GT40/GT44

VISUAL DISPLAY TEST

MD-11-DDGTG-B

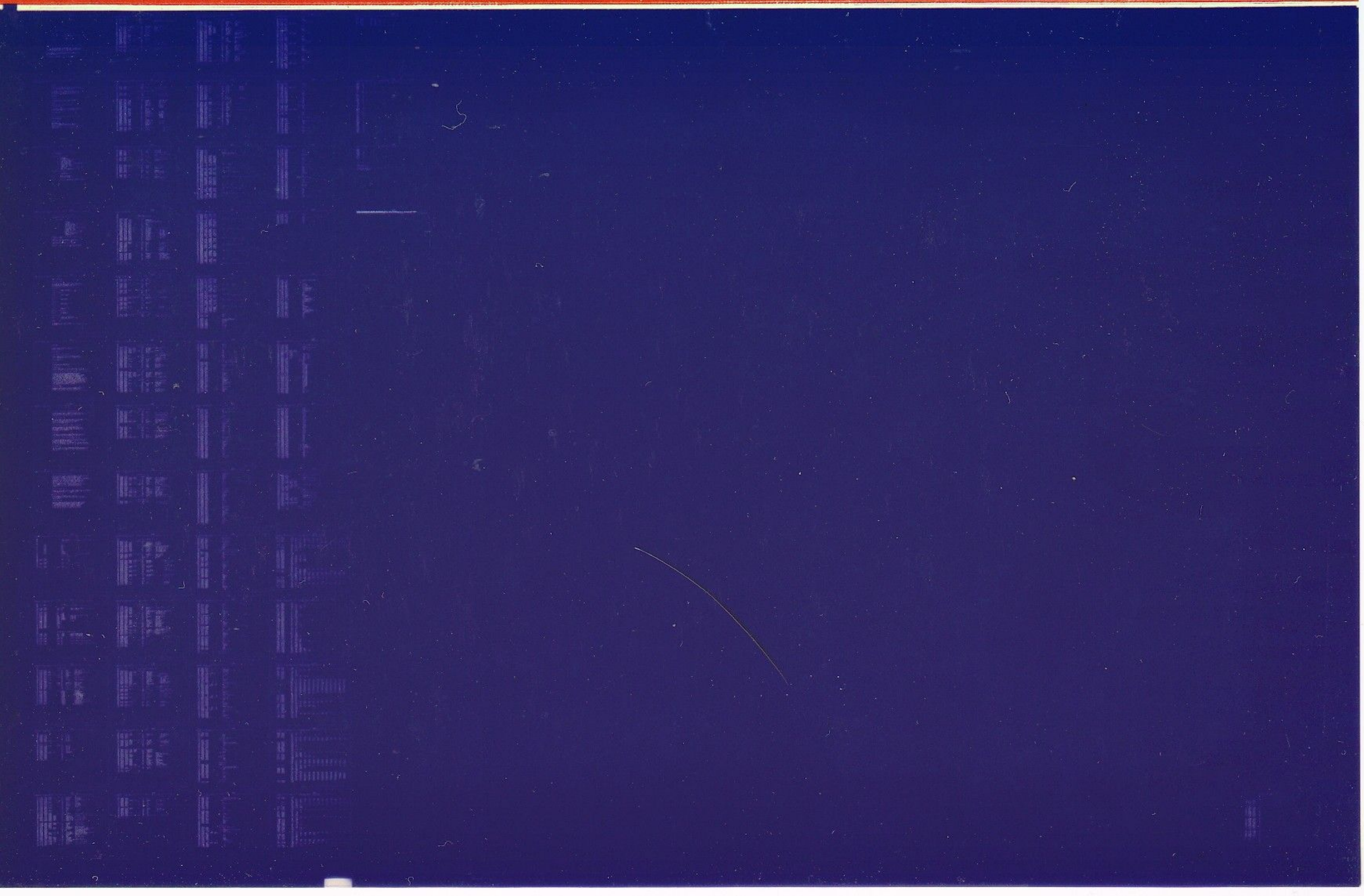
EP-DDGTG-B-DL-B

FICHE 1 OF 1

DEC 1976

digital

MADE IN USA



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IDENTIFICATION

PRODUCT CODE:	MAINDEC-11-DDGTG-B-D
PRODUCT NAME:	GT40/GT44 VISUAL DISPLAY TES" WITH VR17 DISPLAY
DATE:	DECEMBER 1976
MAINTAINER:	DIAGNOSTIC GROUP

1. ABSTRACT

THIS VERSION OF THE PROGRAM SUPPORTS NON-SWITCH REGISTER CPU'S. FOR THESE CPU'S, THE SWITCH REGISTER CAN BE CHANGED BY CHANGING THE CONTENTS OF SWREG (170).

THIS PROGRAM CONTAINS A SERIES OF PATTERNS THAT ARE USED AS AIDS IN THE ALIGNMENT AND ADJUSTMENT OF THE GT40/GT44 DISPLAY SYSTEM WITH A VR17. FOR THIS TEST THE MAINTENCE SWITCHES ARE NOT USED (NORMAL POSITION).

2. REQUIREMENTS

2.1 EQUIPTMENT

GT40 DISPLAY SYSTEM WITH VR17 DISPLAY SCOPE OR
GT44 DISPLAY SYSTEM WITH VR17 DISPLAY SCOPE.

2.2 STORAGE

THIS PROGRAM USES LESS THAN 4K OF MEMORY.

2.3 PRELIMINARY PROGRAMS

ALL PROCESSOR MAINDECS, GT40/GT44 INSTRUCTION TEST I AND GT40/GT44 INSTRUCTION TEST II MUST HAVE RUN IN THEIR ENTIRETY BEFORE ATTEMPTING TO RUN THIS TEST.

3. LOADING PROCEDURE

3.1 METHOD

PROCEDURE FOR NORMAL BINARY TAPES SHOULD BE FOLLOWED.

4. STARTING PROCEDURE

4.1 STARTING ADDRESS

LOAD ADDRESS 0200
START WITH SWITCHES 7=0, 8=0 FOR AUTO SEQUENCING THRU ALL NON-OPERATOR INVERVENTION PATTERNS.
START WITH SWITCH BIT 7=0, 8=1 FOR SWITCH REGISTER PATTERN CONTROL (REF 4.2).
START WITH SWITCH BIT 7=1, 8=0 OR 1 FOR KEYBOARD PATTERN CONTROL (REF 4.3).

4.2 CONTROL SWITCH SETTINGS (SWITCH REGISTER)

SWITCH REGISTER BITS 0,1,2,3 ARE USED TO SELECT
EACH OF THE TESTS.

NON-OPERATOR INTERVENTION TESTS

SW 3-0 = 00 /DIRECTORY
01 /DOT REPEATIBILITY
02 /PINCUSHION (X AND Y OFFSET ADJ.)
03 /OCTAGONS OR SQUARES
04 /CHARACTER SET (CHAR ADJ.)
05 /DASH LINES AND BLINK
06 /VECTOR LENGTH TEST (X VECTOR LENGTH ADJ.)
07 /VECTOR LENGTH TEST (Y VECTOR LENGTH ADJ.)
10 /PHOSPHOR TEST (HORIZ)
11 /PHOSPHOR TEST (VERT)
12 /INTENSITY LEVELS, SYNC AND LIGHT-PEN TEST
13 /EDGE TEST
14 /SHORT VECTOR AND RELATIVE POINT TEST
15 /GRAPHPLOT INCREMENT TEST

OPERATOR INTERVENTION TESTS

16 /LIGHT-PEN FOLLOW TEST
17 /KEYBOARD ECHO

SW 6 = 0 SELECT SUB-PICTURE 0
SW 6 = 1 SELECT SUB-PICTURE 1 OR
STOP DISPLAY FRAME MOTION

SW 8 = 0 EXECUTE ALL NON-OPERATOR INTERVENTION FRAMES.
SW 8 = 1 EXECUTE THE DISPLAY FRAME SPECIFIED BY SW 0-3.

4.3 CONTROL SWITCH SETTINGS (DISPLAY KEYBOARD)

ALPHA CHARACTERS 'A' THRU 'P' ARE USED TO SELECT EACH OF THE TESTS.

CHARACTER	TEST
A	DIRECTORY
B	DOT REPEATIBILITY
C	PINCUSHION (X AND Y OFFSET ADJ..
D	OCTAGONS OR SQUARES
E	CHARACTER SET (CHAR. ADJ.)
F	DASH LINES AND BLINK
G	VECTOR LENGTH TEST (X VECTOR LENGTH ADJ.
H	VECTOR LENGTH TEST (Y VECTOR LENGTH ADJ..
I	PHOSPHOR TEST (HORIZ)
J	PHOSPHOR TEST (VERT)
K	INTENSITY LEVELS, SYNC AND LIGHT-PEN TEST
L	EDGE TEST
M	SHORT VECTOR AND RELATIVE POINT
N	GRAPHPLOT INCREMENT TEST
O	LIGHT-PEN FOLLOW TEST
P	KEYBOARD ECHO

DEPRESSING A 'RUBOUT' AFTER SELECTING A FRAME WILL LOCK ON THE SELECT FRAME.

DEPRESSING A 'CR' AFTER SELECTING A FRAME WILL SELECT SUB-PICTURE 1 OR STOP DISPLAY FRAME MOTION.

TO CONTINUE AFTER DEPRESSING A 'CR' OR 'RUBOUT' DEPRESS ANY KEY OTHER THAN 'CR' OR 'RUBOUT'.

DEPRESSING 'CONTROL C (↑C)' WHEN EXECUTING THE KEYBOARD ECHO TEST, WILL RETURN CONTROL TO THE DIRECTORY FRAME.

5. OPERATING PROCEDURE

5.1 OPERATIONAL SWITCHES

ALL OF THE TEST WILL RUN IN THEIR NORMAL MANNER WITHOUT ANY OPERATIONAL SWITCHES SELECTED, HOWEVER, SOME OF THE TESTS HAVE ADDITIONAL FEATURES AND THE ARE SELECTED BY USING SWITCH BIT 06 OR "CR" KEYBOARD KEY.

5.1.1 PINCUSHION TEST

SW 6 = 0 DISPLAY PINCUSHION
SW 6 = 1 DISPLAY CROSSHATCH (IN-HOUSE TEST ONLY)

5.1.2 OCTAGON OR SQUARES

SW 6 = 0 DISPLAY OCTAGONS
SW 6 = 1 DISPLAY SQUARES

5.1.3 VECTOR LENGTH TEST

SW 6 = 0 SWEEP MOVEMENT
SW 6 = 1 STOP MOVEMENT

5.1.4 PHOSPHOR TEST

SW 6 = 0 SWEEP ACROSS THE SCREEN
SW 6 = 1 STOP MOVEMENT

5.1.5 INTENSITY TEST

SW 6 = 0 ENABLE SYNC 'OFF'
SW 6 = 1 ENABLE SYNC 'ON'

5.1.6 GRAPHPLOT INCREMENT TEST

SW 6 = 0 USE GRAPHPLOT X
SW 6 = 1 USE GRAPHPLOT Y

5.1.7 LIGHT PEN FOLLOW

SW 6 = 0 DISPLAY LIGHT PEN FOLLOW
SW 6 = 1 DISPLAY LIGHT PEN FIELD OF VIEW
(IN-HOUSE TEST ONLY)

6. ERRORS

THE PROGRAM WILL ONLY HALT ON ERROR.
THE PROGRAM DOES NOT CONTAIN FACILITES FOR THE REPORTING OF ERROR CONDITIONS.

7. RESTRICTIONS

IF USING THE SWITCH REGISTER (REF 4.2) TO CONTROL THE PROGRAM, THERE WILL BE A DELAY BEFORE THE NEW TEST IS SELECTED.

8. MISCELLANEOUS

8.1 DEVICE ADDRESS PROGRAM LOCATIONS

LOCATION 1000 CONTAINS THE GT40/GT44 DEVICE ADDRESS.
LOCATION 1002 CONTAINS THE GT40/GT44 INTERRUPT VECTOR.
LOCATION 1004 CONTAINS THE GT40/GT44 INTERRUPT BR LEVEL.

9. PROGRAM DESCRIPTION

9.1 DIRECTORY

THIS TEST USES THE CHARACTER MODE TO DISPLAY A DIRECTORY OF THE TESTS THAT ARE AVAILABLE.

9.2 DOT REPEATIBILITY

THIS TEST INTENSIFIES A DOT IN EACH CORNOR AND A DOT IN THE CENTER OF THE SCREEN. THIS TEST IS USED TO VERIFY DOT REPEATIBILITY.

9.3 FINCUSHION AND VECTOR CURVATURE TEST (ADJUSTMENT OF X AND Y OFFSET POTS)

THIS TEST OUTLINES THE FULL SCREEN AREA, IT IS USEFUL IN CENTERING THE VIEWING AREA IN THE DISPLAY MASK.
THIS TEST ALSO DRAWS A DIAGONAL LINE FROM LOWER LEFT CORNER TO THE UPPER RIGHT AND THEN RETURNS IN THE OPPOSITE DIRECTION.
A SIMILAR SEQUENCE IS REPEATED STARTING AT LOWER RIGHT CORNER TO THE UPPER LEFT CORNER AND BACK. THE PURPOSE IS TO MAKE CERTAIN THAT THE VECTORS ARE LINEAR OVER THEIR ENTIRE LENGTH.
WITH PROPER LENGTH VECTORS ONLY TWO DIAGONAL LINES SHOULD BE SEEN IN THE CENTER OF THE SCREEN. DO NOT ADJUST THE VECTOR LENGTH POTS WITH THIS DISPLAY PATTERN. SINGLE LINES SHOULD BE VISABLE AT THE TOP AND BOTTOM OF THE SCREEN, IF NOT ADJUST THE Y OFFSET POT.
SINGLE LINES SHOULD BE VISABLE AT THE RIGHT AND LEFT EDGE OF THE SCREEN IF NOT ADJUST THE X OFFSET POT..

9.4 OCTAGONS OR SQUARES

A SERIES OF DIFFERENT SIZE OCTAGONS OR SQUARES ARE DRAWN TO DEMONSTRATE THAT CLOSED FIGURES CAN BE DRAWNED USING DIFFERENT VECTOR LENGTHS (7,17,37,77,177,377 AND 777).
THIS TEST IS USED TO TEST THE END POINT MATCHING OF THE VECTORS.

9.5 CHARACTER SET (ADJUSTMENT OF THE CHARACTER POT'S)

TWO COMPLETE SETS OF ASCII CHARACTERS AVAILABLE FROM THE
CHARACTER GENERATOR ARE DISPLAYED. THE CHARACTERS ARE DISPLAYED IN FOUR
LINES OF TEXT. THE FIRST HALF OF A LINE IS IN 'NORMAL' FONT
THE SECOND HALF OF A LINE IS IN 'ITALICS' FONT.

9.6 DASH LINES AND BLINK TEST

THIS TEST IS USED TO TEST THE FOUR TYPES OF VECTOR LINES.
FOUR VECTORS ARE PLOTTED USING EACH OF THE FOUR LINE REGISTER VALUES.
THIS TEST ALSO ENABLES THE BLINK OPTION. THE FIRST
VECTOR ON A LINE SHOULD NOT BLINK. THE SECOND
VECTOR ON A LINE SHOULD BLINK.

9.7 VECTOR LENGTH TEST (ADJUSTMENT OF X AND Y VECTOR LENGTH)

A SERIES OF INCREMENTING ANGLE VECTORS ARE DRAWNED
FROM THE SCREEN ORGIN TO THE OPPOSITE EDGE OF THE SCREEN.
THESE VECTORS SHOULD TERMINATE ON THE LINE DRAWNED AT THE
VIEWING EDGE. IF THE VECTORS DO NOT END ON THE LINE, ADJUST
THE APPROPIATE VECTOR LENGTH POT.

9.8 PHOSPHOR TEST

A WIDE BAND OF INTENSIFIED VECTORS IS DISPLAYED TO ALLOW FOR
VISUAL INSPECTION OF THE CRT PHOSPHOR. THIS TEST ALSO TEST FOR
ANY DISTORTION IN DEFLECTION CROSS-OVER IN THE SCOPE.

9.9 INTENSITY LEVEL, SYNC AND LIGHT-PEN SENSITIVITY TEST

EIGHT VECTORS ARE DRAWN USING EACH OF THE EIGHT INTENSITY LEVELS.
THE INTENSITY SHOULD BE ADJUSTED SO THAT THE LEVEL 0 IS BARELY
VISABLE. THIS TEST IS ALSO USED TEST
THE LIGHT PEN SENSITIVITY. ALL LINES ARE SET TO ALLOW A LIGHT PEN
HIT, THEN HIT THE MESSAGE 'LIGHT PEN HIT' WILL BE DISPLAYED ON THE
LINE HIT. THIS TEST IS ALSO USED TO TEST THE 'SYNC' LOGIC IF SELECTED.

9.10 EDGE SQUARES TEST

THIS TEST IS USED TO TEST FOR PROPER EDGE BLANKING AND REENTRY SETTLE
TIME. THE SCREEN IS OUTLINED AND FOUR RECTANGLES ARE DRAWNED AS TO
EXCEED THE EDGE OF THE SCREEN. ONLY HALF OF EACH RECTANGLE SHOULD
BE VISIBLE.

9.11 SHORT VECTOR AND RELATIVE POINT TEST

THIS TEST IS USED TO VERIFY PROPER DECODING OF THE SHORT VECTOR AND RELATIVE POINT. A SERIES OF INTINIFIED VERTICAL LINES ARE PLOTTED USING SHORT VECTOR MODE. THE TEST THEN REPEATS USING RELATIVE POINT. THE RESULTS IS THAT A SINGLE HORIZONTAL LINE APPEARS TO THE RIGHT OF THE VERTICAL LINES. ALSO INCLUDED IS A RELATIVE POINT REPEATIBILITY TEST. FOUR SETS OF THREE OCTAGONS EACH WILL BE DISPLAYED. THE INNER OCTAGON IS DRAWN USING SHORT VECTOR MODE WITH A DELTA X, Y OF 71 OCT. THE MIDDLE OCTAGON IS DRAWN USING RELATIVE POINT MODE WITH A DELTA X, Y OF 74 OCT. THE OUTTER OCTAGON IS DRAWN USING SHORT VECTOR MDODE WITH AN DELTA X,Y OF 77 OCT. THE MIDDLE OCTAGON SHOULD BE EQUAL DISTANCE FROM THE OUTER OCTAGONS AND SHOULD NOT MOVE.

9.12 GRAPHPLOT INCREMENT TEST

A SERIES OF POINTS ARE PLOTTED WITH EACH POSSIBLE VALUE IN THE GRAPHPLOT INCREMENT REGISTER FROM 0-77. THE RESULTING PATTERN USED SHOULD APPEAR TO BE A SERIES OF POINTS AT AN INCREASING ANGLE.

9.13 LIGHT-PEN FOLLOW TEST

IN THIS OPERATOR INTERVENTION TEST A TRACKING CROSS IS DISPLAYED. THE OPERATOR MAY MOVE ACROSS THE SCREEN WITH THE LIGHT PEN. AN X AND Y OCTAL READOUT IS ALSO DISPLAYED TO THE OPERATOR.

9.14 KEYBOARD ECHO TEST

THIS IS AN OPERATOR INTERVENTION TEST USED TO INSURE PROPER OPERATION OF THE DISPLAY KEYBOARD. WHEN A DISPLABLE CHARACTER KEY IS DEPERSSED THE CHARACTER IS DISPLAYED ON THE SCREEN. IN SELECTING THE SHIFT-OUT MODE. IF THE KEY DEPRESSED IS NOT A CONTROL CHARACTER, THE PROGRAM WILL TRAP TO THE SHIFT-OUT VECTOR. AN OCTAL CHARACTER VALUE READOUT IS ALSO DISPLAYED AS AN AID IN ADJUSTING THE TTY CLOCK.

.LIST

```
                                        .ENABL  ABS,AMA
                                        .TITLE GT-40/GT-44 WITH VR17 VISUAL DISPLAY TEST MAINDEC-11-DDGTG-B
                                        .LIST   ME
                                        .NLIST  MC,MD,CND

                000000                  R0=%0
                000001                  R1=%1
                000002                  R2=%2
                000003                  R3=%3
                000004                  R4=%4
                000005                  R5=%5
                000006                  SP=%6
                000007                  PC=%7
                104000                  SCOPE=EMT
                000004                  ERRVEC=4
                000500                  STKPTR=500
                177570                  DSWR=177570             ;11/45 LIGHT DISPLAY REGISTER

                                        ;0-776 IS FILLED WITH .+2, HALT
                                        .LIST

                000024                  .=24
000024  001250                          .WORD   LOWPWR
000026  000340                          340

                000030                  .=30
000030  001100                          .WORD   SCOPEA          ;EMT RETURN
000032  000340                          340

                000170                  .=170
000170  000000          SWREG:          .WORD   0
000172  177570          SWR:            .WORD   DSWR
```

```
                    000200                          .=200
000200  000200  000137  001356                      JMP     START   ;DISPLAY TEST

                    001000                          .=1000
001000  001000  172000                  GSADD:  172000          ;DISPLAY STARTING ADDRESS
001002  001002  000320                  GSVCT:  320             ;DISPLAY INTERRUPT VECTOR STARTING ADDRESS
001004  001004  000200                  GSBRL:  200             ;DISPLAY BR LEVEL

001006  001006  000000                  ICNT:   0
001010  001010  177776                  PSW:    177776
001012  001012  177560                  TKS:    177560
001014  001014  177562                  TKB:    177562
001016  001016  012536                  DBUF:   BUFFER          ;FIRST WORD IN THE DISPLAY BUFFER
001020  001020  012540                  DBUF1:  BUFFER+2        ;SECOND WORD
001022  001022  012542                  DBUF2:  BUFFER+4        ;THIRD WORD
001024  001024  012544                  DBUF3:  BUFFER+6        ;FOURTH WORD
001026  001026  012546                  DBUF4:  BUFFER+10       ;FIFTH WORD
001030  001030  012550                  DBUF5:  BUFFER+12
001032  001032  000000                  DSAVE:  0               ;TEMP REG.
001034  001034  000000                  DSAVE1: 0
001036  001036  000000                  DSAVE2: 0
001040  001040  000000                  DSAVE3: 0
001042  001042  000000                  HOLD:   0
001044  001044  000000                  TSAVE:  0
001046  001046  000000                  CNTR:   0
001050  001050  000000                  CHANGE: 0
001052  001052  000000                  LOKRB:  0


                                        ;GS ADDRESSES AND INTERRUPT VECTORS

001054  001054  172000                  DPC:    172000          ;DISPLAY PROGRAM COUNTER
001056  001056  172002                  DSR:    172002          ;DISPLAY STATUS REGISTER
001060  001060  172004                  XPOS:   172004          ;DISPLAY X AXIS REGISTER
001062  001062  172006                  YPOS:   172006          ;DISPLAY Y AXIS REGISTER

001064  001064  000320                  DDONE:  320             ;DISPLAY INTERRUPT VECTOR FOR STOP
001066  001066  000322                  DDONE1: 322

001070  001070  000324                  LPVCT:  324             ;DISPLAY INTERRUPT VECTOR FOR LIGHT-PEN
001072  001072  000326                  LPVCT1: 326

001074  001074  000330                  TIMEVT: 330             ;DISPLAY INTERRUPT VECTOR FOR TIME-OUT OR SHIFT-OUT
001076  001076  000332                  TMEVT1: 332
```

```
                                        ;MONITOR ROUTINE

001100  005737  002114          SCOPEA: TST     KRBD            ;TEST IF SW OR "KRB"
001104  001014                          BNE     SCOPEF          ;BR IF "KRB"
001106  005037  005624                  CLR     SWITCH          ;CLEAR "SWITCH"
001112  032777  000100  177052          BIT     #100,@SWR       ;TEST FOR "HOLD/STOP SWITCH"
001120  001402                          BEQ     SCOPEE          ;BR IF CLEARED
001122  005137  005624                  COM     SWITCH          ;SET SWITCH
001126  032777  000400  177036  SCOPEE: BIT     #400,@SWR       ;TEST BIT 8
001134  001010                          BNE     SCOPEB
001136  005737  001042          SCOPEF: TST     HOLD            ;TEST FOR "HOLD/STOP"
001142  001012                          BNE     SCOPED          ;BR IF SET
001144  000240                          NOP
001146  004737  001536                  JSR     PC,SETUP        ;RESET HOUSEKEEPING
001152  000240                          NOP
001154  000002                          RTI                     ;EXIT
001156  017704  177D10          SCOPEB: MOV     @SWR,R4         ;READ SWITCHES
001162  042704  177760          SCOPEC: BIC     #177760,R4      ;MASK TO BITS 4-15
001166  006304                          ASL     R4              ;MOVE LEFT
001170  012706  000500          SCOPED: MOV     #STKPTR,SP      ;RESET STACK
001174  000240                          NOP
001176  004737  001536                  JSR     PC,SETUP        ;RESET HOUSEKEEPING
001202  000240                          NOP
001204  000174  001210                  JMP     @DISPTC(R4)     ;JMP TO THAT TEST

001210  002120          DISPTC: FILE0+2                 ;DIRECTORY
                                FILE1+2                 ;DOT REPEATIBILITY
                                FILE2+2                 ;PINCUSHION
                                FILE3+2                 ;OCTAGONS OR SQUARES
                                FILE4+2                 ;CHARACTER SET
                                FILE5+2                 ;DASH LINES AND BLINK
                                FILE6+2                 ;X VECTOR LENGTH
                                FILE7+2                 ;Y VECTOR LENGTH
                                FILE10+2                ;X PHOSPHOR TEST
                                FILE11+2                ;Y PHOSPHOR TEST
                                FILE12+2                ;INTENSITY LEVEL AND LIGHTPEN
                                FILE13+2                ;EDGE SQUARES
                                FILE14+2                ;SHORT VECTOR RELATIVE POINT TEST
                                FILE15+2                ;GRAPHPLOT TEST
                                FILE16+2                ;LIGHT-PEN FOLLOW
                                FILE17+2                ;KEY BOARD ECHO
```

```
                                                LOWPWR: MOV     R0,-(SP)
                                                        MOV     R1,-(SP)
                                                        MOV     R2,-(SP)
                                                        MOV     R3,-(SP)
                                                        MOV     R4,-(SP)
                                                        MOV     R5,-(SP)
001300  000000                                  LOWSV:  0
001302  013706  001300                          HIGPWR: MOV     LOWSV,SP
001306  012605                                         MOV     (SP)+,R5
001310  012604                                         MOV     (SP)+,R4
001312  012603                                         MOV     (SP)+,R3
001314  012602                                         MOV     (SP)+,R2
001316  012601                                         MOV     (SP)+,R1
001320  012600                                         MOV     (SP)+,R0
001322  012737  001250  000024                       MOV     #LOWPWR,@#24
001330  012706  000500                               MOV     #STKPTR,SP
001334  000240                                       NOP
001336  000240                                       NOP
001340  000240                                       NOP
001342  000000                                       HALT
001344  000240                                       NOP
001346  000240                                       NOP
001350  000240                                       NOP
001352  000137  001170                               JMP     SCOPED
```

```
                                                    ;SET UP THE STACK
                                                    ;RAISE PSW
                                                    ;GET POINTER
                                                    ;GET SUPPLIED ADDRESS
                                                    ;UPDATE
                                                    ;THE
                                                    ;ADDRESSES
                                                    ;UNTIL DONE
                                                    ;GET POINTER
                                                    ;GET SUPPLIED VECTOR
                                                    ;UPDATE
                                                    ;THE VECTORS
                                                    ;HOUSEKEEP
                                                    ;SET UP VECTORS
                                                    ;HOUSEKEEP X,Y ORIGIN FOR LIGHTPEN
                                                    ;INITIALIZE X READOUT
                                                    ;INITIALIZE Y READOUT
                                                    ;START THE TEST

                                                    ;RESET KRB VECTOR
                                                    ;CLEAR INT ENABLE
                                                    ;SAVE VECTOR CONTENTS
                                                    ;SET UP FOR TRAP
                                                    ;SET UP TO TEST FOR SWITCH REGISTER
                                                    ;TEST FOR SWITCH REGISTER
                                                    ;SWITCH REGISTER IS PRESENT
                                                    ;NO SWITCH REGISTER
                                                    ;POP 2 WORDS OFF STACK
                                                    ;SET UP FOR SOFTWARE SWITCH REGISTER
                                                    ;RESTORE VECTOR CONTENTS
                                                    ;TEST FOR "KRB" CONTROL
                                                    ;BR IF NOT
                                                    ;SET "KRB" CONTROL
                                                    ;SET UP "KRB" INT

                                                    ;ENABLE "KRB' INT
                                                    ;SET UP GT DONE VECTOR

                                                    ;RESET LIGHT-PEN VECTOR

                                                    ;RESET TIME-OUT/SHIFT OUT VECTOR

                                                    ;EXIT
```

```
002732  005777  177120          SETJPB: TST     @DSR            ;TEST FOR STOP
002736  100401                          BMI     .+4
002740  000000                          HALT                    ;ERROR, INTERRUPT OCCURRED TO THE STOP
                                                                ;VECTOR BUT STOP WAS NOT SET
002742  000002                          RTI
002744  000000                          HALT


002746  117737  177042  001044  RETB:   MOVB    @TKB,TSAVE      ;READ THE CHARACTER
002754  042737  177600  001044          BIC     #177600,TSAVE   ;MASK TO 7 BITS
003002  022737  000015  001044          CMP     #15,TSAVE       ;TEST FOR "CR"
003010  001003                          BEQ     KYT3            ;BR IF
003012  005037  005624                  CLR     SWITCH          ;CLEAR "SWITCH"
003016  162737  000101  001044          SUB     #101,TSAVE      ;MAKE 0-77
003024  100426                  KYT5:   BMI     KYT1            ;<A
003026  022737  000017  001044          CMP     #17,TSAVE
003034  100412                          BMI     KYT2            ;>P
003036  013704  001044                  MOV     TSAVE,R4
003042  012737  177777  001050          MOV     #-1,CHANGE
003050  005037  005624                  CLR     SWITCH
003054  005037  001042                  CLR     HOLD
003060  000002                          RTI                     ;EXIT
003062  022737  000076  001044  KYT2:   CMP     #76,TSAVE
003070  001015                          BNE     KYT4
003072  012737  177777  001042          MOV     #-1,HOLD        ;RUBOUT
003100  000002                          RTI                     ;EXIT
003102  005037  001042          KYT1:   CLR     HOLD
003106  000002                          RTI
003110  000000                          HALT                    ;FATAL ERROR RTI FAILED

003112  012737  177777  005624  KYT3:   MOV     #-1,SWITCH
003120  000002                          RTI
003122  000000                          HALT                    ;FATAL ERROR, RTI FAILED

003124  162737  000040  001044  KYT4:   SUB     #40,TSAVE       ;CONVERT LC TO UC
003132  000734                          BR      KYT5
003134  000000                  KRBC:   0
```

```
                                        .LIST
                                ;EXECUTE DIRECTORY FRAME
                                FILED:  SCOPE
002116  104350                          JSR     5,MESG          ;EXIT TO DISPLAY A FRAME
002120  004537  005460                  1000
002124  001000                          FRMED                   ;USING THE DIR. FRAME
002126  005626
                                ;EXECUTE DOT REPEATIBILITY FRAME
                                FILE1:  SCOPE
002130  104350                          JSR     5,MESG          ;EXIT TO DISPLAY A FRAME
002132  004537  005460                  100000
002136  100000                          FRME1                   ;USING THE DOT REPEAT FRAME
002140  001206
                                ;EXECUTE PINCUSHION FRAME
                                FILE2:  SCOPE
002142  104350                          MOV     #BUFFER,R0              :LOAD START ADDRESS
002146  012700  012536                  JSR     PC,SETPNT               :LOAD 0,0 ORGIN
002152  004737  002320                  MOV     #20,R1                  :SETUP COUNT
002156  012701  000020          1$:     MOV     #INTX,(R0)+             :LOAD INT LINE
002162  012720  040000                  MOV     #MAXY,(R0)+             ; MAX Y
002166  012720  001777                  MOV     #100,(R0)+              :LOAD DELTA X
002172  012720  000100                  MOV     #MINUSX+MAXY,(R0)+      :LOAD - MAX Y
002176  012720  021777                  DEC     R1                      :FINISHED ?
002202  005301                          BNE     1$                      :BR IF NOT
002204  001366                          MOV     #MINUSX+1,(R0)+         :GO BACK 1 UNIT
002206  012720  022000                  MOV     #0,(R0)+
002212  012720  000000                  MOV     #INTX,(R0)+
002216  012720  040000                  MOV     #MAXY,(R0)+             :PLOT LAST LINE
002222  012720  001777                  JSR     PC,SETPNT               :SET ORGIN
002226  004737  002320                  MOV     #MAXY+1/100,R1          :SETUP COUNT
002232  012701  000020          2$:     MOV     #INTX+MAXX,(R0)+        :LOAD DELTA X MAX
002236  012720  041777                  MOV     #0,(R0)+                :LOAD DELTA Y = 0
002242  012720  000000                  MOV     #MINUSX+MAXX,(R0)+      :RETRACE
002246  012720  021777                  MOV     #100,(R0)+              :LOAD DELTA Y OF 100
002252  012720  000100                  DEC     R1                      :FINISHED ?
002256  005301                          BNE     2$                      :BR IF NOT
002260  001366                          MOV     #0,(R0)+
002262  012720  000000                  MOV     #MINUSX+1,(R0)+
002266  012720  020001                  MOV     #INTX+MAXX,(R0)+        :PLOT LAST LINE
002272  012720  041777                  MOV     #0,(R0)+
002276  012720  000000                  MOV     #STOP,(R0)+             :LOAD STOP
002302  012720  173400                  MOV     #JMP,(R0)+              :LOAD JUMP
002306  012720  160000                  MOV     #BUFFER,(R0)
002312  012710  012536                  JMP     FILE2A
002316  000137  002342
                                SETPNT: MOV     #POINT!INT4,(R0)+               :LOAD POINT
002320  012720  117000                  MOV     #0,(R0)+                        : AT X
002324  012720  000000                  MOV     #0,(R0)+                        : AT Y
002330  012720  000000                  MOV     #LONGV,(R0)+                    :LONG VECTOR
002334  012720  110000                  RTS     PC                              :EXIT
002340  000207
```

```
                                                ;LOAD COUNTER
002342  012737  004000  001046  FILE2A: MOV     #4000,CNTR
002350  005737  005624          FILE2B: TST     SWITCH          ;TEST SWITCH
002354  001405                          BEQ     FILE2C          ;BR IF SUBTEST NOT SELECTED
002356  004537  005460                  JSR     R5,MESG         ;EXIT TO DISPLAY FRAME
002362  000001                          1
002364  012536                          BUFFER                  ;USING THE CROSS HATCH PATTERN
002366  000424                          BR      FILE2D          ;BR
                                                ;EXIT TO DISPLAY FRAME
002370  004537  005460          FILE2C: JSR     R5,MESG
002374  000001                          1
002376  007276                          FRME2                   ;USING THE OFFSET PATTERN
002400  005337  001046          FILE2D: DEC     CNTR            ;FINISHED ?
002404  001361                          BNE     FILE2B          ;BR IF NOT
                                        ;EXECUTE OCTAGONS OR SQUARES
002406  104000                  FILE3:  SCOPE
002410  012737  014000  001046          MOV     #14000,CNTR     ;SET UP A COUNTER
002416  005737  005624          FILE3A: TST     SWITCH
002422  001010                          BNE     FILE3B          ;BRANCH IF SUB-TEST
002424  004537  005460                  JSR     5,MESG          ;DISPLAY TEST
002430  000001                          1
002432  007402                          FRME3                   ;FRAME # 3
002434  005337  001046                  DEC     CNTR            ;DECREMENT COUNTER
002440  001366                          BNE     FILE3A          ;BRANCH IF NOT COMPLETE
002442  000407                          BR      FILE4           ;EXIT TO NEXT TEST

002444  004537  005460          FILE3B: JSR     5,MESG          ;DISPLAY TEST
002450  000001                          1
002452  007772                          FRME3A                  ;FRAME # 3A
002454  005337  001046                  DEC     CNTR            ;DECREMENT COUNTER
002460  001356                          BNE     FILE3A          ;BRANCH IF NOT COMPLETE
```

```
                                        ;DISPLAY FILE
                                        ;CHARACTER AND ITALICS TEST
                                        ;SET UP THE BUFFER FOR THIS TEST

002462  104000                  FILE4:  SCOPE
002464  012700  012536                  MOV     #BUFFER,R0
002470  012720  174000                  MOV     #STATSA!SIZE0,(R0)+
002474  012720  170052                  MOV     #STATSA!ITALO!STNOFF!GREEN,(R0)+
002500  012720  117200                  MOV     #POINT!INT4!LPOFF!BLKOFF!LINE0,(R0)+     ;LOAD POINT MODE
002504  012720  000000                  MOV     #0,(R0)+
002510  012720  001700                  MOV     #MAXY-77,(R0)+
002514  012720  100000                  MOV     #CHAR,(R0)+
002520  112720  000017                  MOVB    #17,(R0)+
002524  112720  000017                  MOVB    #17,(R0)+
002530  012737  000100  002734          MOV     #100,STCHAR             ;LOAD INITIAL CHAR.
002536  004737  002672                  JSR     PC,LOADBF
002542  012737  000140  002734          MOV     #140,STCHAR             ;LOAD INITIAL LC CHAR
002550  004737  002672                  JSR     PC,LOADBF               ;LOAD LINE
002554  012737  000040  002734          MOV     #40,STCHAR              ;LOAD NUMBERS AND PUNCT
002562  004737  002672                  JSR     PC,LOADBF               ;LOAD LINE
002566  012720  170040                  MOV     #STATSA!ITALO,(R0)+     ;LOAD NORMAL FONT
002572  004737  002632                  JSR     PC,LOADSP               ;LOAD SPECIAL CHARS
002576  004737  002776                  JSR     PC,SPACE                ;INSERT SPACES
002602  012720  170060                  MOV     #STATSA!ITALI,(R0)+     ;LOAD ITALICS FONT
002606  004737  002632                  JSR     PC,LOADSP               ;LOAD SPECIAL
002612  012720  173400                  MOV     #DSTOP,(R0)+            ;LOAD DSTOP
002616  012720  160000                  MOV     #DJMP,(R0)+
002622  012720  012536                  MOV     #BUFFER,(R0)+
002626  000137  003014                  JMP     FILE4A

002632  112720  000016          LOADSP: MOVB    #16,(R0)+
002636  012702  000002                  MOV     #2,R2                   ;SET INITIAL SHIFT OUT CHAR
002642  012703  000037                  MOV     #37,R3                  ;LOAD COUNT
002646  110220                  1$:     MOVB    R2,(R0)+                ;LOAD CHAR
002650  005202                  2$:     INC     R2
002652  022702  000017                  CMP     #17,R2                  ;TEST FOR SI
002656  001774                  BEQ     2$                              ;BR IF SI
002660  005303                  DEC     R3                              ;FINISHED ?
002662  001371                  BNE     1$                              ;BR IF NOT
002664  012720  020017                  MOV     #20017,(R0)+            ;LOAD SHIFT-IN SPACE
002670  000207                  RTS     PC                              ;EXIT

002672  012720  170040          LOADBF: MOV     #STATSA!ITALO,(R0)+     ;LOAD NORMAL FONT
002676  013702  002734                  MOV     STCHAR,R2               ;GET STARTING CHAR
002702  004737  002760                  JSR     PC,FILLIT               ;LOAD THE CHARACTERS
002706  004737  002776                  JSR     PC,SPACE                ;INSERT SPACES
002712  012720  170060                  MOV     #STATSA!ITALI,(R0)+     ;LOAD ITALICS FONT
002716  013702  002734                  MOV     STCHAR,R2               ;GET STARTING CHARACTER
002722  004737  002760                  JSR     PC,FILLIT               ;LOAD THE CHARACTERS
002726  004737  002736                  JSR     PC,CRLF                 ;INSERT CR-LF
002732  000207                  RTS     PC                              ;EXIT

002734  000000          STCHAR: 0

002736  112720  000015          CRLF:   MOVB    #15,(R0)+
```

```
                                                MOVB    #12.,(0)+
                                                MOVB    #12.,(0)+
                                                MOVB    #12.,(0)+
002756  000207                                  RTS     PC                      ;EXIT

002760  012703  000040          FILLIT: MOV     #40,R3
002764  110230                  FILLA:  MOVB    R2,(0)+
002766  005202                          INC     R2
002770  005303                          DEC     R3
002772  001374                          BNE     FILLA
002774  000207                          RTS     7

002776  012703  000010          SPACE:  MOV     #10,R3
003002  112720  000040          1$:     MOVB    #40,(R0)+               ;LOAD A SPACE
003006  005303                          DEC     R3
003010  001374                          BNE     1$                      ;BR IF NOT DONE
003012  000207                          RTS     PC                      ;EXIT

                                        ;ACTUAL DISPLAY ROUTINE

003014  012737  001000  003070  FILE4A: MOV     #1000 10$               ;LOAD A COUNTER
003022  012737  001700  012546  4$:     MOV     #MAXY-77.BUFFER+10      ;LOAD STARTING POINT
003030  004537  005460                  JSR     R5,MESG
003034  000001                          1
003036  012536                          BUFFER

003040  012737  000400  012546          MOV     #400,BUFFER+10
003046  004537  005460                  JSR     R5,MESG
003052  000001                          1
003054  012536                          BUFFER

003056  005337  003070                  DEC     10$                     ;FINISHED ?
003062  001357                          BNE     4$                      ;BR IF NOT
003064  000137  003072                  JMP     FILE5                   ;GO TO NEXT TEST

003070  000000          10$:    0

                                        ;EXECUTE DASH LINES AND BLINK

003072  104000          FILE5:  SCOPE
003074  004537  005460                  JSR     5,MESG          ;EXIT TO DISPLAY A FRAME
003100  010000                          10000
003102  010242                          FRME5                   ;USING THE DASH AND BLINK FRAME
```

```
                                        ;EXECUTE VECTOR LENGTH TEST (HORIZ)
                                
003104  104000                  FILE6:  SCOPE
003106  012737  041777  010540          MOV     #INTX!MAXX,DELTX6 ;SET UP VERTICAL HEIGHT
003114  012737  000010  001036          MOV     #10,DSAVE2        ;SET UP TIMER
003122  012737  000000  001034          MOV     #0,DSAVE1
003130  012737  000040  001046  LOOPA:  MOV     #40,CNTR          ;SET UP EXECUTION COUNT
003136  012737  000200  001032  LOOPA1: MOV     #MAXY+1/10,DSAVE  ;SET UP
003144  013737  001034  010542          MOV     DSAVE1,DELTY6
003152  004537  005460                  JSR     5,MESG            ;EXIT TO DISPLAY FRAME
003156  000001                          1
003160  010474                          FRME6                     ;VECTOR LENGTH FRAME
003162  004537  005460          LOOPA2: JSR     5,MESG            ;EXIT TO DISPLAY FRAME
003166  000001                          1
003170  010530                          FRME6A                    ;VECTOR LENGTH FRAME
003172  062737  000010  010542          ADD     #10,DELTY6        ;UPDATE ANGLE
003200  005337  001032                  DEC     DSAVE             ;FINISHED ALL THE ANGLES
003204  001366                          BNE     LOOPA2            ;BR IF NOT
003206  005337  001046          LOOPA3: DEC     CNTR              ;DONE COUNT?
003212  001351                          BNE     LOOPA1            ;BR IF NOT
003214  000240                          NOP
003216  005737  005624                  TST     SWITCH            ;TEST SWITCH
003222  001342                          BNE     LOOPA             ;BR IF HALT MOTION
003224  005237  001034                  INC     DSAVE1            ;UPDATE INITIAL ANGLE
003230  005337  001036                  DEC     DSAVE2            ;FINISHED ALL?
003234  001335                          BNE     LOOPA             ;BR IF NOT

                                        ;EXECUTE VECTOR LENGTH TEST (VERT)

003236  104000                  FILE7:  SCOPE
003240  012737  040000  001034          MOV     #INTX,DSAVE1      ;SETUP INITIAL X
003246  012737  001777  010542          MOV     #MAXY,DELTY6      ;SETUP INITIAL Y
003254  012737  000010  001036          MOV     #10,DSAVE2        ;SETUP EXECUTION COUNT
003262  012737  000040  001046  LOOPB:  MOV     #40,CNTR          ;SETUP DELAY
003270  012737  000200  001032  LOOPB1: MOV     #200,DSAVE
003276  013737  001034  010540          MOV     DSAVE1,DELTX6     ;EXIT TO DISPLAY FRAME
003304  004537  005460                  JSR     5,MESG            ;VECTOR LENGTH TEST FRAME
003310  000001                          1
003312  010474                          FRME6
003314  004537  005460          LOOPB2: JSR     5,MESG            ;EXIT TO DISPLAY FRAME
003320  000001                          1
003322  010530                          FRME6A                    ;VECTOR LENGTH FRAME
003324  062737  000010  010540          ADD     #10,DELTX6        ;UPDATE ANGLE
003332  005337  001032                  DEC     DSAVE             ;FINISHED ALL THE ANGLES
003336  001366                          BNE     LOOPB2            ;BR IF NOT
003340  005337  001046          LOOPB3: DEC     CNTR              ;DONE COUNT?
003344  001351                          BNE     LOOPB1            ;BR IF NOT
003346  000240                          NOP
003350  005737  005624                  TST     SWITCH            ;TEST SWITCH
003354  001342                          BNE     LOOPB             ;BR IF HALT MOTION
003356  005237  001034                  INC     DSAVE1            ;UPDATE INITIAL ANGLE
003362  005337  001036                  DEC     DSAVE2            ;FINISHED ALL?
003366  001335                          BNE     LOOPB             ;BR IF NOT
```

```
                                        ;PHOSPHOR TEST (HORIZONTAL)

003370  104000                          FILE10: SCOPE
003372  005037  010554                          CLR     DELTX7
003376  004537  005460                  D7A:    JSR     5,MESG          ;EXIT TO DISPLAY A FRAME
003402  000050                                  50
003404  010552                                  FRME10                  ;USING THE HORIZ FRAME
003406  004537  005460                          JSR     5,MESG          ;EXIT TO DISPLAY A FRAME
003412  000001                                  1
003414  010652                                  FRM10                   ;USING THE PERIMETER BOX
003416  000240                                  NOP
003420  005737  005624                          TST     SWITCH          ;TEST THE "SWITCH"
003424  001364                                  BNE     D7A             ;BR IF FREEZE THE MOVEMENT
003426  062737  000001  010554  D7C:    ADD     #1,DELTX7       ;UPDATE THE X ORIGIN
003434  022737  002000  010554                  CMP     #2000,DELTX7    ;TEST IF THE END
003442  001355                          BNE     D7A             ;BR IF NOT

                                        ;PHOSPHOR TEST (VERTICAL)

003444  104000                          FILE11: SCOPE
003446  005037  010616                          CLR     DELTY7
003452  004537  005460                  D7D:    JSR     5,MESG          ;EXIT TO DISPLAY A FRAME
003456  000050                                  50
003460  010612                                  FRME11                  ;USING THE VERT FRAME
003462  004537  005460                          JSR     5,MESG          ;EXIT TO DISPLAY A FRAME
003466  000001                                  1
003470  010652                                  FRM10                   ;USING THE PERIMETER BOX
003472  000240                                  NOP
003474  005737  005624                          TST     SWITCH          ;TEST THE "SWITCH"
003500  001364                                  BNE     D7D             ;BR IF FREEZE THE MOVEMENT
003502  062737  000001  010616  D7F:    ADD     #1,DELTY7       ;UPDATE THE Y ORIGIN
003510  022737  002300  010616                  CMP     #MAXY+1,DELTY7  ;TEST IF THE END
003516  001355                          BNE     D7D             ;BR IF NOT
```

```
                                        ;INTENSITY LEVEL TEST
                                        
003520  104000                  FILE12: SCOPE
003522  012777  003616  175340          MOV     #RETLP,@LPVCT   ;SET UP LIGHT-PEN VECTOR
003530  013777  001004  175334          MOV     GSBRL,@LPVCT1   ;SET UP BR LEVEL
003536  012737  004000  001032          MOV     #4000,DSAVE     ;SET UP A EXECUTION COUNT
003544  005737  005624          FLE12A: TST     SWITCH          ;TEST THE "SWITCH"
003550  001004                          BNE     FLE12B          ;BR IF SET "SYNC"
003552  042737  000004  010716          BIC     #4,SYN12        ;ENSURE CLEAR "SYNC"
003560  000403                          BR      FLE12C          ;BY PASS
003562  052737  000004  010716  FLE12B: BIS     #4,SYN12        ;SET THE "SYNC"
003570  004537  005460          FLE12C: JSR     5,MESG          ;EXIT TO DISPLAY FRAME
003574  000001                          1
003576  010710                          FRME12                  ;USING THE "INTENSITY" FRAME
003600  005337  001032                  DEC     DSAVE           ;FINISHED?
003604  001423                          BEQ     FLE12D          ;YES, EXIT
003606  012737  173400  011316          MOV     #DSTOP,RAYLPA   ;NO, RESET MESSAGE
003614  000753                          BR      FLE12A          ;BR BACK
003616  012737  164000  011316  RETLP: MOV     #DNOP,RAYLPA    ;LIGHT-PEN HIT
003624  017737  175232  011330          MOV     @YPOS,LPPNT     ;READ Y POSITION
003632  042737  176000  011330          BIC     #176000,LPPNT   ;MASK THE BITS
003640  022626                          CMP     (SP)+,(SP)+     ;POP THE STACK
003642  012777  000001  175204          MOV     #1,@DPC         ;SINGLE STEP THE DISPLAY
003650  000137  005476                  JMP     MESGA           ;JUMP TO WAIT
003654  013777  001072  175206  FLE12D: MOV     LPVCT1,@LPVCT   ;RESET THE LIGHT-PEN VECTOR
                                        
                                        ;EXECUTE EDGE TEST
                                        
003662  104000                  FILE13: SCOPE
003664  004537  005460                  JSR     5,MESG          ;EXIT TO DISPLAY FRAME
003670  010000                          10000
003672  011300                          FRME13                  ;USING THE "EDGE" FRAME
```

```
                                        ;SHORT VECTOR AND RELATIVE POINT TEST

003674  104000                  FILE14: SCOPE
003676  012700  012536                  MOV     #BUFFER,R0      ;SET UP R0
003702  012720  114000                  MOV     #POINT,(0)+     ;SET UP INITIAL
003706  012720  000240                  MOV     #240,(0)+       ;X POSITION
003712  012720  001000                  MOV     #MAXY+1/2,(0)+  ;Y POSITION
003716  012720  107004                  MOV     #SHORTV!INT4!LINE0,(0)+ ;LOAD "SHORT VECTOR"
003722  004737  003754                  JSR     PC,LOADVT       ;LOAD THE DISPLAY PATTERN
003726  012720  130000                  MOV     #RELATV,(0)+    ;LOAD "RELATIVE POINT"
003732  004737  003754                  JSR     PC,LOADVT       ;LOAD THE DISPLAY PATTERN
003736  012720  173400                  MOV     #DSTOP,(0)+     ;LOAD "DISPLAY STOP"
003742  012720  160000                  MOV     #DJMP,(0)+      ;LOAD "DISPLAY JUMP"
003746  012720  012536                  MOV     #BUFFER,(0)+    ;TO THE BUFFER ADDRESS
003752  000413                          BR      FIL14A          ;BR TO THE FRAME

003754  012737  000024  001046  LOADVT: MOV     #24,CNTR        ;LOAD A COUNTER
003762  012720  040077          LADVT:  MOV     #INTX+77,(0)+   ;LOAD A DELTA Y
003766  012720  004177                  MOV     #4177,(0)+      ;LOAD A DELTA X,Y
003772  005337  001046                  DEC     CNTR            ;FINISHED?
003776  001371                          BNE     LADVT           ;BR IF NOT
004000  000207                          RTS     PC              ;EXIT

004002  012737  004000  004152  FIL14A: MOV     #4000,10$               ;LOAD COUNTER
004010  012737  000200  011640  1$:     MOV     #200,FRM14A             ;LOAD FIRST OCTAGON
004016  012737  000200  011642          MOV     #200,FRM14B
004024  004537  005460                  JSR     R5,MESG                 ;DISPLAY OCT.
004030  000001                          1
004032  011634                          FRME14
004034  012737  001400  011640          MOV     #1400,FRM14A            ;LOAD SECOND OCTAGON
004042  012737  000200  011642          MOV     #200,FRM14B
004050  004537  005460                  JSR     R5,MESG                 ;DISPLAY 2ND OCT.
004054  000001                          1
004056  011634                          FRME14
004060  012737  001400  011640          MOV     #1400,FRM14A            ;LOAD THIRD OCTAGON
004066  012737  001400  011642          MOV     #MAXY-377,FRM14B
004074  004537  005460                  JSR     R5,MESG
004100  000001                          1
004102  011634                          FRME14
004104  012737  000200  011640          MOV     #200,FRM14A             ;LOAD FOURTH OCTAGON
004112  012737  001400  011642          MOV     #MAXY-377,FRM14B
004120  004537  005460                  JSR     R5,MESG                 ;DISPLAY 4TH OCT.
004124  000001                          1
004126  011634                          FRME14
004130  004537  005460                  JSR     R5,MESG                 ;DISPLAY BAR
004134  000001                          1
004136  012536                          BUFFER
004140  005337  004152                  DEC     10$                     ;FINISHED ?
004144  001221                          BNE     1$                      ;BR IF NOT
004146  000137  004154                  JMP     FILE15                  ;NEXT TEST
004152  000000          10$:            0
```

```
                                        ;GRAPHPLOT X-Y TEST

004154  104000                  FILE15: SCOPE
004156  012700  012536                  MOV     #BUFFER,R0      ;LOAD R0
004162  012720  117600                  MOV     #POINT!INT7,(0)+ ;LOAD INITIAL POINT
004166  012720  000000                  MOV     #0,(0)+
004172  012720  000000                  MOV     #0,(0)+
004176  012720  170052                  MOV     #STATSA!ITALO!SYNOFF!GREEN,(R0)+ ;RESET THE STATUS A
004202  012720  174100                  MOV     #STATSB!INCR,(0)+ ;LOAD INITIAL STATUS B
004206  012720  120000                  MOV     #GRAPHX,(0)+    ;LOAD GRAPH X INST
004212  012705  000040          DFL15C: MOV     #40,R5          ;LOAD STARTUP COUNT
004216  012737  000000  001032          MOV     #0,DSAVE        ;LOAD INITIAL PLOT
004224  000403                        BR      2$
004226  062737  000020  001032  1$:     ADD     #20,DSAVE       ;UPDATE PLOT POINT
004234  013720  001032          2$:     MOV     DSAVE,(0)+      ;SAVE THE POINT
004240  005305                        DEC     R5              ;FINISHED?
004242  001371                        BNE     1$              ;BR IF NOT
004244  012720  173400                  MOV     #DSTOP,(0)+     ;LOAD "DSTOP"
004250  012720  160000                  MOV     #DJMP,(0)+      ;LOAD "DJMP"
004254  012720  012536                  MOV     #BUFFER,(0)+    ;LOAD RETURN
004260  012737  000200  001032          MOV     #200,DSAVE      ;LOAD POINT COUNT
004266  042777  004000  174534  DFL15D: BIC     #4000,@DBUF5    ;ENSURE "GRAPHX"
004274  005737  005624                  TST     SWITCH          ;TEST SWITCH
004300  001403                        BEQ     DFL15B          ;BR IF GRAPHX
004302  052777  004000  174520          BIS     #4000,@DBUF5    ;SET GRAPHY
004310  004537  005460          DFL15B: JSR     5,MESG          ;EXIT TO DISPLAY A FRAME
004314  000001                        1
004316  012536                        BUFFER                  ;USING THE GENERATED PATTERN
004320  062777  000001  174500        ADD     #1,@DBUF4       ;UPDATE INCREMENT
004326  022777  174200  174472        CMP     #STATSB+200,@DBUF4 ;TEST IF LAST INCREMENT
004334  001365                        BNE     DFL15B          ;BR IF NOT
004336  012777  174100  174462        MOV     #STATSB!INCR,@DBUF4 ;RELOAD INCREMENT
004344  005337  001032                DEC     DSAVE           ;FINISHED 10 SEC?
004350  001346                        BNE     DFL15D          ;BR IF NOT

004352  013700  000042                MOV     @#42,R0
004356  001407                        BEQ     HERE                            ;ACT-11/DDP-11
004360  000005                        RESET
004362  000005                        RESET
004364  004710                  LOGICAL:      JSR     PC,(R0)
004366  000240                        NOP
004370  000240                        NOP
004372  000240                        NOP
004374  000240                        NOP
004376  000137  002116          HERE:   JMP     FILE0
004402  000240                        NOP
004404  000240                        NOP
004406  000240                        NOP
```

```
1019
1020                                    ;OPERATOR OPERATOR INTERVENTION TESTS
1021
1022  004410  104000                    FILE16: SCOPE
1023  004412  012777  004662  174450            MOV     #RET14,@LPVCT
1024  004420  013777  001004  174444            MOV     GSBRL,@LPVCT1
1025  004426  012737  000100  001034            MOV     #100,DSAVE1             ;SET UP COUNT
1026  004434  012700  012536            1$:     MOV     #BUFFER,R0              ;LOAD START ADDR.
1027  004440  012737  000100  001032            MOV     #100,DSAVE
1028  004446  012720  117744                    MOV     #POINT!INT7!LPON!LINE0,(R0)+    ;LOAD POINT
1029  004452  012720  000700                    MOV     #700.,(R0)+             ;LOAD X POINT
1030  004456  012720  000474                    MOV     #474.,(R0)+             ;LOAD Y POINT
1031  004462  004737  004624                    JSR     PC,LOADUP               ;LOAD UP THE BUFFER
1032  004466  012720  173400                    MOV     #DSTOP,(R0)+            ;LOAD DSTOP
1033  004472  012720  160000                    MOV     #DJMP,(R0)+             ;LOAD DJUMP
1034  004476  012720  012536                    MOV     #BUFFER,(R0)+           ;LOAD RETURN ADDRESS
1035  004502  005037  005116                    CLR     HITCNT                  ;CLEAR HIT COUNT
1036  004506  012737  030060  012442            MOV     #30060,FRM16B-2         ;PRESET THE READOUT
1037  004514  012737  030060  012440            MOV     #30060,FRM16B-4
1038
1039  004522  005737  005624            4$:     TST     SWITCH                  ;TEST SWITCH BIT
1040  004526  001005                            BNE     6$              ;BR IF SUBTEST
1041
1042  004530  004537  005460                    JSR     R5,MESG                 ;EXIT TO DISPLAY FRAME
1043  004534  000100                            100
1044  004536  011762                            FRME16                          ;USINT THE LIGHT-PEN FRAME
1045  004540  000770                            BR      4$                      ;BR BACK
1046
1047  004542  004537  005460            6$:     JSR     R5,MESG                 ;EXIT TO DISPLAY FRAME
1048  004546  000001                            1
1049  004550  012350                            FRM16A                          ;ASCII SUBTITLE
1050
1051  004552  004537  005460                    JSR     R5,MESG                 ;EXIT TO DISPLAY FRAME
1052  004556  000001                            1
1053  004560  012536                            BUFFER
1054
1055
1056  004562  005337  001032                    DEC     DSAVE                   ;FINISHED ?
1057  004566  001355                            BNE     4$                      ;BR IF NOT MINI-LOOP
1058
1059  004570  005337  001034                    DEC     DSAVE1                  ;FINISHED ?
1060  004574  001317                            BNE     1$                      ;BR IF NOT
1061  004576  000137  004410                    JMP     FILE16                  ;RESTART
1062
```

```
1063
1064  004602  012701  000030          LOADAC: MOV     #24.,R1                 ;LOAD COUNT
1065  004606  012720  130000                  MOV     #RELATV,(R0)+           ;LOAD RELATIVE POINT
1066  004612  012720  040004          1$:     MOV     #INTX+4,(R0)+           ;LOAD INTEN BIT
1067  004616  005301                          DEC     R1                      ;FINISHED ?
1068  004620  001374                          BNE     1$                      ;BR IF NOT
1069  004622  000207                          RTS     PC                      ;EXIT
1070
1071  004624  012737  000030  001046  LOADUP: MOV     #24.,CNTR                       ;LOAD COUNT
1072  004632  004737  004602          1$:     JSR     PC,LOADAC               ;LOAD ACCROSS
1073  004636  012720  110000                  MOV     #LONGV,(R0)+            ;LOAD LONG VECTOR
1074  004642  012720  000004                  MOV     #4,(R0)+                ;LOAD VECTOR OVER
1075  004646  012720  020140                  MOV     #MINUSX+140,(R0)+               ;AND UP
1076  004652  005337  001046                  DEC     CNTR
1077  004656  001365                          BNE     1$                      ;BR IF NOT DONE
1078  004660  000207                          RTS     PC                      ;EXIT
1079
1080
1081  004662  017737  174174  005022  RET14:  MOV     @YPOS,40$
1082  004670  042737  176000  005022          BIC     #176000,40$
1083  004676  017737  174156  005024          MOV     @XPOS,41$
1084  004704  042737  176000  005024          BIC     #176000,41$
1085  004712  005737  005624                  TST     SWITCH          ;TEST SW
1086  004716  001411                          BEQ     1$              ;BR IF LIGHT PEN FOLLOW
1087  004720  005237  005116                  INC     HITCNT          ;UPDATE LIGHT PEN HIT COUNT
1088  004724  013703  005116                  MOV     HITCNT,R3       ;LOAD R3
1089  004730  012702  012444                  MOV     #FRM16B,R2      ;LOAD ADDRESS
1090  004734  004737  005400                  JSR     PC,KBCHR        ;CONVERT OCTAL
1091  004740  000432                          BR      20$             ;BR
1092  004742  013703  005024          1$:     MOV     41$,R3          ;LOAD R3
1093  004746  012702  012036                  MOV     #DLT14A+4,R2    ;LOAD ADDRESS
1094  004752  004737  005400                  JSR     PC,KBCHR        ;LOAD X READOUT
1095  004756  013703  005022                  MOV     40$,R3          ;LOAD R3
1096  004762  012702  012050                  MOV     #DLT14B+4,R2    ;LOAD ADDRESS
1097  004766  004737  005400                  JSR     PC,KBCHR        ;LOAD Y READOUT
1098  004772  013737  005022  012054          MOV     40$,RAY14B      ;LOAD NEW Y POSITION
1099  005000  013737  005024  012052          MOV     41$,RAY14A      ;LOAD NEW X POSITION
1100  005006                          10$:
1101  005006  012777  000001  174040          MOV     #1,@DPC         ;SINGLE STEP THE DISPLAY
1102  005014  022626                          CMP     (SP)+,(SP)+
1103  005016  000137  005476                  JMP     MESGA
1104
1105  005022  000000          40$:    0
1106  005024  000000          41$:    0
1107
```

```
1108
1109  005026  005001                  20$:    CLR     R1
1110  005030  005002                          CLR     R2
1111  005032  013700  005024                  MOV     41$,R0          ;GET X AXIS
1112  005036  162700  000700                  SUB     #700,R0         ;GET A BASE ADDRESS
1113  005042  006200                          ASR     R0
1114  005044  006200                          ASR     R0
1115  005046  001404                          BEQ     30$
1116  005050  062701  000070          21$:    ADD     #70,R1          ;UPDATE OFFSET
1117  005054  005300                          DEC     R0
1118  005056  001374                          BNE     21$             ;BR UNTIL DONE
1119
1120  005060  013700  005022          30$:    MOV     40$,R0          ;GET X AXIS
1121  005064  162700  000500                  SUB     #500,R0         ;MAKE BASE ADDRESS
1122  005070  006200                          ASR     R0
1123  005072  006200                          ASR     R0              ;SHIFT RIGHT
1124  005074  001404                          BEQ     32$
1125  005076  062701  000002          31$:    ADD     #2,R1
1126  005102  005300                          DEC     R0
1127  005104  001374                          BNE     31$
1128  005106  042761  040000  012546  32$:    BIC     #INTX,BUFFER+10(R1)     ;CLEAR THE BIT
1129  005114  000734                          BR      10$
1130
1131  005116  000000                  HITCNT: 0
```

```
                                        ;ECHO ROUTINE KEYBOARD TO DISPLAY

                                FILE17: SCOPE
005120  104000                          
005122  012700  012536                   MOV     #BUFFER,R0      ;LOAD R0
005126  012720  173400           ECHOA:  MOV     #DSTOP,(0)+     ;MOV "DSTOPS"
005132  022700  013536                   CMP     #BUFFER+1000,R0 ;THRUOUT THE
005136  001373                           BNE     ECHOA           ;BUFFER
005140  005037  001052                   CLR     LOKRB           ;HOUSE
005144  005037  001032                   CLR     DSAVE           ;KEEPING
005150  112737  000060  012527           MOVB    #60,KBOCT-4
005156  112737  000060  012530           MOVB    #60,KBOCT-3             ;PRESET READOUT
005164  112737  000060  012531           MOVB    #60,KBOCT-2
005172  112737  000060  012532           MOVB    #60,KBOCT-1
005200  012737  005254  000060           MOV     #RET117,@#60    ;LOAD KEYBOARD VECTOR
005206  012737  000340  000062           MOV     #340,@#62
005214  052777  000100  173570           BIS     #100,@TKS       ;ENABLE INTERRUPT
005222  012737  000700  005376           MOV     #700,CHRCNT     ;LOAD CHAR COUNT
005230  012700  012536                   MOV     #BUFFER,R0      ;RESET R0
005234  004537  005460           ECHOC:  JSR     5,MESG          ;EXIT TO DISPLAY A FRAME
005240  000001                           1
005242  012452                           FRME17                  ;USING THE KEYBOARD HEADER
005244  005737  001052                   TST     LOKRB           ;UPDATE A CHAR?
005250  001016                           BNE     RET21           ;BR IF YES
005252  000770                           BR      ECHOC
005254  017701  173534           RET117: MOV     @TKB,R1         ;GET A CHAR
005260  042701  177600                   BIC     #177600,R1      ;MASK
005264  012737  177777  001052           MOV     #-1,LOKRB       ;SET (FLAG)
005272  000002                           RTI                     ;EXIT
005274  000000                           HALT
005276  005037  001052           RET21:  CLR     LOKRB           ;CLEAR (FLAG)
005302  022701  000003                   CMP     #3,R1           ;TEST FOR PC
005306  001002                           BNE     RET20           ;BR IF NOT
005310  000137  001456                   JMP     STRC            ;RESTART
005314  005337  005376           RET20:  DEC     CHRCNT          ;FINISHED COUNT?
005320  001002                           BNE     1$              ;BR IF NOT
005322  000137  005122                   JMP     FILE17+2        ;RESTART
005326  012702  012533           1$:     MOV     #KBOCT,R2               ;LOAD ADDRESS
005332  010103                           MOV     R1,R3
005334  004737  005400                   JSR     PC,KBCHR                ;LOAD THE OCTAL VALUE
005340  005737  001032                   TST     DSAVE           ;TEST HIGH/LOW BYTE
005344  001007                           BNE     ECHOB
005346  110120                           MOVB    R1,(R0)+        ;SAVE BYTE
005350  112710  000017                   MOVB    #17,(R0)        ;SHIFT-IN
005354  005137  001032                   COM     DSAVE           ;COMP FLAG
005360  000137  005234                   JMP     ECHOC           ;BR BACK
005364  110120           ECHOB:  MOVB    R1,(0)+         ;SAVE CHAR
005366  005037  001032                   CLR     DSAVE           ;CLEAR FLAG
005372  000137  005234                   JMP     ECHOC           ;BR BACK

005376  000200           CHRCNT: 200
```

```
                                        ;UPDATE OCTAL READOUT

005400  042703  176000          KBCHR:  BIC     #176000,R3
005404  004737  005444                  JSR     PC,10$                  ;LOAD BITS
005410  110442                          MOVB    R4,-(R2)                ;SAVE BITS
005412  004737  005436                  JSR     PC,11$                  ;MOVE BITS
005416  110442                          MOVB    R4,-(R2)                ;SAVE BITS
005420  004737  005436                  JSR     PC,11$                  ;MOVE BITS
005424  110442                          MOVB    R4,-(R2)                ;SAVE BITS
005430  004737  005436                  JSR     PC,11$
005432  110442                          MOVB    R4,-(R2)
005434  000207                          RTS     PC
005436  006003                  11$:    ROR     R3
005440  006003                          ROR     R3
005442  006003                          ROR     R3
005444  010304                  10$:    MOV     R3,R4                   ;LOAD R4
005446  042704  177770                  BIC     #177770,R4              ;MASK BITS
005452  062704  000060                  ADD     #60,R4                  ;MAKE A NUMBER
005456  000207                          RTS     PC

005460  012537  005620          MESG:   MOV     (5)+,COUNT
005464  012537  005622                  MOV     (5)+,FILE
005470  013777  005622  173356          MOV     FILE,@DPC               ;START DISPLAY
005476  005077  173306          MESGA:  CLR     @PSW
005502  000001                          WAIT
005504  005737  002114                  TST     KRBD
005510  001025                          BNE     MESGAB
005512  005337  005620          MESGAA: DEC     COUNT
005516  001405                          BEQ     MESGB
005520  012777  000001  173326          MOV     #1,@DPC                 ;SINGLE STEP THE DISPLAY
005526  000137  005476                  JMP     MESGA
005532  000240                  MESGB:  NOP
005534  005737  002114                  TST     KRBD
005540  001012                          BNE     MESGBA
005542  005037  005624                  CLR     SWITCH
005546  032777  000100  172416          BIT     #BIT6,@SWR
005554  001402                          BEQ     MESGBA
005556  005137  005624                  COM     SWITCH
005562  000205                  MESGBA: RTS     5
005564  005737  005624          MESGAB: TST     SWITCH
005570  001350                          BNE     MESGAA
005572  005737  001050                  TST     CHANGE
005576  001745                          BEQ     MESGAA
006000  005037  001050                  CLR     CHANGE
006004  005037  005624                  CLR     SWITCH
006010  005037  001042                  CLR     HOLD
006014  000137  001162                  JMP     SCOPEC
006020  000000          COUNT:  0
006022  000000          FILE:   0
006024  000000          SWITCH: 0
```

```
     005626  114000                      FRMED:  POINT
     005630  000000                              0
     005632  001500                              MAXY-277
     005634  170252                              STATSA!ITALO!SYNOFF!GREEN
     005636  103124                              CHAR!INT4!LPOFF!BLKOFF!LINE0
     005640     017     017                      .BYTE   17,17
     005642  052107  032055  020060              .ASCIZ  /GT-40 OR GT-44 WITH VR17 VISUAL TEST  (MD-11-DDGTG-B)/
     005650  051117  043440  026524
     005656  032064  053440  052111
     005664  020110  051126  033461
     005672  053040  051511  040525
     005700  020114  042524  052123
     005706  020040  046474  026504
     005714  030461  042055  043524
     005722  043524  041055  000076
     005730     015     012     012              .BYTE   15,12,12
     005733     040  020040  044504              .ASCII  /    DIRECTORY/
     005740  042522  052103  051117
     005746     131
     005747     015     012     012              .BYTE   15,12,12
     005752  030060  036440  040440              .ASCII  /00 = A = DIRECTORY/
     005760  036440  042040  051111
     005766  041505  047524  054522
     005774     015     012                      .BYTE   15,12
     005776  030460  036440  041040              .ASCII  /01 = B = DOT REPEATIBILITY/
     006004  036440  042040  052117
     006012  051040  050105  040505
     006020  044524  044502  044514
     006026  054524
     006030     015     012                      .BYTE   15,12
     006032  031060  036440  041440              .ASCII  /02 = C = PINCUSHION AND VECTOR CURVATURE (X OR Y OFFSET ADJ.)/
     006040  036440  050040  047111
     006046  052503  044123  047511
     006054  020116  047101  020104
     006062  042526  052103  051117
     006070  041440  051125  040526
     006076  052524  042522  036040
     006104  020130  051117  054440
     006112  047440  043106  042523
     006120  020124  042101  027112
     006126     076
     006127     015     012                      .BYTE   15,12
     006131     060  020063  020075              .ASCII  /03 = D = OCTAGONS OR SQUARES/
     006136  020104  020075  041517
     006144  040524  047507  051516
     006152  047440  020122  050523
     006160  040525  042522     123
     006165     015     012                      .BYTE   15,12
     006167     060  020064  020075              .ASCII  /04 = E = CHARACTER SET (CHAR. ADJ.)/
     006174  020105  020075  044103
     006202  051101  041501  042524
     006210  020122  042523  020124
     006216  041474  040510  027122
     006224  040440  045104  037056
     006232     015     012                      .BYTE   15,12
```

```
                                                .ASCII   05 = F = DASH LINES AND BLINK
                                                .BYTE   15,12
                                                .ASCII   06 = G = HORIZONTAL VECTOR ANGLE (ADJ. X VECTOR LENGTH)
                                                .BYTE   15,12
                                                .ASCII   07 = H = VERTICAL VECTOR ANGLE (ADJ. Y VECTOR LENGTH)
                                                .BYTE   15,12
                                                .ASCII   10 = I = HORIZONTAL PHOSPHOR TEST
                                                .BYTE   15,12
                                                .ASCII   11 = J = VERTICAL PHOSPHOR TEST
                                                .BYTE   15,12
                                                .ASCII   12 = K = INTENSITY LEVEL AND LIGHT-PEN TEST
                                                .BYTE   15,12
                                                .ASCII   13 = L = EDGE FLAG TEST
                                                .BYTE   15,12
                                                .ASCII   14 = M = SHORT VECTORS AND RELATIVE POINT
```

```
                                                        .BYTE   15,12
                                                        .ASCII  /15 = N = GRAPHPLOT TEST/

                                                        .BYTE   15,12
                                                        .ASCII  /16 = O = LIGHT PEN FOLLOW/

                                                        .BYTE   15,12
                                                        .ASCII  /17 = P = KEYBOARD ECHO TEST/

                                                        .BYTE   15,12,12
                                                        .ASCII  /  RUBOUT TO REMAIN ON THE PATTERN/

                                                        .BYTE   15,12
                                                        .ASCIZ  /  CR TO SELECT SUB-PICTURE OR STOP MOTION /

                                                        .EVEN
                                                        DSTOP
                                                        DJMP
                                                        FRME0

                                                FRME1:
                                                        STATSA!ITALO!SYNOFF!GREEN
                                                        POINT!INTO!LPOFF!BLKOFF!LINEO
                                                        INTX+1000
                                                        MAXY+1/2
                                                        INTX+0
                                                        0
                                                        INTX+1000
                                                        MAXY+1/2
                                                        INTX+1777
                                                        0
                                                        INTX+1000
```

```
                                        MAXY+1/2
                                        INTX+1777
                                        MAXY
                                        INTX+1000
                                        MAXY+1/2
                                        INTX
                                        MAXY
                                        DNOP
                                        DNOP
                                        DNOP
                                        DNOP
                                        DNOP
                                        DNOP
                                        DNOP
                                        DSTOP
                                        DJMP
                                        FRME1

                        ;FILE 2 <ANALOG TUNE-UP TEST >

007276  11:6524         FRME2:  POINT!INT2!LPOFF!BLKOFF!LINED
007300  000000                 0
007302  000000                 0
007304  170000                 STATSA!ITALO!SYNOFF!GREEN
007306  110000                 LONGV
007310  041777                 INTX!MAXX                       ; +X, +Y
007312  000000                 0
007314  040000                 INTX                            ; +X, +Y
007316  001777                 MAXY
007320  061777                 INTX!MINUSX!MAXX                ; -X, +Y
007322  000000                 0
007324  040000                 INTX                            ; +X, -Y
007326  021777                 MINUSY!MAXY
007330  041777                 INTX!MAXX                       ; +X, -Y
007332  020000                 MINUSY
007334  060000                 INTX!MINUSX                     ; -X, +Y
007336  001777                 MAXY
007340  061777                 INTX!MINUSX!MAXX                ; -X, -Y
007342  020000                 MINUSY
007344  060000                 INTX!MINUSX                     ; -X, -Y
007346  021777                 MINUSY!MAXY
007350  041777                 INTX!MAXX
007352  001777                 MAXY
007354  061777                 INTX!MINUSX!MAXX
007356  021777                 MINUSX!MAXY
007360  001777                 MAXX
007362  000000                 0
007364  061777                 INTX!MINUSX!MAXX
007366  001777                 MAXY
007370  041777                 INTX!MAXX
007372  021777                 MINUSX!MAXY
007374  173400                 DSTOP
007376  160000                 CJMP
007400  007276                 FRME2

                        ;OCTAGONS
```

```
1457
1458  007402  ;;7124          FRME3:  POINT!INT4!LPOFF!BLKOFF!LINED
1459  007404  000774                  774
1460  007406  000564                  564
1461  007410  170052                  STATSA!ITALD!SYNOFF!GREEN
1462  007412  110000                  LONGV                          ;OCTOGON BY LENGTH OF 7
1463  007414  040007                  INTX+7
1464  007416  000000                  0
1465  007420  040007                  INTX+7
1466  007422  020007                  4
1467  007424  040007                  INTX
1468  007426  020007                  4
1469  007430  060007                  INTX!MINUSX+7
1470  007432  020007                  4
1471  007434  060007                  INTX!MINUSX+7
1472  007436  000000                  0
1473  007440  060007                  INTX!MINUSX+7
1474  007442  020007                  MINUSX+7
1475  007444  040007                  INTX
1476  007446  020007                  MINUSX+7
1477  007450  040007                  INTX+7
1478  007452  020007                  MINUSX+7
1479  007454  114000                  POINT
1480  007456  000770                  770
1481  007460  000550                  550
1482  007462  110000                  LONGV                          ;OCTOGON BY LENGTH OF 17
1483  007464  040017                  INTX+17
1484  007466  000000                  0
1485  007470  040017                  INTX+17
1486  007472  000017                  17
1487  007474  040000                  INTX
1488  007476  000017                  17
1489  007500  060017                  INTX!MINUSX+17
1490  007502  000017                  17
1491  007504  060017                  INTX!MINUSX+17
1492  007506  000000                  0
1493  007510  060017                  INTX!MINUSX+17
1494  007512  020017                  MINUSX+17
1495  007514  040000                  INTX
1496  007516  020017                  MINUSX+17
1497  007520  040017                  INTX+17
1498  007522  020017                  MINUSX+17
1499  007524  114000                  POINT
1500  007526  000760                  760
1501  007530  000520                  520
1502  007532  110000                  LONGV                          ;OCTOGON BY LENGTH OF 37
1503  007534  040037                  INTX+37
1504  007536  000000                  0
1505  007540  040037                  INTX+37
1506  007542  000037                  37
1507  007544  040000                  INTX
1508  007546  000037                  37
1509  007550  060037                  INTX!MINUSX+37
1510  007552  000037                  37
1511  007554  060037                  INTX!MINUSX+37
1512  007556  000000                  0
```

```
1513  007560  060037          INTX!MINUSX+37
1514  007562  020037          MINUSX+37
1515  007564  040000          INTX
1516  007566  020037          MINUSX+37
1517  007570  040037          INTX+37
1518  007572  020037          MINUSX+37
1519  007574  114000          POINT
1520  007576  000740          740
1521  007600  000440          440
1522  007602  110000          LONGV                   ;OCTOGON BY LENGTH OF 77
1523  007604  040077          INTX+77
1524  007606  000000          0
1525  007610  040077          INTX+77
1526  007612  000077          77
1527  007614  040000          INTX
1528  007616  000077          77
1529  007620  060077          INTX!MINUSX+77
1530  007622  000077          77
1531  007624  060077          INTX!MINUSX+77
1532  007626  000000          0
1533  007630  060077          INTX!MINUSX+77
1534  007632  020077          MINUSX+77
1535  007634  040000          INTX
1536  007636  020077          MINUSX+77
1537  007640  040077          INTX+77
1538  007642  020077          MINUSX+77
1539  007644  114000          POINT
1540  007646  000700          700
1541  007650  000300          300
1542  007652  110000          LONGV                   ;OCTOGON BY LENGTH OF 177
1543  007654  040177          INTX+177
1544  007656  000000          0
1545  007660  040177          INTX+177
1546  007662  000177          177
1547  007664  040000          INTX
1548  007666  000177          177
1549  007670  060177          INTX!MINUSX+177
1550  007672  000177          177
1551  007674  060177          INTX!MINUSX+177
1552  007676  000000          0
1553  007700  060177          INTX!MINUSX+177
1554  007702  020177          MINUSX+177
1555  007704  040000          INTX
1556  007706  020177          MINUSX+177
1557  007710  040177          INTX+177
1558  007712  020177          MINUSX+177
1559  007714  114000          POINT
1560  007716  000600          600
1561  007720  000000          0
1562  007722  110000          LONGV                   ;OCTOGON BY LENGTH OF 377
1563  007724  040377          INTX+377
1564  007726  000000          0
1565  007730  040377          INTX+377
1566  007732  000377          377
1567  007734  040000          INTX
1568  007736  000377          377
```

```
1569  007740  060377                  INTX!MINUSX+377
1570  007742  000377                  377
1571  007744  060377                  INTX!MINUSX+377
1572  007746  000000                  0
1573  007750  060377                  INTX!MINUSX+377
1574  007752  020377                  MINUSX+377
1575  007754  040000                  INTX
1576  007756  020377                  MINUSX+377
1577  007760  040377                  INTX+377
1578  007762  020377                  MINUSX+377
1579  007764  173400                  DSTOP
1580  007766  160000                  DJMP
1581  007770  007402                  FRME3
1582                          ;SQUARES   7,17,37,77,177,377,777 WIDE
1583
1584  007772  117124          FRME3A: PCINT!INT4!LPOFF!BLKOFF!LINEC          ; BY 7
1585  007774  001000                  1000
1586  007776  000600                  600
1587  010000  170052                  STATSA!ITALO!SYNOFF!GREEN
1588          000007                  Q=7
1589          000004                  R=4
1590  010002  113003                  LONGV                          ;BY 7 AND 4
1591  010004  040007                  INTX+7
1592  010006  000000                  0
1593  010010  040000                  INTX
1594  010012  000007                  7
1595  010014  060007                  INTX!MINUSX+7
1596  010016  000000                  0
1597  010020  040000                  INTX
1598  010022  020007                  MINUSX+7
1599  010024  020004                  MINUSX+4
1600  010026  020004                  MINUSX+4
1601                                  .LIST
1602  010030  110000                  LONGV                          ;BY 17 AND 7
1603  010032  040017                  INTX+17
1604  010034  000000                  0
1605  010036  040000                  INTX
1606  010040  000017                  17
1607  010042  060017                  INTX!MINUSX+17
1608  010044  000000                  0
1609  010046  040000                  INTX
1610  010050  020017                  MINUSX+17
1611  010052  020007                  MINUSX+7
1612  010054  020007                  MINUSX+7
1613                                  .LIST
1614  010056  110000                  LONGV                          ;BY 37 AND 17
1615  010060  040037                  INTX+37
1616  010062  000000                  0
1617  010064  040000                  INTX
1618  010066  000037                  37
1619  010070  060037                  INTX!MINUSX+37
1620  010072  000000                  0
1621  010074  040000                  INTX
1622  010076  020037                  MINUSX+37
1623  010100  020017                  MINUSX+17
1624  010102  020017                  MINUSX+17
```

```
1625                                            .LIST
1626  010104  110000                            LONGV                           ;BY 77 AND 37
1627  010106  040077                            INTX+77
1628  010110  000000                            0
1629  010112  040000                            INTX
1630  010114  000077                            77
1631  010116  060077                            INTX!MINUSX+77
1632  010120  000000                            0
1633  010122  040000                            INTX
1634  010124  020077                            MINUSX+77
1635  010126  020037                            MINUSX+37
1636  010130  020037                            MINUSX+37
1637                                            .LIST
1638  010132  110000                            LONGV                           ;BY 177 AND 77
1639  010134  040177                            INTX+177
1640  010136  000000                            0
1641  010140  040000                            INTX
1642  010142  000177                            177
1643  010144  060177                            INTX!MINUSX+177
1644  010146  000000                            0
1645  010150  040000                            INTX
1646  010152  020177                            MINUSX+177
1647  010154  020077                            MINUSX+77
1648  010156  020077                            MINUSX+77
1649                                            .LIST
1650  010160  110000                            LONGV                           ;BY 377 AND 177
1651  010162  040377                            INTX+377
1652  010164  000000                            0
1653  010166  040000                            INTX
1654  010170  000377                            377
1655  010172  060377                            INTX!MINUSX+377
1656  010174  000000                            0
1657  010176  040000                            INTX
1658  010200  020377                            MINUSX+377
1659  010202  020177                            MINUSX+177
1660  010204  020177                            MINUSX+177
1661                                            .LIST
1662  010206  110000                            LONGV                           ;BY 777 AND 377
1663  010210  040777                            INTX+777
1664  010212  000000                            0
1665  010214  040000                            INTX
1666  010216  000777                            777
1667  010220  060777                            INTX!MINUSX+777
1668  010222  000000                            0
1669  010224  040000                            INTX
1670  010226  020777                            MINUSX+777
1671  010230  020377                            MINUSX+377
1672  010232  020377                            MINUSX+377
1673                                            .LIST
1674  010234  173400                            DSTOP
1675  010236  160000                            DJMP
1676  010240  007772                            FRME3A
1677
1678                                    ;DASH LINE TEST
1679
1680  010242  117000                    FRME5:  POINT!INT4
```

```
1681  010244  000000                        0
1682  010246  001000                        1000
1683  010250  174400                        STATSB!SIZE0
1684  010252  170052                        STATSA!ITALO!SYNOFF!GREEN
1685  010254  100004                        CHAR!LINE0
1686  010256     017      017               .BYTE   17,17
1687  010260  047523  044514  020104        .ASCII /SOLID     /
1688  010266  020040  020040
1689  010272  110004                        LONGV!LINE0
1690  010274  040400                        40400
1691  010276  000000                        0
1692  010300  000400                        400
1693  010302  000000                        0
1694  010304  110030                        LONGV!BLKON
1695  010306  040400                        40400
1696  010310  000000                        0
1697  010312  100023                        CHAR!BLKOFF
1698  010314     015      012      012       .BYTE   15,12,12,12,12,12
1699  010317     012      012      012
1700  010322  040504  044123  044440        .ASCII /DASH I    /
1701  010330  020040  020040
1702  010334  110006                        LONGV!LINE1
1703  010336  040400                        40400
1704  010340  000000                        0
1705  010342  000400                        400
1706  010344  000000                        0
1707  010346  110030                        LONGV!BLKON
1708  010350  040400                        40400
1709  010352  000000                        0
1710  010354  100020                        CHAR!BLKOFF
1711  010356     015      012      012       .BYTE   15,12,12,12,12,12
1712  010361     012      012      012
1713  010364  040504  044123  044440        .ASCII /DASH II   /
1714  010372  020111  020040
1715  010376  110006                        LONGV!LINE2
1716  010400  040400                        40400
1717  010402  000000                        0
1718  010404  000400                        400
1719  010406  000000                        0
1720  010410  110030                        LONGV!BLKON
1721  010412  040400                        40400
1722  010414  000000                        0
1723  010416  100020                        CHAR!BLKOFF
1724  010420     015      012      012       .BYTE   15,12,12,12,12,12
1725  010423     012      012      012
1726  010426  040504  044123  044440        .ASCII /DASH III  /
1727  010434  044511  020040
1728  010440  110007                        LONGV!LINE3
1729  010442  040400                        40400
1730  010444  000000                        0
1731  010446  000400                        400
1732  010450  000000                        0
1733  010452  110030                        LONGV!BLKON
1734  010454  040400                        40400
1735  010456  000000                        0
1736  010460  110024                        LONGV!BLKOFF!LINE0
```

```
1737  010462  000000                    0
1738  010464  000000                    0
1739  010466  173400                    DSTOP
1740  010470  160000                    DJMP
1741  010472  010242                    FRME5
1742
1743                              ;VECTOR LENGTH TEST (FILE 6 AND 7)
1744
1745  010474  114000              FRME6:  POINT
1746  010476  001777                     MAXX
1747  010500  000000                     0
1748  010502  170052                     STATSA!ITALO!SYNOFF!GREEN
1749  010504  113724                     LONGV!INT7!LPOFF!BLKOFF!LINE0
1750  010506  040000                     INTX
1751  010510  001777                     MAXY
1752  010512  114000                     POINT
1753  010514  000000                     0
1754  010516  001777                     MAXY
1755  010520  110000                     LONGV
1756  010522  041777                     INTX!MAXX
1757  010524  000000                     0
1758  010526  173400                     DSTOP
1759  010530  114000              FRME6A: POINT
1760  010532  000000                     0
1761  010534  000000                     0
1762  010536  110000                     LONGV
1763  010540  000000              DELTX6: 0
1764  010542  000000              DELTY6: 0
1765  010544  173400                     DSTOP
1766  010546  160000                     DJMP
1767  010550  010530                     FRME6A
1768
1769
1770                              ;PHOSPHOR TEST
1771
1772  010552  114000              FRME10: POINT
1773  010554  000000              DELTX7: 0
1774  010556  000000                     0
1775  010560  170052                     STATSA!ITALO!SYNOFF!GREEN
1776  010562  113724              DFI10A: LONGV!INT7!LPOFF!BLKOFF!LINE0
1777  010564  040000                     INTX
1778  010566  001777                     MAXY
1779  010570  000002                     2
1780  010572  000000                     0
1781  010574  040000                     INTX
1782  010576  021777                     MINUSY!MAXY
1783  010600  000002                     2
1784  010602  000000                     0
1785  010604  173400                     DSTOP
1786  010606  160000                     DJMP
1787  010610  010562                     DFI10A
1788
1789                              ;PHOSPHOR TEST
1790
1791  010612  114000              FRME11: POINT
1792  010614  000000                     0
```

```
1793  010616  000000                DELTY7: 0
1794  010620  170052                        STATSA!ITALO!SYNOFF!GREEN
1795  010622  113724                DFI11C: LONGV!INT7!LPOFF!BLKOFF!LINE0
1796  010624  041777                        INTX!MAXX
1797  010626  000000                        0
1798  010630  000000                        0
1799  010632  000002                        2
1800  010634  061777                        INTX!MINUSX!MAXX
1801  010636  000000                        0
1802  010640  000000                        0
1803  010642  000002                        2
1804  010644  173400                        DSTOP
1805  010646  160000                        DJMP
1806  010650  010622                        DFI11C
1807
1808  010652  117604                FRM10:  POINT!INT7!LINE0
1809  010654  000000                        0
1810  010656  000000                        0
1811  010660  110000                        LONGV
1812  010662  041777                        INTX!MAXX
1813  010664  000000                        0
1814  010666  040000                        INTX
1815  010670  001777                        MAXY
1816  010672  061777                        INTX!MINUSX!MAXX
1817  010674  000000                        0
1818  010676  040000                        INTX
1819  010700  021777                        MINUSX!MAXY
1820  010702  173400                        DSTOP
1821  010704  160000                        DJMP
1822  010706  010652                        FRM10
1823
1824                                  ;INTENSITY TEST
1825
1826  010710  114164                FRME12: POINT!LINE0!LPON!BLKOFF
1827  010712  000000                        0
1828  010714  001200                        1200
1829  010716  170252                SYN12:  STATSA!LPLITE!SYNOFF!ITALO!GREEN
1830  010720  103600                        CHAR!INT7
1831  010722     017      017               .BYTE  17,17
1832  010724  047111  042524  051516        .ASCII /INTENSITY 7   /
1833  010732  052111  020131  020067
1834  010740  020040
1835  010742  110000                        LONGV
1836  010744  041000                        41000
1837  010746  000000                        0
1838  010750  130000                        RELATV
1839  010752  057600                        57600
1840  010754  103400                        CHAR!INT6
1841  010756     015      012      012      .BYTE 15,12,12,12
1842  010761     012
1843  010762  047111  042524  051516        .ASCII /INTENSITY 6   /
1844  010770  052111  020131  020066
1845  010776  020040
1846  011000  110000                        LONGV
1847  011002  041000                        41000
1848  011004  000000                        0
```

```
011006  130000                          RELATV
011010  057600                          57600
011012  102400                          CHAR!INT5
011014     015     012     012          .BYTE 15,12,12,12
011017     012
011020  047111  042524  051516          .ASCII /INTENSITY 5   /
011026  052111  020131  020065
011034  020040
011036  110000                          LONGV
011040  041000                          41000
011042  000000                          0
011044  130000                          RELATV
011046  057600                          57600
011050  102400                          CHAR!INT4
011052     015     012     012          .BYTE 15,12,12,12
011055     012
011056  047111  042524  051516          .ASCII /INTENSITY 4   /
011064  052111  020131  020064
011072  020040
011074  110000                          LONGV
011076  041000                          41000
011100  000000                          0
011102  130000                          RELATV
011104  057600                          57600
011106  102400                          CHAR!INT3
011110     015     012     012          .BYTE 15,12,12,12
011113     012
011114  047111  042524  051516          .ASCII /INTENSITY 3   /
011122  052111  020131  020063
011130  020040
011132  110000                          LONGV
011134  041000                          41000
011136  000000                          0
011140  130000                          RELATV
011142  057600                          57600
011144  102400                          CHAR!INT2
011146     015     012     012          .BYTE 15,12,12,12
011151     012
011152  047111  042524  051516          .ASCII /INTENSITY 2   /
011160  052111  020131  020062
011166  020040
011170  110000                          LONGV
011172  041000                          41000
011174  000000                          0
011176  130000                          RELATV
011200  057600                          57600
011202  102400                          CHAR!INT1
011204     015     012     012          .BYTE 15,12,12,12
011207     012
011210  047111  042524  051516          .ASCII /INTENSITY 1   /
011216  052111  020131  020061
011224  020040
011226  110000                          LONGV
011230  041000                          41000
011232  000000                          0
011234  130000                          RELATV
```

```
1905  011236  057600                          57600
1906  011240  102000                          CHAR!INTO
1907  011242     015     012     012          .BYTE 15,12,12,12
1908  011245     012
1909  011246  047111  042524  051516          .ASCII /INTENSITY C
1910  011254  052111  023131  020360
1911  011262  020040
1912  011264  113000                          LONGV
1913  011266  041000                          41000
1914  011270  000000                          0
1915  011272  130000                          RELATV
1916  011274  057600                          57600
1917  011276  164000                          DNOP
1918  011300  164000                          DNOP
1919  011302  164000                          DNOP
1920  011304  164000                          DNOP
1921  011306  164000                          DNOP
1922  011310  164000                          DNOP
1923  011312  164000                          DNOP
1924  011314  164000                          DNOP
1925  011316  173400              RAYLPA:     DSTOP
1926  011320  164000                          DNOP
1927  011322  164000                          DNOP
1928
1929  011324  117100              DFI12A:     POINT!INT4!LPOFF
1930  011326  001500                          1500
1931  011330  001200              _PPNT:      1200
1932  011332  100000                          CHAR
1933  011334  044514  044107  020124          .ASCIZ  /LIGHT PEN HIT/
1934  011342  042520  020116  044510
1935  011350  000124
1936                                          .EVEN
1937  011352  173400                          DSTOP
1938  011354  160000                          DJMP
1939  011356  010710                          FRME12
1940
1941                              :EDGE FILE
1942
1943  011360  117124              FRME13:     POINT!INT4!LPOFF!BLKOFF!LINE0
1944  011362  000000                          0
1945  011364  000000                          0
1946  011366  170052                          STATSA!ITALO!SYNOFF!GREEN
1947  011370  100000                          CHAR
1948  011372     017     017                  .BYTE   17,17
1949  011374  110000                          LONGV
1950  011376  041777                          INTX!MAXX
1951  011400  000000                          0
1952  011402  040000                          INTX
1953  011404  001777                          MAXY
1954  011406  061777                          INTX!MINUSX!MAXX
1955  011410  000000                          0
1956  011412  040000                          INTX
1957  011414  021777                          MINUSY!MAXY
1958  011416  114000                          PCINT
1959  011420  000100                          100
1960  011422  000300                          300                         :LEFT SIDE
```

```
:961  011424  110000                    LONGV
:962  011426  020000                    INTX
:963  011430  000400                    400
:964  011432  060200                    INTX!MINUSX+200
:965  011434  000000                    0
:966  011436  040000                    INTX
:967  011440  020400                    MINUSY+400
1968  011442  040200                    INTX+200
:969  011444  000000                    0
:970  011446  114000                    POINT
:971  011450  003200                    200                         ;TOP SIDE
:972  011452  001700                    MAXY+1-100
:973  011454  110000                    LONGV
:974  011456  040400                    INTX+400
:975  011460  000000                    0
:976  011462  040000                    INTX
:977  011464  000200                    200
:978  011466  060400                    INTX!MINUSX+400
:979  011470  000000                    0
:980  011472  040000                    INTX
1981  011474  020000                    MINUSY+200
:982  011476  114000                    POINT                       ;RIGHT SIDE
:983  011500  001700                    1700
:984  011502  001500                    MAXY+1-300
:985  011504  110000                    LONGV
:986  011506  040000                    INTX
:987  011510  020400                    MINUSY+400
:988  011512  040200                    INTX+200
:989  011514  000000                    0
:990  011516  040000                    INTX
:991  011520  000400                    400
:992  011522  060200                    INTX!MINUSX+200
:993  011524  000000                    0
:994  011526  114000                    POINT
:995  011530  001600                    1600                        ;BOTTOM SIDE
:996  011532  000100                    100
:997  011534  110000                    LONGV
:998  011536  060400                    INTX!MINUSX+400
1999  011540  000000                    0
2000  011542  040000                    INTX
2001  011544  020200                    MINUSY+200
2002  011546  040400                    INTX+400
2003  011550  000000                    0
2004  011552  040000                    INTX
2005  011554  000200                    200
2006  011556  114000                    POINT
2007  011560  001777                    MAXX
2008  011562  000400                    400
2009  011564  110000                    LONGV
2010  011566  000020                    20
2011  011570  000000                    0
2012  011572  100000                    CHAR
2013  011574     015      101           .BYTE   15.101              ;"CR" AND AN "A"
2014  011576  114000                    POINT
2015  011600  000000                    0
2016  011602  000500                    500
```

```
002017  011604  110000                          LONGV
002018  011606  020012                          MINUSX+12
002019  011610  000000                          0
002020  011612  100000                          CHAR
002021  011614      040         102             .BYTE   40.102          ;"SPACE" AND AN "B"
002022  011616  164000                          DNOP
002023  011620  164000                          DNOP
002024  011622  173400                          DSTOP
002025  011624  164000                          DNOP
002026  011626  164000                          DNOP
002027  011630  160000                          DJMP
002030  011632  011360                          FRME:3
```

```
                                    FRME14: STATSA!ITALO!SYNOFF!GREEN
                                            POINT!INT4!BLKOFF!LPOFF!LINED
                                    FRM14A: 0
                                    FRM14B: 0
                                            SHORTV
                                            INTX+16200
                                            INTX+16200+71
                                            INTX+71
                                            INTX!MINUSX+16200+71
                                            INTX!MINUSX+16200
                                            INTX!MINUSX+16200+MINSUY+71
                                            INTX+MINSUY+71
                                            INTX+16200+MINSUY+71
                                            20504
                                            DNOP
                                            DNOP
                                            RELATV
                                            INTX+17000
                                            INTX+17000+74
                                            INTX+74
                                            INTX!MINUSX+17000+74
                                            INTX!MINUSX+17000
                                            INTX!MINUSX+17000+MINSUY+74
                                            INTX+MINSUY+74
                                            INTX+17000+MINSUY+74
                                            20504
                                            DNOP
                                            DNOP
                                            SHORTV
                                            INTX+17600
                                            INTX+17600+77
                                            INTX+77
                                            INTX!MINUSX+17600+77
                                            INTX!MINUSX+17600
                                            INTX!MINUSX+17600+MINSUY+77
                                            INTX+MINSUY+77
                                            INTX+17600+MINSUY+77
                                            20504
                                            DNOP
                                            DNOP
                                            DSTOP
                                            DJMP
                                            FRME14
```

```
                                FRME16: POINT!INT7!LPOFF!BLKOFF!LINED
                                        C
                                        MAXY-177
                                        STATSA!ITALO!SYNOFF!GREEN
                                        CHAR
011774  017     017                     .BYTE   17,17
011776  044514  044107  020124        .ASCII  /LIGHT PEN FOLLOW TEST /
012004  042520  020116  047506
012012  046114  053517  052040
012020  051505  020124
012024  015     012     012           .BYTE   15,12,12
012027  130     020075                .ASCII  /X= /
012032  030061  030060                DLT14A: .ASCII  /1000/
012036  015     012     012           .BYTE   15,12,12
012041  131     020075                .ASCII  /Y= /
012044  033060  030060                DLT14B: .ASCII  /0600/
012050  114140                        POINT!LPON
012052  001000                        RAY14A: 1000
012054  000600                        RAY14B: 600
012056  164000                        DNOP
012060  164000                        DNOP
012062  130000                        RELATV
012064  074000                        TAB16A: INTX!MINUSX+14000
012066  041000                        INTX+1000
012070  041000                        INTX+1000
012072  041000                        INTX+1000
012074  041000                        INTX+1000
012076  041000                        INTX+1000
012100  041000                        INTX+1000
012102  041000                        INTX+1000
012104  041000                        INTX+1000
012106  041000                        INTX+1000
012110  041000                        INTX+1000
012112  041000                        INTX+1000
012114  041000                        INTX+1000
012116  041000                        INTX+1000
012120  041000                        INTX+1000
012122  041000                        INTX+1000
012124  041000                        INTX+1000
012126  041000                        INTX+1000
012130  041000                        INTX+1000
012132  041000                        INTX+1000
012134  041000                        INTX+1000
012136  041000                        INTX+1000
012140  041000                        INTX+1000
012142  041000                        INTX+1000
012144  041000                        INTX+1000
012146  164000                        DNOP
012150  164000                        DNOP
012152  164000                        DNOP
012154  164000                        DNOP
012156  164000                        DNOP
012160  164000                        DNOP
012162  164000                        DNOP
012164  164000                        DNOP
```

```
2131  012166  164000                    DNOP
2132  012170  164000                    DNOP
2133  012172  130000                    RELATV
2134  012174  034000                    MINUSX+14000
2135  012176  040160          TAB16B:   INTX!MINSUY+60
2136  012200  040004                    INTX+4
2137  012202  040004                    INTX+4
2138  012204  040004                    INTX+4
2139  012206  040004                    INTX+4
2140  012210  040004                    INTX+4
2141  012212  040004                    INTX+4
2142  012214  040004                    INTX+4
2143  012216  040004                    INTX+4
2144  012220  040004                    INTX+4
2145  012222  040004                    INTX+4
2146  012224  040004                    INTX+4
2147  012226  040004                    INTX+4
2148  012230  040004                    INTX+4
2149  012232  040004                    INTX+4
2150  012234  040004                    INTX+4
2151  012236  040004                    INTX+4
2152  012240  040004                    INTX+4
2153  012242  040004                    INTX+4
2154  012244  040004                    INTX+4
2155  012246  040004                    INTX+4
2156  012250  040004                    INTX+4
2157  012252  040004                    INTX+4
2158  012254  040004                    INTX+4
2159  012256  040004                    INTX+4
2160  012260  164000                    DNOP
2161  012262  164000                    DNOP
2162  012264  164000                    DNOP
2163  012266  164000                    DNOP
2164  012270  164000                    DNOP
2165  012272  164000                    DNOP
2166  012274  164000                    DNOP
2167  012276  164000                    DNOP
2168  012300  110000                    LONGV
2169  012302  000000                    0
2170  012304  000077                    77
2171  012306  040160          PNT16A:   INTX+160
2172  012310  020160                    MINUSX+160
2173  012312  060160          PNT16B:   INTX!MINUSX+160
2174  012314  020160                    MINUSX+160
2175  012316  060160          PNT16C:   INTX!MINUSX+160
2176  012320  000160                    160
2177  012322  040160          PNT16D:   INTX+160
2178  012324  000160                    160
2179  012326  000200                    .WORD   200
2180  012330  000200                    .WORD   200
2181  012332  164000                    DNOP
2182  012334  164000                    DNOP
2183  012336  164000                    DNOP
2184  012340  164000                    DNOP
2185  012342  173400                    DSTOP
2186  012344  160000                    DJMP
```

```
 2187  012346  011762                          FRME16
 2188
 2189  012350  117724                FRM16A:   POINT!INT7!LPOFF!BLKOFF!LINE0
 2190  012352  000000                          0
 2191  012354  001600                          MAXY-177
 2192  012356  170052                          STATSA!ITALO!SYNOFF!GREEN
 2193  012360  100000                          CHAR
 2194  012362     017      017                 .BYTE   17,17
 2195  012364  044514  044107  020124          .ASCII  /LIGHT PEN FIELD OF VIEW /
 2196  012372  042520  020116  044506
 2197  012402  046105  020104  043111
 2198  012406  053040  042511  020127
 2199  012414     015      012      012        .BYTE   15,12,12
 2200  012417     116  046525  042502          .ASCII  /NUMBER OF HITS = 0000/
 2201  012424  020122  043117  044040
 2202  012432  052111  020123  020075
 2203  012440  030060  030060
 2204  012444  173400                FRM16B:   DSTOP
 2205  012446  160000                          CJMP
 2206  012450  012350                          FRM16A
 2207
 2208  012452  114124                FRME17:   POINT!LPOFF!BLKOFF!LINE0                    ;MUST BE JUST BEFORE THE BUFFER
 2209  012454  000000                          0
 2210  012456  001600                          MAXY-177
 2211  012460  170052                          STATSA!ITALO!SYNOFF!GREEN
 2212  012462  103000                          CHAR!INT4
 2213  012464     017      017                 .BYTE   17,17
 2214  012466  042513  041131  040517          .ASCIZ  /KEYBOARD ECHO TEST/
 2215  012474  042122  042440  044103
 2216  012502  020117  042524  052123
 2217  012510     000
 2218  012511     015      012      012        .BYTE   15,12,12
 2219  012514  044103  051101  047440          .ASCII  /CHAR OCT = /
 2220  012522  052103  036440      040
 2221  012527     000      000      000        .BYTE   0,0,0,0
 2222  012532     000
 2223  012533     015      012      012  KBOCT:.BYTE   15,12,12
 2224
 2225  012536  164000                BUFFER:   DNOP
 2226
 2227          000001                          .END
```

```
BIT6   = 000100   609#  1218
BLKOFF= 000020   609#  1234  1238  1391  1421  1458  1584  1697  1710  1723  1736  1749  1776
                1796  1826  1943  2033  2076  2185  2208
BLKON  = 000030   609#  1194  1207  1720  1733
BUFFER  012536   409    410    411    412    413    414    627    654    668    731    723    772#   775
                777#   780    921    931    964    974    990    998   1026   1034   1053   1128#  1135
                1137   1149   2225#
CHANGE  001050   422#   589#  1224   1226#
CHAR   = 000000   609#   707   1238   1685   1697   1710   1723   1830   1840   1851   1962   1873   1884
                1895   1906   1932   1947   2012   2020   2080   2193   2212
CHRCNT  005376   1149#  1165#  1182#
CNTR    001046   421#   663#   674#   680#   686#   693#   801#   813#   828#   840#   934#   937#  1071#
                1076#
COUNT   005620   1203#  1210#  1230#
CR_F    002736   745    750#
DBJF    001016   409#
DBJF1   001020   410#
DBJF2   001022   411#
DBJF3   001024   412#
DBJF4   001026   413#   999#  1000   1002#
DBJF5   001030   414#   992#   995#
DCONE   001064   434#   524    528    563#
DCONE1  001066   435#   564#
DE_TX6  010540   798#   830#   837#  1763#
DE_TX7  010554   852#   862#   863   1773#
DE_TY6  010542   803#   810#   826#  1764#
DE_TY7  010616   869#   879#   880   1793#
DFI13A  010562  1776#  1787
DFI11C  010622  1795#  1806
DFI12A  011324  1929#
DFL15B  004310   994    996#  1001
DFL15C  004212   981#
DFL15D  004266   992#  1004
DISPTC  001210   466    468#
DJMP   = 160000   609#   653    722    930    989   1033   1386   1416   1453   1580   1675   1740   1766
                1786  1805  1821  1938  2027  2073  2186  2205
DLT14A  012032   538#   539#  1093  2088#
DLT14B  012044   540#   541#  1096  2091#
DNOP   = 164000   609#   902   1408  1409  1410  1411  1412  1413  1414  1417  1418  1419  1920
                1921  1922  1923  1924  1926  1927  2022  2023  2025  2026  2046  2047  2058
                2059  2070  2071  2095  2096  2123  2124  2125  2126  2127  2128  2129  2130
                2131  2132  2160  2161  2162  2163  2164  2165  2166  2167  2181  2182  2183
                2184  2225
DPC     001054   429#   518    522    906#  1101#  1205#  1212#
DSAVE   001032   415#   802#   811#   829#   838#   899#   898#   982#   984#   985    991#  1003#  1027#
                1056#  1140#  1171  1175#  1178#
DSAVE1  001034   416#   800#   803    818#   825#   830    845#  1025#  1059#
DSAVE2  001036   417#   799#   819#   827#   846#
DSAVE3  001040   418#
DSR     001056   430#   571
DSTOP  = 173400   609#   652    721    900    929    988   1032   1136   1395   1415   1452   1579   1674
                1739  1758  1765  1785  1804  1820  1925  1937  2024  2072  2185  2204
DSWR   = 177570   380#   395    553
D7A     003376   853#   861    864
D7C     003426   862#
D7D     003452   870#   878    881
```

DTF	003502	879#					
ECHOA	005126	1136#	1138				
ECHOB	005364	1172	1177#				
ECHOC	005234	1150#	1155	1176	1179		
ERRVEC=	000004	378#	548	549*	556*		
FILE	005622	1204#	1205	1231#			
FILE0	002116	468	542	612#	1015		
FILE1	002130	469	619#				
FILE10	003310	476	851#				
FILE11	003444	477	868#				
FILE12	003520	478	886#				
FILE13	003662	479	913#				
FILE14	003674	480	920#				
FILE15	004154	481	967	973#			
FILE16	004410	482	1022#	1061			
FILE17	005120	483	1134#	1167			
FILE2	002142	470	626#				
FILE2A	002342	655	663#				
FILE2B	002350	664#	675				
FILE2C	002370	665	671#				
FILE2D	002400	669	674#				
FILE3	002406	471	679#				
FILE3A	002416	681#	687	694			
FILE3B	002444	692	690#				
FILE4	002462	472	698	700#			
FILE4A	003014	724	771#				
FILE5	003072	473	784	790#			
FILE6	003104	474	797#				
FILE7	003236	475	824#				
FILLA	002764	757#	760				
FILLIT	002760	740	744	756#			
FIL14A	004002	932	941#				
FILE12A	003544	890#	901				
FILE12B	003562	891	894#				
FILE12C	003570	893	895#				
FILE12D	003654	899	908#				
FRAME0	[illegible]	615	1234#	1387			
FRAME1	[illegible]	622	1389#	1417			
FRAME10	[illegible]	855	1772#				
FRAME11	[illegible]	872	1791#				
FRAME12	[illegible]	897	1926#	1939			
FRAME13	[illegible]	916	1943#	2028			
FRAME14	[illegible]	946	951	956	961	2032#	2074
FRAME16	[illegible]	1044	2076#	2187			
FRAME17	[illegible]	1152	2208#				
FRAME2	[illegible]	673	1421#	1454			
FRAME3	[illegible]	685	1458#	1581			
FRAME3A	[illegible]	692	1584#	1676			
FRAME5	[illegible]	793	1680#	1741			
FRAME6	[illegible]	806	833	1745#			
FRAME6A	[illegible]	809	836	1759#	1767		
FRM[illegible]	[illegible]	858	875	1808#	1822		
FRM[illegible]	[illegible]640	942*	947*	952*	957*	2034#	
FRM[illegible]	[illegible]642	943*	948*	953*	958*	2035#	
FRM[illegible]	[illegible]350	1049	2189#	2206			
FRM[illegible]	[illegible]	1036*	1037*	1089	2204#		

L04

```
[illegible] VISUAL DISPLAY TEST MAINDEC-11-DOGTG-B    MACY11 27(1006)  05-NOV-76  12:14  PAGE 52
[illegible]      15-SEP-76 [illegible]          CROSS REFERENCE TABLE -- USER SYMBOLS

[illegible] = [illegible]          609#    980
[illegible] = [illegible]          609#
GREEN  = 00000[illegible]          609#    703     978    1237    1390    1424    1461    1587    1684    1746    1775    1794    1829
                                  1946    2032    2079    2192    2211
[illegible]                       [illegible]  519
[illegible]                       [illegible]  988    1024
[illegible]                       [illegible]  525
[illegible]                       [illegible]  1015#
[illegible]                       1494    499#
[illegible]                       1035*   1087*   1088    1131#
[illegible]                       [illegible]  453     531*    535*    591*    595*    597*    1228*
[illegible]                       [illegible]
[illegible] = [illegible]          609#    979    1002
[illegible] = [illegible]          609#    630     638     642     650     798     825     935    1066    1128    1392    1394    1396
                                  1398    1400    1402    1404    1406    1426    1428    1430    1432    1434    1436    1438    1440
                                  1442    1444    1448    1450    1463    1465    1467    1469    1471    1473    1475    1477    1483
                                  1485    1487    1489    1491    1493    1495    1497    1503    1505    1507    1509    1511    1513
                                  1515    1517    1523    1525    1527    1529    1531    1533    1535    1537    1543    1545    1547
                                  1549    1551    1553    1555    1557    1563    1565    1567    1569    1571    1573    1575    1577
                                  1591    1593    1595    1597    1603    1605    1607    1609    1615    1617    1619    1621    1627
                                  1629    1631    1633    1639    1641    1643    1645    1651    1653    1655    1657    1663    1665
                                  1667    1669    1750    1756    1777    1781    1796    1800    1812    1814    1816    1818    1950
                                  1952    1954    1956    1962    1964    1966    1968    1974    1976    1978    1980    1986    1988
                                  1990    1992    1998    2000    2002    2004    2037    2039    2039    2040    2041    2042    2043
                                  2044    2049    2050    2051    2052    2053    2054    2055    2056    2061    2062    2063    2064
                                  2065    2066    2067    2068    2098    2099    2100    2101    2102    2103    2104    2105    2106
                                  2107    2108    2109    2110    2111    2112    2113    2114    2115    2116    2117    2118    2119
                                  2120    2121    2122    2135    2136    2137    2138    2139    2140    2141    2142    2143    2144
                                  2145    2146    2147    2148    2149    2150    2151    2152    2153    2154    2155    2156    2157
                                  2158    2159    2171    2173    2175    2177
[illegible] = [illegible]          609#    1391    1906
[illegible] = [illegible]          609#    1895
[illegible] = [illegible]          609#    1421    1884
[illegible] = [illegible]          609#    1873
[illegible] = [illegible]          609#    657     704     925    1238    1458    1584    1680    1862    1929    1943    2033    2212
[illegible] = [illegible]          609#    1851
[illegible] = 003400               609#    1840
[illegible] = 003600               609#    975    1028    1749    1776    1795    1808    1830    2076    2189
ITALC  = 000040                    609#    703     716     738     978    1237    1390    1424    1461    1587    1684    1748    1775
                                  1794    1829    1946    2032    2079    2192    2211
ITALI  = 000060                    609#    719     742
KBCHR    005400                   1090    1094    1097    1170    1185#
KBOCT    012533                   1141*   1142*   1143*   1144*   1168    2223#
KRBC     002114                    445     547*    559*    607#   1208    1215
KYT1     002062                    585     597#
KYT2     002042                    587     593#
KYT3     002072                    582     601#
KYT4     002104                    594     605#
KYT5     002004                    585#    606
LADVT    003762                    935#    938
LINE0  = 000004                    609#    704     925    1029    1238    1391    1421    1458    1584    1685    1689    1736    1749
                                  1776    1795    1808    1826    1943    2033    2076    2189    2208
LINE1  = 000005                    609#    1702
LINE2  = 000006                    609#    1715
LINE3  = 000007                    609#    1728
LOADAC   004602                   1064#    1072
```

LOADBF	002672	711	713	715	738#									
LOADSP	002632	[illegible]	720	726#										
LOADJP	004624	[illegible]	[illegible]#											
LOADVT	003754	926	928	934#										
LOGICA	004364	[illegible]#												
LOKAB	001252	420#	1139*	1153	1158*	1161*								
LONGV =	110000	609#	660	1073	1425	1462	1482	1502	1522	1542	1562	1590	1602	1614
		1626	1638	1650	1662	1683	1694	1702	1707	1715	1720	1728	1733	1736
		1749	1755	1762	1776	1795	1811	1835	1846	1957	1868	1973	1990	1901
		1912	1949	1961	1973	1935	1997	2009	2017	2168				
LOOPA	003130	801#	817	820										
LOOPA1	003136	802#	814											
LOOPA2	003162	807#	812											
LOOPA3	003206	813#												
LOOPB	003262	828#	844	847										
LOOPB1	003270	829#	841											
LOOPB2	003314	834#	839											
LOOPB3	003340	840#												
LOWPWR	001250	386	487#	506										
LOWSV	001300	493*	497#	499										
LPDARK=	000300	609#												
LPLITE=	000200	609#	1829											
LPOFF =	000100	609#	704	1238	1391	1421	1458	1584	1749	1776	1795	1929	1943	2033
		2076	2199	2208										
LPON =	000140	609#	1028	1826	2092									
LPPNT	011330	903*	904*	1931#										
LPVCT	001070	437#	565*	887*	908*	1023*								
LPVCT1	001072	438#	565	566*	898*	908	1024*							
MAXSX =	017600	609#												
MAXSY =	000077	609#												
MAXX =	001777	609#	642	644	650	798	1426	1430	1434	1438	1442	1444	1446	1448
		1450	1746	1756	1796	1800	1812	1816	1950	1954	2007			
MAXY =	001777	609#	631	633	639	641	706	772	802	826	890	924	953	959
		1236	1393	1397	1401	1403	1405	1407	1429	1433	1437	1441	1443	1445
		1449	1451	1751	1754	1778	1782	1815	1819	1953	1957	1972	1984	2078
		2191	2210											
MESG	005460	613	620	666	671	683	690	773	778	791	804	807	831	834
		853	856	870	873	895	914	944	949	954	959	962	996	1042
		1047	1051	1150	1203#									
MESGA	005476	907	1103	1206#	1213									
MESGAA	005512	1210#	1223	1225										
MESGAB	005564	1209	1222#											
MESGB	005532	1211	1214#											
MESGBA	005562	1216	1219	1221#										
MINSUY=	000100	609#	2042	2043	2044	2054	2055	2056	2066	2067	2069	2135		
MINUSX=	020000	609#	633	636	644	649	1075	1430	1436	1438	1440	1444	1445	1448
		1451	1469	1471	1473	1474	1476	1478	1489	1491	1493	1494	1496	1498
		1509	1511	1513	1514	1516	1518	1529	1531	1533	1534	1536	1538	1549
		1551	1553	1554	1556	1558	1569	1571	1573	1574	1576	1578	1595	1599
		1599	1600	1607	1610	1611	1612	1619	1622	1623	1624	1631	1634	1635
		1636	1643	1646	1647	1648	1655	1658	1659	1660	1667	1670	1671	1672
		1800	1816	1819	1954	1964	1978	1992	1999	2018	2040	2041	2042	2052
		2053	2054	2064	2065	2066	2098	2134	2172	2173	2174	2175		
MINUSY=	020000	609#	1433	1435	1439	1441	1782	1957	1967	1981	1987	2001		
PNT16A	012306	2171#												
PNT16B	012312	2173#												

```
PNT16C  012316          2175#
PNT16D  012322          2177#
POINT = 114000           609#   657    704    922    975   1026   1234   1391   1421   1458   1479   1499   1519
                        1539   1559   1584   1680   1745   1752   1759   1772   1791   1808   1926   1929   1943
                        1958   1970   1982   1994   2006   2014   2033   2076   2092   2189   2208
PSW     001010           406#   517#  1206#
Q       = 001777        1588#  1590   1601#  1602   1613#  1614   1625#  1626   1637#  1638   1649#  1650   1661#
                        1662   1673#
R       = 000777        1589#  159C   1601#  1602   1613#  1614   1625#  1626   1637#  1638   1649#  1650   1661#
                        1662   1673#
RAYLPA  011316           905*   902*  1925#
RAY14A  012052           536*  1099*  2093#
RAY14B  012054           537*  1098*  2094#
REC     = 000003         609#
RELATV= 130000           609#   927    1065   1838   1949   1860   1971   1982   1893   1904   1915   2048   2097
                        2133
RETB    001746           560    579#
RETJP   003616           887    902#
RETI17  005254          1145   1156#
RETI4   004662          1023   1081#
RETI20  005314          1163   1165#
RETI21  005276          1154   1161#
SCOPE = 104000           377#   612    619    626    679    700    790    797    824    851    868    886    913
                         920    973   1022   1134
SCOPEA  001100           390    445#
SCOPEB  001156           452    459#
SCOPEC  001162           460#  1229
SCOPED  001170           454    462#   515
SCOPEE  001126           449    451#
SCOPEF  001136           446    453#
SETPNT  002320           628    640    657#
SETUP   001536           456    464    534    544#
SETUPA  001670           558    563#
SETUPB  001732           563    571#
SHORTV= 104000           609#   925   2036   2060
SIZE0 = 000400           609#   702   1683
SIZE1 = 000600           609#
SPACE   002776           718    741    763#
START   001356           398    516#
STATSA= 170000           609#   703    716    719    738    742    978   1237   1390   1424   1461   1587   1684
                        1748   1775   1794   1829   1946   2032   2079   2192   2211
STATSB= 174000           609#   702    979   1000   1002   1683
STCHAR  002734           710*   712*   714*   739    743    748#
STKPTR= 000500           379#   462    507    516
STPA    001420           520#   523
STRB    001424           526#   529
STRC    001436           534#  1164
SWITCH  005624           447*   450*   530*   583*   590*   601*   664    681    816    843    860    877    890
                         993   1039   1085   1217*  1220*  1222   1227*  1232#
SWP     000172           395#   448    451    459    550*   551    555*   557   1218
SWREG   000176           394#   555
SYNOFF= 000010           609#   703    978   1237   1390   1424   1461   1587   1684   1748   1775   1794   1829
                        1946   2032   2079   2192   2211
SYNON = 000014           609#
SYN12   010716           892*   894*  1829#
TABLBA  012064          2098#
```

[illegible]		2135#								
[illegible]		4400#	567*							
[illegible]		4408#	579	1156						
[illegible]		4411#	546*	562*	1147*					
[illegible]		4414#	566	568*						
[illegible]		4420#	533*	579*	580*	581	584*	586	588	593	605*
[illegible]		4431#	1083							
[illegible]		4438#	903	1081						
. = [illegible]		383#	385#	389#	393#	397#	400#	572		

```
CLEARA    610#   1237   1389   1424   1461   1587   1748   1775   1794   1946   2073   2192   2211
COMMEN      1#
DSTEP     426#    906   1100   1212
ENDCOM      1#
ESCAPE      1#
GETPRI      1#
GETSWR      1#
MULT        1#
NEWTST      1#
OCTAN    2031#   2037   2049   2061
OCTGON   1462#   1482   1502   1522   1542   1562
POP         1#
PUSH        1#
REPORT      1#
SETPRI      1#
SETUP       1#
SKIP        1#
SLASH       1#
SQUARE   1588#   1590   1602   1614   1626   1638   1650   1662
STARS       1#
SWRSU       1#
TYPBIN      1#
TYPDEC      1#
TYPNAM      1#
TYPNUM      1#
TYPOCS      1#
TYPOCT      1#
TYPTXT      1#
$$ESCA      1#
$$NEWT      1#
$$SKIP      1#
.EQUAT      1#
.HEADE      1#
.[illegible]      1#
.SETUP      1#
.SWRHI      1#
.$ACT1      1#
.$APTB      1#
.$APTH      1#
.$APTY      1#
.$ASTA      1#
.$CATC      1#
.$CMTA      1#
.$DB2C      1#
.$DB20      1#
.$DIV       1#
.$EOP       1#
.$ERRO      1#
.$ERRT      1#
.$MULT      1#
.$POWE      1#
.$RAND      1#
.$RDDE      1#
.$RDOC      1#
.$READ      1#
.$R2A2      1#
```

D05


```
.$SAVE      18
.$SB2D      18
.$SB2O      18
.$SCOP      18
.$SIZE      18
.$SUPR      18
.$TRAP      18
.$TYPB      18
.$TYPC      18
.$TYPE      18
.$TYPO      18
.$400A      18
.[illegible]      18

. ABS.  012540    000

 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

 DDGTGB.BIN,DDGTGB.SEQ/SOL/CRF/NL:TOC=DDGTGB.SML,DDGTGB.P11
 RUN-TIME: 25 31 2 SECONDS
 RUN-TIME RATIO: 153/58=2.6
 CORE USED:  33K  (65 PAGES)
```

EOS

Spooler runtime 0 Seconds, 37 KCS, 173 disk reads, 3 disk writes, 55 pages