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DECUS NO.	8-367
TITLE	DIGITAL 8-12-U MODIFIED
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SOURCE LANGUAGE	LAP6-DIAL

DIGITAL 8-12-U MODIFIED

DECUS Program Library Write-up

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This is a report on modification of Digital-8-12-U, Incremental Plotter Subroutine.

The changes indicated allow the routine to recognize numbers in the range of ± 2047 instead of from 0 to 4095. As is usual with all software - making it more powerful takes a little more core or, eliminates some features or both. In this instance, the calling program will have to decide about initializing or plotting - and when plotting the pen will have to be raised or lowered, or commanded so, regardless of its up or down status of entry. The storage required is still 1 PDP-8 page.

This version of Digital-8-12-U is now serving us as an FNEW addition to FOCAL. It does a very nice job.

```
0000            *20
0001            /DIGITAL 8-12-U
0002            /MODIFIED TO ACCEPT SIGNED ELEVEN
0003            /BIT NUMBERS
0004            /
0005            /WILL NOW WORK AS A FOCAL SUBROUTINE
0006            /
0007            /JUD GILBERT-
0010            /COMPUTER RESEARCH SPECIALIST
0011            /PSYCHOBIOLOGY RESEARCH CENTER
0012            /FLORIDA STATE UNIVERSITY
0013            /TALLAHASSEE, FLORIDA -32306
0014            /NOV 16, 1970
0015            /
0016            /CALLING SEQUENCE
0017            /
0020            /TO INITIALIZE:
0021            /
0022            /           CLA
0023            /           JMS I XPLOTA
0024            /           RETURN
0025            /           .....
0026            /    XPLOTA, PLOTA
0027            /
0030            /TO PLOT WITH PEN DOWN:
0031            /
0032            /           CLA
0033            /           JMS I PLOT
0034            /           X COORDINATE
0035            /           Y COORDINATE
0036            /           RETURN
0037            /           .....
0040            /    PLOT,  PLOTX
0041            /
0042            /TO PLOT WITH PEN UP REPLACE THE
0043            /CLA IN THE ABOVE EXAMPLE WITH
0044            /CLA I AC.
0045            /
0046            /
0047                 PMODE                      /PDP-8 PROG
0050            /
0051            /DEFINE THE PLOTTER IOTS FOR THE PDP12
0052            /
0053                 PLPR=6511
0054                 PLPL=6521
0055                 PLDU=6512
0056                 PLDD=6514
0057                 PLSF=6501
0060                 PLCF=6502
```

```
0061                        PLPD=6524
0062                        PLPU=6504
0063                        DUPR=6513
0064                        UDPL=6523
0065                        DDPR=6515
0066                  /
0067                  /SUBROUTINE ENTRY POINT
0070                  /
0071                      *200
0072  0200  0000   PLOTX,  0                 /
0073  0201  7640           SZA CLA           /C(AC)=0 ?
0074  0202  5205           JMP .+3           /NO
0075  0203  6524           PLPD              /YES, PEN DOWN
0076  0204  5206           JMP .+2           /
0077  0205  6504           PLPU              /PEN UP
0100  0206  4356           JMS PLOTWT        /WAIT FOR FLAG
0101                  /
0102                  /PICK UP ARGUMENTS
0103                  /
0104  0207  1371   PLOT1,  TAD PLOTNX        /GET OLD X
0105  0210  7141           CIA CLL           /
0106  0211  1600           TAD I PLOTX       /FORM NX-NPX
0107  0212  7510           SPA               /DIFF POS ?
0110  0213  7041           CIA               /NO GET ABS VAL
0111  0214  3373           DCA PLOTDX        /ABS (DELTA)
0112  0215  1371           TAD PLOTNX        /GET OLD X
0113  0216  4343           JMS XDIR          /GO CHECK SIGN
0114  0217  3371           DCA PLOTNX        /NEW OLD X
0115  0220  7004           RAL               /GET DIFF SIGN
0116  0221  3376           DCA PLOTMV        /SAVE AS DIRCTN
0117  0222  2200           ISZ PLOTX         /+1 TO POINTER
0120  0223  1372           TAD PLOTNY        /FETCH OLD Y
0121  0224  7141           CIA CLL           /
0122  0225  1600           TAD I PLOTX       /FORM NY-NPY
0123  0226  7510           SPA               /DIFF POS ?
0124  0227  7041           CIA               /NO GET ABS
0125  0230  3374           DCA PLOTDY        /SAVE ABS(DLTA)
0126  0231  1372           TAD PLOTNY        /GET OLD Y
0127  0232  4343           JMS XDIR          /GO CHECK SIGN
0130  0233  3372           DCA PLOTNY        /NEW, OLD Y
0131  0234  1376           TAD PLOTMV        /SAVE SIGN BIT
0132  0235  7004           RAL               /BIT 10(1)=PLDD
0133  0236  3376           DCA PLOTMV        /BIT 11(1)=PLPL
0134  0237  2200           ISZ PLOTX         /+1 TO POINTER
0135  0240  1373           TAD PLOTDX        /SUBTRACT DELTA
0136  0241  7141           CIA CLL           /X FROM DELTA Y
0137  0242  1374           TAD PLOTDY        /
0140  0243  7620           SNL CLA           /L=0: DELTA Y <
0141  0244  5257           JMP PLOT2         /DELTA X
```

```
0142  0245  1373          TAD PLOTDX      /REVERSE NUMBERS
0143  0246  3375          DCA PLOTNA      /
0144  0247  1374          TAD PLOTDY      /
0145  0250  3373          DCA PLOTDX      /
0146  0251  1375          TAD PLOTNA      /
0147  0252  3374          DCA PLOTDY      /
0150  0253  7001          IAC             /SET MAJOR MOTN
0151  0254  0376          AND PLOTMV      /INSTRUCTION
0152  0255  1324          TAD PLOTT1      /
0153  0256  5262          JMP .+4         /
0154                /
0155  0257  1376  PLOT2,   TAD PLOTMV      /
0156  0260  7110          CLL RAR         /
0157  0261  1327          TAD PLOTT2      /
0160  0262  3375          DCA PLOTNA      /
0161  0263  1775          TAD I PLOTNA    /
0162  0264  3322          DCA PLOT4       /
0163  0265  1376          TAD PLOTMV      /SET COMBINED
0164  0266  1332          TAD PLOTT3      /MOTION
0165  0267  3376          DCA PLOTMV      /
0166  0270  1776          TAD I PLOTMV    /
0167  0271  3313          DCA PLOTDB      /
0170  0272  1373          TAD PLOTDX      /
0171  0273  7110          CLL RAR         /
0172  0274  3375          DCA PLOTNA      /
0173  0275  1373          TAD PLOTDX      /
0174  0276  7040          CMA             /
0175  0277  3376          DCA PLOTMV      /
0176  0300  2376  PLOT3,   ISZ PLOTMV      /
0177  0301  7410          SKP             /
0200  0302  5600          JMP I PLOTX     /ALL DONE
0201  0303  1375          TAD PLOTNA      /
0202  0304  1374          TAD PLOTDY      /
0203  0305  3375          DCA PLOTNA      /
0204  0306  1375          TAD PLOTNA      /
0205  0307  7140          CMA CLL         /
0206  0310  1373          TAD PLOTDX      /
0207  0311  7630          SZL CLA         /
0210  0312  5322          JMP PLOT4       /SINGLE MOTION
0211  0313  0000  PLOTDB,  0              /COMBINED MOTION
0212  0314  1373          TAD PLOTDX      /
0213  0315  7041          CIA             /
0214  0316  1375          TAD PLOTNA      /
0215  0317  3375          DCA PLOTNA      /
0216  0320  4356          JMS PLOTWT      /
0217  0321  5300          JMP PLOT3       /
0220  0322  0000  PLOT4,   0              /
0221  0323  5320          JMP .-3         /
0222  0324  0325  PLOTT1,  .+1            /
0223  0325  6511          PLPR            /PEN-RIGHT
0224  0326  6521          PLPL            /PEN-LEFT
```

```
0225  0327  0330  PLOTT2,   .+1          /
0226  0330  6512            PLDU         /DRUM-UP
0227  0331  6514            PLDD         /DRUM-DOWN
0230  0332  0333  PLOTT3,   .+1          /
0231  0333  6513            DUPR         /UP-RIGHT
0232  0334  6523            UDPL         /UP-LEFT
0233  0335  6515            DDPR         /DOWN-RIGHT
0234  0336  4337            JMS .+1      /DOWN-LEFT
0235  0337  0000            0            /
0236  0340  6514            PLDD         /
0237  0341  6521            PLPL         /
0240  0342  5737            JMP I .-3    /
0241                  /
0242                  /ROUTINE TO DETECT A SIGN CHANGE
0243                  /
0244  0343  0000  XDIR,     0            /
0245  0344  7700            SMA CLA      /OLD SIGN NEG ?
0246  0345  5352            JMP PLUS     /NO-
0247  0346  1600            TAD I PLOTX  /YES-GET NEW1
0250  0347  7500            SMA          /NEW1 NEG TOO ?
0251  0350  7020            CML          /NO CHANGE SIGN
0252  0351  5743            JMP I XDIR   /YES, EXIT
0253  0352  1600  PLUS,     TAD I PLOTX  /OLD1 IS POS
0254  0353  7510            SPA          /IS NEW 1 POS ?
0255  0354  7020            CML          /NO, CHANGE SIGN
0256  0355  5743            JMP I XDIR   /YES, EXIT
0257                  /
0260                  /ROUTINE TO WAIT FOR PLOTTER FLAG
0261                  /
0262  0356  0000  PLOTWT,   0            /
0263  0357  6501            PLSF         /WAIT FOR FLAG
0264  0360  5357            JMP .-1      /NOT YET
0265  0361  6502            PLCF         /CLEAR FLAG
0266  0362  5756            JMP I PLOTWT /EXIT
0267                  /
0270                  /ROUTINE TO INITIALIZE X AND Y
0271                  /
0272  0363  0000  PLOTA,    0            /
0273  0364  6504            PLPU         /PEN UP
0274  0365  3371            DCA PLOTNX   /ZERO OLD X
0275  0366  3372            DCA PLOTNY   /ZERO OLD Y
0276  0367  4356            JMS PLOTWT   /WAIT FOR FLAG
0277  0370  5763            JMP I PLOTA  /EXIT
0300                  /
0301                  /STORAGE LOCATIONS
0302                  /
0303  0371  0000  PLOTNX,   0            /OLD X
0304  0372  0000  PLOTNY,   0            /OLD Y
0305  0373  0000  PLOTDX,   0            /DELTA X
0306  0374  0000  PLOTDY,   0            /DELTA Y
```

```
0307  0375  0000  PLOTNA,  0          /TEMP STORAGE
0310  0376  0000  PLOTMV,  0          /PLOT DIRECTION
0311              /
```

```
0000          ERRORS

DDPR          6515
DUPR          6513
PLCF          6502
PLDD          6514
PLDU          6512
PLOTA         0363
PLOTDB        0313
PLOTDX        0373
PLOTDY        0374
PLOTMV        0376
PLOTNA        0375
PLOTNX        0371
PLOTNY        0372
PLOTT1        0324
PLOTT2        0327
PLOTT3        0332
PLOTWT        0356
PLOTX         0200
PLOT1         0207
PLOT2         0257
PLOT3         0300
PLOT4         0322
PLPD          6524
PLPL          6521
PLPR          6511
PLPU          6504
PLSF          6501
PLUS          0352
UDPL          6523
XDIR          0343
```