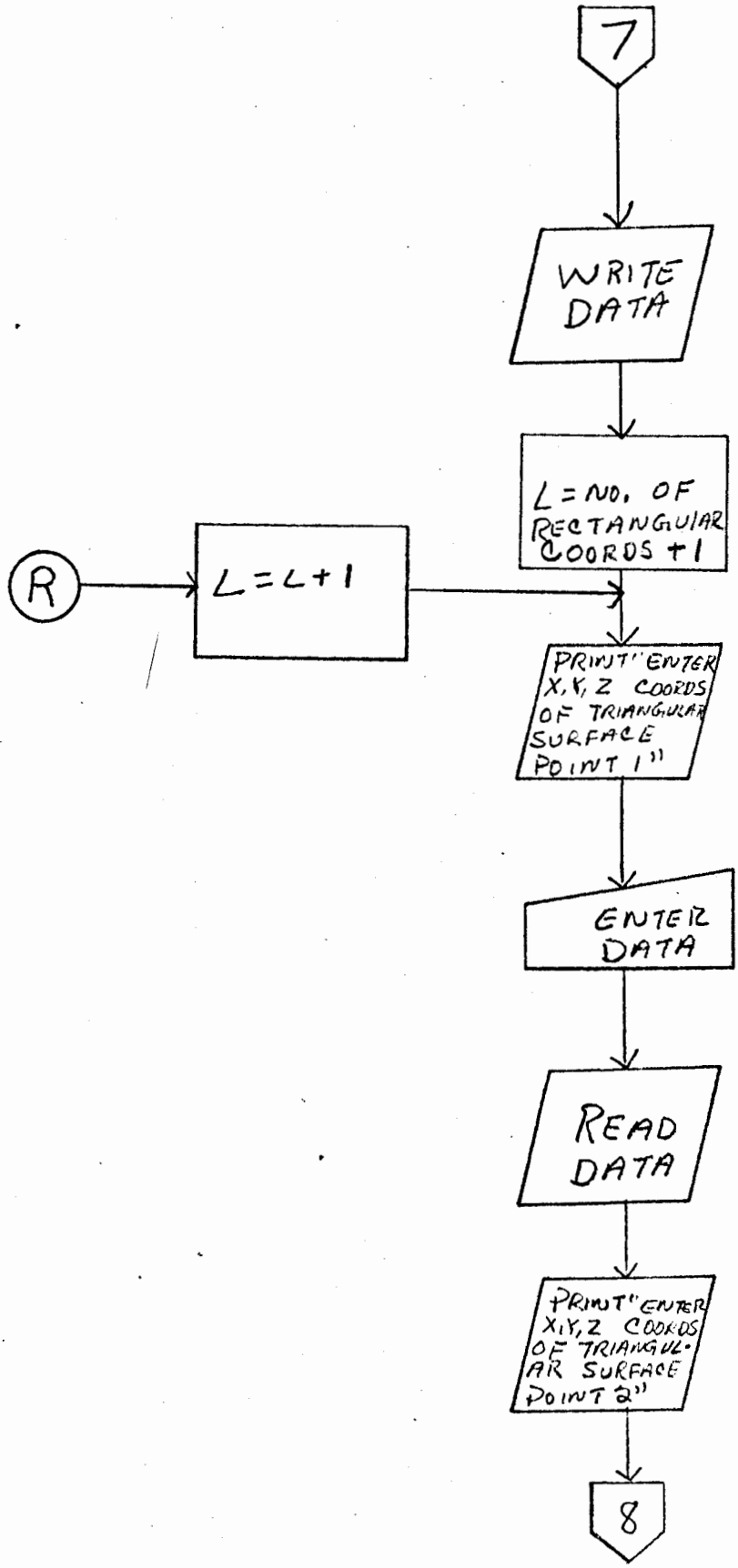
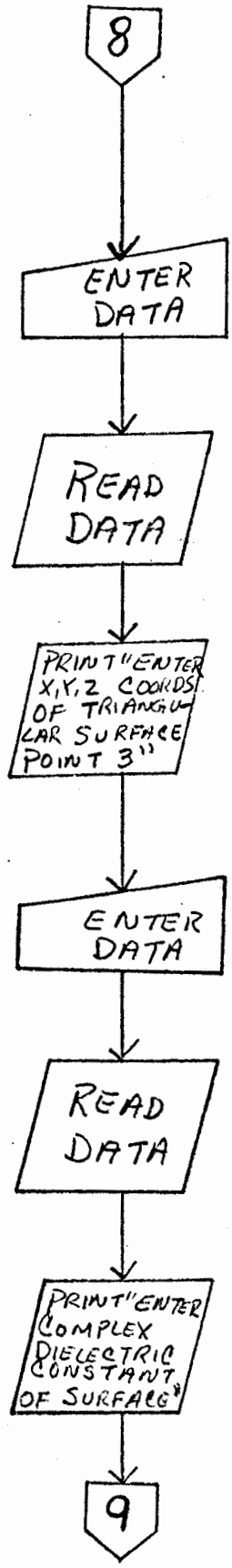
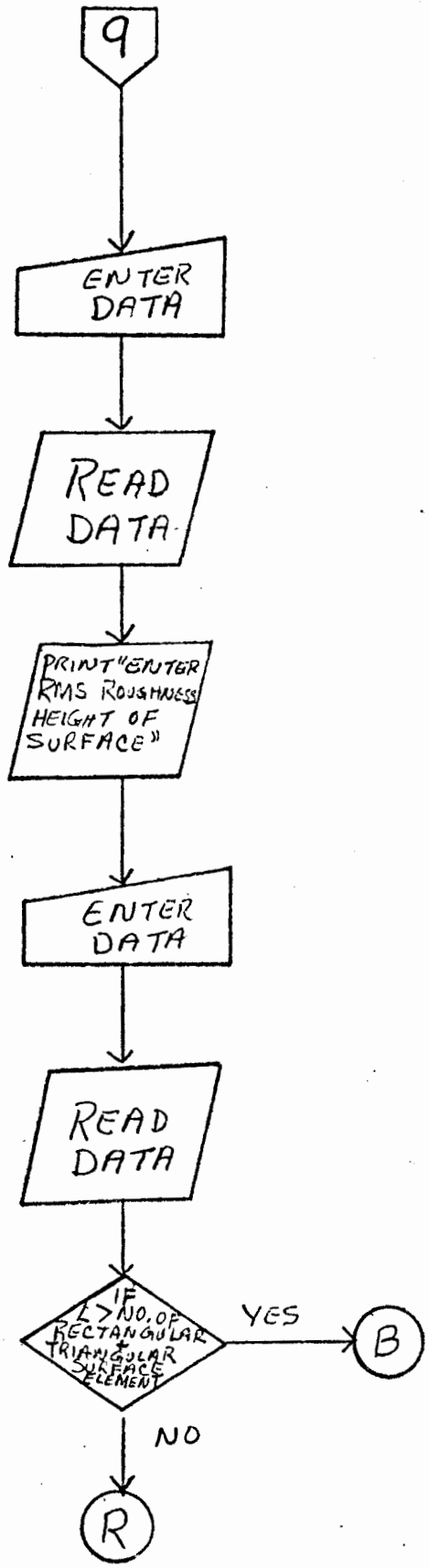
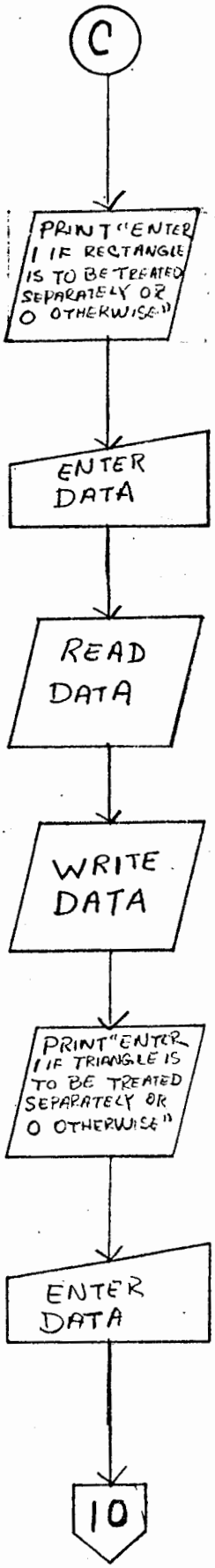
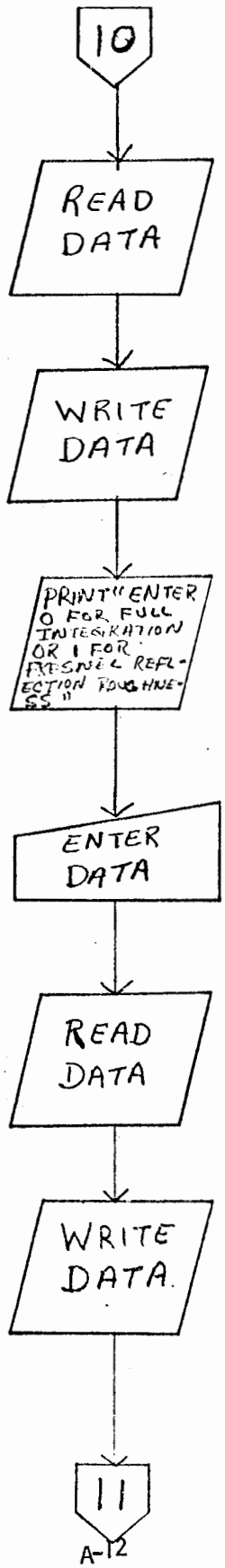
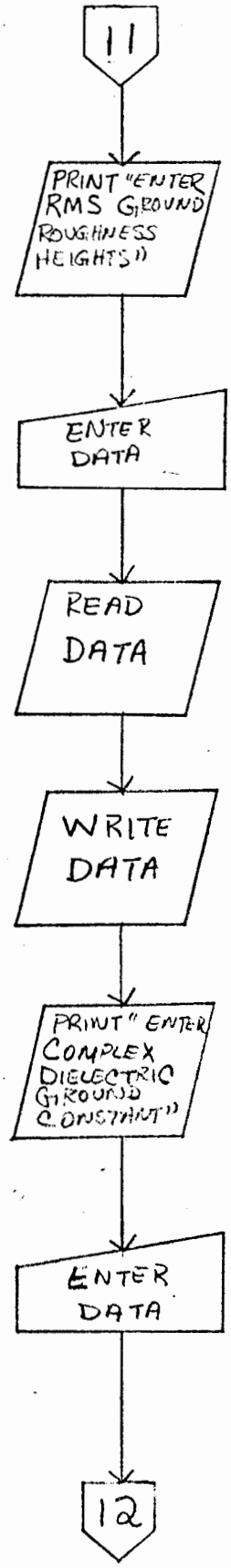

7
WRITE DATA
L = NO. OF RECTANGULAR COORDS + 1
R
L = L + 1
PRINT "ENTER X, Y, Z COORDS OF TRIANGULAR SURFACE POINT 1"
ENTER DATA
READ DATA
PRINT "ENTER X, Y, Z COORDS OF TRIANGULAR SURFACE POINT 2"
8

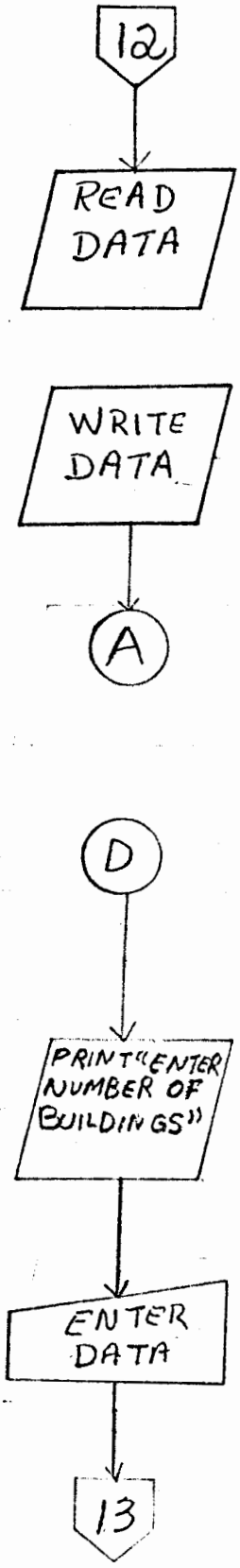

8
ENTER DATA
READ DATA
PRINT "ENTER X,Y,Z COORDS OF TRIANGULAR SURFACE POINT 3"
ENTER DATA
READ DATA
PRINT "ENTER COMPLEX DIELECTRIC CONSTANT OF SURFACE"
9

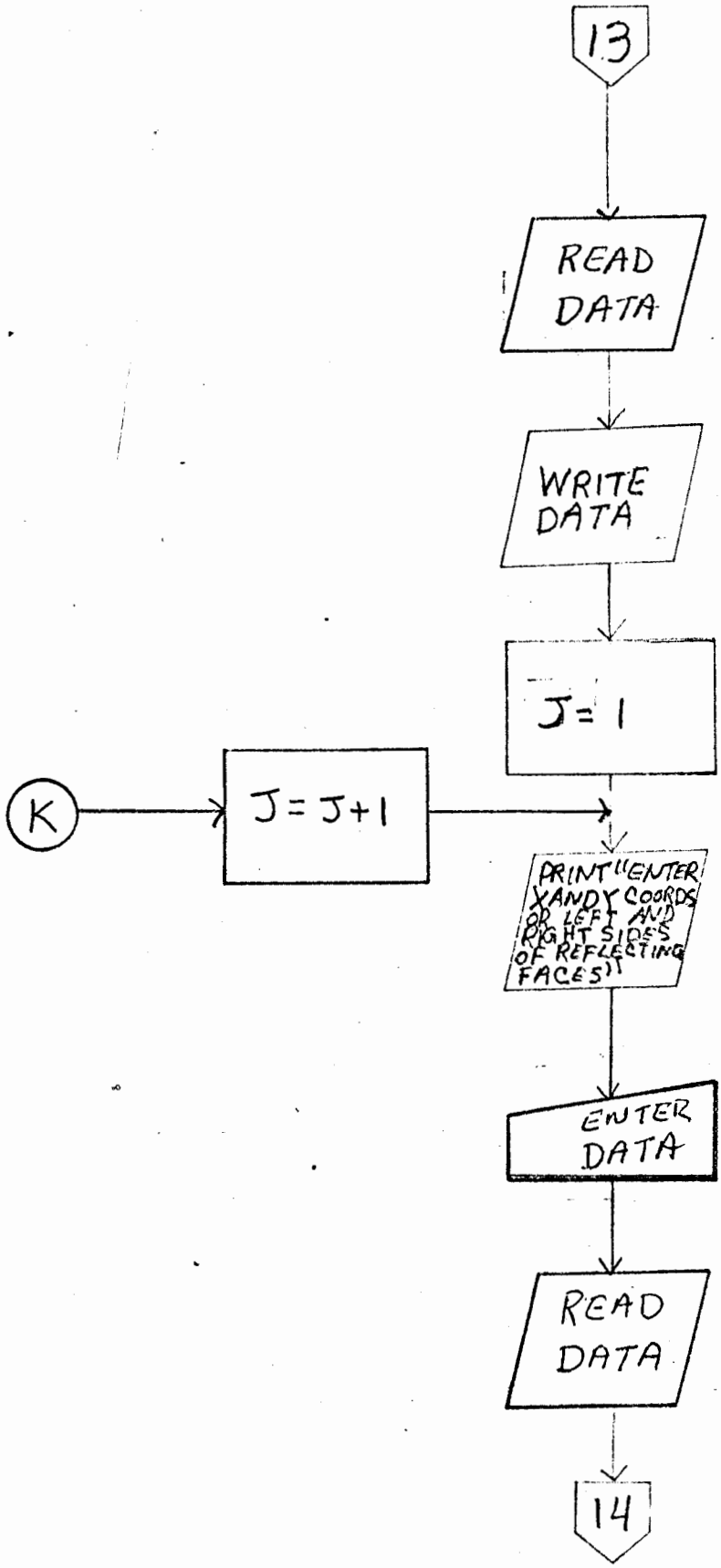

9
ENTER DATA
READ DATA
PRINT "ENTER RMS ROUGHNESS HEIGHT OF SURFACE"
ENTER DATA
READ DATA
IF L > NO. OF RECTANGULAR + TRIANGULAR SURFACE ELEMENT
YES
B
NO
R

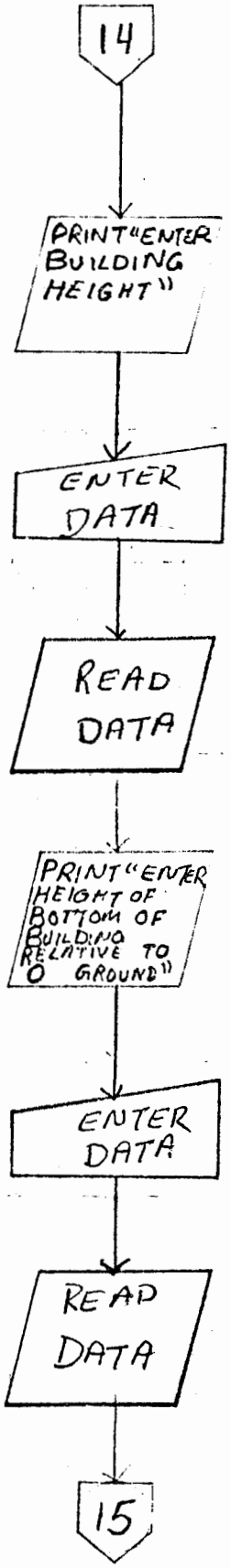

C
PRINT "ENTER 1 IF RECTANGLE IS TO BE TREATED SEPARATELY OR 0 OTHERWISE"
ENTER DATA
READ DATA
WRITE DATA
PRINT "ENTER 1 IF TRIANGLE IS TO BE TREATED SEPARATELY OR 0 OTHERWISE"
ENTER DATA
10

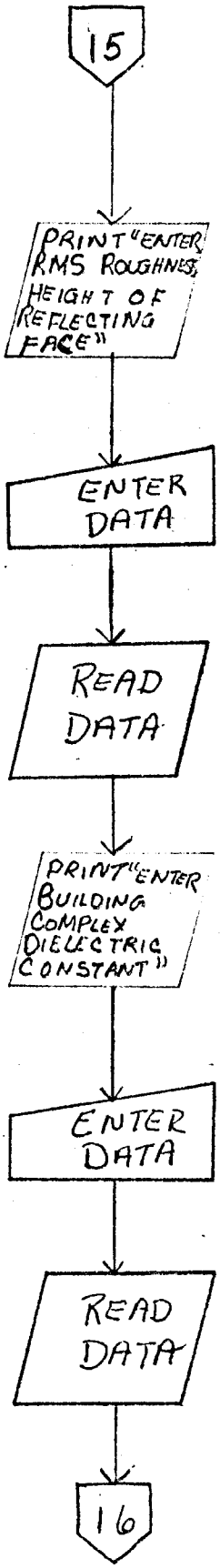

10
READ DATA
WRITE DATA
PRINT "ENTER 0 FOR FULL INTEGRATION OR 1 FOR FRESNEL REFLECTION ROUGHNESS"
ENTER DATA
READ DATA
WRITE DATA.
11

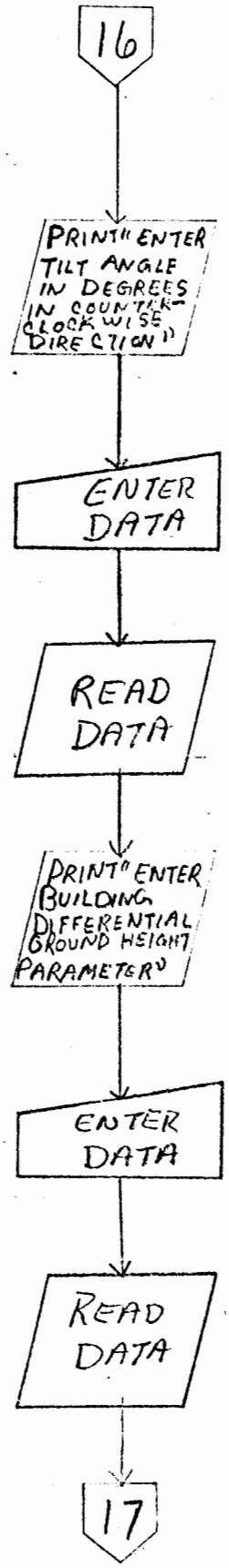

11
PRINT "ENTER RMS GROUND ROUGHNESS HEIGHTS"
ENTER DATA
READ DATA
WRITE DATA
PRINT "ENTER COMPLEX DIELECTRIC GROUND CONSTANT"
ENTER DATA
12

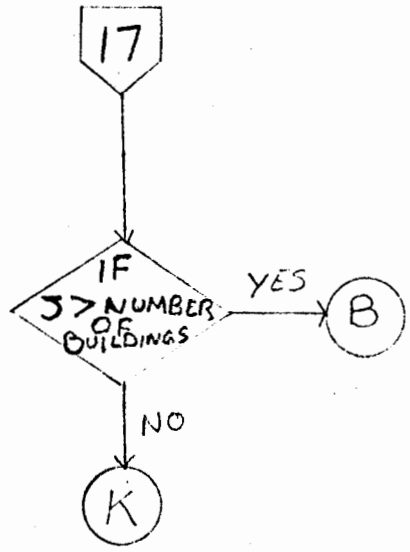

12
READ DATA
WRITE DATA
A
D
PRINT "ENTER NUMBER OF BUILDINGS"
ENTER DATA
13

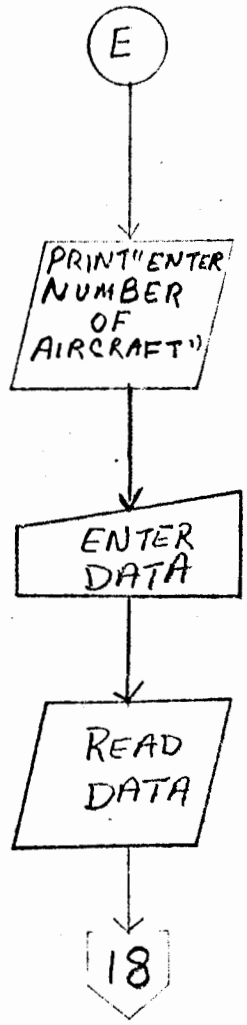

13
READ DATA
WRITE DATA
J = 1
K
J = J+1
PRINT "ENTER X AND Y COORDS OF LEFT AND RIGHT SIDES OF REFLECTING FACES"
ENTER DATA
READ DATA
14

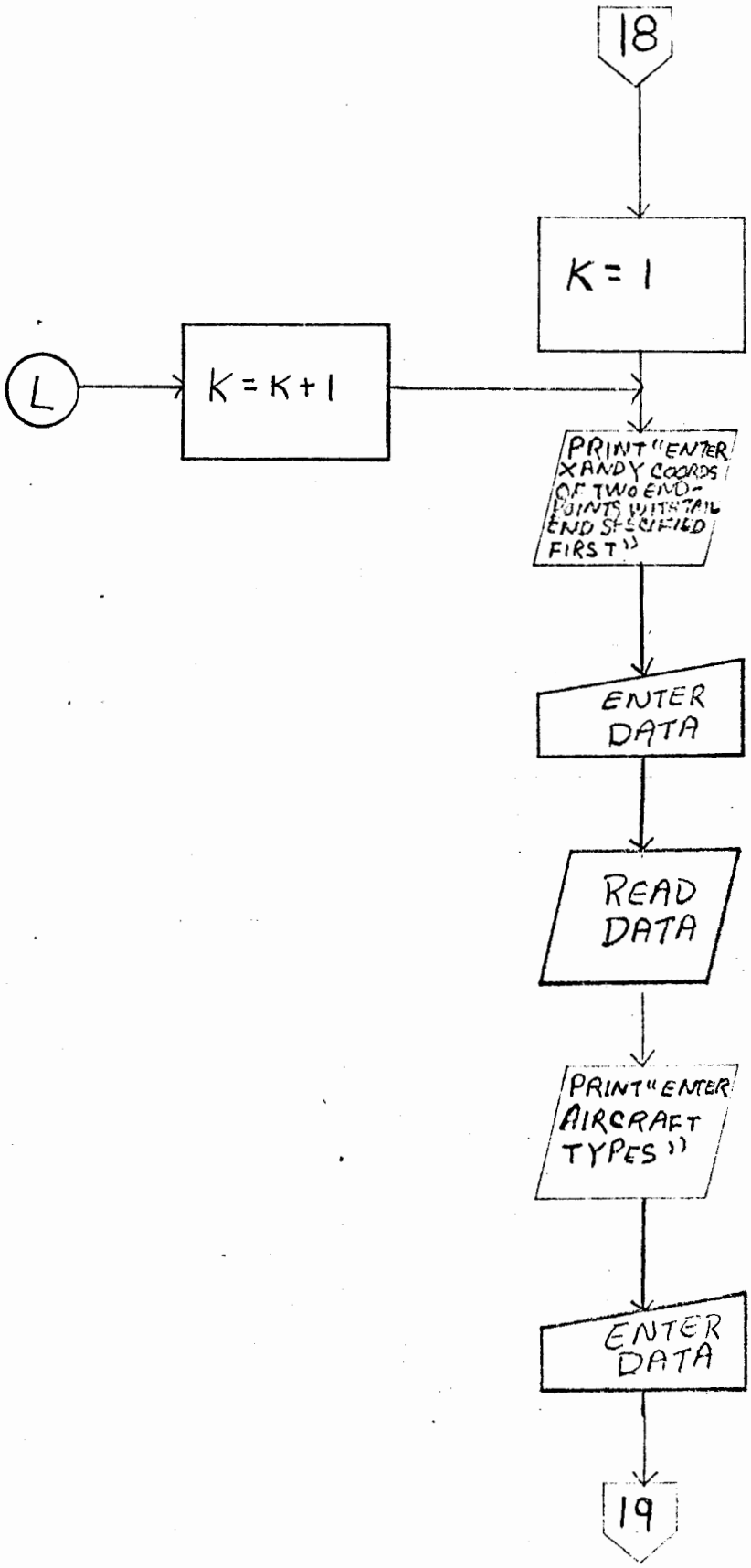

14
PRINT "ENTER BUILDING HEIGHT"
ENTER DATA
READ DATA
PRINT "ENTER HEIGHT OF BOTTOM OF BUILDING RELATIVE TO GROUND"
ENTER DATA
READ DATA
15

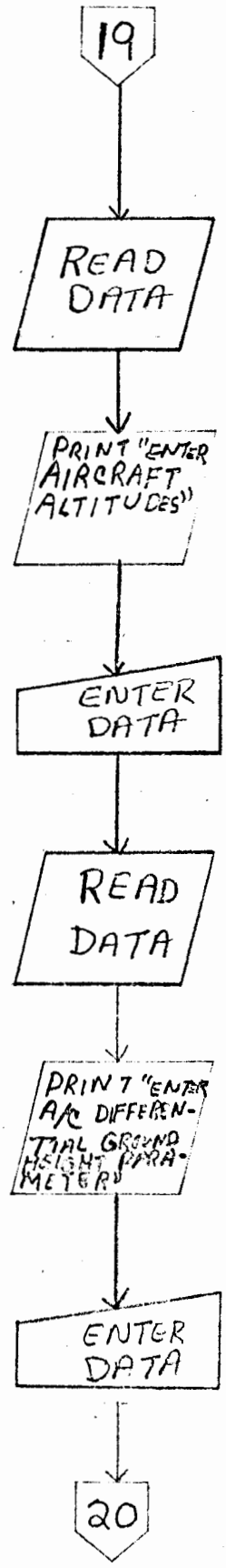

15
PRINT "ENTER RMS ROUGHNESS, HEIGHT OF REFLECTING FACE"
ENTER DATA
READ DATA
PRINT "ENTER BUILDING COMPLEX DIELECTRIC CONSTANT"
ENTER DATA
READ DATA
16

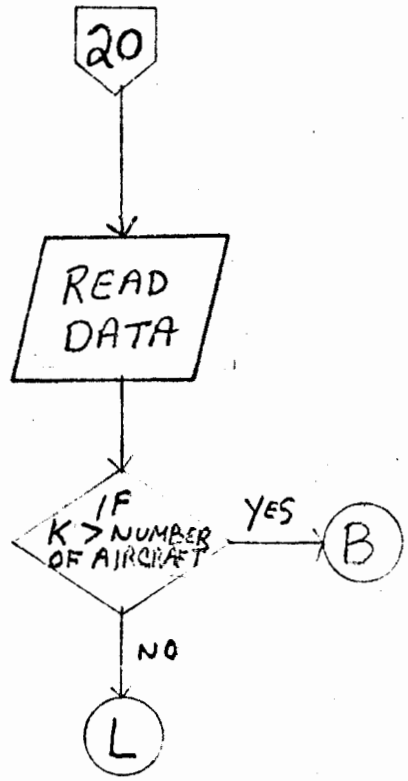

16
PRINT" ENTER TILT ANGLE IN DEGREES IN COUNTER-CLOCK WISE DIRECTION"
ENTER DATA
READ DATA
PRINT" ENTER BUILDING DIFFERENTIAL GROUND HEIGHT PARAMETER"
ENTER DATA
READ DATA
17

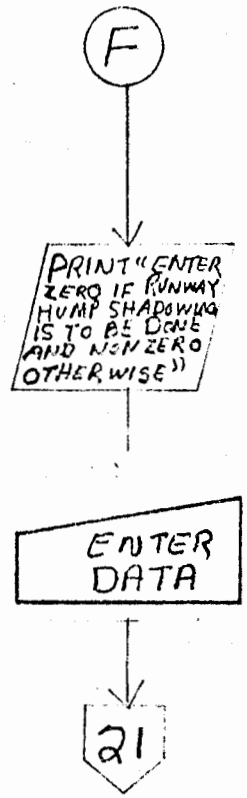

17
IF
J > NUMBER OF BUILDINGS
YES
B
NO
K

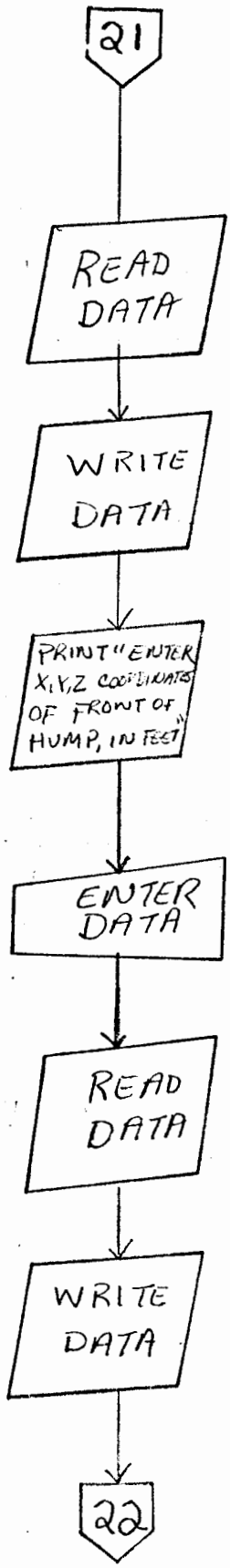

E
PRINT "ENTER NUMBER OF AIRCRAFT"
ENTER DATA
READ DATA
18

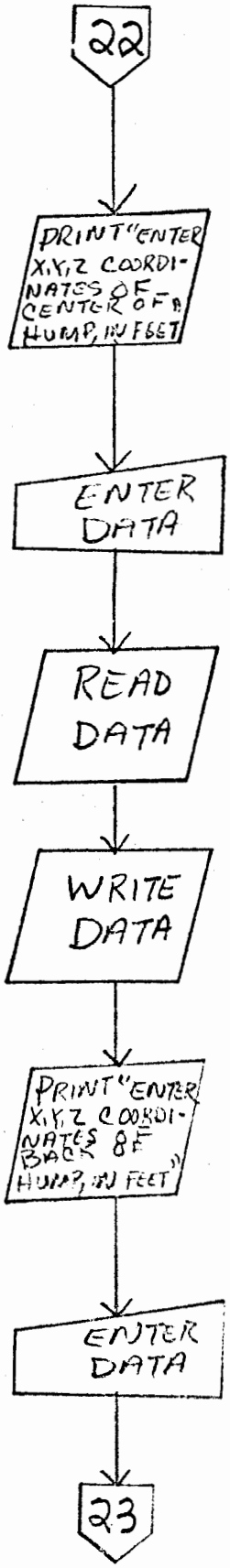

18
K = 1
L
K = K + 1
PRINT "ENTER X AND Y COORDS OF TWO END-POINTS WITH TAIL END SPECIFIED FIRST"
ENTER DATA
READ DATA
PRINT "ENTER AIRCRAFT TYPES"
ENTER DATA
19

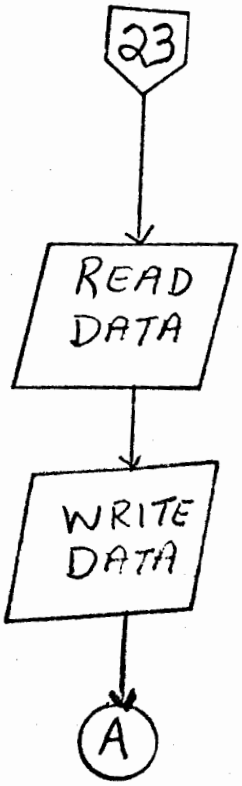

19
READ DATA
PRINT "ENTER AIRCRAFT ALTITUDES"
ENTER DATA
READ DATA
PRINT "ENTER A/C DIFFERENTIAL GROUND HEIGHT PARAMETERS"
ENTER DATA
20


20
READ DATA
IF K > NUMBER OF AIRCRAFT
YES
B
NO
L

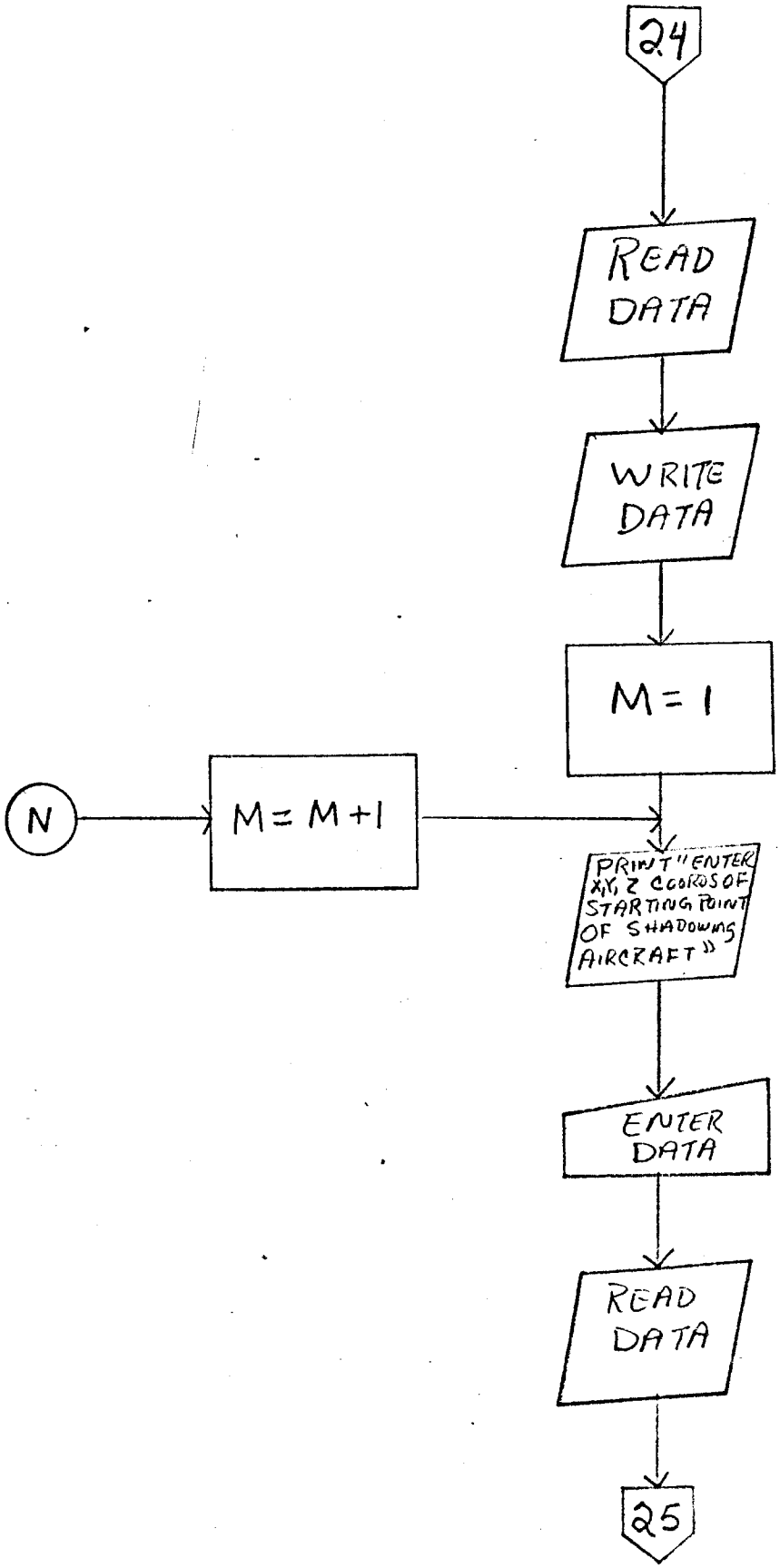

F
PRINT "ENTER ZERO IF RUNWAY HUMP SHADOWING IS TO BE DONE AND NONZERO OTHERWISE"
ENTER DATA
21

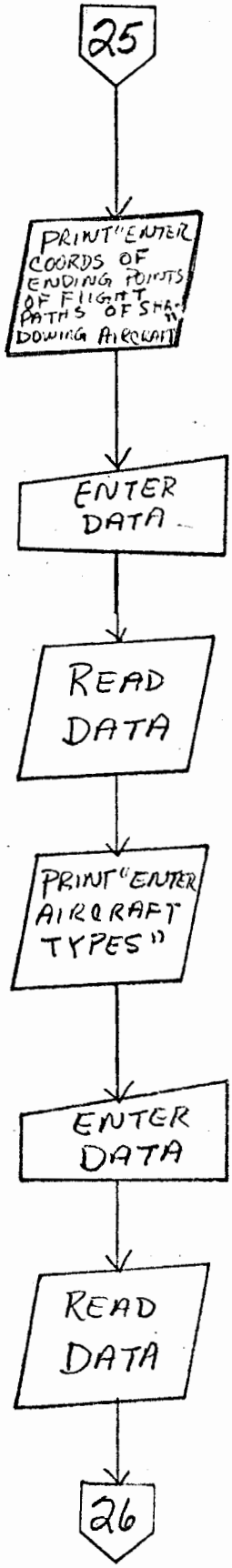

21
READ DATA
WRITE DATA
PRINT "ENTER X,Y,Z COORDINATES OF FRONT OF HUMP, IN FEET"
ENTER DATA
READ DATA
WRITE DATA
22

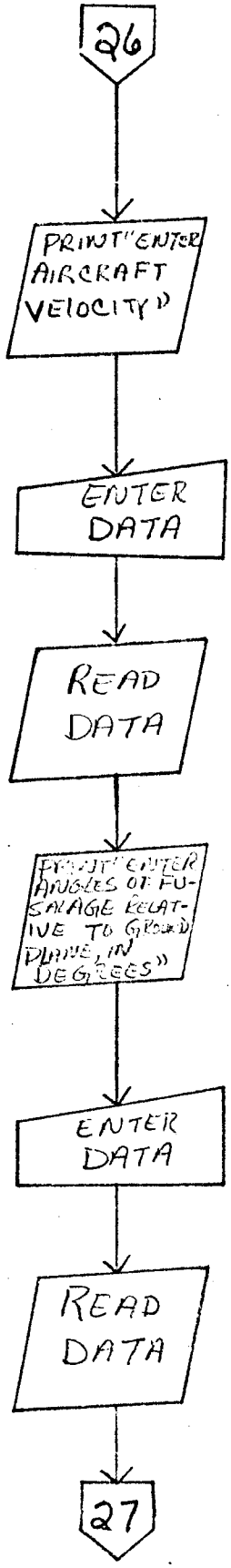

22
PRINT "ENTER X,Y,Z COORDINATES OF CENTER OF A HUMP, IN FEET
ENTER DATA
READ DATA
WRITE DATA
PRINT "ENTER X,Y,Z COORDINATES OF BACK OF HUMP, IN FEET"
ENTER DATA
23

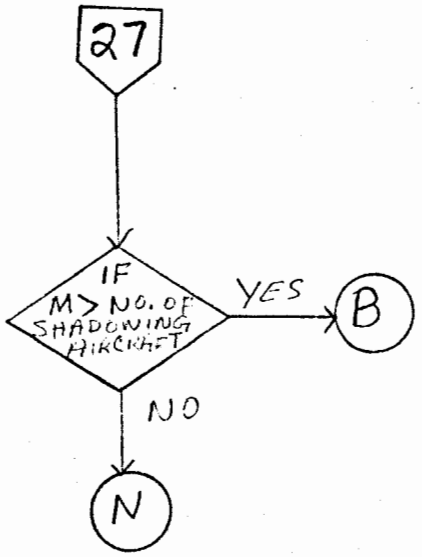

23
READ DATA
WRITE DATA
A

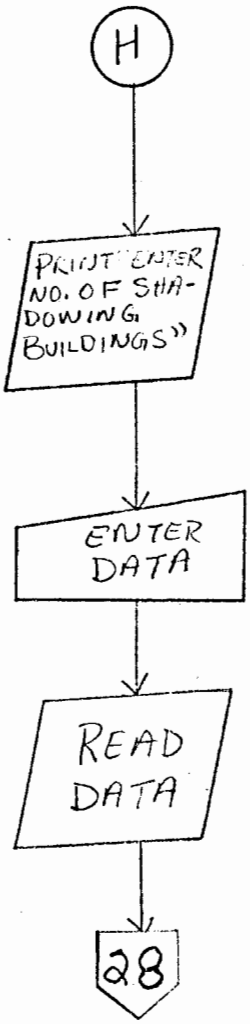
G
PRINT "ENTER NUMBER OF SHADOWING AIRCRAFT"
ENTER DATA
24

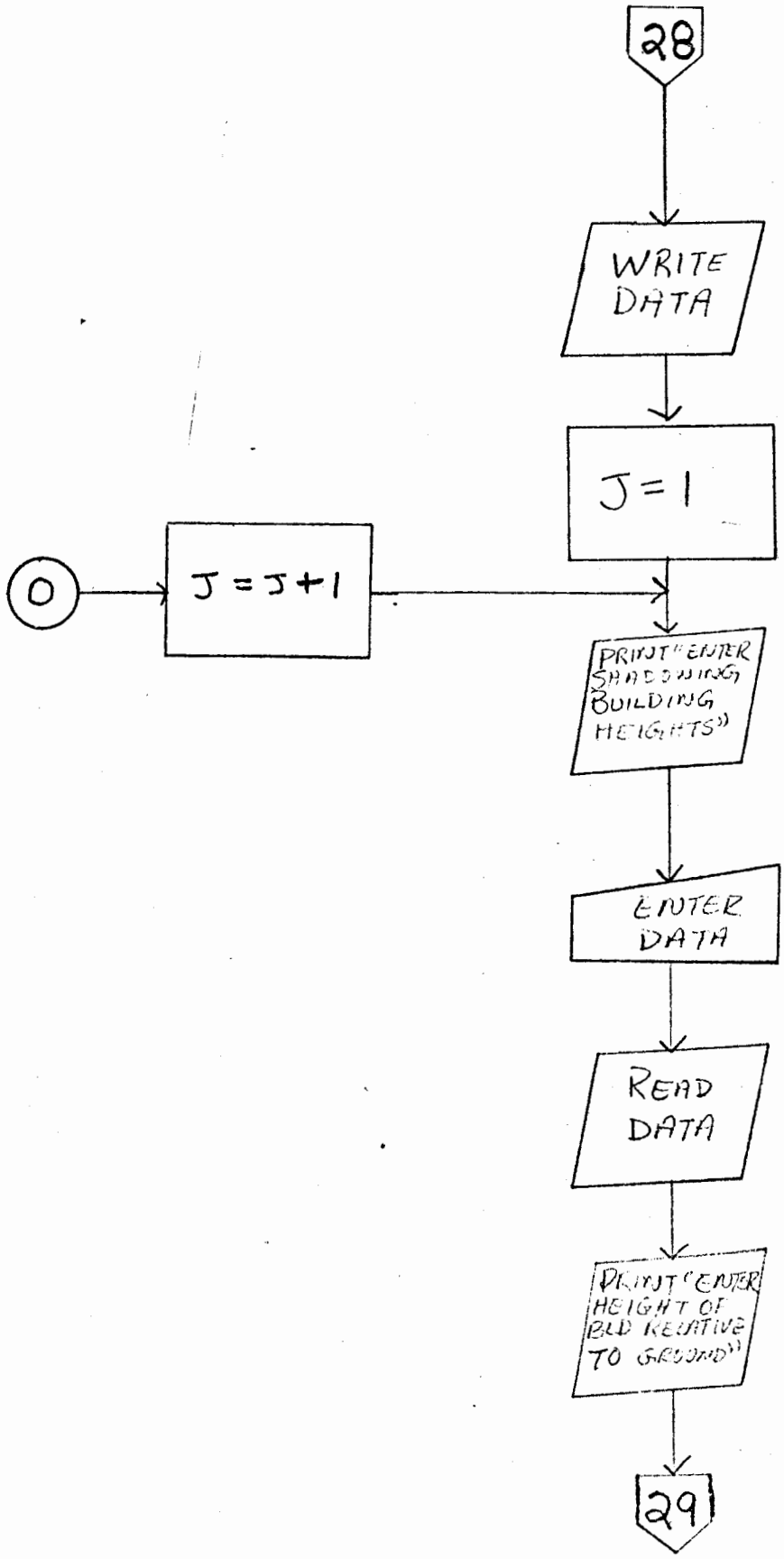

24
READ DATA
WRITE DATA
M = 1
N
M = M + 1
PRINT "ENTER X, Y, Z COORDS OF STARTING POINT OF SHADOWING AIRCRAFT"
ENTER DATA
READ DATA
25

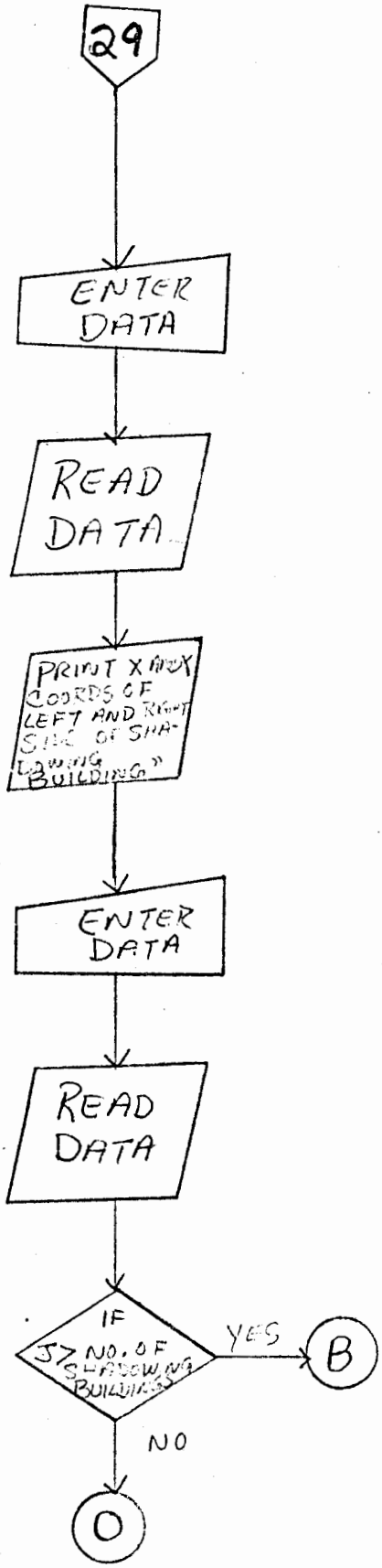

25
PRINT "ENTER COORDS OF ENDING POINTS OF FLIGHT PATHS OF SHA-DOWING AIRCRAFT"
ENTER DATA
READ DATA
PRINT "ENTER AIRCRAFT TYPES"
ENTER DATA
READ DATA
26

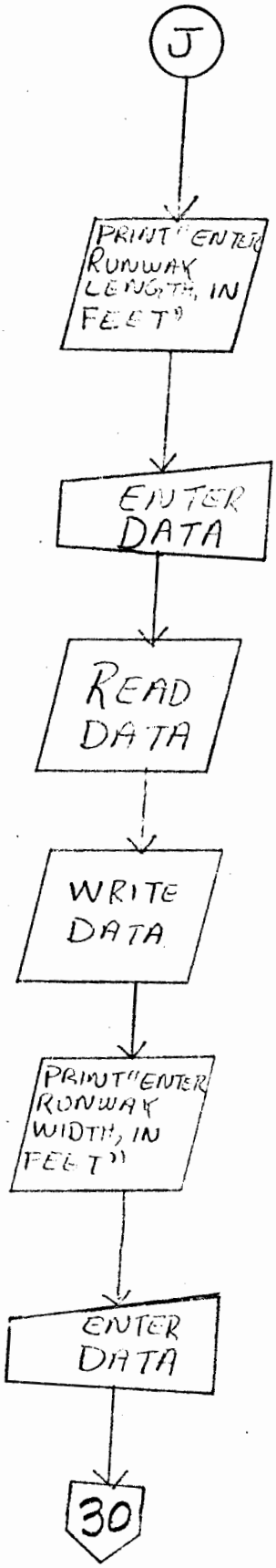

26
PRINT "ENTER AIRCRAFT VELOCITY"
ENTER DATA
READ DATA
PRINT "ENTER ANGLES OF FUSAGE RELATIVE TO GROUND PLANE, IN DEGREES"
ENTER DATA
READ DATA
27

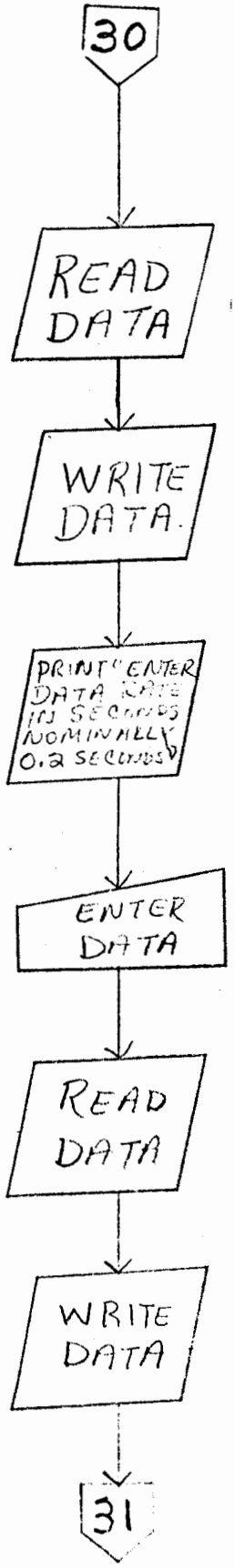

27
IF
M > NO. OF
SHADOWING
AIRCRAFT
YES
B
NO
N

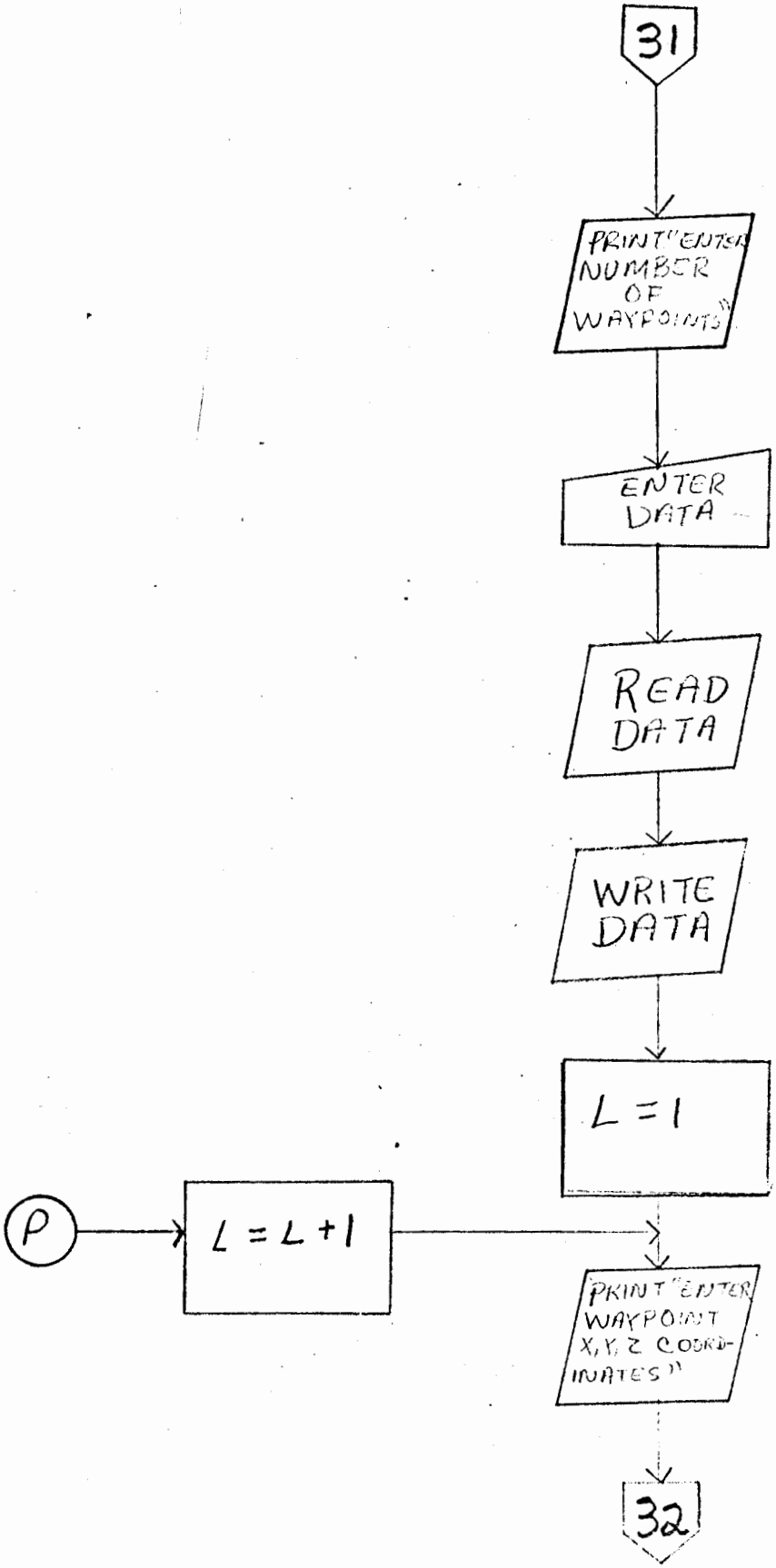

H
PRINT "ENTER
NO. OF SHA-
DOWING
BUILDINGS"
ENTER
DATA
READ
DATA
28

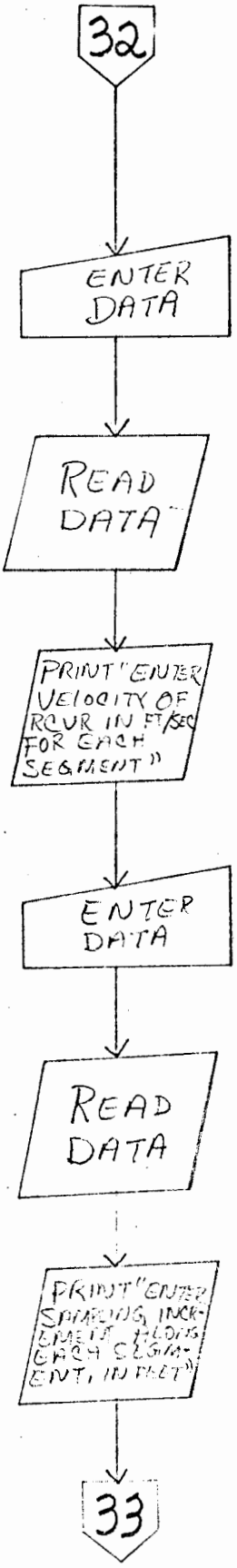

28
WRITE DATA
J=1
0
J=J+1
PRINT "ENTER SHADOWING BUILDING HEIGHTS"
ENTER DATA
READ DATA
PRINT "ENTER HEIGHT OF BLD RELATIVE TO GROUND"
29

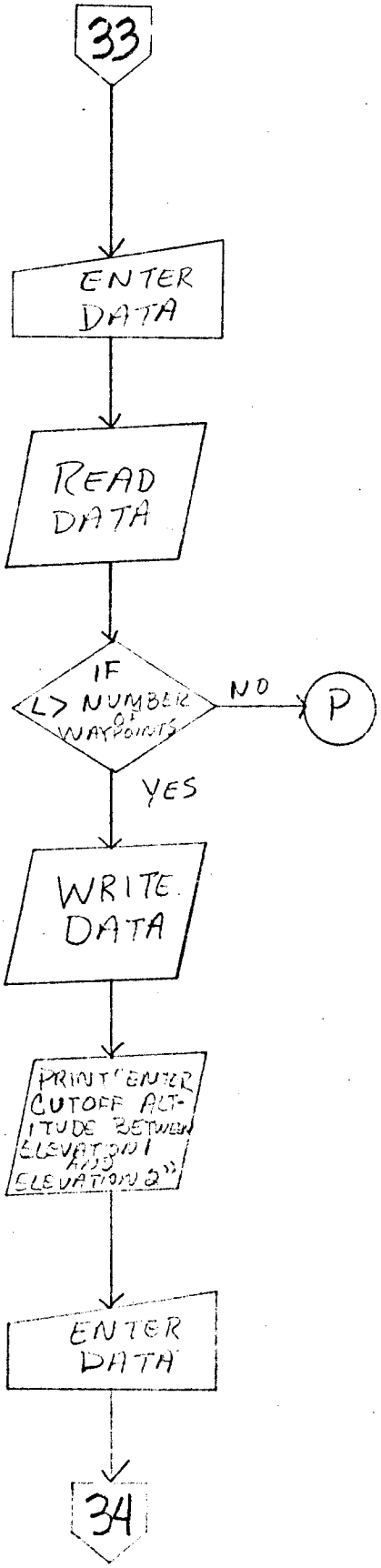

29
ENTER DATA
READ DATA
PRINT X AND Y COORDS OF LEFT AND RIGHT SIDE OF SHADOWING BUILDING"
ENTER DATA
READ DATA
IF J7 NO. OF SHADOWING BUILDINGS
YES
B
NO
O

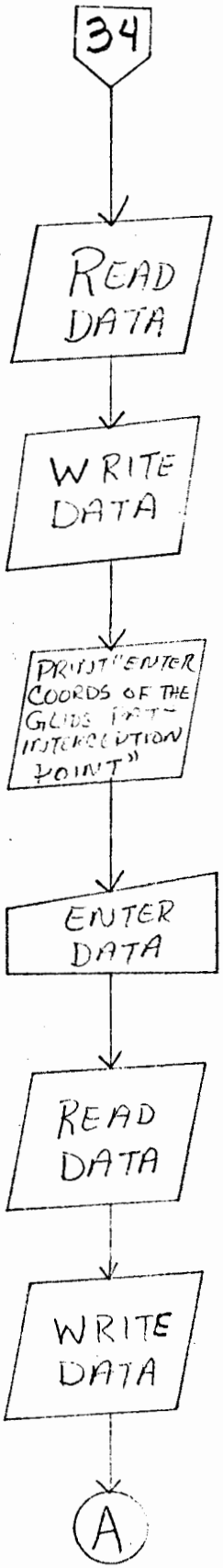

J
PRINT "ENTER RUNWAY LENGTH, IN FEET"
ENTER DATA
READ DATA
WRITE DATA
PRINT "ENTER RUNWAY WIDTH, IN FEET"
ENTER DATA
30


30
READ DATA
WRITE DATA.
PRINT "ENTER DATA RATE IN SECONDS NOMINALLY 0.2 SECONDS"
ENTER DATA
READ DATA
WRITE DATA
31


31
PRINT "ENTER NUMBER OF WAYPOINTS"
ENTER DATA
READ DATA
WRITE DATA
L = 1
P
L = L + 1
PRINT "ENTER WAYPOINT X, Y, Z COORDINATES"
32


32
ENTER DATA
READ DATA
PRINT "ENTER VELOCITY OF RCVR IN FT/SEC FOR EACH SEGMENT"
ENTER DATA
READ DATA
PRINT "ENTER SPACING, INCREMENT, HEDING EACH SEGMENT, IN FEET"
33


33
ENTER DATA
READ DATA
IF L> NUMBER OF WAYPOINTS
NO
P
YES
WRITE DATA
PRINT "ENTER CUTOFF ALTITUDE BETWEEN ELEVATION 1 AND ELEVATION 2"
ENTER DATA
34


34
READ DATA
WRITE DATA
PRINT "ENTER COORDS OF THE GLIDE PATH INTERSECTION POINT"
ENTER DATA
READ DATA
WRITE DATA
A

APPENDIX B

LISTING OF PROGRAM

```
10:*RUN* /BUSTER/WRIDAT"08":/BUSTER/MYFILE"10"
20C ******PROGRAM "WRIDAT"******
30      DIMENSION SURFS(9,20),ERS(20),SH2S(20),GRNDBD(10),AC(4,10),HUMPF(3),HUMP(3)
40      DIMENSION BLD(10,4),HB(10),HBOT(10),SH2B(10),DICSTB(10)
50      DIMENSION SHPOS1(3,10),SHPOS2(3,10)
60      DIMENSION SHACTP(10),SHVEL(10),SHANG(10),HBS(10),HBI(10),SHBLD(4,10)
70      DIMENSION XPOS(36),YPOS(36),ZPOS(36),VEL(36),DINC(36),GPIP(3)
80      DIMENSION HUMPB(3),TILT(10),NACTYP(10),ALT(10),GRNDAC(10)
90      DATA XPOS,YPOS,ZPOS,VEL,DINC/180*0./
100      DATA AC/40*0./,HUMPF,HUMP,HUMPB/9*0./
110      DATA ERS,SH2S/40*0./,SURFS/180*0./
120     CHARACTER*80 C
130     NDAT=355
140C
150     DO 10 I=1,NDAT
160      READ(08,99)C
170   99 FORMAT(A80)
180     IF(I.EQ.133)GO TO 25
190     IF(I.EQ.244)GO TO 26
200     IF(I.EQ.250)GO TO 27
210     IF(I.EQ.345)GO TO 101
220     IF(I.EQ.346)GO TO 106
230     IF(I.EQ.347)GO TO 111
240     IF(I.EQ.348)GO TO 804
250     IF(I.EQ.351)GO TO 809
260     IF(I.EQ.352)GO TO 813
270     IF(I.EQ.353)GO TO 819
280     IF(I.EQ.354)GO TO 823
290      WRITE(10,23)C
300   23 FORMAT(A80)
310     GO TO 10
320C
330C      AZIMUTH ANTENNA CHARACTERISTICS
340C
350 25 WRITE(6,31)
360 31 FORMAT(1X,"ENTER ABSOLUTE X,Y,Z LOCATIONS OF AZIMUTH XMTR(FT)")
370     READ ,X,Y,Z
380      LN=62235
390      WRITE(6,125)LN,X,Y,Z
400      WRITE(10,125)LN,X,Y,Z
410 125 FORMAT(I5,6X,"DATA XMTRAZ/",2(F8.2,","),F8.2,"/")
420     GO TO 10
430C
440C      ELEVATION ANTENNA CHARACTERISTICS
450C
460 26 WRITE(6,32)
470 32 FORMAT(1X,"ENTER ABSOLUTE X,Y,Z LOCATIONS OF ELEVATION 1
480& XMTR(FT)")
490     READ ,X,Y,Z
500      LN=64761
510      WRITE(6,126)LN,X,Y,Z
520      WRITE(10,126)LN,X,Y,Z
530 126 FORMAT(I5,6X,"DATA XMTREL/",2(F8.2,","),F8.2,"/")
540     GO TO 10
550C
560 27 WRITE(6,33)
570 33 FORMAT(1X,"ENTER ABSOLUTE X,Y,Z LOCATIONS OF ELEVATION 2
580& XMTR(FT)")
590     READ ,X,Y,Z
600      LN=65005
```

```
610      WRITE(6,127)LN,X,Y,Z
620      WRITE(10,127)LN,X,Y,Z
630 127 FORMAT(I5,6X,"DATA XMTRE2/",2(F8.2,","),F8.2,"/")
640     GO TO 10
650C
660C      SURFACE ELEMENTS
670C
680 101 WRITE(6,150)
690 150 FORMAT(1X,"ENTER NO. OF RECTANGULAR SURFACE ELEMENTS")
700      READ ,NR
710      LN=68361
720      WRITE(6,128)LN,NR
730      WRITE(10,128)LN,NR
740 128 FORMAT(I5,6X,"DATA NR/",I3,"/")
750C
760 103 DO 12 L=1,NR
770     WRITE(6,152)L
780 152 FORMAT(1X,"ENTER X,Y,Z COORDS OF RECTANGULAR SURFACE",1X,I2,1X,"
790& POINT1")
800      READ ,(SURFS(J,L),J=1,3)
810 130 FORMAT(I5,6X,"DATA SURFS/")
820      WRITE(6,636)L
830 636 FORMAT(1X,"ENTER X,Y,Z COORDS OF RECTANGULAR SURFACE",1X,I2,1X,"
840& POINT 2")
850      READ ,(SURFS(J,L),J=4,6)
860      WRITE(6,637)L
870 637 FORMAT(1X,"ENTER X,Y,Z COORDS OF RECTANGULAR SURFACE",1X,I2,1X,"
880& POINT 3")
890      READ ,(SURFS(J,L),J=7,9)
900C
910      WRITE(6,153)L
920 153 FORMAT(1X,"ENTER COMPLEX DIELECTRIC CONSTANTS OF SURFACE",I2)
930     READ ,ERS(L)
940 131 FORMAT(I5,6X,"DATA ERS/"5(F8.2,","),/,I5,5X,"&",5(F8.2,","),/
950& ,I5,5X,"&",5(F8.2,","),/,I5,5X,"&",5(F8.2,","),"/")
960C
970      WRITE(6,154)L
980 154 FORMAT(1X,"ENTER RMS ROUGHNESS HEIGHT OF SURFACES",I2)
990      READ ,SH2S(L)
1000 132 FORMAT(I5,6X,"DATA SH2S/"5(F8.2,","),/,I5,5X,"&",5(F8.2,","),/,
1010& I5,5X,"&",5(F8.2,","),/,I5,5X,"&",5(F8.2,","),"/")
1020  12 CONTINUE
1030      WRITE(6,643)
1040 643 FORMAT(1X"ENTER NO. OF TRIANGULAR ELEMENTS")
1050      READ ,NT
1060      WRITE(6,644)LN+1,NT
1070      WRITE(10,644)LN+1,NT
1080 644 FORMAT(I5,6X,"DATA NT/",I3,"/")
1090      DO 13 L=NR+1,NR+NT
1100      WRITE(6,638)L-NR
1110 638 FORMAT(1X,"ENTER X,Y,Z COORDS OF TRIANGULAR SURFACE",1X,I2,1X,"
1120& POINT 1")
1130      READ ,(SURFS(J,L),J=1,3)
1140      WRITE(6,639)L-NR
1150 639 FORMAT(1X,"ENTER X,Y,Z COORDS OF TRIANGULAR SURFACE",1X,I2,1X,"
1160& POINT 2")
1170      READ ,(SURFS(J,L),J=4,6)
1180      WRITE(6,640)L-NR
1190 640 FORMAT(1X,"ENTER X,Y,Z COORDS OF TRIANGULAR SURFACE",1X,I2,1X,"
1200& POINT 3")
```

```
      READ ,(SURFS(J,L),J=7,9)
      WRITE(6,645)L-NR
  645 FORMAT(1X,"ENTER COMPLEX DIELECTRIC CONSTANTS OF SURFACE",I2)
      READ ,ERS(L)
      WRITE(6,646)L-NR
  646 FORMAT(1X,"ENTER RMS ROUGHNESS HEIGHT OF SURFACE",I2)
      READ ,SH2S(L)
   13 CONTINUE
      LN=68365
      WRITE(6,130)LN
      WRITE(10,130)LN
      NUM=180-(NR+NT)*9
      DO 14 M=1,NR+NT
      WRITE(6,641)LN+M,(SURFS(J,M),J=1,9)
      WRITE(10,641)LN+M,(SURFS(J,M),J=1,9)
  641 FORMAT(I5,5X,"&",9(F8.2,","))
   14 CONTINUE
      LN=LN+M+1
      WRITE(6,642)LN,NUM
  642 FORMAT(I5,5X,"&",I3,"*0,/")
      WRITE(10,642)M,NUM
      WRITE(6,131)LN+10,(ERS(L),L=1,5),LN+11,(ERS(L),L=6,10),
     LN+12,(ERS(L),L=11,15),LN+13,(ERS(L),L=16,20)
      WRITE(10,131)LN+10,(ERS(L),L=1,5),LN+11,(ERS(L),L=6,10),
     LN+12,(ERS(L),L=11,15),LN+13,(ERS(L),L=16,20)
      WRITE(6,132)LN+14,(SH2S(L),L=1,5),LN+15,(SH2S(L),L=6,10),
     LN+16,(SH2S(L),L=11,15),LN+17,(SH2S(L),L=16,20)
      WRITE(10,132)LN+14,(SH2S(L),L=1,5),LN+15,(SH2S(L),L=6,10),
     LN+16,(SH2S(L),L=11,15),LN+17,(SH2S(L),L=16,20)
      GO TO 10
C
  106 WRITE(6,155)
  155 FORMAT(1X,"ENTER 1 IF RECTANGLE IS TO BE TREATED SEPERATELY
     OR 0 OTHERWISE")
      READ ,NRSPEC
      LN=68550
      WRITE(6,133)LN,NRSPEC
      WRITE(10,133)LN,NRSPEC
  133 FORMAT(I5,6X,"DATA NRSPEC/",I1,"/")
  107 WRITE(6,156)
  156 FORMAT(1X,"ENTER 1 IF TRIANGLE IS TO BE TREATED SEPERATELY
     OR 0 OTHERWISE")
      READ ,NTSPEC
      WRITE(6,134)LN+1,NTSPEC
      WRITE(10,134)LN+1,NTSPEC
  134 FORMAT(I5,6X,"DATA NTSPEC/",I1,"/")
C
      WRITE(6,157)
  157 FORMAT(1X,"ENTER 0 FOR FULL INTEGRATION OR 1 FOR FRESNEL
     REFLECTION ROUGHNESS")
      READ ,ISPGRD
      WRITE(6,135)LN+2,ISPGRD
      WRITE(10,135)LN+2,ISPGRD
  135 FORMAT(I5,6X,"DATA ISPGRD/",I1,"/")
C
  109 WRITE(6,158)
  158 FORMAT(1X,"ENTER RMS GROUND ROUGHNESS HEIGHT")
      READ ,SH2G
      WRITE(6,136)LN+3,SH2G
      WRITE(10,136)LN+3,SH2G
```

```
1810 136  FORMAT(I5,6X,"DATA SH2G/",F8.2,"/")
1820C
1830 110 WRITE(6,159)
1840 159 FORMAT(1X,"ENTER COMPLEX DIELECTRIC GROUND CONSTANT")
1850     READ ,ERG
1860     WRITE(6,137)LN+4,ERG
1870     WRITE(10,137)LN+4,ERG
1880 137 FORMAT(I5,6X,"DATA ERG/",F8.2,"/")
1890     GO TO 10
1900C
1910C     BUILDING CHARACTERISTICS
1920C
1930 111 WRITE(6,160)
1940 160 FORMAT(1X,"ENTER NUMBER OF BIULDINGS")
1950     READ ,NBLD
1960     LN=68641
1970     WRITE(6,138)LN,NBLD
1980     WRITE(10,138)LN,NBLD
1990 138 FORMAT(I5,6X,"DATA NBLD/",I3,"/")
2000C
2010     N=68651
2020     NUM=40-NBLD*4
2030     LNUM=N+NBLD
2040 112 DO 45 J=1,NBLD
2050    WRITE(6,161)J
2060 161 FORMAT(1X,"ENTER X & Y COORDS OR LEFT & RIGHT SIDES OF REFLECTING
2070&    FACES",I2)
2080     READ ,(BLD(J,K),K=1,4)
2090 139 FORMAT(I5,6X,"DATA BLD/")
2100C
2110   WRITE(6,162)J
2120 162 FORMAT(1X,"ENTER BUILDING HEIGHT",I2)
2130     READ ,HB(J)
2140 140 FORMAT(I5,6X,"DATA HB/"9(F6.2,","),F6.2,"/")
2150C
2160   WRITE(6,163)J
2170 163 FORMAT(1X,"ENTER HEIGHT OF BOTTOM OF BUILDING",I2,1X,"RELATIVE TO
2180&  0 GROUND")
2190     READ ,HBOT(J)
2200 600 FORMAT(I5,6X,"DATA HBOT/"9(F8.2,","),F8.2,"/")
2210C
2220   WRITE(6,164)J
2230 164 FORMAT(1X,"ENTER RMS ROUGHNESS HEIGHT OF REFLECTING FACE",I2)
2240     READ ,SH2B(J)
2250 601 FORMAT(I5,6X,"DATA SH2B/",9(F8.2,","),F8.2,"/")
2260C
2270   WRITE(6,165)J
2280 165 FORMAT(1X,"ENTER BUILDING",I3,1X,"COMPLEX DIELECTRIC CONSTANT",I2)
2290     READ ,DICSTB(J)
2300 602 FORMAT(I5,6X,"DATA DICSTB/"9(F6.2,","),F6.2,"/")
2310C
2320   WRITE(6,166)J
2330 166 FORMAT(1X,"ENTER TILT ANGLE IN DEGREES IN COUNTERCLOCKWISE DIRECTION",I2)
2340     READ ,TILT(J)
2350 603 FORMAT(I5,6X,"DATA TILT/"9(F6.2,","),F6.2,"/")
2360C
2370   WRITE(6,167)J
2380 167 FORMAT(1X,"ENTER BUILDING DIFFERENTIAL GROUND HEIGHT PARAMETER",I2)
2390     READ ,GRNDRD(J)
2400 604 FORMAT(I5,6X,"DATA GRNDRD/"9(F8.2,","),F8.2," ")
```

```
2410   45 CONTINUE
2420      WRITE(6,139)N
2430      DO 63 L=1,NBLD
2440      WRITE(6,98)NHL,(BLD(L,K),K=1,4)
2450      WRITE(10,98)NHL,(BLD(L,K),K=1,4)
2460   98 FORMAT(I5,5X,"&",4(F8.2,","))
2470   63 CONTINUE
2480      WRITE(6,95)LNUM+1,NUM
2490   95 FORMAT(I5,5X,"&",I2,"*0./")
2500      WRITE(6,140)LNUM+2,(HB(J),J=1,10)
2510      WRITE(10,140)LNUM+2,(HB(J),J=1,10)
2520      WRITE(6,600)LNUM+3,(HBOT(J),J=1,10)
2530      WRITE(10,600)LNUM+3,(HBOT(J),J=1,10)
2540      WRITE(6,601)LNUM+4,(SH2B(J),J=1,10)
2550      WRITE(10,601)LNUM+4,(SH2B(J),J=1,10)
2560      WRITE(6,602)LNUM+5,(DICSTB(J),J=1,10)
2570      WRITE(10,602)LNUM+5,(DICSTB(J),J=1,10)
2580      WRITE(6,603)LNUM+6,(TILT(J),J=1,10)
2590      WRITE(10,603)LNUM+6,(TILT(J),J=1,10)
2600      WRITE(6,604)LNUM+7,(GRNDRD(J),J=1,10)
2610      WRITE(10,604)LNUM+7,(GRNDRD(J),J=1,10)
2620      GO TO 10
2630C
2640C      AIRCRAFT CHARACTERISTICS
2650C
2660 804 WRITE(6,168)
2670 168 FORMAT(1X,"ENTER NUMBER OF AIRCRAFT")
2680     READ ,NAC
2690      LN=68891
2700      WRITE(6,605)LN,NAC
2710      WRITE(10,605)LN,NAC
2720 605 FORMAT(I5,6X,"DATA NAC/",I3,"/")
2730C
2740 805 DO 46 K=1,NAC
2750      WRITE(6,169)K
2760 169 FORMAT(1X,"ENTER X & Y COORDS OF TWO ENDPOINTS OF AIRCRAFT",I2,1X,"
2770&    WITH TAIL END SPECIFIED FIRST")
2780      READ ,(AC(K,J),J=1,4)
2790 606 FORMAT(I5,6X,"DATA AC/"9(F8.2,","),F8.2,"/")
2800C
2810      WRITE(6,170)K
2820 170 FORMAT(1X,"ENTER AIRCRAFT TYPES",I2)
2830      READ ,NACTYP(K)
2840 607 FORMAT(I5,6X,"DATA NACTYP/"9(F8.2,","),F8.2,"/")
2850C
2860      WRITE(6,171)K
2870 171 FORMAT(1X,"ENTER AIRCRAFT",I2,1X,"ALTITUDES")
2880      READ ,ALT(K)
2890 608 FORMAT(I5,6X,"DATA ALT/"9(F8.2,","),F8.2,"/")
2900C
2910      WRITE(6,172)K
2920 172 FORMAT(1X,"ENTER A/C DIFFERENTIAL GROUND HEIGHT PARAMETER",I2)
2930      READ ,GRNDAC(K)
2940 609 FORMAT(I5,6X,"DATA GRNDAC/"9(F8.2,","),F8.2,"/")
2950   46 CONTINUE
2960      NUM=40-NAC*4
2970      WRITE(6,606)LN
2980      WRITE(10,606)LN
2990      DO 299 M=1,NAC
3000      WRITE(6,700)LN+M,(AC(M,J),J=1,4)
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*

```
3010      WRITE(10,700)LN+M,(AC(K,J),J=1,4)
3020 700 FORMAT(I5,5X,"&",4(F8.2,","))
3030 299 CONTINUE
3040      WRITE(6,701)LN+M+1,NUM
3050      WRITE(10,701)LN+N+1,NUM
3060 701 FORMAT(I5,5X,"&",I2,"*0,/")
3070      WRITE(6,607)LN+10,(NACTYP(K),K=1,10)
3080      WRITE(10,607)LN+10,(NACTYP(K),K=1,10)
3090      WRITE(6,608)LN+11,(ALT(K),K=1,10)
3100      WRITE(10,608)LN+11,(ALT(K),K=1,10)
3110      WRITE(6,609)LN+12,(GRNDAC(K),K=1,10)
3120      WRITE(10,609)LN+12,(GRNDAC(K),K=1,10)
3130      LN=0
3140      GO TO 10
3150C
3160C      RUNWAY HUMP PARAMETERS
3170C
3180 809 WRITE(6,173)
3190 173 FORMAT(1X,"ENTER ZERO IF RUNWAY HUMP SHADOWING IS TO BE DONE
3200% AND NONZERO OTHERWISE")
3210      READ ,IHUMP
3220      LN=69301
3230      IF(IHUMP.NE.0)GO TO 399
3240      WRITE(6,610)LN,IHUMP
3250      WRITE(10,610)LN,IHUMP
3260 610 FORMAT(I5,6X,"DATA IHUMP/",I2,"/")
3270C
3280 810 WRITE(6,174)
3290 174 FORMAT(1X,"ENTER X,Y,Z COORDINATES OF FRONT OF HUMP,IN FEET")
3300      READ ,HUMPF
3310      WRITE(6,611)LN+1,HUMPF
3320      WRITE(10,611)LN+1,HUMPF
3330 611 FORMAT(I5,6X,"DATA HUMPF/",2(F8.2,","),F8.2,"/")
3340C
3350 811 WRITE(6,175)
3360 175 FORMAT(1X,"ENTER X,Y,Z COORDINATES OF CENTER OF HUMP,IN FEET")
3370      READ ,HUMP
3380      WRITE(6,612)LN+2,HUMP
3390      WRITE(10,612)LN+2,HUMP
3400 612 FORMAT(I5,6X,"DATA HUMP/",2(F8.2,","),F8.2,"/")
3410C
3420 812 WRITE(6,176)
3430 176 FORMAT(1X,"ENTER X,Y,Z COORDINATES OF BACK OF HUMP,IN FEET")
3440      READ ,HUMPB
3450      WRITE(6,613)LN+3,HUMPB
3460      WRITE(10,613)LN+3,HUMPB
3470 613 FORMAT(I5,6X,"DATA HUMPB/",2(F8.2,","),F8.2,"/")
3480      LN=0
3490      GO TO 10
3500 399 WRITE(6,611)LN+1,HUMPF
3510      WRITE(10,611)LN+1,HUMPF
3520      WRITE(6,612)LN+2,HUMP
3530      WRITE(10,612)LN+2,HUMP
3540      WRITE(6,613)LN+3,HUMPB
3550      WRITE(10,613)LN+3,HUMPB
3560      GO TO 10
3570C
3580C      SHADOWING AIRCRAFT CHARACTERISTICS
3590C
3600 813 WRITE(6,178)
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3610 178 FORMAT(1X,'ENTER NUMBER OF SHADOWING AIRCRAFT')
3620     READ ,NSHAC
3630     LN=69481
3640     WRITE(6,614)LN,NSHAC
3650     WRITE(10,614)LN,NSHAC
3660 614 FORMAT(I5,6X,'DATA NSHAC/',I3,'/')
3670C
3680 814 DO 15 M=1,NSHAC
3690     WRITE(6,179)M
3700 179 FORMAT(1X,'ENTER X,Y,Z COORDS OF STARTING POINTS OF FLIGHT PATHS
3710&  OF SHADOWING AIRCRAFT',I2)
3720     READ ,(SHPOS1(J,M),J=1,3)
3730 615 FORMAT(I5,6X,'DATA SHPOS1/'9(F8.2,',',),F8.2,'/')
3740C
3750     WRITE(6,180)M
3760 180 FORMAT(1X,'ENTER COORDS OF ENDING POINTS OF FLIGHT PATHS
3770&  OF SHADOWING AIRCRAFT',I2)
3780     READ ,(SHPOS2(J,M),J=1,3)
3790 616 FORMAT(I5,6X,'DATA SHPOS2/'9(F8.2,',',),F8.2,'/')
3800C
3810     WRITE(6,181)M
3820 181 FORMAT(1X,'ENTER AIRCRAFT ',I3,1X,'TYPE')
3830     READ ,SHACTP(M)
3840 617 FORMAT(I5,6X,'DATA SHACTP/'9(F8.2,',',),F8.2,'/')
3850C
3860     WRITE(6,182)M
3870 182 FORMAT(1X,'ENTER AIRCRAFT VELOCITY',I2)
3880     READ ,SHVEL(M)
3890 618 FORMAT(I5,6X,'DATA SHVEL/'9(F8.2,',',),F8.2,'/')
3900C
3910     WRITE(6,183)M
3920 183 FORMAT(1X,'ENTER ANGLES OF FUSELAGE',I2,1X,'RELATIVE TO GROUND
3930&  PLANE,IN DEGREES')
3940     READ ,SHANG(M)
3950 619 FORMAT(I5,6X,'DATA SHANG/'9(F8.2,',',),F8.2,'/')
3960  15 CONTINUE
3970     NUM=30-NSHAC*3
3980     LN=69482
3990     WRITE(6,615)LN
4000     WRITE(10,615)LN
4010     DO 89 L=1,NSHAC
4020 .   WRITE(6,702)LN+L,(SHPOS1(J,M),J=1,3)
4030     WRITE(10,702)LN+L,(SHPOS1(J,M),J=1,3)
4040 702 FORMAT(I5,5X,'&',3(F8.2,','))
4050  89 CONTINUE
4060     L=L+1
4070     WRITE(6,703)LN+L,NUM
4080     WRITE(10,703)LN+L,NUM
4090 703 FORMAT(I5,5X,'&',I2,'/0./')
4100     LN=69510
4110     WRITE(6,616)LN
4120     WRITE(10,616)LN
4130     DO 90 K=1,NSHAC
4140     WRITE(6,704)LN+K,(SHPOS2(J,M),J=1,3)
4150     WRITE(10,704)LN+K,(SHPOS2(J,M),J=1,3)
4160 704 FORMAT(I5,5X,'&',3(F8.2,',',))
4170  90 CONTINUE
4180     K=K+1
4190     WRITE(6,705)LN+K,NUM
4200     WRITE(10,705)LN+K,NUM
```

```
4210 705 FORMAT(I5,5X,"&",I2,"*0./")
4220     WRITE(6,617)LN+11,(SHACTP(M),M=1,10)
4230     WRITE(10,617)LN+11,(SHACTP(M),M=1,10)
4240     WRITE(6,618)LN+12,(SHVEL(M),M=1,10)
4250     WRITE(10,618)LN+12,(SHVEL(M),M=1,10)
4260     WRITE(6,619)LN+13,(SHANG(M),M=1,10)
4270     WRITE(10,619)LN+13,(SHANG(M),M=1,10)
4280     LN=0
4290     GO TO 10
4300C
4310C     SHADOWING AIRCRAFT CHARACTERISTICS
4320C
4330 819 WRITE(6,184)
4340 184 FORMAT(1X,"ENTER NO. OF SHADOWING BUILDINGS")
4350     READ ,NSHBLD
4360     LN=69651
4370     WRITE(6,620)LN,NSHBLD
4380     WRITE(10,620)LN,NSHBLD
4390 620 FORMAT(I5,6X,"DATA NSHBLD/",I3,"/")
4400C
4410   DO 16 J=1,NSHBLD
4420     WRITE(6,185)J
4430 185 FORMAT(1X,"ENTER SHADOWING BUILDING HEIGHTS",I2)
4440     READ ,HBS(J)
4450 621 FORMAT(I5,6X,"DATA HBS/"9(F8.2,","),F8.2,"/")
4460C
4470     WRITE(6,186)J
4480 186 FORMAT(1X,"ENTER HEIGHT OF BLD",I2,1X,"RELATIVE TO GROUND")
4490     READ ,HBT(J)
4500 622 FORMAT(I5,6X,"DATA HBT/"9(F8.2,","),F8.2,"/")
4510C
4520     WRITE(6,187)J
4530 187 FORMAT(1X,"ENTER X & Y COORDS  OF LEFT & RIGHT SIDE FOR SHADOWING
4540& BUILDINGS",I2)
4550     READ ,(SHBLD(J,K),K=1,4)
4560 623 FORMAT(I5,6X,"DATA SHBLD/"9(F8.2,","),F8.2,"/")
4570  16 CONTINUE
4580     WRITE(6,621)LN+1,(HBS(J),J=1,10)
4590     WRITE(10,621)LN+1,(HBS(J),J=1,10)
4600     WRITE(6,622)LN+2,(HBT(J),J=1,10)
4610     WRITE(10,622)LN+2,(HBT(J),J=1,10)
4620     LN=69654
4630     NUM=40-NSHBLD*4
4640     WRITE(6,623)LN
4650     WRITE(10,623)LN
4660     DO 91 K=1,NSHBLD
4670     WRITE(6,706)LN+K,(SHBLD(K,L),L=1,4)
4680     WRITE(10,706)LN+K,(SHBLD(K,L),L=1,4)
4690 706 FORMAT(I5,5X,"&",4(F8.2,","))
4700  91 CONTINUE
4710     K=K+1
4720     WRITE(6,707)LN+K,NUM
4730     WRITE(10,707)LN+K,NUM
4740 707 FORMAT(I5,5X,"&",I2,"*0./")
4750     GO TO 10
4760C
4770C     AIRPORT AND FLIGHT CHARACTERISTICS
4780C
4790 823 WRITE(6,188)
4800 188 FORMAT(1X,"TRUE RUNWAY LENGTH IN FEET")
```

```
      READ ,RUNLEN
      LN=69871
      WRITE(6,624)LN,RUNLEN
      WRITE(10,624)LN,RUNLEN
  624 FORMAT(I5,6X,"DATA RUNLEN/",F8.2,"/")
C
    WRITE(6,189)
  189 FORMAT(1X,"ENTER RUNWAY WIDTH,IN FEET")
      READ ,RUNWID
      WRITE(6,625)LN+1,RUNWID
      WRITE(10,625)LN+1,RUNWID
  625 FORMAT(I5,6X,"DATA RUNWID/",F8.2,"/")
C
    WRITE(6,190)
  190 FORMAT(1X,"ENTER DATA RATE IN SECONDS,NOMINALLY 0.2 SECONDS")
      READ ,DRATE
      WRITE(6,626)LN+2,DRATE
      WRITE(10,626)LN+2,DRATE
  626 FORMAT(I5,6X,"DATA DRATE/",F4.2,"/")
C
      WRITE(6,196)
  196 FORMAT(1X,"ENTER NUMBER OF WAYPOINTS")
      READ ,NWAYPT
      WRITE(6,632)LN+3,NWAYPT
      WRITE(10,632)LN+3,NWAYPT
  632 FORMAT(I5,6X,"DATA NWAYPT/",I3,"/")
      LN=0
      LN=69900
    DO 17 L=1,NWAYPT
      WRITE(6,191)L
  191 FORMAT(1X,"ENTER WAYPOINT",I2,1X,"X,Y,Z COORDINATES")
      READ ,XPOS(L),YPOS(L),ZPOS(L)
  627 FORMAT(I5,6X,"DATA XPOS/")
  628 FORMAT(I5,6X,"DATA YPOS/")
  629 FORMAT(I5,6X,"DATA ZPOS/")
C
      WRITE(6,194)L
  194 FORMAT(1X,"ENTER VELOCITY OF RCVR IN FT/SEC FOR EACH SEGMENT",I2)
      READ ,VEL(L)
  630 FORMAT(I5,6X,"DATA VEL/")
C
      WRITE(6,195)L
  195 FORMAT(1X,"ENTER SAMPLING INCREMENT ALONG EACH SEGMENT",I2,1X,"IN FEET")
      READ ,DINC(L)
  631 FORMAT(I5,6X,"DATA DINC/")
   17 CONTINUE
  650 FORMAT(I5,5X,"&",9(F8.2,","),/,I5,5X,"&",9(F8.2,","),/,
&I5,5X,"&",9(F8.2,","),/,I5,5X,"&",9(F8.2,","),"/")
      WRITE(6,627)LN
      WRITE(10,627)LN
      WRITE(6,650)LN+1,(XPOS(M),M=1,9),LN+2,(XPOS(M),M=10,18),LN+3,
&(XPOS(M),M=19,27),LN+4,(XPOS(M),M=28,36)
      WRITE(10,650)LN+1,(XPOS(M),M=1,9),LN+2,(XPOS(M),M=10,18),
& LN+3,(XPOS(M),M=19,27),LN+4,(XPOS(M),M=28,36)
      WRITE(6,628)LN+5
      WRITE(10,628)LN+5
      WRITE(6,650)LN+6,(YPOS(M),M=1,9),LN+7,(YPOS(M),M=10,18),LN+8,
&(YPOS(M),M=19,27),LN+9,(YPOS(M),M=28,36)
      WRITE(10,650)LN+6,(YPOS(M),M=1,9),LN+7,(YPOS(M),M=10,18),
& LN+8,(YPOS(M),M=19,27),LN+9,(YPOS(M),M=28,36)
```

```
5410      WRITE(6,629)LN+10
5420      WRITE(10,629)LN+10
5430      WRITE(6,650)LN+11,(ZPOS(M),M=1,9),LN+12,(ZPOS(M),M=10,18),LN+13,
5440% (ZPOS(M),M=19,27),LN+14,(ZPOS(M),M=28,36)
5450      WRITE(10,650)LN+11,(ZPOS(M),M=1,9),LN+12,(ZPOS(M),M=10,18),
5460% LN+13,(ZPOS(M),M=19,27),LN+14,(ZPOS(M),M=28,36)
5470      WRITE(6,630)LN+15
5480      WRITE(10,630)LN+15
5490      WRITE(6,650)LN+16,(VEL(M),M=1,9),LN+17,(VEL(M),M=10,18),LN+18,
5500% (VEL(M),M=19,27),LN+19,(VEL(M),M=28,36)
5510      WRITE(10,650)LN+16,(VEL(M),M=1,9),LN+17,(VEL(M),M=10,18),
5520% LN+18,(VEL(M),M=19,27),LN+19,(VEL(M),M=28,36)
5530      WRITE(6,631)LN+20
5540      WRITE(10,631)LN+20
5550      WRITE(6,650)LN+21,(DINC(M),M=1,9),LN+22,(DINC(M),M=10,18),LN+23,
5560% (DINC(M),M=19,27),LN+24,(DINC(M),M=28,36)
5570      WRITE(10,650)LN+21,(DINC(M),M=1,9),LN+22,(DINC(M),M=10,18),
5580% LN+23,(DINC(M),M=19,27),LN+24,(DINC(M),M=28,36)
5590C
5600   WRITE(6,197)
5610 197 FORMAT(1X,"ENTER CUTOFF ALTITUDE BETWEEN ELEVATION 1 AND 2")
5620      READ ,ZCUT
5630      LN=69980
5640      WRITE(6,633)LN,ZCUT
5650      WRITE(10,633)LN,ZCUT
5660 633 FORMAT(I5,6X,"DATA ZCUT/",F8.2,"/")
5670C
5680   WRITE(6,198)
5690 198 FORMAT(1X,"ENTER X,Y,Z COORDINATES OF THE GLIDE PATH INTERCEPTION
5700% POINT")
5710      READ ,GPIP
5720      WRITE(6,634)LN+40,GPIP
5730      WRITE(10,634)LN+40,GPIP
5740 634 FORMAT(I5,6X,"DATA GPIP/",2(F8.2,","),F8.2,"/")
5750  10 CONTINUE
5760      STOP
5770      END
```

*

APPENDIX C

SAMPLE OUTPUT

```
      BLOCK DATA
      LOGICAL FIRSTR
      INTEGER NSCNTR,ITRTRK,ITCCST,ITCCTS,ITCCAS,ITACST,ITRGDS,ITRGDV
      INTEGER SCNFMT
      LOGICAL FRAMST,FRAHND
      INTEGER ITRFRM,NENVTR,NFENTR,ICONCT,ITRPRC,ITRTH1,ITRTH2,MCTTRS
      INTEGER ITRSLW,ITSLCT
      REAL TZTRS,WCTRS,TDTRS,THTDTR,TRSCNW,TRBMWD,TMLTA,TMLTT
      REAL TRDWSM,TROOB,TRGRP,TRDGMN,TRGDMX,THFTR,TRDLY,TRSLWR
      REAL TRSLWA,TRSLWB
      REAL TRUNUS
      REAL ALPHA1(4),STDIFF(4),DTMAX(4)
      INTEGER SPCTMX(4)
      INTEGER IBEAM,IPHS
      REAL TBMWID,FBMWID,FOLDBM
      LOGICAL TIMPRT,CNTPRT,IFCORR
      INTEGER PRNTR
      COMMON/CMTRS/FIRSTR(4),NSCNTR(4),TZTRS(4),WCTRS(4),TDTRS(4),
     &  THTDTR(4),TRSCNW(4),TRBMWD(4),
     & ITRTRK(4),ITCCST(4),ITCCTS(4),ITCCAS(4),ITACST(4),TMLTA(4),
     &   TMLTT(4),
     & ITRGDS(4),TRDWSM(4),TROOB(4),TRGRP(4),
     & ITRDGV(4),TRDGMN(4),TRDGMX(4),
     & ITRFRM(4),NENVTR(4),NFENTR(4),ICONCT(4),ITRPRC(4),
     &  THFTR(4),TRDLY(4),ITRTH1(4),ITRTH2(4),MCTTRS(4),
     & ITRSLW(4),TRSLWR(4),TRSLWA(4),TRSLWB(4),ITSLCT(4),
     & TRUNUS(40)
       EQUIVALENCE (TRUNUS(1),ALPHA1(1)),(TRUNUS(5),SPCTMX(1))
      EQUIVALENCE (TRUNUS(9),STDIFF(1)),(TRUNUS(13),DTMAX(1))
      COMMON/CMTRS4/IBEAM(4),TBMWID,FBMWID,FOLDBM(4,13),IPHS(4)
      COMMON/CNTRS8/TIMPRT,CNTPRT,PRNTR,ANGHI(4),ANGLO(4),IFCORR
      COMMON/COVLM2/AZWID,AZHI
      COMMON/RTSPEC/NRSPEC(10),NTSPEC(10),ISPGRD,DUMRT(21)
       CHARACTER*4 TITLE1
      COMMON /TITLE/TITLE1(18)
      EQUIVALENCE(TITLE1(1),IDRUN)
      LOGICAL PLZD,PLZAZ,PLZE1,PLZE2
      COMMON/AZSYS/XMTRAZ(3),AZVEL(3),WLAZ,PLZAZ,DIMAZ,KWNAZ,KWNSAZ,
     &ITYPAZ,DUMERA(4),
     &AKOOAH,TCAZH,TSAZH,WRAZH,WOFAZH,NSCNAH,THAZH,DUMAZH(13),
     &AKOOAI,TCAZI,TSAZI,WRAZI,WOFAZI,NSCNAI,THAZI,DUMAZI(13),
     &DM1AZT,TSAZT,NPKAZT,FNAZT,WCAZT,NSNAZT,IOPAZT,IO2AZT,THFAZT,
     &TDTAZT,TWAZT,TZAZT,DM2AZT(8),
     & CSTAB,TSAB,NPKAB,TGAB,WCAB,NSCNAB,ILGAB,IERAB,DM1AB,
     & THDTAB,TDAB,TZAB,DM2AB(8)
      COMMON/DME/XMTRD(3),DUMVEL(3),WLD,PLZD,DIMDME,KWND,KWNSD,ITYPD,
     &DUMERD(4),
     &TMINCH,TRISEH,PRPH,WRDMEH,DMWOFH,NSCNDH,THDMDH,THDMUH,PLSWDH,
     &DUMDMH(11),
     &DMD1II(3),WRDMEI,DMWOFI,NSCNDI,DMTHDI,GANDMI,TDELDI,TRISEI,PLSWDI,
     &TMINCI,PRPI,DMD2II(7),
     &WCDI,TPRPDT,TMUDT,TPWDDT,TMU2DT,TUPWDT,THFDDT,THFUDT,TURDT,
     &DUM1DT(7),NSCNDT,DUM3DT(3),
     &DMD1BE(2),WRDMEB,DMD2BE(4),THFDB,DM04BE(2),TDELDB,TMINCB,PRPB,
     &GANDMB,TRISEB,PLSWDB,NSCNDB,TAURDB,DMD3BE(2)
      COMMON/EL1/XMTRE1(3),EIVEL(3),WLE1,PLZE1,DIMEL1,KWNE1,KWNSE1,
     &ITYPE1,DUMER1(4),
     &AKOO1H,TCE1H,TSE1H,WRE1H,WOFE1H,NSCN1H,THE1H,DUME1H(13),
     &AKOO1I,TCE1I,TSE1I,WRE1I,WOFE1I,NSCN1I,THE1I,DUME1I(13),
     &DM1E1T,TSE1T,NPKE1T,FNE1T,WCE1T,NSNE1T,IOPE1T,IO2E1T,THE1T,
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60860     %TDTE1T,TDE1T,TZE1T,DM2E1T(8),
60870     % CST1B,TS1B,NPK1B,TG1B,WC1B,NSCN1B,ILG1B,IER1B,DM11B,
60880     % THDT1B,TD1B,TZ1B,DM21B(8)
60900      COMMON/EL2/XMIRE2(3),E2VEL(3),WLE2,PLZE2,DIMEL2,KWNE2,KWNSE2,
60910     %ITYPE2,DUMER2(4),
60920     %AKOD2H,TCE2H,TSE2H,WRE2H,WOFE2H,NSCN2H,THE2H,DUME2H(13),
60930     %AKOD2I,TCE2I,TSE2I-WRE2I,WOFE2I,NSCN2I,THE2I,DUME2I(13),
60940     %MCTS2T,TSE2I,NPKE2T,FNE2T,WCE2T,NSNE2T,IOPE2T,IO2E2T,THFE2T,
60950     %TDTE2T,TDE2T,TZE2T,THST2T,DM2E2T(7),
60960     % CST2B,TS2B,NPK2B,TG2B,WC2B,NSCN2B,ILG2B,IER2B,DM12B,
60970     % THDT2B,TD2B,TZ2B,DM22B(8)
60990      COMPLEX ERG,ERS,ERO,DICSTB
61020      COMMON/BDICST/DICSTB(10)
61040      REAL NFZ
61050      COMMON /SURFAC/NR,NT,SURFS(9,20),ERS(20),SH2S(20),
61060     %   ERO,SH20,NFZ,NA,NB,DUM4(101)
61070      COMMON /BUILD/NBLD,SH2G,ERG,BLD(4,10),HB(10),HBOT(10),SH2B(10),
61080     %   DUM5(90)
61090      COMMON /ACS/NAC,AC(4,10),NACTYP(10),ALT(10),DUMM6(140)
61100      COMMON /DIFSIG/SIGHAZ,SIGHDM,SIGHE1,SIGHE2,SIGLAZ,SIGLDM,SIGLE1,
61110     %SIGLE2
61120      COMMON /HMPR/HUMPF(3),HUMP(3),HUMPB(3), IHUMP
61140      COMMON /AIRPRT/RUNLEN,RUNWID,DRATE,XPOS(36),YPOS(36),ZPOS(36),
61150     % VEL(36),DINC(36),NWAYPT,DUMA11(2)
61160      COMMON/TRSJTR/TJTR(60,4),IPOINT(4,13),NSER(4)
61170      DIMENSION AZJIT(60),DMEJIT(60),EL1JIT(60),EL2JIT(60)
61180      EQUIVALENCE(TJTR(1,1),AZJIT(1)),(TJTR(1,2),DMEJIT(1)),
61190     % (TJTR(1,3), EL1JIT(1)),  (TJTR(1,4), EL2JIT(1))
61200      COMMON/EL2CUT/ZCUT
61210      COMMON/CMACPT/ACBNAZ,ACTTAZ,ACBHEL,ACTTEL
61240      COMMON/CMGPIP/GPIP(3)
61260      LOGICAL FIRST
61270      COMMON/FIRSTS/FIRST(4,4)
61290      COMMON/CNSTNT/PI,TWOPI,PI2,PIPI,RADIAN,DEGREE,SOL
61310      COMMON/COVLIM/E1AZLO,E1AZHI,E1ELHI,E2AZLO,E2AZHI,E2ELHI
61330      INTEGER SHACTP
61340      COMMON /SHDAC/NSHAC,SHPOS1(3,10),SHPOS2(3,10),SHACTP(10),
61350     %SHVEL(10),SHANG(10),DUMSHA(150)
61370      COMMON /SHDBLD/NSHBLD,SHBLD(4,10),HBS(10),HBT(10),DUMSHB(60)
61390      COMMON/BTILT/TILT(10),DMTILT(20)
61410      COMMON/CMDGU/WRGU(2,4),PRPGU(2,4),BETGU(2,4),TRGU(2,4),NSGU(2,4),
61420     % DUMGU1(32)
61440      COMMON/CMDFU/ITDFU(2,4),NDFU(2,4),ADFU(2,4)
61460      LOGICAL LDMFST
61470      COMMON/DME3/IDMTYP(2,4),IDMPLS(2,4),LDMFST(4)
61490      COMMON/DMETTL/TLINK(2,2),TSYST(3,4)
61510      COMMON/CMDDCU/DDUDEL(2,4),DDUGN(2,4),IDDUNS(2,4)
61530      COMMON/CMDTU/WRDTU(2,4),PRPDTU(2,4),WDDTU(2,4),TRDTU(2,4),
61540     % NSDTU(2,4),DMDTU(32)
61560      COMMON/CMDCU/WRDCU(2,4),PRPDCU(2,4),WDDCU(2,4),FNUDCU(2,4),
61570     % NSDCU(2,4),DMDCU1(48)
61590      COMMON/CMDCSU/WRDCSU(2,4),PRPCSU(2,4),WIDCSU(2,4),NSCSU(2,4),
61600     % DUMCSU(32)
61620      COMMON/BDGRND/GRNDED(10)
61640      COMMON/ACGRND/GRNDAC(10)
61660      COMMON/CMEDIT/THROW(3),AZOUT,ELOUT,DELAY
61680      COMMON/AZRES/ DUMAZR(64),IAMB
61710      DATA IDRUN/9999/
61750      DATA FIRST/16*.TRUE./
61870      DATA PI/3.14159/
61900      DATA TWOPI/6.28318/
61910      DATA PI2/1.57079/
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61920      DATA PIPI/9.86960/
61930      DATA RADIAN/0.0174532925/
61940      DATA DEGREE/57.2957/
61950      DATA SOL/9.834813E8/
62000      DATA TLINK/'UPLI', 'NK  ',
62010     & 'DOWN', 'LINK'/
62020      DATA TSYST/'DME ', 'MLS ', '    ',
62030     & 'DOPP', 'LER ', '    ',
62040     & 'TRSB', '    ', '    ',
62050     & 'DABS', '    ', '    '/
62235      DATA XMTRAZ/   12.00,   34.00,   67.00/
62240      DATA WLAZ/0.197/
62250      DATA PLZAZ/.TRUE./
62260      DATA DIMAZ/12.1/
62270      DATA ITYPAZ/1/
62450      DATA XMTRD/0.0,275.,15.0/
62460      DATA WLD/0.917/
62470      DATA PLZD/.TRUE./
62480      DATA DIMDME/4./
62490      DATA ITYPD/2/
62500      DATA DUMVEL/3*0./
62760      DATA IDMTYP/0, 0,  0, 0,  2, 2,  0, 0/
62770      DATA IDMPLS/0 ,0,  0, 0,  5, 5,  0, 0/
62780      DATA LDMFST/4*.TRUE./
62890      DATA ITDFU/0, 0,
62900     & 0, 0,
62910     & 1, 1,
62920     & 0,0/
62930      DATA NDFU/0, 0,
62940     & 0, 0,
62950     & 8, 8,
62960     & 0, 0/
62970      DATA ADFU/0., 0.,
62980     & 0., 0.,
62990     & -20., -20.,
63000     & 0., 0./
63120      DATA DDUDEL/
63130     & 0., 0.,
63140     & 0., 0.,
63150     & 100E-9, 100E-9,
63160     & 0., 0./
63170      DATA DDUGN/
63180     & 0., 0.,
63190     & 0., 0.,
63200     & -20., -20.,
63210     & 0., 0./
63220      DATA IDDUNS/
63230     & 0, 0,
63240     & 0, 0,
63250     & 8, 8,
63260     & 0, 0/
63450      DATA WRGU/
63460     & 0., 0.,
63470     & 0., 0.,
63480     & 1.041E9, 1.104E9,
63490     & 0., 0./
63500      DATA PRPGU/
63510     & 0., 0.,
63520     & 0., 0.,
63530     & 25E-3, 25E-3,
63540     & 0., 0./
63550      DATA DETGU/
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63560     & 0., 0.,
63570     & 0., 0.,
63580     & 1.423, 1.423,
63590     & 0., 0./
63600      DATA TRGU/
63610     & 0., 0.,
63620     & 0., 0.,
63630     & 2.5E-6, 2.5E-6,
63640     & 0., 0./
63650      DATA NSGU/
63660     & 0, 0,
63670     & 0, 0,
63680     & 25, 25,
63690     & 0, 0/
63810      DATA WRDTU/
63820     & 0., 0.,
63830     & 0., 0.,
63840     & 1.041E9, 1.104E9,
63850     & 0., 0./
63860      DATA PRPDTU/
63870     & 0., 0.,
63880     & 0., 0.,
63890     & 25E-3, 25E-3,
63900     & 0., 0./
63910      DATA WDDTU/
63920     & 0., 0.,
63930     & 0., 0.,
63940     & 3.5E-6, 3.5E-6,
63950     & 0., 0./
63960      DATA TRDTU/
63970     & 0., 0.,
63980     & 0., 0.,
63990     & 1E-6, 1E-6,
64000     & 0., 0./
64010      DATA NSDTU/
64020     & 0, 0,
64030     & 0, 0,
64040     & 25, 25,
64050     & 0, 0/
64370      DATA WRDCSU/
64380     & 0., 0.,
64390     & 0., 0.,
64400     & 1.041E9, 1.104E9,
64410     & 0., 0./
64420      DATA PRPCSU/
64430     & 0., 0.,
64440     & 0., 0.,
64450     & 25E-3, 25E-3,
64460     & 0., 0./
64470      DATA WIDCSU/
64480     & 0., 0.,
64490     & 0., 0.,
64500     & 3.5E-6, 3.5E-6,
64510     & 0., 0./
64520      DATA NSCSU/
64530     & 0, 0,
64540     & 0, 0,
64550     & 25, 25,
64560     & 0, 0/
64761      DATA XMTRE1/   45.00,   56.00,    9.90/
64770      DATA EIVEL/0., 0., 8300./
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64780      DATA WLE1/0.197/
64790      DATA PLZE1/.TRUE./
64800      DATA DIMEL1/11.82/
64810      DATA ITYPE1/3/
65005      DATA XMTRE2/   67.00,    0.90,    0.70/
65010      DATA WLE2/0.197/
65020      DATA PLZE2/.TRUE./
65030      DATA DIMEL2/24./
65040      DATA ITYPE2/4/
66110      DATA FIRSTR/4*.TRUE./
66120      DATA NSCNTR/3, 0, 8, 8/
66130      DATA TZTRS/6.8E-3, 0., 3.333E-3, 3.067E-3/
66140      DATA WCTRS/5.06E9, 0., 5.06E9, 5.06E9/
66150      DATA TDTRS/75E-3, 0., 25E-3, 25E-3/
66160      DATA THTDTR/-2E4, 0.,-2E4, -1E4/
66170      DATA TRBMWD/3., 0., 2., 2./
66180      DATA ITRTRN/1, 0, 1, 1/
66200      DATA ITCCST/300, 0, 800, 800/
66210      DATA ITCCTS/8,0,20,20/
66220      DATA ITACST/8, 0, 20, 20/
66230      DATA ITRGDS/1, 0, 1, 1/
66240      DATA ITRDGV/1, 0, 1, 1/
66250      DATA TRDGMN/12.E-6, 0., 12.E-6, 12.E-6/
66260      DATA TRDGMX/350.E-6, 0., 350.E-6, 350.E-6/
66270      DATA NENVTR/25, 0, 25, 25/
66280      DATA NFENTR/10, 0, 10, 10/
66290      DATA THETR/-3., 0., -3., -3./
66300      DATA ITRTH1/1, 0, 1, 1/
66310      DATA ITRTH2/1, 0, 1, 1/
66320      DATA ITRSLW/9,9,9,9/
66330      DATA TRSLWR/0.07, 0., 0.025, 0.025/
66340      DATA TRSLWA/0.25, 0., 0.125, 0.125/
66350      DATA TRSLWB/0.03125, 0., 7.813E-3, 7.813E-3/
66360      DATA ITSLCT/1, 0, 1, 0/
66370      DATA IBEAM/1, 0, 1, 1/
66450      DATA ITRPRC/0, 0, 0, 0/
66460      DATA TRDLY/0., 0., .5625, 0.5625/
66470      DATA ALPHA1/0.99875, 0., 0.99875, 0.99875/
66480      DATA SPCTMX/450, 0, 1200,1200/
66490      DATA STDIFF/0.,0.,16.E-6,16.E-6/
66500      DATA DTMAX/4*2.E-6/
66600      DATA NSEB/8, 0, 24, 24/
66620      DATA AZJIT/
66630     & 0E-3, 65E-3, 143E-3, 227E-3, 293E-3,
66640     &     377E-3, 447E-3, 511E-3, 592E-3, 657E-3,
66650     &     735E-3, 819E-3, 885E-3, 969E-3, 1039E-3,
66660     &    1103E-3, 1184E-3, 1249E-3, 1327E-3, 1411E-3, 40*0./
66680      DATA DMEJIT/60*0./
66700      DATA ELIJIT/
66710     & 0E-3, 31E-3, 53.8E-3, 65E-3, 96E-3,
66720     &    118.8E-3, 143E-3, 174E-3, 196.8E-3, 227E-3,
66730     &     258E-3, 280.8E-3, 293E-3, 324E-3, 346.8E-3,
66740     &     377E-3, 408E-3, 430.8E-3, 447E-3, 478E-3,
66750     &     500.8E-3, 511E-3, 542E-3, 564.8E-3, 592E-3,
66760     &     623E-3, 645.8E-3, 657E-3, 688E-3, 710.8E-3,
66770     &     735E-3, 766E-3, 788.8E-3, 819E-3, 850E-3,
66780     &     872.8E-3, 885E-3, 916E-3, 938.8E-3, 969E-3,
66790     &     1000E-3, 1022.8E-3, 1039E-3, 1070E-3, 1092.8E-3,
66800     &     1103E-3, 1134E-3, 1156.8E-3, 1188E-3, 1215E-3,
66810     &    1237.8E-3, 1249E-3, 1280E-3, 1302.8E-3, 1327E-3,
66820     &     1358E-3, 1380.8E-3,  340./
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      DATA EL2JIT/
     & 0E-3, 20.8E-3, 53.8E-3, 65E-3, 85.8E-3,
     &      118.8E-3, 143E-3, 163.8E-3, 196.8E-3,227E-3,
     &      247.8E-3, 280.8E-3, 293E-3, 313.8E-3, 346.8E-3,
     &      377E-3, 397.8E-3, 430.8E-3, 447E-3, 467.8E-3,
     &      500.8E-3, 511E-3, 531.8E-3, 564.8E-3, 592E-3,
     &      612.8E-3, 645.8E-3, 657E-3, 677.8E-3, 710.8E-3,
     &     735E-3, 755.8E-3, 788.8E-3, 819E-3, 839.8E-3,
     &      872.8E-3, 885E-3, 905.8E-3, 938.8E-3, 969E-3,
     &      989.8E-3, 1022.8E-3, 1039E-3, 1059.8E-3, 1092.8E-3,
     &      1103E-3, 1123.8E-3, 1156.8E-3, 1184E-3, 1204.8E-3,  10*0./
      DATA IPOINT/52*1/
      DATA ANGHI/62.,0.,32.66,16./
      DATA ANGLO/-62.,0.,0.,-2./
      DATA TIMPRT/.FALSE./
      DATA CNTPRT/.TRUE./
      DATA PRNTR/13/
      DATA IFCORR/.TRUE./
      DATA THROW/1E-5, 1E-2, 3E-2/
      DATA AZOUT/3./
      DATA ELOUT/3./
      DATA DELAY/5E-6/
      DATA E1AZLO/-0.803/
      DATA E1AZHI/0.803/
      DATA E1ELHI/0.349/
      DATA E2AZLO/-0.524/
      DATA E2AZHI/0.524/
      DATA E2ELHI/0.175/
      DATA AZWID/1.047/
      DATA AZHI/0.349/
      DATA ACBMAZ/1E5/
      DATA ACTTAZ/0./
      DATA ACBMEL/1E5/
      DATA ACTTEL/0./
      DATA ERO/(15.,0.)/
      DATA NFZ/2.8/
      DATA SH20/0.06562/
      DATA NA,NB/25,11/
      DATA NR/  1/
      DATA NT/  1/
      DATA SURFS/
     &   56.00,    7.00,    0.90,   77.00,    7.90,    9.00,   79.00,   34.00,    3.40,
     &   67.00,   78.00,   99.00,   67.00,   99.00,    0.60,   45.00,    4.50,   77.00,
     &162*0./
      DATA ERS/    7.00,   89.00,    0.  ,    0.  ,    0.  ,
     &    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
     &    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
     &    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,/
      DATA SH2S/   88.00,    8.90,    0.  ,    0.  ,    0.  ,
     &    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
     &    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
     &    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,/
      DATA NRSPEC/0/
      DATA NTSPEC/0/
      DATA ISPGRD/1/
      DATA SH2G/   56.00/
      DATA ERG/   78.00/
      DATA NBLD/  1/
     &    7.00,   89.00,    9.90,   89.00,
      DATA HB/ 34.00,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  /
      DATA HBOT/   78.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  /
      DATA SH2B/    9.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  /
      DATA BIGSIB/ 23.00,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  /
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68657     DATA DICSTR/ 23.00,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  /
68658     DATA TILT/ 90.00,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  /
68659     DATA GRNBBD/   12.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  /
68881     DATA NAC/  1/
68881     DATA AC/
68882    %    0.12,    0.50,   56.00,   67.00,
68883    %36*0./
68891     DATA NACTYP/    0.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  /
68892     DATA ALT/   78.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  /
68893     DATA GRNDAC/  99.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  /
69170     DATA SIGHAZ,SIGHDM,SIGHE1,SIGHE2/4*.5/
69180     DATA SIGLAZ,SIGLDM,SIGLE1,SIGLE2/4*1.0/
69302     DATA HUMPF/    0.  ,    0.  ,    0.  /
69303     DATA HUMP/    0.  ,    0.  ,    0.  /
69304     DATA HUMPB/    0.  ,    0.  ,    0.  /
69481     DATA NSHAC/  1/
69482     DATA SHPOS1/
69483    %   78.00,   89.00,   99.00,
69484    %27*0./
69510     DATA SHPOS2/
69511    %   78.00,   99.00,   67.00,
69512    %27*0./
69521     DATA SHACTP/   45.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  /
69522     DATA SHVEL/   78.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  /
69523     DATA SHANG/   89.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  /
69651     DATA NSHBLD/  1/
69652     DATA HBS/   45.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  /
69653     DATA HBT/   89.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  /
69654     DATA SHBLD/
69655    %   89.00,   78.00,   99.00,   56.00,
69656    %36*0./
69871     DATA RUNLEN/   78.00/
69872     DATA RUNWID/   78.00/
69873     DATA DRATE/9.80/
69874     DATA NWAYPT/  1/
69900     DATA XPOS/
69901    %   45.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
69902    %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
69903    %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
69904    %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,/
69905     DATA YPOS/
69906    %   67.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
69907    %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
69908    %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
69909    %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,/
69910     DATA ZPOS/
69911    %   99.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
69912    %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
69913    %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
69914    %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,/
69915     DATA VEL/
69916    %   67.90,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
69917    %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
69918    %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
69919    %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,/
69920     DATA DINC/
69921    %   89.70,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
69922    %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
69923    %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
69924    %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,/
69980     DATA ZCHI/   67.80/
70020     DATA HCHI/   77.90,   89.00,   13.30/
70030     END
```