GT40

VISUAL TEST

MD-11-DDGTC-B

EP-DDGTC-B-DL-A

FICHE 1 OF 1

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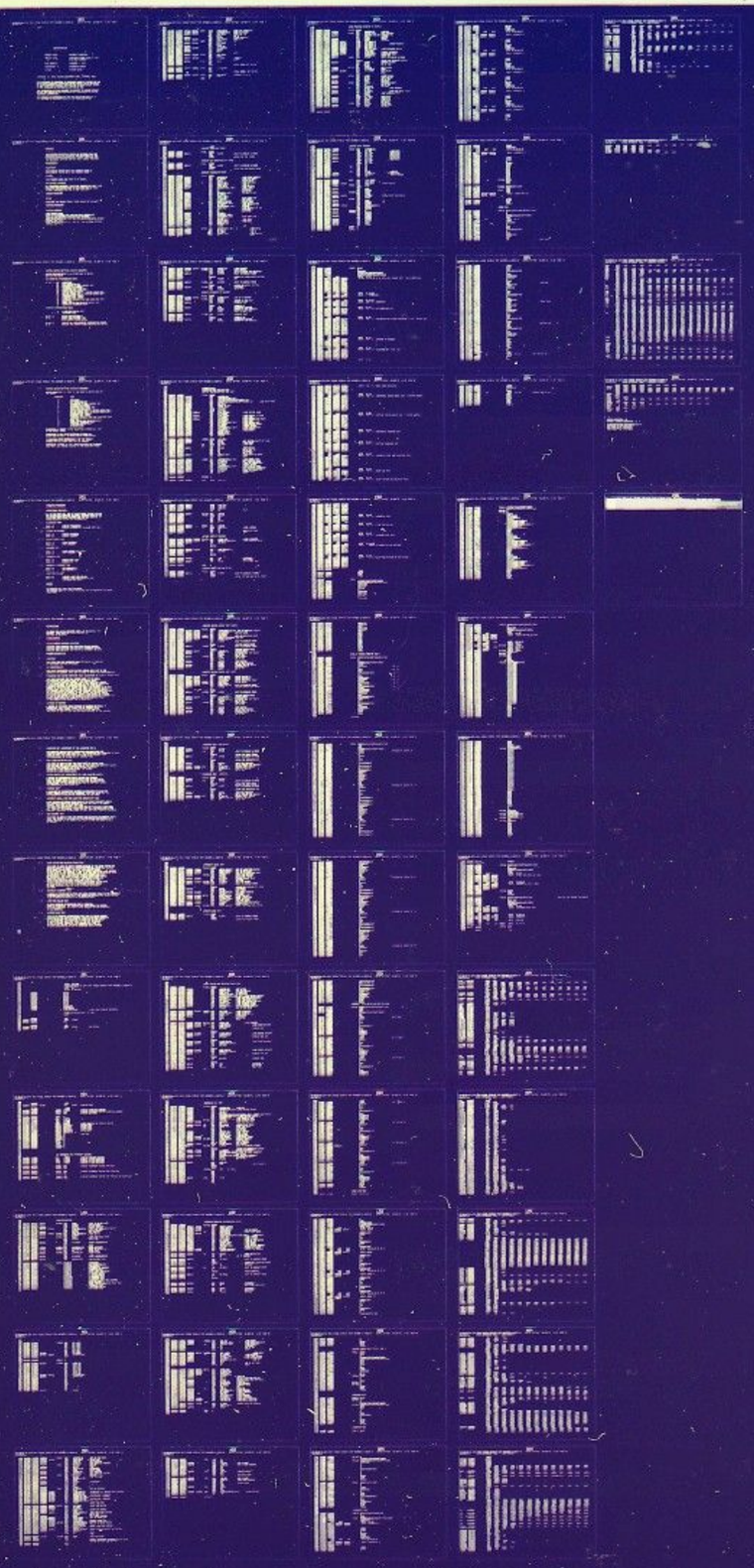

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IDENTIFICATION

PRODUCT CODE:	MAINDEC-11-DDGTC-B
PRODUCT NAME:	GT40/GT44 VISUAL DISPLAY TEST WITH VR14 DISPLAY
DATE CREATED:	NOVEMBER 1, 1973
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	RAYMOND SHOOP

1. ABSTRACT

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 VR14. FOR THIS TEST
THE MAINTENCE SWITCHES ARE NOT USED <NORMAL POSITION>.

2. REQUIREMENTS

2.1 EQUIPTMENT

GT40 DISPLAY SYSTEM WITH VR14 DISPLAY SCOPE OR
GT44 DISPLAY SYSTEM WITH VR14 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 SPECIFIEC 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 PINCUSHION 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 SERIEC 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
RC >EATIBILITY 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 VR14 VISUAL DISPLAY TEST MAINDEC-11-DDGTC-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
                000500                  STKPTR=500
                177570                  DISPLAY=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
```

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

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

001006  000000                      ICNT:   0
001010  177776                      PSW:    177776
001012  177560                      TKS:    177560
001014  177562                      TKB:    177562
001016  012470                      DBUF:   BUFFER          ;FIRST WORD IN THE DISPLAY BUFFER
001020  012472                      DBUF1:  BUFFER+2        ;SECOND WORD
001022  012474                      DBUF2:  BUFFER+4        ;THIRD WORD
001024  012476                      DBUF3:  BUFFER+6        ;FOURTH WORD
001026  012500                      DBUF4:  BUFFER+10       ;FIFTH WORD
001030  012502                      DBUF5:  BUFFER+12
001032  000000                      DSAVE:  0               ;TEMP REG.
001034  000000                      DSAVE1: 0
001036  000000                      DSAVE2: 0
001040  000000                      DSAVE3: 0
001042  000000                      HOLD:   0
001044  000000                      TSAVE:  0
001046  000000                      CNTR:   0
001050  000000                      CHANGE: 0
001052  000000                      LOKRB:  0


                                ;GS ADDRESSES AND INTERRUPT VECTORS

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

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

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

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

```
                                        ;MONITOR ROUTINE

001100  005737  002046          SCOPEA: TST     KRBD            ;TEST IF SW OR "KRB"
001104  001014                          BNE     SCOPEF          ;BR IF "KRB"
001106  005037  005556                  CLR     SWITCH          ;CLEAR "SWITCH"
001112  032737  000100  177570          BIT     #100,@#DISPLAY  ;TEST FOR "HOLD/STOP SWITCH"
001120  001402                          BEQ     SCOPEE          ;BR IF CLEARED
001122  005137  005556                  COM     SWITCH          ;SET SWITCH
001126  032737  000400  177570  SCOPEE: BIT     #400,@#DISPLAY  ;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  013704  177570          SCOPEB: MOV     @#DISPLAY,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  002052          DISPTC: FILED+2                         ;DIRECTORY
001212  002064                  FILE1+2                         ;DOT REPEATIBILITY
001214  002076                  FILE2+2                         ;PINCUSHION
001216  002342                  FILE3+2                         ;OCTAGONS OR SQUARES
001220  002416                  FILE4+2                         ;CHARACTER SET
001222  003026                  FILE5+2                         ;DASH LINES AND BLINK
001224  003040                  FILE6+2                         ;X VECTOR LENGTH
001226  003172                  FILE7+2                         ;Y VECTOR LENGTH
001230  003324                  FILE10+2                        ;X PHOSPHOR TEST
001232  003400                  FILE11+2                        ;Y PHOSPHOR TEST
001234  003454                  FILE12+2                        ;INTENSITY LEVEL AND LIGHTPEN
001236  003616                  FILE13+2                        ;EDGE SQUARES
001240  003630                  FILE14+2                        ;SHORT VECTOR RELATIVE POINT TEST
001242  004110                  FILE15+2                        ;GRAPHPLOT TEST
001244  004344                  FILE16+2                        ;LIGHT-PEN FOLLOW
001246  005054                  FILE17+2                        ;KEY BOARD ECHO
```

```


001250  010046                    LOWPWR: MOV     R0,-(SP)
001252  010146                            MOV     R1,-(SP)
001254  010246                            MOV     R2,-(SP)
001256  010346                            MOV     R3,-(SP)
001260  010446                            MOV     R4,-(SP)
001262  010546                            MOV     R5,-(SP)
001264  010637  001300                    MOV     SP,LOWSV
001270  012737  001302  000024            MOV     #HIGPWR,@#24
001276  000000                            HALT

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
```

```
001356 012706 000500          START:  MOV     #STKPTR,SP              ;SET UP THE STACK
001362 012777 000340 177420           MOV     #340,@PSW               ;RAISE PSW
001370 012700 001054                  MOV     #DPC,R0                 ;GET POINTER
001374 013701 001000                  MOV     GSADD,R1                ;GET SUPPLIED ADDRESS
001400 010120                 STRA:   MOV     R1,(0)+                 ;UPDATE
001402 062701 000002                  ADD     #2,R1                   ;THE
001406 022700 001064                  CMP     #DPC+10,R0              ;ADDRESSES
001412 001372                         BNE     STRA                    ;UNTIL DONE
001414 012700 001064                  MOV     #DDONE,R0               ;GET POINTER
001420 013701 001002                  MOV     GSVCT,R1                ;GET SUPPLIED VECTOR
001424 010120                 STRB:   MOV     R1,(0)+                 ;UPDATE
001426 062701 000002                  ADD     #2,R1                   ;THE VECTORS
001432 022700 001100                  CMP     #DDONE+14,R0
001436 001372                         BNE     STRB
001440 005037 005556                  CLR     SWITCH                  ;HOUSEKEEP
001444 005037 001042                  CLR     HOLD                    ;
001450 005004                         CLR     R4                      ;
001452 005037 001044                  CLR     TSAVE                   ;
001456 004737 001536          STRC:   JSR     PC,SETUP                ;SET UP VECTORS
001462 005037 001042                  CLR     HOLD
001466 012737 001000 012004           MOV     #1000,RAY14A            ;HOUSEKEEP X,Y ORIGIN FOR LIGHTPEN
001474 012737 000600 012006           MOV     #600,RAY14B
001502 012737 030060 011764           MOV     #30060,DLT14A           ;INITIALIZE X READOUT
001510 012737 030060 011766           MOV     #30060,DLT14A+2
001516 012737 030060 011776           MOV     #30060,DLT14B           ;INITIALIZE Y READOUT
001524 012737 030060 012000           MOV     #30060,DLT14B+2
001532 000137 002050                  JMP     FILED                   ;START THE TEST

001536 012737 000062 000060   SETUP:  MOV     #62,@#60                ;RESET KRB VECTOR
001544 012737 000000 000062           MOV     #0,@#62
001552 042777 000100 177232           BIC     #100,@TKS               ;CLEAR INT ENABLE
001560 005037 002046                  CLR     KRBD
001564 032737 000200 177570           BIT     #200,@#DISPLAY          ;TEST FOR "KRB" CONTROL
001572 001413                         BEQ     SETUPA                  ;BR IF NOT
001574 005137 002046                  COM     KRBD                    ;SET "KRB" CONTROL
001600 012737 001700 000060           MOV     #RETB,@#60              ;SET UP "KRB" INT
001606 012737 000340 000062           MOV     #340,@#62
001614 052777 000100 177170           BIS     #100,@TKS               ;ENABLE "KRB" INT
001622 012777 001664 177234   SETUPA: MOV     #SETUPB,@DDONE          ;SET UP GT DONE VECTOR
001630 012777 000340 177230           MOV     #340,@DDONE1
001636 013777 001072 177224           MOV     LPVCT1,@LPVCT           ;RESET LIGHT-PEN VECTOR
001644 005077 177222                  CLR     @LPVCT1
001650 013777 001076 177216           MOV     TMEVT1,@TIMEVT          ;RESET TIME-OUT/SHIFT OUT VECTOR
001656 005077 177214                  CLR     @TMEVT1
001662 000207                         RTS     PC                      ;EXIT

001664 005777 177166          SETUPB: TST     @DSR                    ;TEST FOR STOP
001670 100401                         BMI     .+4
001672 000000                         HALT                            ;ERROR, INTERRUPT OCCURRED TO THE STOP
                                                                      ;VECTOR BUT STOP WAS NOT SET
001674 000002                         RTI
001676 000000                         HALT
```

```
560
561
562  001700  117737  177110  001044  RETB:   MOVB    @TKB,TSAVE      ;READ THE CHARACTER
563  001706  042737  177600  001044          BIC     #177600,TSAVE   ;MASK TO 7 BITS
564  001714  022737  000015  001044          CMP     #15,TSAVE       ;TEST FOR "CR"
565  001722  001440                          BEQ     KYT3            ;BR IF
566  001724  005037  005556                  CLR     SWITCH          ;CLEAR "SWITCH"
567  001730  162737  000101  001044          SUB     #101,TSAVE      ;MAKE 0-77
568  001736  100456                  KYT5:   BMI     KYT1            ;<A
569  001740  022737  000017  001044          CMP     #17,TSAVE
570  001746  100412                          BMI     KYT2            ;>P
571  001750  013704  001044                  MOV     TSAVE,R4
572  001754  012737  177777  001050          MOV     #-1,CHANGE
573  001762  005037  005556                  CLR     SWITCH
574  001766  005037  001042                  CLR     HOLD
575  001772  000002                          RTI                     ;EXIT
576  001774  022737  000076  001044  KYT2:   CMP     #76,TSAVE
577  002002  001015                          BNE     KYT4
578  002004  012737  177777  001042          MOV     #-1,HOLD        ; RUBOUT
579  002012  000002                          RTI                     ;EXIT
580  002014  005037  001042          KYT1:   CLR     HOLD
581  002020  000002                          RTI
582  002022  000000                          HALT                    ;FATAL ERROR RTI FAILED
583
584  002024  012737  177777  005556  KYT3:   MOV     #-1,SWITCH
585  002032  000002                          RTI
586  002034  000000                          HALT                    ;FATAL ERROR, RTI FAILED
587
588  002036  162737  000040  001044  KYT4:   SUB     #40,TSAVE       ;CONVERT LC TO UC
589  002044  000734                          BR      KYT5
590  002046  000000                  KRB0:   0
591
```

```
                                .LIST
                        ;EXECUTE DIRECTORY FRAME
002050  104000          FILE0:  SCOPE
002052  004537  005412          JSR     5,MESG          ;EXIT TO DISPLAY A FRAME
002056  001000                  1000
002060  005560                  FRME0                   ;USING THE DIR. FRAME
                        ;EXECUTE DOT REPEATIBILITY FRAME
002062  104000          FILE1:  SCOPE
002064  004537  005412          JSR     5,MESG          ;EXIT TO DISPLAY A FRAME
002070  100000                  100000
002072  007140                  FRME1                   ;USING THE DOR REPEAT FRAME
                        ;EXECUTE PINCUSHION FRAME
002074  104000          FILE2:  SCOPE
002076  012700  012470          MOV     #BUFFER,R0              ;LOAD START ADDRESS
002102  004737  002252          JSR     PC,SETPNT               ;LOAD 0,0 ORGIN
002106  012701  000020          MOV     #20,R1                  ;SETUP COUNT
002112  012720  040000  1$:     MOV     #INTX,(R0)+             ;LOAD INT LINE
002116  012720  001377          MOV     #MAXY,(R0)+             ;  MAX Y
002122  012720  000100          MOV     #100,(R0)+              ;LOAD DELTA X
002126  012720  021377          MOV     #MINUSX+MAXY,(R0)+      ;LOAD - MAX Y
002132  005301                  DEC     R1                      ;FINISHED ?
002134  001366                  BNE     1$                      ;BR IF NOT
002136  012720  020001          MOV     #MINUSX+1,(R0)+         ;GO BACK 1 UNIT
002142  012720  000000          MOV     #0,(R0)+
002146  012720  040000          MOV     #INTX,(R0)+
002152  012720  001377          MOV     #MAXY,(R0)+             ;PLOT LAST LINE
002156  004737  002252          JSR     PC,SETPNT               ;SET ORGIN
002162  012701  000014          MOV     #MAXY+1/100,R1          ;SETUP COUNT
002166  012720  041777  2$:     MOV     #INTX+MAXX,(R0)+        ;LOAD DELTA X MAX
002172  012720  000000          MOV     #0,(R0)+                ;LOAD DELTA Y = 0
002176  012720  021777          MOV     #MINUSX+MAXX,(R0)+      ;RETRACE
002202  012720  000100          MOV     #100,(R0)+              ;LOAD DELTA Y OF 100
002206  005301                  DEC     R1                      ;FINISHED ?
002210  001366                  BNE     2$                      ;BR IF NOT
002212  012720  000000          MOV     #0,(R0)+
002216  012720  020001          MOV     #MINUSX+1,(R0)+
002222  012720  041777          MOV     #INTX+MAXX,(R0)+        ;PLOT LAST LINE
002226  012720  000000          MOV     #0,(R0)+
002232  012720  173400          MOV     #STOP,(R0)+             ;LOAD STOP
002236  012720  160000          MOV     #JMP,(R0)+              ;LOAD JUMP
002242  012710  012470          MOV     #BUFFER,(R0)
002246  000137  002274          JMP     FILE2A

002252  012720  117000  SETPNT: MOV     #POINT!INT4,(R0)+               ;LOAD POINT
002256  012720  000000          MOV     #0,(R0)+                        ;  AT X
002262  012720  000000          MOV     #0,(R0)+                        ;  AT Y
002266  012720  110000          MOV     #LONGV,(R0)+                    ;LONG VECTOR
002272  000207                  RTS     PC                              ;EXIT
```

```

002274  012737  004000  001046  FILE2A: MOV     #4000,CNTR          ;LOAD COUNTER
002302  005737  005556          FILE2B: TST     SWITCH              ;TEST SWITCH
002306  001405                          BEQ     FILE2C              ;BR IF SUBTEST NOT SELECTED
002310  004537  005412                  JSR     R5,MESG             ;EXIT TO DISPLAY FRAME
002314  000001                          1
002316  012470                          BUFFER                      ;USING THE CROSS HATCH PATTERN
002320  000404                          BR      FILE2D              ;BR

002322  004537  005412          FILE2C: JSR     R5,MESG             ;EXIT TO DISPLAY FRAME
002326  000001                          1
002330  007230                          FRME2                       ;USING THE OFFSET PATTERN
002332  005337  001046          FILE2D: DEC     CNTR                ;FINISHED ?
002336  001361                          BNE     FILE2B              ;BR IF NOT

                                ;EXECUTE OCTAGONS OR SQUARES

002340  104000                  FILE3:  SCOPE
002342  012737  014000  001046          MOV     #14000,CNTR         ;SET UP A COUNTER
002350  005737  005556          FILE3A: TST     SWITCH
002354  001010                          BNE     FILE3B              ;BRANCH IF SUB-TEST
002356  004537  005412                  JSR     5,MESG              ;DISPLAY TEST
002362  000001                          1
002364  007334                          FRME3                       ;FRAME # 3
002366  005337  001046                  DEC     CNTR                ;DECREMENT COUNTER
002372  001366                          BNE     FILE3A              ;BRANCH IF NOT COMPLETE
002374  000407                          BR      FILE4               ;EXIT TO NEXT TEST

002376  004537  005412          FILE3B: JSR     5,MESG              ;DISPLAY TEST
002402  000001                          1
002404  007724                          FRME3A                      ;FRAME # 3A
002406  005337  001046                  DEC     CNTR                ;DECREMENT COUNTER
002412  001356                          BNE     FILE3A              ;BRANCH IF NOT COMPLETE
```

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

002414  104000                  FILE4:  SCOPE
002416  012700  012470                  MOV     #BUFFER,R0
002422  012720  174400                  MOV     #STATSB!SIZED,(0)+
002426  012720  170052                  MOV     #STATSA!ITALO!SYNOFF!GREEN,(0)+
002432  012720  117124                  MOV     #POINT!INT4!LPOFF!BLKOFF!LINE0,(0)+     ;LOAD POINT MODE
002436  012720  000000                  MOV     #0,(0)+
002442  012720  001300                  MOV     #MAXY-77,(0)+
002446  012720  100000                  MOV     #CHAR,(0)+
002452  112720  000017                  MOVB    #17,(0)+
002456  112720  000017                  MOVB    #17,(0)+
002462  012737  000100  002666          MOV     #100,STCHAR             ;LOAD INITIAL CHAR.
002470  004737  002624                  JSR     PC,LOADBF
002474  012737  000140  002666          MOV     #140,STCHAR             ;LOAD INITIAL LC CHAR
002502  004737  002624                  JSR     PC,LOADBF               ;LOAD LINE
002506  012737  000040  002666          MOV     #40,STCHAR              ;LOAD NUMBERS AND PUNCT
002514  004737  002624                  JSR     PC,LOADBF               ;LOAD LINE
002520  012720  170040                  MOV     #STATSA!ITALO,(R0)+     ;LOAD NORMAL FONT
002524  004737  002564                  JSR     PC,LOADSP               ;LOAD SPECIAL CHARS
002530  004737  002730                  JSR     PC,SPACE                ;INSERT SPACES
002534  012720  170060                  MOV     #STATSA!ITAL1,(R0)+     ;LOAD ITALICS FONT
002540  004737  002564                  JSR     PC,LOADSP               ;LOAD SPIECAL
002544  012720  173400                  MOV     #DSTOP,(R0)+            ;LOAD DSTOP
002550  012720  160000                  MOV     #DJMP,(R0)+
002554  012720  012470                  MOV     #BUFFER,(R0)+
002560  000137  002746                  JMP     FILE4A

002564  112720  000016          LOADSP: MOVB    #16,(R0)+
002570  012702  000000                  MOV     #0,R2                   ;SET INITIAL SHIFT OUT CHAR
002574  012703  000037                  MOV     #37,R3                  ;LOAD COUNT
002600  110220                  1$:     MOVB    R2,(R0)+                ;LOAD CHAR
002602  005202                  2$:     INC     R2
002604  022702  000017                  CMP     #17,R2                  ;TEST FOR SI
002610  001774                          BEQ     2$                      ;BR IF SI "17"
002612  005303                          DEC     R3                      ;FINISHED ?
002614  001371                          BNE     1$                      ;BR IF NOT
002616  012720  020017                  MOV     #20017,(R0)+            ;LOAD SHIFT-IN SPACE
002622  000207                          RTS     PC                      ;EXIT

002624  012720  170040          LOADBF: MOV     #STATSA!ITALO,(R0)+     ;LOAD NORMAL FONT
002630  013702  002666                  MOV     STCHAR,R2               ;GET STARTING CHAR
002634  004737  002712                  JSR     PC,FILLIT               ;LOAD THE CHARACTERS
002640  004737  002730                  JSR     PC,SPACE                ;INSERT SPACES
002644  012720  170060                  MOV     #STATSA!ITAL1,(R0)+     ;LOAD ITALICS FONT
002650  013702  002666                  MOV     STCHAR,R2               ;GET STARTING CHARACTER
002654  004737  002712                  JSR     PC,FILLIT               ;LOAD THE CHARACTERS
002660  004737  002670                  JSR     PC,CRLF                 ;INSERT CR-LF
002664  000207                          RTS     PC                      ;EXIT

002666  000000          STCHAR: 0

002670  112720  000015          CRLF:   MOVB    #15,(0)+
```

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

002712  012703  000040         FILLIT: MOV     #40,R3
002716  110220                 FILLA:  MOVB    R2,(0)+
002720  005202                         INC     R2
002722  005303                         DEC     R3
002724  001374                         BNE     FILLA
002726  000207                         RTS     7

002730  012703  000010         SPACE:  MOV     #10,R3
002734  112720  000040         1$:     MOVB    #40,(R0)+               ;LOAD A SPACE
002740  005303                         DEC     R3
002742  001374                         BNE     1$                      ;BR IF NOT DONE
002744  000207                         RTS     PC                      ;EXIT

                               ;ACTUAL DISPLAY ROUTINE

002746  012737  001000 003022 FILE4A: MOV     #1000,10$               ;LOAD A COUNTER
002754  012737  001300 012500 4$:     MOV     #MAXY-77,BUFFER+10      ;LOAD STARTING POINT
002762  004537  005412                 JSR     R5,MESG
002766  000001                         1
002770  012470                         BUFFER

002772  012737  000400 012500         MOV     #400,BUFFER+10
003000  004537  005412                 JSR     R5,MESG
003004  000001                         1
003006  012470                         BUFFER

003010  005337  003022                 DEC     10$                     ;FINISHED ?
003014  001357                         BNE     4$                      ;BR IF NOT
003016  000137  003024                 JMP     FILE5                   ;GO TO NEXT TEST

003022  000000         10$:    0

                               ;EXECUTE DASH LINES AND BLINK

003024  104000         FILE5:  SCOPE
003026  004537  005412                 JSR     5,MESG          ;EXIT TO DISPLAY A FRAME
003032  010000                         10000                   ;USING THE DASH AND BLINK FRAME
003034  010174                         FRME5
```

```
                                        ;EXECUTE VECTOR LENGTH TEST (HORIZ)
                                        
003036  104000                  FILE6:  SCOPE
003040  012737  041777  010472          MOV     #INTX!MAXX,DELTX6 ;SET UP VERTICAL HEIGHT
003046  012737  000010  001036          MOV     #10,DSAVE2        ;SET UP TIMER
003054  012737  000000  001034          MOV     #0,DSAVE1
003062  012737  000040  001046  LOOPA:  MOV     #40,CNTR          ;SET UP EXECUTION COUNT
003070  012737  000140  001032  LOOPA1: MOV     #MAXY+1/10,DSAVE  ;SET UP
003076  013737  001034  010474          MOV     DSAVE1,DELTY6
003104  004537  005412                  JSR     5,MESG            ;EXIT TO DISPLAY FRAME
003110  000001                          1
003112  010426                          FRME6                     ;VECTOR LENGTH FRAME
003114  004537  005412          LOOPA2: JSR     5,MESG            ;EXIT TO DISPLAY FRAME
003120  000001                          1
003122  010466                          FRME6A                    ;VECTOR LENGTH FRAME
003124  062737  000010  010474          ADD     #10,DELTY6        ;UPDATE ANGLE
003132  005337  001032                  DEC     DSAVE             ;FINISHED ALL THE ANGLES
003136  001366                          BNE     LOOPA2            ;BR IF NOT
003140  005337  001046          LOOPA3: DEC     CNTR              ;DONE COUNT?
003144  001351                          BNE     LOOPA1            ;BR IF NOT
003146  000240                          NOP
003150  005737  005556                  TST     SWITCH            ;TEST SWITCH
003154  001342                          BNE     LOOPA             ;BR IF HALT MOTION
003156  005237  001034                  INC     DSAVE1            ;UPDATE INITIAL ANGLE
003162  005337  001036                  DEC     DSAVE2            ;FINISHED ALL?
003166  001335                          BNE     LOOPA             ;BR IF NOT

                                        ;EXECUTE VECTOR LENGTH TEST (VERT)

003170  104000                  FILE7:  SCOPE
003172  012737  040000  001034          MOV     #INTX,DSAVE1      ;SETUP INITIAL X
003200  012737  001377  010474          MOV     #MAXY,DELTY6      ;SETUP INITIAL Y
003206  012737  000010  001036          MOV     #10,DSAVE2        ;SETUP EXECUTION COUNT
003214  012737  000040  001046  LOOPB:  MOV     #40,CNTR          ;SETUP DELAY
003222  012737  000200  001032  LOOPB1: MOV     #200,DSAVE
003230  013737  001034  010472          MOV     DSAVE1,DELTX6     ;EXIT TO DISPLAY FRAME
003236  004537  005412                  JSR     5,MESG            ;VECTOR LENGTH TEST FRAME
003242  000001                          1
003244  010426                          FRME6
003246  004537  005412          LOOPB2: JSR     5,MESG            ;EXIT TO DISPLAY FRAME
003252  000001                          1
003254  010466                          FRME6A                    ;VECTOR LENGTH FRAME
003256  062737  000010  010472          ADD     #10,DELTX6        ;UPDATE ANGLE
003264  005337  001032                  DEC     DSAVE             ;FINISHED ALL THE ANGLES
003270  001366                          BNE     LOOPB2            ;BR IF NOT
003272  005337  001046          LOOPB3: DEC     CNTR              ;DONE COUNT?
003276  001351                          BNE     LOOPB1            ;BR IF NOT
003300  000240                          NOP
003302  005737  005556                  TST     SWITCH            ;TEST SWITCH
003306  001342                          BNE     LOOPB             ;BR IF HALT MOTION
003310  005237  001034                  INC     DSAVE1            ;UPDATE INITIAL ANGLE
003314  005337  001036                  DEC     DSAVE2            ;FINISHED ALL?
003320  001335                          BNE     LOOPB             ;BR IF NOT
```

```
                                        ;PHOSPHOR TEST (HORIZONTAL)
                                FILE10: SCOPE
003322  104000                          CLR     DELTX7
003324  005037  010506                  
003330  004537  005412          D7A:    JSR     5,MESG          ;EXIT TO DISPLAY A FRAME
003334  000050                          50
003336  010504                          FRME10                  ;USING THE HORIZ FRAME
003340  004537  005412                  JSR     5,MESG          ;EXIT TO DISPLAY A FRAME
003344  000001                          1
003346  010604                          FRM10                   ;USING THE PERIMETER BOX
003350  000240                          NOP
003352  005737  005556                  TST     SWITCH          ;TEST THE "SWITCH"
003356  001364                          BNE     D7A             ;BR IF FREEZE THE MOVEMENT
003360  062737  000001  010506  D7C:     ADD     #1,DELTX7       ;UPDATE THE X ORIGIN
003366  022737  002000  010506          CMP     #2000,DELTX7    ;TEST IF THE END
003374  001355                          BNE     D7A             ;BR IF NOT

                                        ;PHOSPHOR TEST  (VERTICAL)
                                FILE11: SCOPE
003376  104000                          CLR     DELTY7
003400  005037  010550                  
003404  004537  005412          D7D:    JSR     5,MESG          ;EXIT TO DISPLAY A FRAME
003410  000050                          50
003412  010544                          FRME11                  ;USING THE VERT FRAME
003414  004537  005412                  JSR     5,MESG          ;EXIT TO DISPLAY A FRAME
003420  000001                          1
003422  010604                          FRM10                   ;USING THE PERIMETER BOX
003424  000240                          NOP
003426  005737  005556                  TST     SWITCH          ;TEST THE "SWITCH"
003432  001364                          BNE     D7D             ;BR IF FREEZE THE MOVEMENT
003434  062737  000001  010550  D7F:     ADD     #1,DELTY7       ;UPDATE THE Y ORIGIN
003442  022737  001400  010550          CMP     #MAXY+1,DELTY7  ;TEST IF THE END
003450  001355                          BNE     D7D             ;BR IF NOT
```

```
                                        ;INTENSITY LEVEL TEST
                                FILE12: SCOPE
003452  104000                        
003454  012777  003550  175406        MOV     #RETLP,@LPVCT   ;SET UP LIGHT-PEN VECTOR
003462  013777  001004  175402        MOV     @SSR1,@LPVCT1   ;SET UP BR LEVEL
003470  012737  004000  001032        MOV     #4000,DSAVE     ;SET UP A EXECUTION COUNT
003476  005737  005556        FLE12A: TST     SWITCH          ;TEST THE "SWITCH"
003502  001004                        BNE     FLE12B          ;BR IF SET "SYNC"
003504  042737  000004  010650        BIC     #4,SYN12        ;ENSURE CLEAR "SYNC"
003512  000403                        BR      FLE12C          ;BY PASS
003514  052737  000004  010650FLE12B: BIS     #4,SYN12        ;SET THE "SYNC"
003522  004537  005412      FLE12C: JSR     5,MESG          ;EXIT TO DISPLAY FRAME
003526  000001                        1
                                    FRME12                  ;USING THE "INTENSITY" FRAME
                                    DEC     DSAVE           ;FINISHED?
                                    BEQ     FLE12D          ;YES, EXIT
                                    BR      FLE12A          ;NO, RESET MESSAGE
003540  012737  173400  011250        MOV     #DSTOP,RAYLPA   ;BR BACK
003546  000752                  RETLP: MOV    #DNOP,RAYLPA    ;LIGHT-PEN HIT
003550  012737  164000  011250        MOV     @YPOS,LPPNT     ;READ Y POSITION
003556  017737  175300  011262        BIC     #176000,LPPNT   ;MASK THE BITS
003564  042737  176000  011262        CMP     (SP)+,(SP)+     ;POP THE STACK
003572  022626                        MOV     #1,@DPC         ;SINGLE STEP THE DISPLAY
003574  012777  000001  175252        JMP     MESGA           ;JUMP TO WAIT
003602  000137  005430        FLE12D: MOV     LPVCT1,@LPVCT   ;RESET THE LIGHT-PEN VECTOR
003606  013777  001072  175254


                                        ;EXECUTE EDGE TEST

003614  104000                FILE13: SCOPE
003616  004537  005412                JSR     5,MESG          ;EXIT TO DISPLAY FRAME
003622  010000                        10000
003624  011312                        FRME13                  ;USING THE "EDGE" FRAME
```

```
                                        ;SHORT VECTOR AND RELATIVE POINT TEST
                                        FILE14: SCOPE
003626  104000                                  
003630  012700  012470                          MOV     #BUFFER,R0      ;SET UP R0
003634  012720  114000                          MOV     #POINT,(0)+     ;SET UP INITIAL
003640  012720  000240                          MOV     #240,(0)+       ;X POSITION
003644  012720  000600                          MOV     #MAXY+1/2,(0)+  ;Y POSITION
003650  012720  107004                          MOV     #SHORTV!INT4!LINED,(0)+ ;LOAD "SHORT VECTOR"
003654  004737  003706                          JSR     PC,LOADVT       ;LOAD THE DISPLAY PATTERN
003660  012720  130000                          MOV     #RELATV,(0)+    ;LOAD "RELATIVE POINT"
003664  004737  003706                          JSR     PC,LOADVT       ;LOAD THE DISPLAY PATTERN
003670  012720  173400                          MOV     #DSTOP,(0)+     ;LOAD "DISPLAY STOP"
003674  012720  160000                          MOV     #DJMP,(0)+      ;LOAD "DISPLAY JUMP"
003700  012720  012470                          MOV     #BUFFER,(0)+    ;TO THE BUFFER ADDRESS
003704  000413                                  BR      FIL14A          ;BR TO THE FRAME

003706  012737  000024  001046  LOADVT: MOV     #24,CNTR        ;LOAD A COUNTER
003714  012720  040077          LADVT:  MOV     #INTX+77,(0)+   ;LOAD A DELTA Y
003720  012720  004177                  MOV     #4177,(0)+      ;LOAD A DELTA X,Y
003724  005337  001046                  DEC     CNTR            ;FINISHED?
003730  001371                          BNE     LADVT           ;BR IF NOT
003732  000207                          RTS     PC              ;EXIT

003734  012737  004000  004104  FIL14A: MOV     #4000,10$               ;LOAD COUNTER
003742  012737  000200  011572  1$:     MOV     #200,FRM14A                     ;LOAD FIRST OCTAGON
003750  012737  000200  011574          MOV     #200,FRM14B
003756  004537  005412                  JSR     R5,MESG                 ;DISPLAY OCT.
003762  000001                          1
003764  011566                          FRME14
003766  012737  001400  011572          MOV     #1400,FRM14A            ;LOAD SECOND OCTAGON
003774  012737  000200  011574          MOV     #200,FRM14B
004002  004537  005412                  JSR     R5,MESG                 ;DISPLAY 2ND OCT.
004006  000001                          1
004010  011566                          FRME14
004012  012737  001400  011572          MOV     #1400,FRM14A            ;LOAD THIRD OCTAGON
004020  012737  001000  011574          MOV     #MAXY-377,FRM14B
004026  004537  005412                  JSR     R5,MESG
004032  000001                          1
004034  011566                          FRME14
004036  012737  000200  011572          MOV     #200,FRM14A             ;LOAD FOURTH OCTAGON
004044  012737  001000  011574          MOV     #MAXY-377,FRM14B
004052  004537  005412                  JSR     R5,MESG                 ;DISPLAY 4TH OCT.
004056  000001                          1
004060  011566                          FRME14
004062  004537  005412                  JSR     R5,MESG                 ;DISPLAY BAR
004066  000001                          1
004070  012470                          BUFFER
004072  005337  004104                  DEC     10$                     ;FINISHED ?
004076  001321                          BNE     1$                      ;BR IF NOT
004100  000137  004106                  JMP     FILE15                  ;NEXT TEST
004104  000000          10$:    0
```

```
                                        ;GRAPHPLOT X-Y TEST
                                        
004106  104000                  FILE15: SCOPE
004110  012700  012470                  MOV     #BUFFER,R0      ;LOAD R0
004114  012720  117600                  MOV     #POINT!INT7,(0)+;LOAD INITIAL POINT
004120  012720  000000                  MOV     #0,(0)+
004124  012720  000000                  MOV     #0,(0)+
004130  012720  170052                  MOV     #STATSA!ITALO!SYNOFF!GREEN,(R0)+ ;RESET THE STATUS A
004134  012720  174100                  MOV     #STATSB!INCR,(0)+ ;LOAD INITIAL STATUS B
004140  012720  120000                  MOV     #GRAPHX,(0)+    ;LOAD GRAPH X INST
004144  012705  000040          DFL15C: MOV     #40,R5          ;LOAD STARTUP COUNT
004150  012737  000000  001032          MOV     #0,DSAVE        ;LOAD INITIAL PLOT
004156  000403                          BR      2$
004160  062737  000020  001032  1$:     ADD     #20,DSAVE       ;UPDATE PLOT POINT
004166  013720  001032          2$:     MOV     DSAVE,(0)+      ;SAVE THE POINT
004172  005305                          DEC     R5              ;FINISHED?
004174  001371                          BNE     1$              ;BR IF NOT
004176  012720  173400                  MOV     #DSTOP,(0)+     ;LOAD "DSTOP"
004202  012720  160000                  MOV     #DJMP,(0)+      ;LOAD "DJMP"
004206  012720  012470                  MOV     #BUFFER,(0)+    ;LOAD RETURN
004212  012737  000200  001032          MOV     #200,DSAVE      ;LOAD POINT COUNT
004220  042777  004000  174602  DFL15D: BIC     #4000,@DBUF5    ;ENSURE "GRAPHX"
004226  005737  005556                  TST     SWITCH          ;TEST SWITCH
004232  001403                          BEQ     DFL15B          ;BR IF GRAPHX
004234  052777  004000  174566          BIS     #4000,@DBUF5    ;SET GRAPHY
004242  004537  005412          DFL15B: JSR     5,MESG          ;EXIT TO DISPLAY A FRAME
004246  000001                          1
004250  012470                          BUFFER                  ;USING THE GENERATED PATTERN
004252  062777  000001  174546          ADD     #1,@DBUF4       ;UPDATE INCREMENT
004260  022777  174200  174540          CMP     #STATSB+200,@DBUF4 ;TEST IF LAST INCREMENT
004266  001365                          BNE     DFL15B          ;BR IF NOT
004270  012777  174100  174530          MOV     #STATSB!INCR,@DBUF4 ;RELOAD INCREMENT
004276  005337  001032                  DEC     DSAVE           ;FINISHED 10 SEC?
004302  001346                          BNE     DFL15D          ;BR IF NOT

004304  013700  000042                  MOV     @#42,R0
004310  001407                          BEQ     HERE                            ;ACT-11/DDP-11
004312  000005                          RESET
004314  000005                          RESET
004316  004710                  LOGICAL:        JSR     PC,(R0)
004320  000240                          NOP
004322  000240                          NOP
004324  000240                          NOP
004326  000240                          NOP
004330  000137  002050          HERE:   JMP     FILE0
004334  000240                          NOP
004336  000240                          NOP
004340  000240                          NOP
```

```
1002
1003                                    ;OPERATOR OPERATOR INTERVENTION TESTS
1004
1005  004342  104000                    FILE16: SCOPE
1006  004344  012777  004614  174516            MOV     #RET14,@LPVCT
1007  004352  013777  001004  174512            MOV     GSBRL,@LPVCT1
1008  004360  012737  000100  001034            MOV     #100,DSAVE1             ;SET UP COUNT
1009  004366  012700  012470            1$:     MOV     #BUFFER,R0              ;LOAD START ADDR.
1010  004372  012737  000100  001032            MOV     #100,DSAVE
1011  004400  012720  117744                    MOV     #POINT!INT7!LPON!LINED,(R0)+     ;LOAD POINT
1012  004404  012720  000700                    MOV     #700,(R0)+              ;LOAD X POINT
1013  004410  012720  000474                    MOV     #474,(R0)+              ;LOAD Y POINT
1014  004414  004737  004556                    JSR     PC,LOADUP               ;LOAD UP THE BUFFER
1015  004420  012720  173400                    MOV     #DSTOP,(R0)+            ;LOAD DSTOP
1016  004424  012720  160000                    MOV     #DJMP,(R0)+             ;LOAD DJUMP
1017  004430  012720  012470                    MOV     #BUFFER,(R0)+           ;LOAD RETURN ADDRESS
1018  004434  005037  005050                    CLR     HITCNT                  ;CLEAR HIT COUNT
1019  004440  012737  030060  012374            MOV     #30060,FRM16B-2         ;PRESET THE READOUT
1020  004446  012737  030060  012372            MOV     #30060,FRM16B-4
1021
1022  004454  005737  005556            4$:     TST     SWITCH                  ;TEST SWITCH BIT
1023  004460  001005                            BNE     6$              ;BR IF SUBTEST
1024
1025  004462  004537  005412                    JSR     R5,MESG                 ;EXIT TO DISPLAY FRAME
1026  004466  000100                            100
1027  004470  011714                            FRME16                          ;USINT THE LIGHT-PEN FRAME
1028  004472  000770                            BR      4$                      ;BR BACK
1029
1030  004474  004537  005412            6$:     JSR     R5,MESG                 ;EXIT TO DISPLAY FRAME
1031  004500  000001                            1
1032  004502  012302                            FRM16A                          ;ASCII SUBTITLE
1033
1034  004504  004537  005412                    JSR     R5,MESG                 ;EXIT TO DISPLAY FRAME
1035  004510  000001                            1
1036  004512  012470                            BUFFER
1037
1038
1039  004514  005337  001032                    DEC     DSAVE                   ;FINISHED ?
1040  004520  001355                            BNE     4$                      ;BR IF NOT MINI-LOOP
1041
1042  004522  005337  001034                    DEC     DSAVE1                  ;FINISHED ?
1043  004526  001317                            BNE     1$                      ;BR IF NOT
1044  004530  000137  004342                    JMP     FILE16                  ;RESTART
1045
```

```
1046
1047  004534  012701  000030          LOADAC: MOV     #24.,R1                 ;LOAD COUNT
1048  004540  012720  130000                  MOV     #RELATV,(R0)+           ;LOAD RELATIVE POINT
1049  004544  012720  040004          1$:     MOV     #INTX+4,(R0)+           ;LOAD INTEN BIT
1050  004550  005301                          DEC     R1                      ;FINISHED ?
1051  004552  001374                          BNE     1$                      ;BR IF NOT
1052  004554  000207                          RTS     PC                      ;EXIT
1053
1054  004556  012737  000030  001046  LOADUP: MOV     #24.,CNTR                       ;LOAD COUNT
1055  004564  004737  004534          1$:     JSR     PC,LOADAC               ;LOAD ACCROSS
1056  004570  012720  110000                  MOV     #LONGV,(R0)+            ;LOAD LONG VECTOR
1057  004574  012720  000004                  MOV     #4,(R0)+                ;LOAD VECTOR OVER
1058  004600  012720  020140                  MOV     #MINUSX+140,(R0)+               ;AND UP
1059  004604  005337  001046                  DEC     CNTR
1060  004610  001365                          BNE     1$                      ;BR IF NOT DONE
1061  004612  000207                          RTS     PC                      ;EXIT
1062
1063
1064  004614  017737  174242  004754  RET14: MOV     @YPOS,40$
1065  004622  042737  176000  004754          BIC     #176000,40$
1066  004630  017737  174224  004756          MOV     @XPOS,41$
1067  004636  042737  176000  004756          BIC     #176000,41$
1068  004644  005737  005556                  TST     SWITCH                  ;TEST SW
1069  004650  001411                          BEQ     1$                      ;BR IF LIGHT PEN FOLLOW
1070  004652  005237  005050                  INC     HITCNT                  ;UPDATE LIGHT PEN HIT COUNT
1071  004656  013703  005050                  MOV     HITCNT,R3               ;LOAD R3
1072  004662  012702  012376                  MOV     #FRM16B,R2              ;LOAD ADDRESS
1073  004666  004737  005330                  JSR     PC,KBCHR                ;CONVERT OCTAL
1074  004672  000432                          BR      20$                     ;BR
1075  004674  013703  004756          1$:     MOV     41$,R3                  ;LOAD R3
1076  004700  012702  011770                  MOV     #DLT14A+4,R2            ;LOAD ADDRESS
1077  004704  004737  005332                  JSR     PC,KBCHR                ;LOAD X READOUT
1078  004710  013703  004754                  MOV     40$,R3                  ;LOAD R3
1079  004714  012702  012002                  MOV     #DLT14B+4,R2            ;LOAD ADDRESS
1080  004720  004737  005332                  JSR     PC,KBCHR                ;LOAD Y READOUT
1081  004724  013737  004754  012006          MOV     40$,RAY14B              ;LOAD NEW Y POSITION
1082  004732  013737  004756  012004          MOV     41$,RAY14A              ;LOAD NEW X POSITION
1083  004740                          10$:
1084  004740  012777  000001  174106          MOV     #1,@DPC                 ;SINGLE STEP THE DISPLAY
1085  004746  022626                          CMP     (SP)+,(SP)+
1086  004750  000137  005430                  JMP     MESGA
1087
1088  004754  000000          40$:    0
1089  004756  000000          41$:    0
1090
```

```
1091
1092  004760  005001                  20$:    CLR     R1
1093  004762  005002                          CLR     R2
1094  004764  013700  004756                  MOV     41$,R0          ;GET X AXIS
1095  004770  162700  000700                  SUB     #700,R0         ;GET A BASE ADDRESS
1096  004774  006200                          ASR     R0
1097  004776  006200                          ASR     R0
1098  005000  001404                          BEQ     30$
1099  005002  062701  000070          21$:    ADD     #70,R1          ;UPDATE OFFSET
1100  005006  005300                          DEC     R0
1101  005010  001374                          BNE     21$             ;BR UNTIL DONE
1102
1103  005012  013700  004754          30$:    MOV     40$,R0          ;GET X AXIS
1104  005016  162700  000500                  SUB     #500,R0         ;MAKE BASE ADDRESS
1105  005022  006200                          ASR     R0
1106  005024  006200                          ASR     R0              ;SHIFT RIGHT
1107  005026  001404                          BEQ     32$
1108  005030  062701  000002          31$:    ADD     #2,R1
1109  005034  005300                          DEC     R0
1110  005036  001374                          BNE     31$
1111  005040  042761  040000  012500  32$:    BIC     #INTX,BUFFER+10(R1)     ;CLEAR THE BIT
1112  005046  000734                          BR      10$
1113
1114  005050  000000          HITCNT: 0
```

```
                                        ;ECHO ROUTINE KEYBOARD TO DISPLAY
                                        
005052  104000                  FILE17: SCOPE
005054  012700  012470                  MOV     #BUFFER,R0      ;LOAD R0
005060  012720  173400          ECHOA:  MOV     #DSTOP'(0)+     ;MOV "DSTOPS"
005064  022700  013470                  CMP     #BUFFER+1000,R0 ;THRUOUT THE
005070  001373                          BNE     ECHOA           ;BUFFER
005072  005037  001052                  CLR     LOKRB           ;HOUSE
005076  005037  001032                  CLR     DSAVE           ;KEEPING
005102  112737  000060  012461          MOVB    #60,KBOCT-4
005110  112737  000060  012462          MOVB    #60,KBOCT-3             ;PRESET READOUT
005116  112737  000060  012463          MOVB    #60,KBOCT-2
005124  112737  000060  012464          MOVB    #60,KBOCT-1
005132  012737  005412  000060          MOV     #RET117,@#60    ;LOAD KEYBOARD VECTOR
005140  012737  000340  000062          MOV     #340,@#62
005146  052777  000100  176536          BIS     #100,@TKS       ;ENABLE INTERRUPT
005154  012737  000700  005330          MOV     #700,CHRCNT     ;LOAD CHAR COUNT
005162  012700  012470                  MOV     #BUFFER,R0      ;RESET R0
005166  004537  005412          ECHOC:  JSR     R5,MESG         ;EXIT TO DISPLAY A FRAME
005172  000001                          .
005174  012404                          FRAME17                 ;USING THE KEYBOARD HEADER
005176  005737  001052                  TST     LOKRB           ;UPDATE A CHAR?
005202  001012                          BNE     RET21           ;BR IF YES
005204  000770                          BR      ECHOC
005206  017701  173602          RET117: MOV     @TKB,R1         ;GET A CHAR
005212  042701  177600                  BIC     #177600,R1      ;MASK
005216  012737  177777  001052          MOV     #-1,LOKRB       ;SET (FLAG)
005224  000002                          RTI                     ;EXIT
005226  000000                          HALT
005230  005037  001052          RET21:  CLR     LOKRB           ;CLEAR (FLAG)
005234  022701  000003                  CMP     #3,R1           ;TEST FOR PC
005240  001002                          BNE     RET20           ;BR IF NOT
005242  000137  001456                  JMP     STRC            ;RESTART
005246  005337  005330          RET20:  DEC     CHRCNT          ;FINISHED COUNT?
005252  001002                          BNE     1$              ;BR IF NOT
005254  000137  005054                  JMP     FILE17+2        ;RESTART
005260  012702  012465          1$:     MOV     #KBOCT,R2               ;LOAD ADDRESS
005264  010103                          MOV     R1,R3
005266  004737  005332                  JSR     PC,KBCHR                ;LOAD THE OCTAL VALUE
005272  005737  001032                  TST     DSAVE           ;TEST HIGH/LOW BYTE
005276  001007                          BNE     ECHOB
005300  110120                          MOVB    R1,(R0)+        ;SAVE BYTE
005302  112710  000017                  MOVB    #17,(R0)        ;SHIFT-IN
005306  005137  001032                  COM     DSAVE           ;COMP FLAG
005312  000137  005166                  JMP     ECHOC           ;BR BACK
005316  110120                  ECHOB:  MOVB    R1,(0)+         ;SAVE CHAR
005320  005037  001032                  CLR     DSAVE           ;CLEAR FLAG
005324  000137  005166                  JMP     ECHOC           ;BR BACK

005330  000200                  CHRCNT: 200
```

```
1166                                        ;UPDATE OCTAL READOUT
1167
1168  005332  042703  176000          KBCHR:  BIC     #176000,R3
1169  005336  004737  005376                  JSR     PC,10$                  ;LOAD BITS
1170  005342  110443                         MOVB    R4,-(R2)                ;SAVE BITS
1171  005344  004737  005370                  JSR     PC,11$                  ;MOVE BITS
1172  005350  110443                         MOVB    R4,-(R2)                ;SAVE BITS
1173  005352  004737  005370                  JSR     PC,11$                  ;MOVE BITS
1174  005356  110443                         MOVB    R4,-(R2)                ;SAVE BITS
1175  005360  004737  005370                  JSR     PC,11$                  ;MOVE BITS
1176  005364  110443                         MOVB    R4,-(R2)
1177  005366  000207                         RTS     PC
1178  005370  006003                 11$:    ROR     R3
1179  005372  006003                         ROR     R3
1180  005374  006003                         ROR     R3
1181  005376  010304                 10$:    MOV     R3,R4                   ;LOAD R4
1182  005400  042704  177770                BIC     #177770,R4              ;MASK BITS
1183  005404  062704  000060                ADD     #60,R4                  ;MAKE A NUMBER
1184  005410  000207                         RTS     PC
1185
1186  005412  012537  005552          MESG:   MOV     (5)+,COUNT
1187  005416  012537  005554                  MOV     (5)+,FILE
1188  005422  013777  005554  173424        MOV     FILE,@DPC               ;START DISPLAY
1189  005430  005077  173354          MESGA:  CLR     @PSW
1190  005434  000001                         WAIT
1191  005436  005737  002046                  TST     KRBD
1192  005442  001025                         BNE     MESGAB
1193  005444  005337  005552          MESGAA: DEC     COUNT
1194  005450  001405                         BEQ     MESGB
1195  005452  012777  000001  173374        MOV     #1,@DPC                 ;SINGLE STEP THE DISPLAY
1196  005460  000137  005430                  JMP     MESGA
1197  005464  000240                 MESGB:  NOP
1198  005466  005737  002046                  TST     KRBD
1199  005472  001010                         BNE     MESGBA
1200  005474  005037  005556                  CLR     SWITCH
1201  005500  032737  000100  177570        BIT     #BIT6,@#DISPLAY
1202  005506  001402                         BEQ     MESGBA
1203  005510  005137  005556                  COM     SWITCH
1204  005514  000205                 MESGBA: RTS     R5
1205  005516  005737  005556          MESGAB: TST     SWITCH
1206  005522  001350                         BNE     MESGAA
1207  005524  005737  001050                  TST     CHANGE
1208  005530  001745                         BEQ     MESGAA
1209  005532  005037  001050                  CLR     CHANGE
1210  005536  005037  005556                  CLR     SWITCH
1211  005542  005037  001042                  CLR     HOLD
1212  005546  000137  001162                  JMP     SCOPEC
1213  005552  000000          COUNT:  0
1214  005554  000000          FILE:   0
1215  005556  000000          SWITCH: 0
```

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005560  114000                          FRMEO:  POINT
005562  000000                                  0
005564  001100                                  MAXY-277
005566  170052                                  STATSA!ITALO!SYNOFF!GREEN
005570  103124                                  CHAR!INT4!LPOFF!BLKOFF!LINEO
005572     017     017                          .BYTE   17,17
005574  052107  032055  020060                  .ASCIZ  /GT-40 OR GT-44 WITH VR14 VISUAL TEST  <MD-11-DDGTC-B>/
005602  051117  043440  026524
005610  032064  053440  052111
005616  020110  051126  032061
005624  053040  051511  040525
005632  020114  042524  052123
005640  020040  046474  026504
005646  030461  042055  043504
005654  041524  041055  000076
005662     015     012     012                  .BYTE   15,12,12
005665     040  020040  044504                  .ASCII  /    DIRECTORY/
005672  042522  052103  051117
005700     131
005701     015     012     012                  .BYTE   15,12,12
005704  030060  036440  040440                  .ASCII  /00 = A = DIRECTORY/
005712  036440  042040  051111
005720  041505  047524  054522
005726     015     012                          .BYTE   15,12
005730  030460  036440  041040                  .ASCII  /01 = B = DOT REPEATIBILITY/
005736  036440  042040  052117
005744  051040  050105  040505
005752  044524  044502  044514
005760  054524
005762     015     012                          .BYTE   15,12
005764  031060  036440  041440                  .ASCII  /02 = C = PINCUSHION AND VECTOR CURVATURE <X OR Y OFFSET ADJ.>/
005772  036440  050040  047111
006000  052503  044123  047511
006006  020116  047101  020104
006014  042526  052103  051117
006022  041440  051125  040526
006030  052524  042522  036040
006036  020130  051117  054440
006044  047440  043106  042523
006052  020124  042101  027112
006060     076
006061     015     012                          .BYTE   15,12
006063     060  020063  020075                  .ASCII  /03 = D = OCTAGONS OR SQUARES/
006070  020104  020075  041517
006076  040524  047507  051516
006104  047440  020122  050523
006112  040525  042522     123
006117     015     012                          .BYTE   15,12
006121     060  020064  020075                  .ASCII  /04 = E = CHARACTER SET <CHAR. ADJ.>/
006126  020105  020075  044103
006134  051101  041501  042524
006142  020122  042523  020124
006150  041474  040510  027122
006156  040440  045104  037056
006164     015     012                          .BYTE   15,12
```

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1272  006166  032460  036440  043040          .ASCII  /05 = F = DASH LINES AND BLINK/
1273  006174  036440  042040  051501
1274  006202  020110  044514  042516
1275  006210  020123  047101  020104
1276  006216  046102  047111      113
1277  006223      015      012
1278  006230      060  020064  020075          .BYTE   15,12
1279  006236  020107  020075  047510          .ASCII  /06 = G = HORIZONTAL VECTOR ANGLE (ADJ. X VECTOR LENGTH)/
1280  006244  044522  047532  052116
1281  006252  046101  050040  041505
1282  006260  047524  020122  047101
1283  006266  046107  020105  040474
1284  006274  045104  020056  020130
1285  006302  044526  052103  051117
1286  006310  044040  047105  052107
1287  006316  037116
1288  006322      015      012
1289  006330  033460  036440  044040          .BYTE   15,12
1290  006336  036440  050040  051105          .ASCII  /07 = H = VERTICAL VECTOR ANGLE (ADJ. Y VECTOR LENGTH)/
1291  006344  044524  041503  020114
1292  006352  044526  052103  051117
1293  006360  044040  042516  042514
1294  006366  042040  042101  027112
1295  006374  044440  050040  041505
1296  006402  047524  020122  042514
1297  006410  043516  044124      076
1298  006416      015      012
1299  006423      061  020060  020075          .BYTE   15,12
1300  006431  020111  020075  047510          .ASCII  /10 = I = HORIZONTAL PHOSPHOR TEST/
1301  006437  044522  047532  052116
1302  006445  046101  050040  047510
1303  006453  020123  047510  020122
1304  006461  042524  052123
1305  006466      015      012
1306  006473  030461  036440  045040          .BYTE   15,12
1307  006501  036440  050040  051105          .ASCII  /11 = J = VERTICAL PHOSPHOR TEST/
1308  006507  044524  041503  020114
1309  006515  044472  051517  044120
1310  006523  051117  052040  051505
1311  006531      124
1312  006534      015      012
1313  006542      061  020062  020075          .BYTE   15,12
1314  006550  020113  020075  047111          .ASCII  /12 = K = INTENSITY LEVEL AND LIGHT-PEN TEST/
1315  006556  044524  051516  052111
1316  006564  020131  044514  044526
1317  006572  020114  047101  020104
1318  006600  044514  044107  026524
1319  006606  042520  020116  042524
1320  006614  052123
1321  006621      015      012
1322  006626  031461  036440  046040          .BYTE   15,12
1323  006634  036440  042440  043504          .ASCII  /13 = L = EDGE FLAG TEST/
1324  006642  020105  046106  043501
1325  006650  052040  051505      124
1326  006655      015      012
1327  006663      061  020064  020075          .BYTE   15,12
                                              .ASCII  /14 = M = SHORT VECTORS AND RELATIVE POINT/
```

```
006624  020115  020075  044123
006632  051117  020124  042526
006640  052103  051117  020123
006646  047101  020104  [illegible]
006654  040514  [illegible]  [illegible]
006662  050040  044517  052116
006670     015     012                          .BYTE   15,12
006672  032461  036440  047040                  .ASCII  /15 = N = GRAPHPLOT TEST/
006700  036440  043440  040522
006706  044120  046120  052117
006714  052040  051505     124
006721     015     012                          .BYTE   15,12
006724     061  020066  020075                  .ASCII  /16 = O = LIGHT PEN FOLLOW/
006730  020117  020075  044514
006736  044107  020124  042520
006744  020116  047506  046114
006752  053517
006754     015     012                          .BYTE   15,12
006756  033461  036440  050040                  .ASCII  /17 = P = KEYBOARD ECHO TEST/
006764  036440  045440  054505
006772  047502  051101  020104
007000  041505  047510  052040
007006  051505     124
007011     015     012     012                  .BYTE   15,12,12
007014  020040  052522  047502                  .ASCII  /  RUBOUT TO REMAIN ON THE PATTERN/
007022  052125  052040  020117
007030  042522  040515  047111
007036  047440  020116  044124
007044  020105  040520  052124
007052  051105     116
007055     015     012                          .BYTE   15,12
007057     040  041440  020122                  .ASCIZ  /  CR TO SELECT SUB-PICTURE OR STOP MOTION /
007064  047524  051440  046105
007072  041505  020124  052523
007100  026502  044520  052103
007106  051125  020105  051117
007114  051440  047524  020120
007122  047515  044524  047117
007130  000040
                                                .EVEN
007132  173400                                  DSTOP
007134  160000                                  DJMP
007136  005560                                  FRME0

007140                                  FRME1:
007140  170052                                  STATSA!ITAL0!SYNOFF!GREEN
007142  116124                                  POINT!INT0!LPOFF!BLKOFF!LINE0
007144  041000                                  INTX+1000
007146  000600                                  MAXY+1/2
007150  000000                                  INTX+0
007152  000000                                  0
007154  041000                                  INTX+1000
007156  000600                                  MAXY+1/2
007160  041777                                  INTX+1777
007162  000000                                  0
007164  041000                                  INTX+1000
```

```
1384  007166  000600                  MAXY+1/2
1385  007170  041777                  INTX+1777
1386  007172  001377                  MAXY
1387  007174  041000                  INTX+1000
1388  007176  000600                  MAXY+1/2
1389  007200  040000                  INTX
1390  007202  001377                  MAXY
1391  007204  164000                  DNOP
1392  007206  164000                  DNOP
1393  007210  164000                  DNOP
1394  007212  164000                  DNOP
1395  007214  164000                  DNOP
1396  007216  164000                  DNOP
1397  007220  164000                  DNOP
1398  007222  173400                  DSTOP
1399  007224  160000                  DJMP
1400  007226  007140                  FRME1
1401
1402                          ;FILE 2 <ANALOG TUNE-UP TEST >
1403
1404  007230  116524          FRME2:  POINT!INT2!LPOFF!BLKOFF!LINE0
1405  007232  000000                  0
1406  007234  000000                  0
1407  007236  170052                  STATSA!ITALO!SYNOFF!GREEN
1408  007240  110000                  LONGV
1409  007242  041777                  INTX!MAXX                       ; +X, +Y
1410  007244  000000                  0
1411  007246  040000                  INTX                            ; +X, +Y
1412  007250  001377                  MAXY
1413  007252  061777                  INTX!MINUSX!MAXX                ; -X, +Y
1414  007254  000000                  0
1415  007256  040000                  INTX                            ; +X, -Y
1416  007260  021377                  MINUSY!MAXY
1417  007262  041777                  INTX!MAXX                       ; +X, -Y
1418  007264  020000                  MINUSY
1419  007266  060000                  INTX!MINUSX                     ; -X, +Y
1420  007270  001377                  MAXY
1421  007272  061777                  INTX!MINUSX!MAXX                ; -X, -Y
1422  007274  020000                  MINUSY
1423  007276  060000                  INTX!MINUSX                     ; -X, -Y
1424  007300  021377                  MINUSY!MAXY
1425  007302  041777                  INTX!MAXX
1426  007304  001377                  MAXY
1427  007306  061777                  INTX!MINUSX!MAXX
1428  007310  021377                  MINUSX!MAXY
1429  007312  001777                  MAXX
1430  007314  000000                  0
1431  007316  061777                  INTX!MINUSX!MAXX
1432  007320  001377                  MAXY
1433  007322  041777                  INTX!MAXX
1434  007324  021377                  MINUSX!MAXY
1435  007326  173400                  DSTOP
1436  007330  160000                  DJMP
1437  007332  007230                  FRME2
1438
1439                          ;OCTAGONS
```

```
1440
1441  007334  117124          FRME3:  POINT!INT4!LPOFF!BLKOFF!LINE0
1442  007336  000774                  774
1443  007340  000564                  564
1444  007342  170003                  STATSA!ITALO!SYNOFF!GREEN
1445  007344  110000                  LONGV                          ;OCTOGON BY LENGTH OF 7
1446  007346  040007                  INTX+7
1447  007350  000000                  0
1448  007352  040007                  INTX+7
1449  007354  000007                  7
1450  007356  040000                  INTX
1451  007360  000007                  7
1452  007362  040007                  INTX!MINUSX+7
1453  007364  000007                  7
1454  007366  040007                  INTX!MINUSX+7
1455  007370  000000                  0
1456  007372  040007                  INTX!MINUSX+7
1457  007374  020007                  MINUSX+7
1460  007376  040000                  INTX
1461  007400  020007                  MINUSX+7
1462  007402  040007                  INTX+7
1463  007404  020007                  MINUSX+7
1464  007406  114000                  POINT
1465  007410  000770                  770
1466  007412  000550                  550
1467  007414  110000                  LONGV                          ;OCTOGON BY LENGTH OF 17
1470  007416  040017                  INTX+17
1471  007420  000000                  0
1472  007422  040017                  INTX+17
1473  007424  000017                  17
1474  007426  040000                  INTX
1475  007430  000017                  17
1476  007432  040017                  INTX!MINUSX+17
1477  007434  000017                  17
1500  007436  040017                  INTX!MINUSX+17
1501  007440  000000                  0
1502  007442  040017                  INTX!MINUSX+17
1503  007444  020017                  MINUSX+17
1504  007446  040000                  INTX
1505  007450  020017                  MINUSX+17
1506  007452  040017                  INTX+17
1507  007454  020017                  MINUSX+17
1510  007456  114000                  POINT
1511  007460  000760                  760
1512  007462  000520                  520
1513  007464  110000                  LONGV                          ;OCTOGON BY LENGTH OF 37
1514  007466  040037                  INTX+37
1515  007470  000000                  0
1516  007472  040037                  INTX+37
1517  007474  000037                  37
1520  007476  040000                  INTX
1521  007500  000037                  37
1522  007502  040037                  INTX!MINUSX+37
1523  007504  000037                  37
1524  007506  040037                  INTX!MINUSX+37
1525  007510  000000                  0
```

```
1496  007512  060037          INTX!MINUSX+37
1497  007514  020037          MINUSX+37
1498  007516  040000          INTX
1499  007520  020037          MINUSX+37
1500  007522  040037          INTX+37
1501  007524  020037          MINUSX+37
1502  007526  114000          POINT
1503  007530  000740          740
1504  007532  000440          440
1505  007534  110000          LONGV                   ;OCTOGON BY LENGTH OF 77
1506  007536  040077          INTX+77
1507  007540  000000          0
1508  007542  040077          INTX+77
1509  007544  000077          77
1510  007546  040000          INTX
1511  007550  000077          77
1512  007552  060077          INTX!MINUSX+77
1513  007554  000077          77
1514  007556  060077          INTX!MINUSX+77
1515  007560  000000          0
1516  007562  060077          INTX!MINUSX+77
1517  007564  020077          MINUSX+77
1518  007566  040000          INTX
1519  007570  020077          MINUSX+77
1520  007572  040077          INTX+77
1521  007574  020077          MINUSX+77
1522  007576  114000          POINT
1523  007600  000700          700
1524  007602  000300          300
1525  007604  110000          LONGV                   ;OCTOGON BY LENGTH OF 177
1526  007606  040177          INTX+177
1527  007610  000000          0
1528  007612  040177          INTX+177
1529  007614  000177          177
1530  007616  040000          INTX
1531  007620  000177          177
1532  007622  060177          INTX!MINUSX+177
1533  007624  000177          177
1534  007626  060177          INTX!MINUSX+177
1535  007630  000000          0
1536  007632  060177          INTX!MINUSX+177
1537  007634  020177          MINUSX+177
1538  007636  040000          INTX
1539  007640  020177          MINUSX+177
1540  007642  040177          INTX+177
1541  007644  020177          MINUSX+177
1542  007646  114000          POINT
1543  007650  000600          600
1544  007652  000000          0
1545  007654  110000          LONGV                   ;OCTOGON BY LENGTH OF 377
1546  007656  040377          INTX+377
1547  007660  000000          0
1548  007662  040377          INTX+377
1549  007664  000377          377
1550  007666  040000          INTX
1551  007670  000377          377
```

```
1552  007672  060377                  INTX!MINUSX+377
1553  007674  000377                  377
1554  007676  060377                  INTX!MINUSX+377
1555  007700  000000                  0
1556  007702  060377                  INTX!MINUSX+377
1557  007704  020377                  MINUSX+377
1558  007706  040000                  INTX
1559  007710  020377                  MINUSX+377
1560  007712  040377                  INTX+377
1561  007714  020377                  MINUSX+377
1562  007716  177400                  DSTOP
1563  007720  160000                  DJMP
1564  007722  007334                  FRME3
1565                          ;SQUARES   7,17,37,77,177,377,777 WIDE
1566
1567  007724  117124          FRME3A: POINT!INT4!LPOFF!BLKOFF!LINEO          ; BY 7
1568  007726  001000                  1000
1569  007730  000600                  600
1570  007732  170052                  STATSA!ITALO!SYNOFF!GREEN
1571          000007                  Q=7
1572          000004                  R=4
1573  007734  110000                  LONGV                          ;BY 7 AND 4
1574  007736  040007                  INTX+7
1575  007740  000000                  0
1576  007742  040000                  INTX
1577  007744  000007                  7
1578  007746  060007                  INTX!MINUSX+7
1579  007750  000000                  0
1580  007752  040000                  INTX
1581  007754  020007                  MINUSX+7
1582  007756  020004                  MINUSX+4
1583  007760  020004                  MINUSX+4
1584                                  .LIST
1585  007762  110000                  LONGV                          ;BY 17 AND 7
1586  007764  040017                  INTX+17
1587  007766  000000                  0
1588  007770  040000                  INTX
1589  007772  000017                  17
1590  007774  060017                  INTX!MINUSX+17
1591  007776  000000                  0
1592  010000  040000                  INTX
1593  010002  020017                  MINUSX+17
1594  010004  020007                  MINUSX+7
1595  010006  020007                  MINUSX+7
1596                                  .LIST
1597  010010  110000                  LONGV                          ;BY 37 AND 17
1598  010012  040037                  INTX+37
1599  010014  000000                  0
1600  010016  040000                  INTX
1601  010020  000037                  37
1602  010022  060037                  INTX!MINUSX+37
1603  010024  000000                  0
1604  010026  040000                  INTX
1605  010030  020037                  MINUSX+37
1606  010032  020017                  MINUSX+17
1607  010034  020017                  MINUSX+17
```

```
1608
1609  010036  110000                .LIST
1610  010040  040077                LONGV                   ;BY 77 AND 37
1611  010042  000000                INTX+77
1612  010044  040000                0
1613  010046  000077                INTX
1614  010050  060077                77
1615  010052  000000                INTX!MINUSX+77
1616  010054  040000                0
1617  010056  020077                INTX
1618  010060  020037                MINUSX+77
1619  010062  020037                MINUSX+37
1620                                MINUSX+37
1621  010064  110000                .LIST
1622  010066  040177                LONGV                   ;BY 177 AND 77
1623  010070  000000                INTX+177
1624  010072  040000                0
1625  010074  000177                INTX
1626  010076  060177                177
1627  010100  000000                INTX!MINUSX+177
1628  010102  040000                0
1629  010104  020177                INTX
1630  010106  020077                MINUSX+177
1631  010110  020077                MINUSX+77
1632                                MINUSX+77
1633  010112  110000                .LIST
1634  010114  040377                LONGV                   ;BY 377 AND 177
1635  010116  000000                INTX+377
1636  010120  040000                0
1637  010122  000377                INTX
1638  010124  060377                377
1639  010126  000000                INTX!MINUSX+377
1640  010130  040000                0
1641  010132  020377                INTX
1642  010134  020177                MINUSX+377
1643  010136  020177                MINUSX+177
1644                                MINUSX+177
1645  010140  110000                .LIST
1646  010142  040777                LONGV                   ;BY 777 AND 377
1647  010144  000000                INTX+777
1648  010146  040000                0
1649  010150  000777                INTX
1650  010152  060777                777
1651  010154  000000                INTX!MINUSX+777
1652  010156  040000                0
1653  010160  020777                INTX
1654  010162  020377                MINUSX+777
1655  010164  020377                MINUSX+377
1656                                MINUSX+377
1657  010166  173400                .LIST
1658  010170  160000                DSTOP
1659  010172  007724                DJMP
1660                                FRME3A
1661                      ;DASH LINE TEST
1662
1663  010174  117000      FRME5:    POINT!INT4
```

```
1664  010176  000000                    0
1665  010200  001000                    1000
1666  010202  174400                    STATSB!SIZEO
1667  010204  170052                    STATSA!ITALO!SYNOFF!GREEN
1668  010206  100004                    CHAR!LINEO
1669  010210      017     017           .BYTE   17,17
1670  010212  047523  044514  020104    .ASCII /SOLID     /
1671  010220  020040  020040
1672  010224  110004                    LONGV!LINEO
1673  010226  040400                    40400
1674  010230  000000                    0
1675  010232  000400                    400
1676  010234  000000                    0
1677  010236  110030                    LONGV!BLKON
1678  010240  040400                    40400
1679  010242  000000                    0
1680  010244  100020                    CHAR!BLKOFF
1681  010246      015     012     012   .BYTE   15,12,12,12,12,12
1682  010251      012     012     012
1683  010254  040504  044123  044440    .ASCII /DASH I    /
1684  010262  020040  020040
1685  010266  110005                    LONGV!LINE1
1686  010270  040400                    40400
1687  010272  000000                    0
1688  010274  000400                    400
1689  010276  000000                    0
1690  010300  110030                    LONGV!BLKON
1691  010302  040400                    40400
1692  010304  000000                    0
1693  010306  100020                    CHAR!BLKOFF
1694  010310      015     012     012   .BYTE   15,12,12,12,12,12
1695  010313      012     012     012
1696  010316  040504  044123  044440    .ASCII /DASH II   /
1697  010324  020111  020040
1698  010330  110006                    LONGV!LINE2
1699  010332  040400                    40400
1700  010334  000000                    0
1701  010336  000400                    400
1702  010340  000000                    0
1703  010342  110030                    LONGV!BLKON
1704  010344  040400                    40400
1705  010346  000000                    0
1706  010350  100020                    CHAR!BLKOFF
1707  010352      015     012     012   .BYTE   15,12,12,12,12,12
1708  010355      012     012     012
1709  010360  040504  044123  044440    .ASCII /DASH III  /
1710  010366  044511  020040
1711  010372  110007                    LONGV!LINE3
1712  010374  040400                    40400
1713  010376  000000                    0
1714  010400  000400                    400
1715  010402  000000                    0
1716  010404  110030                    LONGV!BLKON
1717  010406  040400                    40400
1718  010410  000000                    0
1719  010412  110024                    LONGV!BLKOFF!LINEO
```

```
1720  010414  000000                    0
1721  010416  000000                    0
1722  010420  173400                    DSTOP
1723  010422  160000                    DJMP
1724  010424  010174                    FRME5
1725
1726                              ;VECTOR LENGTH TEST <FILE 6 AND 7>
1727
1728  010426  114000              FRME6:  POINT
1729  010430  001777                     MAXX
1730  010432  000000                     0
1731  010434  170052                     STATSA!ITALO!SYNOFF!GREEN
1732  010436  113724                     LONGV!INT7!LPOFF!BLKOFF!LINE0
1733  010440  040000                     INTX
1734  010442  001377                     MAXY
1735  010444  114000                     POINT
1736  010446  000000                     0
1737  010450  001377                     MAXY
1738  010452  110000                     LONGV
1739  010454  041777                     INTX!MAXX
1740  010456  000000                     0
1741  010460  173400                     DSTOP
1742  010462  114000              FRME6A: POINT
1743  010464  000000                     0
1744  010466  000000                     0
1745  010470  110000                     LONGV
1746  010472  000000              DELTX6: 0
1747  010474  000000              DELTY6: 0
1748  010476  173400                     DSTOP
1749  010500  160000                     DJMP
1750  010502  010462                     FRME6A
1751
1752
1753                              ;PHOSPHOR TEST
1754
1755  010504  114000              FRME10: POINT
1756  010506  000000              DELTX7: 0
1757  010510  000000                     0
1758  010512  170052                     STATSA!ITALO!SYNOFF!GREEN
1759  010514  113724              DFI10A: LONGV!INT7!LPOFF!BLKOFF!LINE0
1760  010516  040000                     INTX
1761  010520  001377                     MAXY
1762  010522  000002                     2
1763  010524  000000                     0
1764  010526  040000                     INTX
1765  010530  021377                     MINUSY!MAXY
1766  010532  000002                     2
1767  010534  000000                     0
1768  010536  173400                     DSTOP
1769  010540  160000                     DJMP
1770  010542  010514                     DFI10A
1771
1772                              ;PHOSPHOR TEST
1773
1774  010544  114000              FRME11: POINT
1775  010546  000000                     0
```

```
  1776  010550  000000                DELTY7: 0
  1777  010552  170052                        STATSA!ITALO!SYNOFF!GREEN
  1778  010554  113724                DFI11C: LONGV!INT7!LPOFF!BLKOFF!LINE0
  1779  010556  041777                        INTX!MAXX
  1780  010560  000000                        0
  1781  010562  000000                        0
  1782  010564  000002                        2
  1783  010566  061777                        INTX!MINUSX!MAXX
  1784  010570  000000                        0
  1785  010572  000000                        0
  1786  010574  000002                        2
  1787  010576  173400                        DSTOP
  1788  010600  160000                        DJMP
  1789  010602  010554                        DFI11C
  1790
  1791  010604  117604                FRM10:  POINT!INT7!LINE0
  1792  010606  000000                        0
  1793  010610  000000                        0
  1794  010612  110000                        LONGV
  1795  010614  041777                        INTX!MAXX
  1796  010616  000000                        0
  1797  010620  040000                        INTX
  1798  010622  001377                        MAXY
  1799  010624  061777                        INTX!MINUSX!MAXX
  1800  010626  000000                        0
  1801  010630  040000                        INTX
  1802  010632  021377                        MINUSX!MAXY
  1803  010634  173400                        DSTOP
  1804  010636  160000                        DJMP
  1805  010640  010604                        FRM10
  1806
  1807                                  ;INTENSITY TEST
  1808
  1809  010642  114164                FRME12: POINT!LINE0!LPON!BLKOFF
  1810  010644  000000                        0
  1811  010646  001200                        1200
  1812  010650  170252                SYN12:  STATSA!LPLITE!SYNOFF!ITALO!GREEN
  1813  010652  103600                        CHAR!INT7
  1814  010654     017      017               .BYTE   17,17
  1815  010656  047111  042524  051516        .ASCII /INTENSITY 7   /
  1816  010664  052111  020131  020067
  1817  010672  020040
  1818  010674  110000                        LONGV
  1819  010676  041000                        41000
  1820  010700  000000                        0
  1821  010702  130000                        RELATV
  1822  010704  057600                        57600
  1823  010706  103400                        CHAR!INT6
  1824  010710     015      012      012      .BYTE 15,12,12,12
  1825  010713     012
  1826  010714  047111  042524  051516        .ASCII /INTENSITY 6   /
  1827  010722  052111  020131  020066
  1828  010730  020040
  1829  010732  110000                        LONGV
  1830  010734  041000                        41000
  1831  010736  000000                        0
```

```
1832  010740  130000                          RELATV
1833  010742  057600                          57600
1834  010744  103200                          CHAR!INT5
1835  010746     015      012      012        .BYTE 15,12,12,12
1836  010751     012
1837  010752  047111  042524  051516          .ASCII /INTENSITY 5   /
1838  010760  052111  020131  020065
1839  010766  020040
1840  010770  110000                          LONGV
1841  010772  041000                          41000
1842  010774  000000                          0
1843  010776  130000                          RELATV
1844  011000  057600                          57600
1845  011002  103000                          CHAR!INT4
1846  011004     015      012      012        .BYTE 15,12,12,12
1847  011007     012
1848  011010  047111  042524  051516          .ASCII /INTENSITY 4   /
1849  011016  052111  020131  020064
1850  011024  020040
1851  011026  110000                          LONGV
1852  011030  041000                          41000
1853  011032  000000                          0
1854  011034  130000                          RELATV
1855  011036  057600                          57600
1856  011040  102600                          CHAR!INT3
1857  011042     015      012      012        .BYTE 15,12,12,12
1858  011045     012
1859  011046  047111  042524  051516          .ASCII /INTENSITY 3   /
1860  011054  052111  020131  020063
1861  011062  020040
1862  011064  110000                          LONGV
1863  011066  041000                          41000
1864  011070  000000                          0
1865  011072  130000                          RELATV
1866  011074  057600                          57600
1867  011076  102400                          CHAR!INT2
1868  011100     015      012      012        .BYTE 15,12,12,12
1869  011103     012
1870  011104  047111  042524  051516          .ASCII /INTENSITY 2   /
1871  011112  052111  020131  020062
1872  011120  020040
1873  011122  110000                          LONGV
1874  011124  041000                          41000
1875  011126  000000                          0
1876  011130  130000                          RELATV
1877  011132  057600                          57600
1878  011134  102200                          CHAR!INT1
1879  011136     015      012      012        .BYTE 15,12,12,12
1880  011141     012
1881  011142  047111  042524  051516          .ASCII /INTENSITY 1   /
1882  011150  052111  020131  020061
1883  011156  020040
1884  011160  110000                          LONGV
1885  011162  041000                          41000
1886  011164  000000                          0
1887  011166  130000                          RELATV
```

```
1888  011170  057600                          57600
1889  011172  102000                          CHAR!INTO
1890  011174      015      012      012       .BYTE 15,12,12,12
1891  011177      012
1892  011200  047111  042524  051516          .ASCII /INTENSITY 0   /
1893  011206  052111  020131  020060
1894  011214  020040
1895  011216  110000                          LONGV
1896  011220  041000                          41000
1897  011222  000000                          0
1898  011224  130000                          RELATV
1899  011226  057600                          57600
1900  011230  164000                          DNOP
1901  011232  164000                          DNOP
1902  011234  164000                          DNOP
1903  011236  164000                          DNOP
1904  011240  164000                          DNOP
1905  011242  164000                          DNOP
1906  011244  164000                          DNOP
1907  011246  164000                          DNOP
1908  011250  173400              RAYLPA:     DSTOP
1909  011252  164000                          DNOP
1910  011254  164000                          DNOP
1911
1912  011256  117100              DFI12A:     POINT!INT4!LPOFF
1913  011260  001500                          1500
1914  011262  001200              LPPNT:      1200
1915  011264  100000                          CHAR
1916  011266  044514  044107  020124          .ASCIZ  /LIGHT PEN HIT/
1917  011274  042520  020116  044510
1918  011302  000124
1919                                          .EVEN
1920  011304  173400                          DSTOP
1921  011306  160000                          DJMP
1922  011310  010642                          FRME12
1923
1924                          ;EDGE FILE
1925
1926  011312  117124              FRME13:     POINT!INT4!LPOFF!BLKOFF!LINE0
1927  011314  000000                          0
1928  011316  000000                          0
1929  011320  170052                          STATSA!ITALO!SYNOFF!GREEN
1930  011322  100000                          CHAR
1931  011324      017      017                .BYTE   17,17
1932  011326  110000                          LONGV
1933  011330  041777                          INTX!MAXX
1934  011332  000000                          0
1935  011334  040000                          INTX
1936  011336  001377                          MAXY
1937  011340  061777                          INTX!MINUSX!MAXX
1938  011342  000000                          0
1939  011344  040000                          INTX
1940  011346  021377                          MINUSY!MAXY
1941  011350  114000                          POINT
1942  011352  000100                          100
1943  011354  000300                          300                         ;LEFT SIDE
```

```
1944  011356  110000                  LONGV
1945  011360  040000                  INTX
1946  011362  000400                  400
1947  011364  040200                  INTX!MINUSX+200
1948  011366  000000                  0
1949  011370  040000                  INTX
1950  011372  020400                  MINUSY+400
1951  011374  040200                  INTX+200
1952  011376  000000                  0
1953  011400  114000                  POINT
1954  011402  000200                  200                     ;TOP SIDE
1955  011404  001300                  MAXY+1-100
1956  011406  110000                  LONGV
1957  011410  040400                  INTX+400
1958  011412  000000                  0
1959  011414  040000                  INTX
1960  011416  000200                  200
1961  011420  040200                  INTX!MINUSX+400
1962  011422  000000                  0
1963  011424  040000                  INTX
1964  011426  020200                  MINUSY+200
1965  011430  114000                  POINT                   ;RIGHT SIDE
1966  011432  001700                  1700
1967  011434  001100                  MAXY+1-300
1968  011436  110000                  LONGV
1969  011440  040000                  INTX
1970  011442  020400                  MINUSY+400
1971  011444  040200                  INTX+200
1972  011446  000000                  0
1973  011450  040000                  INTX
1974  011452  000400                  400
1975  011454  040200                  INTX!MINUSX+200
1976  011456  000000                  0
1977  011460  114000                  POINT
1978  011462  001600                  1600                    ;BOTTOM SIDE
1979  011464  000100                  100
1980  011466  110000                  LONGV
1981  011470  040400                  INTX!MINUSX+400
1982  011472  000000                  0
1983  011474  040000                  INTX
1984  011476  020200                  MINUSY+200
1985  011500  040400                  INTX+400
1986  011502  000000                  0
1987  011504  040000                  INTX
1988  011506  000200                  200
1989  011510  114000                  POINT
1990  011512  001777                  MAXX
1991  011514  000400                  400
1992  011516  110000                  LONGV
1993  011520  000020                  20
1994  011522  000000                  0
1995  011524  100000                  CHAR
1996  011526    015   101             .BYTE   15,101          ;"CR" AND AN "A"
1997  011530  114000                  POINT
1998  011532  000000                  0
1999  011534  000500                  500
```

```
2000  011536  110000                  LONGV
2001  011540  002012                  MINUSX+12
2002  011542  000000                  0
2003  011544  100000                  CHAR
2004  011546  040102          102     .BYTE   40,102          ;"SPACE" AND AN "B"
2005  011550  164000                  DNOP
2006  011552  164000                  DNOP
2007  011554  173400                  DSTOP
2008  011556  164000                  DNOP
2009  011560  164000                  DNOP
2010  011562  160000                  DJMP
2011  011564  011312                  FRME13
2012
```

```
2013
2014
2015  011566  170052  FRME14: STATSA!ITALO!SYNOFF!GREEN
2016  011570  117124          POINT!INT4!BLKOFF!LPOFF!LINE0
2017  011572  000000  FRM14A: 0
2018  011574  000000  FRM14B: 0
2019  011576  104000          SHORTV
2020  011600  056200          INTX+16200
2021  011602  056271          INTX+16200+71
2022  011604  040071          INTX+71
2023  011606  076271          INTX!MINUSX+16200+71
2024  011610  076200          INTX!MINUSX+16200
2025  011612  076371          INTX!MINUSX+16200+MINSUY+71
2026  011614  040171          INTX+MINSUY+71
2027  011616  056371          INTX+16200+MINSUY+71
2028  011620  020504          20504
2029  011622  164000          DNOP
2030  011624  164000          DNOP
2031  011626  130000          RELATV
2032  011630  057000          INTX+17000
2033  011632  057074          INTX+17000+74
2034  011634  040074          INTX+74
2035  011636  077074          INTX!MINUSX+17000+74
2036  011640  077000          INTX!MINUSX+17000
2037  011642  077174          INTX!MINUSX+17000+MINSUY+74
2038  011644  040174          INTX+MINSUY+74
2039  011646  057174          INTX+17000+MINSUY+74
2040  011650  020504          20504
2041  011652  164000          DNOP
2042  011654  164000          DNOP
2043  011656  104000          SHORTV
2044  011660  057600          INTX+17600
2045  011662  057677          INTX+17600+77
2046  011664  040077          INTX+77
2047  011666  077677          INTX!MINUSX+17600+77
2048  011670  077600          INTX!MINUSX+17600
2049  011672  077777          INTX!MINUSX+17600+MINSUY+77
2050  011674  040177          INTX+MINSUY+77
2051  011676  057777          INTX+17600+MINSUY+77
2052  011700  020504          20504
2053  011702  164000          DNOP
2054  011704  164000          DNOP
2055  011706  173400          DSTOP
2056  011710  160000          DJMP
2057  011712  011566          FRME14
```

```

 011714  117724                          FRME16: POINT!INT7!LPOFF!BLKOFF!LINEO
 011716  000000                                  0
 011720  001200                                  MAXY-177
 011722  170052                                  STATSA!ITALO!SYNOFF!GREEN
 011724  100000                                  CHAR
 011726     017     017                          .BYTE   17,17
 011730  044514  044107  020124                  .ASCII  /LIGHT PEN FOLLOW TEST /
 011736  042520  020116  047506
 011744  046114  053517  052040
 011752  051505  020124
 011756     015     012     012                  .BYTE   15,12,12
 011761     130  020075                          .ASCII  /X= /
 011764  030061  030060                  DLT14A: .ASCII  /1000/
 011770     015     012     012                  .BYTE   15,12,12
 011773     131  020075                          .ASCII  /Y= /
 011776  033060  030060                  DLT14B: .ASCII  /0600/
 012002  114140                                  POINT!LPON
 012004  001000                          RAY14A: 1000
 012006  000600                          RAY14B: 600
 012010  164000                                  DNOP
 012012  164000                                  DNOP
 012014  130000                                  RELATV
 012016  074000                          TAB16A: INTX!MINUSX+14000
 012020  041000                                  INTX+1000
 012022  041000                                  INTX+1000
 012024  041000                                  INTX+1000
 012026  041000                                  INTX+1000
 012030  041000                                  INTX+1000
 012032  041000                                  INTX+1000
 012034  041000                                  INTX+1000
 012036  041000                                  INTX+1000
 012040  041000                                  INTX+1000
 012042  041000                                  INTX+1000
 012044  041000                                  INTX+1000
 012046  041000                                  INTX+1000
 012050  041000                                  INTX+1000
 012052  041000                                  INTX+1000
 012054  041000                                  INTX+1000
 012056  041000                                  INTX+1000
 012060  041000                                  INTX+1000
 012062  041000                                  INTX+1000
 012064  041000                                  INTX+1000
 012066  041000                                  INTX+1000
 012070  041000                                  INTX+1000
 012072  041000                                  INTX+1000
 012074  041000                                  INTX+1000
 012076  041000                                  INTX+1000
 012100  164000                                  DNOP
 012102  164000                                  DNOP
 012104  164000                                  DNOP
 012106  164000                                  DNOP
 012110  164000                                  DNOP
 012112  164000                                  DNOP
 012114  164000                                  DNOP
 012116  164000                                  DNOP
```

```
        012120  164000                          DNOP
        012122  164000                          DNOP
        012124  130000                          RELATV
        012126  034000                          MINUSX+14000
        012130  040160                  TAB16B: INTX!MINSUY+60
        012132  040004                          INTX+4
        012134  040004                          INTX+4
        012136  040004                          INTX+4
        012140  040004                          INTX+4
        012142  040004                          INTX+4
        012144  040004                          INTX+4
        012146  040004                          INTX+4
        012150  040004                          INTX+4
        012152  040004                          INTX+4
        012154  040004                          INTX+4
        012156  040004                          INTX+4
        012160  040004                          INTX+4
        012162  040004                          INTX+4
        012164  040004                          INTX+4
        012166  040004                          INTX+4
        012170  040004                          INTX+4
        012172  040004                          INTX+4
        012174  040004                          INTX+4
        012176  040004                          INTX+4
        012200  040004                          INTX+4
        012202  040004                          INTX+4
        012204  040004                          INTX+4
        012206  040004                          INTX+4
        012210  040004                          INTX+4
        012212  164000                          DNOP
        012214  164000                          DNOP
        012216  164000                          DNOP
        012220  164000                          DNOP
        012222  164000                          DNOP
        012224  164000                          DNOP
        012226  164000                          DNOP
        012230  164000                          DNOP
        012232  110000                          LONGV
        012234  000000                          0
        012236  000077                          77
        012240  040160                  PNT16A: INTX+160
        012242  020160                          MINUSX+160
        012244  060160                  PNT16B: INTX!MINUSX+160
        012246  020160                          MINUSX+160
        012250  060160                  PNT16C: INTX!MINUSX+160
        012252  000160                          160
        012254  040160                  PNT16D: INTX+160
        012256  000160                          160
        012260  164000                          DNOP
        012262  164000                          DNOP
        012264  164000                          DNOP
        012266  164000                          DNOP
        012270  164000                          DNOP
        012272  164000                          DNOP
        012274  173400                          DSTOP
        012276  160000                          DJMP
```

```
        012300  011714                            FRME16

        012302  117724                    FRM16A: POINT!INT7!LPOFF!BLKOFF!LINEO
        012304  000000                            0
        012306  001200                            MAXY-177
        012310  170052                            STATSA!ITALO!SYNOFF!GREEN
        012312  100000                            CHAR
        012314     017     017                    .BYTE   17,17
        012316  044514  044107  020124            .ASCII  /LIGHT PEN FIELD OF VIEW /
        012324  042520  020116  044506
        012332  046105  020104  043117
        012340  053040  042511  020127
        012346     015     012     012            .BYTE   15,12,12
        012351     116  046525  042502            .ASCII  /NUMBER OF HITS = 0000/
        012356  020122  043117  044040
        012364  052111  020123  020075
        012372  030060  030060
        012376  173400                    FRM16B: DSTOP
        012400  160000                            DJMP
        012402  012302                            FRM16A

        012404  114124                    FRME17: POINT!LPOFF!BLKOFF!LINEO                        ;MUST BE JUST BEFORE THE BUFFER
        012406  000000                            0
        012410  001200                            MAXY-177
        012412  170052                            STATSA!ITALO!SYNOFF!GREEN
        012414  103000                            CHAR!INT4
        012416     017     017                    .BYTE   17,17
        012420  042513  041131  040517            .ASCIZ  /KEYBOARD ECHO TEST/
        012426  042122  042440  044103
        012434  020117  042524  052123
        012442     000
        012443     015     012     012            .BYTE   15,12,12
        012446  044103  051101  047440            .ASCII  /CHAR OCT = /
        012454  052103  036440     040
        012461     000     000     000            .BYTE   0,0,0,0
        012464     000
        012465     015     012     012    KBOCT:  .BYTE   15,12,12

        012470  164000                    BUFFER: DNOP

                000001                            .END
```

```
BIT6   = 000100   592#  1201
BLKOFF= 000020   592#  687  1221  1374  1404  1441  1567  1680  1693  1706  1719  1732  1759
                1778  1809  1826  2016  2059  2172  2191
BLKON  = 000030   592#  1677  1690  1703  1716
BUFFER  012470    401   402   403   404   405   406   610   637   651   684   706   755*  758
                 760*  763   904   914   947   957   973   981  1009  1017  1036  1111*  1118
                1120  1132  2208#
CHANGE  001050    414#  572*  1207  1209*
CHAR   = 100000   592#  690  1221  1668  1680  1693  1706  1813  1823  1834  1845  1856  1867
                1878  1889  1915  1930  1995  2003  2063  2176  2195
CHRCNT  005330   1131*  1140*  1165#
CNTR    001046    413#  646*  657*  663*  669*  676*  784*  796*  811*  823*  917*  920*  1054*
                1059*
COUNT   005552   1186*  1193*  1213#
CRLF    002670    728   733#
DBUF    001016    401#
DBUF1   001020    402#
DBUF2   001022    403#
DBUF3   001024    404#
DBUF4   001026    405#  982*  983   985*
DBUF5   001030    406#  975*  978*
DDONE   001064    426#  516   520   546*
DDONE1  001066    427#  547*
DELTX6  010472    781*  813*  820*  1746#
DELTX7  010606    835*  845*  846   1756#
DELTY6  010474    786*  793*  809*  1747#
DELTY7  010550    852*  862*  863   1776#
DFI10A  010514   1759#  1770
DFI11C  010554   1778#  1789
DFI12A  011256   1912#
DFLISB  004242    977   979#  984
DFLISC  004144    964#
DFLISD  004220    975#  987
DISPLA= 177570    375#  440   443   451   540   1201
DISPTC  001210    458   460#
DJMP   = 160000   592#  636   705   913   972   1016  1369  1399  1436  1563  1658  1723  1749
                1769  1788  1804  1921  2010  2056  2169  2188
DLT14A  011764    530*  531*  1076  2071#
DLT14B  011776    532*  533*  1079  2074#
DNOP   = 164000   592#  885   1391  1392  1393  1394  1395  1396  1397  1900  1901  1902  1903
                1904  1905  1906  1907  1909  1910  2005  2006  2008  2009  2029  2030  2041
                2042  2053  2054  2078  2079  2106  2107  2108  2109  2110  2111  2112  2113
                2114  2115  2143  2144  2145  2146  2147  2148  2149  2150  2162  2163  2164
                2165  2166  2167  2208
DPC     001054    421#  510   514   889*  1084*  1188*  1195*
DSAVE   001032    407#  785*  794*  812*  821*  872*  881*  965*  967*  968  974*  986*  1010*
                1039*  1123*  1154  1158*  1161*
DSAVE1  001034    408#  783*  786   801*  808*  813   828*  1008*  1042*
DSAVE2  001036    409#  782*  802*  810*  829*
DSAVE3  001040    410#
DSR     001056    422#  554
DSTOP  = 173400   592#  635   704   883   912   971   1015  1119  1368  1398  1435  1562  1657
                1722  1741  1748  1768  1787  1803  1908  1920  2007  2055  2168  2187
D7A     003330    836#  844   847
D7C     003360    845#
D7D     003404    853#  861   864
```

```
D7F     003434            862#
ECHOA   005060           1119#  1121
ECHOB   005316           1155   1160#
ECHOC   005166           1133#  1138   1159   1162
FILE    005554           1187*  1188   1214#
FILE0   002050            460    524    595#   998
FILE1   002104            461    602#
FILE10  003322            468    634#
FILE11  003376            469    651#
FILE12  003452            470    669#
FILE13  003614            471    836#
FILE14  003626            472    903#
FILE15  004106            473    950    956#
FILE16  004342            474   1005#  1044
FILE17  005052            475   1117#  1150
FILE2   002074            462    609#
FILE2A  002274            638    646#
FILE2B  002302            647#   658
FILE2C  002322            648    654#
FILE2D  002332            652    657#
FILE3   002340            463    662#
FILE3A  002350            664#   670    677
FILE3B  002376            665    673#
FILE4   002414            464    671    683#
FILE4A  002746            707    754#
FILE5   003024            465    767    773#
FILE6   003036            466    780#
FILE7   003170            467    807#
FILLA   002716            740#   743
FILLIT  002712            723    727    739#
FIL14A  003734            915    924#
FLE12A  003476            873#   884
FLE12B  003514            874    877#
FLE12C  003522            876    878#
FLE12D  003606            882    891#
FRME0   005560            598   1217#  1370
FRME1   007140            605   1372#  1400
FRME10  010504            838   1755#
FRME11  010544            855   1774#
FRME12  010642            880   1809#  1922
FRME13  011312            899   1926#  2011
FRME14  011566            928    934    939    944    2015#  2057
FRME16  011714           1027   2059#  2170
FRME17  012404           1135   2191#
FRME2   007230            656   1404#  1437
FRME3   007334            668   1441#  1564
FRME3A  007724            675   1567#  1659
FRME5   010174            776   1663#  1724
FRME6   010426            789    816   1728#
FRME6A  010462            792    819   1742#  1750
FRM10   010604            841    858   1791#  1805
FRM14A  011572            925*   930*   935*   940*   2017#
FRM14B  011574            926*   931*   936*   941*   2018#
FRM16A  012302           1032   2172#  2189
FRM16B  012376           1019*  1020*  1072   2187#
GRAPHX= 120000            592#   963
```

```
GRAPHY= 124000          592#
GREEN = 000002          592#   686    961   1220   1373   1407   1444   1570   1667   1731   1758   1777   1812
                       1929   2015   2062   2175   2194
GSADD   001000          343#   511
GSBRL   001004          345#   871   1007
GSVCT   001002          394#   517
HERE    004330          990    998#
HIGPWR  001302          486    491#
HITCNT  005050         1018*  1070*  1071   1114#
HOLD    001042          411#   445    523*   527*   574*   578*   580*  1211*
ICNT    001006          397#
INCR  = 000100          592#   962    965
INTX  = 040000          592#   613    621    625    633    781    808    918   1049   1111   1375   1377   1379
                       1381   1383   1385   1387   1389   1409   1411   1413   1415   1417   1419   1421   1423
                       1425   1427   1431   1433   1446   1448   1450   1452   1454   1456   1458   1460   1466
                       1468   1470   1472   1474   1476   1478   1480   1486   1488   1490   1492   1494   1496
                       1498   1500   1506   1508   1510   1512   1514   1516   1518   1520   1526   1528   1530
                       1532   1534   1536   1538   1540   1546   1548   1550   1552   1554   1556   1558   1560
                       1574   1576   1578   1580   1586   1588   1590   1592   1598   1600   1602   1604   1610
                       1612   1614   1616   1622   1624   1626   1628   1634   1636   1638   1640   1646   1648
                       1650   1652   1733   1739   1760   1764   1779   1783   1795   1797   1799   1801   1933
                       1935   1937   1939   1945   1947   1949   1951   1957   1959   1961   1963   1969   1971
                       1973   1975   1981   1983   1985   1987   2020   2021   2022   2023   2024   2025   2026
                       2027   2032   2033   2034   2035   2036   2037   2038   2039   2044   2045   2046   2047
                       2048   2049   2050   2051   2081   2082   2083   2084   2085   2086   2087   2088   2089
                       2090   2091   2092   2093   2094   2095   2096   2097   2098   2099   2100   2101   2102
                       2103   2104   2105   2118   2119   2120   2121   2122   2123   2124   2125   2126   2127
                       2128   2129   2130   2131   2132   2133   2134   2135   2136   2137   2138   2139   2140
                       2141   2142   2154   2156   2158   2160
INT0  = 002000          592#   1374   1889
INT1  = 002200          592#   1878
INT2  = 002400          592#   1404   1867
INT3  = 002600          592#   1856
INT4  = 003000          592#   640    687    908   1221   1441   1567   1663   1845   1912   1926   2016   2195
INT5  = 003200          592#   1834
INT6  = 003400          592#   1823
INT7  = 003600          592#   958    1011   1732   1759   1778   1791   1813   2059   2172
ITALO = 000040          592#   686    699    721    961   1220   1373   1407   1444   1570   1667   1731   1758
                       1777   1812   1929   2015   2062   2175   2194
ITAL1 = 000060          592#   702    725
KBCHR   005332         1073   1077   1080   1153   1168#
KBOCT   012465         1124*  1125*  1126*  1127*  1151   2206#
KRBO    002046          437    539*   542*   590#   1191   1198
KYT1    002014          568    580#
KYT2    001774          570    576#
KYT3    002024          565    584#
KYT4    002036          577    588#
KYT5    001736          568#   589
LADVT   003714          918#   921
LINE0 = 000004          592#   687    908   1011   1221   1374   1404   1441   1567   1668   1672   1719   1732
                       1759   1778   1791   1809   1926   2016   2059   2172   2191
LINE1 = 000005          592#   1685
LINE2 = 000006          592#   1698
LINE3 = 000007          592#   1711
LOADAC  004534         1047#  1055
LOADBF  002624          694    696    698    721#
```

```
LOADSP  002564          700     703     709#
LOADUP  004556         1014    1054#
LOADVT  003706          909     911     917#
LOGICA  004316          993#
LOKR6   001052          415#   1122*    1136    1141*   1144*
LONGV = 110000          592#    643     1056    1408    1445    1465    1485    1505    1525    1545    1573    1585    1597
                       1609    1621     1633    1645    1672    1677    1685    1690    1698    1703    1711    1716    1719
                       1732    1738     1745    1759    1778    1794    1818    1829    1840    1851    1862    1873    1884
                       1895    1932     1944    1956    1968    1980    1992    2000    2151
LOOPA   003062          784#    800     803
LOOPA1  003070          785#    797
LOOPA2  003114          790#    795
LOOPA3  003140          796#
LOOPB   003214          811#    827     830
LOOPB1  003222          812#    824
LOOPB2  003246          817#    822
LOOPB3  003272          823#
LOWPWR  001250          381     479#    498
LOWSV   001300          485*    489#    491
LPDARK= 000300          592#
LPLITE= 000200          592#   1812
LPOFF = 000100          592#    687     1221    1374    1404    1441    15[illegible]    1732    1759    1778    1912    1926    2016
                       2059    2172    2191
LPON  = 000140          592#   1011     1809    2075
LPPNT   011262          886*    887*    1914#
LPVCT   001070          429#    548*    870*    891*    1006*
LPVCT1  001072          430#    548     549*    871*    891     1007*
MAXSX = 017600          592#
MAXSY = 000077          592#
MAXX  = 001777          592#    625     627     633     781     1409    1413    1417    1421    1425    1427    1429    1431
                       1433    1729     1739    1779    1783    1795    1799    1933    1937    1990
MAXY  = 001377          592#    614     616     622     624     689     755     785     809     863     907     936     941
                       1219    1376     1380    1384    1386    1388    1390    1412    1416    1420    1424    1426    1428
                       1432    1434     1734    1737    1761    1765    1798    1802    1936    1940    1955    1967    2061
                       2174    2193
MESG    005412          596     603     649     654     666     673     756     761     774     787     790     814     817
                        836     839     853     856     878     897     927     932     937     942     945     979    1025
                       1030    1034     1133    1186#
MESGA   005430          890    1086     1189#   1196
MESGAA  005444         1193#   1206     1208
MESGAB  005516         1192    1205#
MESGB   005464         1194    1197#
MESGBA  005514         1199    1202     1204#
MINSUY= 000100          592#   2025     2026    2027    2037    2038    2039    2049    2050    2051    2118
MINUSX= 020000          592#    616     619     627     632     1058    1413    1419    1421    1423    1427    1428    1431
                       1434    1452     1454    1456    1457    1459    1461    1472    1474    1476    1477    1479    1481
                       1492    1494     1496    1497    1499    1501    1512    1514    1516    1517    1519    1521    1532
                       1534    1536     1537    1539    1541    1552    1554    1556    1557    1559    1561    1578    1581
                       1582    1583     1590    1593    1594    1595    1602    1605    1606    1607    1614    1617    1618
                       1619    1626     1629    1630    1631    1638    1641    1642    1643    1650    1653    1654    1655
                       1783    1799     1802    1937    1947    1961    1975    1981    2001    2023    2024    2025    2035
                       2036    2037     2047    2048    2049    2081    2117    2155    2156    2157    2158
MINUSY= 020000          592#   1416     1418    1422    1424    1765    1940    1950    1964    1970    1984
PC     =%000007         372#    448*     456*    526*    552*    611*    623*    644*    694*    696*    698*    700*    701*
                        703*    719*     723*    724*    727*    728*    729*    737*    750*    909*    911*    922*    993*
                       1014*   1052*    1055*   1061*   1073*   1077*   1080*   1153*   1169*   1171*   1173*   1175*   1177*
```

```
                1184*
PNT16A  012240  2154*
PNT16B  012244  2156*
PNT16C  012250  2158*
PNT16D  012254  2160*
POINT = 114000   592*   640    687    905    958   1011   1217   1374   1404   1441   1462   1482   1502
                1522   1542   1567   1663   1728   1735   1742   1755   1774   1791   1809   1912   1926
                1941   1953   1965   1977   1989   1997   2016   2059   2075   2172   2191
PSW     001010   398*   509*  1189*
Q     = 001777  1571*  1573   1584*  1585   1596*  1597   1608*  1609   1620*  1621   1632*  1633   1644*
                1645   1656*
R     = 000777  1572*  1573   1584*  1585   1596*  1597   1608*  1609   1620*  1621   1632*  1633   1644*
                1645   1656*
RAYLPA  011250   883*   885*  1908*
RAY14A  012004   528*  1082*  2076*
RAY14B  012006   529*  1081*  2077*
RED   = 000003   592*
RELATV= 130000   592*   910   1048   1821   1832   1843   1854   1865   1876   1887   1898   2031   2080
               2116
RETB    001700   543    562*
RETLP   003550   870    885*
RET117  005206  1128   1139*
RET14   004614  1006   1064*
RET20   005246  1146   1148*
RET21   005230  1137   1144*
R0    =%000000   365*   479    497*   510*   514    516*   520    610*   613*   614*   615*   616*   619*
                620*   621*   622*   625*   626*   627*   628*   631*   632*   633*   634*   635*   636*
                637*   640*   641*   642*   643*   684*   699*   702*   704*   705*   706*   709*   712*
                718*   721*   725*   747*   904*   957*   961*   989*   993   1009*  1011*  1012*  1013*
               1015*  1016*  1017*  1048*  1049*  1056*  1057*  1058*  1094*  1095*  1096*  1097*  1100*
               1103*  1104*  1105*  1106*  1109*  1118*  1120   1132*  1156*  1157*
R1    =%000001   366*   480    496*   511*   512    513*   517*   518    519*   612*   617*   624*   629*
               1047*  1050*  1092*  1099*  1108*  1111*  1139*  1140*  1145   1152   1156   1160
R2    =%000002   367*   481    495*   710*   712    713*   714    722*   726*   740    741*  1072*  1076*
               1079*  1093*  1151*  1170*  1172*  1174*  1176*
R3    =%000003   368*   482    494*   711*   712*   739*   742*   746*   748*  1071*  1075*  1078*  1152*
               1168*  1178*  1179*  1180*  1181
R4    =%000004   369*   451*   452*   453*   458    483    493*   524*   571*  1170   1172   1174   1176
               1181*  1182*  1183*
R5    =%000005   370*   484    492*   649*   654*   756*   761*   927*   932*   937*   942*   945*   964*
                969*  1025*  1030*  1034*
SCOPE = 104000   373*   595    602    609    662    683    773    780    807    834    851    869    896
                903    956   1005   1117
SCOPEA  001100   385    437*
SCOPEB  001156   444    451*
SCOPEC  001162   452*  1212
SCOPED  001170   446    454*   507
SCOPEE  001126   441    443*
SCOPEF  001136   438    445*
SETPNT  002252   611    623    640*
SETUP   001536   448    456    526    536*
SETUPA  001622   541    546*
SETUPB  001664   546    554*
SHORTV= 104000   592*   908   2019   2043
SIZE0 = 000400   592*   685   1666
SIZE1 = 000600   592*
```

```
SP      =X000006        371#    454#    479#    480#    481#    482#    483#    484#    485     491#    492     493     494
                        495     496     497     499#    508#    888     1085
SPACE   002730          701     724     746#
START   001356          340     508#
STATSA= 170000          592#    666     699     702     721     725     961     1220    1373    1407    1444    1570    1667
                        1731    1758    1777    1812    1929    2015    2062    2175    2194
STATSB= 174000          592#    666     962     983     985     1666
STCHAR  002666          693#    695#    697#    722     726     731#
STKPTR= 000500          374#    454     499     508
STRA    001400          512#    515
STRB    001424          518#    521
STRC    001456          526#    1147
SWITCH  005556          439#    442#    522#    566#    573#    584#    647     664     799     826     843     860     873
                        976     1022    1068    1200#   1203#   1205    1210#   1215#
SYNOFF= 000010          592#    666     961     1220    1373    1407    1444    1570    1667    1731    1758    1777    1812
                        1929    2015    2062    2175    2194
SYNON = 000014          592#
SYN12   010650          875#    877#    1812#
TAB16A  012016          2081#
TAB16B  012130          2116#
TIMEVT  001074          432#    550#
TKB     001014          400#    562     1139
TKS     001012          393#    538#    545#    1130#
TMEVT1  001076          433#    550     551#
TSAVE   001044          412#    525#    562#    563#    564     567#    569     571     576     588#
XPOS    001060          423#    1066
YPOS    001062          424#    886     1064
.       = 012472        378#    380#    384#    389#    392#    555
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CLEARA	5938	1220	1372	1407	1444	1570	1731	1758	1777	1929	2062	2175	2194
DSTEP	4188	889	1083	1195									
OCTGN	20148	2020	2032	2044									
OCTGON	14458	1465	1485	1505	1525	1545							
SQUARE	15718	1573	1585	1597	1609	1621	1633	1645					

ADD	513	519	793	820	845	862	967	982	1099	1108	1183				
ASL	453														
ASR	1096	1097	1105	1106											
BEQ	441	541	565	648	715	882	977	990	1069	1098	1107	1194	1202	1208	
BIC	452	538	563	875	887	975	1065	1067	1111	1140	1168	1182			
BIS	545	877	978	1130											
BIT	440	443	540	1201											
BMI	555	568	570												
BNE	438	444	446	515	521	577	618	630	658	665	670	677	717	743	749
	766	795	797	800	803	822	824	827	830	844	847	861	864	874	921
	949	970	984	987	1023	1040	1043	1051	1060	1101	1110	1121	1137	1146	1149
	1155	1192	1199	1206											
BR	589	652	671	876	884	915	966	1028	1074	1112	1138				
CLR	439	522	523	524	525	527	539	549	551	535	573	574	580	835	852
	1018	1092	1093	1122	1123	1144	1161	1189	1200	1209	1210	1211			
CMP	514	520	564	569	576	714	846	863	888	983	1085	1120	1145		
COM	442	542	1158	1203											
DEC	617	629	657	669	676	716	742	748	765	794	796	802	821	823	829
	881	920	948	969	986	1039	1042	1050	1059	1100	1109	1148	1193		
EMT	373														
HALT	378	487	503	556	559	582	586	1143							
INC	713	741	801	828	1070										
JMP	390	458	507	534	638	707	767	890	950	998	1044	1086	1147	1150	1159
	1162	1196	1212												
JSR	448	456	526	596	603	611	623	649	654	666	673	694	696	698	700
	701	703	723	724	727	728	756	761	774	787	790	814	817	836	839
	853	856	878	897	909	911	927	932	937	942	945	979	993	1014	1025
	1030	1034	1055	1073	1077	1080	1133	1153	1169	1171	1173	1175			
MOV	451	454	479	480	481	482	483	484	485	486	491	492	493	494	495
	496	497	498	499	508	509	510	511	512	516	517	518	528	529	530
	531	532	533	536	537	543	544	546	547	548	550	571	572	578	584
	610	612	613	614	615	616	619	620	621	622	624	625	626	627	628
	631	632	633	634	635	636	637	640	641	642	643	646	663	684	685
	686	687	688	689	690	693	695	697	699	702	704	705	706	710	711
	718	721	722	725	726	739	746	754	755	760	781	782	783	784	785
	786	808	809	810	811	812	813	870	871	872	883	885	886	889	891
	904	905	906	907	908	910	912	913	914	917	918	919	924	925	926
	930	931	935	936	940	941	957	958	959	960	961	962	963	964	965
	968	971	972	973	974	985	989	1006	1007	1008	1009	1010	1011	1012	1013
	1015	1016	1017	1019	1020	1047	1048	1049	1054	1056	1057	1058	1064	1066	1071
	1072	1075	1076	1078	1079	1081	1082	1084	1094	1103	1118	1119	1128	1129	1131
	1132	1139	1141	1151	1152	1181	1186	1187	1188	1195					
MOVB	562	691	692	709	712	733	734	735	736	740	747	1124	1125	1126	1127
	1156	1157	1160	1170	1172	1174	1176								
NOP	447	449	455	457	500	501	502	504	505	506	798	825	842	859	994
	995	996	997	999	1000	1001	1197								
RESET	991	992													
ROR	1178	1179	1180												
RTI	450	558	575	579	581	585	1142								
RTS	552	644	719	729	737	744	750	922	1052	1061	1177	1184	1204		
SUB	567	588	1095	1104											
TST	437	445	554	647	664	799	826	843	860	873	976	1022	1068	1136	1154
	1191	1198	1205	1207											
WAIT	1190														
.ASCII	1233	1237	1241	1247	1259	1265	1272	1278	1289	1299	1306	1313	1322	1327	1335
	1340	1346	1352	1670	1683	1696	1709	1815	1826	1837	1848	1859	1870	1881	1892

EOS


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        2065    2070    2071    2073    2074    2178    2183    2202
.ASCIZ  1223    1359    1916    2197
.BYTE   1222    1232    1236    1240    1246    1258    1264    1271    1277    1288    1298    1305    1312    1321    1326
        1334    1339    1345    1351    1358    1669    1681    1694    1707    1814    1824    1835    1846    1857    1868
        1879    1890    1931    1996    2004    2064    2069    2072    2177    2182    2196    2201    2204    2206
.ENABL   360
.END    2210
.EVEN   1367    1919
.LIST      1     356     362     378     592    1584    1596    1608    1620    1632    1644    1656
.MACR    418
.MACRO   593    1445    1571    2014
.NLIST     1     356     363     378     592    1584    1596    1608    1620    1632    1644    1656
.REM       1
.REPT    378    1573    2082    2119
.TITLE   361
.WORD    381     385


ERRORS DETECTED:  0
DEFAULT GLOBALS GENERATED:  0

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RUN-TIME RATIO:  82/21=3.7
CORE USED:  8K  (15 PAGES)
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