

ADVANCE COPY

IDENTIFICATION

PRODUCT CODE:	MAINDEC 08-D6CC-D (D)
PRODUCT NAME:	PDP-8 CALCOMP PLOTTER DIAGNOSTIC
DATE CREATED:	APRIL 1, 1969
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	ROBERT E. CHRISTOPHER

1. ABSTRACT

The PDP-8 Calcomp Plotter Diagnostic may be run using the PDP-8, 8I or 8L computers. It may be used to test the 12 inch 10 Mil, the 12 inch 5 Mil, the 31 inch 10 Mil, or the 31 inch 5 Mil Plotter. See Para. 9 for program description.

NOTE: The program must be reloaded each time the size or stepping rate of the plotter being tested is changed.

2. REQUIREMENTS

2.1 EQUIPMENT

- a. PDP-8 or PDP-8I or PDP-8L
- b. Calcomp Plotter type 350

3. LOADING PROCEDURE

Load the binary program in the normal manner.

5. OPERATING PROCEDURE

5.1 SWITCH REGISTER SETTINGS

- a. BIT 0
Set to halt program after next step when drawing patterns. (MA = 3033)
Press continue to go on.
- b. BIT 1
Set to retrace octagons or concentric squares
- c. BIT 2
Set to loop timing tests
- d. BIT 3
Set if 31 inch plotter
- e. BIT 5
Set if 5 Mil plotter
- f. BIT 11
Set for PDP-8L

5.2 OPERATOR ACTION

- a. Set switch register to 200
- b. Depress load address
- c. Set switch register (see para 5.1)
- d. Depress start
- e. Monitor computer for error halts (see para 6.)

6. PROGRAM HALTS

<u>TAG</u>	<u>MA</u>	<u>DESCRIPTION AND RECOVERY</u>
E1	203	PLSF skipped. Flag should have been cleared by initialize. Continue to repeat test T1.
E2	221	Plotter flag will not set. Two IOT's were used (pen up and drum down). Neither set the flag. Continue to repeat test T2.
E4	231	Plotter flag is still set after a PLCF was issued. Continue to repeat test T4.
E5	245	Program interrupt occurred after a PLCF. Continue to repeat test T5.
E5A	247	Program interrupt caused by some device other than the plotter. Continue to repeat test T5.
E6	263	No program interrupt from plotter flag. Continue to repeat test T6.
E7	275	Flag not set within 85 MS after a PLPU. Continue to repeat test T7.
E8	306	Flag not set within 85 MS after a PLPD. Continue to repeat test T8.
E9	316	Flag set sooner than 55 MS after a PLPU. Continue to repeat test T9.
E10	330	Flag set sooner than 55 MS after a PLPD. Continue to repeat test T10.
E11	416	Flag set sooner than 3.5 MS after a PLPR. Continue to repeat test T11.
E12	420	Flag not set within 5.5 MS after a PLPR. Continue to repeat test T11.
E13	436	Flag set sooner than 3.5 MS after a PLDU. Continue to repeat test T12.

<u>TAG</u>	<u>MA</u>	<u>DESCRIPTION AND RECOVERY</u>
E14	44Ø	Flag not set within 5.5 MS after a PLDU. Continue to repeat test T12.
E15	456	Flag set sooner than 3.5 MS after a PLDD. Continue to repeat test T13.
E16	46Ø	Flag not set within 5.5 MS after a PLDD. Continue to repeat test T13.
E17	476	Flag set sooner than 3.5 MS after a PLPL. Continue to repeat test T14.
E18	5ØØ	Flag not set within 5.5 MS after a PLPL. Continue to repeat test T14.
E19	516	Flag set sooner than 3.5 MS after a PLUD. Continue to repeat test T15.
E2Ø	52Ø	Flag not set within 5.5 MS after a PLUD. Continue to repeat test T15.

The following errors will occur if the specified plotter command did not cause a program interrupt. The computer will not halt, but instead hangs in a one instruction loop.

<u>TAG</u>	<u>MA</u>	<u>COMMAND</u>
E21	3Ø44	PLDD - DRUM DOWN
E22	3Ø51	PLDU - DRUM UP
E23	3Ø56	PLPL - PEN LEFT
E24	3Ø63	PLPR - PEN RIGHT
E25	3Ø7Ø	PLPD - PEN DOWN
E26	3Ø75	PLPU - PEN UP
E27	31Ø3	PLDD AND PLPL
E28	311Ø	DUPL - DRUM UP; PEN LEFT
E29	3115	DDPR - DRUM DOWN; PEN RIGHT
E3Ø	3122	DUPR - DRUM UP; PEN RIGHT

9. PROGRAM DESCRIPTION

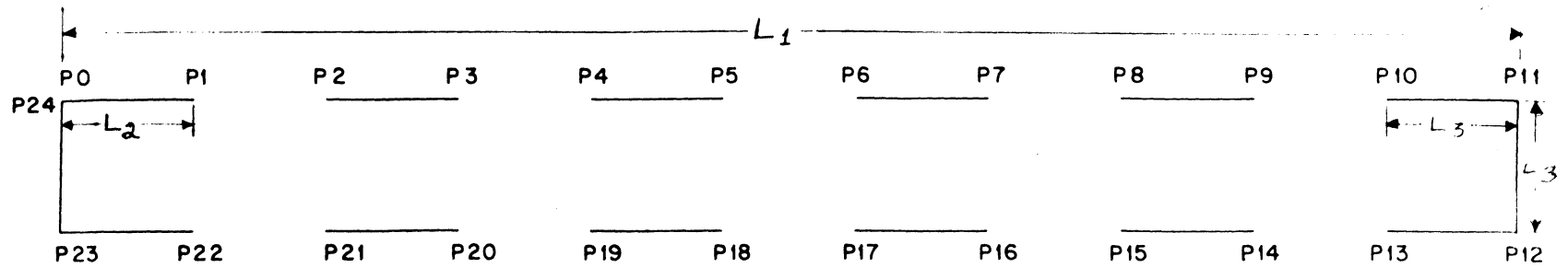
The PDP-8 Calcomp Plotter Diagnostic runs a series of timing tests at the beginning of the program which may be looped using a switch register option. At the completion of the timing tests the three figures, illustrated in para. 10, are drawn. The octagons or concentric squares may be retraced using a switch register option. The patterns may be stopped at any point desired and then continued from that point using still another switch option. Options are described in para. 5.1.

PARA 10.

Dimensions

12 inch
 L1 = 11 inches
 L2 = 1 inch
 L3 = 1 inch

31 inch
 L1 = 29.25 inches
 L2 = 1 inch
 L3 = 1.25 inches

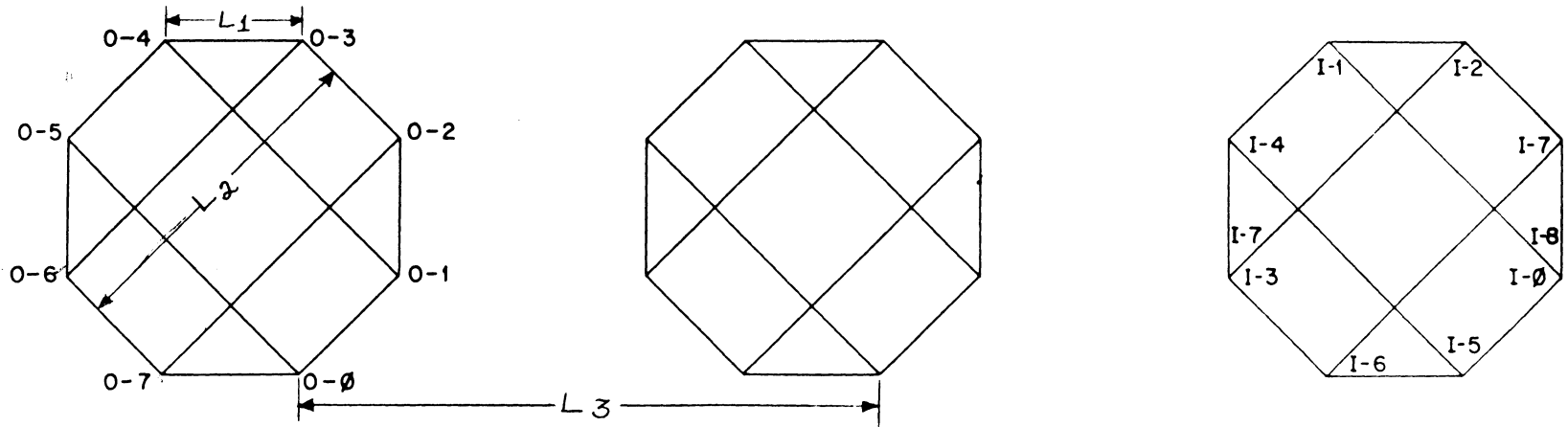


Drawing 1 - The spaces and dashes were plotted in the order of P0-P24.

Dimensions

12 inch
 L1 = 1 inch
 L2 = 2.41 inches
 L3 = 4.25 inches

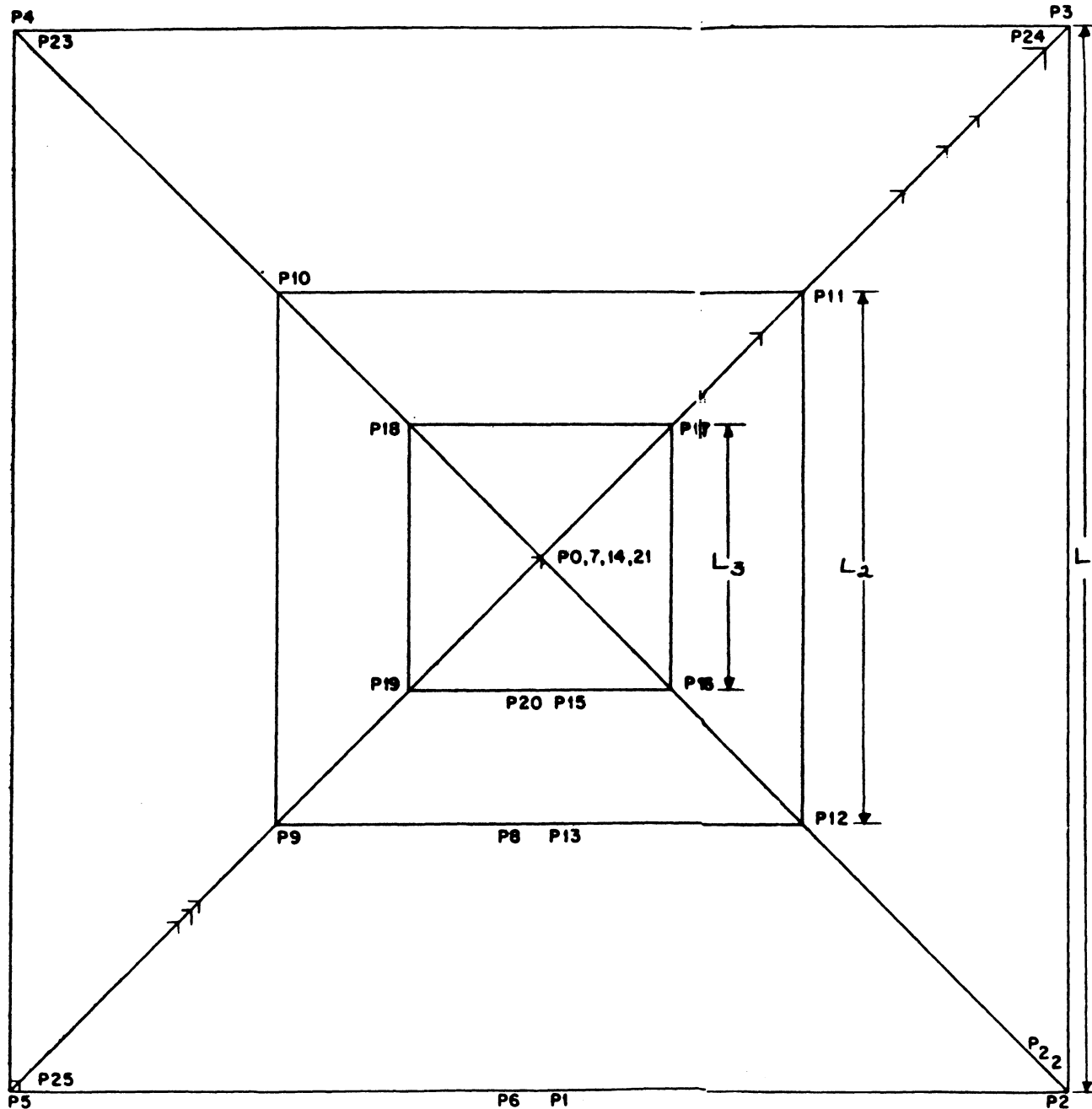
31 inch
 L1 = 3.5 inches
 L2 = 8.46 inches
 L3 = 10.25 inches



Drawing 2 - The 3 intersected octagons are plotted in the following manner:

1. The outer octagons were plotted from left to right.
2. The intersecting lines were plotted from right to left.
 (I-1, I-2) (I-3, I-4) (I-5, I-6) (I-7, I-8) are overlayed

PARA 10 (CONTD)



Drawing 3 - The intersected box is a square.
It is plotted from (center) P0-P25.

Dimensions

12 inch

L1 = 10 inches

L2 = 5 inches

L3 = 2.5 inches

31 inch

L1 = 28 inches

L2 = 14 inches

L3 = 7 inches

The angle brackets are drawn last, and begin at point P24 on the figure. For 12 inch plotters, 100 brackets intersect the diagonal between points P24 and P25. For 31 inch plotters, 106 brackets intersect the diagonal between points P24 and P17. The length of each side of the brackets is .1 inch.

/P P-8 CALCOMP PLOTTER DIAGNOSTIC FOR TYPE 350,
/MODELS 563 AND 565

/
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/MAYNARD, MASS.

/
/R, CHRISTOPHER

/
/IOT DEFINITIONS

650	PLSF=650	/SKIP IF FLAG IS SET
6502	PLCF=6502	/CLEAR FLAG
6504	PLPU=6504	/PEN UP
6511	PLUR=6511	/PEN RIGHT
6512	PLUR=6512	/DRUM UP
6513	DUPR=6513	/DRUM UP; PEN RIGHT
6514	PLUD=6514	/DRUM DOWN
6515	DDPR=6515	/DRUM DOWN; PEN RIGHT
6521	PLPL=6521	/PEN LEFT
6522	PLUD=6522	/DRUM UP
6523	DUPL=6523	/DRUM UP; PEN LEFT
6524	PLPD=6524	/PEN DOWN

/
/START PROGRAM FROM LOCATION 200

/
/SWITCH REGISTER OPTIONS

/BIT 0
/SET TO HALT PROGRAM AFTER NEXT STEP WHEN DRAWING PATTERNS

/BIT 1
/SET TO RETRACE PRESENT PATTERN

/BIT 2
/SET TO LOOP TIMING TESTS

/BIT 3
/SET IF 31 INCH PLOTTER

/BIT 5
/SET IF 5 MIL PLOTTER

/BIT 11
/SET FOR PDP-8L

```

/
/CONSTANTS AND STORAGE REGISTERS
/
2020 *20
/
0020 0000 CNTA, 0
0021 0000 CNIB, 0
0022 3030 CSTEP, STEP
0023 2713 FVTN, FORTN
0024 5451 JML, JMP I KE>
0025 5452 JM<, JMP I KT/
0026 5462 JMS, JMP I SVC
0027 0100 K0100, 0100
0030 0400 K0400, 0400
0031 7470 K7470, 7470
0032 7526 K7526, 7526
0033 7621 K7621, 7621
0034 7623 K7623, 7623
0035 7630 K7630, 7630
0036 7713 K7713, 7713
0037 7716 K7716, 7716
0040 7743 K7743, 7743
0041 7764 K7764, 7764
0042 7765 K7765, 7765
0043 7770 K7770, 7770
0044 7772 K7772, 7772
0045 7773 K7773, 7773
0046 7774 K7774, 7774
0047 7775 K7775, 7775
0050 7776 K7776, 7776
0051 0242 KE>, E5=3
0052 0265 KT(/, T/
0053 1200 MVLFT, LLFT
0054 2070 P19A, T19A
0055 2307 PDUU, DDU
0056 0000 PNMV, 0
0057 3000 PRECT, RECT
0060 0000 SCNT, 0
0061 0000 SVAC, 0
0062 3200 SVC, PISVC
0063 0600 XTIM, TIMER
0064 3072 PNUP, PENUP
0065 3060 RITE, PN RTE
0066 3046 DRUU, DRMDU
0067 3117 DPPR, DMUPR
0070 3041 DRUN, DRMDN
007 3112 DNPR, DM DPR
0071 3053 LEFT, PNLFT
0072 3053 LEFT, PNLFT
0073 3105 DPPL, DMUPL
0074 3065 PNUN, PNDWN
0075 3077 DNPL, DM DPL
0076 3060 PNRT, PN RTE
0077 3053 PNLT, PNLFT
0100 2600 S2, C2
0101 2701 S10, C10
/PEN UP
/PEN RIGHT
/DRUM UP
/DRUM UP; PEN RIGHT
/DRUM DOWN
/DRUM DOWN; PEN RIGHT
/PEN LEFT
/DRUM UP; PEN LEFT
/PEN DOWN
/DRUM DOWN; PEN LEFT
/PEN RIGHT
/PEN LEFT

```

0102	2605	S20,	C25
0103	2612	S50,	C50
0104	2617	S71,	C/1
0105	2624	S100,	C100
0106	2631	S1/5,	C175

0107	2636	S177,	C177
0110	2643	S200,	C250
0111	2650	S300,	C350
0112	2655	S425,	C425
0113	2662	S500,	C500
0114	2674	S600,	C600
0115	2667	S604,	C604
0116	3212	S1231,	C1231
0117	2706	S1300,	C1300
0120	3221	WHICH,	CYCLE
0121	2331	XPLT,	PLT
/			
0122	0122	CNTS,	
0123	0000	TNTH,	0
0124	0000	QRTR,	0
0125	0000	SVNT,	0
0126	0000	HALF,	0
0127	0000	ONE,	0
0130	0000	QRTS,	0
0131	0000	SVNTY,	0
0132	0000	TWY,	0
0133	0000	THY,	0
0134	0000	FQNT,	0
0135	0000	FVH,	0
0136	0000	SIX4,	0
0137	0000	SIXH,	0
0140	0000	TEN,	0
0141	0000	THNT,	0
0142	2515	XPNR,	RYTE
/			

```

0200      *200
          /
          /TEST T1, PLOTTER FLAG SHOULD BE CLEAR,
          /
0220 5520          JMP I WHICH
0221 6501 T1,      PLSF          /SHOULDN'T SKIP
0222 5205          JMP T2          /OK
0223 7402 E1,      HLT          /ERROR, PLSF SKIPPED, FLAG
          /SHOULD HAVE BEEN CLEARED
          /BY INITIALIZE,
0224 5201          JMP T1          /PRESS CONT, TO REPEAT
          /
          /TEST T2, USE PEN UP IOT 6504 TO SET FLAG, IF NO FLAG IN
          /100 MSEC, DRUM DOWN IOT 6514 WILL BE TRIED, IF STILL NO
          /FLAG, ERROR HALT AT E2, IF FLAG IS TRUE AFTER DRUM DOWN,
          /NO ERROR HALT,
          /
0225 1031 T2,      TAD K7470        /100 MS CONSTANT
0226 6504          PLPU          /PEN UP
0227 4463          JMS I XTIM        /WAIT 100 MS
0210 6501          PLSF          /SHOULD SKIP
0211 7410          SKP          /TRY ANOTHER IOT
0212 5223          JMP T4          /NEXT TEST
0213 1031          TAD K7470        /100 MS CONSTANT
0214 6514          PLDD          /DRUM DOWN
0215 4463          JMS I XTIM        /WAIT 100 MS
0216 6501          PLSF          /MAY NOW BE SET
0217 7400          SKP          /ERROR PATH
0220 5223          JMP T4          /NEXT TEST
          /
0221 7402 E2,      HLT          /ERROR, PLOTTER FLAG WILL
          /NOT SET, TWO IOT'S WERE
          /USED (PEN UP AND DRUM
          /DOWN), NEITHER SET THE
0222 5205          JMP T2          /FLAG, PRESS CONT TO REPEAT,
          /
          /TEST T4, SET FLAG WITH DRUM DOWN AND TEST THAT IOT 6502 (PLCF)
          /CLEARS IT,
          /
0223 1031 T4,      TAD K7470        /100 MS CONSTANT
0224 6514          PLDD          /DRUM DOWN
0225 4463          JMS I XTIM        /WAIT 100 MS
0226 6502          PLCF          /CLEAR FLAG
0227 6501          PLSF          /SHOULD NOT SKIP
0230 5233          JMP T5          /NEXT TEST
0231 7402 E4,      HLT          /ERROR, PLOTTER FLAG IS
          /STILL SET AFTER A PLCF
          /WAS ISSUED, PRESS CONT
0232 5223          JMP T4          /TO REPEAT TEST,

```

```

/
/TEST T5, CLEAR PLOTTER FLAG AND ENABLE PROGRAM INTERRUPT,
/NO PI SHOULD OCCUR,
/
0233 6502      T5,  PLCF          /CLEAR FLAG
0234 1028      TAD JM1          /JM1=JMP I KE5=3
0235 3001      DCA 1
0236 6001      ION          /ENABLE PI
0237 1031      TAD K7470
0240 4463      JMS I XTIM      /WAIT 100 MS
0241 5251      JMP T6          /NEXT TEST
/
0242 6002      IOF          /PI OFF
0243 6501      PLSF         /PLOTTER FLAG?
0244 5247      JMP ,+3        /NO
0245 7402      E5,  HLT          /ERROR, PI OCCURED AFTER
/                          /A PLCF, PRESS CONT TO
0246 5233      JMP T5          /REPEAT TEST,
/
0247 7402      E5A, HLT          /ERROR, PI CAUSED BY
/                          /SOME DEVICE OTHER THAN
0250 5233      JMP T5          /PLOTTER, PRESS CONT TO
/                          /REPEAT TEST,
/
/TEST T6, SET PLOTTER FLAG WITH DRUM DOWN AND ENABLE
/PROGRAM INTERRUPT, A PI SHOULD OCCUR,
/
0251 6002      T6,  IOF          /PI OFF
0252 6502      PLCF         /CLEAR FLAG
0253 1025      TAD JM2          /JM2=JMP I KT7
0254 3001      DCA 1
0255 6514      LDD          /DRUM D W
0256 6501      PLSF         /WAIT FOR FLAG
0257 5256      JMP ,=1
0260 6001      ION          /ENABLE PI
0261 7000      NOP
0262 7000      NOP
0263 7402      E6,  HLT          /ERROR, NO PROGRAM
/                          /INTERRUP FROM PLOTTER
0264 5251      JMP T6          /FLAG, PRESS CONT TO
/                          /REPEAT TEST,
/
/TEST T7, FIRST OF TIMING TESTS, PEN UP (IOT 6504) IS TESTED,
/FLAG SHOULD SET WITHIN 85 MS,
/
0265 6002      T7,  IOF          /PI OFF
0266 6502      PLCF         /CLEAR FLAG
0267 1032      TAD K7526      /85 MS CONSTANT
0270 6504      PLPU          /PEN UP
0271 4463      JMS I XTIM      /WAIT 85 MS
0272 6501      PLSF         /SHOULD SKIP
0273 7410      SKP
0274 5277      JMP T8          /NEXT TEST
/

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0275 7402 E7: HLT /ERROR, FLAG NOT SET
/WITHIN 85 MS AFTER
/PLPU, PRESS CONT TO
0276 5265 JMP T7 /REPEAT TEST,

```

/
/TEST T8, PEN DOWN (IOT 6524) IS TESTED TO MAKE SURE
/FLAG SETS WITHIN 85 MS,
/
0327 6502 T8,   PLCF           /CLEAR FLAG
0328 1032   TAD K7526     /85 MS CONSTANT
0329 6524   PLPD           /PEN DOWN
0330 4463   JMS I XTIM     /WAIT 85 MS
0331 6501   PLSF           /SHOULD SKIP
0332 7410   SAK           /NEXT TEST
0333 5310   JMP T9
/
0334 7402 E8,   HLT           /ERROR, FLAG DID NOT SET
                               /WITHIN 85 MS AFTER
0335 5277   JMP T8           /L D (IOT 6524), PRESS
                               /CONT TO REPEAT TEST,
/
/TEST T9, USE PEN UP (IOT 6504) TO MAKE SURE FLAG DOES NOT
/SET SOONER THAN 55 MS,
/
0336 6502 T9,   PLCF           /CLEAR FLAG
0337 1034   TAD K7625     /54.5 MS CONSTANT
0338 6504   PLPU           /PEN UP
0339 4463   JMS I XTIM     /WAIT 54.5 MS
0340 6501   PLSF           /SHOULD NOT SKIP
0341 5320   JMP T10        /NEXT TEST
0342 5320 E9,   HLT 1       /ERROR, FLAG SET SOONER
0343 7402   /THAN 55 MS AFTER A PLPU,
0344 5310   JMP T9         /PRESS CONT TO REPEAT TEST,
/
/TEST T10, USE PEN DOWN (IOT 6524) TO MAKE SURE FLAG SETS NO
/SOONER THAN 55 MS,
/
0345 1034 T10,  TAD K7625     /54.5 MS CONSTANT
0346 4463   JMS I XTIM     /WAIT FOR FLAG FROM TEST T9,
0347 6502   PLCF           /CLEAR FLAG
0348 1034   TAD K7625     /54.5 MS CONSTANT
0349 6524   PLPD           /PEN DOWN
0350 4463   JMS I XTIM     /WAIT 54.5 MS
0351 6501   PLSF           /SHOULD NOT SKIP
0352 5430   JMP I K0400    /NEXT TEST
0353 7402 E10, HLT         /ERROR, FLAG SET SOONER
                               /THAN 55 MS AFTER A
0354 5322   /PLPD IOT, PRESS CONT TO
                               /REPEAT TEST,

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```

0400 *4
/TEST T11, TEST THAT FLAG DOES NOT SET SOONER THAN 3,5 MS
/NOR LATER THAN 5,5 MS WITH PLPR (IOT 6511),
/
0400 1034 T11, TAD K7625 /54,5 MS CONSTANT
0401 4463 JMS I XTIM /WAIT FOR FLAG FROM TEST T10,
0402 6502 PLCF /CLEAR FLAG
0403 1044 TAD K7772 /3 MS CONSTANT
0404 6511 PLPR /PEN RIGHT
0405 4463 JMS I XTIM /WAIT 3 MS
0406 6501 PLSF /SHOULD NOT SKIP
0407 7410 SKP
0410 5216 JMP E11 /ERROR PATH
0411 1045 TAD K7775 /2,5 MS CONSTANT
0412 4463 JMS I XTIM /WAIT TOTAL OF 5,5 MS
0413 6501 PLSF /SHOULD SKIP
0414 5220 JM E12 /ERROR PATH
0415 5222 JMP T12 /NEXT TEST
/
0416 7402 E11, HLT /ERROR, FLAG SET SOONER
/THAN 3,5 MS AFTER A
0417 5202 JMP T11+2 /PLPR, PRESS CONT TO REPEAT,
/
0420 7402 E12, HLT /ERROR, FLAG NOT SET WITHIN
/5,5 MS AFTER A PLPR,
0421 5202 JMP T11+2 /PRESS CONT TO REPEAT TEST,
/
/TEST T12 MAKE SURE FLAG DOES NOT SET SOONER THAN 3,5 MS NOT
/LATER THAN 5,5 MS WITH PLDU (IOT 6512),
/
0422 6502 T12, PLCF /CLEAR FLAG
0423 1044 TAD K7772 /3 MS CONSTANT
0424 6512 PLDU /DRUM UP
0425 4463 JMS I XTIM /WAIT 3 MS
0426 6501 PLSF /SHOULD NOT SKIP
0427 7410 SKP
0430 5236 JMP E13 /ERROR PATH
0431 1045 TAD K7775 /2,5 MS CONSTANT
0432 4463 JMS I XTIM /WAIT TOTAL OF 5,5 MS
0433 6501 PLSF /SHOULD SKIP
0434 5240 JMP E14 /ERROR PATH
0435 5242 JMP T13 /NEXT TEST
/
0436 7402 E13, HLT /ERROR, FLAG SET SOONER
/THAN 3,5 MS AFTER A PLDU,
0437 5222 JMP T12 /PRESS CONT TO REPEAT TEST,
/
0440 7402 E14, HLT /ERROR, FLAG NOT SET
/WITHIN 5,5 MS AFTER A
0441 5222 JMP T12 /PLDU, PRESS CONT TO REPEAT TEST,

```

/TEST T13, MAKE SURE FLAG DOES NOT SET SOONER THAN 3,5 MS NOR
/LATER THAN 5,5 MS WITH PLDD (IOT 6514),

```

/
T13,   PLCF           /CLEAR FLAG
        TAD K7772     /3 MS CONSTANT
        PLDD          /RUM DOWN
        JMS I XTIM    /WAIT 3 MS
        PLSF          /SHOULD NOT SKIP
        SKP
        JMP E15       /ERROR PATH
        TAD K7775     /2,5 MS CONSTANT
        JMS I XTIM    /WAIT TOTAL OF 5,5 MS
        PLSF          /SHOULD SKIP
        JMP E16       /ERROR PATH
        JMP T14       /NEXT TEST

```

```

/
E15,   HLT           /ERROR, FLAG SET SOONER THAN
        JMP T13       /3,5 MS AFTER A PLDD, PRESS
                        /CONT TO REPEAT TEST,

```

```

/
E16,   HLT           /ERROR, FLAG NOT SET WITHIN
        JMP T13       /5,5 MS AFTER A PLDD, PRESS
                        /CONT TO REPEAT TEST,

```

/TEST T14, MAKE SURE FLAG DOES NOT SET SOONER THAN 3,5 MS NOR
/LATER THAN 5,5 MS WITH PLPL (IOT 6521),

```

/
T14,   PLCF           /CLEAR FLAG
        TAD K7772     /3 MS CONSTANT
        PLPL          /PEN LEFT
        JMS I XTIM    /WAIT 3 MS
        PLSF          /SHOULD NOT SKIP
        SKP
        JMP E17       /ERROR PATH
        TAD K7775     /2,5 MS CONSTANT
        JMS I XTIM    /WAIT TOTAL OF 5,5 MS
        PLSF          /SHOULD SKIP
        JMP E18       /ERROR PATH
        JMP T15       /NEXT TEST

```

```

/
E17,   HLT           /ERROR, FLAG SET SOONER
        JMP T14       /THAN 3,5 MS AFTER A PLPL,
                        /PRESS CONT TO REPEAT TEST,

```

```

/
E18,   HLT           /ERROR, FLAG NOT SET WITHIN
        JMP T14       /5,5 MS AFTER A PLPL, PRESS
                        /CONT TO REPEAT TEST,

```

```

/
/TEST T.5, MAKE SURE FLAG DOES NOT SET SOONER THAN 3.5 MS NOR
/LATER THAN 5.5 MS WITH A PLUD (IOT 6522),
/
0502 6502 T.5, PLCF /CLEAR FLAG
0503 1044 TAD K7772 /3 MS CONSTANT
0504 6522 PLUD /DRUM UP
0505 4463 JMS I XTIM /WAIT 3 MS
0506 6501 PLSF /SHOULD NOT SKIP
0507 7410 SKP
0510 5316 JMP E19 /ERROR PATH
0511 1045 TAD K7773 /2.5 MS CONSTANT
0512 4463 JMS I XTIM /WAIT TOTAL OF 5.5 MS
0513 6501 PLSF /SHOULD SKIP
0514 5320 JMP E20 /ERROR PATH
0515 5322 JMP SR0 /NEXT TEST

/
0516 7402 E.5, HLT /ERROR, FLAG SET SOONER THAN
0517 5302 JMP T15 /3.5 MS AFTER A PLUD,
/ /PRESS CONT TO REPEAT TEST,
0520 7402 E20, HLT /ERROR, FLAG NOT SET WITHIN
0521 5302 JMP T15 /5.5 MS AFTER A PLUD
/ /PRESS CONT TO REPEAT TEST,
0522 6502 SR0, PLCF /CLEAR FLAG
0523 7604 LAS /GET SWITCH REGISTER
0524 7006 RTL
0525 7700 SMA CLA
0526 5731 JMP I ,+3
0527 5730 JMP I ,+1 /LOOP TIMING TESTS
0530 0201 T1
0531 0611 PLOT

```

```

/
0600 *600
/
/ ,5 MS TIMER MULTIPLIED TIMES CNTB FOR DESIRED DELAY
/
0600 0000 TIMER, 0
0601 3021 DCA CNTB /STORE MULTIPLIER
0602 1033 TAD K7621 / ,5 MS CONSTANT
0603 3020 DCA CNTA
0604 2020 ISZ CNTA /LOOP FOR ,5 MS
0605 5204 JMP ,=1
0606 2021 ISZ CNTB /MULTIPLIER
0607 5202 JMP TIMER+2 /RESTORE CNTA
0610 5600 JMP I TIMER /EXIT
/
0611 006 PLOT, TAD JM3 /JM3 = JMP I SVC
0612 3001 DCA 1 /PI RETURN JUMP
0613 4423 JMS I FVTN /CHECK FOR 5 OR 10 MIL
/
/12 AND 31 INCH PLOTTER DRAWINGS
/
/TEST T16, A DASHED LINE RECTANGLE IS DRAWN USING 1 INCH
/LINES, FROM MARGIN TO MARGIN, THE LAST HORIZONTAL
/LINES DRAWN AT THE RIGHT MARGIN ARE 1,25 INCHES
/LONG IF A 31 INCH PLOTTER IS USED
/
0614 4464 T16, JMS I PNUP /PEN UP
0615 1045 TAD K7773 /=5
0616 3020 DCA CNTA
0617 4505 JMS I S100 /SETUP 1 INCH COUNTER
0620 4470 JMS I DRUM /DRUM DOWN
0621 4422 JMS I CSTEP /COUNT 1 INCH
0622 5220 JMP ,=2
0623 2020 ISZ CNTA /TOTAL OF 5 INCHES IF SKIP
0624 5217 JMP T16+3 /DRUM DOWN 1 MORE INCH
/
/MOVE PEN TO LEFT MARGIN
/
0625 4516 JMS I S1231 /CHECK FOR 12 OR 31 INCH
0626 5261 JMP T16 /31 INCH
0627 4501 JMS I S10 /12 INCH, SETUP FOR 10 INCHES
0630 4477 JMS I PNLT /PEN LEFT 10 INCHES
0631 4422 JMS I CSTEP
0632 5230 JMP ,=2
0633 4505 JMS I S100 /SETUP FOR 1 INCH
0634 4477 JMS I PNLT /PEN LEFT 1 INCH FOR A
0635 4422 JMS I CSTEP /TOTAL OF 11 INCHES
0636 5234 JMP ,=2

```

```

/PUT PEN DOWN; PEN RIGHT 1 INCH; PUT PEN UP; PEN RIGHT
/1 INCH, MAKE SIX 1 INCH DASHES; FIVE 1 INCH SPACES; DRUM
/UP 1 INCH AND PLOT SECOND LINE FROM RIGHT TO LEFT,
/
0637 1065 RT16, TAD RITE /MOVE RIGHT ROUTINE
0640 3056 DCA PNMV /SAVE ADDRESS
0641 1042 TAD K776D /-11 DECIMAL
0642 4457 JMS I PRECT /DRAW DASHES TO RIGHT
0643 4505 JMS I S100 /SETUP FOR 1 INCH
0644 4466 JMS I DRDU /DRUM UP 1 INCH
0645 4422 JMS I CSTEP
0646 5244 JMP I,=2
0647 1072 AD LEF /MOVE LEFT ROUTINE
0650 3056 DCA PNMV /SAVE ADDRESS
0651 1042 TAD K776D /-11 DECIMAL
0652 4457 JMS I PRECT /DRAW DASHES TO LEFT
0653 4505 JMS I S100 /SETUP FOR 1 INCH
0654 4470 JMS I DRDN /DRUM DOWN 1 INCH
0655 4422 JMS I CSTEP
0656 5254 JMP I,=2
0657 5660 JMP I,+1
0660 1000 T17 /NEXT TEST
/
/TEST T16A, DRAW RECTANGLE FOR 31 INCH PLOTTER, MARGIN TO MARGIN
/LENGTH IS 29,25 INCHES, ALL LINES AND SPACES ARE 1 INCH EXCEPT
/THE LAST TWO LINES WHICH ARE 1,25 INCHES,
/
0661 1047 T16A, TAD K7775 /-3
0662 3020 DCA CNTA
0663 4501 JMS I S10 /SETUP FOR 10 INCHES
0664 4477 JMS I PNLT /PEN LEFT 10 INCHES
0665 4422 JMS I CSTEP
0666 5264 JMP I,=2
0667 2020 ISZ CNTA /TOTAL OF 30 INCHES IF SKIP
0670 5263 JMP T16A+2 /MOVE ANOTHER 10
/
/DRAW 29,25 INCH DASHED RECTANGLE, READ COMMENTS ABOVE
/TEST T16 FOR 12 INCH PLOTTER,
/
0671 1065 R10A, TAD RITE /MOVE RIGHT ROUTINE
0672 3056 DCA PNMV /SAVE ADDRESS

```

0673	1040	TAD K7743	/-29 DECIMAL
0674	4457	JMS I PRECT	/DRAW 15 1 INCH LINES;
			/14 1 INCH SPACES
0675	4502	JMS I S2>	/SETUP FOR ,25 INCH
0676	4476	JMS I PNHT	/PEN RIGHT ,25 INCH
0677	4422	JMS I CSTEP	
0700	5276	JMP ,=2	
0701	4505	JMS I S100	/SETUP FOR 1 INCH
0702	4466	JMS I DRDU	/DRUM UP 1 INCH
0703	4422	JMS I CSTEP	
0704	5302	JMP ,=2	
0705	4502	JMS I S2>	/SETUP FOR ,25 INCH
0706	4477	JMS I PNLT	/PEN LEFT ,25 INCH
0707	4422	JMS I CSTEP	
0710	5306	JMP ,=2	
0711	1072	TAD LEFT	/MOVE LEFT ROUTINE
0712	3056	DCA PNMV	/SAVE ADDRESS
0713	1040	TAD K7743	/-29 DECIMAL
0714	4457	JMS I PRECT	/DRAW DASHES TO LEFT
0715	4505	JMS I S100	/SETUP FOR 1 INCH
0716	4470	JMS I DRDN	/DRUM DOWN 1 INCH
0717	4422	JMS I CSTEP	
0720	5316	JMP ,=2	
0721	5722	JMP I ,+1	
0722	1000	T17	/NEXT TEST

```

/
1000 *1000
/
/TEST T17, DRAW 3 OCTAGONS ACROSS PAGE FROM LEFT TO RIGHT, TEST
/T17 IS FOR 12 INCH; T17A FOR 31 INCH,
/
1000 4464 T1/, JMS I PNUP /PEN UP
1001 4505 JMS I S100 /SETUP FOR 1 INCH
1002 4470 JMS I DRUM /DRUM DOWN 1 INCH
1003 4422 JMS I CSTEP
1004 5202 JMP ,=-2
1005 4542 JMS I XPNR
1006 4516 JMS I S1231 /CHECK FOR 12 OR 31 INCH
1007 5675 JMP I P1/A /31 INCH
/
/BEGIN OCTAGON PLOT FOR 12 INCH
/
0 0 4225 RT17, JMS OCT12 /PLOT 1ST OCTAGON
1011 4510 JMS I S250 /SETUP FOR 2,5 INCHES
1012 4476 JMS I PNRT /PEN RIGHT 2,5 INCHES
1013 4422 JMS I CSTEP
1014 5212 JMP ,=-2
1015 4225 JMS OCT12 /PLOT 2ND OCTAGON
1016 4510 JMS I S250
1017 4476 JMS I PNRT /PEN RIGHT 2,5 INCHES
1020 4422 JMS I CSTEP
1021 5217 JMP ,=-2
1022 4225 JMS OCT12 /PLOT 3RD OCTAGON
1023 4464 JMS I PNUP /PEN UP
1024 5276 JMP T18 /FILL IN CENTERS
/
/OCTAGON SUBROUTINE
/
/PLOT RIGHT; PEN UP; 1,75 INCHES
/
1025 3000 OCT12, 0
1026 4506 CT1, JMS I S175 /SETUP FOR 1,75 INCHES
1027 4476 JMS I PNRT /MOVE RIGHT 1,75 INCHES
1030 4422 JMS I CSTEP
1031 5227 JMP ,=-2
/
/PEN DOWN; DRUM DOWN; PEN RIGHT; 1 INCH
/
0 0 4474 CT2, JMS I PNDN /PEN DOWN
1033 4504 JMS I S71 /SET UP FOR ,71 DIAG
1034 4471 JMS I DNPR /DRUM DOWN; PEN RIGHT-
1035 4422 JMS I CSTEP /FOR 1 INCH DIAGONAL
1036 5234 JMP ,=-2

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```

/
/DRUM DOWN 1 INCH
/
1037 4505 CT3, JMS I S100 /SETUP FOR 1 INCH
1040 4470 JMS I DRDN /DRUM DOWN 1 INCH
1041 4422 JMS I CSTEP
1042 5240 JMP I=-2
/
/DRUM DOWN; PEN LEFT; 1 INCH
/
1043 4504 CT4, JMS I S71 /SETUP FOR .71 DIAGONAL
1044 4475 JMS I DNPL /DRUM DOWN; PEN LEFT
1045 4422 JMS I CSTEP
1046 5244 JMP I=-2
/
/PEN LEFT 1 INCH
/
1047 4505 CT5, JMS I S100 /SETUP FOR 1 INCH
1050 4477 JMS I PNLT /PEN LEFT 1 INCH
1051 4422 JMS I CSTEP
1052 5250 JMP I=-2
/
/DRUM UP; PEN LEFT; 1 INCH
/
1053 4504 CT6, JMS I S71 /SETUP FOR .71 DIAGONAL
1054 4473 JMS I DPPL /DRUM UP; PEN LEFT
1055 4422 JMS I CSTEP
1056 5254 JMP I=-2
/
/DRUM UP 1 INCH
/
1057 4505 CT7, JMS I S100 /SETUP FOR 1 INCH
1060 4466 JMS I DRU /DRUM UP 1 INCH
1061 4422 JMS I CSTEP
1062 5260 JMP I=-2
/
/DRUM UP; PEN RIGHT; 1 INCH
/
1063 4504 CT8, JMS I S71 /SETUP FOR DIAGONAL
1064 4467 JMS I DPPR /DRUM UP; PEN RIGHT
1065 4422 JMS I CSTEP
1066 5264 JMP I=-2
/
/PEN RIGHT 1 INCH; FINISH
/
1067 4505 CT9, JMS I S100 /SETUP FOR 1 INCH
1070 4476 JMS I PRRT /PEN RIGHT 1 INCH
1071 4422 JMS I CSTEP
1072 5270 JMP I=-2
1073 4464 JMS I PNUP /PEN UP
1074 5625 JMP I OCT12 /EXIT

```



```

1075 1217 P1/A, T17A
/
/T18, FILL IN OCTAGON CENTERS
/
1076 4326 T18, JMS F18 /DRAW DIAGONALS
1077 4453 JMS I MVLFT /MOVE TO MIDDLE OCTAGON
1100 4326 JMS F18 /DRAW DIAGONALS
1101 4453 JMS I MVLFT /MOVE TO LEFT OCTAGON
1102 4326 JMS F18 /DRAW DIAGONALS
1103 4505 JMS I S100
1104 4466 JMS I DRDU /DRUM UP
1105 4422 JMS I CSTEP
1106 5304 JMP ,=2
1107 4464 JMS I PNUP /PEN UP
1110 4504 JMS I S71
1111 4473 JMS I DPPL
1112 4422 JMS I CSTEP
1113 5311 JMP ,=2
1114 4506 JMS I S175
1115 4477 JMS I PNLT /PEN LEFT
1116 4422 JMS I CSTEP
1117 5315 JMP ,=2
1120 7604 LAS
1121 7004 RAL
1122 7710 SPA CLA /BIT "1" A "1" = RETRACE
1123 5210 JMP RT17 /RETRACE ALL 3
1124 5725 JMP I ,+1
1125 1423 T19 /NEXT TEST
/
/START DIAGONALS, DRUM DOWN ,71 INCH
/
1126 0000 F18, 0
1127 4504 CD1, JMS I S71 /SETUP FOR ,71 INCH
1130 4470 JMS I DRDN /DRUM DOWN ,71 INCH
1131 4422 JMS I CSTEP
1132 5330 JMP ,=2
/
/MOVE PEN RIGHT ,71 INCH
/
1133 4504 CD2, JMS I S71 /SET UP FOR ,71
1134 4476 JMS I PNRT /PEN RIGHT ,71 INCH
1135 4422 JMS I CSTEP
1136 5334 JMP ,=2
/
/PEN DOWN; DRUM DOWN; PEN LEFT 2,5 INCHES
/
1137 4474 CDS, JMS I PNUN /PEN DOWN
1140 4507 JMS I S177 /SETUP FOR 2,5 INCH DIAG,
1141 4475 JMS I DNPL /DRUM DOWN; PEN LEFT
1142 4422 JMS I CSTEP
1143 5341 JMP ,=2

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```

/PEN RIGHT 1 INCH
/
1144 4505 CD4, JMS I S100 /SETUP FOR 1 INCH
1145 4476 JMS I PNRT /PEN RIGHT 1 INCH
1146 4422 JMS I CSTEP
1147 5345 JMP ,-2
/
/DRUM UP; PEN LEFT 2,5 INCHES
/
1150 4507 CD3, JMS I S177 /SETUP FOR 2,5 INCHES
1151 4473 JMS I DPPL /DRUM UP; PEN LEFT
1152 4422 JMS I CSTEP
1153 5351 JMP ,-2
/
/DRUM DOWN 1 INCH
/
1154 4505 CD6, JMS I S100 /SETCOUNT FOR 1 INCH
1155 4470 JMS I DRDN /DRUM DOWN 1 INCH
1156 4422 JMS I CSTEP
1157 5355 JMP ,-2
/
/DRUM UP; PEN RIGHT 2,5 INCHES
/
1160 4507 CD7, JMS I S177 /SET COUNT FOR 2,5 INCHES
1161 4467 JMS I DPPR /DRUM UP; PEN RIGHT
1162 4422 JMS I CSTEP
1163 5361 JMP ,-2
/
/PEN LEFT 1 INCH
/
1164 4505 CD8, JMS I S100 /SET COUNT FOR 1 INCH
1165 4477 JMS I PNL1 /PEN LEFT 1 INCH
1166 4422 JMS I CSTEP
1167 5365 JMP ,-2
/
/DRUM DOWN; PEN RIGHT 2,5 INCHES
/
1170 4507 CD9, JMS I S177 /SET COUNT FOR 2,5 INCHES
1171 4471 JMS I DNPR /DRUM DOWN; PEN RIGHT
1172 4422 JMS I CSTEP
1173 5371 JMP ,-2
1174 5726 JMP I F18 /EXIT
/

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1200      41200
/
/ROUTINE TO MOVE PEN TO NEXT OCTAGON
/
/PEN UP; DRUM UP 1 INCH
/
LLFT, 0
1200 2000
1201 4505      JMS I S100      /SET COUNT FOR 1 INCH
1202 4466      JMS I DRUU      /DRUM UP 1 INCH
1203 4422      JMS I CSTEP
1204 5202      JMP ,=2
1205 4464      JMS I PNUP      /PEN UP
1206 4504      JMS I S71
1207 4473      JMS I DPPL      /DRUM UP; PEN LEFT
1210 4422      JMS I CSTEP
1211 5207      JMP ,=2
/
/MOVE PEN 4.25 INCHES LEFT
/
1212 4512      JMS I S425      /SET COUNT FOR 4.25 INCHES
1213 4477      JMS I PNLT      /PEN LEFT 4.25 INCHES
1214 4422      JMS I CSTEP
1215 5213      JMP ,=2
1216 5600      JMP I LLFT      /EXIT
/
/TEST T17A, DRAW 3 OCTAGONS FOR 31 INCH PLOTTER,
/
T17A, 1217 4234      JMS OCT31      /PLOT 1ST OCTAGON
1220 4512      JMS I S425      /SET COUNT FOR 4.25 INCHES
1221 4476      JMS I PNRT      /PEN RIGHT 4.25 INCHES
1222 4422      JMS I CSTEP
1223 5221      JMP ,=2
1224 4675      JMS I PC12      /PLOT 2ND OCTAGON
1225 4512      JMS I S425
1226 4476      JMS I PNRT      /PEN RIGHT 4.25 INCHES
1227 4422      JMS I CSTEP
1230 5226      JMP ,=2
1231 4675      JMS I PC12      /PLOT 3RD OCTAGON
1232 4464      JMS I PNUP      /PEN UP
1233 5276      JMP T18A      /FILL IN CENTERS
/
/31 INCH OCTAGON SUBROUTINE, THIS ROUTINE MODIFIES THE
/12 INCH OCTAGON ROUTINE TO DRAW LARGER OCTAGONS,
/
1234 0000      OCT31, 0
1235 1261      TAD JM4      /JM4=JMS I S600
1236 3664      DCA I PT1
1237 1262      TAD JM5      /JM5=JMS I S250
1240 3665      DCA I PT2
1241 1263      TAD JM6      /JM6=JMS I S350
1242 3666      DCA I PT3
1243 1262      TAD JM5      /JM5=JMS I S250
1244 3667      DCA I PT4

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1245	1263	TAD JM6	/JM6=JMS I S350
1246	3670	DCA I PT>	
1247	1262	TAD JM5	/JM5=JMS I S250
1250	3671	DCA I PT6	
1251	1263	TAD JM6	/JM6=JMS I S350
1252	3672	DCA I PT/	
1253	1262	TAD JM5	/JM5=JMS I S250

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1254 3673      DCA I PT8
1255 1263      AD JM6      /JM6=JM I S 350
1256 3674      DCA I PT9
1257 4675      JMS I PC12     /DRAW AN OCTAGON
1260 5634      JMP I OCT31     /EXIT
/
1261 4514      JM4,      JMS I S600     /SET COUNT FOR 6 INCHES
1262 4510      JM5,      JMS I S250     /SET COUNT FOR 2,5 INCHES
1263 4511      JM6,      JMS I S350     /SET COUNT FOR 3,5 INCHES
1264 1026      PT1,      CT1
1265 1033      PT2,      CT2
1266 1037      PT3,      CT3
1267 1043      PT4,      CT4
1270 1047      PT5,      CT5
1271 1053      PT6,      CT6
1272 1057      PT7,      CT7
1273 1063      PT8,      CT8
1274 1067      PT9,      CT9
1275 1025      PC12,    OCT12
/
/T18A, FILL IN OCTAGON CENTERS, THE 12 INCH PLOTTER ROUTINE IS
/MODIFIED AND USED,
/
1276 4526      T18A,    JMS F18A      /DRAW DIAGONALS
1277 4766      JMS I LF31     /MOVE TO MID
1300 4765      JMS I PF18     /DRAW DIAGONALS
1301 4766      JMS I LF31     /MOVE TO LEFT OCTAGON
1302 4765      JMS I PF18     /DRAW DIAGONALS
1303 4511      JMS I S350
1304 4488      JMS I DRDU     /DRUM UP
1305 4422      JMS I CSTEP
1306 5304      JMP ,=-2
1307 4464      JMS I PNUP     /PEN UP
1310 4510      JMS I S250
1311 4473      JMS I NPPL
1312 4422      JMS I CSTEP
1313 5311      JMP ,=-2
1314 4514      JMS I S600
1315 4477      JMS I PNLT     /PEN LEFT
1316 4422      JMS I CSTEP
1317 5315      JMP ,=-2
1320 7604      LAS
1321 7004      RAL
1322 7710      SPA CLA      /BIT "1" A "1" = RETRACE
1323 5217      JMP T17A      /RETRACE
1324 5725      JMP I ,+1
1325 1423      T19          /NEXT TEST

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```

1326 0000 /
1327 1262 F18A, 0
1330 3754 TAD JM5 /JM5=JMS I S250
1331 1262 DCA I PC1
1332 3755 TAD JM5
1333 1353 DCA I PC2
1334 3756 TAD JM7 /JM7=JMS I S604
1335 1263 DCA I PC3
1336 3757 TAD JM6 /JM6=JMS I S350
1337 1353 DCA I PC4
1340 3760 TAD JM7
1341 1263 DCA I PC5
1342 3761 TAD JM6
1343 1353 DCA I PC6
1344 3762 TAD JM7
1345 1263 DCA I PC7
1346 3763 TAD JM6
1347 1353 DCA I PC8
1350 3764 TAD JM7
1351 4765 DCA I PC9
1352 5726 JMS I PF18 /DRAW DIAGONALS
JMP I F18A /EXIT

1353 4515 /
1354 1127 JM/, JMS I S604 /SET COUNT FOR 8.5 INCHES
1355 1133 PC1, C01
1356 1140 PC2, C02
1357 1144 PC3, C03
1360 1150 PC4, C04
1361 1154 PC5, C05
1362 1160 PC6, C06
1363 1164 PC7, C07
1364 1170 PC8, C08
1365 1126 PC9, C09
1366 1400 PF18, F18
LF31, L31

```

```

1400      1400
/
/MOVE PEN TO NEXT OCTAGON
/
/PEN UP; DRUM UP 3,5 INCHES
/
1400 0000 L31, 0
1401 4511 JMS I S300 /SET COUNT FOR 3,5 INCHES
1402 4466 JMS I DRU0 /DRUM UP 3,5 INCHES
1403 4422 JMS I CSTEP
1404 5202 JMP ,=2
1405 4464 JMS I PNUP /PEN UP
1406 4510 JMS I S200
1407 4473 JMS I DPPL
1410 4422 JMS I CSTEP
1411 5207 JMP ,=2
/
/MOVE PEN 1,25 INCHES LEFT
/
1412 4501 JMS I S10 /SET COUNT FOR 10 INCHES
1413 4477 JMS I PNLT /PEN LEFT 10 INCHES
1414 4422 JMS I CSTEP
1415 5213 JMP ,=2
1416 4502 JMS I S20 /SET COUNT FOR ,25 INCH
1417 4477 JMS I PNLT /PEN LEFT ,25 INCH
1420 4422 JMS I CSTEP
1421 5217 JMP ,=2
1422 5600 JMP I L31 /EXIT
/
/TEST T19, DRAW CONCENTRIC SQUARES,
/
1423 4516 T19, JMS I S1231 /CHECK FOR 12 OR 31 INCH
1424 5454 JMP I P19 /31 INCH
/
/PEN UP; DRUM DOWN 5 INCHES
/
1425 4464 JMS I PNUP /PEN UP
1426 4513 JMS I S500 /SET COUNT TO 5 INCHES
1427 4470 JMS I DRDN /DRUM DOWN 5 INCHES
1430 4422 JMS I CSTEP
1431 5227 JMP ,=2

```

```

//BEGIN DRAWING SQUARE
1432 4505      JMS I S100      /SETUP FOR 1 INCH
1433 4477      JMS I PNLT      /PEN LEFT 1 INCH
1434 4422      JMS I CSTEP
1435 5233      JMP      ,=2
1436 4501      JMS I S10
1437 4477      JMS I PNLT      /PEN LEFT 10 INCHES
1440 4422      JMS I CSTEP
1441 5237      JMP      ,=2
/
/DRUM DOWN 5 INCHES (HALF SQUARE)
/
1442 4542      JMS I XPNR
1443 4503      JMS I S50      /SETUP FOR ,5 INCHES
1444 4476      JMS I PNRT      /DRUM DOWN ,5 INCHES
1445 4422      JMS I CSTEP
1446 5244      JMP      ,=2
/
/PEN RIGHT 5,5 INCHES (CENTER SQUARE)
/
R19, 1447 4513      JMS I S500
1450 4476      JMS I PNRT      /PEN RIGHT 5 INCHES
1451 4422      JMS I CSTEP
1452 5250      JMP      ,=2
1453 4513      JMS I S500
1454 4470      JMS I DRUN      /DRUM DOWN 5 INCHES
1455 4422      JMS I CSTEP
1456 5254      JMP      ,=2

```



```

/
/MAKE A DOT
/
1457 4474      JMS I PNDN      /PEN DOWN
1460 4464      JMS I PNUP      /PEN UP
/
/DRUM UP HALF SQUARE
/
1451 4513      JMS I S500
1462 4466      JMS I DRUU      /DRUM UP
1453 4422      JMS I CSTEP
1464 5262      JMP      ,=2
/
/PEN DOWN; PEN RIGHT HALF SIDE
/
1455 4474      JMS I PNDN      /PEN DOWN
1456 4513      JMS I S500
1457 4476      JMS I PNRT      /PEN RIGHT
1470 4422      JMS I CSTEP
1471 5267      JMP      ,=2
/
/DRUM DOWN FULL RIGHT SIDE
/
1472 4501      JMS I S10
1473 4470      JMS I DRDN      /DRUM DOWN
1474 4422      JMS I CSTEP
1475 5273      JMP      ,=2
/
/PEN LEFT ALONG TOP
/
1476 4501      JMS I S10
1477 4477      JMS I PNLT      /PEN LEFT
1500 4422      JMS I CSTEP
1501 5277      JMP      ,=2
/
/DRUM UP; FULL LEFT SIDE
/
1502 4500      JMS I S 0
1503 4466      JMS I DRUU      /DRUM UP
1504 4422      JMS I CSTEP
1505 5303      JMP      ,=2
/
/PEN RIGHT; MEET 1ST POINT
/
1506 4513      JMS I S500
1507 4476      JMS I PNRT      /PEN RIGHT
1510 4422      JMS I CSTEP
1511 5307      JMP      ,=2

```

```

/
/PEN UP; BACK TO CENTER
/
1512 4464          JMS I PNUP          /PEN UP
1513 4513          JMS I S500
1514 4470          JMS I DRUN          /DRUM DOWN
1515 4422          JMS I CSTEP
1516 5314          JMP      , -2
/
/PEN DOWN; PEN UP
/
1517 4474          JMS I PNUN          /PEN DOWN
1520 4464          JMS I PNUP          /PEN UP
/
/MAKE 2ND SQUARE
/
1521 4510          JMS I S200
1522 4466          JMS I DRUO          /DRUM UP
1523 4422          JMS I CSTEP
1524 5322          JMP      , -2
/
/PEN DOWN; PEN LEFT HALF SIDE
/
1525 4474          JMS I PNUN          /PEN DOWN
1526 4510          JMS I S200
1527 4477          JMS I PNLT          /PEN LEFT
1530 4422          JMS I CSTEP
1531 5327          JMP      , -2
/
/DRUM DOWN LEFT SIDE
/
1532 4513          JMS I S500
1533 4470          JMS I DRUN          /DRUM DOWN
1534 4422          JMS I CSTEP
1535 5333          JMP      , -2
/
/PEN RIGHT ALONG TOP
/
1536 4513          JMS I S500
1537 4476          JMS I PNRT
1540 4422          JMS I CSTEP
1541 5337          JMP      , -2
/
/DRUM UP RIGHT SIDE
/
1542 4513          JMS I S500
1543 4466          JMS I DRUO          /DRUM UP
1544 4422          JMS I CSTEP
1545 5343          JMP      , -2

```

```

/ PEN LEFT; MEET 1ST POINT
/
1546 4510      JMS I S200
1547 4477      JMS I PNLT      /PEN LEFT
1550 4422      JMS I CSTEP
1551 5347      JMP      ,-2
1552 5703      JMP I    ,+1
1553 1600      CSW
/
1600          *1000
/
/ PEN UP; BACK TO CENTER
/
1600 4464      CSW,     JMS I PNUP      /PEN UP
1601 4510      JMS I S200
1602 4470      JMS I DRDN      /DRUM DOWN
1603 4422      JMS I CSTEP
1604 5202      JMP      ,-2
/
/ MAKE A DOT
/
1605 4474      JMS I PNDN      /PEN DOWN
1606 4464      JMS I PNUP      /PEN UP
/
/ MAKE THE CENTER SQUARE
/
1607 4505      JMS I S100
1610 4466      JMS I DRDU      /DRUM UP
1611 4422      JMS I CSTEP
1612 5210      JMP      ,-2
1613 4502      JMS I S200
1614 4466      JMS I DRDU      /DRUM UP
1615 4422      JMS I CSTEP
1616 5214      JMP      ,-2
/
/ PEN RIGHT; HALF SIDE
/
1617 4474      JMS I PNDN      /PEN DOWN
1618 4505      JMS I S100
1621 4476      JMS I PNRT      /PEN RIGHT
1622 4422      JMS I CSTEP
1623 5221      JMP      ,-2
1624 4502      JMS I S200
1625 4476      JMS I PNRT      /PEN RIGHT
1626 4422      JMS I CSTEP
1627 5225      JMP      ,-2

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/
/DRUM DOWN RIGHT SIDE
/
1630 4510      JMS I S250
1631 4470      JMS I DRDN      /DRUM DOWN
1632 4422      JMS I CSTEP
1633 5231      JMP      ,-2
/
/PEN LEFT ALONG TOP
/
1634 4510      JMS I S250
1635 4477      JMS I PNLT      /PEN LEFT
1636 4422      JMS I CSTEP
1637 5235      JMP      ,-2
/
/DRUM UP LEFT SIDE
/
1640 4510      JMS I S250
1641 4466      JMS I DRDU      /DRUM UP
1642 4422      JMS I CSTEP
1643 5241      JMP      ,-2
/
/PEN RIGHT; MEET 1ST POINT
/
1644 4505      JMS I S100
1645 4476      JMS I PNRT      /PEN RIGHT
1646 4422      JMS I CSTEP
1647 5245      JMP      ,-2
1650 4502      JMS I S25
1651 4476      JMS I PNRT      /PEN RIGHT
1652 4422      JMS I CSTEP
1653 5251      JMP      ,-2
/
/PEN UP; MOVE BACK TO CENTER
/
1654 4464      JMS I PNUP      /PEN UP
1655 4505      JMS I S100
1656 4470      JMS I DRDN      /DRUM DOWN
1657 4422      JMS I CSTEP
1660 5256      JMP      ,-2
1661 4502      JMS I S25
1662 4470      JMS I DRDN      /DRUM DOWN
1663 4422      JMS I CSTEP
1664 5262      JMP      ,-2
/
1655 4474      JMS I PNUN      /PEN DOWN
1666 4464      JMS I PNUP      /PEN UP
/
/START DIAGONALS
/
/DRUM UP; PEN RIGHT TO LOWER RIGHT CORNER
/
1667 4513      JMS I S500
1670 4467      JMS I DPPP      /DRUM UP; PEN RIGHT
1671 4422      JMS I CSTEP

```

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1672 5270 JMP ,-2

```

/
/DRUM DOWN; PEN LEFT; PEN DOWN
/
1673 4474      JMS I PNDN      /PEN DOWN
1674 4501      JMS I S10
1675 4475      JMS I DNPL      /DRUM DOWN; PEN LEFT
1676 4422      JMS I CSTEP
1677 5275      JMP      ,-2
/
/PEN UP; MOVE TO UPPER RIGHT HAND CORNER
/
1700 4464      JMS I PNUP      /PEN UP
1701 4501      JMS I S10
1702 4476      JMS I PNRT      /PEN RIGHT
1703 4422      JMS I CSTEP
1704 5302      JMP      ,-2
/
/PEN DOWN; DRUM UP; PEN LEFT
/
1705 4474      JMS I PNDN      /PEN DOWN
1706 4501      JMS I S10
1707 4473      JMS I DPPL      /DRUM UP; PEN LEFT
1710 4422      JMS I CSTEP
1711 5307      JMP      ,-2
1712 4464      JMS I PNUP      /PEN UP
/
/PEN RIGHT TO MARGIN
/
1713 4501      JMS I S10
1714 4476      JMS I PNRT      /PEN RIGHT
1715 4422      JMS I CSTEP
1716 5314      JMP      ,-2

```

/
/DRUM DOWN TO TOP OF SQUARE
/

1717	4501	JMS I S10	
1720	4470	JMS I DRUM	/DRUM DOWN
1721	4422	JMS I CSTEP	
1722	5320	JMP I , -2	
1723	5724	JMP I , +1	
1724	2000	LSQR	

/

```

2000      *2000
          /
2000 4500  LSUR,  JMS I S2
2001 4477      JMS I PRLT      /PEN LEFT ,2 INCH
2002 4422      JMS I CSTEP
2003 5201      JMP , -2
          /
2004 137      TAD K7716      /_25
2005 3020      DCA CNTA
2006 4474      WRIT,  JMS I BDDN      /E DOW
2007 4240      JMS RTPN      /PEN RIGHT ,2 INCH
2010 4246      JMS DUDR      /DRUM UP ,2 INCH
2011 4464      JMS I PNUP      /PEN UP
2012 4246      JMS DUDR      /DRUM UP ,2 INCH
2013 4254      JMS LTPN      /PEN LEFT ,2 INCH
2014 4474      JMS I PNDN      /PEN DOWN
2015 4262      JMS DNDR      /DRUM DOWN ,2 INCH
2016 4254      JMS LTPN      /PEN LEFT ,2 INCH
2017 4464      JMS I PNUP      /PEN UP
2020 4254      JMS LTPN      /PEN LEFT ,2 INCH
2021 4246      JMS DUDR      /DRUM UP ,2 INCH
2022 2020      ISZ CNTA      /DONE WHEN SKIP
2023 5206      JMP WRIT
2024 4240      JMS RTPN
2025 7604      LAS
2026 7004      RAL
2027 7710      SPA CLA
2030 5637      JMP I RT19      /RETRACE
2031 4501      JMS I S10
2032 4470      JMS I DRDN      /DRUM DOWN
2033 4422      JMS I CSTEP
2034 5232      JMP , -2
2035 5636      JMP I , +1
2036 0614      T16

```



```
2037 1447 /
RT19, R19
2040 0000 /
2041 4500 RTPN, 0
2042 4476 JMS I S2
2043 4422 JMS I PNRT /PEN RIGHT
2044 5242 JMS I CSTEP
2045 5640 JMP ,-2
JMP I RTPN

/
2046 0000 DUUR, 0
2047 4500 JMS I S2
2050 4466 JMS I DRDU /DRUM UP
2051 4422 JMS I CSTEP
2052 5250 JMP ,-2
2053 5646 JMP I DUUR

/
2054 0000 LTPN, 0
2055 4500 JMS I S2
2056 4477 JMS I PNLT /PEN LEFT
2057 4422 JMS I CSTEP
2060 5256 JMP ,-2
2061 5654 JMP I LTPN

/
2062 0000 DNUR, 0
2063 4500 JMS I S2
2064 4470 JMS I DRDN /DRUM DOWN
2065 4422 JMS I CSTEP
2066 5264 JMP ,-2
2067 5662 JMP I DNUR
```

```
/
/TEST T19A, CONCENTRIC SQUARES FOR 31 INCH PLOTTER
/
/PEN UP; DRUM DOWN FOR 20 INCHES
/
2070 4464 T19A, JMS I PNUP /PEN UP
2071 1050 TAD K7776
2072 3020 DCA CNTA
2073 4501 JMS I S10
2074 4470 JMS I DRDN /DRUM DOWN 20 INCHES
2075 4422 JMS I CSTEP
2076 5274 JMP , -2
2077 2020 ISZ CNTA
2100 5273 JMP T19A+3
/
/BEGIN 28 INCH SQUARE
/
2101 1041 R19A, TAD K7764
2102 3020 DCA CNTA
2103 4510 JMS I S200
2104 4477 JMS I PNLT /PEN LEFT 30 INCHES
2105 4422 JMS I CSTEP
2106 5304 JMP , -2
2107 2020 ISZ CNTA
2110 5303 JMP , -5
2111 4503 JMS I S50
2112 4476 JMS I PNRT /PEN RIGHT
2113 4422 JMS I CSTEP
2114 5312 JMP , -2
2115 5716 JMP I , +1
2116 2200 CP19
/
```

```

2200      2200
          *
          /
2200      1046      CP19,      TAD K7774
2201      4276      JMS DDN      /DRUM DOWN 14 INCHES
2202      1046      TAD K7774
2203      4320      JMS PRT      /PEN RIGHT 14 INCHES
          /
          /MAKE A DOT
          /
2204      4474      JMS I PNDN      /PEN DOWN
2205      4464      JMS I PNUP      /PEN UP
2206      1046      TAD K7774
2207      4307      JMS DDU      /DRUM UP 14 INCHES
2210      4474      JMS I PNDN      /PEN DOWN
2211      1046      TAD K7774
2212      4320      JMS PRT      /PEN RIGHT 14 INCHES
2213      1043      TAD K7770
2214      4276      JMS DDN      /DRUM DOWN 28 INCHES
2215      1043      TAD K7770
2216      4331      JMS PLT      /PEN LEFT 28 INCHES
2217      1043      TAD K7770
2220      4307      JMS DDU      /DRUM UP 28 INCHES
          TAD K7774
2221      046       JMS PRT      /PEN RIGHT 14 INCHES
2222      4320      JMS I PNUP      /PEN UP
2223      4464      TAD K7774
2224      1046      JMS DDN      /DRUM DOWN 14 INCHES
2225      4276
          /
2226      4474      JMS I PNDN      /PEN DOWN
2227      4464      JMS I PNUP      /PEN UP
          /
          /MAKE 2ND SQUARE
          /
2230      1050      TAD K7776
2231      4307      JMS DDU      /DRUM UP 7 INCHES
2232      4474      JMS I PNDN      /PEN DOWN
2233      1050      TAD K7776
2234      4331      JMS PLT      /PEN LEFT 7 INCHES
2235      1046      TAD K7774
2236      4276      JMS DDN      /DRUM DOWN 14 INCHES
2237      1046      TAD K7774
2240      4320      JMS PRT      /PEN RIGHT 14 INCHES
2241      1046      TAD K7774
2242      4307      JMS DDU      /DRUM UP 14 INCHES
2243      1050      TAD K7776
2244      4331      JMS PLT      /PEN LEFT 7 INCHES
2245      4464      JMS I PNUP      /PEN UP
2246      1050      TAD K7776
2247      4276      JMS DDN      /DRUM DOWN 7 INCHES
2250      4474      JMS I PNDN      /PEN DOWN
2251      4464      JMS I PNUP      /PEN UP

```

MAKE THE CENTER SQUARE

2252	7240	CLA CMA	
2253	4307	JMS DDU	/DRUM UP 3,5 INCHES
2254	4474	JMS I PNDN	/PEN DOWN
2255	7040	CMA	
2256	4320	JMS PRT	/PEN RIGHT 3,5 INCHES
2257	1050	TAD K7776	
2258	4276	JMS DUN	/DRUM DOWN 7 INCHES
2261	1050	TAD K7776	
2262	4331	JMS PLT	/PEN LEFT 7 INCHES
2263	1050	TAD K7776	
2264	4307	JMS DD	/DRUM UP 7 INCHES
2265	7040	CMA U	
2266	4320	JMS PRT	/PEN RIGHT 3,5 INCHES
2267	4464	JMS I PNUP	/PEN UP
2270	7040	CMA	
2271	4276	JMS DUN	/DRUM DOWN 3,5 INCHES
2272	4474	JMS I PNDN	/PEN DOWN
2273	4464	JMS I PNUP	/PEN UP
2274	5675	JMP I ,+1	/DRAW DIAGONALS
2275	2400	D19A	
2276	0000	DDN,	
2277	3020	DCA CNTA	
2300	4511	JMS I S300	
2301	4470	JMS I DRDN	/DRUM DOWN
2302	4422	JMS I CSTEP	
2303	5301	JMP ,=2	
2304	2020	ISZ CNTA	
2305	5300	JMP ,=5	
2306	5676	JMP I DDN	/EXIT

2307	0000	DDU,	0	
2310	3020		DCA CNTA	
2311	4511		JMS I S300	
2312	4466		JMS I DRDU	/DRUM UP
2313	4422		JMS I CSTEP	
2314	5312		JMP , -2	
2315	2020		ISZ CNTA	
2316	5311		JMP , -5	
2317	5707		JMP I DDU	/EXIT
		/		
2320	0000	PRT,	0	
2321	3020		DCA CNTA	
2322	4511		JMS I S300	
2323	4476		JMS I PNR	/PEN RIGHT
2324	4422		JMS I CSTEP	
2325	5323		JMP , -2	
2326	2020		ISZ CNTA	
2327	5322		JMP , -5	
2330	5720		JMP I PRT	/EXIT
		/		
2331	0000	PLI,	0	
2332	3020		DCA CNTA	
2333	4511		JMS I S300	
2334	4477		JMS I PNL	/PEN LEFT
2335	4422		JMS I CSTEP	
2336	5334		JMP , -2	
2337	2020		ISZ CNTA	
2340	5333		JMP , -5	
2341	5731		JMP I PLT	/EXIT

```

/
2400 *2400
/
/DRAW DIAGONALS
/
019A, JMS I S1300
2401 4467 JMS I DPPR /DRUM UP; PEN RIGHT
2402 4422 JMS I CSTEP
2403 5201 JMP , -2
2404 4474 JMS I PNDN /PEN DOWN
2405 1050 TAD K7776
2406 3020 DCA CNTA
2407 4517 JMS I S1300
2410 4475 JMS I DNPL /DRUM DOWN; PEN LEFT
2411 4422 JMS I CSTEP
2412 5210 JMP , -2
2413 2020 ISZ CNTA
2414 5207 JMP , -5
2415 1043 TAD K7776
2416 3020 DCA CNTA
2417 4511 JMS I S350
2420 4476 JMS I PNRT /PEN RIGHT 28 INCHES
2421 4422 JMS I CSTEP
2422 5220 JMP , -2
2423 2020 ISZ CNTA
2424 5217 JMP , -5

/
2425 1050 TAD K7776
2426 3020 DCA CNTA
2427 4517 JMS I S1300
2430 4473 JMS I DPPL /DRUM UP; PEN LEFT
2431 4422 JMS I CSTEP
2432 5230 JMP , -2
2433 2020 ISZ CNTA
2434 5227 JMP , -5

```

```

/
/PEN RIGHT TO MARGIN
/
2435 1043          TAD K7770
2436 4464          JMS I PNUP          /PEN UP
2437 4714          JMS I PRIT          /PEN RIGHT 28 INCHES
/
/DRUM DOWN TO TOP OF SQUARE
/
2440 1043          TAD K7770
2441 4707          JMS I PDUN          /DRUM DOWN 28 INCHES
/
2442 4500          JMS I S2
2443 4477          JMS I PNLT          /PEN LEFT ,2 INCH
2444 4422          JMS I CSTEP
2445 5243          JMP , -2
2446 1036          TAD K7713          /-53 DECIMAL
2447 3020          DCA CNTA
2450 4474          BRIT, JMS I PNUN          /PEN DOWN
2451 47 0          JMS I XPRT          /PEN RIGHT ,2 INCH
2452 47 1          JMS I XDUD          /DRUM UP ,2 INCH
2453 4464          JMS I PNUP          /PEN UP
2454 4711          JMS I XDUD          /DRUM UP ,2 INCH
2455 4712          JMS I XLT           /E LEFT ,2 INCH
2456 4474          JMS I PNUN          /PEN DOWN
2457 4713          JMS I XUN          /DRUM DOWN ,2 INCH
2460 4712          JMS I XLT           /PEN LEFT ,2 INCH
2451 4464          JMS I PNUP          /PEN UP
2452 4712          JMS I XLT           /E LEFT ,2 INCH
2463 4711          JMS I XDUD          /DRUM UP ,2 INCH

```

2464	2020	ISZ CNTA	/DONE WHEN SKIP
2465	5250	JMP BRIT	
2466	4464	JMS I PNUP	/PEN UP
2467	1045	TAD K777J	
2470	4521	JMS I XPLT	/PEN LEFT 17,5 INCHES
2471	1045	TAD K777J	
2472	4455	JMS I PDU	/DR M P 17,5 INCHES
2473	4713	JMS I XDNV	/BACK DOWN ,1 INCH
2474	4710	JMS I XPRT	
2475	4710	JMS I XPRT	
2476	7604	LAS	
2477	7004	RAL	
2500	7710	SPA CLA	
2501	5706	JMP I DT19	/RETRACE
2502	1043	TAD K777J	
2503	4707	JMS I PUDN	
2504	5705	JMP I ,+1	
2505	0614	T16	/RERUN
/			
2506	2200	DT 9,	CP 9
2507	2276	PUDN,	DDA
2510	2040	XPRT,	RTPN
2511	2046	XDUD,	DUOR
2512	2054	XLT,	LTPN
2513	2062	XDN,	DNDR
2514	2320	PRIT,	PRT
/			
2515	0000	RYTE,	0
2516	4476	JMS I PNRT	/PEN RIGHT TENTH INCH
2517	4476	JMS I PNRT	
2520	4476	JMS I PNRT	
2521	4476	JMS I PNRT	
2522	4476	JMS I PNRT	
2523	5715	JMP I RYTE	

	2600	/			
	2601	*2600			
	2602	/			
	2603	C2,	Ø		
	2604		CLA		
	2605		TAD TNTH		/,1 INCH
	2606		DCA SCNT		
	2607		JMP I C2		
	2608	/			
	2609	C2>,	Ø		
	2610		CLA		
	2611		TAD ORTH		/,25 INCH
	2612		DCA SCNT		
	2613		JMP I C2>		
	2614	/			
	2615	C50,	Ø		
	2616		CLA		
	2617		TAD HALF		/,5 INCH
	2618		DCA SCNT		
	2619		JMP I C50		
	2620	/			
	2621	C71,	Ø		
	2622		CLA		
	2623		TAD SYNT		/,71 INCH
	2624		DCA SCNT		
	2625		JMP I C71		
	2626	/			
	2627	C100,	Ø		
	2628		CLA		
	2629		TAD ONE		/1 INCH
	2630		DCA SCNT		
	2631		JMP I C100		
	2632	/			
	2633	C175,	Ø		
	2634		CLA		
	2635		TAD ORTS		/1,75 INCH
	2636		DCA SCNT		
	2637		JMP I C175		
	2638	/			
	2639	C177,	Ø		
	2640		CLA		
	2641		TAD SYNTY		
	2642		DCA SCNT		
	2643		JMP I C177		
	2644	/			
	2645	C2>0,	Ø		
	2646		CLA		
	2647		TAD TWFY		/2,5 INCHES
	2648		DCA SCNT		
	2649		JMP I C2>0		
	2650	/			
	2651	C3>0,	Ø		
	2652		CLA		
	2653		TAD THFY		/3,5 INCHES

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2653 3060
2654 5650

DCA SCNT
J_{MP} I C350

/

2655 0000 C425, 0
 2656 7200 CLA
 2657 1134 TAD FQRT /4,25 INCHES
 2660 3060 DCA SCNT
 2651 5655 JMP I C425

/
 C500,
 2662 0000 0
 2663 7200 CLA
 2664 1135 TAD FVH /5 INCHES
 2655 3060 DCA SCNT
 2666 5662 JMP I C500

/
 C604,
 2667 0000 0
 2670 7200 CLA
 2671 1136 TAD SIX4 /6 INCHES
 2672 3060 DCA SCNT
 2673 5667 JMP I C604

/
 C600,
 2674 0000 0
 2675 7200 CLA
 2676 1137 TAD SIXH /6 INCHES
 2677 3060 DCA SCNT
 2700 5674 JMP I C600

/
 C10,
 2701 0000 0
 2702 7200 CLA
 2703 1140 TAD TE /10 INCHES
 2704 3060 DCA CN
 2705 5701 JMP I C10

/
 C1300,
 2706 0000 0
 2707 7200 CLA
 2710 1141 TAD THRT /19,6 INCHES
 2711 3060 DCA SCNT
 2712 5706 JMP I C1300

/CHECK FOR 5 OR 10 MIL STEPS

/
 FORTN, 0
 2713 0000 LAS
 2714 7604 AND 0100
 2715 0027 SNA CLA /SKI = 5 MIL
 2716 7650 JMP TNML /10 MIL
 2717 5334 TAD CNTS /POINTER
 2720 1122 DCA 10
 2721 3010 TAD NUMS /POINTER
 2722 1347 DCA 11
 2723 3011 TAD K7761 /-15 DECIMAL
 2724 1367 DCA CNTA
 2725 3020

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2726	1411	CNVT,	TAD I 11	/GET A NUMBER
2727	7104		CLL RAL	/MULTIPLY BY 2
2730	3410		DCA I 10	
2731	2020		ISZ CNTA	
2732	5326		JMP CNVT	
2733	5713		JMP I FORTN	/EXIT
		/		
2734	1122	TNML,	TAD CNTS	
2735	3010		DCA 10	
2736	1347		TAD NUMS	
2737	3011		DCA 11	
2740	1367		TAD K/761	
2741	3020		DCA CNTA	
2742	1411		TAD I 11	
2743	3410		DCA I 10	
2744	2020		ISZ CNTA	
2745	5342		JMP , -3	
2746	5713		JMP I FORTN	/EXIT
		/		
2747	2747	NUMS,	.	
2750	7766		7766	/-10
2751	7747		7747	/-25
2752	7671		7671	/-71
2753	7716		7716	/-50
2754	7634		7634	/-100
2755	7521		7521	/-175
2756	7525		7525	/-171
2757	7406		7406	/-250
2750	7242		7242	/-350
2751	7127		7127	/-425
2752	7014		7014	/-500
2753	6650		6650	/-600
2754	6650		6650	/-600
2755	6030		6030	/-1000
2756	5210		5210	/-1392
2757	7761	K/61,	7761	/

```

/
3000 *3000
/DASH SUBROUTINE
/
3000 0000 RECT, 0
3001 3020 DCA CNTA
3002 4212 JMS DASH
3003 2020 ISZ CNTA
3004 7410 SXP
3005 5600 JMP I RECT /EXIT
3006 4221 JMS SPC
3007 2020 ISZ CNTA
3010 5202 JMP RECT+2
3011 5600 JMP I RECT
/
DASH, 0
3012 0000
3013 4474 JMS I PNUN /PEN DOWN
3014 4505 JMS I S100
3015 4456 JMS I PNMV /PEN LEFT OR RIGHT
3016 4422 JMS I CSTEP
3017 5215 JMP ,-2
3020 5612 JMP I DASH /EXIT
/
/
3021 0000 SPC, 0
3022 4464 JMS I PNUP /PEN UP
3023 4505 JMS I S100
3024 4456 JMS I PNMV /PEN LEFT OR RIGHT
3025 4422 JMS I CSTEP
3026 5224 JMP ,-2
3027 5621 JMP I SPC /EXIT
/
/
3030 0000 STEP, 0
3031 7604 LAS
3032 7710 SPA CLA /CHECK FOR HALT
3033 7402 HLT /PRESS CONT TO GO ON
3034 7200 CLA
3035 2060 ISZ SCNT /STEP COUNTER
3036 5630 JMP I STEP
3037 2230 ISZ STEP
3040 5630 JMP I STEP /EXIT

```

```

/ MOVE ROUTINES
/
/ DRUM DOWN
/
3041 0000 DRMDN, 0
3042 6001 IUN /PI ON
3043 6514 PLDD /DRUM DOWN
3044 5244 E21, JMP I
3045 5641 JMP I DRMDN
/
/ DRUM UP
/
3046 0000 DRMDU, 0
3047 6001 IUN /PI ON
3050 6512 PLDU /DRUM UP
3051 5251 E22, JMP I
3052 5646 JMP I DRMDU
/
/ PEN LEFT
/
3053 0000 PNLFT, 0
3054 6001 IUN /PI ON
3055 6525 PLPL /PEN LEFT
3056 5256 E23, JMP I
3057 5653 JMP I PNLFT
/
/ PEN RIGHT
/
3060 0000 PNRTL, 0
3061 6001 IUN /PI ON
3062 6511 PLPR /PEN RIGHT
3063 5263 E24, JMP I
3064 5660 JMP I PNRTL
/
/ PEN DOWN
/
3065 0000 PNDWN, 0
3066 6001 IUN /PI ON
3067 6524 PLPD /PEN DOWN
3070 5270 E25, JMP I
3071 5665 JMP I PNDWN
/
/ PEN UP
/
3072 0000 PENUP, 0
3073 6001 IUN /PI ON
3074 6504 PLPU /PEN UP
3075 5275 E26, JMP I
3076 5672 JMP I PENUP
/
/ DRUM UP
/
3077 0000 DMUPL, 0
3100 6001 IUN /PI ON
3101 6514 PLDD /DRUM DOWN
3102 6521 PLPL /PEN LEFT

```

3103	5303	E2',	JMP ;	
3104	5677		JMP I DMUPL	
		/		
3105		DMUPL,	Ø	
3106	ØØØØ		ION	/PI ON
3107	6523		DUPL	/DRUM UP; PEN LEFT
3110	5310	E2',	JMP ;	
3111	5705		JMP I DMUPL	
		/		
3112	ØØØØ	DMUPR,	Ø	
3113	6001		ION	/PI ON
3114	6515		DUPR	/DRUM DOWN; PEN RIGHT
3115	5315	E2',	JMP ;	
3116	5712		JMP I DMUPR	
		/		
3117	ØØØØ	DMUPR,	Ø	
3120	6001		ION	/PI ON
3121	6513		DUPR	/DRUM UP; PEN RIGHT
3122	5322	E3',	JMP ;	
3123	5717		JMP I DMUPR	

```

/
3200 *3200
/
/PROGRAM INTERRUPT SERVICE
/
3200 3061 PISVC, DCA SVAC /SAVE AC
3201 6036 KRB /CLEAR KEYBOARD
3202 6501 PLSF /CHECK PLOTTER FLAG
3203 5206 JMP ,+3
3204 6502 PLCF /CLEAR FLAG
3205 2000 ISZ 0 /RETURN +1
3206 7200 CLA
3207 1061 TAD SVAC /RESTORE AC
3210 6001 ION /PI ON
3211 5400 JMP I 0 /EXIT
/
/CHECK FOR 12 OR 31 INCH PLOTTER
/
3212 0000 C1231, 0
3213 7604 LAS
3214 0030 AND K0400 /MASK BIT 3
3215 7640 SZA CLA /NO SKIP = 31 INCH
3216 5612 JMP I C1231 /EXIT
3217 2212 ISZ C1231
3220 5612 JMP I C1231 /EXIT TO 12 INCH
/
CYCLE, LAS
3221 7604 RAR
3222 7010
3223 7620 S C A /SKIP IF 8
3224 5630 JMP I ,+4 /PDP-8 OR 81
3225 1035 TAD K7630
3226 3033 DCA K7621
3227 5630 JMP I ,+1
3230 0201 T1
/
$

```


JRIT	2450	DNDR	2062	JM3	0026	PF18	1365
C10	2701	DNPL	0075	JM4	1261	PISVC	3200
C120	2624	DNPR	0071	JM5	1262	PLCF	6502
C1231	3212	DPPPL	0073	JM6	1263	PLDU	6514
C1300	2706	DPPR	0067	JM7	1353	PLDU	6512
C175	2631	DRDN	0070	K0100	0027	PLDT	0611
C177	2636	DRDU	0066	K0400	0030	PLPD	6524
C2	2600	DRMUN	3041	K7470	0031	PLPL	6521
C25	2605	DRMDU	3046	K7526	0032	PLPR	6511
C250	2643	DT19	2506	K7621	0033	PLPU	6504
C350	2650	DUDR	2046	K7623	0034	PLSF	6501
C425	2655	DUPL	0523	K7630	0035	PLT	2331
C50	2612	DUPR	0513	K7713	0036	PLUD	6522
C500	2662	E1	0203	K7716	0037	PNDN	0074
C600	2674	E10	0330	K7743	0040	PNDWN	3065
C604	2667	E11	0416	K7761	2767	PNLFT	3053
C71	2617	E12	0420	K7764	0041	PNLT	0077
CD1	1127	E13	0436	K7765	0042	PNMV	0056
CD2	1133	E14	0440	K7770	0043	PNRT	0076
CD3	1140	E15	0456	K7772	0044	PNRTE	3060
CD4	1144	E16	0460	K7773	0045	PNUP	0064
CD5	1150	E17	0476	K7774	0046	PRECT	0057
CD6	1154	E18	0500	K7775	0047	PRIT	2514
CD7	1160	E19	0516	K7776	0050	PRT	2320
CD8	1164	E2	0221	KE5	0051	PT1	1264
CD9	1170	E20	0520	KT7	0052	PT2	1265
CNTA	0020	E21	3044	L31	1400	PT3	1266
CNTB	0021	E22	3051	LEFT	0072	PT4	1267
CNTS	0122	E23	3056	LF31	1366	PT5	1270
CNVT	2726	E24	3063	LLFT	1200	PT6	1271
CP19	2200	E25	3070	LSQR	2000	PT7	1272
CS3	1600	E26	3075	LTPN	2054	PT8	1273
CSTEP	0022	E27	3103	MVLF	0053	PT9	1274
CT1	1026	E28	3110	NUMS	2747	QRTR	0124
CT2	1033	E29	3115	OCT12	1025	QRTS	0130
CT3	1037	E30	3122	OCT31	1234	R16A	0671
CT4	1043	E4	0231	ONE	0127	R19	1447
CT5	1047	E5	0245	P17A	1075	R19A	2101
CT6	1053	E5A	0247	P19A	0054	RECT	3000
CT7	1057	E6	0263	PC1	1354	RITE	0065
CT8	1063	E7	0275	PC12	1275	RT16	0637
CT9	1067	E8	0306	PC2	1355	RT17	1010
CYCLE	3221	E9	0316	PC3	1356	RT19	2037
J19A	2400	F18	1126	PC4	1357	RIPN	2040
JASH	3012	F18A	1326	PC5	1360	RYTE	2515
JUN	2276	FQRTN	2713	PC6	1361	S10	0101
JUPR	6515	FQRT	0134	PC7	1362	S100	0105
JUJ	2307	FVH	0135	PC8	1363	S1231	0116
JMPL	3077	FVTN	0023	PC9	1364	S1300	0117
JMPPR	3112	HALF	0126	PDDN	2507	S175	0106
JMJPL	3105	JM1	0024	PDDU	0055	S177	0107
JMJPR	3117	JM2	0025	PEUP	3072	S2	0100

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S25	0102	XLT	2512
S250	0110	XPLT	0121
S350	0111	XPNR	0142
S425	0112	XPRY	2510
S50	0103	XTIM	0063
S500	0113		
S600	0114		
S604	0115		
S71	0104		
SCNT	0060		
SIX4	0136		
SIXH	0137		
SPC	3021		
SR0	0522		
STEP	3030		
SVAC	0061		
SVC	0062		
SVNT	0125		
SVNTY	0131		
T1	0201		
T10	0320		
T11	0400		
T12	0422		
T13	0442		
T14	0462		
T15	0502		
T16	0614		
T16A	0661		
T17	1000		
T17A	1217		
T18	1076		
T18A	1276		
T19	1423		
T19A	2070		
T2	0205		
T4	0223		
T5	0233		
T6	0251		
T7	0265		
T8	0277		
T9	0310		
TEN	0140		
THFY	0133		
THRT	0141		
TIMER	0600		
TNML	2734		
TNTM	0123		
TWFY	0132		
WHICH	0120		
WRIT	2006		
XUN	2513		
XUJD	2511		

ERRORS DETECTED: 0
LINKS GENERATED: 0
RUN-TIME: 35 SECONDS
% CORE USED

