

IDENTIFICATION

PRODUCT CODE: MA1NDEC:X8:DIXVA-A-D
PRODUCT NAME: DEC/X8 MODULE "PLOTTER"
INCREMENTAL PLOTTER EXERCISER FOR DEC/X8
DATE CREATED: DECEMBER 28, 1972
MAINTAINER: DIAGNOSTIC GROUP
AUTHOR: LEONARD E. BEYERSDORFER

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MAYNARD, MASS. 01754

1.
MODULE DESCRIPTION

"PLOTTER" IS A DEC/X8 SOFTWARE MODULE WHICH EXERCISES AN INCREMENTAL PLOTTER CONTROLLED VIA AN XY8-E, VP8/118/LJ OR XY12 INTERFACE.

THE PLOTTER DISPLAYS THE "SIERPINSKY SPACE FILLING CURVE" USING AN ALGORITHM GIVEN IN "SOFTWARE PRACTICE AND EXPERIENCE" (VOL. 1, PP. 403-410, 1971) AS MODIFIED BY S. RABINOWITZ (D,E,C).

THE INFORMATION PRESENTED IN THIS MODULE DESCRIPTION IS SUFFICIENT FOR THIS MODULE'S USE. HOWEVER, THE USER IS REFERRED TO THE ABOVE ARTICLE IF A MATHEMATICAL INSIGHT INTO THE GENERATION OF THIS CURVE IS DESIRED.

"PLOTTER" HAS THE ABILITY TO DISPLAY SEVERAL VARIATIONS OF THE CURVE, ANYONE OF WHICH MAY BE CHOSEN BY THE USER VIA MODULE INITIALIZATION (REF. PARAGRAPH 4.3). THE TWO PARAMETERS WHICH CONTROL THESE VARIATIONS ARE "ITERATION" AND "LINE LENGTH".

THE FIGURES WHICH FOLLOW WERE DRAWN BY A PLOTTER (USING THIS MODULE) BUT HAVE BEEN PHOTO REDUCED FOR PRINTING. THEY SHOW THE EFFECT OF THE TWO VARIABLES ON THE CURVE GENERATED. EACH FIGURE IS NOTED WITH THE FOLLOWING INFORMATION.

SYMBOL DEFINITION


- B ITERATION CODE NUMBER = REFERS TO CURVE COMPLEXITY (01 IS SIMPLEST, 13 MOST COMPLEX). UNFORTUNATELY ONLY UP TO A CERTAIN LEVEL OF COMPLEXITY HAS BEEN SHOWN DUE TO THE SIZE OF THE CURVE GENERATED.
- C LINE LENGTH CODE NUMBER = REFERS TO CURVE COMPONENT SIZE (01 IS SMALLEST, 17 IS LARGEST). THIS NUMBER MULTIPLIED BY 2 THEN MULTIPLIED BY INCREMENT SIZE YIELDS THE LENGTH OF EACH HORIZONTAL AND VERTICAL LINE.


THE CURVE STARTS AT THE POINT INDICATED BY THE ARROW (→) AND CONTINUES FIRST IN THE PEN RIGHT (=Y) DIRECTION, ACTUALLY THE STARTING POINT IS NEAR THE EXTREME PEN RIGHT (=Y), DRUM DOWN (→X) POSITION ON THE CURVE. NOTE THAT ONLY THE FOLLOWING VECTORS ARE USED: (→X), (→Y), (→X), (→Y), (→X,→Y), (→X,→Y) AND (→X,→Y). NO 1/2 INCREMENT VECTORS ARE USED.


THE ENTIRE CURVE IS DRAWN WITHOUT THE PEN EVER LEAVING THE PAPER. HOWEVER, PERIODICALLY A PEN DOWN COMMAND IS GIVEN TO RECOVER FROM USER INTERVENTION. ONCE THE COMPLETE CURVE HAS BEEN DRAWN IT WILL RETRACE AND CONTINUE UNTIL THE JOB HAS BEEN KILLED.


SIERPINSKY SPACE FILLING CURVES


B = ITERATION
 C = LINE LENGTH
 $L = 2B1$ WHERE L = LENGTH OF EACH HORIZONTAL AND VERTICAL LINE, AND 1 IS THE PLOTTER INCREMENT SIZE,

$B = \emptyset 1$
 $C = 11$


$B = \emptyset 1$
 $C = 10$


$B = \emptyset 1$
 $C = \emptyset 6$


$B = \emptyset 1$
 $C = \emptyset 5$


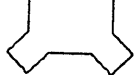
$B = \emptyset 1$
 $C = \emptyset 4$


$B = \emptyset 1$
 $C = \emptyset 3$


$B = \emptyset 1$
 $C = \emptyset 2$

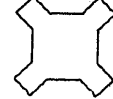

$B = \emptyset 1$
 $C = \emptyset 1$

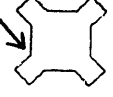

$B = \emptyset 1$
 $C = 17$


$B = \emptyset 1$
 $C = 16$


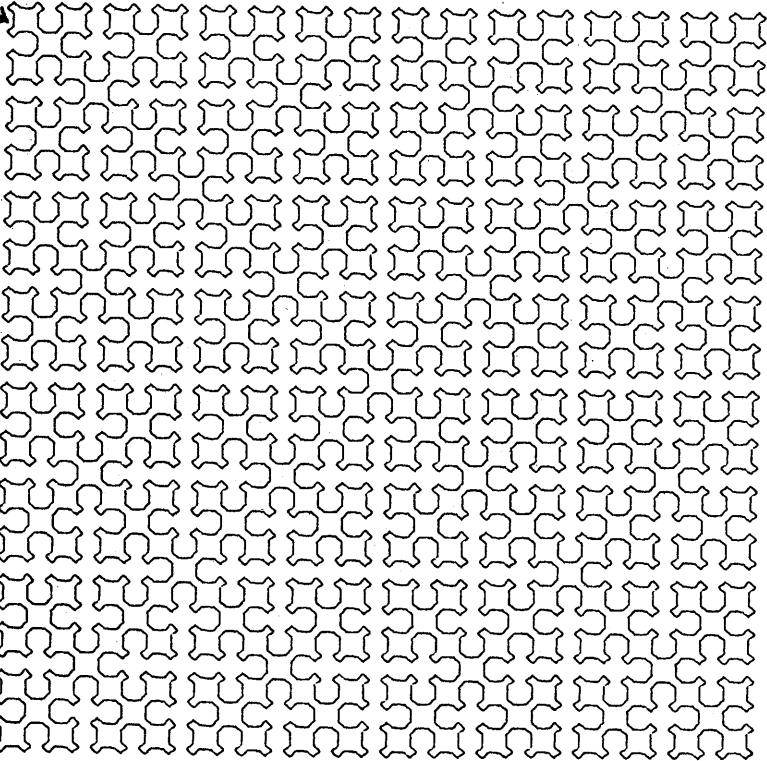
$B = \emptyset 1$
 $C = 15$


$B = \emptyset 1$
 $C = 14$

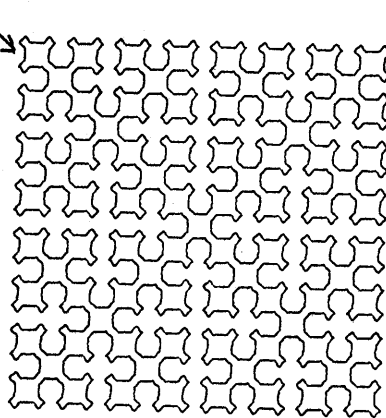

$B = \emptyset 1$
 $C = 13$


$B = \emptyset 1$
 $C = 12$


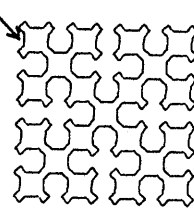
$B = \emptyset 5$
 $C = \emptyset 4$

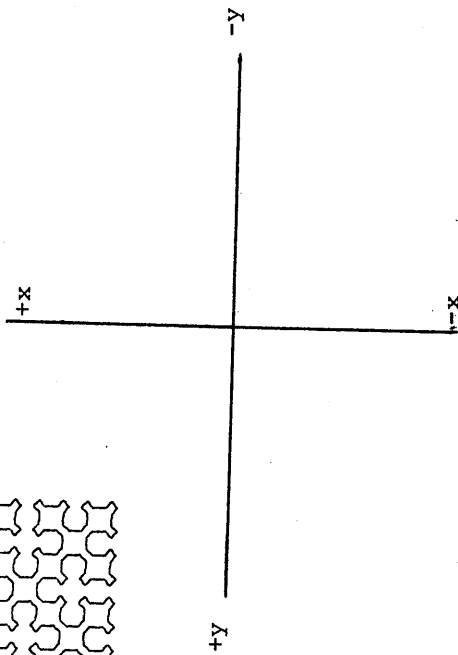
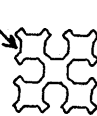
$B = \emptyset 4$
 $C = \emptyset 4$

$B = \emptyset 3$
 $C = \emptyset 4$

$B = \emptyset 2$
 $C = \emptyset 4$

2, REQUIREMENTS

- 1, PROCESSORS: POP=8, 8/I, 8/L, 8/E, 8/F, 8/M AND POP=12
- 2, OPTIONS: XY8=E (ENCODED OR UNENCODED), VP8/I18/LJ
OR XY12 PLOTTER INTERFACE, AND AN INCREMENTAL PLOTTER.
- 3, SPECIAL: NONE

3, RESTRICTIONS

IT IS RECOMMENDED NEVER TO USE A LINE LENGTH PARAMETER OF LESS THAN 3.

4, OPERATING INFORMATION

4.1 SPECIAL CONSIDERATIONS

THE USER SHOULD EXPERIMENT WITH ITERATION AND LINE LENGTH PARAMETERS SET AT LOWER VALUES TO GET A FEEL OF HOW LARGE A GIVEN CURVE IS. SELECTING A LARGE LINE LENGTH AND/OR ITERATION CODE MAY VERY WELL PRODUCE A CURVE WHICH WILL NOT BE CONTAINED WITHIN THE PLOTTING AREA. ACTUALLY THE PRESET VALUES FOR THESE PARAMETERS WOULD BE A GOOD PLACE TO START FOR MOST PLOTTERS. (REF. PARAGRAPH 4.3).

4.2 BUILDING

- 1, JOB TYPE: INTERRUPT DRIVEN
- 2, PRIORITY: ABSOLUTELY NON-CRITICAL
- 3, JOB SLOTS: JF1 OR VP2 ONLY; 4 PAGES REQUIRED.
- 4, STANDARD DEVICE CODES: 0500 (APPLIES TO ALL)
0510 (VP8/I18/LJ, XY12 ONLY)
0520 (VP8/I18/LJ, XY12 ONLY)

4.3 INITIALIZING

REFER TO THE FIGURES IN PARAGRAPH 1 FOR A VISUAL DESCRIPTION OF THE EFFECTS OF THE VARIOUS PARAMETERS. ALSO REVIEW THE STATEMENTS IN PARAGRAPHS 3 AND 4.3.

AFTER "PLOTTER" IS PRINTED, RESPOND TO EACH CODE LETTER AS DEFINED BELOW.

CODE	DESIRED RESULT	RESPONSE	LIMITS	PRESET
A	XY8=E UNENCODED XY8=E ENCODED VP8/IL8/LJ, XY12	00 01 02	00#02	00
B	ITERATION	NN	01#13	05
C	LINE LENGTH	NN	01#17*	04

*SELECTING A LINE LENGTH OF LESS THAN 03 IS NOT ENCOURAGED.

4.4 DEVICE SETUP

THE PLOTTER MUST BE ON LINE, INITIALLY IT IS RECOMMENDED THAT THE PEN BE PLACED ABOUT 3/4 INCH FROM THE EXTREME PEN RIGHT (Y) POSITION AND THAT A PORTION OF THE PLOT AREA AT LEAST AS LONG AS THE PLOT AREA IS WIDE EXIST IN THE DRUM UP (X) DIRECTION. ON A FLATBED PLOTTER THIS WOULD CORRESPOND TO THE PEN NEAR THE -Y, #X EXTREME.

4.5 RUNNING

1: CNTRI UPDATED BY EVERY PLOTTER INTERRUPT;
2: SR10: NO EFFECT;
3: SR11: NO EFFECT;

5: ERROR INFORMATION

ALL ERROR DETECTION IS VISUAL.

6: LISTING (ATTACHED)

/DEC/X8 EXTERNAL SYMBOL TABLE "EXTSYM"
 /FOR USE IN ASSEMBLING DEC/X8 SOFTWARE MODULES;
 /COPYRIGHT 1972, DIGITAL EQUIPMENT COMP., MAYNARD, MASS.
 XLIST
 PAUSE

/MAINDEC-X8-DIXYA=A-L "DEC/X8" PLOTTER
 /PLOTTER EXERCISER MODULE FOR DEC/X8
 /THE PLOTTER DISPLAYS THE SIERPINSKY SPACE FILLING CURVE USING AN
 /ALGORITHM AS MODIFIED BY S. RABINOWITZ (O,E,C) FROM THE
 /ALGORITHM GIVEN IN "SOFTWARE=PRACTICE AND EXPERIENCE" (VOL. 1, PP. 403-410 1971)
 /COPYRIGHT 1972, DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASS;
 /THIS MODULE OPERATIONAL ON PDP-8,8/1,8/L,8/E,8/M,8/F AND PDP-12
 /WITH ANY OF THE FOLLOWING PLOTTER OPTIONS!
 /XY8=E (ENCODED AND UNENCODED)
 /VP8/[E/L]
 /XY12
 /PRG1 LEN BEVERSDORFER (X2337)
 /BUILDER INSTRUCTIONS!
 /1, PRIORITY: INTERRUPT DRIVEN; NON-CRITICAL
 /2, JOB SLOT: 4 PAGES (JE1 OR JF2)

/INITIALIZER INSTRUCTIONS

/CODE	DEFINITION	RESPONSE	LIMITS	PRESET
/A	XY8E UNENCODED	00	00+02	00
/	XY8E ENCODED	01		
/	XY12,VP8[E/L]	02		
/B	ITERATION	NN	01+13	05
/C	LINE LENGTH	NN	01+17	04

/PLOTTER MOVEMENT INFORMATION

/DIRECTION	XY8=E (6504)	XY8=E UNENCODED (6504)	XY12,VP8[E/L] UNENCODED (6504)
/PL(+Y)	10	20	6501
/PR(-Y)	14	48	6511
/DD(+X)	12	10	6514
/DU(-X)	16	04	6512 OR 6522
/PLDD(+Y+X)	11	30	6505 THEN 6514
/PLDU(+Y-X)	17	24	6523
/PRDD(+Y+X)	13	30	6515
/PRDU(+Y-X)	15	44	6513
/PU(?P)	31	6503	6504

```

/PD(DOWN P) 32 6505 6224
/CLEAR FLAG 6502 6502 6502
/SKIP FLAG 6501 6501 6501
    
```

/MODULE INTERFACE TABLE

```

0200 0200 *200
0200 0000 0
0201 2014 TEXT1, TEXT "PLOTTER"
0202 1724
0203 0522
0204 0000
0205 0411 TEXT "DIXYA=A"
0206 3031
0207 0155
0210 2100
0211 0000
0212 7402
0213 5611
0214 6202
0215 4426
0216 7777
0217 7777
0220 7777
0221 0000
    
```

/END OF MODULE INTERFACE TABLE

/INITIALIZER

```

0222 4444 INIT, MESSAGE
0223 0201 TEXT1
0224 1117 TAD E K301
0225 3251 DCA INT
0226 4240 JMS INITA
0227 7104 CLL RAL /AIPLOTTER TYPE 0,2,4(0,1,2)
0230 3777 DCA PLOTTER
0231 4240 JMS INITA /B)ITERATION 01=13 2'S COMP IN TEMHLD
0232 7041 CIA
0233 3776 DCA TEMHLD
0234 4240 JMS INITA /D)LINE LENGTH 01=17 2'S COMP IN NUM
0235 7041 CIA
0236 3775 DCA NUM
0237 5020 INITEX
0240 0000 INITA, 0
0241 4454 CRLF
0242 1251 TAD INT
0243 2251 ISZ INT
0244 4450 TYPE
0245 4455 SPACE2
0246 4441 TMOOCT
0247 5224 JMP INIT*2
0250 5640 JMP I INITA
    
```

/INTERRUPT SERVICE

```

0251 0000 INT, 0
0252 2276 ISZ RENTRY /EXPECTED INTERRUPT?
0253 5264 JMP NOTMIN /NO
0254 4211 JMS HOMEDF /YES, DF=IF
0255 6502 DC50A, 6502 /CLEAR FLAG
0256 2221 ISZ CNTR /+1 TO PLOT COUNTER
0257 1217 TAD KILL /KILL JOB?
0260 7450 SNA
0261 5672 JMP I EXIT /NO, CONTINUE
0262 3220 DCA KILLED /YES, ACKNOWLEDGE LAST INTERRUPT AND EXIT;
0263 5214 JMP INTACK
0264 6214 NOTMIN, ROP /INTERRUPT NOT ACKNOWLEDGED EXIT
0265 1020 TAD E KCIFDF
0266 3270 DCA I*2
0267 3276 DCA RENTRY
0270 7402 HLT
0271 5651 JMP I INT

0272 0000 EXIT, 0 /PLOTTER ACTION INITIATED
0273 7240 STA /ALLOW ONE INTERRUPT
0274 3276 DCA RENTRY
0275 5214 JMP INTACK /ACKNOWLEDGE PREVIOUS INTERRUPT
0276 0000 RENTRY, 0
    
```

/PLOTTER TABLES

/NOTE) IF YOU'RE REALLY INTERESTED, YOU MIGHT TRY MODIFYING THE PLOTTER TABLES (AND ALSO THE PEN DOWN SECTION IN THE "FILL" /ROUTINE) SO THE OUTPUT WOULD APPEAR ON OTHER THAN THE DEVICES FOR WHICH THIS MODULE IS INTENDED;

/FORMAT

```

/TAG, + NUMBER OF SERIES
/ XYSR PLLR
/ XYSR UNENCODED CONSTANT
/ XYSR PLLR
/ XYSR ENCODED CONSTANT
/ VPSICBLJ,XY12 UNENCODED INSTRUCTION
/ NOTHING OR ANOTHER VPSICBLJ,XY12 UNENCODED INSTRUCTION
    
```

```

0277 0002 XUXU, 2 /2 SERIES OF PEN RIGHT
0300 6504 DC50B, 6504
0301 0040 40
0302 6504 DC50C, 6504
0303 0014 14
0304 6511 DC51A, 6511

0305 0001 XUYU, 1 /DRUM DOWN;PEN RIGHT
0306 6504 DC50D, 6504
0307 0050 50
0310 6504 DC50E, 6504
    
```

```

0311 0013      13
0312 0515      DC51B, 0515

0313 0001      XUYD, 1          /DRUM UP,PEN RIGHT
0314 0504      DC50F, 0504
0315 0044      44
0316 0504      DC50G, 0504
0317 0015      15
0320 0513      DC51C, 0513

0321 0002      XDXU, 2          /2 SERIES OF PEN LEFT
0322 0504      DC50H, 0504
0323 0020      20
0324 0504      DC50I, 0504
0325 0010      10
0326 0521      DC52A, 0521

0327 0001      XDYU, 1          /DRUM DOWN,PEN LEFT
0330 0504      DC50J, 0504
0331 0030      30
0332 0504      DC50K, 0504
0333 0011      11
0334 0521      DC52B, 0521
0335 0514      DC51D, 0514

0336 0001      XDVO, 1          /DRUM UP,PEN LEFT
0337 0504      DC50L, 0504
0340 0024      24
0341 0504      DC50M, 0504
0342 0017      17
0343 0523      DC52C, 0523

0344 0002      YDVO, 2          /2 SERIES OF DRUM UP
0345 0504      DC50N, 0504
0346 0004      04
0347 0504      DC50O, 0504
0350 0016      16
0351 0512      DC51E, 0512

0352 0002      YUYU, 2          /2 SERIES OF DRUM DOWN
0353 0504      DC50P, 0504
0354 0010      10
0355 0504      DC50Q, 0504
0356 0012      12
0357 0514      DC51F, 0514
0360 0000      0/NEVER DELETE THIS "0"

0361 0361      *,
0361 0563      TH, TH1;TH2;TH3;TH4          /0 0 NOT DISPERSE
0362 0611
0363 0521
0364 0542
0365 0510      TH, TH1;TH2;TH3;TH4          /*****
0366 0531
0367 0552

```

```

0370 0600

0223 0223      *INIT*1;TEXT1

0375 0797
0376 0476
0377 0616      *400
0400 2400

/runner (ALSO THE START OF THE QUANTILY COMMENTED ALGORITHM)

0400 3777      RUN, DCA CNTR          /0 => PLOT COUNTER
0401 4776      JMS CLRBUF          /CLEAR COMMAND BUFFER
0402 1276      TAD TENHLD          /SET UP ITERATION
0403 3277      DCA TEMP
0404 7101      CLL IAC
0405 7004      RAL
0406 2277      ISZ TEMP
0407 5205      JMP J,=2
0410 3300      DCA J
0411 3301      DCA THETA          /2;1=>J
0412 1300      TAD J
0413 3302      DCA JX
0414 1300      TAD J
0415 3303      DCA JY
0416 1300      LOOP, TAD J
0417 3304      DCA K
0420 1302      TAD JX
0421 3305      DCA K1
0422 1303      TAD JY
0423 3306      DCA K2
0424 5241      JMP L2
0425 1304      REDUCE, TAD K
0426 7041      CIA
0427 1305      TAD K1
0430 7200      SMA
0431 3305      DCA K1
0432 7200      CLA
0433 1304      TAD K
0434 7041      CIA
0435 1306      TAD K2
0436 7200      SMA
0437 3306      DCA K2
0440 7200      CLA
0441 7344      L2, CLL STA RAL
0442 1304      TAD K
0443 7450      SMA
0444 5267      JMP JUNPA          /K=2
0445 7710      SPA CLA          /K=1
0446 7402      HLT K
0447 1304      TAD K
0450 7110      CLL RAR
0451 3304      DCA K          /K/2=>K

```



```

0452 1304 TAD K
0453 7041 CIA
0454 1305 TAD K1
0455 7110 CLL RAR
0456 7640 SEA CLA
0457 5225 JMP REDUCE
0460 1304 TAD K
0461 7041 CIA
0462 1306 TAD K2
0463 7110 CLL RAR
0464 7640 SEA CLA
0465 5225 JMP REDUCE
0466 7410 SKP
0467 1307 JUMPA, TAD KTHMTW
0470 1375 TAD (TW
0471 1301 TAD THETA
0472 3277 DCA TEMP
0473 1677 TAD I TEMP
0474 3277 DCA TEMP
0475 5677 JMP I TEMP
0476 7773 TEMHLD, +3
0477 0000 TEMP, 0
0500 0000 J, 0
0501 0000 THETA, 0
0502 0000 JX, 0
0503 0000 JY, 0
0504 0000 K, 0
0505 0000 K1, 0
0506 0000 K2, 0
0507 0004 KTHMTW, TH=TW
    
```

/RELATES TO ITERATION; PRESET FOR ITERATION 5

```

0510 4774' TH1, JMS FILL
0511 0277 XUXU
0512 4774' JMS FILL
0513 0305 XUYU
0514 4774' JMS FILL
0515 0313 XUYD
0516 2301 ISE THETA
0517 2301 ISE THETA
0520 5323 JMP ,+3
0521 4774' TH3, JMS FILL
0522 0321 XDXD
0523 4774' JMS FILL
0524 0336 XDYD
0525 7240 STA
0526 1303 TAD JY
0527 3303 DCA JY
0530 5773' JMP TEST

0531 4774' TH2, JMS FILL
0532 0344 YDYD
0533 4774' JMS FILL
0534 0313 XUYD
0535 4774' JMS FILL
0536 0336 XDYD
    
```

```

0537 2301 ISE THETA
0540 2301 ISE THETA
0541 5344 JMP ,+3
0542 4774' TH4, JMS FILL
0543 0352 YUYU
0544 4774' JMS FILL
0545 0327 XDYU
0546 7240 STA
0547 1302 TAD JX
0550 3302 DCA JX
0551 5773' JMP TEST

0552 4774' TH5, JMS FILL
0553 0321 XDXD
0554 4774' JMS FILL
0555 0336 XDYD
0556 4774' JMS FILL
0557 0327 XDYU
0560 2301 ISE THETA
0561 2301 ISE THETA
0562 5365 JMP ,+3
0563 4774' TH1, JMS FILL
0564 0277 XUXU
0565 4774' JMS FILL
0566 0305 XUYU
0567 2303 ISE JY
0570 7000 NOP
0571 5773' JMP TEST
    
```

```

0572 *
0573 0617
0574 0641
0575 0361
0576 0644
0577 0221
0600 *600
0600 4261 TH4, JMS FILL
0601 0352 YUYU
0602 4261 JMS FILL
0603 0327 XDYU
0604 4261 JMS FILL
0605 0305 XUYU
0606 2777' ISE THETA
0607 2777' ISE THETA
0610 5213 JMP ,+3
0611 4261 TH2, JMS FILL
0612 0344 YDYD
0613 4261 JMS FILL
0614 0313 XUYD
0615 2776' ISE JX
0616 0000 PLOTEN, 0
    
```

/PRESET FOR X8-E UNENCODED

```

0617 1777' TEST, TAD THETA
0620 1072 TAD K3
0621 0072 AND K3
0622 3777' DCA THETA
0623 1775' TAD J
0624 7041 CIA
0625 1776' TAD JX
0626 7640 SEA CLA
0627 5774' JMP LOOP
0630 1775' TAD J
0631 7041 CIA
0632 1773' TAD JY
0633 7640 SEA CLA
0634 5774' JMP LOOP
0635 1131 TAD E M200
0636 3372 DCA ("A
0637 4261 JMS FILL
0640 0000 0
0641 2372 ISE ("A
0642 9237 JMP ,=3
0643 5771' JMP RUN+1

0644 0000 CLRBUF, 0
0645 4253 JMS PRESET
0646 3417 AUA, DCA I AUTO
0647 2370 ISE ("B
0650 5246 JMP ,=2
0651 4253 JMS PRESET
0652 5644 JMP I CLRBUF

0653 0000 PRESET, 0
0654 1131 TAD E M200
0655 3370 DCA ("B
0656 1367 TAD (777
0657 3017 AUB, DCA AUTO
0660 5653 JMP I PRESET

0661 0000 FILL, 0
0662 1661 TAD I FILL
0663 7450 SNA
0664 5247 JMP ,+3
0665 1131 TAD E M200
0666 1366 TAD (200
0667 3417 AUC, DCA I AUTO
0670 2241 ISE FILL
0671 2370 ISE ("B
0672 5661 JMP I FILL
0673 4253 JMS PRESET
0674 1365 TAD (AUD
0675 3744' DCA EXIT
0676 7240 STA
0677 6002 IOF
0700 3763' DCA RENTRY
0701 1216 TAD PLOTTER

```

/ENSURE ALL OF COMMAND BUFFER IS EXECUTED;

/PRESET; CLEAR BUFFER; PRESET

/PRESET FOR BUFFER USAGE

/FILL BUFFER AND EXECUTE WHEN FULL
/SAVE COMMAND VECTOR

/GET ANOTHER
/BUFFER FULL; PRESET

/SETUP INTERRUPT RETURN

/ALLOW 1 INTERRUPT
/READY FOR INITIAL PEN DOWN

```

0702 7112 CLL RTR
0703 7670 SNA SZL CLA
0704 5307 JMP ,+3
0705 6524 DC52D, 6524
0706 9004 SERVEX
0707 7430 SZL
0710 5313 JMP ,+3
0711 6505 DC50R, 6505
0712 9004 SERVEX
0713 1067 TAD E K32
0714 6504 DC50S, 6504
0715 7200 CLA
0716 9004 SERVEX
0717 1417 AUB, TAD I AUTO
0720 7450 SNA
0721 9353 JMP FILLEX
0722 3253 DCA PRESET
0723 1653 TAD I PRESET
0724 7041 CIA
0725 3244 DCA CLRBUF
0726 7001 TAD
0727 1253 TAD PRESET
0730 1216 TAD PLOTTER
0731 3253 DCA PRESET
0732 1653 TAD I PRESET
0733 3343 DCA INST
0734 2253 ISE PRESET
0735 1653 TAD I PRESET
0736 3341 DCA CONST
0737 1357 TAD NUM
0740 3360 DCA KNT
0741 7402 CONST, HLT
0742 1341 TAD ,=1
0743 7402 INST, HLT
0744 4764' JMS EXIT
0745 2360 ISE KNT
0746 5341 JMP ,=5
0747 2244 ISE CLRBUF
0750 5337 JMP ,=11
0751 2370 ISE ("B
0752 9317 JMP AUB
0753 1362 FILLEX, TAD (,+2
0754 5761' JMP INTACK
0755 4253 JMS PRESET
0756 9661 JMP I FILL
0757 7774 NUM, =4
0760 7774 KNT, =4
0761 *

```

/XY12, VP01E0L]

/XY8E UNENCODED

/XY8E ENCODED

/INTERRUPT RETURN; GET
/COMMAND VECTOR

/GET SERIES COUNTER

/COMPUTE POINTER TO PROPER
/INSTRUCTION LEVEL IN
/PLOTTER TABLE;

/GET INST

/GET CONSTANT (OR INST)

/GET LINE LENGTH

/CONSTANT OR INST

/INST
/PLOTTER GO AND WAIT FOR INTERRUPT;
/DONE)
/NO
/AGAIN?
/YES;
/END OF BUFFER?
/NO GET NEXT COMMAND;
/YES, SWITCH TO DEFERRED SERVICE
/TO GENERATE MORE COMMANDS;
/ENTER DEFERRED SERVICE, PRESET BUFFER;
/EXIT

```

0761 0214
0762 0755
0763 0276
0764 0272
0765 0717
0766 0200

```

0767 0777
0770 0302
0771 0481
0772 0301
0773 0503
0774 0416
0775 0500
0776 0502
0777 0581
1000 1000
1000 0000

*100010/THIS WHOLE PAGE COMPRISES THE COMMAND BUFFER;

1001 *

0000
0100

0200	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
0300	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	10000111
0400	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
0500	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11011111
0600	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
0700	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111

1000	10000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
1100	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000

1200
1300

1400
1500

1600
1700

2000
2100

2200
2300

2400
2500

2600
2700

3000
3100

3200
3300

3400
3500

3600
3700

4000
4100

4200
4300

4400
4500

4600
4700

5000
5100

5200
5300

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5600
5700

6000
6100

6200
6300

6400
6500

6600
6700

7000
7100

7200
7300

7400
7500

7600
7700

```

0001      FIELD 1
          /BUILDER CALL

1001 0222      INITIRUNINT
1002 0400
1003 0291

1004 6501      6501;0;1;HLT;HLT;HLT
1005 2000
1006 0001
1007 7402
1010 7402
1011 7402

1012 7774      -4;AUA;AUB;AUC;AUD
1013 0646
1014 0697
1015 0667
1016 0717

1017 7775      -3

1020 0500      0500;1;24;1;DC50A;DC50B;DC50C;DC50D;DC50E;DC50F;DC50G
1021 7754
1022 0001
1023 0295
1024 0300
1025 0302
1026 0306
1027 0310
1030 0314
1031 0316
1032 0322      DC50H;DC50I;DC50J;DC50K;DC50L;DC50M;DC50N
1033 0324
1034 0330
1035 0332
1036 0337
1037 0341
1040 0345
1041 0347      DC50O;DC50P;DC50Q;DC50R;DC50S
1042 0353
1043 0355
1044 0711
1045 0714

1046 0510      0510;1;0;DC51A;DC51B;DC51C;DC51D;DC51E;DC51F
1047 7772
1050 0304
1051 0312
1052 0320
1053 0335
1054 0351
1055 0357

```

1056	0520	05201A1DC92A1DC92B1DC92C1DC92D
1057	7774	
1060	0326	
1061	0334	
1062	0343	
1063	0705	
1064	0000	0
1065	0000	0

SSSSSSSSSSSSSS

0000
0100
0200
0300
0400
0500
0600
0700

1000 01111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111 00000000
1100 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000

1200
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7700

ASBUFF	4460	INIT	0222	K7748	0133	SPACE2	4455
ASBUFF	0060	INITA	0240	K7750	0134	SPACEP	0055
AUA	0646	INITEX	0020	K7760	0135	TECHLD	0476
AUB	0657	INST	0743	K7771	0136	TEMP	0477
AUC	0667	INT	0251	K7773	0137	TEST	0617
AUD	0717	INTACK	0214	K7774	0140	TEXT1	0201
AUTO	0017	IOFMSP	0056	K7775	0141	TN	0365
CLRBUF	0644	J	0500	KCDF	0044	TM1	0510
CNTR	0221	JUMPA	0467	KCIF	0000	TM2	0531
CONST	0741	JX	0502	KCIFOF	0000	TM3	0552
CRLF	4454	JY	0503	KILL	0217	TM4	0600
CRLFF	0054	K	0504	KILLEQ	0220	THETA	0501
DC50A	0255	K0	0066	KIOP	0004	TN	0361
DC50B	0300	K1	0505	KNY	0760	TM1	0563
DC50C	0302	K10	0076	KYHMTM	0007	TM2	0611
DC50D	0306	K100	0107	LR	0441	TM3	0621
DC50E	0310	K11	0077	L10N	4440	TM4	0542
DC50F	0314	K110	0071	L10NP	0040	TMOCOP	0041
DC50G	0316	K13	0100	LOOP	0416	TMOCCT	4441
DC50H	0322	K17	0101	M0	0105	TYPE	4450
DC50I	0324	K177	0130	M20	0131	TYPEP	0050
DC50J	0330	K2	0506	M240	0127	XDXD	0321
DC50K	0332	K20	0102	M200	0126	XDYD	0336
DC50L	0337	K200	0110	M270	0125	XDYU	0327
DC50M	0341	K2000	0122	M3	0141	XUXU	0277
DC50N	0345	K212	0111	M00	0134	XUYD	0313
DC50O	0347	K215	0112	M4	0140	XUYU	0300
DC50P	0353	K240	0113	M40	0103	YDYD	0344
DC50Q	0355	K260	0114	M43	0132	YUYU	0352
DC50R	0711	K272	0115	M5	0137		
DC50S	0714	K277	0116	M7	0136		
DC51A	0304	K3	0072	MESSAGE	4444		
DC51B	0312	K30	0103	MESSAGEP	0044		
DC51C	0320	K301	0117	MULR0P	0065		
DC51D	0335	K32	0047	NQYMIN	0244		
DC51E	0351	K323	0100	NUM	0707		
DC51F	0357	K4	0073	ONECOP	0042		
DC52A	0326	K40	0104	ONECOT	4402		
DC52B	0334	K400	0121	PLOTTER	0006		
DC52C	0343	K5	0074	PRESCT	0003		
DC52D	0705	K5200	0123	PRNT1	4401		
ENRP	0061	K540	0124	PRNT1P	0001		
EXINIT	0020	K5402	0003	PRNT2	4402		
EXIT	0272	K64	0070	PRNT2P	0002		
EXSERV	0004	K7	0075	PRNT4	4403		
EXTMEM	0161	K70	0105	PRNT4P	0003		
FILL	0061	K7510	0125	REDUCE	0405		
FILLEX	0753	K7520	0126	RETRY	0276		
FOROCF	0043	K7540	0127	RLBUFF	4407		
FOROCT	4443	K7600	0131	RLBUFF	0007		
HOMEDF	0211	K77	0106	RUN	0000		
IHRETP	0026	K7735	0132	SERVEK	5004		

ERRORS DETECTED: 0
LINKS GENERATED: 39
RUN-TIME: 5 SECONDS
3K CORE USED