GT40

VISUAL TEST

MD-11-DDGTC-B

EP-DDGTC-B-DL-A

FICHE 1 OF 1

OCT 1976

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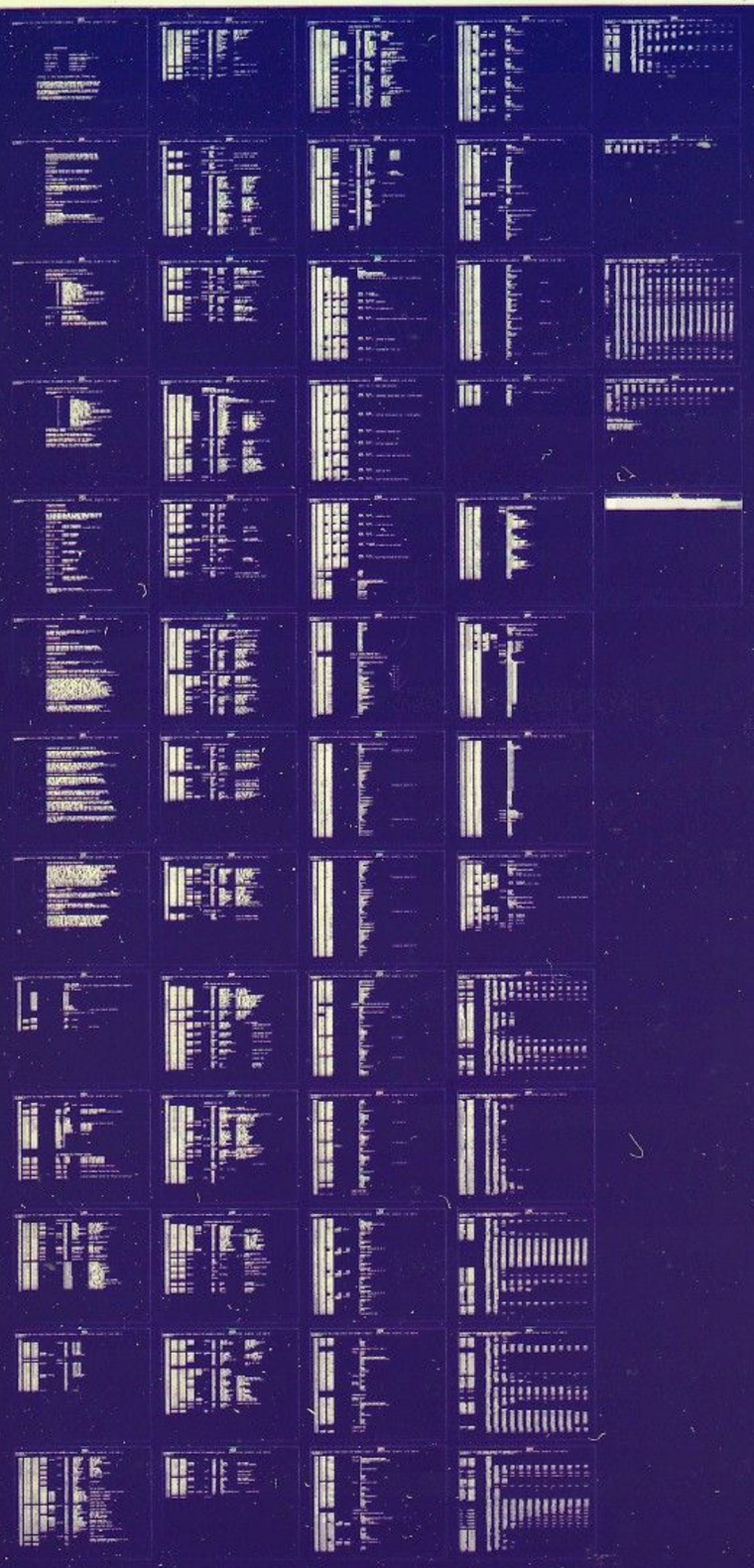
MADE IN U.S.A.



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                        .REM    *
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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 /OCTANTS OR SQUARES
04 /CHARACTER SET (CHAR ADJ.)
05 /DOTTED 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	PINCU HION (X AND Y OFFSET ADJ.)
D	OCTO NS OR SQU ES
E	CH CTER SET (CHAR. ADJ.)
F	DASH LINES AND BLINK
G	VECTOR LENGTH TEST (X VECTOR LENGTH ADJ.)
H	VECTOR LE TH TEST (Y VECTOR LENGTH ADJ.)
I	PHOSPHOR TEST (HORIZ)
J	PHO HOR 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 THESE 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 DRAWN FROM THE SCREEN ORIGIN TO THE OPPOSITE EDGE OF THE SCREEN. THESE VECTORS SHOULD TERMINATE ON THE LINE PLACED AT THE VIEWING EDGE. IF THE VECTORS DO NOT END ON THE LINE, ADJUST THE APPROPIATE VECTOR LENGTH POT.

9.8 PHOSPHOR TEST

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

9.9 INTENSITY LEVEL, SYNC AND LIGHT-PEN SENSITIVITY TEST

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

9.10 EDGE SQUARES TEST

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

9.11 SHORT VECTOR AND RELATIVE POINT TEST

THIS TEST IS USED TO VERIFY PROPER DECODING OF THE SHORT VECTOR AND
RELATIVE POINT. A SERIES OF INTINIFIED V[illegible]TICAL LINES ARE PLOTTED
USING SHORT VECTOR MODE. THE TEST THEN [illegible]EATS [illegible]
RELATIVE POINT. THE R[illegible]LTS IS THAT A SI[illegible]E H[illegible]TAL LINE APPEARS
TO THE RIGHT OF THE V[illegible]TICAL LINES. ALSO I[illegible]D IS A RELATIVE POINT
RC[illegible]EATIBILITY TEST. F[illegible]R SETS OF TH[illegible]E OCT[illegible] E[illegible]CH WILL
BE DISPLAYED. THE INNER OCTAGON IS [illegible] T VECTOR
MODE WITH A DELTA X, Y OF 71 OCT. THE MIDDLE OCT[illegible] IS
DR[illegible]N USING RELATIVE POINT MODE WITH A DELTA X, Y [illegible]
74 OCT. THE OUTTER OCTAGON IS DRAWN USING SHORT VECTOR MDODE
WITH AN DELTA X,Y OF 77 OCT. THE MIDDLE OCTAGON S[illegible]LD
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 G[illegible]PHPLOT
INCREMENT REGISTER FROM 0-77. THE RESULTING PATTERN USED SHOULD [illegible]PEAR
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 KEYB[illegible]RD. WHEN A DISPLABLE CHARACTER
KEY IS DEPERS[illegible]D THE CHARACTER IS DI[illegible]LAYED ON THE SCREEN.
IN SELECTING [illegible]E SHIFT-OUT MO[illegible]E, IF THE KEY DEPRESSED
IS NOT A CONTROL CHARACTER, [illegible]E PP[illegible]1 WILL TRAP TO
THE SHIFT-OUT VECTOR. AN OCTAL CH[illegible]ER VALUE READOUT
IS ALSO DISPLAYED AS AN AID IN ADJUSTING THE TTY CLOCK.

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356                             .LIST
357
358
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                                        .ENABL  ABS,AMA
                                        .TITLE GT-40/GT-44 WITH VR14 VISUAL DISPLAY TEST MAINDEC-11-DOGTC-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  177760                    TPS:     177760
001014  177562                    TPB:     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     KRB0            ;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: FILE0+2                 ;DIRECTORY
001212  002064                  FILE1+2                 ;DOT REPEATIBILITY
001214  003076                  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
```

```
 508  001356  012706  000500            START:  MOV     #STKPTR,SP      ;SET UP THE STACK
 509  001362  012777  000340  177420            MOV     #340,@PSW       ;RAISE PSW
 510  001370  012700  001054                    MOV     #OPC,R0         ;GET POINTER
 511  001374  013701  001000                    MOV     GSADD,R1        ;GET SUPPLIED ADDRESS
 512  001400  010120                    STRA:   MOV     R1,(0)+         ;UPDATE
 513  001402  062701  000002                    ADD     #2,R1           ;THE
 514  001406  022700  001064                    CMP     #OPC+10,R0      ;ADDRESSES
 515  001412  001372                            BNE     STRA            ;UNTIL DONE
 516  001414  012700  001064                    MOV     #DDONE,R0       ;GET POINTER
 517  001420  013701  001002                    MOV     GSVCT,R1        ;GET SUPPLIED VECTOR
 518  001424  010120                    STRB:   MOV     R1,(0)+         ;UPDATE
 519  001426  062701  000002                    ADD     #2,R1           ;THE VECTORS
 520  001432  022700  001100                    CMP     #DDONE+14,R0
 521  001436  001372                            BNE     STRB
 522  001440  005037  005556                    CLR     SWITCH          ;HOUSEKEEP
 523  001444  005037  001042                    CLR     HOLD            ;
 524  001450  005004                            CLR     R4              ;
 525  001452  005037  001044                    CLR     TSAVE           ;
 526  001456  004737  001536            STRC:   JSR     PC,SETUP        ;SET UP VECTORS
 527  001462  005037  001042                    CLR     HOLD
 528  001466  012737  001000  012004            MOV     #1000,RAY14A    ;HOUSEKEEP X,Y ORIGIN FOR LIGHTPEN
 529  001474  012737  001000  012006            MOV     #600,RAY14B
 530  001502  012737  030060  011764            MOV     #30060,DLT14A   ;INITIALIZE X READOUT
 531  001510  012737  030060  011766            MOV     #30060,DLT14A+2
 532  001516  012737  030060  011776            MOV     #30060,DLT14B   ;INITIALIZE Y READOUT
 533  001524  012737  030060  012000            MOV     #30060,DLT14B+2
 534  001532  000137  002050                    JMP     FILEO           ;START THE TEST
 535
 536  001536  012737  000062  000060    SETUP:  MOV     #62,@#60        ;RESET KRB VECTOR
 537  001544  012737  000000  000062            MOV     #0,@#62
 538  001552  042777  000100  177232            BIC     #100,@TKS       ;CLEAR INT ENABLE
 539  001560  005037  002046                    CLR     KRB0
 540  001564  032737  000200  177570            BIT     #200,@#DISPLAY  ;TEST FOR "KRB" CONTROL
 541  001572  001413                            BEQ     SETUPA          ;BR IF NOT
 542  001574  005137  002046                    COM     KRB0            ;SET "KRB" CONTROL
 543  001600  012737  001700  000060            MOV     #RETB,@#60      ;SET UP "KRB" INT
 544  001606  012737  000340  000062            MOV     #340,@#62
 545  001614  052777  000100  177170            BIS     #100,@TKS       ;ENABLE "KRB" INT
 546  001622  012777  001664  177234    SETUPA: MOV     #SETUPB,@DDONE  ;SET UP GT DONE VECTOR
 547  001630  012777  000340  177230            MOV     #340,@DDONE1
 548  001636  013777  001072  177224            MOV     LPVCT1,@LPVCT   ;RESET LIGHT-PEN VECTOR
 549  001644  005077  177222                    CLR     @LPVCT1
 550  001650  013777  001076  177216            MOV     TMEVT1,@TIMEVT  ;RESET TIME-OUT/SHIFT OUT VECTOR
 551  001656  005077  177214                    CLR     @TMEVT1
 552  001662  000207                            RTS     PC              ;EXIT
 553
 554  001664  005777  177166    SETUPB: TST     @DSR            ;TEST FOR STOP
 555  001670  100401                            BMI     .+4
 556  001672  000000                            HALT                    ;ERROR, INTERRUPT OCCURRED TO THE STOP
 557                                                                    ;VECTOR BUT STOP WAS NOT SET
 558  001674  000002                            RTI
 559  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            ;EXIT IF
566  001724  005037  005556                  CLR     SWITCH          ;CLEAR "SWITCH"
567  001730  162737  000101  001044          SUB     #101,TSAVE      ;MAKE 0-77
568  001736  100436                  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          FILED:  SCOPE
002052  004537  005412          JSR     5,MESG          ;EXIT TO DISPLAY A FRAME
002056  001000                  1000
002060  005560                  FRMED0                  ;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
```

```
                                                ;LOAD COUNTER
002274  012737  004000  001046  FILE2A: MOV     #4000,CNTR
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     #^UFFER,R0
002422  012720  174400                  MOV     #STATS3!SIZE0,(0)+
002426  012720  170052                  MOV     #STATSA!ITALO!SYNOFF!GREEN,(0)+
002432  012720  117124                  MOV     #POINT!INT4!LPOFF!BLKOFF!LINE0,(0)+     ;LOAD POINT MODE
[illegible]     012720  000000                  MOV     #0,(0)+
[illegible]     012720  001300                  MOV     #MAXY-77,(0)+
[illegible]     012720  100000                  MOV     #CHAR,(0)+
[illegible]     112720  000017                  MOVB    #17,(0)+
[illegible]     112720  000017                  MOVB    #17,(0)+
[illegible]     012737  000100  002666          MOV     #100,STCHAR             ;LOAD INITIAL CHAR.
[illegible]     004737  [illegible]             JSR     PC,LOADBF
[illegible]     012737  000140  002666          MOV     #140,STCHAR             ;LOAD INITIAL LC CHAR
[illegible]     004737  [illegible]             JSR     PC,LOADBF               ;LOAD LINE
[illegible]     012737  [illegible] 002666      MOV     #40,STCHAR              ;LOAD NUMBERS AND PUNCT
[illegible]     004737  [illegible]             JSR     PC,LOADBF               ;LOAD LINE
[illegible]     012720  [illegible]             MOV     #STATSA!ITALO,(R0)+     ;LOAD NORMAL FONT
700             004737  [illegible]             JSR     PC,LOADSP               ;LOAD SPECIAL CHARS
701             004737  [illegible]             JSR     PC,SPACE                ;INSERT SPACES
[illegible]     012720  [illegible]             MOV     #STATSA!ITAL1,(R0)+     ;LOAD ITALICS FONT
703             004737  [illegible]             JSR     PC,LOADSP               ;LOAD SPIECAL
704             012720  [illegible]             MOV     #DSTOP,(R0)+            ;LOAD DSTOP
705             012720  [illegible]             MOV     #JUMP,(R0)+
[illegible]     [illegible]     012[illegible]  MOV     #BUFFER,(R0)+
707             [illegible]     [illegible]137  002746          JMP     FILE4A
708
709             [illegible]     112720  000016  LOADSP: MOVB    #16,(R0)+
710             [illegible]     012702  [illegible]  MOV     #0,R2                   ;SET INITIAL SHIFT OUT CHAR
711             [illegible]     012703  000037          MOV     #37,R3                  ;LOAD COUNT
712             [illegible]     [illegible]     1$:     MOVB    R2,(R0)+                ;LOAD CHAR
713             [illegible]     [illegible]     2$:     INC     R2
714             [illegible]     [illegible]  000017     CMP     #17,R2                  ;TEST FOR SI
715             [illegible]     [illegible] 1774        BEQ     2$                      ;BR IF SI "17"
716             [illegible]     [illegible]303          DEC     R3                      ;FINISHED ?
717             [illegible]     001371                  BNE     1$                      ;BR IF NOT
718             [illegible]     012720  020017          MOV     #20017,(R0)+            ;LOAD SHIFT-IN SPACE
719             00[illegible]22 000207                  RTS     PC                      ;EXIT
720
721             002624  012720  170040  LOADBF: MOV     #STATSA!ITALO,(R0)+     ;LOAD NORMAL FONT
[illegible]     [illegible]     013702  [illegible]66  MOV     STCHAR,R2               ;GET STARTING CHAR
723             [illegible]     004737  [illegible]2712        JSR     PC,FILLIT               ;LOAD THE CHARACTERS
724             [illegible]     004737  [illegible]2730        JSR     PC,SPACE                ;INSERT SPACES
725             [illegible]     012720  170060          MOV     #STATSA!ITAL1,(R0)+     ;LOAD ITALICS FONT
726             [illegible]     013702  [illegible]666  MOV     STCHAR,R2               ;GET STARTING CHARACTER
727             [illegible]     004737  [illegible]2712        JSR     PC,FILLIT               ;LOAD THE CHARACTERS
728             [illegible]     004737  002670          JSR     PC,CRLF                 ;INSERT CR-LF
729             00[illegible]64 000207                  RTS     PC                      ;EXIT
730
731             002666  000000  STCHAR: 0
732
733             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  003400  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     FILES                   ;GO TO NEXT TEST

003022  000000         10$:    0

                                ;EXECUTE DASH LINES AND BLINK

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

```
                                        ;EXECUTE VECTOR LENGTH TEST (HORIZ)
                                        
003036  104000                  FILE6:  SCOPE
003040  012737  041777  010472          MOV     #INTX!MOXX,DELTX6 ;SET UP VERTICAL HEIGHT
003046  012737  000010  001036          MOV     #10,DSAVE2        ;SET UP TIMER
003054  012737  [ 0]0  001034          MOV     #0,DSAVE1
003062  012737  [ 0]40  001046  LOOPA:  MOV     #40,CNTR          ;SET UP EXECUTION COUNT
003070  012737  [ 0140  001032  LOOPA1: MOV     #MAXY+1/10,DSAVE  ;SET UP
003076  013737  [ 1034  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  010462                          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  041000  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  000000  001032  LOOPB1: MOV     #0,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  010462                          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
```

```
831
832                                     ;PHOSPHOR TEST (HORIZONTAL)
833
834 003372 104400                       FILE10: SCOPE
835 003374 005037 010506                        CLR     DELTX7
836 003400 004537 005412                D7A:    JSR     5,MESG          ;EXIT TO DISPLAY A FRAME
837 003404 000050                               50
838 003406 010346                               FRME10                  ;USING THE HORIZ FRAME
839 003410 004537 005412                        JSR     5,MESG          ;EXIT TO DISPLAY A FRAME
840 003414 000001                               1
841 003416 010634                               FRM10                   ;USING THE PERIMETER BOX
842 003420 000240                               NOP
843 003422 005737 005556                        TST     SWITCH          ;TEST THE "SWITCH"
844 003426 001364                               BNE     D7A             ;BR IF FREEZE THE MOVEMENT
845 003430 062737 000001 010506 D7C:    ADD     #1,DELTX7       ;UPDATE THE X ORIGIN
846 003436 022737 002000 010506                 CMP     #2000,DELTX7    ;TEST IF THE END
847 003444 001355                               BNE     D7A             ;BR IF NOT
848
849                                     ;PHOSPHOR TEST (VERTICAL)
850
851 003446 104400                       FILE11: SCOPE
852 003450 005037 010550                        CLR     DELTY7
853 003454 004537 005412                D7D:    JSR     5,MESG          ;EXIT TO DISPLAY A FRAME
854 003460 000050                               50
855 003462 010344                               FRME11                  ;USING THE VERT FRAME
856 003464 004537 005412                        JSR     5,MESG          ;EXIT TO DISPLAY A FRAME
857 003470 000001                               1
858 003472 010604                               FRM10                   ;USING THE PERIMETER BOX
859 003474 000240                               NOP
860 003476 005737 005556                        TST     SWITCH          ;TEST THE "SWITCH"
861 003502 001364                               BNE     D7D             ;BR IF FREEZE THE MOVEMENT
862 003504 062737 000001 010550 D7F:    ADD     #1,DELTY7       ;UPDATE THE Y ORIGIN
863 003512 022737 001400 010550                 CMP     #MAXY+1,DELTY7  ;TEST IF THE END
864 003520 001355                               BNE     D7D             ;BR IF NOT
865
```

```
                                        ;INTENSITY LEVEL TEST
                                FILE12: SCOPE
                                        MOV     #LPTLP,@LPVCT           ;SET UP LIGHT-PEN VECTOR
                                        MOV     #LVL,@LPVCT+2           ;SET UP LP LEVEL
                                        MOV     #200,DSAVE              ;SET UP A EXECUTION COUNT
                                FLE12A: TST     SWITCH                  ;TEST THE "SWITCH"
                                        BEQ     FLE12B                  ;BR IF SET "SYNC"
                                        BIC     #4,SYN12                ;ELSE CLEAR "SYNC"
                                        BR      FLE12C                  ;BY PASS
                                FLE12B: BIS     #4,SYN12                ;SET THE "SYNC"
                                FLE12C: JSR     5,MESG                  ;EXIT TO DISPLAY FRAME
                                        1
                                        FRME12                          ;USING THE "INTENSITY" FRAME
                                        DEC     DSAVE                   ;FINISHED?
                                        BEQ     FLE12D                  ;YES, EXIT
                                        MOV     #RSTLP,RAYLPA           ;NO, RESET MESSAGE
                                        BR      FLE12A                  ;BR BACK
                                RETLP:  MOV     @#LPBUF,LPPNT           ;LIGHT-PEN HIT
                                        MOV     @YPOS,LPPNT             ;READ Y POSITION
                                        BIC     #177000,LPPNT           ;MASK THE BITS
                                        CMP     (SP)+,(SP)+             ;POP THE STACK
                                        MOV     #1,@DPC                 ;SINGLE STEP THE DISPLAY
                                        JMP     MESGA                   ;JUMP TO WAIT
                                FLE12D: MOV     LPVCT1,@LPVCT           ;RESET THE LIGHT-PEN VECTOR


                                        ;EXECUTE EDGE TEST

                                FILE13: SCOPE
                                        JSR     5,MESG          ;EXIT TO DISPLAY FRAME
                                        10000
                                        FRME13                  ;USING THE "EDGE" FRAME
```

```
                                ;SHORT VECTOR AND RELATIVE POINT TEST
                        FILE14: SCOPE
003726  104000                  
003730  012700  012470          MOV     #BUFFER,R0      ;SET UP R0
003734  012720  114000          MOV     #POINT,(0)+     ;SET UP INITIAL
003740  012720  000240          MOV     #240,(0)+       ;X POSITION
003744  012720  000600          MOV     #MAXY+1/2,(0)+  ;Y POSITION
003750  012720  107004          MOV     #SHORTV!INT4!LINED,(0)+ ;LOAD "SHORT VECTOR"
003754  004737  003706          JSR     PC,LOADVT       ;LOAD THE DISPLAY PATTERN
003760  012720  130000          MOV     #RELATV,(0)+    ;LOAD "RELATIVE POINT"
003764  004737  003706          JSR     PC,LOADVT       ;LOAD THE DISPLAY PATTERN
003770  012720  173400          MOV     #DSTOP,(0)+     ;LOAD "DISPLAY STOP"
003774  012720  160000          MOV     #DJMP,(0)+      ;LOAD "DISPLAY JUMP"
004000  012720  012470          MOV     #BUFFER,(0)+    ;TO THE BUFFER ADDRESS
004004  000413                  BR      FIL14A          ;BR TO THE FRAME
                                
004006  012737  000024  001046 LOADVT: MOV     #24,CNTR        ;LOAD A COUNTER
004014  012720  040077          LADVT:  MOV     #INIX+77,(0)+   ;LOAD A DELTA Y
004020  012720  004177          MOV     #4177,(0)+      ;LOAD A DELTA X,Y
004024  005337  001046          DEC     CNTR            ;FINISHED?
004030  001371                  BNE     LADVT           ;BR IF NOT
004032  000207                  RTS     PC              ;EXIT
                                
004034  012737  004000  004104 FIL14A: MOV     #4000,10$               ;LOAD COUNTER
004042  012737  000200  011572 1$:     MOV     #200,FRM14A             ;LOAD FIRST OCTAGON
004050  012737  000200  011574         MOV     #200,FRM14B
004056  004537  005412                  JSR     R5,MESG                 ;DISPLAY OCT.
004062  000001                          1
004064  011566                          FRME14
004066  012737  001400  011572         MOV     #1400,FRM14A            ;LOAD SECOND OCTAGON
004074  012737  000200  011574         MOV     #200,FRM14B
004102  004537  005412                  JSR     R5,MESG                 ;DISPLAY 2ND OCT.
004106  000001                          1
004110  011566                          FRME14
004112  012737  001400  011572         MOV     #1400,FRM14A            ;LOAD THIRD OCTAGON
004120  012737  001000  011574         MOV     #MAXY-377,FRM14B
004126  004537  005412                  JSR     R5,MESG
004132  000001                          1
004134  011566                          FRME14
004136  012737  000200  011572         MOV     #200,FRM14A             ;LOAD FOURTH OCTAGON
004144  012737  001000  011574         MOV     #MAXY-377,FRM14B
004152  004537  005412                  JSR     R5,MESG                 ;DISPLAY 4TH OCT.
004156  000001                          1
004160  011566                          FRME14
004162  004537  005412                  JSR     R5,MESG                 ;DISPLAY BAR
004166  000001                          1
004170  012470                          BUFFER
004172  005337  004104                  DEC     10$                     ;FINISHED ?
004176  001321                          BNE     1$                      ;BR IF NOT
004100  000137  004106                  JMP     FILE15                  ;NEXT TEST
004104  000000          10$:    0
```

```
                                        ;GRAPHPLOT X-Y TEST

004106  104[illegible]0                          FILE15: SCOPE
004110  012[illegible]  012470                           MOV     #BUFFER,RO          ;LOAD RO
004114  0127[illegible] 117600                           MOV     #POINT!INT7,(0)+ ;LOAD INITIAL POINT
004120  012[illegible]  000000                           MOV     #0,(0)+
004124  01[illegible]0  000000                           MOV     #0,(0)+
004130  0[illegible]0   170052                           MOV     #STATSA!ITALO!SYNOFF!GREEN,(RO)+ ;RESET THE STATUS A
004134  [illegible]720  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
004[illegible]  0[illegible]403                  [illegible]     2$
004[illegible]  [illegible]737  000020  001032  1$:     ADD     #20,DSAVE           ;UPDATE PLOT POINT
004166  013720  001032                   2$:     M[illegible]    DSAVE,(0)+          ;SAVE THE POINT
004172  005305                                   [illegible]     R5                  ;FINISHED?
004174  00[illegible]                            [illegible]E    1$                  ;BR IF NOT
004176  012[illegible]20  173400                 MOV     #DSTOP,(0)+         ;LOAD "DSTOP"
00[illegible]2  012720  160000                   MOV     #DJMP,(0)+          ;LOAD "DJMP"
00[illegible]6  012720  012470                   MOV     #BUFFER,(0)+        ;LOAD RETURN
00[illegible]2  012737  000200  001032           MOV     #[illegible]00,DSAVE  ;LOAD POINT COUNT
0[illegible]    0[illegible]777  0[illegible]0  174602  DFL15D: BIC  #40[illegible]0,[illegible]UF5  ;EN[illegible]RE "GRAPHX"
0[illegible]    0[illegible]737  00[illegible]  TST     SWITCH              ;TEST SWITCH
00[illegible]2  001403                           BEQ     DFL15B              ;BR IF GRAPHX
00[illegible]4  052777  004000  174566           BIS     #4000,@DBUF5        ;SET GRAPHY
00[illegible]2  004537  005412           DFL15B: JSR     5,MSG               ;EXIT TO DISPLAY A FRAME
00[illegible]5  000001                                   1
00[illegible]0  012470                                   BUFFER              ;USING THE GENERATED PATTERN
00[illegible]2  062777  000001  174546           ADD     #1,@DBUF4           ;UPDATE INCREMENT
00[illegible]0  0[illegible]2777  174200  174540 CMP     #STAT[illegible]B+200,@DBUF4 ;TEST IF LAST INCREMENT
00[illegible]6  001365                           BNE     DFL[illegible]5B    ;BR IF NOT
00[illegible]0  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,RO
004310  001407                                   BEQ     HERE                        ;ACT-11/DDP-11
004312  000005                                   RESET
004314  000005                                   RESET
00[illegible]6  004710                   LOGICAL:        JSR     PC,(RO)
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$:     MOV     #BUFFER,R0              ;LOAD START ADDR.
1010  004372  012737  000100  001032            MOV     #100,DSAVE
1011  004400  012720  117744                    MOV     #POINT!INT7!LPON!LINE0,(R0)+    ;LOAD POINT
1012  004404  012720  000700                    MOV     #700,(R0)+              ;LOAD X POINT
1013  004410  012720  000474                    MOV     #474,(R0)+              ;LOAD Y POINT
1014  004414  004737  004556                    JSR     PC,LOADUP               ;LOAD UP THE BUFFER
1015  004420  012720  173400                    MOV     #DSTOP,(R0)+            ;LOAD DSTOP
1016  004424  012720  160000                    MOV     #DJMP,(R0)+             ;LOAD DJUMP
1017  004430  012720  012470                    MOV     #BUFFER,(R0)+           ;LOAD RETURN ADDRESS
1018  004434  005037  005050                    CLR     HITCNT                  ;CLEAR HIT COUNT
1019  004440  012737  030060  012374            MOV     #30060,FRM16B-2         ;PRESET THE READOUT
1020  004446  012737  030060  012372            MOV     #30060,FRM16B-4
1021
1022  004454  005737  005556            4$:     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     #FRM168,R2              ;LOAD ADDRESS
1073  004666  004737  005332                  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
```

```
1115                                    ;ECHO ROUTINE KEYBOARD TO DISPLAY
1116
1117  [illegible]  104000               FILE17: SCOPE
1118  [illegible]  012700  012470               MOV     #BUFFER,R0      ;LOAD R0
1119  [illegible]  012720  173400       ECHOA:  MOV     #DSTOP,(0)+     ;MOV "DSTOPS"
1120  [illegible]  020027  013470               CMP     #BUFFER+1000,R0 ;THRUOUT THE
1121  [illegible]  001373                       BNE     ECHOA           ;BUFFER
1122  [illegible]  005037  001052               CLR     LOKRB           ;HOUSE
1123  [illegible]  005037  001032               CLR     DSAVE           ;KEEPING
1124  [illegible]  112737  000060  012461       MOVB    #60,KBOCT-4
1125  [illegible]  112737  000060  012462       MOVB    #60,KBOCT-3             ;PRESET READOUT
1126  [illegible]  112737  000060  012463       MOVB    #60,KBOCT-2
1127  [illegible]  112737  000060  012464       MOVB    #60,KBOCT-1
1128  [illegible]  012737  [illegible]  000060  MOV     #[illegible],@#60       ;LOAD KEYBOARD VECTOR
1129  [illegible]  012737  [illegible]  000062  MOV     #340,@#62
1130  [illegible]  052777  [illegible]  177456  BIS     #100,@TKS               ;ENABLE INTERRUPT
1131  [illegible]  012737  000700  005330       MOV     #700,CHRCNT             ;LOAD CHAR COUNT
1132  [illegible]  012700  012470               MOV     #BUFFER,R0              ;RESET R0
1133  [illegible]  [illegible]  000412  ECHOC:  JSR     R5,MESG                 ;EXIT TO DISPLAY A FRAME
1134  [illegible]  [illegible]                  .
1135  [illegible]  [illegible]                  FRAME17                         ;USING THE KEYBOARD HEADER
1136  [illegible]  005737  001052               TST     LOKRB                   ;UPDATE A CHAR?
1137  [illegible]  [illegible]                  BNE     RET117                  ;BR IF YES
1138  [illegible]  [illegible]                  BR      ECHOC
1139  [illegible]  017701  173602       RET117: MOV     @TKB,R1                 ;GET A CHAR
1140  [illegible]  042701  177600               BIC     #177600,R1              ;MASK
1141  [illegible]  012737  177777  001052       MOV     #-1,LOKRB               ;SET (FLAG)
1142  [illegible]  [illegible]                  RTI                             ;EXIT
1143  [illegible]  [illegible]                  HALT
1144  [illegible]  005037  001052       RET21:  CLR     LOKRB                   ;CLEAR (FLAG)
1145  [illegible]  020127  000003               CMP     #3,R1                   ;TEST FOR PC
1146  [illegible]  [illegible]                  BNE     RET20                   ;BR IF NOT
1147  [illegible]  000137  001456               JMP     STRC                    ;RESTART
1148  [illegible]  005337  005330       RET20:  DEC     CHRCNT                  ;FINISHED COUNT?
1149  [illegible]  [illegible]                  BNE     1$                      ;BR IF NOT
1150  [illegible]  000137  005054               JMP     FILE17+2                ;RESTART
1151  [illegible]  012702  012465       1$:     MOV     #KBOCT,R2                       ;LOAD ADDRESS
1152  [illegible]  010103                       MOV     R1,R3
1153  [illegible]  004737  005332               JSR     PC,KBCHR                        ;LOAD THE OCTAL VALUE
1154  [illegible]  005737  001032               TST     DSAVE                   ;TEST HIGH/LOW BYTE
1155  [illegible]  001007                       BNE     ECHOB
1156  [illegible]  110120                       MOVB    R1,(R0)+                ;SAVE BYTE
1157  [illegible]  112710  000017               MOVB    #17,(R0)                ;SHIFT-IN
1158  [illegible]  005137  001032               COM     DSAVE                   ;COMP FLAG
1159  005312  000137  005166                   JMP     ECHOC                   ;BR BACK
1160  005316  110120       ECHOB:  MOVB    R1,(0)+                 ;SAVE CHAR
1161  005320  005037  001032                   CLR     DSAVE                   ;CLEAR FLAG
1162  005324  000137  005166                   JMP     ECHOC                   ;BR BACK
1163
1164
1165  005330  000200       CHRCNT: 200
```

```
1166                                        ;UPDATE OCTAL READOUT
1167
1168  [illegible]  042703  176000           KBCHR:  BIC     #176000,R3
1169  [illegible]  004737  005376                   JSR     PC,10$          ;LOAD BITS
1170  [illegible]  110442                           MOVB    R4,-(R2)        ;SAVE BITS
1171  [illegible]  004737  005370                   JSR     PC,11$          ;MOVE BITS
1172  [illegible]  110442                           MOVB    R4,-(R2)        ;SAVE BITS
1173  [illegible]  004737  005370                   JSR     PC,11$          ;MOVE BITS
1174  [illegible]  110442                           MOVB    R4,-(R2)        ;SAVE BITS
1175  [illegible]  004737  005370                   JSR     PC,11$
1176  [illegible]  110442                           MOVB    R4,-(R2)
1177  [illegible]  000207                           RTS     PC
1178  [illegible]  006003                 11$:      ROR     R3
1179  [illegible]  006003                           ROR     R3
1180  [illegible]  006003                           ROR     R3
1181  [illegible]  010304                 10$:      MOV     R3,R4           ;LOAD R4
1182  [illegible]  042704  177770                   BIC     #177770,R4      ;MASK BITS
1183  [illegible]  062704  000060                   ADD     #60,R4          ;MAKE A NUMBER
1184  [illegible]  000207                           RTS     PC
1185
1186  005412  012537  005552               MESG:   MOV     (5)+,COUNT
1187  [illegible]  012537  [illegible]               MOV     (5)+,FILE
1188  [illegible]  013777  [illegible] 173424        MOV     FILE,@DPC       ;START DISPLAY
1189  [illegible]  [illegible]  173354        MESGA:  CLR     @DPSW
1190  005434  000001                                  WAIT
1191  005436  005737  002046                        TST     KRBD
1192  [illegible]  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  [illegible]  [illegible]  005430               JMP     MESGA
1197  005464  [illegible]                   MESGB:  NOP
1198  005466  005737  002046                        TST     KRBD
1199  005472  001010                           BNE     MESGBA
1200  [illegible]  [illegible]  005556               CLR     SWITCH
1201  005500  032737  000100  177570               BIT     #BIT6,@#DISPLAY
1202  005506  001402                           BEQ     MESGBA
1203  005510  005137  005556                        COM     SWITCH
1204  [illegible]  [illegible]               MESGBA: RTS     5
1205  [illegible]  [illegible]  005556       MESGAB: TST     SWITCH
1206  005522  001350                           BNE     MESGAA
1207  005524  005737  001050                        TST     CHANGE
1208  005530  001745                           BEQ     MESGA
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
```

```

 00[illegible]0 114000                            FRMEO:  POINT
 0[illegible]2  000000                                    0
 0[illegible]4  001100                                    MAXY-277
 0[illegible]6  170[illegible]2                                    STATSA!ITALO!SYNOFF!GREEN
 0[illegible]0  103124                                    CHAR!INT4!LPOFF!BLKOFF!LINEO
 0[illegible]72    017    017                             .BYTE   17,17
 0[illegible]74 0[illegible]2107 03[illegible]5 020060                      .ASCIZ  /GT-40 OR GT-44 WITH VR14 VISUAL TEST  <MD-11-DDGTC-B>/
 0[illegible]2  [illegible]1117 0[illegible]0 0[illegible]6524
 0[illegible]10 [illegible]364  [illegible]3440 0[illegible]2111
 [illegible]16  [illegible]110  [illegible]1126 0[illegible]1
 [illegible]    [illegible]0   [illegible]511  0[illegible]5
 [illegible]    [illegible]114  [illegible]4  0[illegible]123
 [illegible]    [illegible]40  0[illegible]474 0[illegible]04
 [illegible]6   [illegible]1   04[illegible]5 04[illegible]4
 [illegible]4   0415[illegible]4 041[illegible]5 000076
 [illegible]       015    012    012                      .BYTE   15,12,12
 0[illegible]      0[illegible] 020[illegible]0 044504                     .ASCII  /    DIRECTORY/
 0[illegible]2     042522 052103 051117
 0[illegible]0     131
 0[illegible]01    015    012    012                      .BYTE   15,12,12
 00[illegible]704  030760 036440 040440                   .ASCII  /00 = A = DIRECTORY/
 00[illegible]5712 0364[illegible]0 0[illegible]40 0[illegible]1111
 00[illegible]720  04150[illegible] 04[illegible]24 0[illegible]4522
 00[illegible]726  015    012                             .BYTE   15,12
 0[illegible]730   030[illegible]0 03[illegible]0 041040                   .ASCII  /01 = B = DOT REPEATIBILITY/
 0[illegible]736   0[illegible]4[illegible]0 0[illegible]040 0[illegible]2117
 0[illegible]744   051040 0[illegible]105 0[illegible]05
 0[illegible]752   04[illegible]4 04[illegible]502 044514
 0[illegible]760   064[illegible]24
 0[illegible]762   015    012                             .BYTE   15,12
 0[illegible]764   0310[illegible] 0[illegible]440 041440                  .ASCII  /02 = C = PINCUSHION AND VECTOR CURVATURE <X OR Y OFFSET ADJ.>/
 0[illegible]772   0[illegible]0 0[illegible]040 047111
 0[illegible]000   0[illegible]503 044123 047511
 0[illegible]006   0[illegible]0116 047101 020104
 0[illegible]014   042[illegible]26 052103 051117
 0[illegible]2     041[illegible]40 051125 040526
 0[illegible]0     0[illegible]524 042522 036040
 0[illegible]6     0[illegible]130 051117 054440
 0[illegible]044   047440 043106 042523
 0[illegible]2     020124 042101 027112
 0[illegible]0     076
 0[illegible]61    015    012                             .BYTE   15,12
 0[illegible]3     060    020[illegible]63 020075                      .ASCII  /03 = D = OCTAGONS OR SQUARES/
 0[illegible]070   020104 0[illegible]075 041517
 0[illegible]076   0[illegible]4 047507 051516
 0[illegible]104   047440 020122 050523
 0[illegible]112   040525 042522    123
 0[illegible]117   015    012                             .BYTE   15,12
 0[illegible]121   060    020064 020075                   .ASCII  /04 = E = CHARACTER SET <CHAR. ADJ.>/
 0[illegible]126   020105 020075 044103
 0[illegible]4     051101 041501 042524
 0[illegible]6142  020122 04[illegible]23 020124
 0[illegible]6150  041474 040510 027122
 006156  040440 045104 037056
 006164     015    012                                    .BYTE   15,12
```

```
1272  006166  032460  036440  043040          .ASCII  /05 = F = DASH LINES AND BLINK/
1273  000172  000440  000740  042501
1274  000202  000110  000014  042516
1275  000210  000123  047101  020104
1276  000214  000111  047111     113
1277  000216     015     012
1278  000220  000000  000000  040075          .BYTE   15,12
                                              .ASCII  /06 = G = HORIZONTAL VECTOR ANGLE (ADJ. X VECTOR LENGTH)/
1279  000230  000000  000000  042510
1280  000240  000000  000000  042116
1281  000250  000000  000000  042505
1282  000260  000000  000000  042501
1283  000270  000000  000000  042524
1284  000300  000000  000000  043130
1285  000310  000000  000103  041117
1286  000320  000000  047105  042107
1287  000330  000111
1288  000332     015     012
1289  000334  033460  036440  044040          .BYTE   15,12
                                              .ASCII  /07 = H = VERTICAL VECTOR ANGLE (ADJ. Y VECTOR LENGTH)/
1290  000344  000440  000740  051105
1291  000354  000000  000000  040114
1292  000364  000000  000000  041117
1293  000374  000000  000000  042514
1294  000404  000000  000101  027112
1295  000414  000440  000740  041505
1296  000424  047524  000122  042514
1297  000434  043516  044124     076
1298  000440  016403     015     012
1299  000444  016405     061  020040  020075  .BYTE   15,12
                                              .ASCII  /10 = I = HORIZONTAL PHOSPHOR TEST/
1300  000454  042412  020111  000075  047510
1301  000464  016420  000522  047532  052116
1302  000474  042436  046101  000040  047510
1303  000504  042434  000123  047510  020122
1304  000514  042442  000124  052123
1305  000524  042446     015     012
1306  000530  030461  036440  045040          .BYTE   15,12
                                              .ASCII  /11 = J = VERTICAL PHOSPHOR TEST/
1307  000540  000440  000740  051105
1308  000550  000454  000440  000103  040114
1309  000560  016472  044120  051517  044120
1310  000570  000110  051117  052040  051505
1311  000600  000006     124
1312  000602  000007     015     012
1313  000604  000011     061  020062  020075  .BYTE   15,12
                                              .ASCII  /12 = K = INTENSITY LEVEL AND LIGHT-PEN TEST/
1314  000614  000016  020113  000075  047111
1315  000624  000024  000516  052111
1316  000634  000042     131  000514  000026
1317  000644  000060     114  047101  020104
1318  000654  000066     114  044107  026524
1319  000664  000074     130  020116  042524
1320  000674  000102  052123
1321  000704  000134     015     012
1322  000706  000136  031461  036440  046040  .BYTE   15,12
                                              .ASCII  /13 = L = EDGE FLAG TEST/
1323  000716  000524  000440  042440  043504
1324  000726  000602  000105  046106  043501
1325  000736  000610  052040  051505     124
1326  000744  006615     015     012
1327  000746  006617     061  020064  020075  .BYTE   15,12
                                              .ASCII  /14 = M = SHORT VECTORS AND RELATIVE POINT/
```

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

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

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

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

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

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

```
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  041000                  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!LINEO
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  041000                  INTX                            ; +X, +Y
1412  007250  001377                  MAXY
1413  007252  061777                  INTX!MINUSX!MAXX                ; -X, +Y
1414  007254  000000                  0
1415  007256  041000                  INTX                            ; +X, -Y
1416  007260  001377                  MINUSY!MAXY
1417  007262  041777                  INTX!MAXX                       ; +X, -Y
1418  007264  001000                  MINUSY
1419  007266  061000                  INTX!MINUSX                     ; -X, +Y
1420  007270  001377                  MAXY
1421  007272  061777                  INTX!MINUSX!MAXX                ; -X, -Y
1422  007274  001000                  MINUSY
1423  007276  061000                  INTX!MINUSX                     ; -X, -Y
1424  007300  001377                  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  007724  117124  FRME3:  POINT!INT4!LPOFF!BLKOFF!LINE0
1442  007726  000774          774
1443  007730  000564          564
1444  007732  170002          STATSA!ITALO!SYNOFF!GREEN
1445  007734  110007          LONGV                          ;OCTOGON BY LENGTH OF 7
1446  007736  000007          INTX+7
1447  007740  000000          0
1448  007742  000007          INTX+7
1449  007744  000007          7
1450  007746  000007          INTX
1451  007750  000007          7
1452  007752  000007          INTX!MINUSX+7
1453  007754  000007          7
1454  007756  000007          INTX!MINUSX+7
1455  007760  000000          0
1456  007762  000007          INTX!MINUSX+7
1457  007764  000007          MINUSX+7
1458  007766  000000          INTX
1459  007770  000007          MINUSX+7
1460  007772  000007          INTX+7
1461  007774  000007          MINUSX+7
1462  007776  110030          POINT
1463  010000  000770          770
1464  010002  000550          550
1465  010004  110000          LONGV                          ;OCTOGON BY LENGTH OF 17
1466  010006  000017          INTX+17
1467  010010  000000          0
1468  010012  000017          INTX+17
1469  010014  000017          17
1470  010016  000000          INTX
1471  010020  000017          17
1472  010022  000017          INTX!MINUSX+17
1473  010024  000017          17
1474  010026  000017          INTX!MINUSX+17
1475  010030  000000          0
1476  010032  000017          INTX!MINUSX+17
1477  010034  000017          MINUSX+17
1478  010036  000000          INTX
1479  010040  000017          MINUSX+17
1480  010042  000017          INTX+17
1481  010044  000017          MINUSX+17
1482  010046  114000          POINT
1483  010050  000760          760
1484  010052  000520          520
1485  010054  110000          LONGV                          ;OCTOGON BY LENGTH OF 37
1486  010056  000037          INTX+37
1487  010060  000000          0
1488  010062  000037          INTX+37
1489  010064  000037          37
1490  010066  000000          INTX
1491  010070  000037          37
1492  010072  000037          INTX!MINUSX+37
1493  010074  000037          37
1494  010076  000037          INTX!MINUSX+37
1495  010100  000000          0
```

```
1496  007512  000037          INTX!MINUSX+37
1497  007514  000037          MINUSX+37
1498  007516  000000          INTX
1499  007520  000037          MINUSX+37
1500  007522  000037          INTX+37
1501  007524  000037          MINUSX+37
1502  007526  114000          POINT
1503  007530  003740          740
1504  007532  000440          440
1505  007534  110000          LONGV                   ;OCTOGON BY LENGTH OF 77
1506  007536  000077          INTX+77
1507  007540  000000          0
1508  007542  000077          INTX+77
1509  007544  000077          77
1510  007546  000000          INTX
1511  007550  000077          77
1512  007552  000077          INTX!MINUSX+77
1513  007554  000077          77
1514  007556  000077          INTX!MINUSX+77
1515  007560  000000          0
1516  007562  000077          INTX!MINUSX+77
1517  007564  000077          MINUSX+77
1518  007566  000000          INTX
1519  007570  000077          MINUSX+77
1520  007572  000077          INTX+77
1521  007574  000077          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  000177          INTX+177
1527  007610  000000          0
1528  007612  000177          INTX+177
1529  007614  000177          177
1530  007616  000000          INTX
1531  007620  000177          177
1532  007622  000177          INTX!MINUSX+177
1533  007624  000177          177
1534  007626  000177          INTX!MINUSX+177
1535  007630  000000          0
1536  007632  000177          INTX!MINUSX+177
1537  007634  000177          MINUSX+177
1538  007636  000000          INTX
1539  007640  000177          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  0[illegible]0377                    INTX!MINUSX+377
1553  007674  0[illegible]377                     377
1554  007676  0[illegible]377                     INTX!MINUSX+377
1555  007700  0[illegible]00                      0
1556  007702  0[illegible]377                     INTX!MINUSX+377
1557  007704  0[illegible]77                      MINUSX+377
1558  007706  0[illegible]10                      INTX
1559  007710  0[illegible]377                     MINUSX+377
1560  007712  0[illegible]377                     INTX+377
1561  007714  020377                              MINUSX+377
1562  007716  17[illegible]00                     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
1570  007726  001000                              1000
1571  007730  000600                              600
1572  007732  170052                              STATSA!ITALO!SYNOFF!GREEN
1573          000007                              Q=7
1574          000004                              R=4
1575  007734  110000                              LONGV                      ;BY 7 AND 4
1576  007736  040007                              INTX+7
1577  007740  000000                              0
1600  007742  040000                              INTX
1601  007744  000007                              7
1602  007746  060007                              INTX!MINUSX+7
1603  007750  000000                              0
1604  007752  040000                              INTX
1605  007754  020007                              MINUSX+7
1606  007756  020004                              MINUSX+4
1607  007760  020004                              MINUSX+4
1610                                              .LIST
1611  007762  110000                              LONGV                      ;BY 17 AND 7
1612  007764  040017                              INTX+17
1613  007766  000000                              0
1614  007770  040000                              INTX
1615  007772  000017                              17
1616  007774  060017                              INTX!MINUSX+17
1617  007776  000000                              0
1620  010000  040000                              INTX
1621  010002  020017                              MINUSX+17
1622  010004  020007                              MINUSX+7
1623  010006  020007                              MINUSX+7
1624                                              .LIST
1625  010010  110000                              LONGV                      ;BY 37 AND 17
1626  010012  040037                              INTX+37
1627  010014  000000                              0
1630  010016  040000                              INTX
1631  010020  000037                              37
1632  010022  060037                              INTX!MINUSX+37
1633  010024  000000                              0
1634  010026  040000                              INTX
1635  010030  020037                              MINUSX+37
1636  010032  020017                              MINUSX+17
1637  010034  020017                              MINUSX+17
```

```
1608                                            .LIST
1609  010036  110000                            LONGV                   ;BY 77 AND 37
1610  010040  040077                            INTX+77
1611  010042  000000                            0
1612  010044  040000                            INTX
1613  010046  000077                            77
1614  010050  060077                            INTX!MINUSX+77
1615  010052  000000                            0
1616  010054  040000                            INTX
1617  010056  020077                            MINUSX+77
1618  010060  020037                            MINUSX+37
1619  010062  020037                            MINUSX+37
1620                                            .LIST
1621  010064  110000                            LONGV                   ;BY 177 AND 77
1622  010066  040177                            INTX+177
1623  010070  000000                            0
1624  010072  040000                            INTX
1625  010074  000177                            177
1626  010076  060177                            INTX!MINUSX+177
1627  010100  000000                            0
1628  010102  040000                            INTX
1629  010104  020177                            MINUSX+177
1630  010106  020077                            MINUSX+77
1631  010110  020077                            MINUSX+77
1632                                            .LIST
1633  010112  110000                            LONGV                   ;BY 377 AND 177
1634  010114  040377                            INTX+377
1635  010116  000000                            0
1636  010120  040000                            INTX
1637  010122  000377                            377
1638  010124  060377                            INTX!MINUSX+377
1639  010126  000000                            0
1640  010130  040000                            INTX
1641  010132  020377                            MINUSX+377
1642  010134  020177                            MINUSX+177
1643  010136  020177                            MINUSX+177
1644                                            .LIST
1645  010140  110000                            LONGV                   ;BY 777 AND 377
1646  010142  040777                            INTX+777
1647  010144  000000                            0
1648  010146  040000                            INTX
1649  010150  000777                            777
1650  010152  060777                            INTX!MINUSX+777
1651  010154  000000                            0
1652  010156  040000                            INTX
1653  010160  020777                            MINUSX+777
1654  010162  020377                            MINUSX+377
1655  010164  020377                            MINUSX+377
1656                                            .LIST
1657  010166  173400                            DSTOP
1658  010170  160000                            DJMP
1659  010172  007724                            FRME3A
1660
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  02CJ40
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  [illegible]  000000                DELTY7: 0
1777  [illegible]  170052                        STATSA!ITALO!SYNOFF!GREEN
1778  [illegible]  113724                DFI11C: LONGV!INT7!LPOFF!BLKOFF!LINE0
1779  [illegible]  041777                        INTX!MAXX
1780  [illegible]  000000                        0
1781  [illegible]  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  103000                          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
```

```
1908  011170  057600                                  57600
1909  011172  102000                                  CHAR!INTO
1910  011174      015      012      012               .BYTE 15,12,12,12
1911  011177      012
1912  011200  047111  042524  051516                  .ASCII /INTENSITY 0   /
1913  011236  042111  020131  020060
1914  011214  000340                                  CHAR
1915  011216  110000                                  LONGV
1916  011220  041000                                  41000
1917  011222  000000                                  0
1918  011224  100000                                  RELATV
1919  011226  057600                                  57600
1920  011230  164000                                  DNOP
1921  011232  164000                                  DNOP
1922  011234  164000                                  DNOP
1923  011236  164000                                  DNOP
1924  011240  164000                                  DNOP
1925  011242  164000                                  DNOP
1926  011244  164000                                  DNOP
1927  011246  164000                                  DNOP
1928  011250  173400                  RAYLPA:         DSTOP
1929  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
1910  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  000030                                  0
1929  011320  171032                                  STATSA!ITALO!SYNOFF!GREEN
1930  011322  100400                                  CHAR
1931  011324      017      017                       .BYTE   17,17
1932  011326  110030                                  LONGV
1933  011330  041777                                  INTX!MAXX
1934  011332  000000                                  0
1935  011334  000030                                  INTX
1936  011336  021377                                  MAXY
1937  011340  001777                                  INTX!MINUSX!MAXX
1938  011342  000000                                  0
1939  011344  000030                                  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  001677                  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  060400                  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  020012                          MINUSX+12
2002  011542  000000                          0
2003  011544  100000                          CHAR
2004  011546  040     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
```

```
                                                    FRME14: STATSA!ITALO!SYNOFF!GREEN
                                                            POINT!INT4!BLKOFF!LPOFF!LINE0
                                                    FRM14A: 0
                                                    FRM14B: 0
                                                            SHORTV
                                                            INTX+16200
                                                            INTX+16200+71
                                                            INTX+71
                                                            INTX!MINUSX+16200+71
                                                            INTX!MI   SX+16200
                                                            INTX!MI   SX+16200+MINSUY+71
                                                            INTX+MINSUY+71
                                                            INTX+16200+MINSUY+71
                                                            20504
                                                            DNOP
                                                            DNOP
                                                            RELATV
                                                            INTX+17000
                                                            INTX+17000+74
                                                            INTX+74
                                                            INTX!MINUSX+17000+74
                                                            INTX!MINUSX+17000
                                                            INTX!MINUSX+17000+MINSUY+74
                                                            INTX+MINSUY+74
                                                            INTX+17000+MINSUY+74
                                                            20504
                                                            DNOP
                                                            DNOP
                                                            SHORTV
                                                            INTX+17600
                                                            INTX+17600+77
                                                            INTX+77
                                                            INTX!MINUSX+17600+77
                                                            INTX!MIN  X+17600
                                                            INTX!MIN  X+17600+MINSUY+77
                                                            INTX+MINSUY+77
                                                            INTX+17600+MINSUY+77
                                                            20504
                                                            DNOP
                                                            DNOP
                                                            DSTOP
                                                            DJMP
                                                            FRME14
```

```
	011714	117724				FRME16:	POINT!INT7!LPOFF!BLKOFF!LINE0
	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
	012[illegible]0	041000					INTX+1000
	012[illegible]2	041000					INTX+1000
	012[illegible]4	041000					INTX+1000
	012[illegible]6	041000					INTX+1000
	012[illegible]0	041000					INTX+1000
	012[illegible]2	041000					INTX+1000
	012[illegible]4	041000					INTX+1000
	012[illegible]36	041000					INTX+1000
	012[illegible]40	041000					INTX+1000
	012[illegible]42	041000					INTX+1000
	012[illegible]44	041000					INTX+1000
	012[illegible]46	041000					INTX+1000
	01[illegible]0	041000					INTX+1000
	01[illegible]2	041000					INTX+1000
	01[illegible]4	041000					INTX+1000
	01[illegible]6	041000					INTX+1000
	01[illegible]0	041000					INTX+1000
	01[illegible]2	041000					INTX+1000
	01[illegible]4	041000					INTX+1000
	01[illegible]6	041000					INTX+1000
	01[illegible]0	041000					INTX+1000
	012[illegible]72	041000					INTX+1000
	012[illegible]74	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
0121[illegible] 16[illegible]0                   DNOP
0121[illegible] 1[illegible]0                   RELATV
012126 034000                   MINUSX+14000
012130 040160          TAB16B:  INTX!MINSUY+60
012132 04[illegible]004                   INTX+4
012134 0[illegible]004                   INTX+4
012136 04[illegible]004                   INTX+4
012140 04[illegible]004                   INTX+4
012142 0[illegible]004                   INTX+4
012144 04[illegible]004                   INTX+4
012146 04[illegible]004                   INTX+4
012150 04[illegible]004                   INTX+4
0121[illegible]2 04[illegible]004                   INTX+4
012154 0[illegible]004                   INTX+4
012156 0[illegible]04                   INTX+4
012160 04[illegible]04                   INTX+4
012162 04[illegible]004                   INTX+4
012164 04[illegible]004                   INTX+4
012166 04[illegible]004                   INTX+4
012170 04[illegible]004                   INTX+4
012172 040004                   INTX+4
012174 040004                   INTX+4
012176 04[illegible]004                   INTX+4
012[illegible]0 040004                   INTX+4
012[illegible]2 040004                   INTX+4
012[illegible]4 040004                   INTX+4
012[illegible]6 040[illegible]04                   INTX+4
012[illegible]10 040[illegible]04                   INTX+4
012212 164[illegible]00                   DNOP
012[illegible]14 16[illegible]00                   DNOP
012[illegible]16 164[illegible]00                   DNOP
01[illegible]0 164[illegible]00                   DNOP
01[illegible]2 164[illegible]00                   DNOP
01[illegible]4 164[illegible]00                   DNOP
01[illegible]6 164[illegible]00                   DNOP
01[illegible]0 164[illegible]00                   DNOP
01[illegible]2 110[illegible]00                   LONGV
01[illegible]4 0[illegible]00                   0
01[illegible]6 0[illegible]077                   77
01[illegible]0 0[illegible]0160          PNT16A:  INTX+160
012[illegible]42 0[illegible]0160                   MINUSX+160
012[illegible]44 0[illegible]0160          PNT16B:  INTX!MINUSX+160
012[illegible]46 0[illegible]0160                   MINUSX+160
01[illegible]0 0[illegible]0160          PNT16C:  INTX!MINUSX+160
01[illegible]2 0[illegible]0160                   160
01[illegible]4 040160          PNT16D:  INTX+160
01[illegible]6 000160                   160
01[illegible]0 164[illegible]00                   DNOP
01[illegible]2 164[illegible]00                   DNOP
01[illegible]4 164000                   DNOP
01[illegible]6 164000                   DNOP
012[illegible]70 164000                   DNOP
012272 164000                   DNOP
012274 173400                   DSTOP
012276 160000                   DJMP
```

```
012300  011714                               FRME16

012302  117724                      FRM16A:  POINT!INT7!LPOFF!BLKOFF!LINEO
012[illegible]  000000                               0
012[illegible]  001[illegible]                               MAXY-177
012310  170[illegible]                               STATSA!ITALO!SYNOFF!GREEN
012312  100[illegible]                               CHAR
012314     017     017                       .BYTE   17,17
012316  044514  044107  0[illegible]124              .ASCII  /LIGHT PEN FIELD OF VIEW /
012[illegible]  0[illegible]  0[illegible]116  0[illegible]6
012[illegible]2  0[illegible]  0[illegible]104  043117
012340  0530[illegible]  042511  020127
012346     015     012     012               .BYTE   15,12,12
012[illegible]     116  04[illegible]  04[illegible]              .ASCII  /NUMBER OF HITS = 0000/
012[illegible]  020122  043117  0[illegible]0
012[illegible]  0[illegible]111  0[illegible]123  020075
012372  0[illegible]060  030060
012376  173[illegible]0                      FRM16B:  DSTOP
012[illegible]0  16[illegible]                               DJMP
012[illegible]2  012[illegible]2                               FRM16A

012404  114124                      FRME17:  POINT!LPOFF!BLKOFF!LINEO               ;MUST BE JUST BEFORE THE BUFFER
012[illegible]6  0[illegible]                               0
012410  0[illegible]                               MAXY-177
012412  170[illegible]2                               STATSA!ITALO!SYNOFF!GREEN
012414  103[illegible]0                               CHAR!INT4
012416     017     017                       .BYTE   17,17
012[illegible]0  042513  041131  040517              .ASCIZ  /KEYBOARD ECHO TEST/
012[illegible]6  042122  04[illegible]40  044103
012[illegible]  020117  042524  052123
012[illegible]2     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* 1677  1221  1374  1404  1441  1567  1680  1693  1706  1719  1732  1759
                        1778  1819  1836  2016  2059  2172  2191
BLKON  = 000030          592* 1677  1640  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  2218*
CHANGE  001050           414*  592*  1207  1209*
CHAR   = 100000          592*  610  1221  1668  1680  1693  1706  1813  1823  1834  1845  1856  1867
                        1878  1889  1915  1930  1995  2003  2063  2176  2195
CHRCNT  005330          1131* 1148* 1165*
CNTR    001046           413*  646*  657*  663*  669*  676*  784*  796*  811*  823*  917*  920*  1054*
                        1059*
COUNT   005552          1106* 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*
DCHAR   001064           411*  516   520   546*
DDONE1  001066           427*  547*
DELTX6  010472           781*  813*  820*  1746*
DELTX7  010536           804*  838*  846   1756*
DELTY6  010674           792*  793*  809*  1747*
DELTY7  010750           852*  862*  863   1776*
DFI10A  011514          1759*  1770
DFI11C  010554          1778*  1789
DFI12A  011536          1912*
DFLI13  002242           977   979*  984
DFLI5C  004144           964*
DFLI5D  004230           975*  987
DISPLA= 177570           375*  440   443   451   540  1201
DISPTC  001210           413   420*
DJMP   = 160000           52*   56*  705   913   972  1016  1369  1399  1436  1563  1658  1723  1749
                        1769  1773  1804  1921  2010  2056  2169  2188
DLT14A  011764           530*  531*  1076  2071*
DLT14B  011776           532*  533*  1079  2074*
DNOP   = 164000           58*   65*  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   839*  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  = 176750           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     003340           845*
D7D     003354           853*  861   864
```

D7F	[illegible]3434	862[illegible]					
ECHOA	[illegible]0	1119#	1121				
ECHOB	[illegible]316	1155	1160#				
ECHOC	005166	1133#	11[illegible]9	1159	1162		
FILE	005554	1187*	11[illegible]3	1214#			
FILE0	002050	460	534	595#	998		
FILE1	0[illegible]2	461	602#				
FILE10	0[illegible]5	468	834#				
FILE11	003376	469	851#				
FILE12	003452	470	8[illegible]9#				
FILE13	003614	471	896#				
FILE14	003[illegible]26	472	903#				
FILE15	004106	473	950	956#			
FILE16	004342	474	1005#	10[illegible]4			
FILE17	005052	475	1117#	1150			
FILE2	002074	462	60[illegible]#				
FILE[illegible]A	002274	638	646#				
FILE[illegible]B	002302	64[illegible]#	658				
FILE2C	002322	648	654#				
FILE2D	002332	652	657#				
FILE3	002340	463	662#				
FILE[illegible]A	002350	664#	670	677			
FILE[illegible]B	002376	665	673#				
FILE4	002414	464	671	683#			
FILE4A	002746	707	754#				
FILE5	00[illegible]024	465	767	773#			
FILE6	00[illegible]036	466	780#				
FILE7	0[illegible]3170	467	807#				
FILLA	0[illegible]716	740#	743				
FILLIT	0[illegible]12	723	727	739#			
FIL14A	003734	915	[illegible]4#				
FLE[illegible]A	003476	873#	[illegible]				
FLE1[illegible]B	00[illegible]514	874	[illegible]7#				
FLE12C	003522	876	878#				
FLE12D	00[illegible]06	8[illegible]2	891#				
FF[illegible]0	00[illegible]0	5[illegible]3	1217#	1370			
FF[illegible]1	007[illegible]	6[illegible]5	1372#	1400			
FF[illegible]E10	010[illegible]4	8[illegible]8	1755#				
FF[illegible]E11	010[illegible]44	855	1774#				
FF[illegible]E12	010642	8[illegible]0	1809#	1922			
F[illegible]E13	011312	8[illegible]9	19[illegible]6#	2011			
F[illegible]E14	011566	929	9[illegible]4	939	944	2015#	2057
FF[illegible]E16	011714	1027	2059#	2170			
FF[illegible]E17	012404	1135	2191#				
FF[illegible]2	007230	656	1404#	1437			
FF[illegible]E3	007334	668	1441#	1564			
FF[illegible]3A	007724	675	1567#	1659			
FF[illegible]	010174	776	1663#	1724			
FF[illegible]	010[illegible]6	789	816	1728#			
FR[illegible]6A	010462	792	819	1742#	1750		
FRM10	010604	841	858	1791#	1805		
FRM14A	011572	9[illegible]5*	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				

DOGTCB.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
GRCPHY= 124000          592#
GREEN = 000002          592#  686   961  1220  1373  1407  1444  1570  1667  1731  1758  1777  1812
                       1929  2015  2062  2175  2194
GSADD   001000          3??#  511
GSCRL   001004          3  #  671  1007
GSVCT   001002          394#  517
HERE    004330          990   998#
HIGPWR  001302          4?5   491#
HITCNT  005050         1018#  1070*  1071  1114#
HOLD    001042          411#  445   523*  527*  574*  578*  580*  1211*
ICNT    001006          397#
INCR  = 000100          592#  962   985
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
INTO  = 002000          592#  1374  1889
INT1  = 00?  10         5??#  1878
INT2  = 00?  40         592#  1404  1867
INT3  = 00?  20         592#  18?6
INT4  = 00?  10         5??#  6?0   687   908  1221  1441  1567  1663  1845  1912  1926  2016  2195
INT5  = 00?  04         5  #  1?4
INT6  = 00?  02         5  #  1?3
INT7  = 00?  01         5??#  5?8  1011  1732  1759  1778  1791  1813  2059  2172
ITALO = 000040          5??#  6?3   699   721   961  1220  1373  1407  1444  1570  1667  1731  1758
                       1777  1812  1939  2015  2062  2175  2194
ITAL1 = 000060          592#  702   725
KPCHR   00?  32         1073  1077  1080  1153  1168#
K  CT   01?  05         1124#  1125#  1126#  1127#  1151  2206#
K  D    00?  06         437   539#  542#  590#  1191  1198
KYT1    00?  14         568   580#
KYT2    001774          570   576#
KYT3    00?  24         565   584#
KYT4    00?  36         577   588#
KYT5    001736          568#  589
LADVT   003714          918#  921
LINEO = 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  00[illegible]3  1014    1054#
LOADVT  003706          909     911     917#
LOGICA  004316          993#
LOKRS   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#
LO[illegible]3  00[illegible]14  811#  827  830
LO[illegible]1  00[illegible]2   812#  824
LO[illegible]2  00[illegible]6   817#  822
LO[illegible]3  00[illegible]72  823#
LO[illegible]2  001[illegible]0  381   479#  498
LO[illegible]V  00[illegible]    485*  489#  491
LF[illegible]<= 0[illegible]     592#
LPLI[illegible]E= 0[illegible]   592#  1812
LPOFF = 000100          592#    687     1221    1374    1404    1441    1[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     10[illegible]6  1189#   1196
MESGAA  005444          1193#   12[illegible]6  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          522*    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*    895*    1908*
RAY14A  012004          523*    1002*   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    1130*
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*    713*    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*
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```
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            390    508#
STATSA= 170000           592#   [illegible]  699    702    721    725    961    1220   1373   1407   1444   1570   1667
                        1731    1758   1777   1812   1829   2015   2062   2175   2194
STATSB= 174000           592#   665    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#   [illegible]  961    1220   1373   1407   1444   1570   1667   1731   1758   1777   1812
                        1829    2015   2062   2175   2194
SYNON = 000014           592#
SYN12  010650            875#   877#   1812#
TAB16A 012016           2081#
TAB16B 012130           2118#
TIMEVT 001074            432#   550#
TKB    001014            400#   562    1139
TKS    001012            399#   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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CLEORA	593#	1220	1372	1407	1444	1570	1731	1758	1777	1929	2062	2175	2194
DSTLP	416#	1079	1083	1195									
OCTGN	2014#	2020	2032	2044									
OCTGON	1445#	1465	1485	1505	1525	1545							
SQUARE	1571#	1573	1585	1597	1609	1621	1633	1645					

DOGTCB.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

```
ADD      513   519   793   820   845   862   967   982  1039  1108  1183
ASL      453
BCC     1096  1097  1105  1106
BCS      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      445   877   928  1130
BIT      440   443   540  1201
BMI      555   568   570
BNE      463   466   515   521   577   618   630   658   665   670   677   717   743   749
         766   786   797   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  1182  1199  1206
BR       [illegible]  621  [illegible]  824  915  966  1028  1074  1112  1133
CLR      [illegible]  [illegible]  [illegible]  525  527  539  549  551  575  573  574  580  835  852
        1018  1082  1093  1122  1123  1144  1161  1189  1200  1209  1210  1211
CMP      514   520   564   569   576   714   846   863   888   983  1025  1120  1145
COM      442   542  1158  1203
DEC      617   629   657   669   676   716   742   748   765   794   796   802   821   823   829
         [illegible]  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   818  1070
JMP      390   458   507   534   638   707   767   890   950   998  1044  1086  1147  1150  1159
        1162  1196  1212
JSR      448   465   526   596   603   611   623   649   654   666   673   [illegible]  [illegible]  699  700
         701   703   723   724   727   728   758   761   774   787   790   [illegible]  817  [illegible]  843
         863   866   878   897   909   911   927   932   937   942   945   [illegible]  993  1014  1025
        1030  1034  1055  1073  1077  1080  1133  1153  1169  1171  1173  1175
MOV      451   454   479   [illegible]  481  482  483  484  485  486  491  [illegible]  493  494  495
         496   497   [illegible]  499  508  509  510  511  512  516  517  518  [illegible]  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   683   684   685
         686   687   [illegible]  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   803   809   810   811   812   813   870   871   872   883   885   886   889   891
         904   905   913   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  1101  1102  1104  1094  1103  1118  1119  1128  1129  1131
        1132  1139  1141  1151  1152  1161  1162  1167  1163  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   595  1142
RTS      552   644   719   729   737   744   750   922  1052  1061  1177  1184  1204
SUB      507   513  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
```

E05


```
        2065    2070    2071    2073    2074    2178    2183    2202
.ASCIZ  1[illegible]3   1359    1916    2197
.BYTE   1[illegible]3   1[illegible]2   1[illegible]6   1240    1246    1258    1264    1271    1277    1288    1298    1305    1312    1321    1326
        1[illegible]4   1[illegible]9   1[illegible]5   1[illegible]1   1[illegible]3   1669    1681    1694    1707    1814    1824    1835    1846    1857    1868
        1879    1890    1931    1956    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
.RADIX     1
.RELPT  378    1573    2082    2119
.TITLE  361
.WORD   381     385


ERRORS DETECTED:  0
DEFAULT GLOBALS GENERATED:  0

$,DOGTCB.SEQ/SOL/CRF/PAGNUM=DOGTCB
RUN-TIME:  6 12 3 SECONDS
RUN-TIME RATIO:  82/21=3.7
CORE USED:  8K  (15 PAGES)
```

FOS

[illegible]