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DECUS NO.	8-253
TITLE	DISC DUMP ON SCOPE
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SOURCE LANGUAGE	PAL-D

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DISC DUMP ON SCOPE

DECUS Program Library Write-up

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ABSTRACT: THIS PROGRAM DISPLAYS DISC DATA ON THE SCOPE SCREEN, A BLOCK AT A TIME, IN OCTAL. A FAST PLOT ROUTINE ALLOWS A REFRESH TIME OF 52 MILLISECONDS OR LESS FOR MINIMUM FLICKER. OTHER FUNCTIONS ARE AVAILABLE, INCLUDING SEARCHES FOR STRINGS OF WORDS, MODIFICATION OF SINGLE WORDS OR LINKS ON THE DISC, AND HARD COPY ON THE TELETYPE.

REQUIREMENTS:

EQUIPMENT: PDP-8 WITH 34D SCOPE DISPLAY AND ANY SIZE DF32 DISC.

STORAGE: 0-1377 FOR PROGRAM, 1400-7577 FOR BUFFERS

OTHER PROGRAMS: THE PROGRAM IS DESIGNED TO OPERATE WITH THE DISC MONITOR SYSTEM AND REQUIRES THE DISC I/O ROUTINE IN THE UPPER PAGE OF MEMORY.

LOADING: THE PROGRAM MAY BE LOADED FROM THE PAPER TAPE USING THE BINARY LOADER, OR CALLED FROM THE SYSTEM DEVICE.

SAVING: "SAVE DMP! 0-1377; 200"

STARTING ADDRESS: 200

OPERATING INSTRUCTIONS:

THE PROGRAM STARTS BY TYPING "*". ONE OF THE FOLLOWING COMMANDS MAY BE GIVEN:

OCTAL NUMBER (1-4 DIGITS) FOLLOWED BY SPACE- THE PROGRAM DISPLAYS THIS BLOCK ON THE SCREEN. IT ALSO PRINTS THE LINK TO THE NEXT BLOCK AND THE CHECKSUM (THE SUM OF THE 128 DATA WORDS IN THE BLOCK WITH END AROUND CARRY).

IF A BLOCK NUMBER IS REQUESTED WHICH EXCEEDS THE DISC SIZE, THE PROGRAM TYPES "OB" AND RETURNS TO THE START POINT.

SPACE- THE PROGRAM PICKS UP THE LINK TO THE NEXT BLOCK AND DISPLAYS IT AS THOUGH THE NUMBER HAD BEEN TYPED. A LONG FILE MAY BE SPACED THROUGH RAPIDLY IN THIS WAY.

P- THE PROGRAM PRINTS A COPY OF THE PRESENT BLOCK ON THE TELETYPE. SINCE THE OUTPUT IS BUFFERED, YOU NEED NOT WAIT UNTIL THE PRINTING IS COMPLETE TO DISPLAY ANOTHER BLOCK. THE PRINTING MAY BE TERMINATED AT ANY TIME BY TYPING "↑P".

S- THE PROGRAM WILL ACCEPT A STRING OF OCTAL NUMBERS, SEPARATED BY ANY NON-NUMERIC CHARACTER AND TERMINATED BY A CARRIAGE RETURN, FOR A SEARCH. THE PROGRAM PRINTS THE LOCATIONS OF ALL OCCURRENCES OF THIS STRING ON THE DISC, AND DISPLAYS THE LAST MATCHED BLOCK. THE FORMAT IS:

BLOCK NO. ADDRESS (WITHIN BLOCK, OF FIRST WORD)

IF AN ERROR IS MADE IN THE TYPEIN, TYPING A RUBOUT ERASES THE STRING. THE SEARCH TAKES ABOUT 10 SECONDS.

M- THE PROGRAM WILL ACCEPT 1,2, OR 3 NUMBERS TO MODIFY A WORD ON THE DISC, AS FOLLOWS:

3N:	N1=BLOCK,	N2=ADDRESS,	N3=CONTENT
2N:	PRESENT BLOCK,	N1=ADDRESS,	N2=CONTENT
1N:	PRESENT BLOCK,	LAST ADDRESS+1,	N1=CONTENT

NUMBERS MUST BE SEPARATED BY A NON-NUMERIC CHARACTER AND TERMINATED BY A CARRIAGE RETURN.

ADDRESSES ARE CALCULATED MODULO 200, I.E. AN ADDRESS OF 3370 MODIFIES WORD 170 ON THE BLOCK.

TO MODIFY THE LINK OF A BLOCK, TYPE "L" IN PLACE OF THE ADDRESS. "L" WILL NOT BE ACCEPTED AS A BLOCK NO. OR CONTENT.

THE MODIFIED BLOCK WILL BE DISPLAYED ON THE SCREEN.

OTHER FEATURES:

TYPING A RUBOUT OR ↑P AT ANY TIME CLEARS THE PRINT AND KEYBOARD BUFFERS AND RETURNS TO THE START POINT.

TYPING A ↑C CAUSES A RETURN TO THE MONITOR AT 7600.

THE OUTPUT IS BUFFERED SO THAT PRINTING AND PLOTTING MAY BE OVERLAPPED. IF THE OUTPUT BUFFER IS OVERFLOWED (FOR EXAMPLE, BY GIVING FOUR "P" COMMANDS TOGETHER) THE PROGRAM EXITS TO THE MONITOR.

THE MODIFY OPTION SHOULD BE USED WITH CARE SINCE ANY UNLOCKED LOCATION ON THE DISC IS ACCESSIBLE. YOU MAY DISABLE THE "M" OPTION BY ZEROING LOCATION 241.

IF AN ATTEMPT IS MADE TO MODIFY A LOCATION ON A WRITE-LOCKED BLOCK, THE PROGRAM HALTS AT LOCATION 1332.

EXAMPLES:

1. TO SEARCH FOR A STRING OF NUMBERS:

```
*S123, 4567, 12 [CR]
0231 0000
0376 0020
0522 0173
*          (BLOCK 522 DISPLAYED ON THE SCREEN)
```

2. TO CLEAR THE LINK AND WORDS 170-172 OF BLOCK 231:

```
* M 231 L 0 [CR]
* M 170 0 [CR]
* M 0 [CR]
* M 0 [CR]
*            (NEW BLOCK 231 DISPLAYED ON THE SCREEN)
```

DESCRIPTION:

THE PLOTTING ROUTINE IS DESIGNED TO PRODUCE MINIMUM FLICKER WITH A LONG-PERSISTENCE SCREEN. CHARACTERS ARE PLOTTED ON A 3*5 GRID IN ABOUT 97 MICROSECONDS EACH, FOR 536 CHARACTERS. SPACES ARE SUBSTITUTED FOR LEADING ZEROS, WHICH REDUCES THE PLOT TIME AND IMPROVES READABILITY.

DUE TO THE HIGH PLOTTING RATE, THE SCOPE LOGIC MUST BE TIMED CORRECTLY TO AVOID SMEARS. LONG CABLES TO THE SCOPE OR DELAYS OUT OF ADJUSTMENT MAY CAUSE SLOW RESPONSE. IF NECESSARY, FAST REPEATING SEQUENCES IN THE PLOT ROUTINE MAY BE SLOWED DOWN, FOR EXAMPLE BY CHANGING LOCATION 645 FROM "TAD [10" TO "TAD I [[10".

```
        / DISC DUMP ON SCOPE, WITH SEARCH, MODIFY, PRINT
          / 12/19/69
          / BRIAN UNDERHILL
          / USE ANY SIZE DF32 DISC AND 34D SCOPE
          *1  /PAGE 0
0001  0000  X, 0 ;
           DCX=DCA X; TDX=TAD X
0002  0000  Y1, 0;
0003  0000  Y2, 0;
0004  0000  Y3, 0;
0005  0000  Y4, 0;
0006  0000  Y5, 0  /Y VALS FOR 5 ROWS OF LETTER
          XL=6053; XS=6057; YL=6063; YS=6067
          U=TAD [10; D=TAD [-10; R=TAD [6; L=TAD [-6; C=CLA
          R2=TAD [14; U3=TAD [30; U2=TAD [20; D2=TAD [-20; U4=TAD [40
          SBUF=1400  /WORD LIST TO SEARCH FOR
          DBUF=1600  /DISC INPUT BUFFER
          TXBUF=2000  /PLOT TEXT.. 5 PAGES, CONTAINS "JMP .."
          PRBUF=3200  /PRINT BUFFER, >6 PAGES, SINGLE CHARACTERS
          XST=10  /INDEX X START POSITIONS
          TXPTR=11  /INDEX PLOT TEXT BUFFER
          DPTR=12  /INDEX DISC BUFFER
          SP1=13; SP2=14  /POINTERS FOR SEARCH ROUTINE
          *20
0020  3200  PRIN, PRBUF  /NEXT TO FILL
0021  3200  PROUT, PRBUF  /NEXT TO USE
0022  0001  PRINTF, 1  /1 IF PRINTER READY, FLAG DOWN
0023  0000  CHAR, 0  /FROM KB
0024  0000  ACUM, 0  /OCTAL NUMB FROM KB
0025  0000  MAXBLK, 0  / -(N BLKS ON THIS DISC)
0026  0643  PTRS, PLT0  /BUFFER CONTAINS "JMP I PTRS+N" OR "JMP DIGIT"
0027  0674   PLT1;
0030  0722   PLT2;
0031  0751   PLT3;
0032  1004   PLT4;
0033  1032   PLT5;
0034  1065   PLT6;
0035  1117   PLT7
          /CHARS ARE 3*5: HORIZ 6/SPOT, 23/CHAR. VERT 8/SPOT, 48/CHAR
          /PLOTS A FULL SCREEN (536 CHAR) IN 52 MSEC, FASTER IF
          /THERE ARE LEADING ZEROS.. PLOT SPEED 6.75 MUSEC/SPOT..
          /CHECK SCOPE LOGIC TIMING (R302 IN A29) IF YOU GET STREAKS

003
```

```
0036  0000  GETCHR, 0  /TO GET A CHAR, COME HERE +PLOT WHILE WAITING
0037  7200  PLOT, CLA
0040  1166   TAD (TXBUF-1
0041  3011   DCA TXPTR
0042  1143   TAD STY1;
0043  3002   DCA Y1  /INIT Y1-Y5

0044  6031  NEWLN, KSF  /SEE IF ANYTHING TO BE DONE WITH TTY
0045  5067   JMP NOKB
0046  6036   KRB  /GOT A CHAR.. CHECK FOR ^C,^P,RUBOUT
0047  3023   DCA CHAR
0050  1023   TAD CHAR
0051  1165   TAD (-203
0052  7450   SNA
0053  5764   JMP 7600  /^C, GO TO MONITOR
0054  1163   TAD (203-377
0055  7450   SNA
0056  5762   JMP INIT  /RUBOUT, START TYPEIN OVER
0057  1161   TAD (377-220
0060  7650   SNA CLA
0061  5762   JMP INIT  /^P, KILL THE PRINT BUFFER
0062  1023   TAD CHAR
0063  4760   JMS PUTPR;
0064  4000   4000  /ECHO
0065  1023   TAD CHAR
0066  5436   JMP I GETCHR  /GO BACK TO CALLING PROG WITH CHAR
0067  6041  NOKB, TSF
0070  5111   JMP NOPRNT
0071  1020   TAD PRIN  /PRINTER READY, IS THERE ANYTHING IN BUFF?
0072  7041   CIA
0073  1021   TAD PROUT
0074  7650   SNA CLA
0075  5103   JMP BUFEMP  /BUFF EMPTY; RESET POINTERS, SET FLAG LOC.
0076  1421   TAD I PROUT  /NOT EMPTY, PRINT ONE FROM BUFF
0077  6046   TLS
0100  7200   CLA
0101  2021   ISZ PROUT
0102  5111   JMP NOPRNT
0103  1157  BUFEMP, TAD (PRBUF;
0104  3020   DCA PRIN
0105  1157   TAD (PRBUF;
0106  3021   DCA PROUT
0107  6042   TCF  /CLEAR HARDWARE FLAG + SET SOFTWARE FLAG
0110  2022   ISZ PRINTF
```

```
0111  1002  NOPRNT, TAD Y1
0112  1156   TAD (-60  /DECREMENT THE Y LEVELS, NEXT LINE
0113  7510   SPA
0114  5037   JMP PLOT  /IF -, DONE, PLOT AGAIN
0115  3002   DCA Y1
0116  1002   TAD Y1;
0117  1177   TAD (10;
0120  3003   DCA Y2
0121  1003   TAD Y2;
0122  1177   TAD (10;
0123  3004   DCA Y3
0124  1004   TAD Y3;
0125  1177   TAD (10;
0126  3005   DCA Y4
0127  1005   TAD Y4;
0130  1177   TAD (10;
0131  3006   DCA Y5
0132  1155  STSCN, TAD (XTBL-1;
0133  3010   DCA XST  /START X AT LEFT
0134  7200  DIGIT, CLA
0135  1410   TAD I XST  /LOAD X START
0136  7450   SNA
0137  5044   JMP NEWLN
0140  6053   XL
0141  3001   DCX  /AND STORE
0142  5411   JMP I TXPTR  /AND GO TO RT TO PLOT NEXT DIGIT
0143  0000  STY1, 0  /NO PLOTTING UNTIL YOU PUT 1400 HERE (START POS)
0153  0541
0154  1146
0155  0577
0156  7720
0157  3200
0160  1340
0161  0157
0162  0211
0163  7604
0164  7600
0165  7575
0166  1777
0167  0040
0170  7760
0171  0020
0172  0030
0173  0014
0174  7772
0175  0006
0176  7770
0177  0010
Z
```

```
                *200  /INPUT HANDLING (TYPE IN, ETC)
0200   1327     ENTRY, TAD FSAM  /FIRST FIND OUT HOW BIG A DISC THEY HAVE
0201   3777     HWMB, DCA BLOC   /BY CHAINING THRU SAM BLOCKS, 1/UNIT
0202   1025      TAD MAXBLK
0203   1376      TAD (-376  /BLOCKS PER UNIT
0204   3025      DCA MAXBLK
0205   4775      JMS GETB
0206   1774      TAD LINK  /IF NON-ZERO LINK, THERE IS ANOTHER UNIT
0207   7440      SZA
0210   5201      JMP HWMB

0211   1373     INIT, TAD (PRBUF;
0212   3020      DCA PRIN  /CLEAR PRINT BUFF TO START
0213   1373      TAD (PRBUF;
0214   3021      DCA PROUT
0215   4560     START, JMS I [PUTPR
0216   0215      215;
0217   0212      212;
0220   4252      4252  /ASK FOR TYPEIN.. PRINT CR,"*"
0221   4554     GTFST, JMS I [GETNUM  /GET FIRST NUMBER, OR MODE CHAR.
0222   5234      JMP MODE  /FST IS NON-NUMERIC, SET MODE (M,S,P, )
0223   1024     GETBL, TAD ACUM  /HAVE NUMBER, =NEXT BL TO GET
0224   3777      DCA BLOC
0225   4775      JMS GETB
0226   1774      TAD LINK
0227   5772      JMP GCSUM  /GET CSUM, TYPE, CALCULATE, DISPLAY
0230   1774     GETNBL, TAD LINK
0231   4553      JMS I [OCTWD
0232   1774      TAD LINK
0233   5224      JMP GETBL+1
0234   1371     MODE, TAD (-240
0235   7450      SNA
0236   5230      JMP GETNBL  /SPACE, PICK UP NEXT BLOCK
0237   1370      TAD (240-315
0240   7450      SNA
0241   5251      JMP MODFY  /M, ACCEPT MODIFY DATA
0242   1367      TAD (315-323
0243   7450      SNA
0244   5766      JMP SERCH  /S, ACCEPT SEARCH DATA
0245   1365      TAD (323-320
0246   7640      SZA CLA
0247   5221      JMP GTFST  /NOT RECOGNIZED, IGNORE
0250   5764      JMP CAL+1  /P, PRINT THE BLOCK ON TTY
```

```
0251  3326  MODFY, DCA CHLINK  /INIT LINK-WANTED INDICATOR
0252  4330   JMS GETM  /GETS A NUMBER, OR "L", OR TERMINATES STRING
0253  1024   TAD ACUM;
0254  3325   DCA CONT  /N1=CONTENT
0255  4330   JMS GETM
0256  1325   TAD CONT;
0257  3323   DCA ADR  /N1=ADR, N2=CONTENT
0260  1024   TAD ACUM;
0261  3325   DCA CONT
0262  4330   JMS GETM
0263  1323   TAD ADR;
0264  3777   DCA BLOC  /N1=BLOC, N2=ADR, N3=CONTENT
0265  1325   TAD CONT;
0266  3323   DCA ADR
0267  1024   TAD ACUM;
0270  3325   DCA CONT
0271  4775  STORE, JMS GETB  /GOT CR; GET THE BLK, MAKE THE MOD, RE-STOR
0272  1326   TAD CHLINK
0273  7440   SZA
0274  5310   JMP TLK  /LINK INDICATOR NOT 0, SEE ABT STORING IN LK
0275  1323   TAD ADR
0276  0363   AND (177  /TYPE IN ANY ADRESS; LAST 7 BITS USED
0277  1362   TAD (DBUF
0300  3324   DCA SADR
0301  1325   TAD CONT  /CONTENT
0302  3724   DCA I SADR
0303  2323   ISZ ADR  /INCREMENT ADR EACH TIME
0304  7000   NOP
0305  7326  PSTR, GET2
0306  4775   JMS GETB
0307  5761   JMP CAL  /RECALCULATE AND DISPLAY IT
0310  1360  TLK, TAD (-4  /STORE DATA IN LINK, BUT MAKE SURE THEY
0311  7640   SZA CLA   /TYPED L FOR ADR ONLY, NOT BLOC OR CONTENT
0312  5316   JMP BADLK  /BAD "L" TYPED, THROW THEM OUT
0313  1325   TAD CONT
0314  3774   DCA LINK
0315  5305   JMP PSTR
0316  4560  BADLK, JMS I [PUTPR  /PRINT "BL", GO TO START
0317  0212   212;
0320  0302   302;
0321  4314   4314
0322  5215   JMP START
0323  0000  ADR, 0
0324  0000  SADR, 0
0325  0000  CONT, 0
0326  0000  CHLINK, 0  /LINK-WANTED INDICATOR, MUST BE 4 IF ANYTHING
0327  0200  FSAM, 200  /FIRST SAM BLOCK, USED TO COUNT DISCS
            GET2=CLA STL RTL
```

```
0330  0000  GETM, 0  /GET N NUMBER, "L", OR KICK OUT ON CR
0331  1023   TAD CHAR  /TREAT PREVIOUS ENDING CHAR AS NON-NUMERIC
0332  1357  MSPEC, TAD (-215  /CHECK: CR,STORE; L,ACCEPT AS NO.
0333  7450   SNA
0334  5271   JMP STORE  /CR BEFORE NUMB, GO STORE
0335  1356   TAD (215-314
0336  7640   SZA CLA
0337  5346   JMP MNEW  /UNRECOGNIZED, IGNORE
0340  3023   DCA CHAR  /"L" COUNTS AS NO, MEANS USE LINK. CLEAR IT
0341  7001   IAC
0342  1326  MNORM, TAD CHLINK  /BUT ONLY IF IN BIT 9 OF CHLINK
0343  7104   CLL RAL
0344  3326   DCA CHLINK  /MOST RECENT BIT SET IS IN BIT 10 NOW
0345  5730   JMP I GETM
0346  4554  MNEW, JMS I [GETNUM
0347  5332   JMP MSPEC  /NON-NUMERIC BEFORE NUMB
0350  5342   JMP MNORM  /NUMBER, RETURN

0356  7701
0357  7563
0360  7774
0361  0414
0362  1600
0363  0177
0364  0415
0365  0003
0366  1200
0367  7772
0370  7723
0371  7540
0372  0400
0373  3200
0374  1331
0375  1315
0376  7402
0377  1327
```

```
                *400  /CALCULATE BUFFER OF TEXT
0400   4341     GCSUM, JMS OCTWD  /PRINT THE LINK
0401   1377      TAD (DBUF-1;
0402   3012      DCA DPTR
0403   1376      TAD (-200  /FIND THE CKSUM, WDS 0-177
0404   3264      DCA WCNT
0405   7100      CLL
0406   1412     CSLUP, TAD I DPTR
0407   7430      SZL
0410   7101      CLL IAC  /END AROUND CARRY
0411   2264      ISZ WCNT
0412   5206      JMP CSLUP
0413   4341      JMS OCTWD  /PRINT IT
                 CAL,  /MAKE PLOT TEXT AND PRINT TEXT BOTH; DELETE
                   / THE PRINT TEXT LATER IF THIS WASN'T A "P" ENTRY
0414   1020      TAD PRIN  /NORMAL ENTRY; SAVE BUFFER SIZE TO RESTORE LATER
0415   3363      DCA OLDPR  /"P" ENTRY; SET 0.. WON'T CLEAR LATER
0416   1376      TAD (-200;
0417   3264      DCA WCNT  /NOW MAKE TEXT
0420   1377      TAD (DBUF-1;
0421   3012      DCA DPTR
0422   7040      CMA;
0423   3265      DCA LNCNT
0424   1375      TAD (TXBUF-1;
0425   3011      DCA TXPTR
0426   2265     LLUP, ISZ LNCNT  /DO A LINE NO FIRST?
0427   5246      JMP LNOK
0430   1176      TAD [-10;
0431   3265      DCA LNCNT
0432   4560      JMS I [PUTPR;
0433   0215      215;
0434   4212      4212  /PRINT CR BEFORE LINE NO
0435   1012      TAD DPTR
0436   7001      IAC  /PRINT+PLOT LINE NO: (DPTR+1) MOD 200
0437   0374      AND (177
0440   7106      CLL RTL
0441   7004      RAL
0442   4266      JMS CLOCT;
0443   7776      -2  /IN UPPER 2 DIG
0444   4560      JMS I [PUTPR;
0445   4240      4240  /PRINT EXTRA BLK AFTER LINE NO
0446   1412     LNOK, TAD I DPTR
0447   4266      JMS CLOCT;
0450   7774      -4  /PRINT+PLOT DATA WD, 4 DIGITS
0451   2264      ISZ WCNT
0452   5226      JMP LLUP
0453   1373      TAD (1400;
0454   3143      DCA STY1  /ENABLE PLOTTING NOW THAT BUFF IS OK
0455   4560      JMS I [PUTPR;
0456   0215      215;
0457   4212      4212
0460   1363      TAD OLDPR
0461   7440      SZA  /IF PRIN NOT SAVED, THEY WANT PRINTING.. DONT RESET
0462   3020      DCA PRIN  /SAVED, NO PRINT, RESTORE PRIN
0463   5772      JMP START
0464   0000     WCNT, 0
0465   0000     LNCNT, 0
```

```
0466  0000  CLOCT, 0  /PUT OCTAL WD IN BUFF AS 4 DIGIT COMMANDS
0467  3336   DCA CW  /AND IN PRINT BUFF AS SINGLE CHARACTERS
0470  3335   DCA LZROS
0471  1666   TAD I CLOCT  /FIELD WIDTH=3 OR 4
0472  3337   DCA CC
0473  2266   ISZ CLOCT
0474  1336  CLLUP, TAD CW
0475  7106   CLL RTL;
0476  7004   RAL
0477  3336   DCA CW
0500  1336   TAD CW
0501  7004   RAL
0502  0371   AND (7
0503  7450   SNA
0504  5322   JMP LZRO  /IF 0, CHECK FOR LEADING 0
0505  2335   ISZ LZROS
0506  3340  CLZ, DCA DIG
0507  1340   TAD DIG
0510  4560   JMS I [PUTPR;
0511  4260   4260  /PRINT THE DIGIT
0512  1340   TAD DIG
0513  1370   TAD (JMP I PTRS  /DIGIT: TEXT IS JMP I PTRS+N
0514  3411  DCTX, DCA I TXPTR   /LEADING SPACE: TEXT IS JMP DIGIT+1
0515  2337   ISZ CC
0516  5274   JMP CLLUP
0517  4560   JMS I [PUTPR;
0520  4240   4240
0521  5666   JMP I CLOCT
0522  1335  LZRO, TAD LZROS
0523  7640   SZA CLA
0524  5306   JMP CLZ  /NOT LEADING
0525  1337   TAD CC  /IF LAST, PRINT ANYWAY
0526  7040   CMA
0527  7650   SNA CLA
0530  5306   JMP CLZ
0531  4560   JMS I [PUTPR;
0532  4240   4240
0533  1367   TAD (JMP DIGIT+1  /LEADING
0534  5314   JMP DCTX
0535  0000  LZROS, 0
0536  0000  CW, 0
0537  0000  CC, 0
0540  0000  DIG, 0
```

```
0541   0000   OCTWD, 0  /WD IN AC
0542   3336    DCA OWD
0543   1366    TAD (-4
0544   3337    DCA OCNT
0545   1336   OCTLUP, TAD OWD
0546   7106    CLL RTL
0547   7004    RAL
0550   3336    DCA OWD
0551   1336    TAD OWD
0552   7004    RAL
0553   0371    AND (7
0554   4560    JMS I [PUTPR;
0555   4260    4260
0556   2337    ISZ OCNT
0557   5345    JMP OCTLUP
0560   4560    JMS I [PUTPR;
0561   4240    4240
0562   5741    JMP I OCTWD
0563   0000   OLDPR, 0  /OLD VALUE OF PRIN, BEFORE CALCULATIONS
              OWD=CW; OCNT=CC
0566   7774
0567   5135
0570   5426
0571   0007
0572   0215
0573   1400
0574   0177
0575   1777
0576   7600
0577   1577
              *600 /TABLES, PLOT ROUTINES
```

```
0600  0002  DECIMAL; XTBL, 2;
0601  0031   25  /LIST OF X COORDINATES
0602  0134   92;
0603  0163   115;
0604  0212   138;
0605  0241   161  /DATA WD 0
0606  0317   207;
0607  0346   230;
0610  0375   253;
0611  0424   276
0612  0502   322;
0613  0531   345;
0614  0560   368;
0615  0607   391
0616  0665   437;
0617  0714   460;
0620  0743   483;
0621  0772   506  /1.5 SPACES BEFORE DATA WD 4
0622  1064   564;
0623  1113   587;
0624  1142   610;
0625  1171   633
0626  1247   679;
0627  1276   702;
0630  1325   725;
0631  1354   748
0632  1432   794;
0633  1461   817;
0634  1510   840;
0635  1537   863
0636  1615   909;
0637  1644   932;
0640  1673   955;
0641  1722   978;
0642  0000   OCTAL 0  /END

            /INDIVIDUAL PLOT ROUTINES FOR DIGITS
0643  1003  PLT0, TAD Y2;
0644  6067   YS;
0645  1177   U;
0646  6067   YS;
0647  1177   U;
0650  6067   YS;
0651  7200   C
0652  1001   TDX;
0653  1173   R2;
0654  6057   XS;
0655  3001   DCX
0656  1004   TAD Y3;
0657  6067   YS;
0660  1176   D;
0661  6067   YS;
0662  1176   D;
0663  6063   YL;
0664  7200   C
0665  1001   TDX;
0666  1174   L;
0667  6057   XS;
0670  7200   C
0671  1006   TAD Y5;
0672  6067   YS
0673  5134   JMP DIGIT
```

```
0674   1002   PLT1, TAD Y1;
0675   6067    YS;
0676   1172    U3;
0677   6067    YS;
0700   7200    C
0701   1001    TDX;
0702   1175    R;
0703   6057    XS;
0704   3001    DCX
0705   1006    TAD Y5;
0706   6067    YS;
0707   1170    D2;
0710   6067    YS;
0711   1176    D;
0712   6067    YS;
0713   1176    D;
0714   6067    YS;
0715   7200    C
0716   1001    TDX;
0717   1175    R;
0720   6057    XS
0721   5134    JMP DIGIT

0722   1002   PLT2, TAD Y1;
0723   6067    YS;
0724   1172    U3;
0725   6067    YS;
0726   7200    C
0727   1001    TDX;
0730   1173    R2;
0731   6057    XS;
0732   3001    DCX
0733   1004    TAD Y3;
0734   6067    YS;
0735   1170    D2;
0736   6067    YS;
0737   7200    C
0740   1001    TDX;
0741   1174    L;
0742   6057    XS;
0743   7200    C
0744   1003    TAD Y2;
0745   6067    YS;
0746   1172    U3;
0747   6067    YS
0750   5134    JMP DIGIT
```

```
0751  1002  PLT3, TAD Y1;
0752  6067   YS;
0753  1171   U2;
0754  6067   YS;
0755  1171   U2;
0756  6067   YS;
0757  7200   C
0760  1001   TDX;
0761  1175   R;
0762  6057   XS;
0763  1175   R;
0764  6057   XS;
0765  3001   DCX
0766  1005   TAD Y4;
0767  6067   YS;
0770  1170   D2;
0771  6067   YS;
0772  1176   D;
0773  6067   YS;
0774  7200   C
0775  1001   TDX;
0776  1174   L;
0777  6057   XS;
1000  7200   PAGE; C
1001  1004   TAD Y3;
1002  6067   YS
1003  5134   JMP DIGIT

1004  1006  PLT4, TAD Y5;
1005  6067   YS;
1006  1176   D;
1007  6067   YS;
1010  1176   D;
1011  6067   YS;
1012  7200   C
1013  1001   TDX;
1014  1175   R;
1015  6057   XS;
1016  1175   R;
1017  6057   XS;
1020  7200   C
1021  1002   TAD Y1;
1022  6067   YS;
1023  1177   U;
1024  6067   YS;
1025  1171   U2;
1026  6067   YS;
1027  1177   U;
1030  6067   YS
1031  5134   JMP DIGIT
```

```
1032  1002  PLT5, TAD Y1;
1033  6067   YS;
1034  1171   U2;
1035  6067   YS;
1036  1177   U;
1037  6067   YS;
1040  1177   U;
1041  6067   YS;
1042  7200   C
1043  1001   TDX;
1044  1175   R;
1045  6057   XS;
1046  1175   R;
1047  6057   XS;
1050  3001   DCX
1051  1003   TAD Y2;
1052  6067   YS;
1053  1177   U;
1054  6063   YL;
1055  7200   C
1056  1001   TDX;
1057  1174   L;
1060  6057   XS;
1061  7200   C
1062  1002   TAD Y1;
1063  6067   YS
1064  5134   JMP DIGIT

1065  1002  PLT6, TAD Y1;
1066  6067   YS;
1067  1177   U;
1070  6067   YS;
1071  1172   U3;
1072  6067   YS;
1073  1176   D;
1074  6067   YS;
1075  1176   D;
1076  6067   YS;
1077  7200   C
1100  1001   TDX;
1101  1175   R;
1102  6057   XS;
1103  1175   R;
1104  6057   XS;
1105  3001   DCX
1106  1003   TAD Y2;
1107  6067   YS;
1110  1176   D;
1111  6067   YS;
1112  7200   C
1113  1001   TDX;
1114  1174   L;
1115  6057   XS
1116  5134   JMP DIGIT
```

```
1117  1002  PLT7, TAD Y1;
1120  6067   YS;
1121  1167   U4;
1122  6067   YS;
1123  7200   C
1124  1001   TDX;
1125  1175   R;
1126  6057   XS;
1127  1175   R;
1130  6057   XS;
1131  3001   DCX
1132  1005   TAD Y4;
1133  6067   YS;
1134  1176   D;
1135  6063   YL;
1136  7200   C
1137  1001   TDX;
1140  1174   L;
1141  6057   XS;
1142  7200   C
1143  1003   TAD Y2;
1144  6067   YS
1145  5134   JMP DIGIT

1146  0000  GETNUM, 0  /JMS GETNUM
1147  4036   JMS GETCHR  /RT IF A NON-NUM BEFORE THE NUMBER; CHAR IN AC
1150  0377   AND (370    /RT IF NUMERIC, NUMB IN ACUM
1151  1376   TAD (-260
1152  7650   SNA CLA
1153  5356   JMP NUMRC  /NUMERIC, START ACCUMULATING
1154  1023   TAD CHAR  /NOT NUM, RETURN FOR INSPECTION OF CHAR
1155  5746   JMP I GETNUM
1156  2346  NUMRC, ISZ GETNUM
1157  3024   DCA ACUM
1160  1024  GETNL, TAD ACUM
1161  7104   CLL RAL;
1162  7104   CLL RAL;
1163  7104   CLL RAL
1164  1023   TAD CHAR
1165  1376   TAD (-260
1166  3024   DCA ACUM
1167  4036   JMS GETCHR  /REPLACE CHAR
1170  0377   AND (370
1171  1376   TAD (-260
1172  7650   SNA CLA
1173  5360   JMP GETNL  /NEXT IS NUMERIC, GO ROUND AGAIN
1174  5746   JMP I GETNUM  /NEXT IS NON-NUM, TERMINATE THE SCAN
1176  7520
1177  0370
```

```
          *1200  /SEARCH FOR STRING OF WDS, SEPARATED BY BLKS
1200  1327  SERCH, TAD BLOC;
1201  3314   DCA MATCH  /IF NO MATCHES FOUND, RETURN TO THIS
1202  1377   TAD (SBUF-1
1203  3013   DCA SP1
1204  3312   DCA INCT
1205  4554  INNLUP, JMS I [GETNUM
1206  5215   JMP LBL  /LEADING NON-NUMERICS
1207  1024   TAD ACUM  /HAVE NUMBER, STORE IN STRING
1210  3413   DCA I SP1
1211  7040   CMA
1212  1312   TAD INCT
1213  3312   DCA INCT
1214  1023   TAD CHAR  /IF ENDED BY CR, GO DO SEARCH
1215  1376  LBL, TAD (-215
1216  7640   SZA CLA
1217  5205   JMP INNLUP  /NOT CR, IGNORE
1220  4560   JMS I [PUTPR  /CR, DO THE SEARCH
1221  4212   4212

1222  7001   IAC
1223  3327  SRCD, DCA BLOC
1224  1025   TAD MAXBLK
1225  7130   STL RAR  /SEARCH HALF THE BLKS ON DISC AT A TIME,
1226  3311   DCA BLCNT  /ODDS, THEN EVENS; FASTER THAN SEQUENTIAL SEARCH
1227  4315  GETAB, JMS GETB
1230  1375   TAD (DBUF-1;
1231  3012   DCA DPTR
1232  1374   TAD (-200;
1233  3313   DCA SCT  /SEARCH THIS BLOCK FOR THE STRING
1234  1412  SRCP, TAD I DPTR  /LOOK FOR MATCH ON FST WORD
1235  7041   CIA
1236  1773   TAD SBUF
1237  7650   SNA CLA
1240  5260   JMP FMTC  /MATCH ON FIRST, CHECK OTHERS
1241  2313  NOTL, ISZ SCT  /NO MATCH ON FIRST, CONTINUE
1242  5234   JMP SRCP
1243  7326   GET2  /FINISH THIS BLOCK, GO TO NEXT
1244  1327   TAD BLOC
1245  3327   DCA BLOC
1246  2311   ISZ BLCNT
1247  5227   JMP GETAB
1250  1327   TAD BLOC  /RAN OUT OF BLOCKS.. IF ODD, GO DO EVENS
1251  7010   RAR
1252  7630   SZL CLA
1253  5223   JMP SRCD
1254  1314   TAD MATCH  /EVEN, END THE SEARCH
1255  3327   DCA BLOC  /DISPLAY THE LAST MATCHED BLOCK
1256  4315   JMS GETB
1257  5772   JMP CAL
```

```
1260  1373  FMTC, TAD (SBUF  /MATCH ON FIRST, RUN THRU STRING
1261  3013   DCA SP1
1262  1012   TAD DPTR;
1263  3014   DCA SP2
1264  1312   TAD INCT
1265  3326   DCA INCTT
1266  2326  CKL, ISZ INCTT
1267  5303   JMP CKMOR  /NOT END OF STRING, KEEP CHECKING UNTIL MISMATCH
1270  1327   TAD BLOC  /END STRING, ALL MATCH.. PRINT BLK + ADR
1271  4553   JMS I [OCTWD
1272  1012   TAD DPTR
1273  0371   AND (177  /7 BIT ADDRESS
1274  4553   JMS I [OCTWD
1275  4560   JMS I [PUTPR
1276  0215  L215, 215;
1277  4212   4212
1300  1327   TAD BLOC;
1301  3314   DCA MATCH  /KEEP NO OF LAST BL THAT MATCHED
1302  5241   JMP NOTL  /CONTINUE SEARCH

1303  1413  CKMOR, TAD I SP1
1304  7041   CIA
1305  1414   TAD I SP2
1306  7640   SZA CLA
1307  5241   JMP NOTL  /BAD, STOP CHECKING THIS STRING
1310  5266   JMP CKL  /MATCH, TRY FOR MORE
1311  0000  BLCNT, 0
1312  0000  INCT, 0  /N WORDS ENTERED
1313  0000  SCT, 0
1314  0000  MATCH, 0


1315  0000  GETB, 0  / AC=0, READ.. AC=2,STORE BLOC ON DISC
1316  1370   TAD (3
1317  3326   DCA PRAM
1320  7100   CLL
1321  1327   TAD BLOC  /SEE IF THE BLOC NO IS OUT OF RANGE
1322  1025   TAD MAXBLK
1323  7630   SZL CLA
1324  5334   JMP OB  /OUT OF BOUNDS, PRINT "OB", GO TO START
1325  4767   JMS 7642
1326  0000  PRAM, 0
1327  0000  BLOC, 0
1330  1600   DBUF
1331  0000  LINK, 0
1332  7402   HLT
1333  5715   JMP I GETB
1334  4340  OB, JMS PUTPR
1335  0317   317;
1336  4302   4302
1337  5766   JMP START
            INCTT=PRAM
```

```
1340  0000  PUTPR, 0  /PUTS OUTPUT IN PRINT BUFF. JMS PUTPR; STRING..
1341  1740   TAD I PUTPR  /ADDS AC, IF ANY, TO FIRST CHAR
1342  2340   ISZ PUTPR  /AND RETURNS AFTER A - CHARACTER ENDS STRING
1343  3420   DCA I PRIN
1344  1022   TAD PRINTF
1345  7640   SZA CLA
1346  5357   JMP PRNOW  /PRINTER WAITING, PRINT IT RIGHT AWAY
1347  7100   CLL  /BUSY, LEAVE IT IN BUFFER
1350  1020   TAD PRIN
1351  1276   TAD L215  /-7563
1352  7630   SZL CLA
1353  5774   JMP 7600  /BUFFER IS FULL, KILL PROGRAM
1354  1420   TAD I PRIN
1355  2020   ISZ PRIN
1356  5362   JMP PUTNX  /GET ANOTHER, UNLESS THIS IS -

1357  3022  PRNOW, DCA PRINTF  /PUT FLAG DOWN
1360  1420   TAD I PRIN
1361  6046   TLS
1362  7700  PUTNX, SMA CLA
1363  5341   JMP PUTPR+1  /+, DO ANOTHER
1364  5740   JMP I PUTPR  /-, RETURN

1366  0215
1367  7642
1370  0003
1371  0177
1372  0414
1373  1400
1374  7600
1375  1577
1376  7563
1377  1377
```