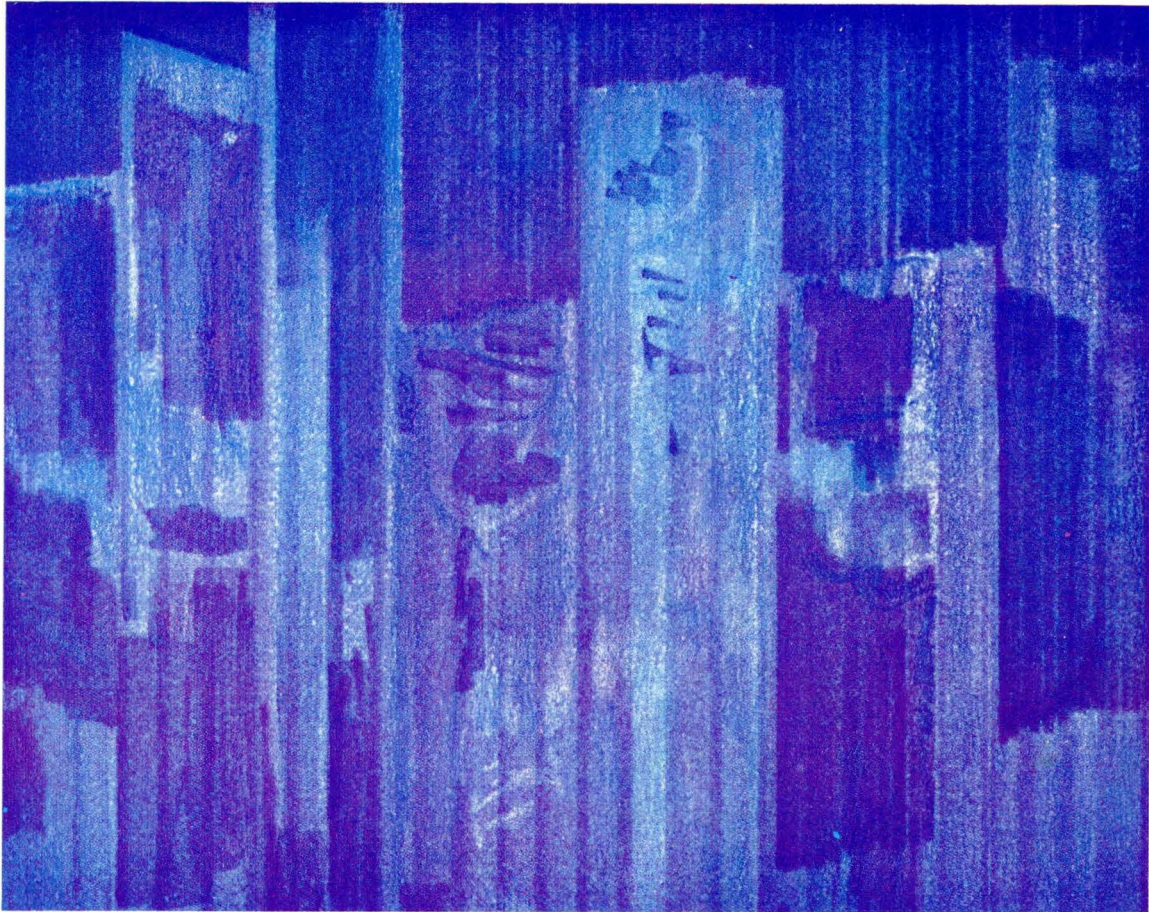
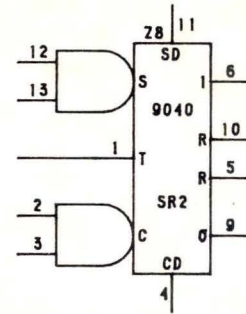


CALCOMP

APPLICATIONS
SOFTWARE



A.S.A.P.

AUTOMATED SYMBOLIC
ARTWORK PROGRAM

VOLUME II
SECTIONS 10 - 13

**A.S.A.P.
AUTOMATIC SYMBOLIC ARTWORK
PROGRAM**

VOLUME II

CALCOMP APPLICATIONS SOFTWARE

July, 1974

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NOTE

The A.S.A.P. manual is in two volumes. Volume I contains Sections 1 through 9. Volume II contains Sections 10 through 13.

ILLUSTRATIONS

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Section 10 SAMPLES

REQUIRED PROCEDURES FOR DIGITIZING

I. DIGITIZING A NEW DRAWING

- A. Initialize digitizer and associated hardware.
- B. Position menu area on digitizer table, making sure bottom edge of menu is parallel to the X-axis of the digitizer.
- C. Position drawing or sketch on digitizer table. (need not be accurately aligned)
- D. Origin digitizer.
- E. Digitize lower left-hand corner of menu area.
- F. Digitize START DRAWING.
- G. Digitize drawing name.
- H. Digitize user remarks. (optional)
- I. Digitize drawing size specifications. (optional)
- J. Digitize lower left-corner of drawing.
- K. Digitize lower right-corner of drawing.
- L. Digitize upper-right corner of drawing.
- M. Create drawing on digitizer, using various A.S.A.P. features.
- N. Digitize END DRAWING.

II. EDITING AN OLD DRAWING ON THE DIGITIZER

- A. Initialize digitizer and associated hardware.
- B. Position menu area on digitizer table making sure bottom edge of menu is parallel to the X-axis of the digitizer.
- C. Position plot or original drawing on digitizer table. (need not be accurately aligned)
- D. Origin digitizer.
- E. Digitize lower left-hand corner of menu area.

- F. Digitize EDIT DRAWING.
- G. Digitize drawing name.
- H. Digitize user remarks. (optional)
- I. Digitize drawing size specifications. (optional)
- J. Reditize lower left-hand corner of drawing.
- K. Reditize lower right-hand corner of drawing.
- L. Reditize upper right-hand corner of drawing.
- M. Digitize windows. (optional)
- N. Make modifications to drawing on digitizer using various A.S.A.P. features.
- O. Digitize END DRAWING.

SAMPLE 1

Sample 1 shows the following:

- The use of digitizer deck correction cards.
- Macro creation and subsequent placements on a drawing with variable annotation.
- The use of continuity connections and their replacements with line segments.
- Expanding macros within a drawing.
- The automatic numbering option.

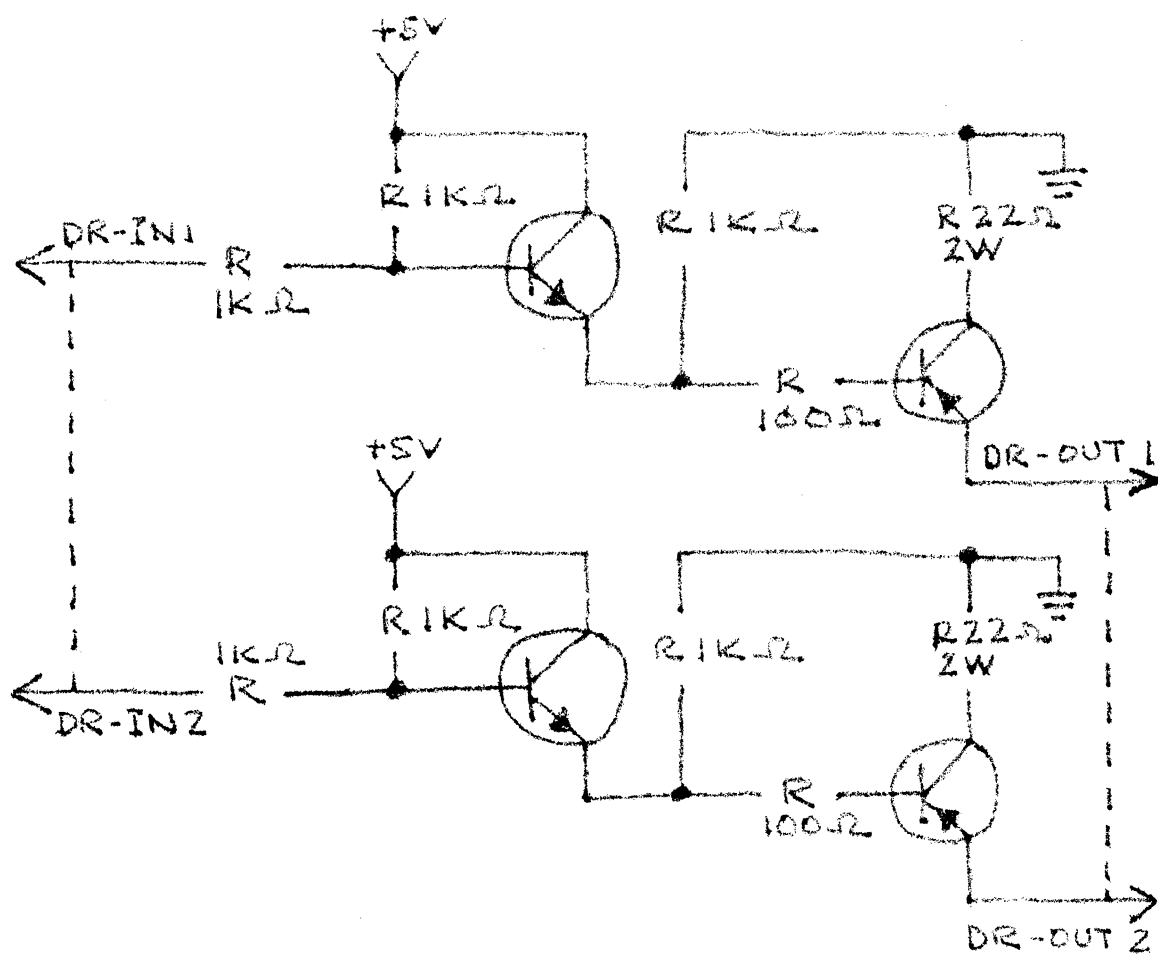


Figure 10-1. Sample 1, Rough Sketch

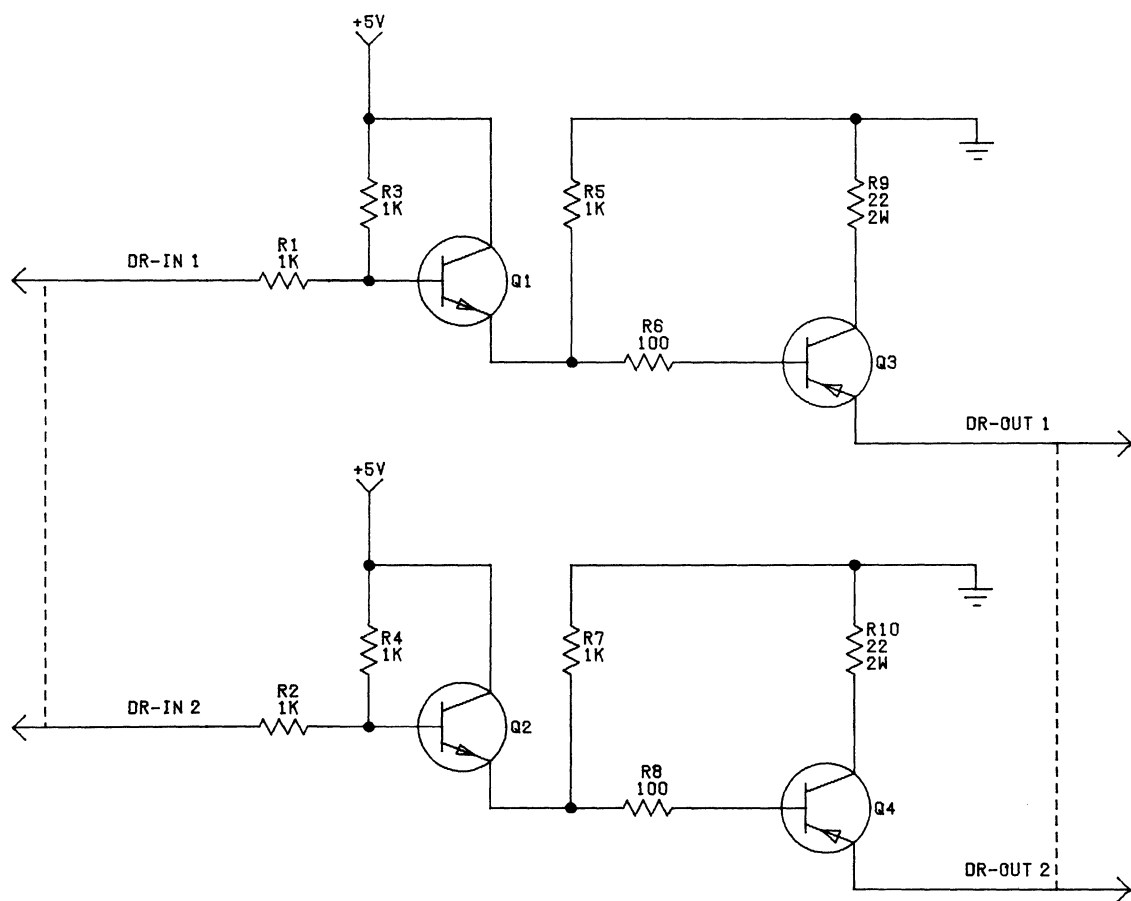


Figure 10-2. Sample 1, Finished Plot

\$ASAP CARD INPUT AS -- \$ASAP,DCC\$

LISTING OF DIGITIZER CARDS CORRECTION DECK

120 ERASE	0.0	0.0
130 ERASE	0.0	0.0
140 ERASE	0.0	0.0
165 Y-MIRROR	0.0	0.0
800 X-MIRROR	0.0	0.0
890 X-MIRROR	0.0	0.0
1000 ERASE	0.0	0.0
1010 ERASE	0.0	0.0

Figure 10-3. Sample 1, Output Listing (page 1 of 13)

```

10      START DRAWING
20      E
30      E
40      -
50      39.0620      3.1060 WORK AREA
60      49.5900      3.0880 WORK AREA
70      49.6180      11.3600 WORK AREA

|EE      -1
*RMK EE      ,X=10.5280,Y=8.2720,*
X=0.0000,Y=0.0000,
/TARGET/,*
X=10.5280,Y=0.0000,
/TARGET/,*
X=10.5280,Y=8.2720,
/TARGET/,*
XU=0.,YU=0.*

80      START MACRO
90      E
100     E
110     M
120     E ERASE
130     E ERASE
140     E ERASE
150     40.3200      7.8630 WORK AREA

|EEM ~ -3
*RMK EEM *
160     1.4810      6.2870 SYMBOL MENU
165     E Y-MIRROR
170     WEST
180     40.8150      7.8700 WORK AREA
X=0.5060,Y=0.0000,YM ,w ,
/PM /,*

190     ANNOTATION
200     D
210     R
220     -
230     I
240     N
250     -
260     LABEL LEFT
270     41.4400      8.0040 WORK AREA
X=1.1250,Y=0.1250,LL ,
"DR-IN"*

280     ANNOTATION
290     LABEL RIGHT
300     @
310     41.4480      8.0000 WORK AREA
X=1.1250,Y=0.1250,LR ,
"@"*

320     5.5520      5.3760 SYMBOL MENU
330     LABEL TOP
***** ERASE ACCESSED
360     I
370     K
380     41.5780      7.8630 WORK AREA
X=1.2500,Y=0.0000,LT ,E ,
/R /,*
"#<1K"*

390     LABEL RIGHT
400     I

```

```

EE
EE
EE
EE
EE
EE
EE
EE

```

```

EEM
EEM

```

```

EEM
EEM

```

```

EEM
EEM

```

```

EEM
EEM

```

```

EEM
EEM
EEM

```

Figure 10-3. Sample 1, Output Listing (page 2 of 13)

```

      410      K
      420      -
      430      NORTH
      440      42.5770
X=2.2500,Y=0.0000,LR ,N ,      7.8620 WORK AREA
/R /,
"#<1K"*
      450      43.8170      7.8620 WORK AREA
X=3.5000,Y=0.0000,LR ,N ,
/R /,
"#<1K"*
      460      EAST
      470      LABEL TOP
      480      1
      490      0
      500      0
      510      -
      520      43.8170      7.3590 WORK AREA
X=3.5000,Y=-0.5000,LT ,E ,
/R /,
"#<100"*
      530      NORTH
      540      LABEL RIGHT
      550      2
      560      2
      570      <
      580      2
      590      W
      600      45.6090      7.8590 WORK AREA
X=5.2500,Y=0.0000,LR ,N ,
/R /,
"#<22<2W"*
      610      4.4770      8.3720 SYMBOL MENU
      620      46.3610      8.8600 WORK AREA
X=6.0000,Y=1.0000,E ,
/GE /,*
      630      1.4430      6.4120 SYMBOL MENU
      640      46.8520      6.8580 WORK AREA
X=6.5000,Y=-1.0000,E ,
/PM /,*
      650      ANNOTATION
      660      LABEL LEFT
      670      D
      680      R
      690      -
      700      D
      710      U
      720      T
      730      -
      740      46.7100      6.9750 WORK AREA
X=6.3750,Y=-0.8750,LL ,
"DR-OUT"*
      750      ANNOTATION
      760      @
      770      LABEL RIGHT
      780      46.7000      6.9850 WORK AREA
X=6.3750,Y=-0.8750,LR ,
"@"*
      790      2.6300      5.4240 SYMBOL MENU
      800      E X-MIRROR
      810      NORTH
      820      45.5960      6.8490 WORK AREA
X=5.2500,Y=-1.0000,XM ,N ,
/QPNP /,
"#"*

```

EEM
EEM
EEM

EEM
EEM
EEM

EEM
EEM
EEM

EEM
EEM

EEM
EEM

EEM
EEM

EEM
EEM

EEM
EEM
EEM

Figure 10-3. Sample 1, Output Listing (page 3 of 13)

```

      830      6.5290      2.4820 SYMBOL MENU
      840      45.6050      8.8610 WORK AREA
X=5.2500,Y=1.0000,E ,
/SD /,*
      850      43.8180      7.3710 WORK AREA
X=3.5000,Y=-0.5000,E ,
/SD /,*
      860      42.5860      7.8610 WORK AREA
X=2.2500,Y=0.0000,E ,
/SD /,*
      870      42.5900      8.8840 WORK AREA
X=2.2500,Y=1.0000,E ,
/SD /,*
      880      1.6570      5.4080 SYMBOL MENU
      890 E X-MIRROR
      900 NORTH
      910      43.3290      7.3720 WORK AREA
X=3.0000,Y=-0.5000,XM ,N ,
/QNPN /,
"$$$
      920      0.6290      6.4140 SYMBOL MENU
      930 NORTH
      940 LABEL TOP
      950 +
      960 5
      970 V
      980 -
      990      42.5780      8.8730 WORK AREA
X=2.2500,Y=1.0000,LT ,N ,
/PF /,
"5Y**
      1000 E ERASE
      1010 E ERASE
***** ERASE ACCESSED
      1090 JOIN
      1100      40.8120      7.8610 WORK AREA
      1110      41.5810      7.8470 WORK AREA
CJ, X=0.4920,Y=-0.0012,X=1.2610,Y=-0.0138,*
      1120      43.3490      8.3390 WORK AREA
      1130      42.5830      8.8880 WORK AREA
CJ, X=3.0282,Y=0.4812,X=2.2612,Y=1.0289,*
      1140      43.3470      7.3650 WORK AREA
      1150      43.8120      7.8600 WORK AREA
CJ, X=3.0278,Y=-0.4928,X=3.4920,Y=0.0030,*
      1160      43.8250      8.8750 WORK AREA
      1170      46.4280      8.8350 WORK AREA
CJ, X=3.5033,Y=1.0180,X=6.1063,Y=0.9824,*
      1180      46.8540      6.8590 WORK AREA
      1190      45.5900      6.8310 WORK AREA
CJ, X=6.5357,Y=-0.9928,X=5.2718,Y=-1.0230,*
      1200 END MACRO
T*
-
      1210 SYMBOL OR MACRO
      1220 E
      1230 E
      1240 M
      1250 -
***** ERASE ACCESSED
      1300 1
      1310 -
      1320 1
      1330 -
      1340      40.3130      7.8490 WORK AREA

```

SYMBOL /EEM / NOT FOUND ON SYMBOL FILE

Figure 10-3. Sample 1, Output Listing (page 4 of 13)

```

X=1.2500,Y=4.7500,E ,
/EEM /,
"1","1"*
      1350 2
      1360 -
      1370 2
      1380 -
      1390 40.3230 5.1120 WORK AREA

X=1.2500,Y=2.0000,E ,
/EEM /,
"2","2"*
      1400 LINE
      1410 SPECIAL
      1420 LINE TYPE
      1430 6
      1440 46.8470 4.0960 WORK AREA
LTP-6*
      1450 46.8430 6.8510 WORK AREA
X=7.7500,Y=1.0000,*
D,X=7.7500,Y=3.7500,*
      1460 40.5710 7.8650 WORK AREA
      1470 40.5650 5.1350 WORK AREA
X=1.5000,Y=4.7500,*
D,X=1.5000,Y=2.0000,*
      1480 END DRAWING

```

EE
EE
EE

EE
EE
EE

SYMBOL /EEM / NOT FOUND ON SYMBOL FILE

EE
EE
EE

EE
EE
EE

EE
EE
EE

Figure 10-3. Sample 1, Output Listing (page 5 of 13)

```

MACRO EEM      INITIAL EDIT AS FOLLOWS --
      *RMK EEM      *
      X=0.5000,Y=0.0000,YM ,W ,
      /PM /,*
      X=1.1250,Y=0.1250,LL ,
      "DR-IN"*
      X=1.1250,Y=0.1250,LR ,
      "J"*
      X=1.2500,Y=0.0000,LT ,E ,
      /R /,
      "K<1K"*
      X=2.2500,Y=0.0000,LR ,N ,
      /R /,
      "K<1K"*
      X=3.5000,Y=0.0000,LR ,N ,
      /R /,
      "K<1K"*
      X=3.5000,Y=-0.5000,LT ,E ,
      /R /,
      "K<10J"*
      X=5.2500,Y=0.0000,LR ,N ,
      /R /,
      "K<22<2W"*
      X=5.0000,Y=1.0000,E ,
      /GE /,*
      X=6.5000,Y=-1.0000,E ,
      /PM /,*
      X=6.3750,Y=-0.8750,LL ,
      "DR-OUT"*
      X=6.3750,Y=-0.8750,LR ,
      "J"*
      X=5.2500,Y=-1.0000,XM ,N ,
      /QPNP /,
      "K"*
      X=5.2500,Y=1.0000,E ,
      /SD /,*
      X=3.5000,Y=-0.5000,E ,
      /SD /,*
      X=2.2500,Y=0.0000,E ,
      /SD /,*
      X=2.2500,Y=1.0000,E ,
      /SD /,*
      X=3.0000,Y=-0.5000,XM ,N ,
      /QNPN /,
      "K"*
      X=2.2500,Y=1.0000,LT ,N ,
      /PF /,
      "+5V"*
      CJ, X=0.4920,Y=-0.0012,X=1.2610,Y=-0.0138,*
      CJ, X=3.0282,Y=0.4812,X=2.2612,Y=1.0289,*
      CJ, X=3.0278,Y=-0.4928,X=3.4920,Y=0.0030,*
      CJ, X=3.5033,Y=1.0180,X=6.1063,Y=0.9824,*
      CJ, X=6.5357,Y=-0.9928,X=5.2718,Y=-1.0230,*
      T*
      00000100      0
      00000200      0
      00000300      0
      00000400      0
      00000500      0
      00000600      0
      00000700      0
      00000800      0
      00000900      0
      00001000      0
      00001100      0
      00001200      0
      00001300      0
      00001400      0
      00001500      0
      00001600      0
      00001700      0
      00001800      0
      00001900      0
      00002000      0
      00002100      0
      00002200      0
      00002300      0
      00002400      0
      00002500      0
      00002600      0
      00002700      0
      00002800      0
      00002900      0
      00003000      0
      00003100      0
      00003200      0
      00003300      0
      00003400      0
      00003500      0
      00003600      0
      00003700      0
      00003800      0
      00003900      0
      00004000      0
      00004100      0
      00004200      0
      00004300      0
      00004400      0
      00004500      0
      00004600      0
      00004700      0
      00004800      0
      00004900      0
      00005000      0
      00005100      0
      00005200      0
      00005300      0

. . . END EDIT FOR EEM

```

Figure 10-3. Sample 1, Output Listing (page 6 of 13)

```

MACRO EEM          FINAL EDIT AS FOLLOWS --
*RMK EEM          *
X=0.5000,Y=0.0000,YM ,W ,
/PM /,*
X=1.1250,Y=0.1250,LL ,
"DR-IN"*
X=1.1250,Y=0.1250,LR ,
"@"**
X=1.2500,Y=0.0000,LT ,E ,
/R /,
"#{<1K"*
X=2.2500,Y=0.0000,LR ,N ,
/R /,
"#{<1K"*
X=3.5000,Y=0.0000,LR ,N ,
/R /,
"#{<1K"*
X=3.5000,Y=-0.5000,LT ,E ,
/R /,
"#{<100"*
X=5.2500,Y=0.0000,LR ,N ,
/R /,
"#{<22<2W"*
X=6.0000,Y=1.0000,E ,
/GE /,*
X=6.5000,Y=-1.0000,E ,
/PM /,*
X=6.3750,Y=-0.8750,LL ,
"DR-OUT"*
X=6.3750,Y=-0.8750,LR ,
"@"**
X=5.2500,Y=-1.0000,XM ,N ,
/QPNP /,
"#"**
X=5.2500,Y=1.0000,E ,
/SD /,*
X=3.5000,Y=-0.5000,E ,
/SD /,*
X=2.2500,Y=0.0000,E ,
/SD /,*
X=2.2500,Y=1.0000,E ,
/SD /,*
X=3.0000,Y=-0.5000,XM ,N ,
/QNPN /,
"#"**
X=2.2500,Y=1.0000,LT ,N ,
/PF /,
"+5V"*
X=0.5000,Y=0.0000,*
D,X=1.2500,Y=0.0000,*
X=3.0000,Y=0.5000,*
D,X=3.0000,Y=1.0000,*
X=3.0000,Y=1.0000,*
D,X=2.2500,Y=1.0000,*
X=3.0000,Y=-0.5000,*
D,X=3.5000,Y=-0.5000,*
X=3.5000,Y=-0.5000,*
D,X=3.5000,Y=0.0000,*
X=3.5000,Y=1.0000,*
D,X=6.0000,Y=1.0000,*
X=6.5000,Y=-1.0000,*
D,X=5.2500,Y=-1.0000,*
T*
00000100      100
00000200      200
00000300      300
00000400      400
00000500      500
00000600      600
00000700      700
00000800      800
00000900      900
00001000     1000
00001100     1100
00001200     1200
00001300     1300
00001400     1400
00001500     1500
00001600     1600
00001700     1700
00001800     1800
00001900     1900
00002000     2000
00002100     2100
00002200     2200
00002300     2300
00002400     2400
00002500     2500
00002600     2600
00002700     2700
00002800     2800
00002900     2900
00003000     3000
00003100     3100
00003200     3200
00003300     3300
00003400     3400
00003500     3500
00003600     3600
00003700     3700
00003800     3800
00003900     3900
00004000     4000
00004100     4100
00004200     4200
00004300     4300
00004400     4400
00004500     4500
00004600     4600
00004700     4700
00004800     4800
00004900     4900
00005000     4900
00005100     4900
00005200     4900
00005300     4900
00005400     5000
00005500     5000
00005600     5000
00005700     5000
00005800     5100
00005900     5100
00006000     5200
00006100     5200
99999999     5300

```

Figure 10-3. Sample 1, Output Listing (page 7 of 13)

```
. . . END EDIT FOR EEM  
****DRAWING EE      STARTS AT SEARCH ADDRESS  1 AND ENDS AT SEARCH ADDRESS  3 ****
```

```

DRAWING EE      FINAL EDIT AS FOLLOWS --
  *RMK EE      ,X=10.5280,Y=8.2720,*
  X=0.0000,Y=0.0000,
  /TARGET/,*
  X=10.5280,Y=0.0000,
  /TARGET/,*
  X=10.5280,Y=8.2720,
  /TARGET/,*
  XO=0.,YO=0.*
  X=1.2500,Y=4.7500,E  ,
  /EEM  /,
  "1","1"*
  X=1.2500,Y=2.0000,E  ,
  /EEM  /,
  "2","2"*
  LTYP-6*
  X=7.7500,Y=1.0000,*
  D,X=7.7500,Y=3.7500,*
  X=1.5000,Y=4.7500,*
  D,X=1.5000,Y=2.0000,*

. . . END EDIT FOR EE

```

00000100	100
00000200	200
00000300	300
00000400	400
00000500	500
00000600	600
00000700	700
00000800	800
00000900	900
00001000	1000
00001100	1100
00001200	1200
00001300	1300
00001400	1400
00001500	1500
00001600	1600
00001700	1700
00001800	1800
00001900	1900

Figure 10-3. Sample 1, Output Listing (page 9 of 13)

\$ASAP CARD INPUT AS -- \$ASAP,ALC,EXP,N,ANBR\$

DRAWING EE INITIAL EDIT AS FOLLOWS --

```
*RMK EE      ,X=10.5280,Y=8.2720,*
X=0.0000,Y=0.0000,
/TARGET/,*
X=10.5280,Y=0.0000,
/TARGET/,*
X=10.5280,Y=8.2720,
/TARGET/,*
X0=0.,Y0=0.*
X=1.2500,Y=4.7500,E  ,
/EEM  /,
"1","1"*
X=1.2500,Y=2.0000,E  ,
/EEM  /,
"2","2"*
LTYP-6*
X=7.7500,Y=1.0000,*
D,X=7.7500,Y=3.7500,*
X=1.5000,Y=4.7500,*
D,X=1.5000,Y=2.0000,*
```

```
00000100      100
00000200      200
00000300      300
00000400      400
00000500      500
00000600      600
00000700      700
00000800      800
00000900      900
00001000     1000
00001100     1100
00001200     1200
00001300     1300
00001400     1400
00001500     1500
00001600     1600
00001700     1700
00001800     1800
00001900     1900
```

. . . END EDIT FOR EE

Figure 10-3. Sample 1, Output Listing (page 10 of 13)

```

DRAWING EE      FINAL EDIT AS FOLLOWS --
*RMK EE      ,X=10.5280,Y=8.2720,*
X=0.0000,Y=0.0000,
/TARGET/,*
X=10.5280,Y=0.0000,
/TARGET/,*
X=10.5280,Y=8.2720,
/TARGET/,*
X0=0.,Y0=0.*
X=1.2500,Y=4.7500,E,
/EEM*
*RMK EEM      *
X=0.5000,Y=0.0000,YM,W,
/PM/,*
X=1.1250,Y=0.1250,LL,
"DR-IN"*
X=1.1250,Y=0.1250,LR,
"1"*
X=1.2500,Y=0.0000,LT,E,
/R/,
"R1<1K"*
X=2.2500,Y=0.0000,LR,N,
/R/,
"R3<1K"*
X=3.5000,Y=0.0000,LR,N,
/R/,
"K5<1K"*
X=3.5000,Y=-0.5000,LT,E,
/R/,
"R6<100"*
X=5.2500,Y=0.0000,LR,N,
/R/,
"R9<22<2W"*
X=6.0000,Y=1.0000,E,
/GE/,*
X=6.5000,Y=-1.0000,E,
/PM/,*
X=6.3750,Y=-0.8750,LL,
"DR-OUT"*
X=6.3750,Y=-0.8750,LR,
"1"*
X=5.2500,Y=-1.0000,XM,N,
/QPNP/,
"Q3"*
X=5.2500,Y=1.0000,E,
/SD/,*
X=3.5000,Y=-0.5000,E,
/SD/,*
X=2.2500,Y=0.0000,E,
/SD/,*
X=2.2500,Y=1.0000,E,
/SD/,*
X=3.0000,Y=-0.5000,XM,N,
/QPNP/,
"Q1"*
X=2.2500,Y=1.0000,LT,N,
/PF/,
"+5V"*
X=0.5000,Y=0.0000,*
U,X=1.2500,Y=0.0000,*
X=3.0000,Y=0.5000,*
00000100      100
00000200      200
00000300      300
00000400      400
00000500      500
00000600      600
00000700      700
00000800      800
00000900      900
00001000     1000
00001100     1100
00001200     1200
00001300     1300
00001400     1400
00001500     1500
00001600     1600
00001700     1700
00001800     1800
00001900     1900
00002000     2000
00002100     2100
00002200     2200
00002300     2300
00002400     2400
00002500     2500
00002600     2600
00002700     2700
00002800     2800
00002900     2900
00003000     3000
00003100     3100
00003200     3200
00003300     3300
00003400     3400
00003500     3500
00003600     3600
00003700     3700
00003800     3800
00003900     3900
00004000     4000
00004100     4100
00004200     4200
00004300     4300
00004400     4400
00004500     4500
00004600     4600
00004700     4700
00004800     4800
00004900     4900
00005000     5000
00005100     5100
00005200     5200
00005300     5300
00005400     5400
00005500     5500
00005600     5600
00005700     5700
00005800     5800
00005900     5900
00006000     6000

```

Figure 10-3. Sample 1, Output Listing (page 11 of 13)

D,X=3.0000,Y=1.0000,*	00006100	6100
X=3.0000,Y=1.0000,*	00006200	6200
D,X=2.2500,Y=1.0000,*	00006300	6300
X=3.0000,Y=-0.5000,*	00006400	6400
D,X=3.5000,Y=-0.5000,*	00006500	6500
X=3.5000,Y=-0.5000,*	00006600	6600
D,X=3.5000,Y=0.0000,*	00006700	6700
X=3.5000,Y=1.0000,*	00006800	6800
D,X=6.0000,Y=1.0000,*	00006900	6900
X=6.5000,Y=-1.0000,*	00007000	7000
D,X=5.2500,Y=-1.0000,*	00007100	7100
T*	00007200	7200
X=1.2500,Y=2.0000,E,	00007300	7300
/EEM*	00007400	7400
*RMK EEM *	00007500	7500
X=0.5000,Y=0.0000,YM,W,	00007600	7600
/PM/,*	00007700	7700
X=1.1250,Y=0.1250,LL,	00007800	7800
"DR-IN"*	00007900	7900
X=1.1250,Y=0.1250,LR,	00008000	8000
"2"*	00008100	8100
X=1.2500,Y=0.0000,LT,E,	00008200	8200
/R/,	00008300	8300
"R2<1K"*	00008400	8400
X=2.2500,Y=0.0000,LR,N,	00008500	8500
/R/,	00008600	8600
"R4<1K"*	00008700	8700
X=3.5000,Y=0.0000,LR,N,	00008800	8800
/R/,	00008900	8900
"R7<1K"*	00009000	9000
X=3.5000,Y=-0.5000,LT,E,	00009100	9100
/R/,	00009200	9200
"R8<100"*	00009300	9300
X=5.2500,Y=0.0000,LR,N,	00009400	9400
/R/,	00009500	9500
"R10<22<2W"*	00009600	9600
X=6.0000,Y=1.0000,E,	00009700	9700
/GE/,*	00009800	9800
X=6.5000,Y=-1.0000,E,	00009900	9900
/PM/,*	00010000	10000
X=6.3750,Y=-0.8750,LL,	00010100	10100
"DR-OUT"*	00010200	10200
X=6.3750,Y=-0.8750,LR,	00010300	10300
"2"*	00010400	10400
X=5.2500,Y=-1.0000,XM,N,	00010500	10500
/QPNP/,	00010600	10600
"Q4"*	00010700	10700
X=5.2500,Y=1.0000,E,	00010800	10800
/SD/,*	00010900	10900
X=3.5000,Y=-0.5000,E,	00011000	11000
/SD/,*	00011100	11100
X=2.2500,Y=0.0000,E,	00011200	11200
/SD/,*	00011300	11300
X=2.2500,Y=1.0000,E,	00011400	11400
/SD/,*	00011500	11500
X=3.0000,Y=-0.5000,XM,N,	00011600	11600
/QPNP/,	00011700	11700
"Q2"*	00011800	11800
X=2.2500,Y=1.0000,LT,N,	00011900	11900
/PF/,	00012000	12000
"+5V"*	00012100	12100
X=0.5000,Y=0.0000,*	00012200	12200
D,X=1.2500,Y=0.0000,*	00012300	12300
X=3.0000,Y=0.5000,*	00012400	12400

Figure 10-3. Sample 1, Output Listing (page 12 of 13)

```

D,X=3.0000,Y=1.0000,*
X=3.0000,Y=1.0000,*
D,X=2.2500,Y=1.0000,*
X=3.0000,Y=-0.5000,*
D,X=3.5000,Y=-0.5000,*
X=3.5000,Y=-0.5000,*
D,X=3.5000,Y=0.0000,*
X=3.5000,Y=1.0000,*
D,X=6.0000,Y=1.0000,*
X=6.5000,Y=-1.0000,*
D,X=5.2500,Y=-1.0000,*
T*
LTP-6*
X=7.7500,Y=1.0000,*
D,X=7.7500,Y=3.7500,*
X=1.5000,Y=4.7500,*
D,X=1.5000,Y=2.0000,*
T*
. . . END EDIT FOR EE

```

```

00012500      12500
00012600      12600
00012700      12700
00012800      12800
00012900      12900
00013000      13000
00013100      13100
00013200      13200
00013300      13300
00013400      13400
00013500      13500
00013600      13600
00013700      13700
00013800      13800
00013900      13900
00014000      14000
00014100      99999999
99999999      99999999

```

Figure 10-3. Sample 1, Output Listing (page 13 of 13)

SAMPLE 2

Sample 2 shows the following:

- The use of digitizer deck correction cards.
- Placement of symbols with pin labels.
- An X-Y Report.
- A Component Report.
- An Interconnect Report.

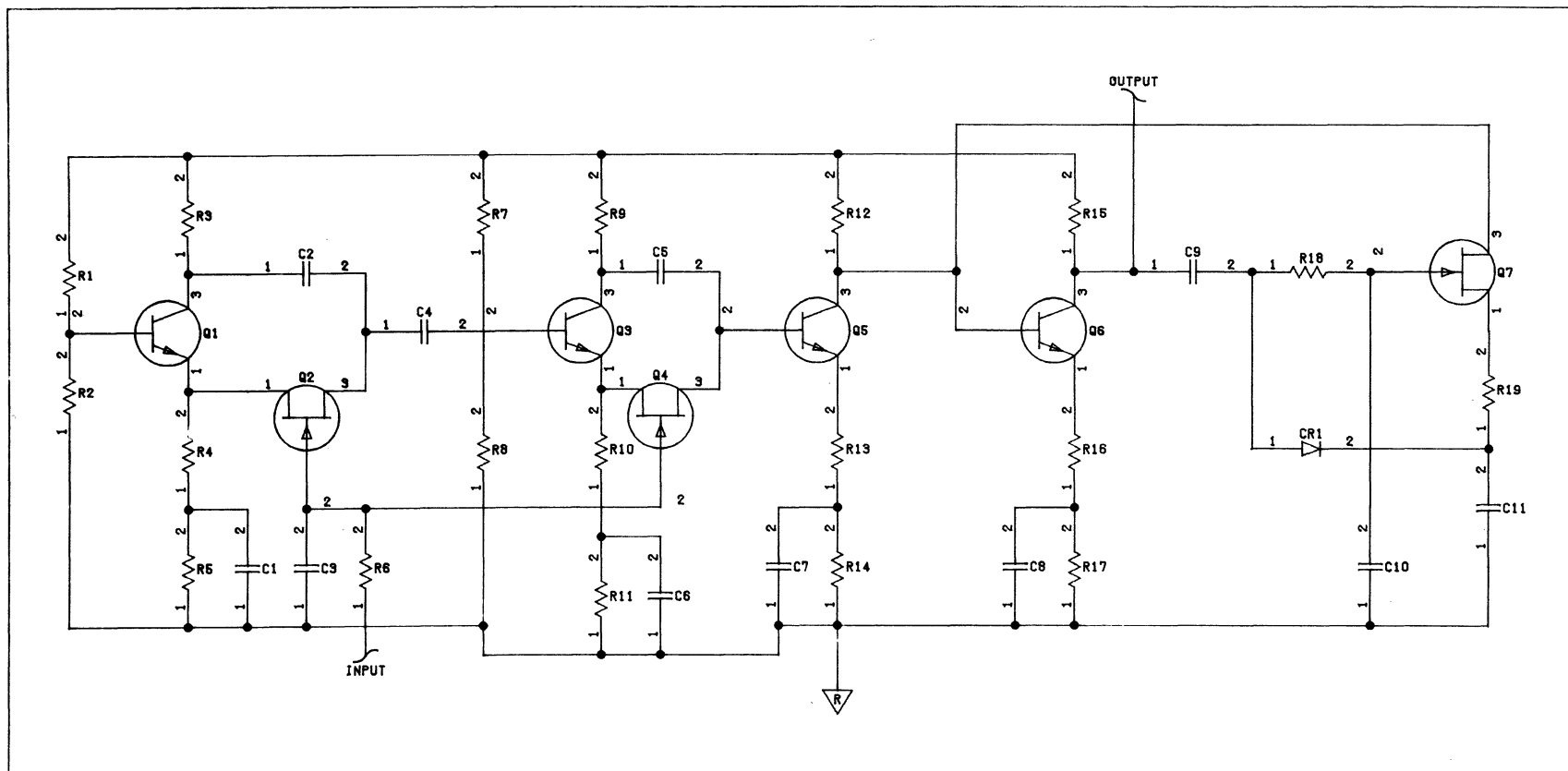


Figure 10-4. Sample 2, Finished Plot

\$ASAP CARD INPUT AS -- \$ASAP,DCC,ICRP,XYRP,CMRP\$

LISTING OF DIGITIZER CARDS CORRECTION DECK

105 OPTION RESET	0.0	0.0
106 NUMBERS	0.0	0.0
1500 X-MIRROR	0.0	0.0
1850 X-MIRROR	0.0	0.0
1980 ERASE	0.0	0.0
2501 LABEL CENTERED	0.0	0.0
2502 R	0.0	0.0
2650 ERASE	0.0	0.0
2660 ERASE	0.0	0.0
2670 ERASE	0.0	0.0
2680 ERASE	0.0	0.0
3451 WORK AREA	7.0000	9.2500
3452 WORK AREA	7.0000	10.2500
3453 WORK AREA	8.0000	8.0000
3454 WORK AREA	8.0000	8.2500
3455 WORK AREA	9.0000	9.2500
3456 WORK AREA	9.0000	9.7500
3457 WORK AREA	9.0000	9.7500
3458 WORK AREA	9.0000	10.2500

Figure 10-5. Sample 2, Output Listing (page 1 of 27)

	10	START DRAWING		
	20	G		
	30	H		
	40	I		
	50	L		
	60	L		
	70	-		
	80	19.5610	2.5560	WORK AREA
	90	37.5670	2.5540	WORK AREA
	100	37.6490	17.5560	WORK AREA
!GHILL	-1			GHILL
RMK GHILL		,X=18.0060,Y=15.0020,		GHILL
X=0.0000,Y=0.0000,/TARGET		/,*		GHILL
X=18.0060,Y=0.0000,/TARGET		/,*		GHILL
X=18.0060,Y=15.0020,/TARGET		/,*		GHILL
X0=0.,Y0=0.*				GHILL
	105	E	OPTION RESET	
	106	E	NUMBERS	
	110		GRID SIZE	
	120		.	
	130		2	
	140		5	
	150		-	
RMK GRID .25				GHILL
	160		SYMBOL OR MACRO	
	170		5.5690 5.4960 SYMBOL MENU	
	180		NORTH	
	190		R	
	200		1	
	210		PIN LABELS	
	220		1	
	230		-	
	240		2	
	250		-	
	260		23.1230 12.3130 WORK AREA	
X=3.5000,Y=9.7500,N		/R	/,"R1",P"1",P"2",*	GHILL
	270		R	
	280		2	
	290		23.1050 11.3130 WORK AREA	
X=3.5000,Y=8.7500,N		/R	/,"R2",P"1",P"2",*	GHILL
	300		R	
	310		3	
	320		24.1100 12.8230 WORK AREA	
X=4.5000,Y=10.2500,N		/R	/,"R3",P"1",P"2",*	GHILL
	330		R	
	340		4	
	350		24.1150 10.8100 WORK AREA	
X=4.5000,Y=8.2500,N		/R	/,"R4",P"1",P"2",*	GHILL
	360		R	
	370		5	
	380		24.1050 9.8370 WORK AREA	
X=4.5000,Y=7.2500,N		/R	/,"R5",P"1",P"2",*	GHILL
	390		R	
	400		6	
	410		25.5960 9.8100 WORK AREA	

Figure 10-5. Sample 2, Output Listing (page 2 of 27)

X=6.0000,Y=7.2500,N	,/R	/,"R6",P"1",P"2",*	GHILL
420	R		
430	7		
440		26.6160 12.8130 WORK AREA	
X=7.0000,Y=10.2500,N	,/R	/,"R7",P"1",P"2",*	GHILL
450	R		
460	8		
470		26.5710 10.8440 WORK AREA	
X=7.0000,Y=8.2500,N	,/R	/,"R8",P"1",P"2",*	GHILL
480	R		
490	9		
500		27.6170 12.8150 WORK AREA	
X=8.0000,Y=10.2500,N	,/R	/,"R9",P"1",P"2",*	GHILL
510	R		
520	1		
530	0		
540		27.5890 10.8420 WORK AREA	
X=8.0000,Y=8.2500,N	,/R	/,"R10",P"1",P"2",*	GHILL
550	R		
560	1		
570	1		
580		27.6000 9.5350 WORK AREA	
X=8.0000,Y=7.0000,N	,/R	/,"R11",P"1",P"2",*	GHILL
590	R		
600	1		
610	2		
620		29.6150 12.8180 WORK AREA	
X=10.0000,Y=10.2500,N	,/R	/,"R12",P"1",P"2",*	GHILL
630	R		
640	1		
650	3		
660		29.6110 10.8060 WORK AREA	
X=10.0000,Y=8.2500,N	,/R	/,"R13",P"1",P"2",*	GHILL
670	R		
680	1		
690	4		
700		29.6090 9.8070 WORK AREA	
X=10.0000,Y=7.2500,N	,/R	/,"R14",P"1",P"2",*	GHILL
710	R		
720	1		
730	5		
740		31.6160 12.8190 WORK AREA	
X=12.0000,Y=10.2500,N	,/R	/,"R15",P"1",P"2",*	GHILL
750	R		
760	1		
770	6		
780		31.6080 10.8120 WORK AREA	
X=12.0000,Y=8.2500,N	,/R	/,"R16",P"1",P"2",*	GHILL
790	R		
800	1		
810	7		
820		31.6070 9.8140 WORK AREA	

Figure 10-5. Sample 2, Output Listing (page 3 of 27)

X=12.0000,Y=7.2500,N	,/R	/,"R17",P"1",P"2",*	GHILL
830	R		
840	1		
850	9		
860	35.1040	11.2960 WORK AREA	
X=15.5000,Y=8.7500,N	,/R	/,"R19",P"1",P"2",*	GHILL
870	EAST		
880	R		
890	1		
900	8		
910	33.1260	12.8190 WORK AREA	
X=13.5000,Y=10.2500,E	,/R	/,"R18",P"1",P"2",*	GHILL
920	SYMBOL OR MACRO		
930	4.6330	11.6310 SYMBOL MENU	
940	NORTH		
950	C		
960	1		
970	PIN LABELS		
980	1		
990	-		
1000	2		
1010	-		
1020	24.5970	9.8260 WORK AREA	
X=5.0000,Y=7.2500,N	,/C	/,"C1",P"1",P"2",*	GHILL
1030	C		
1040	3		
1050	25.1120	9.8300 WORK AREA	
X=5.5000,Y=7.2500,N	,/C	/,"C3",P"1",P"2",*	GHILL
1060	C		
1070	6		
1080	28.1010	9.5570 WORK AREA	
X=8.5000,Y=7.0000,N	,/C	/,"C6",P"1",P"2",*	GHILL
1090	C		
1100	7		
1110	29.1010	9.8110 WORK AREA	
X=9.5000,Y=7.2500,N	,/C	/,"C7",P"1",P"2",*	GHILL
1120	C		
1130	8		
1140	31.0940	9.8410 WORK AREA	
X=11.5000,Y=7.2500,N	,/C	/,"C8",P"1",P"2",*	GHILL
1150	C		
1160	1		
1170	0		
1180	34.0960	9.8170 WORK AREA	
X=14.5000,Y=7.2500,N	,/C	/,"C10",P"1",P"2",*	GHILL
1190	C		
1200	1		
1210	1		
1220	35.1190	10.3020 WORK AREA	
X=15.5000,Y=7.7500,N	,/C	/,"C11",P"1",P"2",*	GHILL
1230	EAST		
1240	C		
1250	2		
1260	24.6290	12.8330 WORK AREA	

Figure 10-5. Sample 2, Output Listing (page 4 of 27)

```

X=5.0000,Y=10.2500,E ,/C /,"C2",P"1",P"2",* GHILL
1270 C
1280 4
1290 25.6120 12.3230 WORK AREA
X=6.0000,Y=9.7500,E ,/C /,"C4",P"1",P"2",* GHILL
1300 C
1310 5
1320 27.6310 12.8090 WORK AREA
X=8.0000,Y=10.2500,E ,/C /,"C5",P"1",P"2",* GHILL
1330 C
1340 9
1350 32.1210 12.3290 WORK AREA
X=12.5000,Y=10.2500,E ,/C /,"C9",P"1",P"2",* GHILL
1360 SYMBCL OR MACRO
1370 4.6720 10.6380 SYMBOL MENU
1380 C
1390 K
1400 1
1410 PIN LABELS
1420 1
1430 2
1440 2
1450 -
1460 33.1090 11.3190 WORK AREA
X=13.5000,Y=8.7500,E ,/CR /,"CR1",P"1",P"2",* GHILL
1470 SYMBCL OR MACRO
1480 1.5860 5.5320 SYMBOL MENU
1490 NORTH
1500 E X-MIRROR
1510 Q
1520 1
1530 PIN LABELS
1540 1
1550 2
1560 2
1570 -
1580 3
1590 -
1600 24.1140 11.8020 WORK AREA
X=4.5000,Y=9.2500,XM ,N ,/QNPN /,"Q1",P"1",P"2",P"3",* GHILL
1610 Q
1620 3
1630 27.6250 11.8100 WORK AREA
X=8.0000,Y=9.2500,XM ,N ,/QNPN /,"Q3",P"1",P"2",P"3",* GHILL
1640 Q
1650 5
1660 29.6060 11.8090 WORK AREA
X=10.0000,Y=9.2500,XM ,N ,/QNPN /,"Q5",P"1",P"2",P"3",* GHILL
1670 Q
1680 6
1690 31.6210 11.8030 WORK AREA

```

Figure 10-5. Sample 2, Output Listing (page 5 of 27)

X=12.0000,Y=9.2500,XM	,N	/,QNP	/,"Q6",P"1",P"2",P"3",*	GHILL
1700	SYMBOL OR MACRO			
1710	4.0500	6.6150	SYMBOL MENU	
1720	Q			
1730	2			
1740	PIN LABELS			
1750	1			
1760	1			
1770	2			
1780	1			
1790	3			
1800	1			
1810	24.6080	11.8350	WORK AREA	
X=5.0000,Y=9.2500,E	/,QFN	/,"Q2",P"1",P"2",P"3",*	GHILL	
1820	Q			
1830	4			
1840	27.6260	11.8130	WORK AREA	
X=8.0000,Y=9.2500,E	/,QFN	/,"Q4",P"1",P"2",P"3",*	GHILL	
1850	E	X-MIRROR		
1860	NORTH			
1870	Q			
1880	7			
1890	35.1450	12.3060	WORK AREA	
X=15.5000,Y=9.7500,XM	,N	/,QFN	/,"Q7",P"1",P"2",P"3",*	GHILL
1900	SYMBOL OR MACRO			
1910	6.5650	2.4860	SYMBOL MENU	
1920	23.1210	12.3110	WORK AREA	
X=3.5000,Y=9.7500,E	/,SD	/,*	GHILL	
1930	24.1090	13.8330	WORK AREA	
X=4.5000,Y=11.2500,E	/,SD	/,*	GHILL	
1940	24.1030	12.8100	WORK AREA	
X=4.5000,Y=10.2500,E	/,SD	/,*	GHILL	
1950	24.1210	11.8210	WORK AREA	
X=4.5000,Y=9.2500,E	/,SD	/,*	GHILL	
1960	24.1150	10.8210	WORK AREA	
X=4.5000,Y=8.2500,E	/,SD	/,*	GHILL	
1970	24.0890	9.8440	WORK AREA	
X=4.5000,Y=7.2500,E	/,SD	/,*	GHILL	
1980	E	ERASE		
1990	25.6090	12.3300	WORK AREA	
X=6.0000,Y=9.7500,E	/,SD	/,*	GHILL	
2000	25.1010	10.7950	WORK AREA	
X=5.5000,Y=8.2500,E	/,SD	/,*	GHILL	
2010	25.6300	10.8410	WORK AREA	
X=6.0000,Y=8.2500,E	/,SD	/,*	GHILL	
2020	24.6120	9.8220	WORK AREA	
X=5.0000,Y=7.2500,E	/,SD	/,*	GHILL	
2030	25.1380	9.8290	WORK AREA	
X=5.5000,Y=7.2500,E	/,SD	/,*	GHILL	
2040	26.5960	13.8230	WORK AREA	
X=7.0000,Y=11.2500,E	/,SD	/,*	GHILL	
2050	26.6150	9.8210	WORK AREA	
X=7.0000,Y=7.2500,E	/,SD	/,*	GHILL	
2060	27.5920	13.8270	WORK AREA	

Figure 10-5. Sample 2, Output Listing (page 6 of 27)

X=8.0000,Y=11.2500,E	/SD	/,*			GHILL
2070	27.5980	12.8170	WORK AREA		
X=8.0000,Y=10.2500,E	/SD	/,*			GHILL
2080	27.6160	11.8190	WORK AREA		
X=8.0000,Y=9.2500,E	/SD	/,*			GHILL
2090	27.6180	10.5520	WORK AREA		
X=8.0000,Y=8.0000,E	/SD	/,*			GHILL
2100	27.6090	9.5380	WORK AREA		
X=8.0000,Y=7.0000,E	/SD	/,*			GHILL
2110	28.1410	9.5450	WORK AREA		
X=8.5000,Y=7.0000,E	/SD	/,*			GHILL
2120	28.6520	12.3060	WORK AREA		
X=9.0000,Y=9.7500,E	/SD	/,*			GHILL
2130	29.1120	9.7950	WORK AREA		
X=9.5000,Y=7.2500,E	/SD	/,*			GHILL
2140	29.6350	9.8020	WORK AREA		
X=10.0000,Y=7.2500,E	/SD	/,*			GHILL
2150	29.6040	10.8210	WORK AREA		
X=10.0000,Y=8.2500,E	/SD	/,*			GHILL
2160	29.6380	12.8300	WORK AREA		
X=10.0000,Y=10.2500,E	/SD	/,*			GHILL
2170	29.6300	13.8160	WORK AREA		
X=10.0000,Y=11.2500,E	/SD	/,*			GHILL
2180	30.5930	12.8140	WORK AREA		
X=11.0000,Y=10.2500,E	/SD	/,*			GHILL
2190	31.6260	12.7910	WORK AREA		
X=12.0000,Y=10.2500,E	/SD	/,*			GHILL
2200	32.0950	12.8320	WORK AREA		
X=12.5000,Y=10.2500,E	/SD	/,*			GHILL
2210	31.5640	10.8390	WORK AREA		
X=12.0000,Y=8.2500,E	/SD	/,*			GHILL
2220	31.0940	9.8620	WORK AREA		
X=11.5000,Y=7.2500,E	/SD	/,*			GHILL
2230	31.6230	9.8170	WORK AREA		
X=12.0000,Y=7.2500,F	/SD	/,*			GHILL
2240	34.0910	9.8540	WORK AREA		
X=14.5000,Y=7.2500,E	/SD	/,*			GHILL
2250	35.1080	11.2660	WORK AREA		
X=15.5000,Y=8.7500,E	/SD	/,*			GHILL
2260	34.1020	12.8140	WORK AREA		
X=14.5000,Y=10.2500,E	/SD	/,*			GHILL
2270	33.1010	12.8370	WORK AREA		
X=13.5000,Y=10.2500,E	/SD	/,*			GHILL
2280	SYMBOL OR MACRO				
2290	1.6000	11.6970	SYMBOL MENU		
2300	NORTH				
2310	LABEL TOP				
2320	O				
2330	U				
2340	T				
2350	P				
2360	U				
2370	T				
2380	32.1440	14.0500	WORK AREA		

Figure 10-5. Sample 2, Output Listing (page 7 of 27)

X=12.5000,Y=11.5000,LT	,N	,/BRK	/,"OUTPUT",*	GHILL
2390	SYMBOL OR MACRO			
2400	1.5940	11.5440	SYMBOL MENU	
2410	NORTH			
2420	Y-MIRROR			
2430	LABEL BOTTOM			
2440	I			
2450	N			
2460	P			
2470	U			
2480	T			
2490	25.5930	9.8140	WORK AREA	
X=6.0000,Y=7.2500,YM	,LB	,N	,/BRK	/,"INPUT",*
2500	3.4820	8.5250	SYMBOL MENU	GHILL
2501	E	LABEL CENTERED		
2502	E	R		
2510	29.6020	9.3170	WORK AREA	
X=10.0000,Y=6.7500,LC	,E	,/GC	/,"R",*	GHILL
2520	LINE			
2530	SPECIAL			
2540	23.1290	13.8250	WORK AREA	
2550	23.1000	13.3270	WORK AREA	
X=3.5000,Y=11.2500,*				GHILL
D,X=3.5000,Y=10.7500,*				GHILL
2560	23.0970	11.3140	WORK AREA	
2570	23.1080	9.8000	WORK AREA	
X=3.5000,Y=8.7500,*				GHILL
D,X=3.5000,Y=7.2500,*				GHILL
2580	23.1080	9.8000	WORK AREA	
2590	24.1170	9.8420	WORK AREA	
X=3.5000,Y=7.2500,*				GHILL
D,X=4.5000,Y=7.2500,*				GHILL
2600	24.0910	9.8320	WORK AREA	
2610	24.6140	9.8330	WORK AREA	
X=4.5000,Y=7.2500,*				GHILL
D,X=5.0000,Y=7.2500,*				GHILL
2620	24.6140	9.8330	WORK AREA	
2630	25.1240	9.8300	WORK AREA	
X=5.0000,Y=7.2500,*				GHILL
D,X=5.5000,Y=7.2500,*				GHILL
2640	25.1240	9.8300	WORK AREA	
2650	E	ERASE		
2660	E	ERASE		
2670	E	ERASE		
2680	E	ERASE		
2690	26.6110	9.8090	WORK AREA	
X=5.5000,Y=7.2500,*				GHILL
D,X=7.0000,Y=7.2500,*				GHILL
2700	26.5810	10.8650	WORK AREA	
2710	26.6060	9.8040	WORK AREA	
X=7.0000,Y=8.2500,*				GHILL
D,X=7.0000,Y=7.2500,*				GHILL
2720	26.6060	9.8040	WORK AREA	
2730	26.6050	9.5350	WORK AREA	

Figure 10-5. Sample 2, Output Listing (page 8 of 27)

X=7.0000,Y=7.2500,*					GHILL
D,X=7.0000,Y=7.0000,*					GHILL
2740	26.6230	9.5410	WORK AREA		
2750	27.6190	9.5180	WORK AREA		
X=7.0000,Y=7.0000,*					GHILL
D,X=8.0000,Y=7.0000,*					GHILL
2760	27.6030	9.5410	WORK AREA		
2770	28.0650	9.5880	WORK AREA		
X=8.0000,Y=7.0000,*					GHILL
D,X=8.5000,Y=7.0000,*					GHILL
2780	28.1020	9.5590	WORK AREA		
2790	29.1300	9.5320	WORK AREA		
X=8.5000,Y=7.0000,*					GHILL
D,X=9.5000,Y=7.0000,*					GHILL
2800	29.0950	9.5420	WORK AREA		
2810	29.0990	9.8040	WORK AREA		
X=9.5000,Y=7.0000,*					GHILL
D,X=9.5000,Y=7.2500,*					GHILL
2820	29.0980	9.8030	WORK AREA		
2830	29.6100	9.8310	WORK AREA		
X=9.5000,Y=7.2500,*					GHILL
D,X=10.0000,Y=7.2500,*					GHILL
2840	29.6100	9.8310	WORK AREA		
2850	29.6070	9.3190	WORK AREA		
X=10.0000,Y=7.2500,*					GHILL
D,X=10.0000,Y=6.7500,*					GHILL
2860	29.6140	9.8210	WORK AREA		
2870	31.0940	9.8510	WORK AREA		
X=10.0000,Y=7.2500,*					GHILL
D,X=11.5000,Y=7.2500,*					GHILL
2880	31.0930	9.8520	WORK AREA		
2890	31.5700	9.8150	WORK AREA		
X=11.5000,Y=7.2500,*					GHILL
D,X=12.0000,Y=7.2500,*					GHILL
2900	31.6220	9.8040	WORK AREA		
2910	34.0970	9.7860	WORK AREA		
X=12.0000,Y=7.2500,*					GHILL
D,X=14.5000,Y=7.2500,*					GHILL
2920	34.0910	9.8400	WORK AREA		
2930	35.1190	9.8100	WORK AREA		
X=14.5000,Y=7.2500,*					GHILL
D,X=15.5000,Y=7.2500,*					GHILL
2940	35.1190	9.8100	WORK AREA		
2950	35.1140	10.2980	WORK AREA		
X=15.5000,Y=7.2500,*					GHILL
D,X=15.5000,Y=7.7500,*					GHILL
2960	24.1390	12.8160	WORK AREA		
2970	24.6510	12.8230	WORK AREA		
X=4.5000,Y=10.2500,*					GHILL
D,X=5.0000,Y=10.2500,*					GHILL
2980	24.0970	11.8080	WORK AREA		
2990	24.6410	11.8490	WORK AREA		

Figure 10-5. Sample 2, Output Listing (page 9 of 27)

X=4.5000,Y=9.2500,*					GHILL
D,X=5.0000,Y=9.2500,*					GHILL
3000	24.1020	10.8150	WORK AREA		
3010	24.5970	10.8140	WORK AREA		
X=4.5000,Y=8.2500,*					GHILL
D,X=5.0000,Y=8.2500,*					GHILL
3020	25.0940	10.7980	WORK AREA		
3030	25.6160	10.8410	WORK AREA		
X=5.5000,Y=8.2500,*					GHILL
D,X=6.0000,Y=8.2500,*					GHILL
3040	25.6280	10.8420	WORK AREA		
3050	28.0910	10.8210	WORK AREA		
X=6.0000,Y=8.2500,*					GHILL
D,X=8.5000,Y=8.2500,*					GHILL
3060	27.6120	10.5710	WORK AREA		
3070	28.1100	10.5100	WORK AREA		
X=8.0000,Y=8.0000,*					GHILL
D,X=8.5000,Y=8.0000,*					GHILL
3080	29.1400	10.8360	WORK AREA		
3090	29.6190	10.8050	WORK AREA		
X=9.5000,Y=8.2500,*					GHILL
D,X=10.0000,Y=8.2500,*					GHILL
3100	31.1050	10.7930	WORK AREA		
3110	31.5960	10.8250	WORK AREA		
X=11.5000,Y=8.2500,*					GHILL
D,X=12.0000,Y=8.2500,*					GHILL
3120	34.0870	10.8000	WORK AREA		
3130	34.1460	12.8140	WORK AREA		
X=14.5000,Y=8.2500,*					GHILL
D,X=14.5000,Y=10.2500,*					GHILL
3140	34.0810	11.3380	WORK AREA		
3150	35.1330	11.3160	WORK AREA		
X=14.5000,Y=8.7500,*					GHILL
D,X=15.5000,Y=8.7500,*					GHILL
3160	33.1130	11.3050	WORK AREA		
3170	33.1290	12.8200	WORK AREA		
X=13.5000,Y=8.7500,*					GHILL
D,X=13.5000,Y=10.2500,*					GHILL
3180	25.6100	12.8230	WORK AREA		
3190	25.6200	12.3170	WORK AREA		
X=6.0000,Y=10.2500,*					GHILL
D,X=6.0000,Y=9.7500,*					GHILL
3200	25.6160	12.3130	WORK AREA		
3210	25.5990	11.8280	WORK AREA		
X=6.0000,Y=9.7500,*					GHILL
D,X=6.0000,Y=9.2500,*					GHILL
3220	23.1120	13.7990	WORK AREA		
3230	24.1140	13.8180	WORK AREA		
X=3.5000,Y=11.2500,*					GHILL
D,X=4.5000,Y=11.2500,*					GHILL
3240	24.1100	13.8100	WORK AREA		
3250	26.5910	13.8100	WORK AREA		

Figure 10-5. Sample 2, Output Listing (page 10 of 27)

X=4.5000,Y=11.2500,*					GHILL
D,X=7.0000,Y=11.2500,*					GHILL
3260	26.5910	13.8100	WORK AREA		
3270	27.5890	13.7820	WORK AREA		
X=7.0000,Y=11.2500,*					GHILL
D,X=8.0000,Y=11.2500,*					GHILL
3280	27.5890	13.7820	WORK AREA		
3290	29.6450	13.7920	WORK AREA		
X=8.0000,Y=11.2500,*					GHILL
D,X=10.0000,Y=11.2500,*					GHILL
3300	29.6450	13.7920	WORK AREA		
3310	31.6040	13.8070	WORK AREA		
X=10.0000,Y=11.2500,*					GHILL
D,X=12.0000,Y=11.2500,*					GHILL
3320	29.6100	12.8050	WORK AREA		
3330	30.6170	12.8220	WORK AREA		
X=10.0000,Y=10.2500,*					GHILL
D,X=11.0000,Y=10.2500,*					GHILL
3340	30.6420	12.2930	WORK AREA		
3350	30.6250	12.8060	WORK AREA		
X=11.0000,Y=9.7500,*					GHILL
D,X=11.0000,Y=10.2500,*					GHILL
3360	30.6250	12.8060	WORK AREA		
3370	30.6030	14.0080	WORK AREA		
X=11.0000,Y=10.2500,*					GHILL
D,X=11.0000,Y=11.5000,*					GHILL
3380	30.6190	14.0500	WORK AREA		
3390	35.0790	14.0530	WORK AREA		
X=11.0000,Y=11.5000,*					GHILL
D,X=15.5000,Y=11.5000,*					GHILL
3400	35.1060	14.0450	WORK AREA		
3410	35.1030	13.3100	WORK AREA		
X=15.5000,Y=11.5000,*					GHILL
D,X=15.5000,Y=10.7500,*					GHILL
3420	31.5990	12.8490	WORK AREA		
3430	32.1180	12.8300	WORK AREA		
X=12.0000,Y=10.2500,*					GHILL
D,X=12.5000,Y=10.2500,*					GHILL
3440	32.1300	12.8240	WORK AREA		
3450	32.1510	14.0540	WORK AREA		
X=12.5000,Y=10.2500,*					GHILL
D,X=12.5000,Y=11.5000,*					GHILL
3451 E	7.0000	9.2500	WORK AREA		
3452 E	7.0000	10.2500	WORK AREA		
X=7.0000,Y=9.2500,*					GHILL

Figure 10-5. Sample 2, Output Listing (page 11 of 27)

GHILL
GHILL

Figure 10-5. Sample 2, Output Listing (page 12 of 27)

***DRAWING GHILL STARTS AT SEARCH ADDRESS 1 AND ENDS AT SEARCH ADDRESS 3 ***

Figure 10-5. Sample 2, Output Listing (page 13 of 27)

DRAWING GHILL FINAL EDIT AS FOLLOWS --					
RMK GHILL	,X=18.0060,Y=15.0020,			100	100
X=0.0000,Y=0.0000,/TARGET	/,*			200	200
X=18.0060,Y=0.0000,/TARGET	/,*			300	300
X=18.0060,Y=15.0020,/TARGET	/,*			400	400
X0=0.,Y0=0.*				500	500
RMK GRID .25				600	600
X=3.5000,Y=9.7500,N	,/R	/,"R1",P"1",P"2",*		700	700
X=3.5000,Y=8.7500,N	,/R	/,"R2",P"1",P"2",*		800	800
X=4.5000,Y=10.2500,N	,/R	/,"R3",P"1",P"2",*		900	900
X=4.5000,Y=8.2500,N	,/R	/,"R4",P"1",P"2",*		1000	1000
X=4.5000,Y=7.2500,N	,/R	/,"R5",P"1",P"2",*		1100	1100
X=6.0000,Y=7.2500,N	,/R	/,"R6",P"1",P"2",*		1200	1200
X=7.0000,Y=10.2500,N	,/R	/,"R7",P"1",P"2",*		1300	1300
X=7.0000,Y=8.2500,N	,/R	/,"R8",P"1",P"2",*		1400	1400
X=8.0000,Y=10.2500,N	,/R	/,"R9",P"1",P"2",*		1500	1500
X=8.0000,Y=8.2500,N	,/R	/,"R10",P"1",P"2",*		1600	1600
X=8.0000,Y=7.0000,N	,/R	/,"R11",P"1",P"2",*		1700	1700
X=10.0000,Y=10.2500,N	,/R	/,"R12",P"1",P"2",*		1800	1800
X=10.0000,Y=8.2500,N	,/R	/,"R13",P"1",P"2",*		1900	1900
X=10.0000,Y=7.2500,N	,/R	/,"R14",P"1",P"2",*		2000	2000
X=12.0000,Y=10.2500,N	,/R	/,"R15",P"1",P"2",*		2100	2100
X=12.0000,Y=8.2500,N	,/R	/,"R16",P"1",P"2",*		2200	2200
X=12.0000,Y=7.2500,N	,/R	/,"R17",P"1",P"2",*		2300	2300
X=15.5000,Y=8.7500,N	,/R	/,"R18",P"1",P"2",*		2400	2400
X=13.5000,Y=10.2500,E	,/R	/,"R19",P"1",P"2",*		2500	2500
X=5.0000,Y=7.2500,N	,/C	/,"C1",P"1",P"2",*		2600	2600
X=5.5000,Y=7.2500,N	,/C	/,"C3",P"1",P"2",*		2700	2700
X=8.5000,Y=7.0000,N	,/C	/,"C6",P"1",P"2",*		2800	2800
X=9.5000,Y=7.2500,N	,/C	/,"C7",P"1",P"2",*		2900	2900
X=11.5000,Y=7.2500,N	,/C	/,"C8",P"1",P"2",*		3000	3000
X=14.5000,Y=7.2500,N	,/C	/,"C10",P"1",P"2",*		3100	3100
X=15.5000,Y=7.7500,N	,/C	/,"C11",P"1",P"2",*		3200	3200
X=5.0000,Y=10.2500,E	,/C	/,"C2",P"1",P"2",*		3300	3300
X=6.0000,Y=9.7500,E	,/C	/,"C4",P"1",P"2",*		3400	3400
X=8.0000,Y=10.2500,E	,/C	/,"C5",P"1",P"2",*		3500	3500
X=12.5000,Y=10.2500,E	,/C	/,"C9",P"1",P"2",*		3600	3600
X=13.5000,Y=8.7500,E	,/C	/,"C11",P"1",P"2",*		3700	3700
X=4.5000,Y=9.2500,XM	,N ,/QNPN	/,"Q1",P"1",P"2",P"3",*		3800	3800
X=3.0000,Y=9.2500,XM	,N ,/QNPN	/,"Q3",P"1",P"2",P"3",*		3900	3900
X=10.0000,Y=9.2500,XM	,N ,/QNPN	/,"Q5",P"1",P"2",P"3",*		4000	4000
X=12.0000,Y=9.2500,XM	,N ,/QNPN	/,"Q6",P"1",P"2",P"3",*		4100	4100
X=5.0000,Y=9.2500,E	,/QFN	/,"Q2",P"1",P"2",P"3",*		4200	4200
X=8.0000,Y=9.2500,E	,/QFN	/,"Q4",P"1",P"2",P"3",*		4300	4300
X=15.5000,Y=9.7500,XM	,N ,/QFN	/,"Q7",P"1",P"2",P"3",*		4400	4400
X=3.5000,Y=9.7500,E	,/SD	/,*		4500	4500
X=4.5000,Y=11.2500,E	,/SD	/,*		4600	4600
X=4.5000,Y=10.2500,E	,/SD	/,*		4700	4700
X=4.5000,Y=9.2500,E	,/SD	/,*		4800	4800
X=4.5000,Y=8.2500,E	,/SD	/,*		4900	4900
X=4.5000,Y=7.2500,E	,/SD	/,*		5000	5000
X=6.0000,Y=9.7500,E	,/SD	/,*		5100	5100
X=5.5000,Y=8.2500,E	,/SD	/,*		5200	5200
X=6.0000,Y=8.2500,E	,/SD	/,*		5300	5300
X=5.0000,Y=7.2500,E	,/SD	/,*		5400	5400
X=5.5000,Y=7.2500,E	,/SD	/,*		5500	5500

Figure 10-5. Sample 2, Output Listing (page 14 of 27)

X=7.0000,Y=11.2500,E	,/SD	/,*	5600	5600
X=7.0000,Y=7.2500,E	,/SD	/,*	5700	5700
X=8.0000,Y=11.2500,E	,/SD	/,*	5800	5800
X=8.0000,Y=10.2500,E	,/SD	/,*	5900	5900
X=8.0000,Y=9.2500,E	,/SD	/,*	6000	6000
X=8.0000,Y=8.0000,E	,/SD	/,*	6100	6100
X=8.0000,Y=7.0000,E	,/SD	/,*	6200	6200
X=8.5000,Y=7.0000,E	,/SD	/,*	6300	6300
X=9.0000,Y=9.7500,E	,/SD	/,*	6400	6400
X=9.5000,Y=7.2500,E	,/SD	/,*	6500	6500
X=10.0000,Y=7.2500,E	,/SD	/,*	6600	6600
X=10.0000,Y=8.2500,E	,/SD	/,*	6700	6700
X=10.0000,Y=10.2500,E	,/SD	/,*	6800	6800
X=10.0000,Y=11.2500,E	,/SD	/,*	6900	6900
X=11.0000,Y=10.2500,E	,/SD	/,*	7000	7000
X=12.0000,Y=10.2500,E	,/SD	/,*	7100	7100
X=12.5000,Y=10.2500,E	,/SD	/,*	7200	7200
X=12.0000,Y=8.2500,E	,/SD	/,*	7300	7300
X=11.5000,Y=7.2500,E	,/SD	/,*	7400	7400
X=12.0000,Y=7.2500,E	,/SD	/,*	7500	7500
X=14.5000,Y=7.2500,E	,/SD	/,*	7600	7600
X=15.5000,Y=8.7500,E	,/SD	/,*	7700	7700
X=14.5000,Y=10.2500,E	,/SD	/,*	7800	7800
X=13.5000,Y=10.2500,E	,/SD	/,*	7900	7900
X=12.5000,Y=11.5000,LT	,N	,/BRK	/,"OUTPUT",*	8000
X=6.0000,Y=7.2500,YM	,LB	,N	/,"INPUT",*	8100
X=10.0000,Y=6.7500,LC	,E	,/GC	/,"R",*	8200
X=3.5000,Y=11.2500,*				8300
D,X=3.5000,Y=10.7500,*				8400
X=3.5000,Y=8.7500,*				8500
D,X=3.5000,Y=7.2500,*				8600
X=3.5000,Y=7.2500,*				8700
D,X=4.5000,Y=7.2500,*				8800
X=4.5000,Y=7.2500,*				8900
D,X=5.0000,Y=7.2500,*				9000
X=5.0000,Y=7.2500,*				9100
D,X=5.5000,Y=7.2500,*				9200
X=5.5000,Y=7.2500,*				9300
D,X=7.0000,Y=7.2500,*				9400
X=7.0000,Y=8.2500,*				9500
D,X=7.0000,Y=7.2500,*				9600
X=7.0000,Y=7.2500,*				9700
D,X=7.0000,Y=7.0000,*				9800
X=7.0000,Y=7.0000,*				9900
D,X=8.0000,Y=7.0000,*				10000
X=8.0000,Y=7.0000,*				10100
D,X=8.5000,Y=7.0000,*				10200
X=8.5000,Y=7.0000,*				10300
D,X=9.5000,Y=7.0000,*				10400
X=9.5000,Y=7.0000,*				10500
D,X=9.5000,Y=7.2500,*				10600
X=9.5000,Y=7.2500,*				10700
D,X=10.0000,Y=7.2500,*				10800
X=10.0000,Y=7.2500,*				10900
D,X=10.0000,Y=6.7500,*				11000
X=10.0000,Y=7.2500,*				11100

Figure 10-5. Sample 2, Output Listing (page 15 of 27)

D,X=11.5000,Y=7.2500,*	11200	11200
X=11.5000,Y=7.2500,*	11300	11300
D,X=12.0000,Y=7.2500,*	11400	11400
X=12.0000,Y=7.2500,*	11500	11500
D,X=14.5000,Y=7.2500,*	11600	11600
X=14.5000,Y=7.2500,*	11700	11700
D,X=15.5000,Y=7.2500,*	11800	11800
X=15.5000,Y=7.2500,*	11900	11900
D,X=15.5000,Y=7.7500,*	12000	12000
X=4.5000,Y=10.2500,*	12100	12100
D,X=5.0000,Y=10.2500,*	12200	12200
X=4.5000,Y=9.2500,*	12300	12300
D,X=5.0000,Y=9.2500,*	12400	12400
X=4.5000,Y=8.2500,*	12500	12500
D,X=5.0000,Y=8.2500,*	12600	12600
X=5.0000,Y=8.2500,*	12700	12700
D,X=6.0000,Y=8.2500,*	12800	12800
X=6.0000,Y=8.2500,*	12900	12900
D,X=8.5000,Y=8.2500,*	13000	13000
X=8.0000,Y=8.0000,*	13100	13100
D,X=8.5000,Y=8.0000,*	13200	13200
X=9.5000,Y=8.2500,*	13300	13300
D,X=10.0000,Y=8.2500,*	13400	13400
X=11.5000,Y=8.2500,*	13500	13500
D,X=12.0000,Y=8.2500,*	13600	13600
X=14.5000,Y=8.2500,*	13700	13700
D,X=14.5000,Y=10.2500,*	13800	13800
X=14.5000,Y=8.7500,*	13900	13900
D,X=15.5000,Y=8.7500,*	14000	14000
X=13.5000,Y=8.7500,*	14100	14100
D,X=13.5000,Y=10.2500,*	14200	14200
X=6.0000,Y=10.2500,*	14300	14300
D,X=6.0000,Y=9.7500,*	14400	14400
X=6.0000,Y=9.7500,*	14500	14500
D,X=6.0000,Y=9.2500,*	14600	14600
X=3.5000,Y=11.2500,*	14700	14700
D,X=4.5000,Y=11.2500,*	14800	14800
X=4.5000,Y=11.2500,*	14900	14900
D,X=7.0000,Y=11.2500,*	15000	15000
X=7.0000,Y=11.2500,*	15100	15100
D,X=8.0000,Y=11.2500,*	15200	15200
X=8.0000,Y=11.2500,*	15300	15300
D,X=10.0000,Y=11.2500,*	15400	15400
X=10.0000,Y=11.2500,*	15500	15500
D,X=12.0000,Y=11.2500,*	15600	15600
X=10.0000,Y=10.2500,*	15700	15700
D,X=11.0000,Y=10.2500,*	15800	15800
X=11.0000,Y=9.7500,*	15900	15900
D,X=11.0000,Y=10.2500,*	16000	16000
X=11.0000,Y=10.2500,*	16100	16100
D,X=11.0000,Y=11.5000,*	16200	16200
X=11.0000,Y=11.5000,*	16300	16300
D,X=15.5000,Y=11.5000,*	16400	16400
X=15.5000,Y=11.5000,*	16500	16500
D,X=15.5000,Y=10.7500,*	16600	16600
X=12.0000,Y=10.2500,*	16700	16700

Figure 10-5. Sample 2, Output Listing (page 16 of 27)

D,X=12.5000,Y=10.2500,*	16800	16800
X=12.5000,Y=10.2500,*	16900	16900
D,X=12.5000,Y=11.5000,*	17000	17000
X=7.0000,Y=9.2500,*	17100	17100
D,X=7.0000,Y=10.2500,*	17200	17200
X=8.0000,Y=8.0000,*	17300	17300
D,X=8.0000,Y=8.2500,*	17400	17400
X=9.0000,Y=9.2500,*	17500	17500
D,X=9.0000,Y=9.7500,*	17600	17600
X=9.0000,Y=9.7500,*	17700	17700
D,X=9.0000,Y=10.2500,*	17800	17800
REC, X=3.0000,Y=6.0000,X=16.2500,Y=12.5000,*	17900	17900
T*	99999999	99999999

.. END EDIT FOR GHILL

Figure 10-5. Sample 2, Output Listing (page 17 of 27)

A.S.A.P.		X-Y REPORT FOR GHILL					A.S.A.P.	
X-CORD	Y-CORD	TYPE	LABEL	PIN	DRAW SEQ.		MAC SEQ.	
30000	125000	REC			17900		0	
30000	60000	REC			17900		0	
35000	112500	LINE			8400		0	
35000	112500	LINE			14800		0	
35000	107500	R	R1	2	700		0	
35000	107500	LINE			8400		0	
35000	97500	R	R1	1	700		0	
35000	97500	R	R2	2	800		0	
35000	97500	QNPV	Q1	2	3800		0	
35000	97500	SD			4500		0	
35000	87500	R	R2	1	800		0	
35000	87500	LINE			8600		0	
35000	72500	LINE			8600		0	
35000	72500	LINE			8800		0	
45000	112500	R	R3	2	900		0	
45000	112500	SD			4600		0	
45000	112500	LINE			14800		0	
45000	112500	LINE			15000		0	
45000	102500	R	R3	1	900		0	
45000	102500	QNPV	Q1	3	3800		0	
45000	102500	SD			4700		0	
45000	102500	LINE			12200		0	
45000	92500	R	R4	2	1600		0	
45000	92500	QNPV	Q1	1	3800		0	
45000	92500	SD			4800		0	
45000	92500	LINE			12400		0	
45000	82500	R	R4	1	1000		0	
45000	82500	R	P5	2	1100		0	
45000	82500	SD			4900		0	
45000	82500	LINE			12500		0	
45000	72500	R	P5	1	1100		0	
45000	72500	SD			5000		0	
45000	72500	LINE			8800		0	
45000	72500	LINE			9000		0	
50000	102500	C	C2	1	3300		0	
50000	102500	LINE			12200		0	
50000	92500	QFN	Q2	1	4200		0	
50000	92500	LINE			12400		0	
50000	82500	C	C1	2	2600		0	
50000	82500	LINE			12600		0	
50000	72500	C	C1	1	2600		0	
50000	72500	SD			5400		0	
50000	72500	LINE			9000		0	
50000	72500	LINE			9200		0	
55000	82500	C	C3	2	2700		0	
55000	82500	QFN	Q2	2	4200		0	
55000	82500	SD			5200		0	
55000	82500	LINE			12800		0	
55000	72500	C	C3	1	2700		0	
55000	72500	SD			5500		0	

Figure 10-5. Sample 2, Output Listing (page 18 of 27)

A.S.A.P.		X-Y REPORT FOR GHILL				A.S.A.P.	
X-CORD	Y-CORD	TYPE	LABEL	PIN	DRAW SEQ.	MAC SEQ.	
55000	72500	LINE			9200	0	
55000	72500	LINE			9400	0	
60000	102500	C	C2	2	3300	0	
60000	102500	LINE			14400	0	
60000	97500	C	C4	1	3400	0	
60000	97500	SD			5100	0	
60000	97500	LINE			14400	0	
60000	97500	LINE			14600	0	
60000	92500	QFN	Q2	3	4200	0	
60000	92500	LINE			14600	0	
60000	82500	R	R6	2	1200	0	
60000	82500	SD			5300	0	
60000	82500	LINE			12800	0	
60000	82500	LINE			13000	0	
60000	72500	R	R6	1	1200	0	
60000	72500	BRK	INPU	1	3100	0	
70000	112500	R	R7	2	1300	0	
70000	112500	SD			5600	0	
70000	112500	LINE			15000	0	
70000	112500	LINE			15200	0	
70000	102500	R	R7	1	1500	0	
70000	102500	LINE			17200	0	
70000	97500	C	C4	2	3400	0	
70000	97500	QNPV	Q3	2	3900	0	
70000	92500	R	R6	2	1400	0	
70000	92500	LINE			17200	0	
70000	82500	R	R6	1	1400	0	
70000	82500	LINE			5600	0	
70000	72500	SD			5700	0	
70000	72500	LINE			5400	0	
70000	72500	LINE			5600	0	
70000	72500	LINE			9300	0	
70000	70000	LINE			9800	0	
70000	70000	LINE			10000	0	
80000	112500	R	R9	2	1500	0	
80000	112500	SD			5800	0	
80000	112500	LINE			15200	0	
80000	112500	LINE			15400	0	
80000	102500	R	R9	1	1500	0	
80000	102500	C	C5	1	3500	0	
80000	102500	QNPV	Q3	3	3900	0	
80000	102500	SD			5900	0	
80000	92500	R	R10	2	1600	0	
80000	92500	QNPV	Q3	1	3900	0	
80000	92500	QFN	Q4	1	4300	0	
80000	92500	SD			6000	0	
80000	82500	R	R10	1	1600	0	
80000	82500	LINE			17400	0	
80000	80000	R	R11	2	1700	0	
80000	80000	SD			6100	0	

Figure 10-5. Sample 2, Output Listing (page 19 of 27)

A.S.A.P.		X-Y REPORT FOR GHILL				A.S.A.P.	
X-CORD	Y-CORD	TYPE	LABEL	PIN	DRAW SEQ.	MAC SEQ.	
80000	80000	LINE			13200	0	
80000	80000	LINE			17400	0	
80000	70000	R	R11	1	1700	0	
80000	70000	SD			6200	0	
80000	70000	LINE			10000	0	
80000	70000	LINE			10200	0	
85000	82500	QFN	Q4	2	4300	0	
85000	82500	LINE			13000	0	
85000	80000	C	C6	2	2800	0	
85000	80000	LINE			13200	0	
85000	70000	C	C6	1	2800	0	
85000	70000	SD			6300	0	
85000	70000	LINE			10200	0	
85000	70000	LINE			10400	0	
90000	102500	C	C5	2	3500	0	
90000	102500	LINE			17800	0	
90000	97500	QNPIN	Q5	2	4000	0	
90000	97500	SD			6400	0	
90000	97500	LINE			17800	0	
90000	97500	LINE			17600	0	
90000	92500	QFN	Q4	3	4300	0	
90000	92500	LINE			17600	0	
95000	82500	C	C7	2	2900	0	
95000	82500	LINE			13400	0	
95000	72500	C	C7	1	2900	0	
95000	72500	SD			6500	0	
95000	72500	LINE			10600	0	
95000	72500	LINE			10800	0	
95000	70000	LINE			10400	0	
95000	70000	LINE			10600	0	
100000	112500	K	R12	2	1800	0	
100000	112500	SD			6900	0	
100000	112500	LINE			15400	0	
100000	112500	LINE			15600	0	
100000	102500	R	R12	1	1800	0	
100000	102500	QNPIN	Q5	3	4000	0	
100000	102500	SD			6800	0	
100000	102500	LINE			15800	0	
100000	92500	K	R13	2	1900	0	
100000	92500	QNPIN	Q5	1	4000	0	
100000	82500	R	R13	1	1900	0	
100000	82500	R	R14	2	2000	0	
100000	82500	SD			6700	0	
100000	82500	LINE			13400	0	
100000	72500	R	R14	1	2000	0	
100000	72500	SD			6600	0	
100000	72500	LINE			10800	0	
100000	72500	LINE			11000	0	
100000	72500	LINE			11200	0	
100000	67500	GC	R	1	8200	0	

Figure 10-5. Sample 2, Output Listing (page 20 of 27)

A.S.A.P.		X-Y REPORT FOR GHILL				A.S.A.P.	
X-CORD	Y-CORD	TYPE	LABEL	PIN	DRAW SEQ.	MAC SEQ.	
100000	67500	LINE			11000	0	
110000	115000	LINE			16200	0	
110000	115000	LINE			16400	0	
110000	102500	SD			7000	0	
110000	102500	LINE			15800	0	
110000	102500	LINE			16000	0	
110000	102500	LINE			16200	0	
110000	97500	QNP	Q6	2	4100	0	
110000	97500	LINE			16000	0	
115000	82500	C	C8	2	3000	0	
115000	82500	LINE			13600	0	
115000	72500	C	C8	1	3000	0	
115000	72500	SD			7400	0	
115000	72500	LINE			11200	0	
115000	72500	LINE			11400	0	
120000	112500	K	R15	2	2100	0	
120000	112500	LINE			15600	0	
120000	102500	R	R15	1	2100	0	
120000	102500	QNP	Q6	3	4100	0	
120000	102500	SD			7100	0	
120000	102500	LINE			16800	0	
120000	92500	R	R16	2	2200	0	
120000	92500	QNP	Q6	1	4100	0	
120000	82500	R	R16	1	2200	0	
120000	82500	R	R17	2	2300	0	
120000	82500	SD			7300	0	
120000	82500	LINE			13600	0	
120000	72500	R	R17	1	2300	0	
120000	72500	SD			7500	0	
120000	72500	LINE			11400	0	
120000	72500	LINE			11600	0	
125000	115000	BRK	GUTP	1	8000	0	
125000	115000	LINE			17000	0	
125000	102500	C	C9	1	3600	0	
125000	102500	SD			7200	0	
125000	102500	LINE			16800	0	
125000	102500	LINE			17000	0	
135000	102500	K	R18	1	2500	0	
135000	102500	C	C9	2	3600	0	
135000	102500	SD			7900	0	
135000	102500	LINE			14200	0	
135000	87500	CR	CR1	1	3700	0	
135000	87500	LINE			14200	0	
145000	102500	R	R18	2	2500	0	
145000	102500	QFN	Q7	2	4400	0	
145000	102500	SD			7800	0	
145000	102500	LINE			13800	0	
145000	87500	CR	CR1	2	3700	0	
145000	87500	LINE			14000	0	
145000	82500	C	C10	2	3100	0	

Figure 10-5. Sample 2, Output Listing (page 21 of 27)

A.S.A.P.		X-Y REPORT FOR GHILL					A.S.A.P.	
X-CORD	Y-CORD	TYPE	LABEL	PIN	DRAW SEQ.	MAC SEQ.		
145000	92500	LINE			13800	0		
145000	72500	C	C10	1	3100	0		
145000	72500	SD			7600	0		
145000	72500	LINE			11600	0		
145000	72500	LINE			11800	0		
155000	115000	LINE			16400	0		
155000	115000	LINE			16600	0		
155000	107500	QFN	Q7	3	4400	0		
155000	107500	LINE			16600	0		
155000	97500	R	R19	2	2400	0		
155000	97500	QFN	Q7	1	4400	0		
155000	87500	R	R19	1	2400	0		
155000	87500	C	C11	2	3200	0		
155000	87500	SD			7700	0		
155000	87500	LINE			14000	0		
155000	77500	C	C11	1	3200	0		
155000	77500	LINE			12000	0		
155000	72500	LINE			11800	0		
155000	72500	LINE			12000	0		
162500	125000	REC			17900	0		
162500	60000	REC			17900	0		

Figure 10-5. Sample 2, Output Listing (page 22 of 27)

A.S.A.P.		COMPONENT REPORT FOR GHILL				A.S.A.P.	
COMPONENT	LABEL	X-CORD	Y-CORD	DRAW SEQ.	MAC SEQ.		
BRK	OUTP	125000	115000	8000	0		
BRK	INPU	60000	72500	8100	0		
					****	2-BRK	
C	C9	125000	102500	3600	0		
C	C10	145000	72500	3100	0		
C	C11	155000	77500	3200	0		
C	C6	85000	70000	2800	0		
C	C7	95000	72500	2900	0		
C	C8	115000	72500	3000	0		
C	C2	50000	102500	3300	0		
C	C1	50000	72500	2600	0		
C	C3	55000	72500	2700	0		
C	C4	60000	97500	3400	0		
C	C5	80000	102500	3500	0		
					****	11-C	
CR	CR1	135000	87500	3700	0		
					****	1-CR	
GC	R	100000	67500	8200	0		
					****	1-GC	
QFN	Q7	155000	57500	4400	0		
QFN	Q4	80000	92500	4300	0		
QFN	Q2	50000	92500	4200	0		
					****	3-QFN	
QNPB	Q3	80000	92500	3900	0		
QNPB	Q5	100000	92500	4000	0		
QNPB	Q6	120000	92500	4100	0		
QNPB	Q1	45000	92500	3800	0		
					****	4-QNPB	
R	R18	135000	102500	2500	0		
R	R19	135000	87500	2400	0		
R	R10	50000	82500	1600	0		
R	R11	80000	70000	1700	0		
R	R12	100000	102500	1800	0		
R	R13	100000	82500	1900	0		
R	R14	100000	72500	2000	0		
R	R15	120000	102500	2100	0		
R	R16	120000	82500	2200	0		
R	R17	120000	72500	2300	0		
R	R1	35000	97500	700	0		
R	R2	35000	87500	800	0		
R	R3	45000	102500	900	0		
R	R4	45000	82500	1000	0		
R	R5	45000	72500	1100	0		
R	R6	60000	72500	1200	0		

Figure 10-5. Sample 2, Output Listing (page 23 of 27)

A.S.A.P.		COMPONENT REPORT FOR GHILL			A.S.A.P.	
COMPONENT	LABEL	X-CORD	Y-CORD	DRAW SEQ.	MAC SEQ.	
R	R7	70000	102500	1300	0	
R	R8	70000	82500	1400	0	
R	R9	80000	102500	1500	0	
					****	19-R
SD		125000	102500	7200	0	
SD		135000	102500	7900	0	
SD		145000	102500	7800	0	
SD		145000	72500	7600	0	
SD		155000	87500	7700	0	
SD		80000	92500	6000	0	
SD		80000	80000	6100	0	
SD		89000	70000	6200	0	
SD		85000	70000	6300	0	
SD		90000	97500	6400	0	
SD		95000	72500	6500	0	
SD		100000	112500	6900	0	
SD		100000	102500	6800	0	
SD		100000	82500	6700	0	
SD		100000	72500	6600	0	
SD		110000	102500	7000	0	
SD		115000	72500	7400	0	
SD		120000	102500	7100	0	
SD		120000	82500	7300	0	
SD		120000	72500	7500	0	
SD		35000	97500	4500	0	
SD		45000	112500	4600	0	
SD		45000	102500	4700	0	
SD		45000	92500	4800	0	
SD		45000	82500	4900	0	
SD		45000	72500	5000	0	
SD		50000	72500	5400	0	
SD		55000	82500	5200	0	
SD		55000	72500	5500	0	
SD		60000	97500	5100	0	
SD		60000	82500	5300	0	
SD		70000	112500	5600	0	
SD		70000	72500	5700	0	
SD		80000	112500	5800	0	
SD		80000	102500	5900	0	
					****	35-SD

Figure 10-5. Sample 2, Output Listing (page 24 of 27)

SYMBOL NAME	S/M PIN LABEL	DRAW SEQ.
R	R1 2	700
R	R3 2	900
R	R7 2	1300
R	R9 2	1500
R	R12 2	1800
R	R15 2	2100
R	K1 1	700
QNP	Q1 2	3800
R	R2 2	800
R	R2 1	800
R	R5 1	1100
C	C1 1	2600
C	C3 1	2700
R	R11 1	1700
C	C6 1	2800
C	C7 1	2900
R	R14 1	2000
C	C8 1	3000
R	R17 1	2300
C	C10 1	3100
C	C11 1	3200
GC	R 1	3200
R	R8 1	1400
R	R3 1	900
QNP	Q1 3	3800
C	C2 1	3300
R	R4 2	1000
QNP	Q1 1	3800
QFN	Q2 1	4200
R	R4 1	1000
R	R5 2	1100
C	C1 2	2600
C	C3 2	2700
QFN	Q2 2	4200
R	R6 2	1200
QFN	Q4 2	4300
C	C2 2	3300
C	C4 1	3400
QFN	Q2 3	4200
R	R6 1	1200
BRK	INPU 1	8100

Figure 10-5. Sample 2, Output Listing (page 25 of 27)

A.S.A.P.	INTERCONNECT LIST FOR GHILL			PAGE 2	A.S.A.P.
SYMBOL NAME	S/M PIN	LABEL	DRAW SEQ.		
R	R7	1	1300		
R	R8	2	1400		
C	C4	2	3400		
QNPN	Q3	2	3900		
R	R9	1	1500		
C	C5	1	3500		
QNPN	Q3	3	3900		
R	R10	2	1600		
QNPN	Q3	1	3900		
QFN	Q4	1	4300		
R	R10	1	1600		
R	R11	2	1700		
C	C6	2	2800		
C	C5	2	3500		
QNPN	Q5	2	4000		
QFN	Q4	3	4300		
C	C7	2	2900		
R	R14	2	2000		
R	R15	1	1900		
R	R12	1	1800		
QNPN	Q5	3	4000		
QFN	Q7	3	4400		
QNPN	Q6	2	4100		
R	R13	2	1900		
QNPN	Q5	1	4000		
C	C8	2	3000		
R	R16	1	2200		
R	R17	2	2300		
R	R15	1	2100		
QNPN	Q6	3	4100		
C	C9	1	3600		
BRK	OUTP	1	8000		
R	R16	2	2200		
QNPN	Q6	1	4100		
R	R18	1	2500		
C	C9	2	3600		
CR	CR1	1	3700		

Figure 10-5. Sample 2, Output Listing (page 26 of 27)

A.S.A.P.

INTERCONNECT LIST FOR GHILL

PAGE 3

A.S.A.P.

SYMBOL NAME	S/M PIN LABEL	DRAW SEQ.
R	R18 2	2500
QFN	Q7 2	4400
C	C10 2	3100
CR	CR1 2	3700
C	C11 2	3200
R	R19 1	2400
R	R19 2	2400
QFN	Q7 1	4400

Figure 10-5. Sample 2, Output Listing (page 27 of 27)

SAMPLE 3

Sample 3 shows the following:

- Macro creation.
- The use of DIGITIZING SCALE.

NOTE

Macro E.5X was digitized using a digitizing scale of 0.5. Macro E2X was digitized using a digitizing scale of 2.0. Both macros are retained on the symbol file and subsequently drawn at the same size.

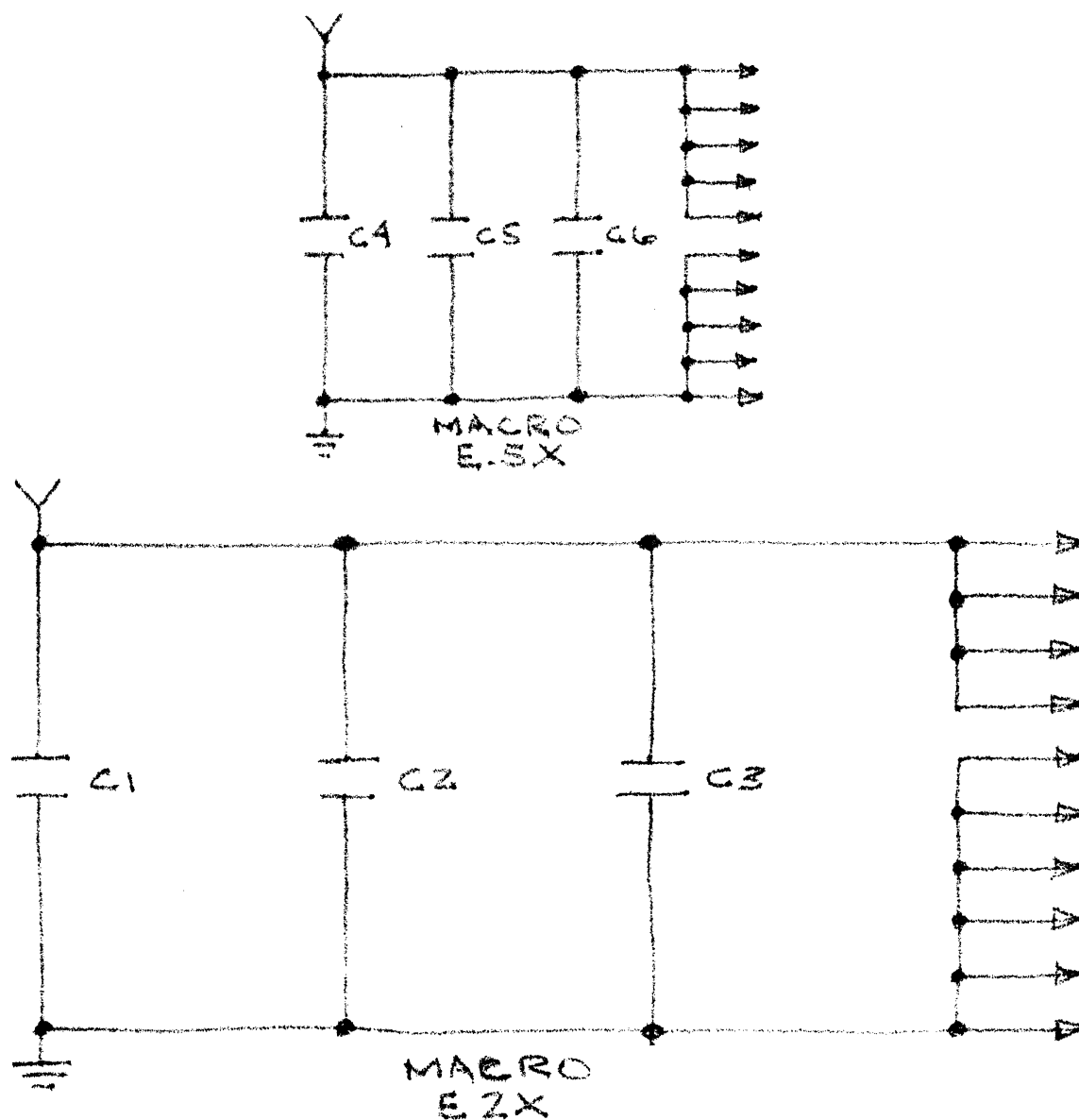


Figure 10-6. Sample 3, Rough Sketch

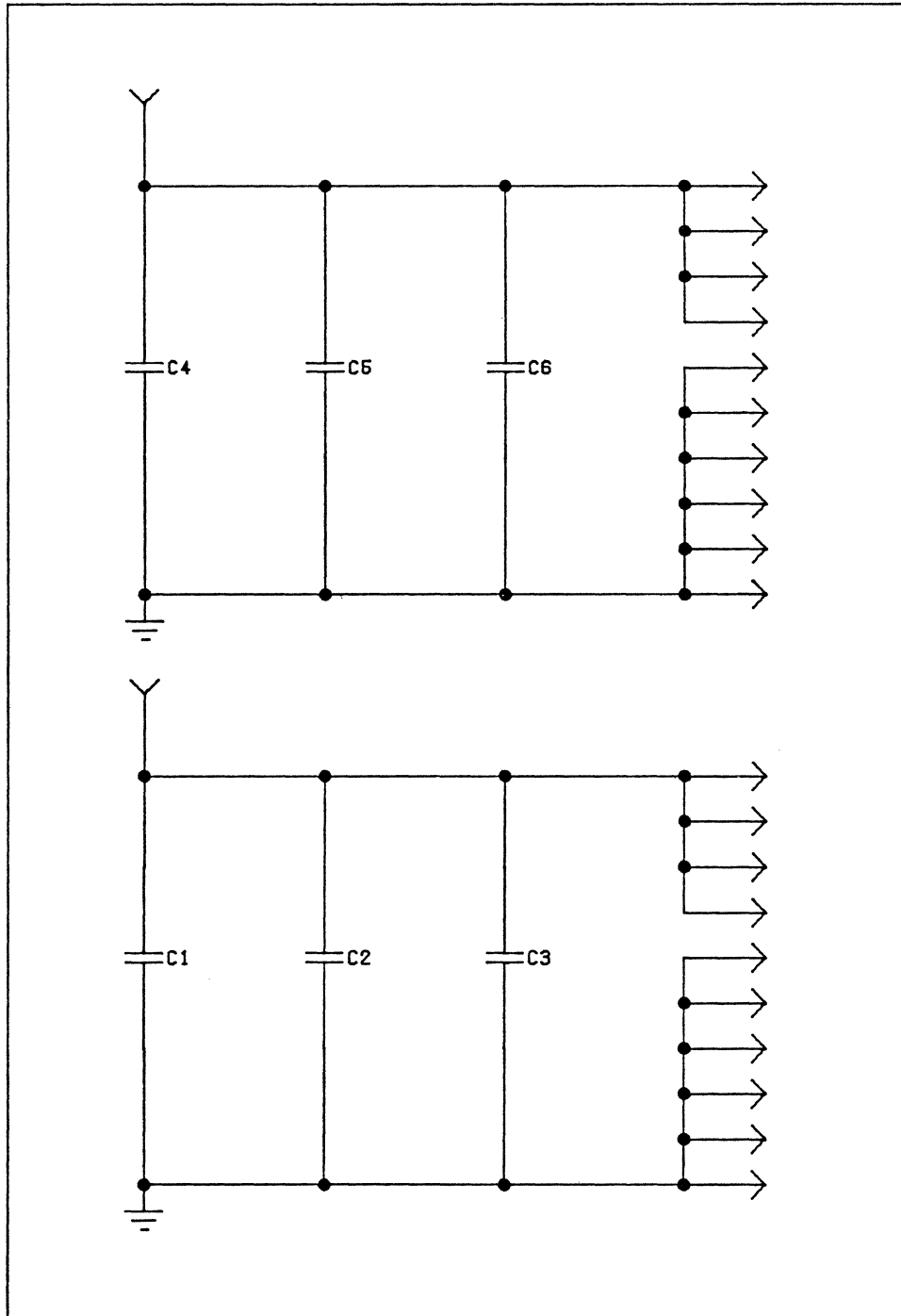


Figure 10-7. Sample 3, Finished Plot

```

$ASAP CARD INPUT AS -- $ASAP,DC$

10 START DRAWING
20 E
30 C
40 -
50 D
60 I
70 G
80 I
90 T
100 I
110 Z
120 I
130 N
140 G
150
160 S
170 C
180 A
190 L
200 E
210
220 S
230 A
240 M
250 P
260 L
270 E
280 4.8010 1.6640 WORK AREA
290 14.0790 1.8350 WORK AREA
300 13.9280 9.3500 WORK AREA

IEC -1
*RMK EC ,DIGITIZING SCALE SAMPLE,X=9.2796,Y=7.5165,*
X=0.0000,Y=0.0000,
/TARGET/,*
X=9.2796,Y=0.0000,
/TARGET/,*
X=9.2796,Y=7.5165,
/TARGET/,*
X0=0.,Y0=0.*

305 E OPTION RESET
306 E NUMBERS
310 START MACRO
320 E
***** ERASE ACCESSED
350 2
360 X
370 -
380 DIGITIZING SCALE
390 2
400 5.2900 2.4360 WORK AREA

IE2X -3
*RMK E2X *
*RMK DIGITIZING SCALE 2.0000*
410 SYMBOL OR MACRO
420 C
430 -
440 C
450 1
460 NORTH
470 LABEL RIGHT
480 5.2560 3.9090 WORK AREA
X=0.0000,Y=0.7500,LR .N ,

```

EC
EC
EC
EC
EC
EC
EC
EC

E2X
E2X
E2X

E2X

Figure 10-8. Sample 3, Output Listing (page 1 of 16)

```

/C      /,
"C1"*      490      C      E2X
           500      2      E2X
           510      7.2430      3.9440      WORK AREA
X=1.0000,Y=0.7500,LR ,N ,
/C      /,
"C2"*      520      C      E2X
           530      3      E2X
           540      9.2840      3.9970      WORK AREA
X=2.0000,Y=0.7500,LR ,N ,
/C      /,
"C3"*      550      SYMBOL OR MACRO      E2X
           560      P
           570      M
           580      REPEAT
           590      11.3110      2.5470      WORK AREA
           600      11.2900      3.0640      WORK AREA
           610      11.2130      7.0720      WORK AREA
X=3.0000,Y=0.0000,E ,      E2X
/PM      /,*      E2X
X=3.0000,Y=0.2500,E ,      E2X
/PM      /,*      E2X
X=3.0000,Y=0.5000,E ,      E2X
/PM      /,*      E2X
X=3.0000,Y=0.7500,E ,      E2X
/PM      /,*      E2X
X=3.0000,Y=1.0000,E ,      E2X
/PM      /,*      E2X
X=3.0000,Y=1.2500,E ,      E2X
/PM      /,*      E2X
X=3.0000,Y=1.5000,E ,      E2X
/PM      /,*      E2X
X=3.0000,Y=1.7500,E ,      E2X
/PM      /,*      E2X
X=3.0000,Y=2.0000,E ,      E2X
/PM      /,*      E2X
X=3.0000,Y=2.2500,E ,      E2X
/PM      /,*      E2X
           620      SYMBOL OR MACRO
           630      S
           640      D
           650      11.2140      7.0520      WORK AREA
X=3.0000,Y=2.2500,E ,      E2X
/SD      /,*      E2X
           660      11.2370      6.5500      WORK AREA
X=3.0000,Y=2.0000,E ,      E2X
/SD      /,*      E2X
           670      11.2490      6.0470      WORK AREA
X=3.0000,Y=1.7500,E ,      E2X
/SD      /,*      E2X
           680      11.2380      4.5300      WORK AREA
X=3.0000,Y=1.0000,E ,      E2X
/SD      /,*      E2X
           690      11.2630      4.0250      WORK AREA
X=3.0000,Y=0.7500,E ,      E2X
/SD      /,*      E2X
           700      11.2840      3.5270      WORK AREA
X=3.0000,Y=0.5000,E ,      E2X
/SD      /,*      E2X
           710      11.2920      3.0480      WORK AREA

```

Figure 10-8. Sample 3, Output Listing (page 2 of 16)

```

X=3.0000,Y=0.2500,E , E2X
/SD /,* 720 11.3160 2.5540 WORK AREA E2X
X=3.0000,Y=0.0000,E , E2X
/SD /,* 730 9.2980 2.5230 WORK AREA E2X
X=2.0000,Y=0.0000,E , E2X
/SD /,* 740 7.2800 2.4800 WORK AREA E2X
X=1.0000,Y=0.0000,E , E2X
/SD /,* 750 5.2870 2.4370 WORK AREA E2X
X=0.0000,Y=0.0000,E , E2X
/SD /,* 760 5.1870 6.9410 WORK AREA E2X
X=0.0000,Y=2.2500,E , E2X
/SD /,* 770 7.2110 6.9870 WORK AREA E2X
X=1.0000,Y=2.2500,E , E2X
/SD /,* 780 9.2180 7.0260 WORK AREA E2X
X=2.0000,Y=2.2500,E , E2X
/SD /,* 790 SYMBOL OR MACRO E2X
800 P E2X
810 F
820 NORTH
830 5.1880 6.9470 WORK AREA
X=0.0000,Y=2.2500,N , E2X
/PE /,* 840 SYMBOL OR MACRO E2X
850 G
860 E
870 5.2910 2.4390 WORK AREA
X=0.0000,Y=0.0000,E , E2X
/GE /,* 880 JOIN E2X
890 5.2050 6.9480 WORK AREA
900 11.3400 2.5620 WORK AREA
CJ, X=-0.0009,Y=-2.2564,X=3.0257,Y=0.0073,* E2X
910 11.3410 2.5610 WORK AREA
920 11.2770 5.0290 WORK AREA
CJ, X=3.0261,Y=0.0067,X=3.0169,Y=1.2411,* E2X
930 11.2330 5.5480 WORK AREA
940 5.2250 6.9330 WORK AREA
CJ, X=2.9997,Y=1.5010,X=0.0089,Y=2.2487,* E2X
950 7.2050 6.9940 WORK AREA
960 7.3100 2.5320 WORK AREA
CJ, X=0.9993,Y=2.2610,X=1.0107,Y=0.0294,* E2X
970 9.3190 2.5130 WORK AREA
980 9.2370 7.0640 WORK AREA
CJ, X=2.0149,Y=0.0014,X=2.0158,Y=2.2772,* E2X
990 END MACRO
T* E2X
- E2X
1000 SYMBOL OR MACRO
1010 E
1020 Z
1030 X
1040 7.5390 2.7280 WORK AREA
X=2.7500,Y=1.0000,E , EC
/E2X /,* 1050 START MACRO EC
1060 E
SYMBOL /E2X / NOT FOUND ON SYMBOL FILE

```

Figure 10-8. Sample 3, Output Listing (page 3 of 16)

10-55

Figure 10-8. Sample 3, Output Listing (page 4 of 16)

```

X=3.0000,Y=2.2500,E , E.5X
/SD /,* 1400 9.4210 9.2810 WORK AREA E.5X
X=3.0000,Y=2.0000,E , E.5X
/SD /,* 1410 9.4220 9.1580 WORK AREA E.5X
X=3.0000,Y=1.7500,E , E.5X
/SD /,* 1420 9.4230 8.7780 WORK AREA E.5X
X=3.0000,Y=1.0000,E , E.5X
/SD /,* 1430 9.4290 8.6540 WORK AREA E.5X
X=3.0000,Y=0.7500,E , E.5X
/SD /,* 1440 9.4300 8.5290 WORK AREA E.5X
X=3.0000,Y=0.5000,E , E.5X
/SD /,* 1450 9.4390 8.4040 WORK AREA E.5X
X=3.0000,Y=0.2500,E , E.5X
/SD /,* 1460 9.4430 8.2680 WORK AREA E.5X
X=3.0000,Y=0.0000,E , E.5X
/SD /,* 1470 8.9370 8.2630 WORK AREA E.5X
X=2.0000,Y=0.0000,E , E.5X
/SD /,* 1480 8.4330 8.2540 WORK AREA E.5X
X=1.0000,Y=0.0000,E , E.5X
/SD /,* 1490 7.9230 8.2480 WORK AREA E.5X
X=0.0000,Y=0.0000,E , E.5X
/SD /,* 1500 7.9190 9.3890 WORK AREA E.5X
X=0.0000,Y=2.2500,E , E.5X
/SD /,* 1510 8.4140 9.3900 WORK AREA E.5X
X=1.0000,Y=2.2500,E , E.5X
/SD /,* 1520 8.9190 9.4010 WORK AREA E.5X
X=2.0000,Y=2.2500,E , E.5X
/SD /,* 1530 SYMBOL OR MACRO E.5X
1540 P
1550 F
1560 NORTH
1570 7.9100 9.3990 WORK AREA
X=0.0000,Y=2.2500,N , E.5X
/PF /,* 1580 SYMBOL OR MACRO E.5X
1590 G
1600 E
1610 7.9220 8.2530 WORK AREA
X=0.0000,Y=0.0000,E , E.5X
/GE /,* 1620 JOIN E.5X
1630 7.9090 9.3940 WORK AREA
1640 9.4410 8.2670 WORK AREA
CJ, X=0.0162,Y=2.2901,X=3.0382,Y=-0.0200,* E.5X
1650 9.4410 8.2670 WORK AREA
1660 9.4290 8.9110 WORK AREA
CJ, X=3.0382,Y=-0.0200,X=3.0379,Y=1.2682,* E.5X
1670 9.4290 9.0380 WORK AREA
1680 7.9050 9.3990 WORK AREA
CJ, X=3.0426,Y=1.5222,X=0.0084,Y=2.3002,* E.5X

```

Figure 10-8. Sample 3, Output Listing (page 5 of 16)

	1690	8.4140	9.3880	WORK AREA	
	1700	8.4300	8.2580	WORK AREA	
CJ,	X=1.0258,Y=2.2595,X=1.0162,Y=-0.0007,*				E.5X
	1710	8.9380	8.2700	WORK AREA	
	1720	8.9150	9.4260	WORK AREA	
CJ,	X=2.0324,Y=0.0046,X=2.0290,Y=2.3170,*				E.5X
	1730	END MACRO			
T*					E.5X
-					E.5X
	1740	SYMBOL OR MACRO			
	1750	E			
	1760	.			
	1770	5			
	1780	X			
	1790	7.4650	5.9700	WORK AREA	
					SYMBOL /E.5X / NOT FOUND ON SYMBOL FILE
X=2.7500,Y=4.2500,E	,				EC
/E.5X /,*					EC
	1800	RECTANGLE			
	1810	6.7930	1.9500	WORK AREA	
	1820	11.6640	9.3130	WORK AREA	
REC,	X=2.0000,Y=0.2500,X=7.0000,Y=7.5000,*				EC
	1830	END DRAWING			
T*					EC
-					EC

Figure 10-8. Sample 3, Output Listing (page 6 of 16)

```

MACRU E2X      INITIAL EDIT AS FULLOWS --
  *RMK E2X      *
  *RMK DIGITIZING SCALE 2,0000*
  X=0.0000,Y=0.7500,LR ,N ,
  /C            /,
  "C1"*
  X=1.0000,Y=0.7500,LR ,N ,
  /C            /,
  "C2"*
  X=2.0000,Y=0.7500,LR ,N ,
  /C            /,
  "C3"*
  X=3.0000,Y=0.0000,E ,
  /PM           /,*
  X=3.0000,Y=0.2500,E ,
  /PM           /,*
  X=3.0000,Y=0.5000,E ,
  /PM           /,*
  X=3.0000,Y=0.7500,E ,
  /PM           /,*
  X=3.0000,Y=1.0000,E ,
  /PM           /,*
  X=3.0000,Y=1.2500,E ,
  /PM           /,*
  X=3.0000,Y=1.5000,E ,
  /PM           /,*
  X=3.0000,Y=1.7500,E ,
  /PM           /,*
  X=3.0000,Y=2.0000,E ,
  /PM           /,*
  X=3.0000,Y=2.2500,E ,
  /PM           /,*
  X=3.0000,Y=2.500,E ,
  /SD           /,*
  X=3.0000,Y=2.0000,E ,
  /SD           /,*
  X=3.0000,Y=1.7500,E ,
  /SD           /,*
  X=3.0000,Y=1.0000,E ,
  /SD           /,*
  X=3.0000,Y=0.7500,E ,
  /SD           /,*
  X=3.0000,Y=0.5000,E ,
  /SD           /,*
  X=3.0000,Y=0.2500,E ,
  /SD           /,*
  X=3.0000,Y=0.0000,E ,
  /SD           /,*
  X=2.0000,Y=0.0000,E ,
  /SD           /,*
  X=1.0000,Y=0.0000,E ,
  /SD           /,*
  X=0.0000,Y=0.0000,E ,
  /SD           /,*
  X=0.0000,Y=2.2500,E ,
  /SD           /,*
  X=1.0000,Y=2.2500,E ,
  /SD           /,*
  X=2.0000,Y=2.2500,E ,
  /SD           /,*
  X=0.0000,Y=2.2500,N ,
  /PF           /,*
  X=0.0000,Y=0.0000,E ,
  /GE           /,*

```

00000100	0
00000200	0
00000300	0
00000400	0
00000500	0
00000600	0
00000700	0
00000800	0
00000900	0
00001000	0
00001100	0
00001200	0
00001300	0
00001400	0
00001500	0
00001600	0
00001700	0
00001800	0
00001900	0
00002000	0
00002100	0
00002200	0
00002300	0
00002400	0
00002500	0
00002600	0
00002700	0
00002800	0
00002900	0
00003000	0
00003100	0
00003200	0
00003300	0
00003400	0
00003500	0
00003600	0
00003700	0
00003800	0
00003900	0
00004000	0
00004100	0
00004200	0
00004300	0
00004400	0
00004500	0
00004600	0
00004700	0
00004800	0
00004900	0
00005000	0
00005100	0
00005200	0
00005300	0
00005400	0
00005500	0
00005600	0
00005700	0
00005800	0
00005900	0
00006000	0
00006100	0
00006200	0
00006300	0

Figure 10-8. Sample 3, Output Listing (page 7 of 16)

CJ,	X=-0.0009,Y=2.2564,X=3.0257,Y=0.0073,*	00006400	0
CJ,	X=3.0261,Y=0.0067,X=3.0169,Y=1.2411,*	00006500	0
CJ,	X=2.9997,Y=1.5010,X=0.0089,Y=2.2487,*	00006600	0
CJ,	X=0.9993,Y=2.2610,X=1.0107,Y=0.0294,*	00006700	0
CJ,	X=2.0149,Y=0.0014,X=2.0158,Y=2.2772,*	00006800	0
T*		99999999	0
. . . END EDIT FOR E2X			

Figure 10-8. Sample 3, Output Listing (page 8 of 16)

```

MACRO E.SX      INITIAL EDIT AS FOLLOWS --
  *RMK E.SX      *
  *RMK DIGITIZING SCALE 0.5000*
  X=0.0000,Y=0.7500,LR ,N ,
  /C      / ,
  "C4"*
  X=1.0000,Y=0.7500,LR ,N ,
  /C      / ,
  "C5"*
  X=2.0000,Y=0.7500,LR ,N ,
  /C      / ,
  "C6"*
  X=3.0000,Y=0.0000,E ,
  /PM      / ,*
  X=3.0000,Y=0.2500,E ,
  /PM      / ,*
  X=3.0000,Y=0.5000,E ,
  /PM      / ,*
  X=3.0000,Y=0.7500,E ,
  /PM      / ,*
  X=3.0000,Y=1.0000,E ,
  /PM      / ,*
  X=3.0000,Y=1.2500,E ,
  /PM      / ,*
  X=3.0000,Y=1.5000,E ,
  /PM      / ,*
  X=3.0000,Y=1.7500,E ,
  /PM      / ,*
  X=3.0000,Y=2.0000,E ,
  /PM      / ,*
  X=3.0000,Y=2.2500,E ,
  /PM      / ,*
  X=3.0000,Y=2.5000,E ,
  /SD      / ,*
  X=3.0000,Y=2.0000,E ,
  /SD      / ,*
  X=3.0000,Y=1.7500,E ,
  /SD      / ,*
  X=3.0000,Y=1.5000,E ,
  /SD      / ,*
  X=3.0000,Y=1.2500,E ,
  /SD      / ,*
  X=3.0000,Y=1.0000,E ,
  /SD      / ,*
  X=3.0000,Y=0.7500,E ,
  /SD      / ,*
  X=3.0000,Y=0.5000,E ,
  /SD      / ,*
  X=3.0000,Y=0.2500,E ,
  /SD      / ,*
  X=3.0000,Y=0.0000,E ,
  /SD      / ,*
  X=2.0000,Y=0.0000,E ,
  /SD      / ,*
  X=1.0000,Y=0.0000,E ,
  /SD      / ,*
  X=0.0000,Y=0.0000,E ,
  /SD      / ,*
  X=0.0000,Y=2.2500,E ,
  /SD      / ,*
  X=1.0000,Y=2.2500,E ,
  /SD      / ,*
  X=2.0000,Y=2.2500,E ,
  /SD      / ,*
  X=0.0000,Y=2.2500,N ,
  /PF      / ,*
  X=0.0000,Y=0.0000,E ,

```

00000100	0
00000200	0
00000300	0
00000400	0
00000500	0
00000600	0
00000700	0
00000800	0
00000900	0
00001000	0
00001100	0
00001200	0
00001300	0
00001400	0
00001500	0
00001600	0
00001700	0
00001800	0
00001900	0
00002000	0
00002100	0
00002200	0
00002300	0
00002400	0
00002500	0
00002600	0
00002700	0
00002800	0
00002900	0
00003000	0
00003100	0
00003200	0
00003300	0
00003400	0
00003500	0
00003600	0
00003700	0
00003800	0
00003900	0
00004000	0
00004100	0
00004200	0
00004300	0
00004400	0
00004500	0
00004600	0
00004700	0
00004800	0
00004900	0
00005000	0
00005100	0
00005200	0
00005300	0
00005400	0
00005500	0
00005600	0
00005700	0
00005800	0
00005900	0
00006000	0
00006100	0
00006200	0

Figure 10-8. Sample 3, Output Listing (page 9 of 16)

/GE	/,*	00006300	0
CJ,	$\lambda=0.0162, Y=2.2901, X=3.0382, Y=-0.0200,*$	00006400	0
CJ,	$\lambda=3.0382, Y=-0.0200, X=3.0379, Y=1.2682,*$	00006500	0
CJ,	$\lambda=3.0426, Y=1.5222, X=0.0084, Y=2.3002,*$	00006600	0
CJ,	$\lambda=1.0258, Y=2.2595, X=1.0162, Y=-0.0007,*$	00006700	0
CJ,	$\lambda=2.0324, Y=0.0046, X=2.0290, Y=2.3170,*$	00006800	0
T*		99999999	0

... END EDIT FOR E.5X

Figure 10-8. Sample 3, Output Listing (page 10 of 16)

MACRU E.5X FINAL EDIT AS FOLLOWS --

```

*RMK E.5X *
*RMK DIGITIZING SCALE 0.5000*
X=0.0000,Y=0.7500,LR ,N ,
/C /,*
"C4"*
X=1.0000,Y=0.7500,LR ,N ,
/C /,*
"C5"*
X=2.0000,Y=0.7500,LR ,N ,
/C /,*
"C6"*
X=3.0000,Y=0.0000,E ,
/PM /,*
X=3.0000,Y=0.2500,E ,
/PM /,*
X=3.0000,Y=0.5000,E ,
/PM /,*
X=3.0000,Y=0.7500,E ,
/PM /,*
X=3.0000,Y=1.0000,E ,
/PM /,*
X=3.0000,Y=1.2500,E ,
/PM /,*
X=3.0000,Y=1.5000,E ,
/PM /,*
X=3.0000,Y=1.7500,E ,
/PM /,*
X=3.0000,Y=2.0000,E ,
/PM /,*
X=3.0000,Y=2.2500,E ,
/PM /,*
X=3.0000,Y=2.5000,E ,
/SD /,*
X=3.0000,Y=2.0000,E ,
/SD /,*
X=3.0000,Y=1.7500,E ,
/SD /,*
X=3.0000,Y=1.0000,E ,
/SD /,*
X=3.0000,Y=0.7500,E ,
/SD /,*
X=3.0000,Y=0.5000,E ,
/SD /,*
X=3.0000,Y=0.2500,E ,
/SD /,*
X=3.0000,Y=0.0000,E ,
/SD /,*
X=2.0000,Y=0.0000,E ,
/SD /,*
X=1.0000,Y=0.0000,E ,
/SD /,*
X=0.0000,Y=0.0000,E ,
/SD /,*
X=0.0000,Y=2.2500,E ,
/SD /,*
X=1.0000,Y=2.2500,E ,
/SD /,*
X=2.0000,Y=2.2500,E ,
/SD /,*
X=0.0000,Y=2.2500,N ,
/PF /,*
X=0.0000,Y=0.0000,E ,

```

```

00000100 100
00000200 200
00000300 300
00000400 400
00000500 500
00000600 600
00000700 700
00000800 800
00000900 900
00001000 1000
00001100 1100
00001200 1200
00001300 1300
00001400 1400
00001500 1500
00001600 1600
00001700 1700
00001800 1800
00001900 1900
00002000 2000
00002100 2100
00002200 2200
00002300 2300
00002400 2400
00002500 2500
00002600 2600
00002700 2700
00002800 2800
00002900 2900
00003000 3000
00003100 3100
00003200 3200
00003300 3300
00003400 3400
00003500 3500
00003600 3600
00003700 3700
00003800 3800
00003900 3900
00004000 4000
00004100 4100
00004200 4200
00004300 4300
00004400 4400
00004500 4500
00004600 4600
00004700 4700
00004800 4800
00004900 4900
00005000 5000
00005100 5100
00005200 5200
00005300 5300
00005400 5400
00005500 5500
00005600 5600
00005700 5700
00005800 5800
00005900 5900
00006000 6000
00006100 6100
00006200 6200

```

Figure 10-8. Sample 3, Output Listing (page 11 of 16)

```

/GE      /,*
X=0.0000,Y=2.2500,*
D,X=0.0000,Y=1.7500,*
X=0.0000,Y=0.7500,*
D,X=0.0000,Y=0.0000,*
D,X=1.0000,Y=0.0000,*
D,X=2.0000,Y=0.0000,*
D,X=3.0000,Y=0.0000,*
X=3.0000,Y=0.0000,*
D,X=3.0000,Y=0.2500,*
D,X=3.0000,Y=0.5000,*
D,X=3.0000,Y=0.7500,*
D,X=3.0000,Y=1.0000,*
D,X=3.0000,Y=1.2500,*
X=3.0000,Y=1.5000,*
D,X=3.0000,Y=1.7500,*
D,X=3.0000,Y=2.0000,*
D,X=3.0000,Y=2.2500,*
D,X=2.0000,Y=2.2500,*
D,X=1.0000,Y=2.2500,*
D,X=0.0000,Y=2.2500,*
X=1.0000,Y=2.2500,*
D,X=1.0000,Y=1.7500,*
X=1.0000,Y=0.7500,*
D,X=1.0000,Y=0.0000,*
X=2.0000,Y=0.0000,*
D,X=2.0000,Y=0.7500,*
X=2.0000,Y=1.7500,*
D,X=2.0000,Y=2.2500,*
T*

. . . END EDIT FOR E.5X

```

```

00006300      6300
00006400      6400
00006500      6500
00006600      6500
00006700      6500
00006800      6500
00006900      6500
00007000      6500
00007100      6500
00007200      6600
00007300      6600
00007400      6600
00007500      6600
00007600      6600
00007700      6600
00007800      6700
00007900      6700
00008000      6700
00008100      6700
00008200      6700
00008300      6700
00008400      6700
00008500      6800
00008600      6800
00008700      6800
00008800      6800
00008900      99999999
00009000      99999999
00009100      99999999
99999999      99999999

```

Figure 10-8. Sample 3, Output Listing (page 12 of 16)

MACRO E2X FINAL EDIT AS FOLLOWS --

```

*RMK E2X *
*RMK DIGITIZING SCALE 2.0000*
X=0.0000,Y=0.7500,LR ,N ,
/C /,
"C1"*
X=1.0000,Y=0.7500,LR ,N ,
/C /,
"C2"*
X=2.0000,Y=0.7500,LR ,N ,
/C /,
"C3"*
X=3.0000,Y=0.0000,E ,
/PM /,*
X=3.0000,Y=0.2500,E ,
/PM /,*
X=3.0000,Y=0.5000,E ,
/PM /,*
X=3.0000,Y=0.7500,E ,
/PM /,*
X=3.0000,Y=1.0000,E ,
/PM /,*
X=3.0000,Y=1.2500,E ,
/PM /,*
X=3.0000,Y=1.5000,E ,
/PM /,*
X=3.0000,Y=1.7500,E ,
/PM /,*
X=3.0000,Y=2.0000,E ,
/PM /,*
X=3.0000,Y=2.2500,E ,
/PM /,*
X=3.0000,Y=2.500,E ,
/SD /,*
X=3.0000,Y=2.0000,E ,
/SD /,*
X=3.0000,Y=1.7500,E ,
/SD /,*
X=3.0000,Y=1.0000,E ,
/SD /,*
X=3.0000,Y=0.7500,E ,
/SD /,*
X=3.0000,Y=0.5000,E ,
/SD /,*
X=3.0000,Y=0.2500,E ,
/SD /,*
X=3.0000,Y=0.0000,E ,
/SD /,*
X=2.0000,Y=0.0000,E ,
/SD /,*
X=1.0000,Y=0.0000,E ,
/SD /,*
X=0.0000,Y=0.0000,E ,
/SD /,*
X=0.0000,Y=2.2500,E ,
/SD /,*
X=1.0000,Y=2.2500,E ,
/SD /,*
X=2.0000,Y=2.2500,E ,
/SD /,*
X=0.0000,Y=2.2500,N ,
/PF /,*
X=0.0000,Y=0.0000,E ,

```

```

00000100 100
00000200 200
00000300 300
00000400 400
00000500 500
00000600 600
00000700 700
00000800 800
00000900 900
00001000 1000
00001100 1100
00001200 1200
00001300 1300
00001400 1400
00001500 1500
00001600 1600
00001700 1700
00001800 1800
00001900 1900
00002000 2000
00002100 2100
00002200 2200
00002300 2300
00002400 2400
00002500 2500
00002600 2600
00002700 2700
00002800 2800
00002900 2900
00003000 3000
00003100 3100
00003200 3200
00003300 3300
00003400 3400
00003500 3500
00003600 3600
00003700 3700
00003800 3800
00003900 3900
00004000 4000
00004100 4100
00004200 4200
00004300 4300
00004400 4400
00004500 4500
00004600 4600
00004700 4700
00004800 4800
00004900 4900
00005000 5000
00005100 5100
00005200 5200
00005300 5300
00005400 5400
00005500 5500
00005600 5600
00005700 5700
00005800 5800
00005900 5900
00006000 6000
00006100 6100
00006200 6200

```

Figure 10-8. Sample 3, Output Listing (page 13 of 16)

```

/GE      /,*
X=0.0000,Y=2.2500,*
D,X=0.0000,Y=1.7500,*
X=0.0000,Y=0.7500,*
D,X=0.0000,Y=0.0000,*
D,X=1.0000,Y=0.0000,*
D,X=2.0000,Y=0.0000,*
D,X=3.0000,Y=0.0000,*
X=3.0000,Y=0.0000,*
D,X=3.0000,Y=0.2500,*
D,X=3.0000,Y=0.5000,*
D,X=3.0000,Y=0.7500,*
D,X=3.0000,Y=1.0000,*
D,X=3.0000,Y=1.2500,*
X=3.0000,Y=1.5000,*
D,X=3.0000,Y=1.7500,*
D,X=3.0000,Y=2.0000,*
D,X=3.0000,Y=2.2500,*
D,X=2.0000,Y=2.2500,*
D,X=1.0000,Y=2.2500,*
D,X=0.0000,Y=2.2500,*
X=1.0000,Y=2.2500,*
D,X=1.0000,Y=1.7500,*
X=1.0000,Y=0.7500,*
D,X=1.0000,Y=0.0000,*
X=2.0000,Y=0.0000,*
D,X=2.0000,Y=0.7500,*
X=2.0000,Y=1.7500,*
D,X=2.0000,Y=2.2500,*
T*

. . . END EDIT FOR E2X

```

```

00006300      6300
00006400      6400
00006500      6500
00006600      6500
00006700      6500
00006800      6500
00006900      6500
00007000      6500
00007100      6500
00007200      6600
00007300      6600
00007400      6600
00007500      6600
00007600      6600
00007700      6600
00007800      6700
00007900      6700
00008000      6700
00008100      6700
00008200      6700
00008300      6700
00008400      6700
00008500      6800
00008600      6800
00008700      6800
00008800      6800
00008900      99999999
00009000      99999999
00009100      99999999
99999999      99999999

```

Figure 10-8. Sample 3, Output Listing (page 14 of 16)

****DRAWING EC STARTS AT SEARCH ADDRESS 1 AND ENDS AT SEARCH ADDRESS 3 ****

Figure 10-8. Sample 3, Output Listing (page 15 of 16)

```

DRAWING EC      FINAL EDIT AS FOLLOWS --
  *RMK EC      ,DIGITIZING SCALE SAMPLE,X=9.2796,Y=7.5165,*
  X=0.0000,Y=0.0000,
  /TARGET/,*
  X=9.2796,Y=0.0000,
  /TARGET/,*
  X=9.2796,Y=7.5165,
  /TARGET/,*
  X0=0.,Y0=0.,*
  X=2.7500,Y=1.0000,E  ,
  /E2X  /,*
  X=2.7500,Y=4.2500,E  ,
  /E.5X /,*
  REC, X=2.0000,Y=0.2500,X=7.0000,Y=7.5000,*
  T*

00000100      100
00000200      200
00000300      300
00000400      400
00000500      500
00000600      600
00000700      700
00000800      800
00000900      900
00001000     1000
00001100     1100
00001200     1200
00001300     1300
99999999     99999999

. . . END EDIT FOR EC

```

Figure 10-8. Sample 3, Output Listing (page 16 of 16)

SAMPLE 4

Sample 4 shows the following:

- Macro creation and placement using Y-mirroring.
- Card edit to cause a macro to be Y-mirrored.

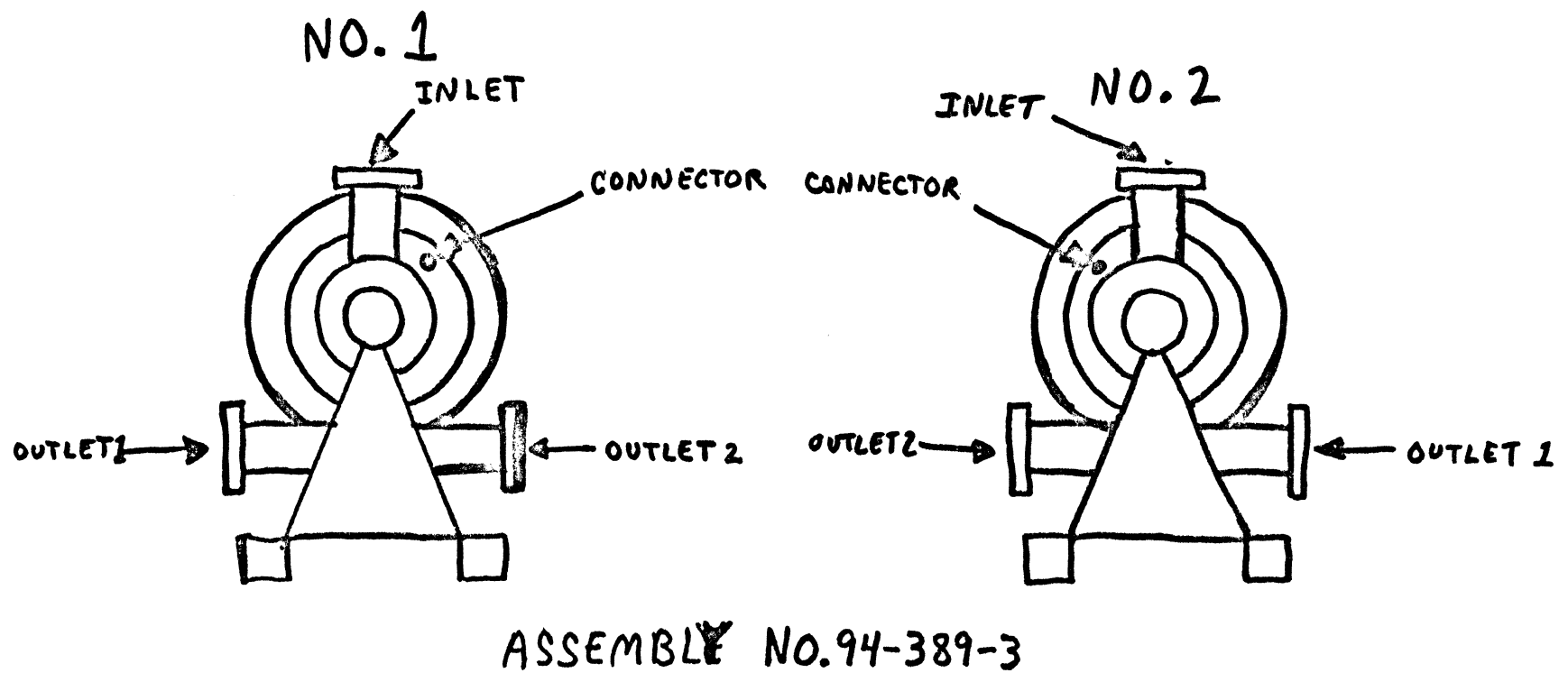


Figure 10-9. Sample 4, Rough Sketch

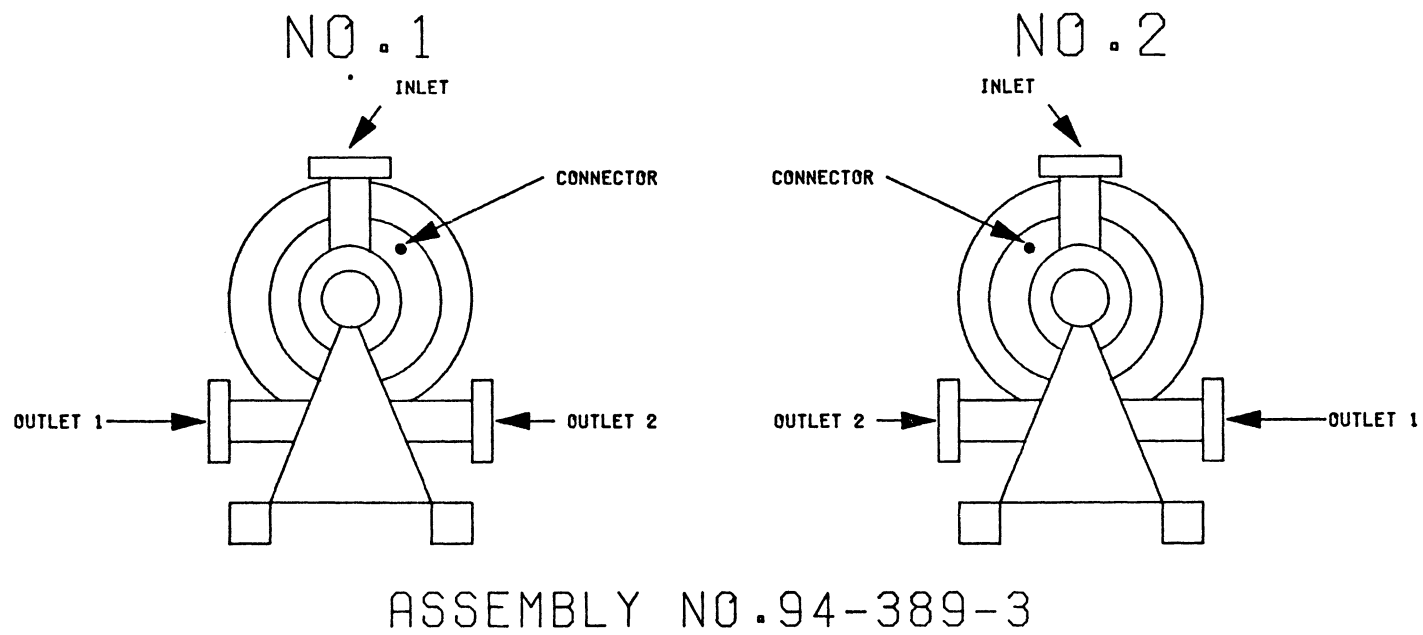


Figure 10-10. Sample 4, Finished Plot

```

$ASAP CARD INPUT AS -- $ASAP,DC$

      10      START DRAWING
      20      E
      30      E
      40      E
      50      -
      60      27.8430      3.2710      WORK AREA
      70      38.3850      3.2680      WORK AREA
      80      38.4030      11.2870      WORK AREA

|EEE      -1
*RMK EEE      ,X=10.5420,Y=8.0190,*
X=0.0000,Y=0.0000,
/TARGET/,*
X=10.5420,Y=0.0000,
/TARGET/,*
X=10.5420,Y=8.0190,
/TARGET/,*
XU=0.,YU=0.*
      90      START MACRO
      100     E
      110     M
      120     5
      130     -
      140     29.3530      3.7690      WORK AREA

|EM5      -3
*RMK EM5      *
      150     RECTANGLE
      160     29.3520      3.7610      WORK AREA
      170     29.6100      4.0000      WORK AREA
REC, X=0.0000,Y=0.0000,X=0.2500,Y=0.2500,*
      180     30.5920      3.7630      WORK AREA
      190     30.8410      4.0090      WORK AREA
REC, X=1.2500,Y=0.0000,X=1.5000,Y=0.2500,*
      200     30.8430      4.2680      WORK AREA
      210     30.9830      4.7690      WORK AREA
REC, X=1.5000,Y=0.5000,X=1.6250,Y=1.0000,*
      220     29.2040      4.2650      WORK AREA
      230     29.3570      4.7750      WORK AREA
REC, X=-0.1250,Y=0.5000,X=0.0000,Y=1.0000,*
      240     29.8730      0.0160      WORK AREA
      250     30.3600      6.1530      WORK AREA
REC, X=0.5000,Y=2.2500,X=1.0000,Y=2.3750,*
      260     CIRCLE
      270     30.1050      5.2740      WORK AREA
      280     30.1540      5.1030      WORK AREA
CIRC=0.1250,X=0.7500,Y=1.5000,*
      290     MAJOR ARC
      300     GRID SIZE
      310     .
      320     0
      330     6
      340     2
      350     5
      360     -
*RMK GRID .0625*
      370     30.2810      4.7730      WORK AREA
      380     30.6570      5.2800      WORK AREA
      390     30.2310      5.7840      WORK AREA
MAJA,X=0.9375,Y=1.0000,X=1.3125,Y=1.5000,X=0.8750,Y=2.0000,*
      400     30.2190      4.9560      WORK AREA
      410     30.4370      5.2840      WORK AREA
      420     30.0920      5.6370      WORK AREA
MAJA,X=0.8750,Y=1.1875,X=1.0625,Y=1.5000,X=0.7500,Y=1.8750,*

```

```

EEE
EEE
EEE
EEE
EEE
EEE
EEE
EEE

```

```

EM5
EM5

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EM5
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EM5
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EM5
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EM5
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EM5
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EM5
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EM5
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EM5
```

```
EM5
```

Figure 10-11. Sample 4, Output Listing (page 1 of 12)

```

430      30.0920      5.0370  WORK AREA
440      29.7750      5.2730  WORK AREA
450      29.9080      4.9600  WORK AREA
MAJA,X=0.7500,Y=1.3750,X=0.4375,Y=1.5000,X=0.6250,Y=1.1875,*      EM5
460      29.9490      5.7640  WORK AREA
470      29.5900      5.2640  WORK AREA
480      29.8980      4.7800  WORK AREA
MAJA,X=0.6250,Y=2.0000,X=0.2500,Y=1.5000,X=0.5625,Y=1.0000,*      EM5
490      29.5470      4.6780  WORK AREA
500      29.3580      5.2750  WORK AREA
510      29.9750      5.9980  WORK AREA
MAJA,X=0.3125,Y=0.9375,X=0.0000,Y=1.5000,X=0.6250,Y=2.2500,*      EM5
520      30.2400      5.9900  WORK AREA
530      30.8420      5.2420  WORK AREA
540      30.4640      4.6490  WORK AREA
MAJA,X=0.8750,Y=2.2500,X=1.5000,Y=1.5000,X=1.1250,Y=0.8750,*      EM5
550      6.5230      2.3150  SYMBOL MENU
560      30.3980      5.5950  WORK AREA
X=1.0625,Y=1.8125,E      ,      EM5
/SD      /,*      EM5
570      LINE
580      SPECIAL
590      30.2230      5.6080  WORK AREA
600      30.2290      6.0230  WORK AREA
X=0.8750,Y=1.8125,*      EM5
0,X=0.8750,Y=2.2500,*      EM5
610      29.9490      6.0310  WORK AREA
620      29.9460      5.5910  WORK AREA
X=0.6250,Y=2.2500,*      EM5
0,X=0.5625,Y=1.8125,*      EM5
630      30.0260      5.1160  WORK AREA
640      29.5840      4.0240  WORK AREA
X=0.6375,Y=1.3750,*      EM5
0,X=0.2500,Y=0.2500,*      EM5
650      29.5840      4.0240  WORK AREA
660      30.5960      4.0070  WORK AREA
X=0.2500,Y=0.2500,*      EM5
0,X=1.2500,Y=0.2500,*      EM5
670      30.5960      4.0070  WORK AREA
680      30.1440      5.1140  WORK AREA
X=1.2500,Y=0.2500,*      EM5
0,X=0.8125,Y=1.3750,*      EM5
690      30.3290      4.6500  WORK AREA
700      30.6080      4.6520  WORK AREA
X=1.0000,Y=0.8750,*      EM5
0,X=1.4375,Y=0.8750,*      EM5
710      30.8280      4.4110  WORK AREA
720      30.4300      4.3880  WORK AREA
X=1.5000,Y=0.6250,*      EM5
0,X=1.0625,Y=0.6250,*      EM5
730      29.7230      4.3880  WORK AREA
740      29.3490      4.4020  WORK AREA
X=0.3750,Y=0.6250,*      EM5
0,X=0.0000,Y=0.6250,*      EM5
750      29.3410      4.6800  WORK AREA
760      29.8550      4.6630  WORK AREA
X=0.0000,Y=0.9375,*      EM5
0,X=0.5000,Y=0.8750,*      EM5
770      ANNOTATION
***** ERASE ACCESSED
800      LABEL LEFT
810      U
820      U
***** ERASE ACCESSED

```

Figure 10-11. Sample 4, Output Listing (page 2 of 12)

```

      850      T
      860      L
      870      E
      880      T
      890
      900      1
      910      -
      920      28.5800      4.5330      WORK AREA
X=-0.7500,Y=0.7500,LL ,
"OUTLET 1"*
      930      ARROW
      940      28.6260      4.5280      WORK AREA
      950      29.1360      4.5270      WORK AREA
ARW ,X=-0.7500,Y=0.7500,X=-0.1875,Y=0.7500,*
      960      31.3460      4.5190      WORK AREA
      970      30.9800      4.5240      WORK AREA
ARW ,X=2.0000,Y=0.7500,X=1.6250,Y=0.7500,*
      980      ANNOTATION
      990      LABEL RIGHT
1000      U
1010      U
1020      T
1030      L
1040      E
1050      T
1060
1070      2
1080      -
1090      31.4190      4.5270      WORK AREA
X=2.0625,Y=0.7500,LK ,
"OUTLET 2"*
1100      ANNOTATION
1110      LABEL RIGHT
1120      C
1130      D
1140      N
1150      N
1160      E
1170      C
1180      T
1190      U
1200      K
1210      -
1220      31.3490      6.0410      WORK AREA
X=2.0000,Y=2.2500,LK ,
"CONNECTOR"*
1230      ARROW
1240      31.2950      6.0500      WORK AREA
1250      30.4610      5.6510      WORK AREA
ARW ,X=1.9375,Y=2.3125,X=1.1250,Y=1.8750,*
1260      30.3150      6.4730      WORK AREA
1270      30.0860      6.1870      WORK AREA
ARW ,X=0.9375,Y=2.0875,X=0.7500,Y=2.4375,*
1280      ANNOTATION
1290      LABEL RIGHT
1300      I
1310      N
1320      L
1330      E
1340      T
1350      -
1360      30.3280      6.5820      WORK AREA
X=1.0000,Y=2.8125,LK ,
"INLET"*

```

EM5
EM5

EM5

EM5

EM5
EM5

EM5
EM5

EM5

EM5

EM5
EM5

Figure 10-11. Sample 4, Output Listing (page 3 of 12)

```

1370 ANNOTATION
1380 LABEL LEFT
1390 LETTER SIZE
1400 .
1410 2
1420 5
1430 -
1440 N
1450 U
1460 .
1470 -
1480 30.1090 6.9120 WORK AREA
X=0.7500,Y=3.1250,LL ,LS= .25,
"NO."*
1490 ANNOTATION
1500 @
1510 LABEL RIGHT
1520 30.0960 6.9440 WORK AREA
X=0.7500,Y=3.1875,LR ,
"@"*
1530 END MACRO
T*
-
1540 SYMBOL OR MACRO
1550 E
1560 M
1570 5
1580 -
1590 1
1600 -
1610 29.3210 3.7780 WORK AREA
X=1.5000,Y=0.5000,E ,
/EM5 /,
"1"*
1620 2
1630 -
1640 WEST
***** ERASE ACCESSED
1690 33.8310 3.7530 WORK AREA
X=0.0000,Y=0.5000,W ,
/EM5 /,
"2"*
1700 ANNGTATION
1710 LETTER SIZE
***** ERASE ACCESSED
1760 .
1770 2
1780 5
1790 -
1800 A
1810 S
1820 S
1830 E
1840 M
1850 B
1860 L
1870 Y
1880 ***** ERASE ACCESSED
1910 N
1920 O
1930 .
1940 9

```

EM5
EM5

EM5
EM5

EM5
EM5

SYMBOL /EM5 / NOT FOUND ON SYMBOL FILE

EEF
EEE
EEE

SYMBOL /EM5 / NOT FOUND ON SYMBOL FILE

EEF
EEE
EEE

Figure 10-11. Sample 4, Output Listing (page 4 of 12)

```
1950 4
1960 -
1970 3
1980 8
1990 9
2000 -
2010 3
2020 -
2030 30.8160 3.2810 WORK AREA
X=3.0000,Y=0.0000,LS= .25,
AR"ASSEMBLY NO.94-389-3"
2040 END DRAWING
EEE
EEE
EEE
```

Figure 10-11. Sample 4, Output Listing (page 5 of 12)

```

MACKO EM5      INITIAL EDIT AS FOLLOWS --
*RMK EM5      *
REC, X=0.0000,Y=0.0000,X=0.2500,Y=0.2500,*
REC, X=1.2500,Y=0.0000,X=1.5000,Y=0.2500,*
REC, X=1.5000,Y=0.5000,X=1.6250,Y=1.0000,*
REC, X=-0.1250,Y=0.5000,X=0.0000,Y=1.0000,*
REC, X=0.5000,Y=2.2500,X=1.0000,Y=2.3750,*
CIRC=0.1250,X=0.7500,Y=1.5000,*
*RMK GRID .0625*
MAJA,X=0.9375,Y=1.0000,X=1.3125,Y=1.5000,X=0.8750,Y=2.0000,*
MAJA,X=0.8750,Y=1.1875,X=1.0625,Y=1.5000,X=0.7500,Y=1.8750,*
MAJA,X=0.7500,Y=1.8750,X=0.4375,Y=1.5000,X=0.6250,Y=1.1875,*
MAJA,X=0.6250,Y=2.0000,X=0.2500,Y=1.5000,X=0.5625,Y=1.0000,*
MAJA,X=0.3125,Y=0.9375,X=0.0000,Y=1.5000,X=0.6250,Y=2.2500,*
MAJA,X=0.8750,Y=2.2500,X=1.5000,Y=1.5000,X=1.1250,Y=0.8750,*
X=1.0625,Y=1.8125,E ,
/SD /,*
X=0.8750,Y=1.8125,*
D,X=0.8750,Y=2.2500,*
X=0.6250,Y=2.2500,*
D,X=0.5625,Y=1.8125,*
X=0.6875,Y=1.3750,*
D,X=0.2500,Y=0.2500,*
X=0.2500,Y=0.2500,*
D,X=1.2500,Y=0.2500,*
X=1.2500,Y=0.2500,*
D,X=0.8125,Y=1.3750,*
X=1.0000,Y=0.8750,*
D,X=1.4375,Y=0.8750,*
X=1.5000,Y=0.6250,*
D,X=1.0625,Y=0.6250,*
X=0.3750,Y=0.6250,*
D,X=0.0000,Y=0.6250,*
X=0.0000,Y=0.9375,*
D,X=0.5000,Y=0.8750,*
X=-0.7500,Y=0.7500,LL ,
"OUTLET 1"*
ARW ,X=-0.7500,Y=0.7500,X=-0.1875,Y=0.7500,*
ARW ,X=2.0000,Y=0.7500,X=1.6250,Y=0.7500,*
X=2.0625,Y=0.7500,LR ,
"OUTLET 2"*
X=2.0000,Y=2.2500,LR ,
"CONNECTUR"*
ARW ,X=1.9375,Y=2.3125,X=1.1250,Y=1.8750,*
ARW ,X=0.9375,Y=2.6875,X=0.7500,Y=2.4375,*
X=1.0000,Y=2.8125,LR ,
"INLET"*
X=0.7500,Y=3.1250,LL ,LS= .25,
"NO."*
X=0.7500,Y=3.1875,LR ,
"@"*
T*
00000100 0
00000200 0
00000300 0
00000400 0
00000500 0
00000600 0
00000700 0
00000800 0
00000900 0
00001000 0
00001100 0
00001200 0
00001300 0
00001400 0
00001500 0
00001600 0
00001700 0
00001800 0
00001900 0
00002000 0
00002100 0
00002200 0
00002300 0
00002400 0
00002500 0
00002600 0
00002700 0
00002800 0
00002900 0
00003000 0
00003100 0
00003200 0
00003300 0
00003400 0
00003500 0
00003600 0
00003700 0
00003800 0
00003900 0
00004000 0
00004100 0
00004200 0
00004300 0
00004400 0
00004500 0
00004600 0
00004700 0
00004800 0
00004900 0
00005000 0
00005100 0

```

... END EDIT FOR EM5

Figure 10-11. Sample 4, Output Listing (page 6 of 12)

```

MACRO EM5      FINAL EDIT AS FOLLOWS --
*RMK EM5      *
REC, X=0.0000,Y=0.0000,X=0.2500,Y=0.2500,*
REC, X=1.2500,Y=0.0000,X=1.5000,Y=0.2500,*
REC, X=1.5000,Y=0.5000,X=1.6250,Y=1.0000,*
REC, X=-0.1250,Y=0.5000,X=0.0000,Y=1.0000,*
REC, X=0.5000,Y=2.2500,X=1.0000,Y=2.3750,*
CIRC=0.1250,X=0.7500,Y=1.5000,*
*RMK GRIU .0625*
MAJA,X=0.9375,Y=1.0000,X=1.3125,Y=1.5000,X=0.8750,Y=2.0000,*
MAJA,X=0.8750,Y=1.1875,X=1.0625,Y=1.5000,X=0.7500,Y=1.8750,*
MAJA,X=0.7500,Y=1.8750,X=0.4375,Y=1.5000,X=0.6250,Y=1.1875,*
MAJA,X=0.6250,Y=2.0000,X=0.2500,Y=1.5000,X=0.5625,Y=1.0000,*
MAJA,X=0.3125,Y=0.9375,X=0.0000,Y=1.5000,X=0.6250,Y=2.2500,*
MAJA,X=0.8750,Y=2.2500,X=1.5000,Y=1.5000,X=1.1250,Y=0.8750,*
X=1.0625,Y=1.8125,E ,
/SD /,*
X=0.8750,Y=1.8125,*
U,X=0.8750,Y=2.2500,*
X=0.6250,Y=2.2500,*
U,X=0.5625,Y=1.8125,*
X=0.6875,Y=1.3750,*
U,X=0.2500,Y=0.2500,*
X=0.2500,Y=0.2500,*
U,X=1.2500,Y=0.2500,*
X=1.2500,Y=0.2500,*
U,X=0.8125,Y=1.3750,*
X=1.0000,Y=0.8750,*
U,X=1.4375,Y=0.8750,*
X=1.5000,Y=0.6250,*
U,X=1.0625,Y=0.6250,*
X=0.3750,Y=0.6250,*
U,X=0.0000,Y=0.6250,*
X=0.0000,Y=0.9375,*
U,X=0.5000,Y=0.8750,*
X=-0.7500,Y=0.7500,LL ,
"OUTLET 1"*
ARW ,X=-0.7500,Y=0.7500,X=-0.1875,Y=0.7500,*
ARW ,X=2.0000,Y=0.7500,X=1.6250,Y=0.7500,*
X=2.0625,Y=0.7500,LR ,
"OUTLET 2"*
X=2.0000,Y=2.2500,LR ,
"CONNECTOR"*
ARW ,X=1.9375,Y=2.3125,X=1.1250,Y=1.8750,*
ARW ,X=0.9375,Y=2.6875,X=0.7500,Y=2.4375,*
X=1.0000,Y=2.8125,LR ,
"INLET"*
X=0.7500,Y=3.1250,LL ,LS= .25,
"NU."*
X=0.7500,Y=3.1875,LR ,
"@"*
T*
00000100      100
00000200      200
00000300      300
00000400      400
00000500      500
00000600      600
00000700      700
00000800      800
00000900      900
00001000     1000
00001100     1100
00001200     1200
00001300     1300
00001400     1400
00001500     1500
00001600     1600
00001700     1700
00001800     1800
00001900     1900
00002000     2000
00002100     2100
00002200     2200
00002300     2300
00002400     2400
00002500     2500
00002600     2600
00002700     2700
00002800     2800
00002900     2900
00003000     3000
00003100     3100
00003200     3200
00003300     3300
00003400     3400
00003500     3500
00003600     3600
00003700     3700
00003800     3800
00003900     3900
00004000     4000
00004100     4100
00004200     4200
00004300     4300
00004400     4400
00004500     4500
00004600     4600
00004700     4700
00004800     4800
00004900     4900
00005000     5000
99999999     5100

```

... END EDIT FOR EM5

Figure 10-11. Sample 4, Output Listing (page 7 of 12)

****DRAWING CEE STARTS AT SEARCH ADDRESS 1 AND ENDS AT SEARCH ADDRESS 3 ****

Figure 10-11. Sample 4, Output Listing (page 8 of 12)

```

DRAWING EEE      INITIAL EDIT AS FOLLOWS --
*RMK EEE      ,X=10.5420,Y=8.0190,*
X=0.0000,Y=0.0000,
/TARGET/,*
X=10.5420,Y=0.0000,
/TARGET/,*
X=10.5420,Y=8.0190,
/TARGET/,*
XD=0.,YD=0.*
X=1.5000,Y=0.5000,E      ,
/EM5      /,
"1"*
X=6.,Y=.5,YM,E,
/EM5      /,
"2"*
X=3.0000,Y=0.0000,LS= .25,
AR"ASSEMBLY NU.94-389-3"*
. . . END EDIT FOR EEE
CARD EDITED

```

00000100	100
00000200	200
00000300	300
00000400	400
00000500	500
00000600	600
00000700	700
00000800	800
00000900	900
00001000	1000
00001100	1100
00001200	1200
00001300	1300
00001400	1400
00001500	1500
00001600	1600

Figure 10-11. Sample 4, Output Listing (page 9 of 12)

\$ASAP CARD INPUT AS -- \$ASAP,ALC\$

Figure 10-11. Sample 4, Output Listing (page 10 of 12)

```

MACRO EM5      INITIAL EDIT AS FOLLOWS --
*RMK EM5      *
REC, X=0.0000,Y=0.0000,X=0.2500,Y=0.2500,*
REC, X=1.2500,Y=0.0000,X=1.5000,Y=0.2500,*
REC, X=1.5000,Y=0.5000,X=1.6250,Y=1.0000,*
REC, X=-0.1250,Y=0.5000,X=0.0000,Y=1.0000,*
REC, X=0.5000,Y=2.2500,X=1.0000,Y=2.3750,*
CIRC=.175,X=.75,Y=1.5,*
*RMK GRID .0625*
MAJA,X=0.9375,Y=1.0000,X=1.3125,Y=1.5000,X=0.8750,Y=2.0000,*
MAJA,X=0.8750,Y=1.1875,X=1.0625,Y=1.5000,X=0.7500,Y=1.8750,*
MAJA,X=0.7500,Y=1.8750,X=0.4375,Y=1.5000,X=0.6250,Y=1.1875,*
MAJA,X=0.6250,Y=2.0000,X=0.2500,Y=1.5000,X=0.5625,Y=1.0000,*
MAJA,X=.625,Y=2.225,X=0.0,Y=1.5,X=.3125,Y=.875,*
MAJA,X=1.125,Y=.875,X=1.5,Y=1.5,X=.875,Y=2.225,*
X=1.0625,Y=1.8125,E ,
/SD ,/*
X=0.8750,Y=1.8125,*
D,X=0.8750,Y=2.2500,*
X=0.6250,Y=2.2500,*
D,X=.625,Y=1.83,*
X=.6875,Y=1.325,*
D,X=0.2500,Y=0.2500,*
X=0.2500,Y=0.2500,*
D,X=1.2500,Y=0.2500,*
X=1.2500,Y=0.2500,*
D,X=.8,Y=1.325,*
X=1.0000,Y=0.8750,*
D,X=1.5,Y=.875,*
X=1.5000,Y=0.6250,*
D,X=1.0625,Y=0.6250,*
X=0.3750,Y=0.6250,*
D,X=0.0000,Y=0.6250,*
X=0.0,Y=.875,*
D,X=0.5000,Y=0.8750,*
X=-0.7500,Y=0.7500,LL ,
"OUTLET 1"*
ARW ,X=-0.7500,Y=0.7500,X=-0.1875,Y=0.7500,*
ARW,X=2.,Y=.75,X=1.65,Y=.75,*
X=2.0625,Y=0.7500,LR ,
"OUTLET 2"*
X=2.0000,Y=2.2500,LR ,
"CONNECTOR"*
ARW,X=1.9375,Y=2.25,X=1.1,Y=1.85,*
ARW ,X=0.9375,Y=2.6875,X=0.7500,Y=2.4375,*
X=1.0000,Y=2.8125,LR ,
"INLET"*
X=1.0,Y=3.125,LL,LS=.25,
"NO."*
X=1.0,Y=3.125,LR,LS=.25,
"@"*
T*
99999999 99999999
. . . END EDIT FOR EM5

```

Figure 10-11. Sample 4, Output Listing (page 11 of 12)

```

DRAWING EEE      INITIAL EDIT AS FOLLOWS --
  *R *K EEE      ,X=10.5420,Y=8.0190,*
  X=0.0000,Y=0.0000,
  /TARGET/,*
  X=10.5420,Y=0.0000,
  /TARGET/,*
  X=10.5420,Y=8.0190,
  /TARGET/,*
  XJ=0.,YJ=0.*
  X=1.5000,Y=0.5000,E      ,
  /EM5      /,
  "1" *
  X=0.,Y=0.5,YM,E,
  /EM5      /,
  "2" *
  X=3.0000,Y=0.0000,LS= .25,
  AR"ASSEMBLY NJ.94-389-3"*
. . . END EDIT FOR EEE

```

```

00000100      100
00000200      200
00000300      300
00000400      400
00000500      500
00000600      600
00000700      700
00000800      800
00000900      900
00001000     1000
00001100     1100
00001200     1200
00001300     1300
00001400     1400
00001500     1500
00001600     1600

```

Figure 10-11. Sample 4, Output Listing (page 12 of 12)

Section 11

CONTINUITY CONNECTIONS AND AUTOMATIC NUMBERING

CONTINUITY CONNECTION MODES

The Continuity Connection Modes are designed to aid the user in making the various connections required on a typical schematic. All of the interconnections required could be done using LINE Mode. However, when in LINE Mode, consideration must be given to the size at which the symbols were drawn, the GRID SIZE specified in placing the symbols, the GRID SIZE to be used in placing the lines or connections, etc.

The Continuity Connection Modes allow the user to define a connection from Point A to Point B (see Figure 11-1). The program moves Point A to the "closest" Junction Point coordinate P2 and Point B to the "closest" Junction Point coordinate P3. Junction Point coordinates are those coordinates generated by prior placement of symbols, macros, lines, rectangles, circles, etc. The term "closest" is defined as the coordinate closest to the specified point within a one-inch circle whose center is at the specified point. Therefore, the connection line will be from P2 to P3 (see Figure 11-1). If a Junction Point coordinate is not found within each of the one-inch circles, the connection will not be made.

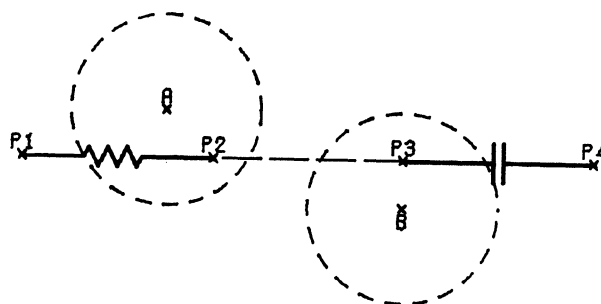


Figure 11-1. Example of Closest Junction Point

The method of selecting the connecting points described above is common to the three continuity modes (JUNCTION CONNECT, JOIN, and JOIN CONNECTOR). This enables interconnections to be made without having to position the digitizer cursor at the precise locations at which the connections are to take place. Therefore, the gapping and butting problems normally associated with point-to-point connections are minimized.

In processing the A.S.A.P. language commands for continuity connections, the program will replace the continuity commands with the appropriate A.S.A.P. language statements for drawing lines.

JOIN

JOIN allows two Junction Point coordinates to be connected orthogonally. The direction of the connection will be counterclockwise from the first coordinate to the second coordinate. If the two coordinates have a common axis, the order of the point specification is immaterial as the connection will be a straight line. Symbols within the connecting path will not be redrawn if the Junction Points defined within the Symbol lie on the connecting path.

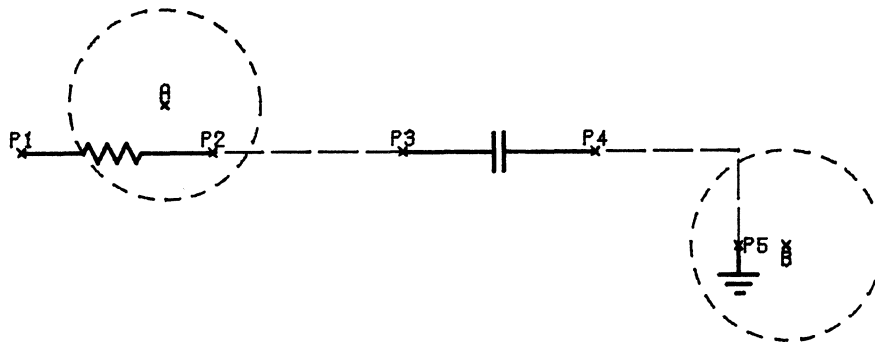
Digitizer accesses:

- 1) JOIN
- 2) Pairs of work area accesses

A.S.A.P. statement:

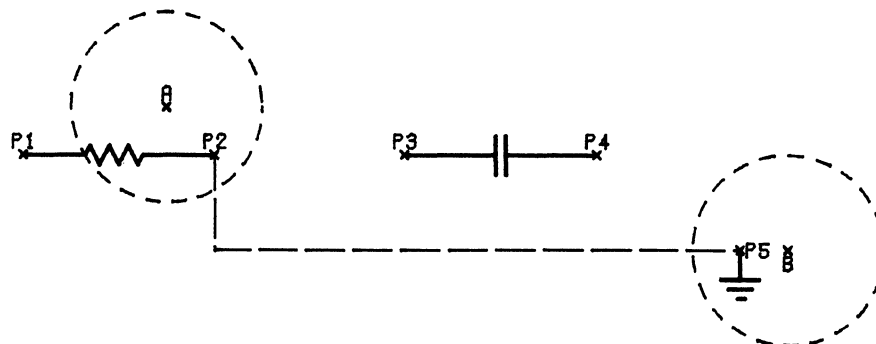
CJ, X=nn.nnn, Y=nn.nnn, X=nn.nnn, Y=nn.nnn,*

Example 1: JOIN from Point B to Point A



Connection will be “” shaped from P5 to P4 and then a straight line from P3 to P2.

Example 2: JOIN from Point A to Point B



Connection will be “” shaped from P2 to P5.

JOIN CONNECTOR

JOIN CONNECTOR allows a straight line connection terminated by a connector symbol (solder-dot) to be made between two Junction Point coordinates. The direction of the connection with connector symbol will be counterclockwise and orthogonal from the first coordinate to the second coordinate. If the two coordinates have a common axis, the order of the point specification is such that placement of the connector symbol will be at the second coordinate. Symbols within the connecting path will not be overdrawn if the Junction Points defined within the Symbol lie within the connecting path.

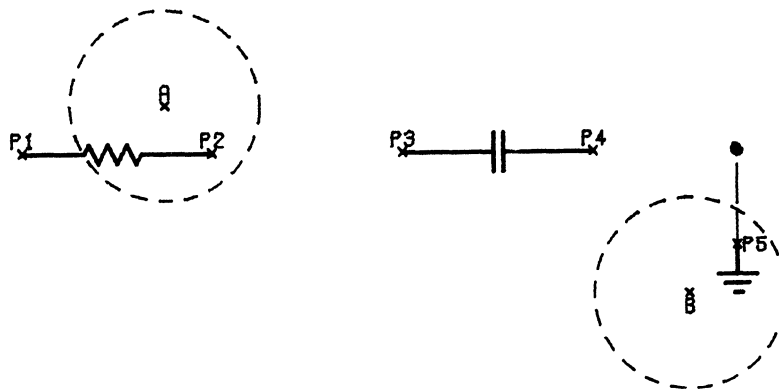
Digitizer access:

- 1) JOIN CONNECTOR
- 2) Pairs of work area accesses

A.S.A.P. statement

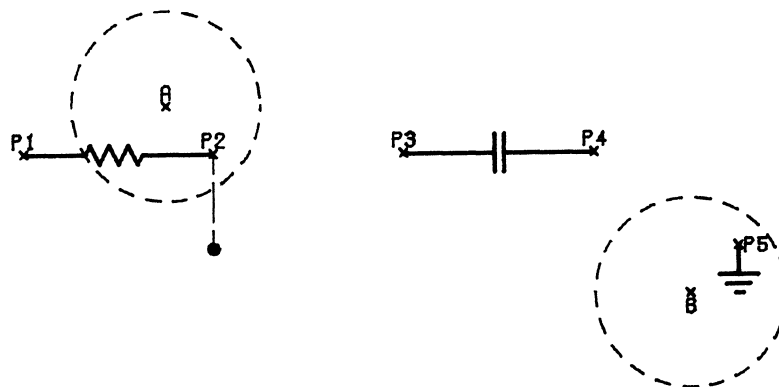
CJC, X=nn.nnn, Y=nn.nnn, X=nn.nnn, Y=nn.nnn,*

Example 1: JOIN CONNECTOR from Point B to Point A.



Connection with connector symbol will be from P5 to Y-value of P2.

Example 2: JOIN CONNECTOR from Point A to Point B.



Connection with connector symbol will be from P2 to Y-value of P5.

JUNCTION CONNECT

JUNCTION CONNECT allows two Junction Point coordinates to be connected by a straight line. All symbols within the connecting path will be overdrawn.

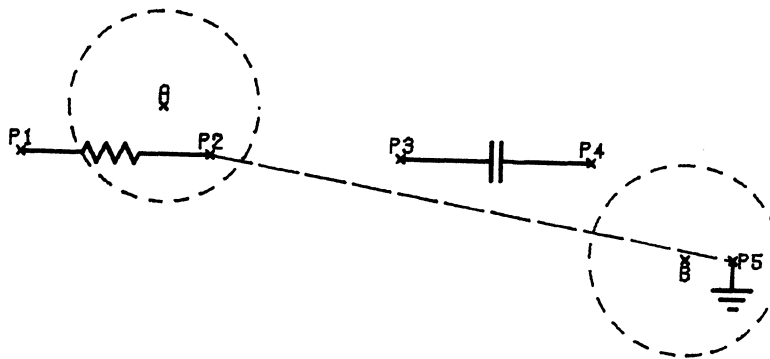
Digitizer accesses:

- 1) JUNCTION CONNECT
- 2) Pairs of work area accesses

A.S.A.P. statement:

JC, X=nn.nnn, Y=nn.nnn, X=nn.nnn, Y=nn.nnn,*

Example: JUNCTION CONNECT from Point B to Point A.



Connection will be a straight line from P5 to P2.

AUTOMATIC NUMBERING

Automatic numbering allows eligible symbols (those symbols having (1) a component class designator and (2) been placed while the NUMBERS option is "on") to be automatically numbered on the drawing. This numbering is done by component class and occurs from top to bottom and from left to right within each zone on the drawing as specified by the ANBR = n option on the \$ASAP system control card.

When symbols are introduced into the system, a symbol component class designator may be specified. For example, all of the various transistors may have a common component designator Q by which they will be sequentially numbered as described above on the drawing. If the component designator is not specified when the symbol is defined, that symbol will never be eligible for automatic numbering. During the translation of the digitizer coordinates into A.S.A.P. statements, all eligible symbols will have a special character generated as part of the symbol label. This character will be replaced by the appropriate automatic number when the ANBR = n option on the \$ASAP system control card is specified. Until the ANBR = n option is specified, the special character will not be plotted on the drawing.

The ANBR = n option, as stated, causes the drawing to be automatically numbered by component class from top to bottom and from left to right within each zone of n-inches on the y-axis of the drawing. For example, ANBR = 6 causes symbols to be numbered from top to bottom and from left to right in 6-inch zones or strips across the drawing. The number of zones on a drawing will be determined by rounding the y-dimension of the drawing as specified by the drawing orientation coordinates (see START DRAWING) to the closest drawing format size listed: 8½, 11, 17, 22, 34, 40, 42, 44, or 48 inches. Once a standard format size has been selected, zones begin at the top of the format size selected and continue down the drawing until all specified zones are completed. Symbols falling above and/or below the format size selected will be contained in a zone above and/or below the specified zones and will be of an indeterminate size.

The drawing should be completed and expanded (see EXPN on the \$ASAP system control card) prior to selection of automatic numbering. If a drawing has not been expanded, symbols within macros will not be automatically numbered.

Subsequent additions to the drawing can be automatically numbered and each component class number will begin with the next available number in that class.

NUMBERS

NUMBERS causes all subsequent eligible symbols to be automatically numbered on the drawing. This numbering is done by component designator class and occurs from top to bottom/left to right on the drawing. The NUMBERS option may be turned “on” and “off” as desired. Initially, the NUMBERS option is turned “off.”

- METHOD 1:

Turn NUMBERS “on.”

Digitizer access:

1) NUMBERS

A.S.A.P. statement:

None

- METHOD 2:

Turn NUMBERS “off.”

Digitizer access:

1) OPTION RESET

2) NUMBERS

A.S.A.P. statement:

None

Section 12 PAINTING

The painting instructions enable the user to specify a set of points defining a closed polygon which will then be entirely painted in when plotted on a CalComp Photoplotter. Almost any shape figure can be painted. Concentric polygons to any level may be defined forming one set of polygons. To provide a sharp outline, the entire figure is first outlined with the smallest aperture and then painted in with an optimum aperture selected from those available.

SPECIFYING APERTURE SIZES

The user must select the aperture sizes that are to be used in Painting. If the required aperture sizes are available from the standard aperture sizes used in A.S.A.P., it is not necessary to redefine them. However, the aperture sizes are other than standard, then the user must enter them in the aperture specification card. The order in which aperture sizes are entered corresponds to the pen number to be used when the plot is made on the photoplotter. Round apertures are positive; square or special apertures are negative. The program will select only from the round apertures for both outlining and painting a figure. The aperture sizes specified must be the true values of line widths obtained, taking into account the minification ratio.

The following aperture specification card could have been used to enter the aperture sizes listed in Table 12-1.

COL. 1



IMPORTANT

If the aperture specification card is to be used, then "APTR" must be inserted into the \$ASAP card. The aperture specification card must then immediately follow the \$ASAP card.

The standard aperture setup is shown in Table 12-1.

TABLE 12-1. A.S.A.P. APERTURE SETUP

PEN NUMBER	APERTURE SIZE	MINIFICATION RATIO	RESULTANT APERTURE SIZE
1	.100R	2	.050R
2	.050S	2	.025S
3	.060R	2	.030R
4	.350R	5	.070R
5	.150R	10	.015R
6	.250R	10	.025R
7	.150S	10	.015S
8	.050R	10	.005R

With the standard aperture setup, Pen 8 would be used to outline each figure, and one of the pens 1, 3, 4, 5, 6, or 8 would be selected for painting each figure, depending on its size and shape.

SPECIFYING A POLYGON

The points defining a polygon must be ordered so that for each line (X_i, Y_i) , (X_{i+1}, Y_{i+1}) the area to be painted lies to the left when traveling along the line from point i to point $i+1$. Thus points should be specified counterclockwise for an outside boundary, and clockwise for an interior boundary. The starting point is immaterial.

NOTE: Each polygon must be closed by specifying the end point and the starting point as the same.

In Figure 12-1, there are two separate polygons, the first defined by points 1-5, the second by points 6-18.

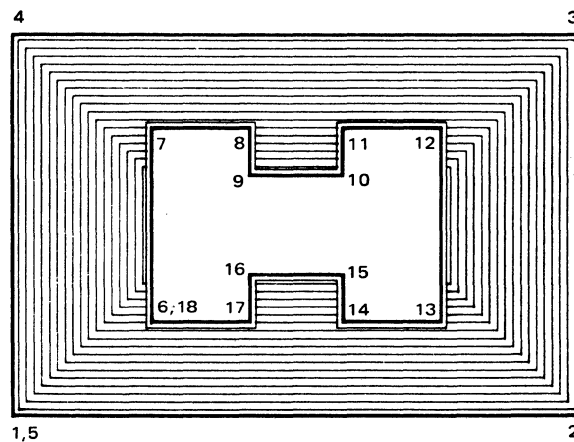


Figure 12-1. Sample Plot A

The following A.S.A.P. statements would cause the figure to be painted as shown:

PNT*

X=0.0 , Y=0.0*

X=3.0 , Y=0.0*

X=3.0 , Y=2.0*

X=0.0 , Y=2.0*

X=0.0 , Y=0.0*

X=0.75, Y=0.50*

X=0.75, Y=1.50*

X=1.25, Y=1.50*

X=1.25, Y=1.25*

X=1.75, Y=1.25*

X=1.75, Y=1.50*

X=2.25, Y=1.50*

X=2.25, Y=0.50*

X=1.75, Y=0.50*

X=1.75, Y=0.75*

X=1.25, Y=0.75*

X=1.25, Y=0.50*

X=0.75, Y=0.50*

ENDP*

The maximum number of points permitted in any set of polygons is 1000; the maximum number of polygons is 200; the minimum number of points per polygon is four.

HOW PAINTING WORKS

Suppose that the smallest aperture is of size W . The painting operation is done in five stages:

1. First, each point is moved into the interior of the area to be painted by a distance equal to $W/2$. The smallest aperture is selected, and the points of each polygon are connected. This has the effect of outlining each polygon of the figure (on the correct side) so that the figure will have the exact dimensions specified. The last line drawn for each polygon, which closes it by connecting to the starting point, is shortened by an amount $W/2$ so that there will be no blooming effect at the starting point caused by double exposure.
2. Next, an optimum aperture is selected for painting the figure. This is done by determining the largest aperture which will fit through the smallest channel of the entire figure.
3. Based on the ratio between the size of the painting aperture and the smallest aperture, the entire figure is now reoutlined, with the smallest aperture, a sufficient number of times to ensure that no gaps are left in the corners when using the painting aperture.
4. The painting aperture is now selected and the entire figure is outlined once with this aperture.
5. The interior of the figure is now painted in with the painting aperture using the following algorithm:

A rectangle, which is just large enough to contain the entire figure, is established parallel to the X,Y axes of the plotter. The pen is moved to the lower right-hand corner of this

rectangle and is put down if the point is inside the figure, or up if the point is outside the figure. A rectangle is now drawn counterclockwise, and the pen alternates position (up or down) each time it crosses one of the lines defining the figure. When completed, this rectangle is then shrunk in all directions by an amount equal to the width of the painting aperture, less an overlap factor. The rectangle is then drawn again. This process is repeated, each time shrinking the dimensions of the rectangle, until the figure is completely painted in. For the sake of plotting efficiency, multiple pen up moves, which may be generated by the algorithm, are combined into a single move.

PLOTTING CONSIDERATIONS

Almost any shape figure may be painted. One restriction is that the narrowest channel of the figure be at least 1.5 times the smallest aperture width. Any figure that contains an acute angle will be painted exclusively with the smallest aperture, because of the method of selecting the optimum aperture. It may be worthwhile, in the interest of plotting efficiency, to segregate those figures which can be painted with a fairly large aperture from those that require the smallest aperture, to avoid a large figure with one narrow channel or one acute angle being painted with a very small aperture. Such division of the input, if desired, is left to the user.

Since aperture selection is data dependent, data must be scaled to the proper size directly before painting.

Keep in mind that the smallest aperture available determines the sharpness of corners in the photoplot. Since the figure is outlined with the smallest round aperture available, each exterior corner of the plot will actually be rounded with a radius of $W/2$, if W is the width of the smallest aperture. Increasing W will result in somewhat faster plotting at the expense of more rounded corners.

SAMPLE PLOTS

Figure 12-1 is a pen plot produced from the sample data shown (see Page 12-2).

Figure 12-2 shows the corresponding plot produced on a photoplotter.

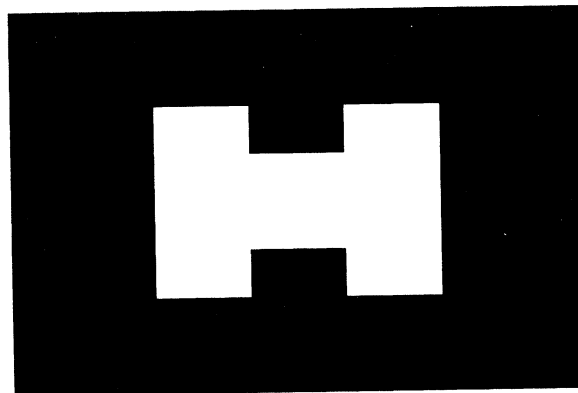


Figure 12-2. Sample Plot B

Figure 12-3 was produced with one set of painting instructions, defining 15 polygons of 5 points each.

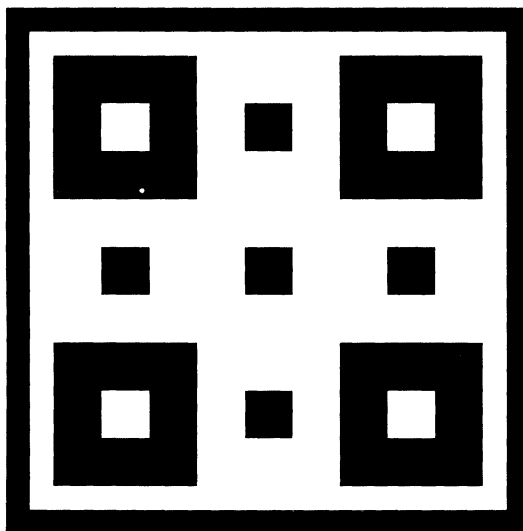


Figure 12-3. Sample Plot C

Figure 12-4 was also produced with one set of painting instructions defining 5 polygons of 5 points each.

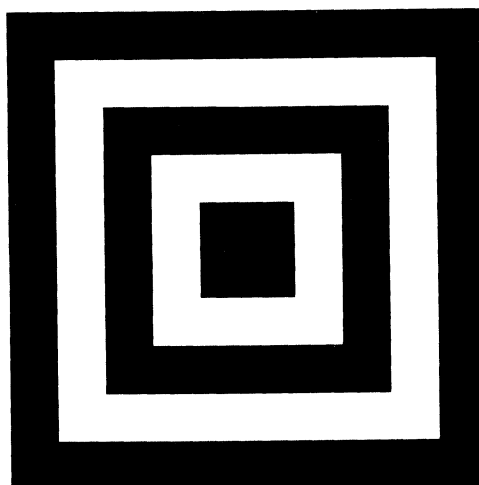


Figure 12-4. Sample Plot D

Figure 12-5 was produced with 94 sets of painting instructions, one set to plot each figure. Each set except for the rectangle at the lower right of the plot, consisted of a single polygon, ranging from 5 to 25 points. The rectangle at the lower right consists of 16 polygons and totals 100 points.

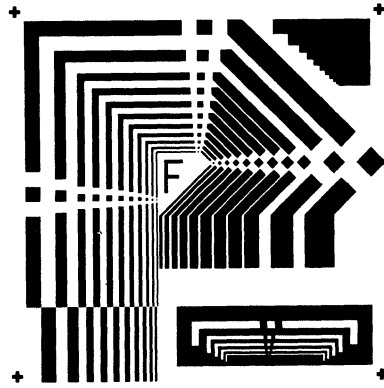


Figure 12-5. Sample Plot E

PAINT

PAINT allows the specification of polygons to be painted.

Digitizer accesses:

- 1) PAINT
- 2) Work area (starting point of polygon)
- 3) Work area (intermediate points defining the polygon)
- .
- .
- .
- .
- n) Work area (ending point of polygon; must be same as starting point)

NOTE: Subsequent work area accesses may be specified for additional polygons.

A.S.A.P. statements:

PNT*

X=nn.nnn,Y=nn.nnn*

X=nn.nnn,Y=nn.nnn*

.

.

.

.

X=nn.nnn,Y=nn.nnn*

ENDP

ENDP specifies the end of a set of polygons to be painted.

Digitizer access:

Any menu access following the work area accesses defining the polygons.

A.S.A.P. statement:

ENDP*

Section 13

Intentionally left blank

Appendix 1 A.S.A.P. SAMPLE ELECTRONIC SYMBOL MENU

MENU NUMBER 1

Appendix 2 A.S.A.P. SAMPLE HYDRAULIC SYMBOL MENU

MENU NUMBER 2

ACV	ADV	ASA (1/2 82)	AMV	BCV	BIL	BVV
BRV	BSV	CAV	CBC	CBV	CCV	CDV
CEV	CFC (1/2 82)	CFV	COV	CHV	C-V	CKV
CNV	COV	CP3	CRO	CSR (1/2 82)	CVN	CX
CY	CYA (1/4 82)	CYB (1/4 82)	DNC (1/2 82)	DNO (1/2 82)	DDT	DNC (1/2 82)
FCA	FSA (1/2 82)	FSB (1/2 82)	FSW	HAS (1/2 82)	HFC (1/2 82)	ICP (1/2 82)
IPS (1/2 82)	LSR (1/2 82)	MLI	MOR	MSO	ORA	ORI
PQA	PSW	PWM (1/2 82)	RIL	SDE	SEM	SMO
SPA	SPB	SUL	SYA	TOA	TDR	ZD (1/2 82)

Appendix 3
A.S.A.P. CHARACTER SETS – PUNCH CODE

Keyboard:	<u>IBM370</u>	<u>CDC6000</u>	<u>UN1100</u>	<u>HIS6000</u>
A-Z } 0-9 } blank }	standard Hollerith punch code			
+	12-8-6	12	12	12-0
-	11	11	11	11
=	8-6	8-3	8-3	0-8-5
.	12-8-3	12-8-3	12-8-3	12-8-3
,	0-8-3	0-8-3	0-8-3	0-8-3
/	1-0	1-0	1-0	1-0
(	12-8-5	0-8-4	0-8-4	12-8-5
)	11-8-5	12-8-4	12-8-4	11-8-5
:	8-2	8-2	8-5	8-5
;	11-8-6	12-8-7	11-8-6	11-8-6
%	0-8-4	8-6	0-8-5	0-8-4
&	12		8-2	12
'	8-5		8-5	11-8-7
±	11-9-7			
Line feed up	0-8-6>	11-8-7>	8-6>	8-6>
Line feed down	12-8-4<	12-0<	12-8-6<	12-8-6<
Variable annotation	8-4@	12-8-6␣	0-8-7□	8-4@
Enclose annotation	8-7”	8-4++	0-8-2++	0-8-6”
Begin edit	12-8-7	8-7⌈	12-8-5⌈	8-2⌈
End edit	0-8-5—	0-8-2⌋	11-8-5⌋	12-8-4⌋
End of statement	11-8-4*	11-8-4*	11-8-4*	11-8-4*
String edit:				
Begin string	8-3#	0-8-6≡	12-8-7#	8-3#
End string	11-8-3\$	11-8-3\$	11-8-3\$	11-8-3\$
Replace first	0-8-7?	0-8-7^	12-0?	8-7?
Replace all	11-8-2!	11-0√	11-0!	0-8-7!
Match any	11-8-7␣	8-5≤	0-8-6\	12-8-7\
Match blanks	12-8-2¢	12-8-5≥	11-8-7△	11-0‡

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