GT40-42-44

INSTRUCTION TEST #2

MD-11-DDGTB-C

EP DDGTB C DL A

OCT 1976

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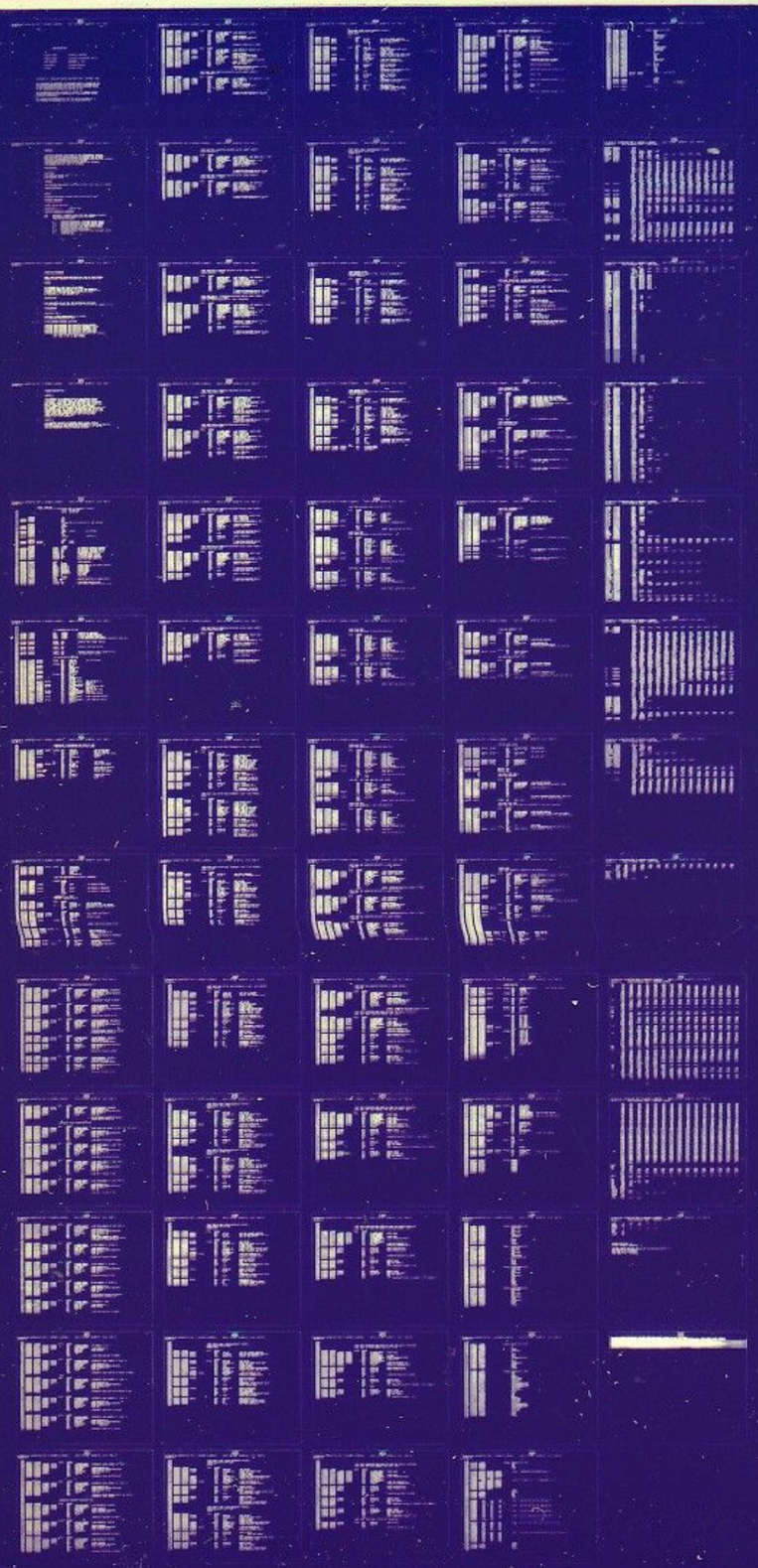
FICHE 1 OF 1



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                        .REM    +
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IDENTIFICATION

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PRODUCT CODE:	MAINDEC-11-DDGTB-C
PRODUCT NAME:	GT40/GT44 INSTRUCTION TEST II
DATE CREATED:	DECEMBER 1, 1974
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	RAYMOND SHOOP

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1. ABSTRACT

THIS IS A TWO PART LOGIC TEST OF THE ALPHAGRAPHIC TERMINAL.
FOR THIS TEST THE TWO MAINTENANCE SWITCH WILL NOT BE USED.
THIS TEST IS DESIGNED TO TEST ALL FUNCTIONAL REGISTERS AND INTERRUPT
VECTOR IN THE ALPHAGRAPHIC DISPLAY CONTROL.
THIS PROGRAM DOES NOT TYPE-OUT OR DISPLAY ANY MESSAGES.
THE PROGRAM WILL ONLY HALT ON AN ERROR.

2. REQUIREMENTS

2.1 EQUIPTMENT

GT40 DISPLAY SYSTEM (REF. 7.) OR
GT44 DISPLAY SYSTEM

2.2 STORAGE

THIS PROGRAM USED MEMORY LOCATIONS 0-14000 (LESS THAN 4K OF MEMORY).

3. LOADING PROCEDURE

3.1 METHOD

PROCEDURE FOR NORMAL BINARY TAPES SHOULD BE FOLLOWED.

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS

SWITCH BIT 14 = 1 LOOP ON TEST

4.2 STARTING ADDRESS OR ADDRESSES

200 SUB-TEST 1, COMPLEX LOGIC TEST (BR, NPR AND INTERRUPT)
204 SUB-TEST 2, BASIC VISUAL DISPLAY PATTERNS
(SELECTED BY SW 00-02)

0 = POSITIVE HORIZONTAL LINE FROM CENTER SCREEN
1 = NEGATIVE HORIZONTAL LINE FROM CENTER SCREEN
2 = POSITIVE VERTICAL LINE FROM CENTER SCREEN
3 = NEGATIVE VERTICAL LINE FROM CENTER SCREEN
4 = RECTANGLE AROUND SCREEN EDGE
5 = OCTAGON PATTERN IN RELATIVE POINT AND SHORT VECTOR
6 = CHARACTER SET
7 = LIGHT PEN TEST

5. OPERATING PROCEDURE

NONE, ONCE STARTED BOTH SUB-TESTS WILL RUN IN THEIR NORMAL MANNER WITHOUT OPERATOR INTERVENTION OR SWITCH SELECTION.

6. ERRORS

THE PROGRAM WILL ONLY HALT ON AN ERROR.
THE PROGRAM DOES NOT CONTAIN FACILITES FOR REPORTING MESSAGES OR ERROR CONDITIONS. TO PLACE THE PROGRAM INTO A SCOPE LOOP, REPLACE THE ERROR HALT WITH A NOP, SET SWITCH 14 = 1 AND DEPRESS CONT.

7. RESTRICTIONS

BOTH SUB-TESTS DO NOT USE THE MAINTENANCE SWITCHES.
IF VR14 SCOPE, LOCATION "GSYAXS" (LOC. 1012) MUST BE CHANGED TO 1377.

8. MISCELANEOUS

8.1 EXECUTION TIME

SUB-TEST 1 TAKES APPROXIMATELY 15 SECONDS.
N/A OPERATOR INTERVENTION ONLY.

8.2 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 LEVEL.
LOCATION 1006 CONTAINS THE GT40/GT44 CHARACTER SIZE.
LOCATION 1010 CONTAINS THE GT40/GT44 LINE FEED SIZE.
LOCATION 1012 CONTAINS THE GT40/GT44 +Y AXIS CUTOFF LOCATION.
(LOC. 1012 = 1377 IF VR14 SCOPE)
(LOC. 1012 = 1777 IF VR17 SCOPE)

9. PROGRAM DESCRIPTION

9.1 SUBTEST 1

THIS SUBTEST IS A COMPLEX TEST OF THE DISPLAY STATUS,
X AXIS AND Y AXIS REGISTERS. THE PROGRAM ALSO TESTS
STOP(DONE), LIGHT-PEN, TIME-OUT AND SHIFT-OUT INTERRUPTS
AND VECTORS. ALSO INCLUDED ARE TESTS FOR MODE, LINE-TYPE,
BLINK, INTENSITY LEVELS, ITALICS AND COLOR CHANGE.
THE 'RESUME' (DSTEP) INSTRUCTION IS USED TO SINGLE STEP THRU
THE DISPLAY FILE. ALL DISPLAY INSTRUCTIONS ARE TESTED FOR
PROPER OPERATION. TESTS ARE ALSO MADE FOR SETTING OF THE
'EDGE' FLAG, WHEN EXCEEDING ALL FOUR DISPLAY EDGES.
TESTS ARE ALSO MADE THAT 'NULL','CR','LF' AND 'BS'
CHANGE X OR Y AXIS CORRECTLY.

9.2 SUBTEST 2

THIS SUBTEST CONSISTS OF SEVERAL BASIC VISUAL DISPLAY
PATTERNS TO AID IN THE REPAIR AND ALIGNMENT OF THE GT-40 TERMINAL.
ONCE A PATTERN HAS BEEN SELECTED BY SW 00-02, THE PROGRAM
MUST BE RESTARTED TO SELECT ANOTHER PATTERN.

```
                        .ENABL  ABS,AMA
                        .TITLE GT-40/GT-44 INSTRUCTION TEST II MAINDEC-11-DOGTB-C
                                                .LIST   ME,BIN,SEQ
                                                .NLIST  MC,MD,CND

                000000                          .=0
000000  000000                                  HALT
000002  000000                                  HALT
                                                ;0 THRU 776 IS FILLED WITH A TRAP CATCHER
                000024                          .=24
000024  012372                                  LOWPWR
000026  000340                                  340
                000030                          .=30
000030  012326                                  .WORD   SCOPEA          ;EMT RETURN
000032  000340                                  340
                000046                          .=46
000046  012246                                  LOGICAL                 ;XXDP-ACT 11

                000200                          .=200
000200  000137  001344                          JMP     START
000204  000137  012472                          JMP     START1

                001000                          .=1000
001000  172000                  GSADD:  172000          ;GS DISPLAY STARTING ADDRESS
001002  000320                  GSVCT:  320             ;GS DISPLAY STARTING VECTOR
001004  000200                  DSPBR:  200             ;GS DISPLAY INTERRUPT LEVEL
001006  000016                  GSCHSZ: 16              ;CHARACTER SIZE (14-16)
001010  000030                  GSLFSZ: 30              ;LINE FEED SIZE (30-32)
001012  001777                  GSYAXS: 1777            ;+Y AXIS CUTOFF LOCATION
001014  000177                  GSSEND: 177             ;SHIFT-OUT END CHARACTER

001016  000000                  ICNT:   0               ;PASS COUNTER
001020  177776                  PSW:    177776
001022  013472                  DBUF:   BUFFER          ;FIRST WORD IN THE DISPLAY BUFFER
001024  013474                  DBUF1:  BUFFER+2        ;SECOND WORD
001026  013476                  DBUF2:  BUFFER+4        ;THIRD WORD
001030  013500                  DBUF3:  BUFFER+6        ;FOURTH WORD
001032  013502                  DBUF4:  BUFFER+10       ;FIFTH WORD
001034  013504                  DBUF5:  BUFFER+12       ;SIX WORD
001036  000000                  DSAVE:  0               ;TEMP REG.
001040  177570                  SWR:    177570
001042  017476                  SIZE:   17476           ;BUFFER SIZE FOR 4K (WORD LENGTH)
001044  000000                  CNTR:   0
001046  000750                  LFSIZE: 750             ;LINE FEED DELTA Y SIZE
001050  000762                  CHSIZE: 762             ;BACK SPACE CHARACTER DELTA X SIZE
```

```
                                        ;GS ADDRESSES AND VECTORS
                                        ;
001052  172000                  DPC:    172000          ;DISPLAY PC REGISTER
001054  172002                  DSR:    172002          ;DISPLAY STATUS REGISTER
001056  172004                  XPOS:   172004          ;X AXIS REGISTER (READ ONLY)
001060  172006                  YPOS:   172006          ;Y AXIS REGISTER AND GRAPHPLOT REGISTER (READ ONLY)
                                        ;
001062  000320                  DDONE:  320             ;DISPLAY STOP (DONE) VECTOR
001064  000322                  DDONE1: 322             ;
                                        ;
001066  000324                  LPVCT:  324             ;DISPLAY LIGHT PEN VECTOR
001070  000326                  LPVCT1: 326             ;
                                        ;
001072  000330                  TIMEVT: 330             ;DISPLAY TIME-OUT (NXM.) ERROR VECTOR
001074  000332                  TMEVT1: 332             ; OR "SHIFT-OUT" VECTOR
                                        ;
                                        ;GS INITALIZATION ROUTINE
                                        ;
001076  012700  001052          SETUP:  MOV     #DPC,R0         ;SET UP POINTER
001102  013701  001000                  MOV     GSADD,R1
001106  010120                  SETUPA: MOV     R1,(0)+
001110  062701  000002                  ADD     #2,R1
001114  020700  001062                  CMP     #DPC+10,R0
001120  001372                          BNE     SETUPA
001122  012700  001062                  MOV     #DDONE,R0
001126  013701  001002                  MOV     GSVCT,R1
001132  010120                  SETUPB: MOV     R1,(0)+
001134  062701  000002                  ADD     #2,R1
001140  022700  001076                  CMP     #DDONE+14,R0
001144  001372                          BNE     SETUPB
001146  013737  001010  001046          MOV     GSLFSZ,LFSIZE   ;SET UP DELTA LF
001154  005437  001046                  NEG     LFSIZE          ;NEGATE IT
001160  042737  177000  001046          BIC     #177000,LFSIZE  ;MASK IT
001166  013737  001006  001050          MOV     GSCHSZ,CHSIZE   ;SET UP DELTA CHAR
001174  005437  001050                  NEG     CHSIZE          ;NEGATE IT
001200  004737  001252                  JSR     PC,DOCORE       ;SET UP CORE SIZE
001204  042737  177000  001050          BIC     #177000,CHSIZE  ;MASK IT
001212  013777  001064  177642          MOV     DDONE1,@DDONE   ;LOAD DONE VECTOR
001220  005077  177640                  CLR     @DDONE1
001224  013777  001070  177634          MOV     LPVCT1,@LPVCT   ;LOAD LIGHT-PEN VECTOR
001232  005077  177632                  CLR     @LPVCT1
001236  013777  001074  177626          MOV     TMEVT1,@TIMEVT  ;LOAD TIME-OUT VECTOR
001244  005077  177624                  CLR     @TMEVT1
001250  000207                          RTS     PC
```

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                                        ;SUBROUTINE TO DETERMINE THE SIZE OF CORE
                                        ; AND SET UP LOCATION SIZE WITH THE VALUE
                                        ;
001252  012737  001302  000004  DOCORE: MOV     #2$,@#4                 ;SET UP FOR NEM
001260  012701  017776          DOCORE: MOV     #17776,R1               ;SET UP ADDRESS
001264  062701  020000          1$:     ADD     #20000,R1               ;MOVE TO THE NEXT BANK
001270  005711                  1$:     TST     (R1)                    ;TIMEOUT ?
001272  022701  177776                  CMP     #177776,R1              ;END ?
001276  001372                          BNE     1$
001300  000401                          BR      3$
001302  022626                  2$:     CMP     (SP)+,(SP)+             ;POP STACK
001304  012737  000006  000004  3$:     MOV     #6,@#4                  ;RESET BUSS ERROR
001312  162701  020000                  SUB     #20000,R1
001316  022701  017776                  CMP     #17776,R1               ;TEST FOR 4K MACHINE
001322  001003                          BNE     4$                      ;BR IF NOT 4 K
001324  162701  000400                  SUB     #400,R1                 ;ADJUST FOR LOADER
001330  000402                          BR      5$
001332  162701  010000          4$:     SUB     #10000,R1               ;ADJUST FOR XXDP
001336  010137  001042          5$:     MOV     R1,SIZE                 ;LOAD SIZE
001342  000207                          RTS     PC                      ;EXIT
```

```
                                ;TEST FOR BUSS ERRORS ON DISPLAY ADDRESSES

001372  104000          GTBUSS: SCOPE
001374  000005                  RESET
001376  005077  177452          CLR     @DSR            ; ON DISPLAY STATUS
001402  000240                  NOP
001404  005077  177446          CLR     @XPOS           ; ON DISPLAY X REGISTER
001410  000240                  NOP
001412  005077  177442          CLR     @YPOS           ; ON DISPLAY Y REGISTERS
001416  000005                  RESET

                                ;INCREMENT P.C. TEST
                                ;COMPLEX - BUFFER LENGTH

001420  104000          GTPC:   SCOPE
001422  013702  001022          MOV     DBUF,R2         ;SET UP POINTER
001426  012722  172000  1$:     MOV     #172000,(2)+    ;MOVE DSTOP INTO THE BUFFER
001432  023702  001042          CMP     SIZE,R2         ;FINISHED FILLING THE BUFFER?
001436  001373                  BNE     1$              ;NO

001440  104000                  SCOPE
001442  013777  001022  177402  MOV     DBUF,@DPC       ;YES, START THE DISPLAY
001450  013737  001022  001036  MOV     DBUF,DSAVE
001456  013702  001042          MOV     SIZE,R2         ;SETUP A COUNT
001462  005302                  DEC     R2
001464  017704  177364  GTPCA:  MOV     @DSR,R4
001470  100402                  BMI     1$
001472  000000                  HALT                    ;ERROR, STOP FLAG FAILED TO SET
001474  000421                  BR      GTO

001476  062737  000002  001036  1$:     ADD     #2,DSAVE
001504  017700  177342          MOV     @DPC,R0         ;READ DISPLAY P.C.
001510  023700  001036          CMP     DSAVE,R0        ;DID IT INCREMENT BY 2?
001514  001402                  BEQ     2$              ;YES
001516  000000                  HALT                    ;DISPLAY PC FAILED TO INCREMENT
001520  000407                  BR      GTO             ;PROPERLY

001522  020037  001036  2$:     CMP     R0,DSAVE        ;FINISHED THE BUFFER ?
001526  001404                  BEQ     GTO             ;BR IF YES
001530  012777  000001  177314  MOV     #1,@DPC         ;SINGLE STEP THE DISPLAY
001536  000752                  BR      GTPCA           ;TRY AGAIN
```

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                                        ;TESTED BY "LOAD STATUS REGISTER A"

001540  104000                GT0:    SCOPE
001542  012777  1,2040  177252        MOV     #172040,@DBUF   ;ITALICS ENABLE=1  ITALICS=0
001550  013777  001022  177274        MOV     @DBUF,@DPC      ;LOAD DISPLAY P.C.
001556  017700  177272                MOV     @DSR,R0         ;READ DISPLAY STATUS REGISTER
001562  042700  177757                BIC     #177757,R0      ;MASK TO BIT 4
001566  022700  000000                CMP     #0,R0           ;TEST R0
001572  001401                        BEQ     .+4             ;
001574  000000                        HALT                    ;ITALICS BIT FAILED TO RESET

001576  104000                GT1:    SCOPE
001600  012777  172060  177214        MOV     #172060,@DBUF   ;ITALICS ENABLE=1  ITALICS=1
001606  013777  001022  177236        MOV     @DBUF,@DPC      ;LOAD DISPLAY P.C.
001614  017700  177234                MOV     @DSR,R0         ;READY DISPLAY STATUS REGISTER
001620  042700  177757                BIC     #177757,R0      ;MASK TO BIT 4
001624  022700  000020                CMP     #20,R0          ;TEST R0
001630  001401                        BEQ     .+4             ;
001632  000000                        HALT                    ;ITALICS BIT FAILED TO SET

001634  104000                GT2:    SCOPE
001636  012777  172000  177156        MOV     #172000,@DBUF   ;ITALICS ENABLE=0  ITALICS=0
001644  013777  001022  177200        MOV     @DBUF,@DPC      ;LOAD DISPLAY P.C.
001652  017700  177176                MOV     @DSR,R0         ;READ DISPLAY STATUS REGISTER
001656  042700  177757                BIC     #177757,R0      ;MASK TO BITS 4
001662  022700  000020                CMP     #20,R0          ;TEST R0
001666  001401                        BEQ     .+4             ;
001670  000000                        HALT                    ;ITALICS ENABLE FAILED TO INHIBIT
                                                              ;CLEARING OF ITALICS BIT

001672  104000                GT3:    SCOPE
001674  012777  172002  177120        MOV     #172002,@DBUF   ;COLOR ENABLE=1  COLOR=0
001702  013777  001022  177142        MOV     @DBUF,@DPC      ;LOAD DISPLAY P.C.
001710  004737  012360                JSR     7,DLAY1         ;EXECUTE A PROGRAM DELAY

001714  017700  177134                MOV     @DSR,R0         ;READ DISPLAY STATUS REGISTER
001720  042700  177773                BIC     #177773,R0      ;MASK TO BIT 2
001724  022700  000000                CMP     #0,R0           ;TEST R0
001730  001401                        BEQ     .+4             ;
001732  000240                        NOP                     ;COLOR BIT FAILED TO RESET

001734  104000                GT4:    SCOPE
001736  012777  172003  177056        MOV     #172003,@DBUF   ;COLOR ENABLE=1  COLOR=1
001744  013777  001022  177100        MOV     @DBUF,@DPC      ;LOAD DISPLAY P.C.
001752  004737  012360                JSR     7,DLAY1         ;EXECUTE A PROGRAM DELAY

001756  017700  177072                MOV     @DSR,R0         ;READ DISPLAY STATUS REGISTER
001762  042700  177773                BIC     #177773,R0      ;MASK TO BIT 2
001766  022700  000004                CMP     #4,R0           ;TEST R0
001772  001401                        BEQ     .+4             ;
001774  000240                        NOP                     ;COLOR BIT FAILED TO SET
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001776  104000                  GT5:    SCOPE
002000  012777  172000  177014          MOV     #172000,@DBUF   ;COLOR ENABLE=0  COLOR=0
002006  013777  001022  177036          MOV     DBUF,@DPC       ;LOAD DISPLAY P.C.
002014  017700  177034                  MOV     @DSR,R0         ;READ DISPLAY STATUS REGISTER
002020  042700  177773                  BIC     #177773,R0      ;MASK TO BIT 2
002024  022700  000004                  CMP     #4,R0           ;TEST R0
002030  001401                          BEQ     .+4             ;
002032  000240                          NOP                     ;COLOR ENABLE FAILED TO INHIBIT
                                                                ;RESETTING OF COLOR BIT
                                
                                        ;TESTED BY "LOAD CHARACTER" MODE
                                
002034  104000                  GT6:    SCOPE
002036  012777  100004  176756          MOV     #100004,@DBUF   ;LOAD LINE TYPE ENABLE =1 AND LINE TYPE VALUE =0
002044  012777  172000  176752          MOV     #172000,@DBUF1
002052  013777  001022  176772          MOV     DBUF,@DPC       ;LOAD DISPLAY P.C.
002060  017700  176770                  MOV     @DSR,R0         ;READ DISPLAY STATUS REGISTER
002064  042700  177774                  BIC     #177774,R0      ;MASK TO BITS 1-0
002070  022700  000000                  CMP     #0,R0           ;TEST R0
002074  001401                          BEQ     .+4             
002076  000000                          HALT                    ;LINE BITS 1-0 FAILED TO RESET
                                
002100  104000                  GT7:    SCOPE
002102  012777  100007  176712          MOV     #100007,@DBUF   ;LINE TYPE ENABLE =1 LINE TYPE =3
002110  012777  172000  176706          MOV     #172000,@DBUF1  ;LOAD STOP
002116  013777  001022  176726          MOV     DBUF,@DPC       ;LOAD DISPLAY P.C.
002124  017700  176724                  MOV     @DSR,R0         ;READ DISPLAY STATUS REGISTER
002130  042700  177774                  BIC     #177774,R0      ;MASK TO BITS 1-0
002134  022700  000003                  CMP     #3,R0           ;TEST R0
002140  001401                          BEQ     .+4             
002142  000000                          HALT                    ;LINE BITS 1-0 FAILED TO SET
                                
002144  104000                  GT8:    SCOPE
002146  012777  100005  176646          MOV     #100005,@DBUF   ;LINE TYPE ENABLE =1 LINE TYPE =1
002154  012777  172000  176642          MOV     #172000,@DBUF1  ;LOAD STOP
002162  013777  001022  176662          MOV     DBUF,@DPC       ;LOAD DISPLAY P.C.
002170  017700  176660                  MOV     @DSR,R0         ;READ DISPLAY STATUS REGISTER
002174  042700  177774                  BIC     #177774,R0      ;MASK TO BITS 1-0
002200  022700  000001                  CMP     #1,R0           ;TEST R0
002204  001401                          BEQ     .+4             
002206  000000                          HALT                    ;LINE BIT 0 FAILED TO SET
                                
002210  104000                  GT9:    SCOPE
002212  012777  100006  176602          MOV     #100006,@DBUF   ;LINE TYPE ENABLE =1 LINE TYPE =2
002220  012777  172000  176576          MOV     #172000,@DBUF1
002226  013777  001022  176616          MOV     DBUF,@DPC       ;LOAD DISPLAY P.C.
002234  017700  176614                  MOV     @DSR,R0         ;READ DISPLAY STATUS REGISTER
002240  042700  177774                  BIC     #177774,R0      ;MASK TO BITS 1-0
002244  022700  000002                  CMP     #2,R0           ;TEST R0
002250  001401                          BEQ     .+4             
002252  000000                          HALT                    ;LINE BIT 1 FAILED TO SET
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002254  104000                    GT10:   SCOPE
002256  012777  100003  176536            MOV     #100003,@DBUF      ;LINE TYPE ENABLE =0 LINE TYPE =3
002264  012777  172000  176532            MOV     #172000,@DBUF1
002272  013777  001022  176552            MOV     DBUF,@DPC          ;LOAD DISPLAY P.C.
002300  017700  176550                    MOV     @DSR,R0            ;READ DISPLAY STATUS REGISTER
002304  042700  177774                    BIC     #177774,R0         ;MASK TO BITS 1-0
002310  022700  000002                    CMP     #2,R0              ;TEST R0
002314  001401                            BEQ     .+4                ;SHOULD NOT CHANGE LT VALUE
002316  000000                            HALT                       ;LINE TYPE ENABLE FAILED TO INHIBIT
                                                                     ;CHANGING OF LINETYPE VALUE

002320  104000                    GT11:   SCOPE
002322  012777  100020  176472            MOV     #100020,@DBUF      ;BLINK ENABLE =1  BLINK =0
002330  012777  172000  176466            MOV     #172000,@DBUF1
002336  013777  001022  176506            MOV     DBUF,@DPC          ;LOAD DISPLAY P.C.
002344  017700  176504                    MOV     @DSR,R0            ;READ DISPLAY STATUS REGISTER
002350  042700  177767                    BIC     #177767,R0         ;MASK TO BIT 3
002354  022700  000000                    CMP     #0,R0              ;TEST R0
002360  001401                            BEQ     .+4
002362  000000                            HALT                       ;BLINK BIT FAILED TO RESET
                                                                     ;

002364  104000                    GT12:   SCOPE
002366  012777  100030  176426            MOV     #100030,@DBUF      ;BLINK ENABLE =1  BLINK =1
002374  012777  172000  176422            MOV     #172000,@DBUF1
002402  013777  001022  176442            MOV     DBUF,@DPC          ;LOAD DISPLAY P.C.
002410  017700  176440                    MOV     @DSR,R0            ;READ DISPLAY STATUS REGISTER
002414  042700  177767                    BIC     #177767,R0         ;MASK TO BIT 3
002420  022700  000010                    CMP     #10,R0             ;TEST R0
002424  001401                            BEQ     .+4
002426  000000                            HALT                       ;BLINK BIT FAILED TO SET


002430  104000                    GT13:   SCOPE
002432  012777  100000  176362            MOV     #100000,@DBUF      ;BLINK ENABLE =0  BLINK =0
002440  012777  172000  176356            MOV     #172000,@DBUF1
002446  013777  001022  176376            MOV     DBUF,@DPC          ;LOAD DISPLAY P.C.
002454  017700  176374                    MOV     @DSR,R0            ;READ DISPLAY STATUS REGISTER
002460  042700  177767                    BIC     #177767,R0         ;MASK TO BIT 3
002464  022700  000010                    CMP     #10,R0             ;TEST R0
002470  001401                            BEQ     .+4
002472  000000                            HALT                       ;BLINK ENABLE FAILED TO INHIBIT
                                                                     ;CHANGING OF THE BLINK BIT

002474  104000                    GT14:   SCOPE
002476  012777  100100  176316            MOV     #100100,@DBUF      ;LP ENABLE =1 LP=0
002504  012777  172000  176312            MOV     #172000,@DBUF1
002512  013777  001022  176332            MOV     DBUF,@DPC          ;LOAD DISPLAY P.C.
002520  017700  176330                    MOV     @DSR,R0            ;READ STATUS
002524  032700  000200                    BIT     #200,R0            ;
002530  001401                            BEQ     .+4
002532  000000                            HALT                       ;LIGHT PEN FLAG SET IN ERROR
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002534  104000                   GT15:   SCOPE
002536  012777  100140  176256           MOV     #100140,@DBUF     ;LP ENABLE =1 LP=1
002544  012777  172000  176252           MOV     #172000,@DBUF1
002552  013777  001022  176272           MOV     DBUF,@DPC         ;LOAD DISPLAY P.C.
002560  017700  176270                   MOV     @DSR,R0           ;READ STATUS
002564  032700  000200                   BIT     #200,R0
002570  001401                           BEQ     .+4
002572  000000                           HALT                      ;LIGHT PEN FLAG SET IN ERROR

002574  104000                   GT16:   SCOPE
002576  012777  102000  176216           MOV     #102000,@DBUF     ;INTENSITY LEVEL ENABLE =1 LEVEL =0
002604  012777  172000  176212           MOV     #172000,@DBUF1
002612  013777  001022  176232           MOV     DBUF,@DPC         ;LOAD DISPLAY P.C.
002620  017700  176230                   MOV     @DSR,R0           ;READ DISPLAY STATUS REGISTER
002624  042700  174377                   BIC     #174377,R0        ;MASK TO BITS 8-10
002630  022700  000000                   CMP     #0,R0             ;TEST R0
002634  001401                           BEQ     .+4
002636  000000                           HALT                      ;INTENSITY LEVEL BITS 8-10 FAILED TO RESET


002640  104000                   GT17:   SCOPE
002642  012777  103600  176152           MOV     #103600,@DBUF     ;INTENSITY LEVEL ENABLE =1  LEVEL =7
002650  012777  172000  176146           MOV     #172000,@DBUF1
002656  013777  001022  176166           MOV     DBUF,@DPC         ;LOAD DISPLAY O.C.
002664  017700  176164                   MOV     @DSR,R0           ;READ DISPLAY STATUS REGISTER
002670  042700  174377                   BIC     #174377,R0        ;MASK TO BITS 8-10
002674  022700  003400                   CMP     #3400,R0          ;TEST R0
002700  001401                           BEQ     .+4
002702  000000                           HALT                      ;INTENSITY LEVEL BITS 8-10 FAILED TO SET


002704  104000                   GT18:   SCOPE
002706  012777  103000  176106           MOV     #103000,@DBUF     ;INTENSITY LEVEL ENABLE =1  LEVEL =4
002714  012777  172000  176102           MOV     #172000,@DBUF1
002722  013777  001022  176122           MOV     DBUF,@DPC         ;LOAD DISPLAY P.C.
002730  017700  176120                   MOV     @DSR,R0           ;READ DISPLAY STATUS REGISTER
002734  042700  174377                   BIC     #174377,R0        ;MASK TO BITS 8-10
002740  022700  002000                   CMP     #2000,R0          ;TEST R0
002744  001401                           BEQ     .+4
002746  000000                           HALT                      ;INTENSITY LEVEL BIT 10 FAILED


002750  104000                   GT19:   SCOPE
002752  012777  102400  176042           MOV     #102400,@DBUF     ;INTENSITY LEVEL ENABLE =1  LEVEL =2
002760  012777  172000  176036           MOV     #172000,@DBUF1
002766  013777  001022  176056           MOV     DBUF,@DPC         ;LOAD DISPLAY P.C.
002774  017700  176054                   MOV     @DSR,R0           ;READ DISPLAY STATUS REGISTER
003000  042700  174377                   BIC     #174377,R0        ;MASK TO BITS 8-10
003004  022700  001000                   CMP     #1000,R0                  ;TEST R0
003010  001401                           BEQ     .+4
003012  000000                           HALT                      ;INTENSITY LEVEL BIT 9 FAILED
```

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003014  104000                          GT20:   SCOPE
003016  012777  102200  175776                  MOV     #102200,@DBUF     ;INTENSITY LEVEL ENABLE =1  LEVEL =1
003024  012777  172000  175772                  MOV     #172000,@DBUF1
003032  013777  001022  176012                  MOV     DBUF,@DPC         ;LOAD DISPLAY P.C.
003040  017700  176010                          MOV     @DSR,R0           ;READ DISPLAY STATUS REGISTER
003044  042700  174377                          BIC     #174377,R0        ;MASK TO BITS 8-10
003050  022700  000400                          CMP     #400,R0           ;TEST R0
003054  001401                                  BEQ     .+4
003056  000000                                  HALT                      ;INTENSITY LEVEL BIT 8 FAILED


003060  104000                          GT21:   SCOPE
003062  012777  101600  175732                  MOV     #101600,@DBUF     ;INTENSITY LEVEL ENABLE =0  LEVEL =7
003070  012777  172000  175726                  MOV     #172000,@DBUF1
003076  013777  001022  175746                  MOV     DBUF,@DPC         ;LOAD DISPLAY P.C.
003104  017700  175744                          MOV     @DSR,R0           ;READ DISPLAY STATUS REGISTER
003110  042700  174377                          BIC     #174377,R0        ;MASK TO BITS 8-10
003114  022700  000400                          CMP     #400,R0           ;TEST R0
003120  001401                                  BEQ     .+4
003122  000000                                  HALT                      ;INTENSITY LEVEL ENABLE FAILED TO INHIBIT
                                                                          ;INTENSITY LEVEL CHANGE

                                        ;GRAPHPLOT INCREMENT REGISTER TEST

003124  104000                          GT22:   SCOPE
003126  012777  174100  175666                  MOV     #174100,@DBUF     ;LOAD GRAPHPLOT COUNTER
003134  012777  172000  175662                  MOV     #172000,@DBUF1
003142  013777  001022  175702                  MOV     DBUF,@DPC         ;START DISPLAY
003150  017700  175702                          MOV     @XPOS,R0          ;READ INCREMENT REGISTER
003154  042700  001777                          BIC     #1777,R0          ;MASK TO BITS 15-10
003160  022700  000000                          CMP     #0,R0
003164  001401                                  BEQ     .+4
003166  000000                                  HALT                      ;GRAPHPLOT REGISTER IN ERROR

003170  104000                          GT23:   SCOPE
003172  012777  174177  175622                  MOV     #174177,@DBUF     ;LOAD GRAPHPLOT COUNTER
003200  012777  172000  175616                  MOV     #172000,@DBUF1
003206  013777  001022  175636                  MOV     DBUF,@DPC         ;START DISPLAY
003214  017700  175636                          MOV     @XPOS,R0          ;READ INCREMENT REGISTER
003220  042700  001777                          BIC     #1777,R0          ;MASK TO BITS 15-10
003224  022700  176000                          CMP     #176000,R0
003230  001401                                  BEQ     .+4
003232  000000                                  HALT                      ;GRAPHPLOT REGISTER IN ERROR

003234  104000                          GT24:   SCOPE
003236  012777  174152  175556                  MOV     #174152,@DBUF     ;LOAD GRAPHPLOT COUNTER
003244  012777  017200  175552                  MOV     #17200,@DBUF1
003252  013777  001022  175572                  MOV     DBUF,@DPC         ;START DISPLAY
003260  017700  175572                          MOV     @XPOS,R0          ;READ INCREMENT REGISTER
003264  042700  001777                          BIC     #1777,R0          ;MASK TO BITS 15-10
003270  022700  124000                          CMP     #124000,R0
003274  001401                                  BEQ     .+4
003276  000000                                  HALT                      ;GRAPHPLOT REGISTER IN ERROR
```

```
                                                GT25:   SCOPE
003300  104000
003302  012777  174125  175512                        MOV     #174125,@DBUF   ;LOAD GRAPHPLOT COUNTER
003310  012777  172000  175506                        MOV     #172000,@DBUF1
003316  013777  001022  175526                        MOV     DBUF,@PC        ;START DISPLAY
003324  017700  175526                                MOV     @XPOS,R0        ;READ INCREMENT REGISTER
003330  042700  001777                                BIC     #1777,R0        ;MASK TO BITS 15-10
003334  022700  052000                                CMP     #52000,R0
003340  001401                                        BEQ     .+4
003342  000000                                        HALT                    ;GRAPHPLOT REGISTER IN ERROR

003344  104000                                GT26:   SCOPE
003346  012777  174100  175446                        MOV     #174100,@DBUF   ;LOAD GRAPHPLOT COUNTER WITH 0
003354  012777  172000  175442                        MOV     #172000,@DBUF1
003362  013777  001022  175462                        MOV     DBUF,@PC        ;START DISPLAY
003370  004737  012346                                JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
003374  012777  174077  175420                        MOV     #174077,@DBUF   ;LOAD GRAPHPLOT NO ENABLE
003402  013777  001022  175442                        MOV     DBUF,@PC        ;START DISPLAY
003410  017700  175442                                MOV     @XPOS,R0                ;READ INCREMENT REGISTER
003414  042700  001777                                BIC     #1777,R0        ;MASK TO BITS 15-10
003420  022700  000000                                CMP     #0,R0           ;ARE THEY EQUAL ?
003424  001401                                        BEQ     .+4
003426  000000                                        HALT                    ;GRAPHPLOT REGISTER CHANGED WITHOUT
                                                                                ; THE ENABLE BEING SET

                                        ;TEST THAT THE X POSITION REGISTER CAN BE LOADED CORRECTLY
                                        ;USING GRAPHPLOT X

003430  104000                        GT27:   SCOPE
003432  012777  122000  175362                MOV     #122000,@DBUF   ;LOW INTENSITY - SET GRAPHPLOT X MODE
003440  012777  001252  175356                MOV     #1252,@DBUF1    ;SET X POSITION
003446  012777  172000  175352                MOV     #172000,@DBUF2  ;LOAD STOP
003454  013777  001022  175370                MOV     DBUF,@PC        ;START THE DISPLAY
003462  004737  012346                        JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
003466  017700  175364                        MOV     @XPOS,R0        ;READ X POSITION
003472  022700  001252                        CMP     #1252,R0        ;
003476  001401                                BEQ     .+4
003500  000C00                                HALT                    ;X POSITION REGISTER FAILED TO LOAD
                                                                        ;PROPERLY USING GRAPHPLOT X MODE '
```

```
                                        ;TEST THAT THE X POSITION REGISTER CAN BE LOADED CORRECTLY
                                        ;USING GRAPHPLOT X

003502  104000                  GT28:   SCOPE
003504  012777  122000  175310          MOV     #122000,@DBUF   ;LOW INTENSITY - SET GRAPH PLOT X MODE
003512  012777  000525  175304          MOV     #525,@DBUF1     ;SET X POSITION
003520  012777  172000  175300          MOV     #172000,@DBUF2  ;LOAD STATUS REGISTER A, STOP
003526  013777  001022  175316          MOV     DBUF,@DPC       ;LOAD THE DISPLAY P.C.
003534  004737  012346                  JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
003540  017700  175312                  MOV     @XPOS,R0        ;READ X POSITION
003544  022700  000525                  CMP     #525,R0         ;
003550  001401                          BEQ     .+4
003552  000000                          HALT                    ;X POSITION REGISTER FAILED TO LAD
                                                                ;PROPERLY USING GRAPH PLOT X MODE

                                        ;TEST THAT THE Y POSITION REGISTER CAN BE LOADED CORRECTLY
                                        ;USING GRAPHPLOT Y MODE

003554  104000                  GT29:   SCOPE
003556  012777  126000  175236          MOV     #126000,@DBUF   ;LOW INTENSITY - SET GRAPHPLOT Y
003564  012777  001252  175232          MOV     #1252,@DBUF1    ;SET Y POSITION
003572  012777  172000  175226          MOV     #172000,@DBUF2  ;LOAD STATUS REGISTER A, STOP
003600  013777  001022  175244          MOV     DBUF,@DPC       ;LOAD THE DISPLAY P.C.
003606  004737  012346                  JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
003612  017700  175242                  MOV     @YPOS,R0        ;READ Y POSITION
003616  022700  001252                  CMP     #1252,R0        ;
003622  001401                          BEQ     .+4             ;
003624  000000                          HALT                    ;Y POSITION REGISTER FAILED TO LOAD
                                                                ;PROPERLY USING GRAPHPLOT Y MODE
```

```
                                        ;TEST THAT THE Y POSITION REGISTER CAN BE LOADED CORRECTLY
                                        ;USING GRAPHPLOT Y MODE
                                        ;
003626  104000                  GT30:   SCOPE
003630  012777  126000  175164          MOV     #126000,@DBUF   ;LOW INTENSITY - SET GRAPHPLOT Y MODE
003636  012777  000525  175160          MOV     #525,@DBUF1     ;SET Y POSITION
003644  012777  172000  175154          MOV     #172000,@DBUF2  ;LOAD STATUS REGISTER A, STOP
003652  013777  001022  175172          MOV     DBUF,@DPC       ;LOAD THE DISPLAY P.C.
003660  004737  012346                  JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
003664  017700  175170                  MOV     @YPOS,R0        ;READ Y POSITION
003670  022700  000525                  CMP     #525,R0         ;
003674  001401                          BEQ     .+4             ;
003676  000000                          HALT                    ;Y POSITION REGISTER FAILED TO LOAD
                                                                ;PROPERLY USING GRAPHPLOT Y MODE
                                        ;
                                        ;TEST THAT THE X - Y POSITION REGISTERS CAN BE LOADED CORRECTLY
                                        ;USING GRAPHPLOT X + Y MODE
                                        ;TEST FOR PROPER SELECTION OF X AND Y REGISTERS
                                        ;
003700  104000                  GT31:   SCOPE
003702  012777  122000  175112          MOV     #122000,@DBUF   ;LOW INTENSITY - SET GRAPHPLOT X MODE
003710  012777  001234  175106          MOV     #1234,@DBUF1    ;SET X POSITION
003716  012777  126000  175102          MOV     #126000,@DBUF2  ;SET GRAPHPLOT Y MODE
003724  012777  001432  175076          MOV     #1432,@DBUF3    ;SET Y POSITION
003732  012777  172000  175072          MOV     #172000,@DBUF4  ;LOAD STATUS REGISTER A, STOP
003740  013777  001022  175104          MOV     DBUF,@DPC       ;LOAD THE DISPLAY P.C.
003746  004737  012346                  JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
003752  017700  175100                  MOV     @XPOS,R0        ;READ X POSITION
003756  022700  001234                  CMP     #1234,R0        ;
003762  001402                          BEQ     .+6             ;
003764  000000                          HALT                    ;GRAPHPLOT X MODE FAILED TO SELECT
003766  000406                          BR      GT32            ;X POSITION PROPERLY
                                        ;
003770  017700  175064                  MOV     @YPOS,R0        ;READ Y POSITION
003774  022700  001432                  CMP     #1432,R0        ;
004000  001401                          BEQ     .+4             ;
004002  000000                          HALT                    ;Y POSITION REGISTER FAILED TO LOAD
                                                                ;PROPERLY USING GRAPHPLOT Y MODE
```

```
                                        ;TEST THAT THE X-Y POSITION REGISTERS CAN BE RESET
                                        ;USING POINT DATA MODE.
                                        ;
004004  104000                  GT32:   SCOPE
004006  012777  116000  175006          MOV     #116000,@DBUF   ;LOW INTENSITY - POINT MODE
004014  005077  175004                  CLR     @#175004        ;CLEAR X POSITION
004020  005077  175002                  CLR     @#175002        ;CLEAR Y POSITION
004024  012777  172000  174776          MOV     #172000,@DBUF3  ;LOAD STATUS "A" REGISTER, STOP
004032  013777  001022  175012          MOV     @DBUF,@DPC      ;LOAD DISPLAY P.C.
004040  004737  012346                  JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
004044  017700  175006                  MOV     @XPOS,R0        ;READ X POSITION
004050  001402                          BEQ     .+6             ;WAS IT 0?
004052  000000                          HALT                    ;X POSITION REGISTER FAILED TO RESET
004054  000404                          BR      GT33            ;USING POINT DATA MODE
                                        ;
004056  017700  174776                  MOV     @YPOS,R0        ;READ Y POSITION
004062  001401                          BEQ     .+4             ;WAS IT 0?
004064  000000                          HALT                    ;Y POSITION REGISTER FAILED TO RESET
                                        ;USING POINT DATA MODE
                                        ;
                                        ;TEST THAT THE X-Y POSITION REGISTERS CAN BE SET
                                        ;USING POINT DATA MODE.
                                        ;
004066  104000                  GT33:   SCOPE
004070  012777  116000  174724          MOV     #116000,@DBUF   ;LOW INTENSITY - POINT MODE
004076  012777  001777  174720          MOV     #1777,@DBUF1    ;SET X POSITION
004104  012777  001777  174714          MOV     #1777,@DBUF2    ;SET Y POSITION
004112  012777  172000  174710          MOV     #172000,@DBUF3  ;LOAD STATUS A REGISTER, STOP
004120  013777  001022  174724          MOV     @DBUF,@DPC      ;LOAD DISPLAY P.C.
004126  004737  012346                  JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
004132  017700  174720                  MOV     @XPOS,R0        ;READ X POSITION
004136  022700  001777                  CMP     #1777,R0        ;WAS IT SET?
004142  001402                          BEQ     .+6             ;
004144  000000                          HALT                    ;X POSITION REGISTER FAILED TO SET
004146  000406                          BR      GT34            ;USING POINT DATA MODE
                                        ;
004150  017700  174704                  MOV     @YPOS,R0        ;READ Y POSITION
004154  022700  001777                  CMP     #1777,R0        ;WAS IT SET?
004160  001401                          BEQ     .+4             ;
004162  000000                          HALT                    ;Y POSITION REGISTER FAILED TO SET
                                        ;USING POINT DATA MODE
                                        ;
```

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                                        ;TEST THAT THE X-Y POSITION REGISTERS CAN BE LOADED CORRECTLY
                                        ;USING POINT DATA MODE

 004164  104000                         GT34:   SCOPE
 004166  012777  116000  174626                 MOV     #116000,@DBUF    ;LOW INTENSITY - POINT MODE
 004174  012777  001252  174622                 MOV     #1252,@DBUF1     ;SET X POSITION
 004202  012777  001252  174616                 MOV     #1252,@DBUF2     ;SET Y POSITION
 004210  012777  172000  174612                 MOV     #172000,@DBUF3   ;LOAD STATUS REGISTER A, STOP
 004216  013777  001C[illegible]2  174626                 MOV     DBUF,@DPC
 [illegible]  004737  012346                         JSR     7,DLAY           ;EXECUTE A PROGRAM DELAY
 [illegible]  017700  174622                         MOV     @XPOS,R0         ;READ X POSITION
 [illegible]  022700  001252                         CMP     #1252,R0         ;
 [illegible]  001402                                 BEQ     .+6
 [illegible]  [illegible]                                 HALT                     ;X POSITION REGISTER FAILED
 [illegible]  [illegible]                                 BR      GT35             ;USING POINT DATA MODE

 004246  017700  174606                         MOV     @YPOS,R0         ;READ Y POSITION
 004252  022700  001252                         CMP     #1252,R0         ;
 [illegible]  001401                                 BEQ     .+4
 004260  000000                                 HALT                     ;Y POSITION REGISTER FAILED
                                                                         ;USING POINT DATA MODE

                                        ;TEST THAT THE X-Y POSITION REGISTERS CAN BE LOADED CORRECTLY
                                        ;USING POINT DATA MODE

 004262  104000                         GT35:   SCOPE
 [illegible]  012777  11[illegible]  174530                 MOV     #116000,@DBUF    ;LOW INTENSITY - POINT MODE
 [illegible]  012777  [illegible]  174[illegible]                 MOV     #525,@DBUF1      ;SET X POSITION
 [illegible]  012777  [illegible]  174520                 MOV     #525,@DBUF2      ;SET Y POSITION
 [illegible]  012777  [illegible]  174514                 MOV     #172000,@DBUF3   ;LOAD STATUS REGISTER A, STOP
 [illegible]  [illegible]  [illegible]  174530                 MOV     DBUF,@DPC
 [illegible]  [illegible]  [illegible]                         JSR     7,DLAY           ;EXECUTE A PROGRAM DELAY
 [illegible]  [illegible]  174524                         MOV     @XPOS,R0         ;READ X POSITION
 [illegible]  [illegible]  000525                         CMP     #525,R0          ;
 [illegible]  [illegible]                                 BEQ     .+6
 [illegible]  [illegible]                                 HALT                     ;X POSITION REGISTER FAILED
 004342  [illegible]                                 BR      GT36             ;USING POINT DATA MODE

 004344  017700  174510                         MOV     @YPOS,R0         ;READ Y POSITION
 004350  022700  000525                         CMP     #525,R0          ;
 004354  001401                                 BEQ     .+4
 004356  000000                                 HALT                     ;Y POSITION REGISTER FAILED
                                                                         ;USING POINT DATA MODE

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                                        ;TEST THAT THE X-Y POSITION REGISTERS CAN BE LOADED CORRECTLY
                                        ;USING POINT DATA MODE
                                        
004360  104000                  GT36:   SCOPE
004362  012777  116000  174432          MOV     #116000,@DBUF   ;LOW INTENSITY - POINT MODE
004370  012777  000000  174426          MOV     #0,@DBUF1       ;SET X POSITION
004376  012777  001777  174422          MOV     #1777,@DBUF2    ;SET Y POSITION
004404  012777  172000  174416          MOV     #172000,@DBUF3  ;LOAD STATUS REGISTER A, STOP
004412  013777  001022  174432          MOV     DBUF,@DPC
004420  004737  012346                  JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
004424  017700  174426                  MOV     @DPOS,R0        ;READ X POSITION
004430  022700  000000                  CMP     #0,R0
004434  001402                          BEQ     .+6
004436  000000                          HALT                    ;X POSITION REGISTER FAILED
004440  000406                          BR      GT37            ;USING POINT DATA MODE

004442  017700  174412                  MOV     @YPOS,R0        ;READ Y POSITION
004446  022700  001777                  CMP     #1777,R0        ;
004452  001401                          BEQ     .+4             ;
004454  000000                          HALT                    ;Y POSITION REGISTER FAILED
                                                                ;USING POINT DATA MODE
```

```
                                        ;TEST THAT LONG VECTOR MODE INCREMENTS X AND Y AXIS PROPERLY
                                        ;COUNT 1
                                        
004456  104000                  GT37:   SCOPE
004460  013700  001022                  MOV     DBUF,R0
004464  012720  116000                  MOV     #116000,(0)+    ;LOAD "POINT MODE"
004470  005020                          CLR     (0)+            ;CLEAR X AXIS
004472  005020                          CLR     (0)+            ;CLEAR Y AXIS
004474  012720  110000                  MOV     #110000,(0)+    ;LOAD "LONG VECTOR MODE"
004500  012720  000001                  MOV     #1,(0)+         ;PRESET "DELTA X AXIS"
004504  012720  000001                  MOV     #1,(0)+         ;PRESET "DELTA Y AXIS"
004510  012710  172000                  MOV     #172000,(0)     ;LOAD "DISPLAY STOP"
004514  013777  001022  174330          MOV     DBUF,@DPC       ;LOAD THE DISPLAY P.C.
004522  004737  012346                  JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY

004526  017700  174324                  MOV     @XPOS,R0        ;READ X AXIS
004532  022700  000001                  CMP     #1,R0           ;DID IT INCREMENT BY 1
004536  001402                          BEQ     .+6             ;YES
004540  000000                          HALT                    ;NO, INCREMENT X AXIS BY
004542  000406                          BR      GT38            ;LONG VECTOR MODE FAILED

004544  017700  174310                  MOV     @YPOS,R0        ;READ Y AXIS
004550  022700  000001                  CMP     #1,R0           ;DID IT INCREMENT BY 1
004554  001401                          BEQ     .+4             ;YES
004556  000000                          HALT                    ;NO, INCREMENT Y AXIS BY
                                                                ;LONG VECTOR MODE FAILED

                                        ;TEST THAT LONG VECTOR MODE DECREMENT X AND Y AXIS PROPERLY
                                        ;COUNT 1

004560  104000                  GT38:   SCOPE
004562  013700  001022                  MOV     DBUF,R0
004566  012720  116000                  MOV     #116000,(0)+    ;LOAD "POINT MODE"
004572  005020                          CLR     (0)+            ;CLEAR X AXIS
004574  005020                          CLR     (0)+            ;CLEAR Y AXIS
004576  012720  110000                  MOV     #110000,(0)+    ;LOAD "LONG VECTOR MODE"
004602  012720  020001                  MOV     #20001,(0)+     ;PRESET "DELTA X AXIS"
004606  012720  020001                  MOV     #20001,(0)+     ;PRESET "DELTA Y AXIS"
004612  012710  172000                  MOV     #172000,(0)     ;LOAD "DISPLAY STOP"
004616  013777  001022  174226          MOV     DBUF,@DPC       ;LOAD THE DISPLAY P.C.
004624  004737  012346                  JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY

004630  017700  174222                  MOV     @XPOS,R0        ;READ X AXIS
004634  022700  001777                  CMP     #1777,R0        ;DID IT DECREMENT BY 1
004640  001402                          BEQ     .+6             ;YES
004642  000000                          HALT                    ;NO, DECREMENT X AXIS BY
004644  000406                          BR      GT39            ;LONG VECTOR MODE FAILED

004646  017700  174206                  MOV     @YPOS,R0        ;READ Y AXIS
004652  022700  001777                  CMP     #1777,R0        ;DID IT DECREMENT BY 1
004656  001401                          BEQ     .+4             ;YES
004660  000000                          HALT                    ;NO, DECREMENT Y AXIS BY
                                                                ;LONG VECTOR MODE FAILED
```

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                                        ;TEST THAT LONG VECTOR MODE INCREMENT X AND Y AXIS PROPERLY
                                        ;COUNT 0-1777
                                
004662  104000                  GT39:   SCOPE
004664  012703  001777                  MOV     #1777,R3        ;SET UP A COUNTER
004670  012704  000001                  MOV     #1,R4           ;PRESET THE COMPARED VALUE
                                
004674  104000                          SCOPE
004676  013700  001022          GT39A:  MOV     DBUF,R0         ;SET UP R0
004702  012720  116000                  MOV     #116000,(0)+    ;LOAD "POINT MODE"
004706  005020                          CLR     (0)+            ;CLEAR X AXIS
004710  005020                          CLR     (0)+            ;CLEAR Y AXIS
004712  012720  110000                  MOV     #110000,(0)+    ;LOAD "LONG VECTOR MODE"
004716  010420                          MOV     R4,(0)+         ;PRESET "DELTA X AXIS"
004720  010420                          MOV     R4,(0)+         ;PRESET "DELTA Y AXIS"
004722  012720  172000                  MOV     #172000,(0)+
004726  013777  001022  174116          MOV     DBUF,@DPC       ;LOAD THE DISPLAY P.C.
004734  004737  012346                  JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
                                
004740  017700  174112                  MOV     @XPOS,R0        ;READ X AXIS
004744  020400                          CMP     R4,R0           ;ARE THEY EQUAL?
004746  001402                          BEQ     .+6             ;YES
004750  000000                          HALT                    ;NO, INCREMENT X AXIS VIA
004752  000411                          BR      GT40            ;LONG VECTOR MODE FAILED
                                
004754  017700  174100                  MOV     @YPOS,R0        ;READ Y AXIS
004760  020400                          CMP     R4,R0           ;ARE THEY EQUAL?
004762  001402                          BEQ     .+6             ;YES
004764  000000                          HALT                    ;NO, INCREMENT Y AXIS VIA
004766  000403                          BR      GT40            ;LONG VECTOR MODE FAILED
                                
004770  005204                          INC     R4              ;INCREMENT EXPECTED VALUE
004772  005303                          DEC     R3              ;FINISHED?
004774  001340                          BNE     GT39A           ;NO, TEST MORE DATA
```

```
                                ;TEST THAT LONG VECTOR MODE DECREMENTS X AND Y AXIS PROPERLY
                                ;COUNT 1777-0
                                
004776  104000                  GT40:   SCOPE
005000  012703  002000                  MOV     #2000,R3        ;SET UP A COUNTER
005004  012704  001777                  MOV     #1777,R4        ;PRESET THE COMPARED VALUE
005010  012705  020001                  MOV     #20001,R5
                                
005014  104000                          SCOPE
005016  013700  001022          GT40A:  MOV     DBUF,R0         ;SET UP R0
        [illegible]  116000             MOV     #116000,(0)+    ;LOAD "POINT MODE"
        [illegible]                     CLR     (0)+            ;CLEAR X AXIS
        [illegible]  005020             CLR     (0)+            ;CLEAR Y AXIS
        [illegible]  110000             MOV     #110000,(0)+    ;LOAD "LONG VECTOR MODE"
        [illegible]                     MOV     R5,(0)+         ;PRESET "DELTA X AXIS"
        [illegible]                     MOV     R5,(0)+         ;PRESET "DELTA Y AXIS"
005042  012710  172000                  MOV     #172000,(0)
005046  013777  001022  173776          MOV     DBUF,@DPC       ;LOAD THE DISPLAY P.C.
005054  004737  012346                  JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY

005060  017700  173772                  MOV     @XPOS,R0        ;READ X AXIS
005064  020400                          CMP     R4,R0           ;ARE THEY EQUAL?
005066  001402                          BEQ     .+6             ;YES
005070  000000                          HALT                    ;NO, DECREMENT X AXIS VIA
005072  000412                          BR      GT41            ;LONG VECTOR MODE FAILED

005074  017700  173760                  MOV     @YPOS,R0        ;READ Y AXIS
005100  020400                          CMP     R4,R0           ;ARE THEY EQUAL?
005102  001402                          BEQ     .+6             ;YES
005104  000000                          HALT                    ;NO, DECREMENT Y AXIS VIA
005106  000404                          BR      GT41            ;LONG VECTOR MODE FAILED

005110  005205                          INC     R5              ;INCREMENT "DELTA X-Y"
005112  005304                          DEC     R4              ;DECREMENT EXPECTED VALUE
005114  005303                          DEC     R3              ;FINISHED?
005116  001337                          BNE     GT40A           ;NO, TEST MORE DATA
```

```
                                        ;TEST THAT X AND Y ASIS INCREMENTS PROPERLY
                                        ;USING SHORT VECTOR MODE
                                        ;COUNT 1

005120  104000                  GT41:   SCOPE
005122  013700  001022                  MOV     DBUF,R0         ;SET UP R0
005126  012720  116000                  MOV     #116000,(0)+    ;LOAD "SET POINT MODE"
005132  005020                          CLR     (0)+            ;CLEAR X AXIS
005134  005020                          CLR     (0)+            ;CLEAR Y AXIS
005136  012720  106000                  MOV     #106000,(0)+    ;LOAD "SET SHORT VECTOR MODE"
005142  012720  000201                  MOV     #201,(0)+       ;PRESET "DELTA X AND DELTA Y"
005146  012710  172000                  MOV     #172000,(0)
005152  013777  001022  173672          MOV     DBUF,@#PC       ;LOAD THE DISPLAY PC
005160  004737  012346                  JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY

005164  017700  173666                  MOV     @XPOS,R0        ;READ X AXIS
005170  022700  000001                  CMP     #1,R0           ;ARE THEY EQUAL?
005174  001402                          BEQ     .+6             ;YES
005176  000000                          HALT                    ;NO, INCREMENT X AXIS FAILED USING
005200  000406                          BR      GT42            ;SHORT VECTOR MODE

005202  017700  173652                  MOV     @YPOS,R0        ;READ Y AXIS
005206  022700  000001                  CMP     #1,R0           ;ARE THEY EQUAL?
005212  001401                          BEQ     .+4             ;YES
005214  000000                          HALT                    ;NO INCREMENT Y AXIS FAILED
                                                                ;USING SHORT VECTOR MODE

                                        ;TEST THAT X AND Y AXIS DECREMENT PROPERLY
                                        ;USING SHORT VECTOR MODE
                                        ;COUNT 1

005216  104000                  GT42:   SCOPE
005220  013700  001022                  MOV     DBUF,R0         ;SET UP R0
005224  012720  116000                  MOV     #116000,(0)+    ;LOAD "SET POINT MODE"
005230  005020                          CLR     (0)+            ;CLEAR X AXIS
005232  005020                          CLR     (0)+            ;CLEAR Y AXIS
005234  012720  106000                  MOV     #106000,(0)+    ;LOAD "SET SHORT VECTOR MODE"
005240  012720  020301                  MOV     #20301,(0)+     ;PRESET "DELTA X AND DELTA Y"
005244  012710  172000                  MOV     #172000,(0)
005250  013777  001022  173574          MOV     DBUF,@#PC       ;LOAD THE DISPLAY PC
005256  004737  012346                  JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY

005262  017700  173570                  MOV     @XPOS,R0        ;READ X AXIS
005266  022700  001777                  CMP     #1777,R0        ;ARE THEY EQUAL?
005272  001402                          BEQ     .+6             ;YES
005274  000000                          HALT                    ;NO, DECREMENT X AXIS FAILED USING
005276  000406                          BR      GT43            ;SHORT VECTOR MODE

005300  017700  173554                  MOV     @YPOS,R0        ;READ Y AXIS
005304  022700  001777                  CMP     #1777,R0        ;ARE THEY EQUAL?
005310  001401                          BEQ     .+4             ;YES
005312  000000                          HALT                    ;NO DECREMENT Y AXIS FAILED
                                                                ;USING SHORT VECTOR MODE
```

```
                                        ;TEST THAT X AND Y AXIS INCREMENT PROPERLY
                                        ;USING SHORT VECTOR MODE
                                        ;COUNT 0-77
                                        
005314  104000                  GT43:   SCOPE
005316  012703  000077                  MOV     #77,R3          ;SET UP A COUNT LOCATION
005322  012702  000001                  MOV     #1,R2           ;SET UP THE COMPARED LOCATION
005326  012704  000201                  MOV     #201,R4         ;SET UP "DELTA X-Y"

005332  104000                          SCOPE
005334  013700  001022          GT43A:  MOV     DBUF,R0         ;SET UP R0
005340  012720  116000                  MOV     #116000,(0)+    ;LOAD "SET POINT DATA MODE"
005344  005020                          CLR     (0)+            ;CLEAR X AXIS
005346  005020                          CLR     (0)+            ;CLEAR Y AXIS
005350  012720  106000                  MOV     #106000,(0)+    ;LOAD "SET SHORT VECTOR MODE"
005354  010420                          MOV     R4,(0)+         ;PRESET "DELTA X AND DELTA Y"
005356  012710  172000                  MOV     #172000,(0)
005362  013777  001022  173462          MOV     DBUF,@DPC       ;LOAD THE DISPLAY P.C.
005370  004737  012346                  JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY

005374  017700  173456                  MOV     @XPOS,R0        ;READ X POSITION
005400  020200                          CMP     R2,R0           ;ARE THEY EQUAL
005402  001402                          BEQ     .+6             ;YES
005404  000000                          HALT                    ;INCREMENT X AXIS FAILED USING
005406  000413                          BR      GT44            ;SHORT VECTOR MODE

005410  017700  173444                  MOV     @YPOS,R0        ;READ Y POSITION
005414  020200                          CMP     R2,R0           ;ARE THEY EQUAL ?
005416  001402                          BEQ     .+6             ;YES
005420  000000                          HALT                    ;INCREMENT Y AXIS FAILED USING
005422  000405                          BR      GT44            ;SHORT VECTOR MODE

005424  062704  000201                  ADD     #201,R4         ;ADD DELTA X-Y
005430  005202                          INC     R2              ;INCREMENT EXPECTED VALUE
005432  005303                          DEC     R3              ;DECREMENT COUNT, FINISHED?
005434  001337                          BNE     GT43A           ;NO, TEST MORE DATA
```

```
1027
1028                                    ;TEST THAT X AND Y AXIS DECREMENT PROPERLY
1029                                    ;USING SHORT VECTOR MODE
1030                                    ;COUNT 77-0
1031
1032  005436  104000                    GT44:   SCOPE
1033  005440  012703  000077                    MOV     #77,R3          ;SET UP A COUNT LOCATION
1034  005444  012702  001777                    MOV     #1777,R2        ;SET UP THE COMPARED LOCATION
1035  005450  012704  020301                    MOV     #20301,R4       ;PRESET THE "DELTA X-Y"
1036
1037  005454  104000                    GT44A:  SCOPE
1038  005456  013700  001022                    MOV     DBUF,R0         ;SET UP R0
1039  005462  012720  116000                    MOV     #116000,(0)+    ;LOAD "SET POINT DATA MODE"
1040  005466  005020                    GT44B:  CLR     (0)+            ;CLEAR X AXIS
1041  005470  005020                            CLR     (0)+            ;CLEAR Y AXIS
1042  005472  012720  106000                    MOV     #106000,(0)+    ;LOAD "SET SHORT VECTOR MODE"
1043  005476  010420                            MOV     R4,(0)+         ;PRESET "DELTA X AND DELTA Y"
1044  005500  012710  172000                    MOV     #172000,(0)
1045  005504  013777  001022  173340            MOV     DBUF,@DPC       ;LOAD THE DISPLAY P.C.
1046  005512  004737  012346                    JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1047
1048  005516  017700  173334                    MOV     @XPOS,R0        ;READ X POSITION
1049  005522  020200                            CMP     R2,R0           ;ARE THEY EQUAL
1050  005524  001402                            BEQ     .+6             ;YES
1051  005526  000000                            HALT                    ;DECREMENT X AXIS FAILED USING
1052  005530  000413                            BR      GT45            ;SHORT VECTOR MODE
1053
1054  005532  017700  173322                    MOV     @YPOS, R0       ;READ Y POSITION
1055  005536  020200                            CMP     R2,R0           ;ARE THEY EQUAL ?
1056  005540  001402                            BEQ     .+6             ;YES DECREMENT
1057  005542  000000                            HALT                    ;DECREMENT Y AXIS FAILED USING
1058  005544  000405                            BR      GT45            ;SHORT VECTOR MODE
1059
1060  005546  062704  000201                    ADD     #201,R4         ;ADD "DELTA X-Y"
1061  005552  005302                            DEC     R2              ;DECREMENT EXPECTED VALUE
1062  005554  005303                            DEC     R3              ;DECREMENT COUNT, FINISHED?
1063  005556  001337                            BNE     GT44A           ;NO, TEST MORE DATA
1064
```

```
1065                                        ;TEST THAT X AND Y ASIS INCREMENTS PROPERLY
1066                                        ;USING RELATIVE POINT MODE
1067                                        ;COUNT 1
1068
1069  005560  104000                        GT45:   SCOPE
1070  005562  013700  001022                        MOV     DBUF,R0         ;SET UP R0
1071  005566  012720  116000                        MOV     #116000,(0)+    ;LOAD "SET POINT MODE"
1072  005572  005020                        CLR     (0)+            ;CLEAR X AXIS
1073  005574  005020                        CLR     (0)+            ;CLEAR Y AXIS
1074  005576  012720  130000                        MOV     #130000,(0)+    ;LOAD "SET RELATIVE POINT MODE"
1075  005602  012720  000201                        MOV     #201,(0)+       ;PRESET "DELTA X AND DELTA Y"
1076  005606  012710  172000                        MOV     #172000,(0)
1077  005612  013777  001022  173232                MOV     DBUF,@DPC       ;LOAD THE DISPLAY PC
1078  005620  004737  012346                        JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1079
1080  005624  017700  173226                        MOV     @XPOS,R0        ;READ X AXIS
1081  005630  022700  000001                        CMP     #1,R0           ;ARE THEY EQUAL?
1082  005634  001402                        BEQ     .+6             ;YES
1083  005636  000000                        HALT                    ;NO, INCREMENT X AXIS FAILED USING
1084  005640  000406                        BR      GT46            ;RELATIVE POINT MODE
1085
1086  005642  017700  173212                        MOV     @YPOS,R0        ;READ Y AXIS
1087  005646  022700  000001                        CMP     #1,R0           ;ARE THEY EQUAL?
1088  005652  001401                        BEQ     .+4             ;YES
1089  005654  000000                        HALT                    ;NO INCREMENT Y AXIS FAILED
1090                                                                ;USING RELATIVE POINT MODE
1091
1092                                        ;TEST THAT X AND Y AXIS DECREMENT PROPERLY
1093                                        ;USING RELATIVE POINT MODE
1094                                        ;COUNT 1
1095
1096  005656  104000                        GT46:   SCOPE
1097  005660  013700  001022                        MOV     DBUF,R0         ;SET UP R0
1098  005664  012720  116000                        MOV     #116000,(0)+    ;LOAD "SET POINT MODE"
1099  005670  005020                        CLR     (0)+            ;CLEAR X AXIS
1100  005672  005020                        CLR     (0)+            ;CLEAR Y AXIS
1101  005674  012720  130000                        MOV     #130000,(0)+    ;LOAD "SET RELATIVE POINT MODE"
1102  005700  012720  020301                        MOV     #20301,(0)+     ;PRESET "DELTA X AND DELTA Y"
1103  005704  012710  172000                        MOV     #172000,(0;
1104  005710  013777  001022  173134                MOV     DBUF,@DPC       ;LOAD THE DISPLAY PC
1105  005716  004737  012346                        JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1106
1107  005722  017700  173130                        MOV     @XPOS,R0        ;READ X AXIS
1108  005726  022700  001777                        CMP     #1777,R0                ;ARE THEY EQUAL?
1109  005732  001402                        BEQ     .+6             ;YES
1110  005734  000000                        HALT                    ;NO, DECREMENT X AXIS FAILED USING
1111  005736  000406                        BR      GT47            ;RELATIVE POINT MODE
1112
1113  005740  017700  173114                        MOV     @YPOS,R0        ;READ Y AXIS
1114  005744  022700  001777                        CMP     #1777,R0        ;ARE THEY EQUAL?
1115  005750  001401                        BEQ     .+4             ;YES
1116  005752  000000                        HALT                    ;NO DECREMENT Y AXIS FAILED
1117                                                                ;USING RELATIVE POINT MODE
```

```
1118
1119                                    ;TEST THAT X AND Y AXIS INCREMENT PROPERLY
1120                                    ;USING RELATIVE POINT MODE
1121                                    ;COUNT 0-77
1122
1123  005754  104000                    GT47:   SCOPE
1124  005756  012703  000077                    MOV     #77,R3          ;SET UP A COUNT LOCATION
1125  005762  012702  000001                    MOV     #1,R2           ;SET UP THE COMPARED LOCATION
1126  005766  012704  000201                    MOV     #201,R4         ;SET UP "DELTA X-Y"
1127
1128  005772  104000                    GT47A:  SCOPE
1129  005774  013700  001022                    MOV     DBUF,R0         ;SET UP R0
1130  006000  012720  116000                    MOV     #116000,(0)+    ;LOAD "SET POINT DATA MODE"
1131  006004  005020                            CLR     (0)+            ;CLEAR X AXIS
1132  006006  005020                            CLR     (0)+            ;CLEAR Y AXIS
1133  006010  012720  130000                    MOV     #130000,(0)+    ;LOAD "SET RELATIVE POINT MODE"
1134  006014  010420                            MOV     R4,(0)+         ;PRESET "DELTA X AND DELTA Y"
1135  006016  012710  172000                    MOV     #172000,(0)
1136  006022  013777  001022  173022            MOV     DBUF,@DPC       ;LOAD THE DISPLAY P.C.
1137  006030  004737  012346                    JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1138
1139  006034  017700  173016                    MOV     @XPOS,R0        ;READ X POSITION
1140  006040  020200                            CMP     R2,R0           ;ARE THEY EQUAL
1141  006042  001402                            BEQ     .+6             ;YES
1142  006044  000000                            HALT                    ;INCREMENT X AXIS FAILED USING
1143  006046  000413                            BR      GT48            ;RELATIVE POINT MODE
1144
1145  006050  017700  173004                    MOV     @YPOS,R0        ;READ Y POSITION
1146  006054  020200                            CMP     R2,R0           ;ARE THEY EQUAL ?
1147  006056  001402                            BEQ     .+6             ;YES
1148  006060  000000                            HALT                    ;INCREMENT Y AXIS FAILED USING
1149  006062  000405                            BR      GT48            ;RELATIVE POINT MODE
1150
1151  006064  062704  000201                    ADD     #201,R4         ;ADD DELTA X-Y
1152  006070  005202                            INC     R2              ;INCREMENT EXPECTED VALUE
1153  006072  005303                            DEC     R3              ;DECREMENT COUNT, FINISHED?
1154  006074  001337                            BNE     GT47A           ;NO, TEST MORE DATA
```

```
1155
1156                                    ;TEST THAT X AND Y AXIS DECREMENT PROPERLY
1157                                    ;USING RELATIVE POINT MODE
1158                                    ;COUNT 77-0
1159
1160  006076  104000                    GT48:   SCOPE
1161  006100  012703  000077                    MOV     #77,R3          ;SET UP A COUNT LOCATION
1162  006104  012702  001777                    MOV     #1777,R2        ;SET UP THE COMPARED LOCATION
1163  006110  012704  020301                    MOV     #20301,R4       ;PRESET THE "DELTA X-Y"
1164
1165  006114  104000                    GT48A:  SCOPE
1166  006116  013700  001022                    MOV     @BUF,R0         ;SET UP R0
1167  006122  012720  116000                    MOV     #116000,(0)+    ;LOAD "SET POINT DATA MODE"
1168  006126  005020                            CLR     (0)+            ;CLEAR X AXIS
1169  006130  005020                            CLR     (0)+            ;CLEAR Y AXIS
1170  006132  012720  130000                    MOV     #130000,(0)+    ;LOAD "SET RELATIVE POINT MODE"
1171  006136  010420                            MOV     R4,(0)+         ;PRESET "DELTA X AND DELTA Y"
1172  006140  012710  172000                    MOV     #172000,(0)
1173  006144  013777  001022  172700            MOV     @BUF,@DPC       ;LOAD THE DISPLAY P.C.
1174  006152  004737  012346                    JSR     7,@DLAY         ;EXECUTE A PROGRAM DELAY
1175
1176  006156  017700  172674                    MOV     @XPOS,R0        ;READ X POSITION
1177  006162  020200                            CMP     R2,R0           ;ARE THEY EQUAL
1178  006164  001402                            BEQ     .+6             ;YES
1179  006166  000000                            HALT                    ;DECREMENT X AXIS FAILED USING
1180  006170  000413                            BR      GT49            ;RELATIVE POINT MODE
1181
1182  006172  017700  172662                    MOV     @YPOS, R0       ;READ Y POSITION
1183  006176  020200                            CMP     R2,R0           ;ARE THEY EQUAL ?
1184  006200  001402                            BEQ     .+6             ;YES DECREMENT
1185  006202  000000                            HALT                    ;DECREMENT Y AXIS FAILED USING
1186  006204  000405                            BR      GT49            ;RELATIVE POINT MODE
1187
1188  006206  062704  000201                    ADD     #201,R4         ;ADD "DELTA X-Y"
1189  006212  005302                            DEC     R2              ;DECREMENT EXPECTED VALUE
1190  006214  005303                            DEC     R3              ;DECREMENT COUNT, FINISHED?
1191  006216  001337                            BNE     GT48A           ;NO, TEST MORE DATA
1192
```

```
1193
1194
1195                                    ;LOAD STATUS B TEST
1196                                    ;USE GRAPHPLOT X MODE TO TEST Y AXIS IS INCREMENTED BY
1197                                    ;"SCALE" REGISTER
1198
1199  006220  104000                    GT49:   SCOPE
1200  006222  012703  000077                    MOV     #77,R3          ;SET UP EXECUTION COUNTER
1201  006226  012704  000001                    MOV     #1,R4           ;SET UP COMPARED DATA
1202  006232  012737  174101  001036            MOV     #174101,DSAVE   ;SET UP BASIC "LOAD STATUS B"
1203
1204  006240  104000                            SCOPE
1205  006242  013700  001022            GT49A:  MOV     DBUF,R0         ;SET UP R0
1206  006246  012720  116000                    MOV     #116000,(0)+    ;LOAD "POINT MODE"
1207  006252  005020                            CLR     (0)+            ;CLEAR X AXIS
1208  006254  005020                            CLR     (0)+            ;CLEAR Y AXIS
1209  006256  013720  001036                    MOV     DSAVE,(0)+      ;LOAD "SET STATUS B"
1210  006262  012720  120000                    MOV     #120000,(0)+    ;LOAD "SET GRAPHPLOT X MODE"
1211  006266  005020                            CLR     (0)+            ;LOAD "X GRAPHPLOT DATA"
1212  006270  012710  172000                    MOV     #172000,(0)
1213  006274  013777  001022  172550            MOV     DBUF,@DPC       ;LOAD THE DISPLAY P.C.
1214  006302  004737  012346                    JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1215
1216  006306  017700  172546                    MOV     @YPOS,R0        ;READ Y AXIS
1217  006312  020400                            CMP     R4,R0           ;COMPARE TO EXPECTED VALUE
1218  006314  001402                            BEQ     .+6             ;ARE THEY EQUAL?
1219  006316  000000                            HALT                    ;LOAD "STATUS B" FAILED TO LOAD
1220  006320  000405                            BR      GT50            ;THE Y AXIS CORRECTLY
1221
1222  006322  005237  001036                    INC     DSAVE
1223  006326  005204                            INC     R4              ;INCREMENT THE STATUS B COUNT
1224  006330  005303                            DEC     R3              ;DECREMENT THE EXECUTION COUNT
1225  006332  001343                            BNE     GT49A           ;TEST MORE DATA
```

```
1226
1227                                    ;LOAD STATUS B TEST
1228                                    ;USE GRAPHPLOT Y MODE TO TEST X AXIS IS INCREMENTED BY
1229                                    ;"SCALE" REGISTER
1230
1231  006334  104000                    GT50:   SCOPE
1232  006336  012703  000077                    MOV     #77,R3          ;SET UP EXECUTION COUNTER
1233  006342  012704  000001                    MOV     #1,R4           ;SET UP COMPARED DATA
1234  006346  012737  174101  001036            MOV     #174101,DSAVE   ;SET UP BASIC "LOAD STATUS B"
1235
1236  006354  104000                            SCOPE
1237  006356  013700  001022            GT50A:  MOV     DBUF,R0         ;SET UP R0
1238  006362  012720  116000                    MOV     #116000,(0)+    ;LOAD "POINT MODE"
1239  006366  005020                            CLR     (0)+            ;CLEAR X AXIS
1240  006370  005020                            CLR     (0)+            ;CLEAR Y AXIS
1241  006372  013720  001036                    MOV     DSAVE,(0)+      ;LOAD "SET STATUS B"
1242  006376  012720  124000                    MOV     #124000,(0)+    ;LOAD "SET GRAPHPLOT Y MODE"
1243  006402  005020                            CLR     (0)+            ;LOAD "Y GRAPHPLOT DATA"
1244  006404  012710  172000                    MOV     #172000,(0)
1245  006410  013777  001022  172434            MOV     DBUF,@DPC       ;LOAD THE DISPLAY P.C.
1246  006416  004737  012346                    JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1247
1248  006422  017700  172430                    MOV     @XPOS,R0        ;READ X AXIS
1249  006426  042700  176000                    BIC     #176000,R0      ;MASK TO BITS 0-9
1250  006432  020400                            CMP     R4,R0           ;COMPARE TO EXPECTED VALUE
1251  006434  001402                            BEQ     .+6             ;ARE THEY EQUAL?
1252  006436  000000                            HALT                    ;LOAD "STATUS B" FAILED TO LOAD
1253  006440  000405                            BR      GT50B           ;THE X AXIS CORRECTLY
1254
1255  006442  005237  001036                    INC     DSAVE
1256  006446  005204                            INC     R4              ;INCREMENT THE STATUS B COUNT
1257  006450  005303                            DEC     R3              ;DECREMENT THE EXECUTION COUNT
1258  006452  001341                            BNE     GT50A           ;TEST MORE DATA
1259
1260  006454  012777  174100  172340  GT50B:   MOV     #174100,@DBUF
1261  006462  012777  172000  172334            MOV     #172000,@DBUF1
1262  006470  013777  001022  172354            MOV     DBUF,@DPC
```

```
1263                                        ;TEST THAT THE EDGE FLAG IS NOT SET AT 1777,0
1264
1265  006476  104000                        GT51:   SCOPE
1266  006500  013700  001022                        MOV     DBUF,R0
1267  006504  012720  116000                        MOV     #116000,(0)+    ;LOAD POINT
1268  006510  012720  001777                        MOV     #1777,(0)+      ;LOAD X
1269  006514  012720  000000                        MOV     #0,(0)+         ;LOAD Y
1270  006520  012720  172000                        MOV     #172000,(0)+    ;LOAD STOP
1271  006524  013777  001022  172320                MOV     DBUF,@DPC       ;START
1272  006532  004737  012346                        JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1273
1274  006536  032777  000040  172310                BIT     #40,@DSR
1275  006544  001401                                BEQ     .+4
1276  006546  000000                                HALT                    ;ERROR, EDGE FLAG SET ON 1777,0
1277
1278                                      ;EDGE FLAG TEST
1279                                      ;TEST THAT EXCEEDING +X AXIS SETS EDGE FLAG
1280
1281  006550  104000                        GT52:   SCOPE
1282  006552  013700  001022                        MOV     DBUF,R0
1283  006556  012720  116000                        MOV     #116000,(0)+    ;LOAD POINT
1284  006562  012720  001777                        MOV     #1777,(0)+      ;LOAD MAX X
1285  006566  012720  000000                        MOV     #0,(0)+         ;LOAD Y
1286  006572  012720  110000                        MOV     #110000,(0)+    ;LOAD LONG VECTOR
1287  006576  012720  000001                        MOV     #1,(0)+         ;LOAD DETA X
1288  006602  012720  000000                        MOV     #0,(0)+         ;LOAD DELTA Y
1289  006606  012720  172000                        MOV     #172000,(0)+    ;LOAD STOP
1290  006612  013777  001022  172232                MOV     DBUF,@DPC       ;START DISPLAY
1291  006620  004737  012346                        JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1292
1293  006624  032777  000040  172222                BIT     #40,@DSR        ;TEST BIT 5
1294  006632  001002                                BNE     .+6
1295  006634  000000                                HALT                    ;EDGE FLAG FAILED TO SET
1296  006636  000424                                BR      GT53
1297
1298
1299                                      ;SUB-TEST, TEST THAT THE EDGE FLAG  CLEARS
1300
1301  006640  013700  001022                        MOV     DBUF,R0
1302  006644  012720  116000                        MOV     #116000,(0)+    ;LOAD POINT
1303  006650  012720  001777                        MOV     #1777,(0)+      ;LOAD X
1304  006654  012720  000000                        MOV     #0,(0)+         ;LOAD Y
1305  006660  012720  172000                        MOV     #172000,(0)+    ;LOAD STOP
1306  006664  013777  001022  172160                MOV     DBUF,@DPC       ;START DISPLAY
1307  006672  004737  012346                        JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1308
1309  006676  032777  000040  172150                BIT     #40,@DSR
1310  006704  001401                                BEQ     .+4
1311  006706  000000                                HALT                    ;ERROR, EDGE FLAGE FAILED TO CLEAR
```

```
1312
1313
1314                                    ;EDGE FLAG TEST
1315                                    ;TEST THAT EXCEEDING -X AXIS SETS EDGE FLAG
1316
1317  006710  104000                    GT53:   SCOPE
1318  006712  013700  001022                    MOV     DBUF,R0
1319  006716  012720  116000                    MOV     #116000,(0)+    ;LOAD POINT
1320  006722  012720  000300                    MOV     #0,(0)+         ;LOAD MAX X
1321  006726  012720  000000                    MOV     #0,(0)+         ;LOAD Y
1322  006732  012720  110000                    MOV     #110000,(0)+    ;LOAD LONG VECTOR
1323  006736  012720  020001                    MOV     #20001,(0)+     ;LOAD DETA X
1324  006742  012720  000000                    MOV     #0,(0)+         ;LOAD DELTA Y
1325  006746  012720  172000                    MOV     #172000,(0)+    ;LOAD STOP
1326  006752  013777  001022  172072            MOV     DBUF,@DPC       ;START DISPLAY
1327  006760  004737  012346                    JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1328
1329  006764  032777  000040  172062            BIT     #40,@DSR        ;TEST BIT 5
1330  006772  001002                            BNE     .+6
1331  006774  000000                            HALT                    ;EDGE FLAG FAILED TO SET
1332  006776  000424                            BR      GT54
1333
1334                                    ;SUB-TEST, TEST THAT THE EDGE FLAG CLEARS
1335
1336  007000  013700  001022                    MOV     DBUF,R0
1337  007004  012720  116000                    MOV     #116000,(0)+    ;LOAD POINT
1338  007010  012720  000000                    MOV     #0,(0)+         ;LOAD X
1339  007014  012720  000000                    MOV     #0,(0)+         ;LOAD Y
1340  007020  012720  172000                    MOV     #172000,(0)+    ;LOAD STOP
1341  007024  013777  001022  172020            MOV     DBUF,@DPC       ;START DISPLAY
1342  007032  004737  012346                    JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1343
1344  007036  032777  000040  172010            BIT     #40,@DSR
1345  007044  001401                            BEQ     .+4
1346  007046  000000                            HALT                    ;ERROR, DEGE FLAG FAILED TO CLEAR
```

```
1347                                    ;EDGE FLAG TEST
1348                                    ;TEST THAT EXCEEDING +Y AXIS SETS EDGE FLAG
1349
1350  007050  104000                    GT54:   SCOPE
1351  007052  013700  001022                    MOV     DBUF,R0
1352  007056  012720  116000                    MOV     #116000,(0)+    ;LOAD POINT
1353  007062  012720  000000                    MOV     #0,(0)+         ;LOAD X
1354  007066  013720  001012                    MOV     GSYAXS,(0)+     ;LOAD MAX Y
1355  007072  012720  110000                    MOV     #110000,(0)+    ;LOAD LONG VECTOR
1356  007076  012720  000000                    MOV     #0,(0)+         ;LOAD DETA X
1357  007102  012720  000001                    MOV     #1,(0)+         ;LOAD DELTA Y
1358  007106  012720  172000                    MOV     #172000,(0)+    ;LOAD STOP
1359  007112  013777  001022  171732            MOV     DBUF,@DPC       ;START DISPLAY
1360  007120  004737  012346                    JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1361
1362  007124  032777  000040  171722            BIT     #40,@DSR        ;TEST BIT 5
1363  007132  001002                            BNE     .+6
1364  007134  000000                            HALT                    ;EDGE FLAG FAILED TO SET
1365  007136  000424                            BR      GT55
1366
1367                                    ;SUB-TEST, TEST THAT THE EDGE FLAG CLEARS
1368
1369  007140  013700  001022                    MOV     DBUF,R0
1370  007144  012720  116000                    MOV     #116000,(0)+    ;LOAD POINT
1371  007150  012720  000000                    MOV     #0,(0)+         ;LOAD X
1372  007154  012720  000000                    MOV     #0,(0)+ ;LOAD Y
1373  007160  012720  172000                    MOV     #172000,(0)+    ;LOAD STOP
1374  007164  013777  001022  171660            MOV     DBUF,@DPC       ;START DISPLAY
1375  007172  004737  012346                    JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1376
1377  007176  032777  000040  171650            BIT     #40,@DSR
1378  007204  001401                            BEQ     .+4
1379  007206  000000                            HALT                    ;ERROR, EDGE FLAG FAILED TO CLEAR
1380
1381                                    ;EDGE FLAG TEST
1382                                    ;TEST THAT EXCEEDING -Y AXIS SETS EDGE FLAG
1383
1384  007210  104000                    GT55:   SCOPE
1385  007212  013700  001022                    MOV     DBUF,R0
1386  007216  012720  116000                    MOV     #116000,(0)+    ;LOAD POINT
1387  007222  012720  000000                    MOV     #0,(0)+         ;LOAD X
1388  007226  012720  000000                    MOV     #0,(0)+         ;LOAD Y
1389  007232  012720  110000                    MOV     #110000,(0)+    ;LOAD LONG VECTOR
1390  007236  012720  000000                    MOV     #0,(0)+         ;LOAD DETA X
1391  007242  012720  020001                    MOV     #20001,(0)+     ;LOAD DELTA Y
1392  007246  012720  172000                    MOV     #172000,(0)+    ;LOAD STOP
1393  007252  013777  001022  171572            MOV     DBUF,@DPC       ;START DISPLAY
1394  007260  004737  012346                    JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1395
1396  007264  032777  000040  171562            BIT     #40,@DSR        ;TEST BIT 5
1397  007272  001001                            BNE     .+4
1398  007274  000000                            HALT                    ;EDGE FLAG FAILED TO SET
1399
```

```
1400                                            ;TEST THAT THE CHARACTER REGISTER IS LOADED PROPERLY
1401                                            ; CODE 00
1402
1403  007276  104000                            GT56:   SCOPE
1404  007300  012777  100000  171514                    MOV     #100000,@DBUF   ;LOAD "CHARACTER MODE"
1405  007306  012777  000000  171510                    MOV     #0,@DBUF1       ;LOAD "NULL" CHARACTER
1406  007314  012777  172000  171504                    MOV     #172000,@DBUF2
1407  007322  013777  001022  171522                    MOV     DBUF,@DPC       ;START DISPLAY
1408  007330  004737  012346                          JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1409  007334  017700  171520                          MOV     @YPOS,R0        ;READ CHARACTER REG.
1410  007340  042700  001777                          BIC     #1777,R0        ;MASK TO BITS 10-15
1411  007344  022700  000000                          CMP     #0,R0
1412  007350  001401                                   BEQ     .+4
1413  007352  000000                                   HALT                    ;ERROR, CHARACTER REGISTER LOADED IN ERROR
1414
1415                                            ;TEST THAT THE CHARACTER REGISTER IS LOADED PROPERLY
1416                                            ; CODE 77
1417
1418  007354  104000                            GT57:   SCOPE
1419  007356  012777  100000  171436                    MOV     #100000,@DBUF   ;LOAD "CHARACTER MODE"
1420  007364  012777  000077  171432                    MOV     #77,@DBUF1      ;LOAD CHARACTER
1421  007372  012777  172000  171426                    MOV     #172000,@DBUF2
1422  007400  013777  001022  171444                    MOV     DBUF,@DPC       ;START DISPLAY
1423  007406  004737  012346                          JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1424  007412  017700  171442                          MOV     @YPOS,R0        ;READ CHARACTER REG.
1425  007416  042700  001777                          BIC     #1777,R0        ;MASK TO BITS 10-15
1426  007422  022700  176000                          CMP     #176000,R0
1427  007426  001401                                   BEQ     .+4
1428  007430  000000                                   HALT                    ;ERROR, CHARACTER REGISTER LOADED IN ERROR
1429
1430                                            ;TEST THAT THE CHARACTER REGISTER IS LOADED PROPERLY
1431                                            ; CODE 25
1432
1433  007432  104000                            GT58:   SCOPE
1434  007434  012777  100000  171360                    MOV     #100000,@DBUF   ;LOAD "CHARACTER MODE"
1435  007442  012777  000025  171354                    MOV     #25,@DBUF1      ;LOAD CHARACTER
1436  007450  012777  172000  171340                    MOV     #172000,@DBUF2
1437  007456  013777  001022  171366                    MOV     DBUF,@DPC       ;START DISPLAY
1438  007464  004737  012346                          JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1439  007470  017700  171364                          MOV     @YPOS,R0        ;READ CHARACTER REG.
1440  007474  042700  001777                          BIC     #1777,R0        ;MASK TO BITS 10-15
1441  007500  022700  052000                          CMP     #52000,R0
1442  007504  001401                                   BEQ     .+4
1443  007506  000000                                   HALT                    ;ERROR, CHARACTER REGISTER LOADED IN ERROR
```

```
1444
1445                                    ;TEST THAT THE CHARACTER REGISTER IS LOADED PROPERLY
1446                                    ; CODE 52
1447
1448  007510  104000                    GT59:   SCOPE
1449  007512  012777  100000  171302            MOV     #100000,@DBUF   ;LOAD "CHARACTER MODE"
1450  007520  012777  000052  171276            MOV     #52,@DBUF1      ;LOAD CHARACTER
1451  007526  012777  172000  171272            MOV     #172000,@DBUF2
1452  007534  013777  001022  171310            MOV     DBUF,@DPC       ;START DISPLAY
1453  007542  004737  012346                    JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1454  007546  017700  171306                    MOV     @YPOS,R0        ;READ CHARACTER REG.
1455  007552  042700  001777                    BIC     #1777,R0        ;MASK TO BITS 10-15
1456  007556  022700  124000                    CMP     #124000,R0
1457  007562  001401                            BEQ     .+4
1458  007564  000000                            HALT                    ;ERROR, CHARACTER REGISTER LOADED IN ERROR
1459
1460                                    ;TEST THAT CHARACTER MODE DOES NOT HANG THE DISPLAY PROCESSOR
1461                                    ;TEST THAT "NULL" DOES NOT CHANGE X OR Y AXIS
1462
1463  007566  104000                    GT60:   SCOPE
1464  007570  012777  116000  171224            MOV     #116000,@DBUF   ;POINT MODE
1465  007576  012777  001000  171220            MOV     #1000,@DBUF1
1466  007604  012777  001000  171214            MOV     #1000,@DBUF2    ;1000,1000
1467  007612  012777  100000  171210            MOV     #100000,@DBUF3  ;LOAD "CHARACTER MODE"
1470  007620  005077  171206                    CLR     @DBUF4          ;NULL CHARACTER
1471  007624  012777  172000  171202            MOV     #172000,@DBUF5
1472  007632  013777  001022  171212            MOV     DBUF,@DPC       ;LOAD THE DISPLAY P.C.
1473  007640  004737  012346                    JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1474
1475  007644  017700  171210                    MOV     @YPOS,R0        ;READ CHARACTER REGISTER
1476  007650  042700  001777                    BIC     #1777,R0        ;MASK TO BITS 10-15
1477  007654  022700  000000                    CMP     #0,R0
1500  007660  001402                            BEQ     .+6
1501  007662  000000                            HALT                    ;CHARACTER REGISTER IN ERROR
1502  007664  000417                            BR      GT61
1503
1504  007666  017700  171164                    MOV     @XPOS,R0        ;READ X AXIS
1505  007672  022700  001000                    CMP     #1000,R0        ;ARE THEY EQUAL ?
1506  007676  001402                            BEQ     .+6             ;YES
1507  007700  000000                            HALT                    ;"NULL" CHARACTER CHANGED X AXIS
1510  007702  000410                            BR      GT61
1511
1512  007704  017700  171150                    MOV     @YPOS,R0        ;READ Y AXIS
1513  007710  042700  176000                    BIC     #176000,R0      ;MASK TO BITS 0-9
1514  007714  022700  001000                    CMP     #1000,R0        ;ARE THEY EQUAL ?
1515  007720  001401                            BEQ     .+4             ;YES
1516  007722  000000                            HALT                    ;"NULL" CHARACTER CHANGED Y AXIS
1517
```

```
1492
1493
1494                                    ;TEST THAT CHARACTER MODE DOES NOT HANG THE DISPLAY PROCESSOR
1495                                    ;TEST THAT "CR" DOES CHANGE X AND DOES NOT CHANGE Y AXIS
1496
1497  007724  104000                    GT61:   SCOPE
1498  007726  012777  116000  171066            MOV     #116000,@DBUF   ;POINT MODE
1499  007734  012777  001000  171062            MOV     #1000,@DBUF1
1500  007742  012777  001000  171056            MOV     #1000,@DBUF2    ;1000,1000
1501  007750  012777  100000  171052            MOV     #100000,@DBUF3  ;LOAD "CHARACTER MODE"
1502  007756  012777  000015  171046            MOV     #15,@DBUF4      ;LOAD "CR"
1503  007764  012777  172000  171042            MOV     #172000,@DBUF5  ;LOAD STOP
1504  007772  013777  001022  171052            MOV     DBUF,@DPC       ;LOAD THE DISPLAY P.C.
1505  010000  004737  012346                    JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1506
1507  010004  017700  171050                    MOV     @YPOS,R0        ;READ Y AXIS
1508  010010  042700  001777                    BIC     #1777,R0        ;MASK TO BITS 10-15
1509  010014  022700  032000                    CMP     #32000,R0
1510  010020  001402                            BEQ     .+6
1511  010022  000000                            HALT                    ;CHARACTER REGISTER FAILED TO LOAD CORRECTLY
1512  010024  000417                            BR      GT62
1513
1514  010026  017700  171024                    MOV     @XPOS,R0        ;READ X AXIS
1515  010032  022700  000000                    CMP     #0,R0           ;ARE THEY EQUAL ?
1516  010036  001402                            BEQ     .+6             ;YES
1517  010040  000000                            HALT                    ;"CR" CHARACTER FAILED TO CHANGED X AXIS CORRECTLY
1518  010042  000410                            BR      GT62
1519
1520  010044  017700  171010                    MOV     @YPOS,R0        ;READ Y AXIS
1521  010050  042700  176000                    BIC     #176000,R0      ;MASK TO BITS 0-9
1522  010054  022700  001000                    CMP     #1000,R0        ;ARE THEY EQUAL ?
1523  010060  001401                            BEQ     .+4             ;YES
1524  010062  000000                            HALT                    ;"CR" CHARACTER CHANGED Y AXIS
1525
```

```
1526
1527
1528                                    ;TEST THAT CHARACTER MODE DOES NOT HANG THE DISPLAY PROCESSOR
1529                                    ;TEST THAT "LF" DOES NOT CHANGE X BUT DOES CHANGE Y AXIS
1530
1531  010064  104000                    GT62:   SCOPE
1532  010066  012777  116000  170726            MOV     #116000,@DBUF   ;POINT MODE
1533  010074  012777  001000  170722            MOV     #1000,@DBUF1
1534  010102  012777  001000  170716            MOV     #1000,@DBUF2    ;1000,1000
1535  010110  012777  100000  170712            MOV     #100000,@DBUF3  ;LOAD "CHARACTER MODE"
1536  010116  012777  000012  170706            MOV     #12,@DBUF4
1537  010124  012777  172000  170702            MOV     #172000,@DBUF5
1538  010132  013777  001022  170712            MOV     DBUF,@DPC       ;LOAD THE DISPLAY P.C.
1539  010140  004737  012346                    JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1540
1541  010144  017700  170710                    MOV     @YPOS,R0        ;READ CHARACTER REG.
1542  010150  042700  001777                    BIC     #1777,R0        ;MASK TO BITS 10-15
1543  010154  022700  024000                    CMP     #24000,R0
1544  010160  001402                            BEQ     .+6
1545  010162  000000                            HALT                    ;CHARACTER REGISTER IN ERROR
1546  010164  000477                            BR      GT63
1547
1548  010166  017700  170664                    MOV     @XPOS,R0        ;READ X AXIS
1549  010172  022700  001000                    CMP     #1000,R0        ;ARE THEY EQUAL ?
1550  010176  001402                            BEQ     .+6             ;YES
1551  010200  000000                            HALT                    ;"LF" CHARACTER CHANGED X AXIS
1552  010202  000470                            BR      GT63
1553
1554  010204  017700  170650                    MOV     @YPOS,R0        ;READ Y AXIS
1555  010210  042700  176000                    BIC     #176000,R0      ;MASK TO BITS 10-15
1556  010214  023700  001046                    CMP     LFSIZE,R0       ;ARE THEY EQUAL ?
1557  010220  001401                            BEQ     .+4             ;YES
1558  010222  000000                            HALT                    ;"LF" CHARACTER FAILED TO CHANGED Y AXIS CORRECTLY
1559
```

```
1560
1561
1562                                    ;TEST THAT CHARACTER MODE DOES NOT HANG THE DISPLAY PROCESSOR
1563                                    ;TEST THAT "A" DOES CHANGE X BUT NOT Y AXIS
1564
1565  010224  104000                    GT62A:  SCOPE
1566  010226  012777  116000  170566            MOV     #116000,@DBUF   ;POINT MODE
1567  010234  012777  000000  170562            MOV     #0,@DBUF1
1568  010242  012777  001000  170556            MOV     #1000,@DBUF2    ;0,1000
1569  010250  012777  100000  170552            MOV     #100000,@DBUF3  ;LOAD "CHARACTER MODE"
1570  010256  012777  000101  170546            MOV     #101,@DBUF4     ;LOAD AN "A"
1571  010264  012777  172000  170542            MOV     #172000,@DBUF5
1572  010272  013777  001022  170552            MOV     DBUF,@DPC       ;LOAD THE DISPLAY P.C.
1573  010300  004737  012346                   JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1574
1575  010304  017700  170550                   MOV     @YPOS,R0        ;READ CHARACTER REG
1576  010310  042700  001777                   BIC     #1777,R0        ;MASK TO BITS 10-15
1577  010314  022700  002000                   CMP     #2000,R0
1578  010320  001402                           BEQ     .+6
1579  010322  000000                           HALT                    ;CHARACTER REGISTER IN ERROR
1580  010324  000417                           BR      GT63
1581
1582  010326  017700  170524                   MOV     @XPOS,R0        ;READ X AXIS
1583  010332  023700  001006                   CMP     GSCHSZ,R0       ;ARE THEY EQUAL ?
1584  010336  001402                           BEQ     .+6             ;YES
1585  010340  000000                           HALT                    ;"A" CHARACTER FAILED TO CHANGED X AXIS CORRECTLY
1586  010342  000410                           BR      GT63
1587
1588  010344  017700  170510                   MOV     @YPOS,R0        ;READ Y AXIS
1589  010350  042700  176000                   BIC     #176000,R0      ;MASK TO BITS 0-9
1590  010354  022700  001000                   CMP     #1000,R0        ;ARE THEY EQUAL ?
1591  010360  001401                           BEQ     .+4             ;YES
1592  010362  000000                           HALT                    ;"A" CHARACTER CHANGED Y AXIS
1593
```

```
1594
1595
1596                                    ;TEST THAT CHARACTER MODE DOES NOT HANG THE DISPLAY PROCESSOR
1597                                    ;TEST THAT "BS" DOES CHANGE X BUT NOT Y AXIS
1598
1599  010364  104000                    GT63:   SCOPE
1600  010366  012777  116000  170426            MOV     #116000,@DBUF   ;POINT MODE
1601  010374  012777  001000  170422            MOV     #1000,@DBUF1
1602  010402  012777  001000  170416            MOV     #1000,@DBUF2    ;1000,1000
1603  010410  012777  100000  170412            MOV     #100000,@DBUF3  ;LOAD "CHARACTER MODE"
1604  010416  012777  000010  170406            MOV     #10,@DBUF4
1605  010424  012777  172000  170402            MOV     #172000,@DBUF5
1606  010432  013777  001022  170412            MOV     DBUF,@DPC       ;LOAD THE DISPLAY P.C.
1607  010440  004737  012346                    JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1608
1609  010444  017700  170410                    MOV     @YPOS,R0        ;READ CHARACTER REG
1610  010450  042700  001777                    BIC     #1777,R0        ;MASK TO BITS 10-15
1611  010454  022700  020000                    CMP     #20000,R0
1612  010460  001402                            BEQ     .+6
1613  010462  000000                            HALT                    ;CHARACTER REGISTER IN ERROR
1614  010464  000425                            BR      GT64
1615
1616  010466  017700  170364                    MOV     @XPOS,R0        ;READ X AXIS
1617  010472  023700  001050                    CMP     CHSIZE,R0       ;ARE THEY EQUAL ?
1618  010476  001402                            BEQ     .+6             ;YES
1619  010500  000000                            HALT                    ;"BS" CHARACTER FAILED TO CHANGED X AXIS CORRECTLY
1620  010502  000416                            BR      GT64
1621
1622  010504  017700  170350                    MOV     @YPOS,R0        ;READ Y AXIS
1623  010510  042700  176000                    BIC     #176000,R0      ;MASK TO BITS 0-9
1624  010514  022700  001000                    CMP     #1000,R0        ;ARE THEY EQUAL ?
1625  010520  001401                            BEQ     .+4             ;YES
1626  010522  000000                            HALT                    ;"BS" CHARACTER CHANGED Y AXIS
1627
1628                                    ;TEST THAT "SHIFT-OUT" STATUS BIT IS NOT SET
1629
1630  010524  017700  170324            GT63A:  MOV     @DSR,R0         ;READ STATUS
1631  010530  032700  000100                    BIT     #100,R0
1632  010534  001401                            BEQ     .+4
1633  010536  000000                            HALT                    ;SHIFT OUT STATUS BIT IS SET
1634
```

```
1635
1636                                    ;TEST THAT "SHIFT-OUT" GENERATES A STATUS BIT
1637                                    ;SHIFT-OUT (LOW BYTE), FOLLOWED BY CODE 77 (HIGH BYTE)
1638
1639  010540  104000            GT64:   SCOPE
1640  010542  012777  116000  170252    MOV     #116000,@DBUF   ;POINT MODE
1641  010550  012777  001000  170246    MOV     #1000,@DBUF1
1642  010556  012777  001000  170242    MOV     #1000,@DBUF2    ;1000,1000
1643  010564  012777  100000  170236    MOV     #100000,@DBUF3  ;LOAD "CHARACTER MODE"
1644  010572  012777  037416  170232    MOV     #37416,@DBUF4   ;"SHIFT-OUT" IN LOW BYTE #77 IN HIGH BYTE
1645  010600  012777  172000  170226    MOV     #172000,@DBUF5  ;LOAD STOP
1646  010606  013777  001022  170236    MOV     DBUF,@DPC       ;START DISPALY
1647  010614  004737  012346            JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1648
1649  010620  017700  170234            MOV     @YPOS,R0        ;READ CHARACTER REG
1650  010624  042700  001777            BIC     #1777,R0        ;MASK TO BITS 10-15
1651  010630  022700  176000            CMP     #176000,R0
1652  010634  001402                    BEQ     .+6
1653  010636  000000                    HALT                    ;CHARACTER REGISTER IN ERROR
1654  010640  000426                    BR      GT65            ; AFTER A SHIFT-OUT COMMAND
1655
1656  010642  017700  170206            MOV     @DSR,R0         ;READ STATUS REGISTER
1657  010646  032700  000100            BIT     #100,R0
1658  010652  001002                    BNE     .+6
1659  010654  000000                    HALT                    ;SHIFT OUT STATUS BIT FAILED TO SET
1660  010656  000417                    BR      GT65
1661
1662  010660  017700  170172            MOV     @XPOS,R0        ;READ X POS
1663  010664  022700  001000            CMP     #1000,R0
1664  010670  001402                    BEQ     .+6
1665  010672  000000                    HALT                    ;SHIFT-OUT CHARACTER CHANGED X AXIS
1666  010674  000410                    BR      GT65
1667
1668  010676  017700  170156            MOV     @YPOS,R0        ;READ Y POS
1669  010702  042700  176000            BIC     #176000,R0      ;MASK
1670  010706  022700  001000            CMP     #1000,R0
1671  010712  001401                    BEQ     .+4
1672  010714  000000                    HALT                    ;SHIFT-OUT CHARACTER CHANGED Y AXIS
```

```
1673
1674                                    ;TEST THAT "SHIFT-OUT" DOES NOT GENERATE A STATUS BIT
1675                                    ;("SHIFT-OUT" FOLLOWED BY CODE 0 THRU 37 EXCEPT #17)
1676
1677  010716  104000                    GT65:   SCOPE
1678  010720  000005                            RESET
1679  010722  005003                            CLR     R3
1680  010724  012777  100000  170070            MOV     #100000,@DBUF   ;SET 'CHAR' MODE
1681  010732  012777  000016  170064            MOV     #16,@DBUF1      ;LOAD "SHIFT-OUT" INTO THE LOW BYTE
1682  010740  012777  172000  170060            MOV     #172000,@DBUF2
1683  010746  110337  013475                    MOVB    R3,BUFFER+3     ;LOAD HIGH BYTE
1684  010752  000240                            NOP
1685  010754  013777  001022  170070            MOV     DBUF,@DPC       ;START THE DISPLAY
1686  010762  004737  012346                    JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1687
1688  010766  032777  000100  170060            BIT     #100,@DSR       ;TEST FOR SHIFT BIT
1689  010774  001402                            BEQ     .+6
1690  010776  000000                            HALT                    ;SHIFT STATUS BIT SET IN ERROR
1691  011000  000407                            BR      GT66            ; CHARACTER IS IN R3
1692
1693  011002  005203                    GT65B:  INC     R3
1694  011004  022703  000017                    CMP     #17,R3          ;TEST FOR "SHIFT-IN"
1695  011010  001774                            BEQ     GT65B
1696  011012  022703  000040                    CMP     #40,R3          ;TEST FOR #40
1697  011016  001353                            BNE     GT65A           ;IS IT #40
1698                                                                    ;YES, NEXT TEST
1699
1700                                    ;TEST THAT "SHIFT-OUT" FOLLOWED BY CODE 40 GENERATE A
1701                                    ;SHIFT STATUS BIT
1702
1703  011020  104000                    GT66:   SCOPE
1704  011022  000005                            RESET
1705  011024  012777  100000  167770            MOV     #100000,@DBUF   ;LOAD SET CHAR MODE
1706  011032  012777  000016  167764            MOV     #16,@DBUF1      ;LOAD "SHIFT-OUT" INTO THE LOW BYTE
1707  011040  012777  172000  167760            MOV     #172000,@DBUF2
1708  011046  112737  000040  013475  GT66A:   MOVB    #40,BUFFER+3    ;LOAD HIGH BYTE
1709  011054  000240                            NOP
1710  011056  013777  001022  167766            MOV     DBUF,@DPC       ;START THE DISPLAY
1711  011064  004737  012346                    JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1712
1713  011070  032777  000100  167756            BIT     #100,@DSR       ;TEST 'SHIFT' STATUS BIT
1714  011076  001002                            BNE     .+6
1715  011100  000000                            HALT                    ;"SHIFT-OUT" STATUS BIT FAILED TO SET
1716  011102  000407                            BR      GT67            ;ON CHARACTER IN R3
1717
```

```
1718
1719  011104  000005                          RESET
1720  011106  032777  000100  167740          BIT     #100,@DSR       ;TEST SHIFT-OUT BIT
1721  011114  001402                          BEQ     GT67            ;BR IF CLEARED
1722  011116  000000                          HALT                    ;SHIFT OUT STATUS BIT FAILED TO CLEAR
1723  011120  000400                          BR      GT67
1724
1725                                  ;TEST THAT 'SHIFT-OUT' IN THE HIGH BYTE FOLLOWED BY A CHARACTER
1726                                  ; IN THE NEXT LOW BYTE GENERATES A STATUS BIT
1727
1728  011122  104000                  GT67:   SCOPE
1729  011124  012777  100000  167670          MOV     #100000,@DBUF   ;LOAD SET 'CHAR' MODE
1730  011132  005077  167666                  CLR     @DBUF1
1731  011136  012777  007000  167660          MOV     #7000,@DBUF1    ;LOAD 'SHIFT-OUT' INTO THE HIGH BYTE
1732  011144  012777  000040  167654          MOV     #40,@DBUF2      ;LOAD A SHIFT-OUT CHARACTER IN THE NEXT
1733                                                                  ;WORD (LOW BYTE)
1734  011152  012777  172000  167650          MOV     #172000,@DBUF3
1735  011160  000005                          RESET
1736  011162  000240                          NOP
1737  011164  013777  001022  167660          MOV     DBUF,@DPC       ;START THE DISPLAY
1738  011172  004737  012346                  JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1739
1740  011176  032777  000100  167650          BIT     #100,@DSR       ;TEST THE STATUS REGISTER
1741  011204  001002                          BNE     .+6
1742  011206  000000                          HALT                    ;SHIFT-OUT IN THE HIGH BYTE FAILED TO
1743  011210  000410                          BR      GT68            ;SET A STATUS BIT
1744
1745  011212  017700  167642                  MOV     @YPOS,R0        ;READ Y POS
1746  011216  042700  001777                  BIC     #1777,R0        ;MASK TO BITS 15-10
1747  011222  022700  100000                  CMP     #100000,R0      ;TEST FOR CHAR #40
1748  011226  001401                          BEQ     .+4
1749  011230  000000                          HALT
1750                                                                  ;CHARACTER REGISTER IN ERROR AFTER A
1751                                                                  ;"SHIFT-OUT" (HIGH BYTE) FOLLOWED BY
1752                                                                  ; #40 (LOW BYTE NEXT WORD)
```

```
                                        ;STOP INTERRUPT TEST
                                        ;TEST FOR NO INTERRUPT

011232  104000                GT68:   SCOPE
011234  000005                        RESET
011236  012777  011320  167616        MOV     #GT68A,@DONE    ;LOAD RETURN FROM DONE INTERRUPT
011244  012777  011320  167620        MOV     #GT68A,@TIMEVT  ;LOAD RETURN FROM TIME-OUT INTERRUPT
011252  012777  011320  167606        MOV     #GT68A,@LPVCT   ;LOAD RETURN FROM LIGHT-PEN INTERRUPT
011260  012777  164000  167534        MOV     #164000,@DBUF   ;LOAD "DISPLAY NOP"
011266  012777  173000  167530        MOV     #173000,@DBUF1  ;LOAD "STATUS A"-"STOP"-"STOP INT. ENABLE"
011274  005077  167520                CLR     @PSW            ;LOWER MACHINE PRIORITY
011300  013777  001022  167544        MOV     DBUF,@DPC       ;LOAD DISPLAY P.C.
011306  000240                        NOP
011310  000240                        NOP
011312  000240                        NOP
011314  000240                        NOP
011316  000401                        BR      .+4

011320  000000                GT68A:  HALT                    ;GT-40 INTERRUPTED IN ERROR

                                        ;STOP INTERRUPT TEST
                                        ;TEST FOR INTERRUPT

011322  104000                GT69:   SCOPE
011324  000005                        RESET
011326  012777  011410  167526        MOV     #GT69A,@DONE    ;LOAD RETURN ADDRESS FROM INTERRUPT
011334  012777  011422  167524        MOV     #GT69B,@LPVCT   ;LOAD LP VECTOR
011342  012777  011430  167522        MOV     #GT69C,@TIMEVT  ;LOAD TO VECTOR
011350  012777  164000  167444        MOV     #164000,@DBUF   ;LOAD "DISPLAY NOP"
011356  012777  173400  167440        MOV     #173400,@DBUF1  ;LOAD "STATUS A"-"STOP"-"STOP INT. ENABLE-INT"
011364  005077  167430                CLR     @PSW
011370  013777  001022  167454        MOV     DBUF,@DPC
011376  000240                        NOP
011400  000240                        NOP
011402  000240                        NOP
011404  000240                        NOP
011406  000000                        HALT                    ;GT-40 FAILED TO GENERATE A STOP INTERRUPT
011410  013777  001064  167444  GT69A:MOV     DDONE1,@DONE
011416  022626                        CMP     (SP)+,(SP)+
011420  000405                        BR      GT70

011422  022626                GT69B:  CMP     (SP)+,(SP)+
011424  000000                        HALT                    ;GT-40 STOP (DONE) INTERRUPTED TO THE
                                                                ; LIGHT-PEN VECTOR
011426  000402                        BR      GT70

011430  022626                GT69C:  CMP     (SP)+,(SP)+
011432  000000                        HALT                    ;GT-40 STOP (DONE) INTERRUPTED TO THE
                                                                ; TIME-OUT VECTOR
```

```
1802
1803                                        ;SHIFT OUT INTERRUPT TEST
1804                                        ;TEST FOR INTERRUPT
1805
1806  011434  104000                GT70:   SCOPE
1807  011436  000005                        RESET
1808  011440  012777  011544 167414        MOV     #GT70B,@DONE    ;LOAD DONE VECTOR
1809  011446  012777  011552 167412        MOV     #GT70C,@LPVCT   ;LOAD LIGHT-PEN VECTOR
1810  011454  012777  011530 167410        MOV     #GT70A,@TIMEVT  ;LOAD RETURN ADDRESS
1811  011462  012777  100000 167366        MOV     #100000,@DBUF   ;LOAD "CHARACTER MODE"
1812  011470  012777  020016 167326        MOV     #20016,@DBUF1   ;LOAD "SHIFT-OUT"
1813  011476  012777  173000 167322        MOV     #173000,@DBUF2
1814  011504  005077  167310               CLR     @PSW
1815  011510  013777  001022 167334        MOV     DBUF,@DPC       ;START DISPLAY
1816  011516  000240                        NOP
1817  011520  000240                        NOP
1818  011522  000240                        NOP
1819  011524  000240                        NOP
1820  011526  000000                        HALT                    ;GT-40 FAILED TO INTERRUPT ON SHIFT-OUT
1821  011530  000240                GT70A:  NOP
1822  011532  013777  001074 167332        MOV     TMEVT1,@TIMEVT
1823  011540  022626                        CMP     (SP)+,(SP)+
1824  011542  000405                        BR      GT71
1825
1826  011544  022626                GT70B:  CMP     (SP)+,(SP)+
1827  011546  000000                        HALT                    ;GT-40 SHIFT-OUT INTERRUPTED TO THE
1828                                                                  ; DONE VECTOR
1829  011550  000402                        BR      GT71
1830
1831  011552  022626                GT70C:  CMP     (SP)+,(SP)+
1832  011554  000000                        HALT                    ;GT-40 SHIFT-OUT INTERRUPTED TO THE
1833                                                                  ; LIGHT PEN VECTOR
1834
```

```
1835
1836
1837                                    ;TIME-OUT INTERRUPT TEST
1838
1839  011556  104000                    GT71:   SCOPE
1840  011560  000005                            RESET
1841  011562  013777  001064  167272            MOV     DDONE1,@DDONE
1842  011570  013777  001070  167270            MOV     LPVCT1,@LPVCT
1843  011576  012777  011624  167266            MOV     #GT71A,@TIMEVT  ;LOAD RETURN ADDRESS
1844  011604  005077  167210                    CLR     @PSW
1845  011610  012777  177776  167234            MOV     #177776,@DPC    ;LOAD DISPLAY P.C.
1846  011616  004737  012346                    JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1847  011622  000000                            HALT                    ;GT-40 FAILED TO INTERRUPT ON TIME-OUT
1848
1849  011624  000240                    GT71A:  NOP
1850  011626  013777  001074  167236            MOV     TMEVT1,@TIMEVT
1851  011634  022626                            CMP     (SP)+,(SP)+
1852
1853                                    ;NO LIGHT PEN INTERUPT TEST
1854
1855  011636  104000                    GT72:   SCOPE
1856  011640  000005                            RESET
1857  011642  012777  011704  167216            MOV     #GT72A,@LPVCT   ;LOAD RETURN ADDRESS
1858  011650  012777  100140  167144            MOV     #100140,@DBUF   ;LOAD DISPLAY BUFFER
1859  011656  012777  173000  167140            MOV     #173000,@DBUF1
1860  011664  005077  167130                    CLR     @PSW
1861  011670  013777  001022  167154            MOV     DBUF,@DPC
1862  011676  004737  012346                    JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
1863  011702  000401                            BR      .+4
1864  011704  000000                    GT72A:  HALT                    ;GT-40 INTERRUPTED ON FALSE LIGHT PEN FLAG
1865  011706  013777  001070  167152            MOV     LPVCT1,@LPVCT
```

```
                                        ;PRE BR LEVEL SETUP
                                        
011714  042737  177437  001004        BIC     #177437,DSPBR   ;MASK TO BITS
011722  001001                        BNE     .+4
011724  000000                        HALT                    ;BR LEVEL WAS 0
011726  022737  000340  001004        CMP     #340,DSPBR
011734  001001                        BNE     .+4
011736  000000                        HALT                    ;BR LEVEL WAS 7

011740  013737  001004  011764        MOV     DSPBR,BRLEV1
011746  162737  000340  011764        SUB     #340,BRLEV1
011754  013737  001004  011766        MOV     DSPBR,BRLEV2
011762  000402                        BR      GT73

011764  000140                BRLEV1: 140
011766  000200                BRLEV2: 200

                                        ;BR LEVEL TEST (BR-1)
                                        ;TEST FOR INTERRUPT

011770  104000                GT73:   SCOPE
011772  000005                        RESET
011774  012777  012036  167060        MOV     #GT73A,@DDONE   ;LOAD RETURN ADDRESS
012002  012777  173400  167012        MOV     #173400,@DBUF   ;LOAD "STATUS A"-NO INTERRUPT ENABLE
012010  013777  011764  167002        MOV     BRLEV1,@PSW
012016  013777  001022  167026        MOV     DBUF,@DPC       ;LOAD THE DISPLAY P.C.
012024  000240                        NOP
012026  000240                        NOP
012030  000240                        NOP
012032  000240                        NOP
012034  000000                        HALT                    ;NO STOP INTERRUPT ON BR LEVEL INDICATED -1
                                                                ;CHECK TO SEE IF PROPER BR LEVEL
012036  022626                GT73A:  CMP     (SP)+,(SP)+

                                        ;BR LEVEL TEST (BR)
                                        ;TEST THAT THE GT-40 DOES NOT INTERRUPT AT THE LEVEL INDICATED

012040  104000                GT74:   SCOPE
012042  000005                        RESET
012044  012777  012106  167010        MOV     #GT74A,@DDONE   ;LOAD RETURN ADDRESS
012052  012777  173400  166742        MOV     #173400,@DBUF   ;LOAD "STATUS A- STOP- STOP INT ENABLE
012060  013777  011766  166732        MOV     BRLEV2,@PSW     ;LOWER MACHINE PRIORITY TO INDICATED LEVEL
012066  013777  001022  166756        MOV     DBUF,@DPC
012074  000240                        NOP
012076  000240                        NOP
012100  000240                        NOP
012102  000240                        NOP
012104  000401                        BR      .+4             ;NEXT TEST
012106  000000                GT74A:  HALT                    ;GT-40 INTERRUPTED ON THE WRONG BR LEVEL
012110  013777  001064  166744        MOV     DDONE1,@DDONE   ;LOAD INVERRUPT VECTOR
012116  000005                        RESET
012120  000005                        RESET
```

```
1918
1919
1920                                        ;RESET TEST
1921                                        ;DOES RESET CLEAR ALL DISPLAY PC AND STATUS BITS
1922
1923  012122  104000                GT75:   SCOPE
1924  012124  012777  117637  166670        MOV     #117637,@DBUF   ;POINT INTENSITY=7,BLINK=1,LINETYPE=3
1925  012132  005077  166666                CLR     @DBUF1          ; X = 0
1926  012136  005077  166654                CLR     @DBUF2          ; Y = 0
1927  012142  012777  172077  166660        MOV     #172077,@DBUF3  ;ITALIC=1,SYNC=1,COLOR=1
1928  012150  013777  001022  166674        MOV     DBUF,@DPC       ;LOAD DISPLAY P.C.
1929  012156  004737  012346                JSR     PC,DLAY         ;DELAY
1930  012162  000005                        RESET                   ;GENERATE "INIT"
1931  012164  005777  166662                TST     @DPC
1932  012170  001402                        BEQ     .+6
1933  012172  000000                        HALT                    ;RESET FAILED TO CLEAR DISPLAY PC
1934  012174  000406                        BR      END
1935
1936  012176  017700  166652                MOV     @DSR,R0         ;READ DISPLAY STATUS
1937  012202  042700  074000                BIC     #74000,R0       ;MASK TO BIT 11-14
1938  012206  001401                        BEQ     .+4             ;IS THE STATUS CLEARED ?
1939  012210  000000                        HALT                    ;"INIT" FAILED TO RESET DISPLAY STATUS REGISTER
1940
1941  012212  104000                END:    SCOPE
1942  012214  005237  001016                INC     ICNT            ;UPDATE COUNT
1943  012220  023737  000010  001016        CMP     #10,ICNT        ;FINISHED ?
1944  012226  001402                        BEQ     HERE            ;BR IF YES
1945  012230  000137  001420                JMP     GTPC            ;NO RE-DO
1946  012234  000005                HERE:   RESET
1947  012236  013700  000042                MOV     @#42,R0
1948  012242  001410                        BEQ     HERE1           ;BRANCH IF OFF LINE
1949  012244  000005                        RESET
1950  012246  004710                LOGICAL:        JSR     PC,(0)
1951  012250  000240                        NOP
1952  012252  000240                        NOP
1953  012254  000240                        NOP
1954  012256  000240                        NOP
1955  012260  000240                        NOP
1956  012262  000240                        NOP
1957  012264  012777  000002  166562  HERE1:  MOV     #2,@DSR         ;RING THE BELL
1958  012272  012737  000207  177566        MOV     #207,TPDBR      ;RINT THE BELL
1959  012300  105737  177564          1$:   TSTB    TPCSR           ;WAIT
1960  012304  100375                        BPL     1$
1961  012306  012737  000207  177566        MOV     #207,TPDBR      ;RINT BELL
1962  012314  105737  177564          2$:   TSTB    TPCSR
1963  012320  100375                        BPL     2$
1964  012322  000137  001344                JMP     START
```

```
 1965                                          ;SCOPE ROUTINE
 1966
 1967  012326  032737  040000  177570  SCOPEA: BIT     #40000,@#DISPLAY        ;TEST "SCOPE" SWITCH
 1968  012334  001001                          BNE     SCOPEB
 1969  012336  011601                          MOV     (SP),R1
 1970  012340  012706  000500          SCOPEB: MOV     #STKPTR,SP
 1971  012344  000111                          JMP     (1)
 1972
 1973  012346  012700  000200          DLAY:   MOV     #200,R0
 1974  012352  005300                  DLAYA:  DEC     R0
 1975  012354  001376                          BNE     DLAYA
 1976  012356  000207                          RTS     7
 1977
 1978  012360  012700  001000          DLAY1:  MOV     #1000,R0
 1979  012364  005300                  DLAY1A: DEC     R0
 1980  012366  001376                          BNE     DLAY1A
 1981  012370  000207                          RTS     7
 1982
 1983  012372  010046                  LOWPWR: MOV     R0,-(SP)
 1984  012374  010146                          MOV     R1,-(SP)
 1985  012376  010246                          MOV     R2,-(SP)
 1986  012400  010346                          MOV     R3,-(SP)
 1987  012402  010446                          MOV     R4,-(SP)
 1988  012404  010546                          MOV     R5,-(SP)
 1989  012406  010637  012470                  MOV     SP,LOWSV
 1990  012412  012737  012422  000024          MOV     #HIGPWR,@#24
 1991  012420  000000                          HALT
 1992  012422  013706  012470          HIGPWR: MOV     LOWSV,SP
 1993  012426  012605                          MOV     (SP)+,R5
 1994  012430  012604                          MOV     (SP)+,R4
 1995  012432  012603                          MOV     (SP)+,R3
 1996  012434  012602                          MOV     (SP)+,R2
 1997  012436  012601                          MOV     (SP)+,R1
 1998  012440  012600                          MOV     (SP)+,R0
 1999  012442  012737  012372  000024          MOV     #LOWPWR,@#24
 2000  012450  012706  000500                  MOV     #STKPTR,SP
 2001  012454  000240                          NOP
 2002  012456  000240                          NOP
 2003  012460  000000                          HALT
 2004  012462  000240                          NOP
 2005  012464  000240                          NOP
 2006  012466  000111                          JMP     (R1)
 2007
 2008  012470  000000          LOWSV:  0
 2009
```

```
2010
2011  012472  012777  000340  166320  START1: MOV     #340,@PSW
2012  012500  012706  000500                  MOV     #STKPTR,SP
2013  012504  004737  012706                  JSR     PC,SETUP
2014  012510  012701  000002                  MOV     #2,R1
2015  012514  012777  012624  166340          MOV     #SPACEA,@DDONE  ;SET UP DONE VECTOR
2016  012522  013777  001004  166334          MOV     DSPBR,@DDONE1
2017  012530  012777  012624  166330          MOV     #SPACEB,@LPVCT  ;SET UP LIGHT-PEN VECTOR
2018  012536  013777  001004  166324          MOV     DSPBR,@LPVCT1
2019  012544  000240                          NOP
2020  012546  000240                          NOP
2021  012550  012706  000500          SPCEA:  MOV     #STKPTR,SP
2022  012554  012737  173400  013434          MOV     #DSTOP,FRM7A
2023  012562  017700  166252                  MOV     @SWR,R0
2024  012566  006100                          ROL     R0
2025  012570  042700  177761                  BIC     #177761,R0
2026  012574  016002  012644                  MOV     DSPTCH(0),R2
2027  012600  010277  166246                  MOV     R2,@DPC         ;START THE DISPLAY
2028
2029  012604  000240                          NOP
2030  012606  000240                          NOP
2031  012610  005077  166204          SPCEC:  CLR     @PSW
2032  012614  000001                          WAIT
2033  012616  000240                          NOP
2034  012620  000240                          NOP
2035  012622  000752                          BR      SPCEA
2036
2037  012624  012737  164000  013434  SPACEB: MOV     #DNOP,FRM7A
2038  012632  012777  000001  166212          MOV     #1,@DPC         ;SINGLE STEP THE DISPLAY
2039  012640  022626                          CMP     (SP)+,(SP)+
2040  012642  000762                          BR      SPCEC
2041
2042
2043  012644  012664          DSPTCH: FRAME0
2044  012646  012712                  FRAME1
2045  012650  012740                  FRAME2
2046  012652  012766                  FRAME3
2047  012654  013014                  FRAME4
2048  012656  013052                  FRAME5
2049  012660  013140                  FRAME6
2050  012662  013364                  FRAME7
2051
2052
```

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2053
2054
2055  012664  117004                FRAME0: POINT!INT4!LINE0
2056  012666  041600                        INTX+1600
2057  012670  000600                        600
2058  012672  041000                        INTX+1000
2059  012674  000600                        600
2060  012676  112400                        LONGV!INT2
2061  012700  040600                        INTX+600
2062  012702  000000                        0
2063  012704  173400                        DSTOP
2064  012706  160000                        DJMP
2065  012710  012664                        FRAME0
2066
2067  012712  117004                FRAME1: POINT!INT4!LINE0
2068  012714  040200                        INTX+200
2069  012716  000600                        600
2070  012720  041000                        INTX+1000
2071  012722  000600                        600
2072  012724  112400                        LONGV!INT2
2073  012726  060600                        INTX!MINUSX+600
2074  012730  000000                        0
2075  012732  173400                        DSTOP
2076  012734  160000                        DJMP
2077  012736  012712                        FRAME1
2078
2079  012740  117004                FRAME2: POINT!INT4!LINE0
2080  012742  041000                        INTX+1000
2081  012744  001200                        1200
2082  012746  041000                        INTX+1000
2083  012750  000600                        600
2084  012752  112400                        LONGV!INT2
2085  012754  040000                        INTX
2086  012756  000400                        400
2087  012760  173400                        DSTOP
2088  012762  160000                        DJMP
2089  012764  012740                        FRAME2
2090
2091  012766  117004                FRAME3: POINT!INT4!LINE0
2092  012770  041000                        INTX+1000
2093  012772  000200                        200
2094  012774  041000                        INTX+1000
2095  012776  000600                        600
2096  013000  112400                        LONGV!INT2
2097  013002  040000                        INTX
2098  013004  020400                        MINUSX+400
2099  013006  173400                        DSTOP
2100  013010  160000                        DJMP
2101  013012  012766                        FRAME3
2102
```

```
2103
2104  013014  117004          FRAME4: POINT!INT4!LINE0
2105  013016  000000                  0
2106  013020  000000                  0
2107  013022  110000                  LONGV
2108  013024  041777                  INTX!MAXX
2109  013026  000000                  0
2110  013030  040000                  INTX
2111  013032  001377                  MAXY
2112  013034  061777                  INTX!MINUSX!MAXX
2113  013036  000000                  0
2114  013040  040000                  INTX
2115  013042  021377                  MINUSX!MAXY
2116  013044  173400                  DSTOP
2117  013046  160000                  DJMP
2118  013050  013014                  FRAME4
2119
2120  013052  117004          FRAME5: POINT!INT4!LINE0
2121  013054  000740                  740
2122  013056  000540                  540
2123  013060  104000                  SHORTV
2124  013062  057600                  INTX+17600
2125  013064  057677                  INTX+17677
2126  013066  040077                  INTX+77
2127  013070  077677                  INTX!MINUSX+17677
2128  013072  077600                  INTX!MINUSX+17600
2129  013074  077777                  INTX:MINUSX+17777
2130  013076  040177                  INTX+177
2131  013100  057777                  INTX+17777
2132  013102  114000                  POINT
2133  013104  000760                  760
2134  013106  000620                  620
2135  013110  130000                  RELATV
2136  013112  047600                  INTX+7600
2137  013114  047637                  INTX+7637
2138  013116  040037                  INTX+37
2139  013120  067637                  INTX!MINUSX+7637
2140  013122  067600                  INTX!MINUSX+7600
2141  013124  067737                  INTX!MINUSX+7737
2142  013126  040137                  INTX+137
2143  013130  047737                  INTX+7737
2144  013132  173400                  DSTOP
2145  013134  160000                  DJMP
2146  013136  013052                  FRAME5
2147
```

```
2148
2149  013140  117004                  FRAME6: POINT!INT4!LINE0
2150  013142  000200                          200
2151  013144  000600                          600
2152  013146  100000                          CHAR
2153
2154  013150  040500  041502  042504          .ASCII  '@ABCDEFGHIJKLMNOPQRSTUVWXYZ'
2155  013156  043506  044510  045512
2156  013164  046514  047516  050520
2157  013172  051522  052524  053526
2158  013200  054530     132
2159  013203     040  021041  022043          .ASCIZ  @ !"#$%&'()*+,-./0123456789:+<=>?@
2160  013210  023045  024047  025051
2161  013216  026053  027055  030057
2162  013224  031061  032063  033065
2163  013232  034067  035071  036053
2164  013240  037075  000077
2165                                          .EVEN
2166  013244  114000                          POINT
2167  013246  000200                          200
2168  013250  000540                          540
2169  013252  100000                          CHAR
2170
2171  013254     140     141     142          .BYTE   140,141,142,143,144,145,146,147
2172  013257     143     144     145
2173  013262     146     147
2174  013264     150     151     152          .BYTE   150,151,152,153,154,155,156,157
2175  013267     153     154     155
2176  013272     156     157
2177  013274     160     161     162          .BYTE   160,161,162,163,164,165,166,167
2178  013277     163     164     165
2179  013302     166     167
2180  013304     170     171     172          .BYTE   170,171,172,173,174,175,176,177
2181  013307     173     174     175
2182  013312     176     177
2183
2184  013314     016     000     001          .BYTE   16,0,1,2,3,4,5,6,7,10,11,12,13,14,15,16
2185  013317     002     003     004
2186  013322     005     006     007
2187  013325     010     011     012
2188  013330     013     014     015
2189  013333     016
2190  013334     020     021     022          .BYTE   20,21,22,23,24,25,26,27,30,31,32,33,34,35,36,37,17,0
2191  013337     023     024     025
2192  013342     026     027     030
2193  013345     031     032     033
2194  013350     034     035     036
2195  013353     037     017     000
2196                                          .EVEN
2197  013356  173400                          DSTOP
2198  013360  160000                          DJMP
2199  013362  013140                          FRAME6
2200
```

```
2201
2202  013364  117004                FRAME7: POINT!INT4!LINE0
2203  013366  000400                        400
2204  013370  000700                        700
2205  013372  170200                        STATSA!LPLITE
2206  013374  110140                        LONGV!LPON
2207  013376  041000                        INTX+1000
2208  013400  000000                        0
2209  013402  114000                        POINT
2210  013404  000400                        400
2211  013406  000600                        600
2212  013410  170300                        STATSA!LPDARK
2213  013412  110140                        LONGV!LPON
2214  013414  041000                        INTX+1000
2215  013416  000000                        0
2216  013420  114000                        POINT
2217  013422  000400                        400
2218  013424  000500                        500
2219  013426  110100                        LONGV!LPOFF
2220  013430  041000                        INTX+1000
2221  013432  000000                        0
2222  013434  173400                FRM7A:  DSTOP
2223  013436  114000                        POINT
2224  013440  000700                        700
2225  013442  001000                        1000
2226  013444  100000                        CHAR
2227  013446  044514  044107  026524        .ASCIZ  /LIGHT-PEN HIT/
2228  013454  042520  020116  044510
2229  013462  000124
2230                                        .EVEN
2231  013464  173400                        DSTOP
2232  013466  160000                        DJMP
2233  013470  013364                        FRAME7
2234
2235  013472  000000                BUFFER: 0
2236
2237          000001                        .END
```

DOGTBC.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
BLKOFF= 000020  164#
BLKON = 000030  164#
BRLEV1  011764  1875*  1876*  1880#  1890
BRLEV2  011766  1877*  1881#  1907
BUFFER  013472  198  199  200  201  202  203  1683*  1708*  2235#
CHAR  = 100000  164#  2152  2169  2226
CHSIZE  001050  209#  245*  246*  248*  1617
CNTR    001044  207#
DBUF    001022  198#  299  305  306  329*  330  338*  339  347*  348  357*  358  369*
                370  380*  381  392*  394  402*  404  412*  414  423*  425  433*  435
                444*  446  455*  457  466*  468  477*  479  486*  488  495*  497  506*
                508  517*  519  528*  530  538*  540  549*  551  562*  564  572*  574
                582*  584  592*  594  602*  604  606*  607  619*  622  634*  637  649*
                652  665*  668  681*  686  705*  709  725*  729  748*  752  770*  774
                793*  797  816  824  843  851  874  882  910  918  942  949  969
                976  1001  1008  1038  1045  1070  1077  1097  1104  1129  1136  1166  1173
                1205  1213  1237  1245  1260*  1262  1266  1271  1282  1290  1301  1306  1318
                1326  1336  1341  1351  1359  1369  1374  1385  1393  1404*  1407  1419*  1422
                1434*  1437  1449*  1452  1464*  1470  1498*  1504  1532*  1538  1566*  1572  1600*
                1606  1640*  1646  1680*  1685  1705*  1710  1729*  1737  1761*  1764  1781*  1784
                1811*  1815  1858*  1861  1889*  1891  1906*  1908  1924*  1928
DBUF1   001024  199#  393*  403*  413*  424*  434*  445*  456*  467*  478*  487*  496*  507*
                518*  529*  539*  550*  563*  573*  583*  593*  603*  620*  635*  650*  666*
                682*  706*  726*  749*  771*  794*  1261*  1405*  1420*  1435*  1450*  1465*  1499*
                1533*  1567*  1601*  1641*  1681*  1706*  1730*  1731*  1762*  1782*  1812*  1859*  1925*
DBUF2   001026  200#  621*  636*  651*  667*  683*  707*  727*  750*  772*  795*  1406*  1421*
                1436*  1451*  1466*  1500*  1534*  1568*  1602*  1642*  1682*  1707*  1732*  1813*  1926*
DBUF3   001030  201#  684*  708*  728*  751*  773*  796*  1467*  1501*  1535*  1569*  1603*  1643*
                1734*  1927*
DBUF4   001032  202#  685*  1468*  1502*  1536*  1570*  1604*  1644*
DBUF5   001034  203#  1469*  1503*  1537*  1571*  1605*  1645*
DDONE   001062  219#  236  240  249*  1758*  1778*  1790*  1808*  1841*  1888*  1905*  1915*  2015*
DDONE1  001064  220#  249  250*  1790  1841  1915  2016*
DISPLA= 177570  169#  1967
DJMP  = 160000  164#  2064  2076  2088  2100  2117  2145  2198  2232
DLAY    012346  605  623  638  653  669  687  710  730  753  775  798  825  852
                883  919  950  977  1009  1046  1078  1105  1137  1174  1214  1246  1272
                1291  1307  1327  1342  1360  1375  1394  1408  1423  1438  1453  1471  1505
                1539  1573  1607  1647  1686  1711  1738  1846  1862  1929  1973#
DLAYA   012352  1974#  1975
DLAY1   012360  359  371  1978#
DLAY1A  012364  1979#  1980
DNOP  = 164000  164#  2037
DOCORE  001252  247  259#
DPC     001052  214#  230  234  305*  315  323*  330*  339*  348*  358*  370*  381*  394*
                404*  414*  425*  435*  446*  457*  468*  479*  488*  497*  508*  519*  530*
                540*  551*  564*  574*  584*  594*  604*  607*  622*  637*  652*  668*  686*
                709*  729*  752*  774*  797*  824*  851*  882*  918*  949*  976*  1008*  1045*
                1077*  1104*  1136*  1173*  1213*  1245*  1262*  1271*  1290*  1306*  1326*  1341*  1359*
                1374*  1393*  1407*  1422*  1437*  1452*  1470*  1504*  1538*  1572*  1606*  1646*  1685*
                1710*  1737*  1764*  1784*  1815*  1845*  1861*  1891*  1908*  1928*  1931  2027*  2038*
DSAVE   001036  204#  306*  314*  316  321  1202*  1209  1222*  1234*  1241  1255*
DSPBR   001004  190#  1868*  1871  1875  1877  2016  2018
DSPTCH  012644  2026  2043#
DSR     001054  215#  288*  309  331  340  349  361  373  382  395  405  415  426
                436  447  458  469  480  489  498  509  520  531  541  552  1274
```

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                        1293    1309    1329    1344    1362    1377    1396    1630    1656    1688    1713    1720    1740
                        1936    1957#
DSTOP = 173400           164#   2022    2063    2075    2087    2099    2116    2144    2197    2222    2231
END     012212          1934    1941#
FRAME0  012664          2043    2055#   2065
FRAME1  012712          2044    2067#   2077
FRAME2  012740          2045    2079#   2089
FRAME3  012766          2046    2091#   2101
FRAME4  013014          2047    2104#   2118
FRAME5  013052          2048    2120#   2146
FRAME6  013140          2049    2149#   2199
FRAME7  013364          2050    2202#   2233
FRM7A   013434          2022#   2037#   2222#
GRAPHX= 120000           164#
GRAPHY= 124000           164#
GREEN = 000002           164#
GSADD   001000           188#    231
GSCHSZ  001006           191#    245    1583
GSLFSZ  001010           192#    242
GSSEND  001014           194#
GSVCT   001002           189#    237
GSYAXS  001012           193#   1354
GTBUSS  001372           282     286#
GTPC    001420           298#   1945
GTPCA   001464           309#    324
GT0     001540           312     319     322     328#
GT1     001576           337#
GT10    002254           432#
GT11    002320           443#
GT12    002364           454#
GT13    002430           465#
GT14    002474           476#
GT15    002534           485#
GT16    002574           494#
GT17    002640           505#
GT18    002704           516#
GT19    002750           527#
GT2     001634           346#
GT20    003014           537#
GT21    003060           548#
GT22    003124           561#
GT23    003170           571#
GT24    003234           581#
GT25    003300           591#
GT26    003344           601#
GT27    003430           618#
GT28    003502           633#
GT29    003554           648#
GT3     001672           356#
GT30    003626           664#
GT31    003700           680#
GT32    004004           692     704#
GT33    004066           714     724#
GT34    004164           735     747#
GT35    004262           758     769#
GT36    004360           780     792#
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GT37    004456          803     815#
GT38    004560          831     842#
GT39    004662          858     869#
GT39A   004676          874#    899
GT4     001734          368#
GT40    004776          889     895     904#
GT40A   005016          910#    936
GT41    005120          925     931     941#
GT42    005216          956     968#
GT43    005314          983     995#
GT43A   005334         1001#   1026
GT44    005436         1015    1021    1032#
GT44A   005456         1038#   1063
GT45    005560         1052    1058    1069#
GT46    005656         1084    1096#
GT47    005754         1111    1123#
GT47A   005774         1129#   1154
GT48    006076         1143    1149    1160#
GT48A   006116         1166#   1191
GT49    006220         1180    1186    1199#
GT49A   006242         1205#   1225
GT5     001776          379#
GT50    006334         1220    1231#
GT50A   006356         1237#   1258
GT50B   006454         1253    1260#
GT51    006476         1265#
GT52    006550         1281#
GT53    006710         1296    1317#
GT54    007050         1332    1350#
GT55    007210         1365    1384#
GT56    007276         1403#
GT57    007354         1418#
GT58    007432         1433#
GT59    007510         1448#
GT6     002034          391#
GT60    007566         1463#
GT61    007724         1478    1484    1497#
GT62    010064         1512    1518    1531#
GT62A   010124         1565#
GT63    010364         1546    1552    1580    1586    1599#
GT63A   010524         1630#
GT64    010540         1614    1620    1639#
GT65    010716         1654    1660    1666    1677#
GT65A   010746         1683#   1697
GT65B   011002         1693#   1695
GT66    011020         1691    1703#
GT66A   011046         1708#
GT67    011122         1716    1721    1723    1728#
GT68    011232         1743    1756#
GT68A   011320         1758    1759    1760    1771#
GT69    011322         1776#
GT69A   011410         1778    1790#
GT69B   011422         1779    1794#
GT69C   011430         1780    1799#
GT7     002100          401#
GT70    011434         1792    1797    1806#
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GT70A   011530          1810    1821#
GT70B   011544          1808    1826#
GT70C   011552          1809    1831#
GT71    011556          1824    1829    1839#
GT71A   011624          1843    1849#
GT72    011636          1855#
GT72A   011704          1857    1864#
GT73    011770          1878    1886#
GT73A   012036          1888    1898#
GT74    012040          1903#
GT74A   012106          1905    1914#
GT75    012122          1923#
GT8     002144           411#
GT9     002210           422#
HERE    012234          1944    1946#
HERE1   012264          1948    1957#
HIGPWR  012422          1990    1992#
ICNT    001016           196#    281#   1942#   1943
INCR  = 000100           164#
INTX  = 040000           164#   2056    2058    2061    2068    2070    2073    2080    2082    2085    2092    2094    2097
                        2108    2110    2112    2114    2124    2125    2126    2127    2128    2129    2130    2131    2136
                        2137    2138    2139    2140    2141    2142    2143    2207    2214    2220
INTO  = 002000           164#
INT1  = 002200           164#
INT2  = 002400           164#   2060    2072    2084    2096
INT3  = 002600           164#
INT4  = 003000           164#   2055    2067    2079    2091    2104    2120    2149    2202
INT5  = 003200           164#
INT6  = 003400           164#
INT7  = 003600           164#
ITAL0 = 000040           164#
ITAL1 = 000060           164#
LFSIZE  001046           208#    242*    243*    244*   1556
LINE0 = 000004           164#   2055    2067    2079    2091    2104    2120    2149    2202
LINE1 = 000005           164#
LINE2 = 000006           164#
LINE3 = 000007           164#
LOGICA  012246           181    1950#
LONGV = 110000           164#   2060    2072    2084    2096    2107    2206    2213    2219
LOWPWR  012372           175    1993#   1999
LOWSV   012470          1989*   1992    2008#
LPDARK= 000300           164#   2212
LPLITE= 000200           164#   2205
LPOFF = 000100           164#   2219
LPON  = 000140           164#   2206    2213
LPVCT   001066           222#    251*   1760*   1779*   1809*   1842*   1857*   1865*   2017*
LPVCT1  001070           223#    251     252*    1842    1865    2018*
MAXSX = 017600           164#
MAXSY = 000077           164#
MAXX  = 001777           164#   2108    2112
MAXY  = 001377           164#   2111    2115
MINSUY= 000100           164#
MINUSX= 020000           164#   2073    2098    2112    2115    2127    2128    2129    2139    2140    2141
MINUSY= 020000           164#
PC    =%000007           169#    247*    255*    275*    280*   1929*   1950*   2013*
POINT = 114000           164#   2055    2067    2079    2091    2104    2120    2132    2149    2166    2202    2209    2216
```

```
                        2223
PSW       001020        197*   278*   1763*  1783*  1814*  1844*  1860*  1890*  1907*  2011*  2031*
RED     = 000003        164*
RELATV= 130000          164*   2135
R0      =%000000        169*   230*   234    236*   240    315*   316    321    331*   332*   333    340*   341*
                        342    349*   350*   3[illegible]1   361*   3[illegible]2*   363    373*   374*   375    382*   383*   384
                        395*   396*   397    405*   406*   407    415*   416*   417    [illegible]26*   427*   428    436*
                        437*   438    447*   448*   449    4[illegible]9*   459*   460    469*   [illegible]0*   471    480*   481
                        489*   490    498*   499*   5[illegible]   [illegible]*   510*   511    520*   521*   522    531*   532*
                        533    541*   542*   543    [illegible]   [illegible]*   554    5[illegible]5*   566*   567    575*   576*   577
                        585*   586*   587    595*   [illegible]   [illegible]   6[illegible]8*   6[illegible]9*   610    624*   625    639*   640
                        654*   655    670*   671    [illegible]   [illegible]   [illegible]   [illegible]   711*   716*   731*   732    737*
                        738    754*   7[illegible]5   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]*   783    799*   800    805*   806
                        816*   8[illegible]7*   8[illegible]3   [illegible]   [illegible]   [illegible]   [illegible]*   [illegible]   [illegible]*   8[illegible]1   874*   8[illegible]5*   886
                        891*   8[illegible]2   9[illegible]0*   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]*   [illegible]*   [illegible]3   9[illegible]*   959    969*
                        979*   9[illegible]0   9[illegible]5*   [illegible]6   [illegible]*   [illegible]*   1[illegible]   10[illegible]7*   1018   1038*   104[illegible]*   1049   1054*
                        1055   1070*   10[illegible]0*   1[illegible]1   1[illegible]   [illegible]   1[illegible]*   1107*   1108   1113*   1114   1129*   1139*
                        1140   1145*   1146   1[illegible]*   1[illegible]   [illegible]   1[illegible]*   1[illegible]3   1[illegible]*   1216*   1217   1237*   1248*
                        1249*   12[illegible]0   12[illegible]5*   1[illegible]   1[illegible]   1[illegible]   1[illegible]*   1[illegible]1*   1[illegible]9*   1[illegible]5*   1409*   1410*   1411
                        1424*   14[illegible]5*   14[illegible]6   14[illegible]9*   1[illegible]*   1[illegible]   1[illegible]*   1[illegible]*   14[illegible]6   1473*   1474*   1475   1480*
                        1481   14[illegible]6*   14[illegible]7*   1486   1[illegible]*   1[illegible]   1[illegible]3   15[illegible]*   1515   1520*   1521*   1522   1541*
                        1542*   1543   15[illegible]3*   1549   15[illegible]*   1[illegible]*   1[illegible]5   15[illegible]5*   1576*   1577   1582*   1583   1588*
                        1589*   1590   16[illegible]9*   1610*   1611   1[illegible]*   1[illegible]7   16[illegible]*   1623*   1624   1630*   1631   1649*
                        1650*   1651   1656*   1657   16[illegible]*   1[illegible]   1[illegible]*   16[illegible]*   1670   1745*   1746*   1747   1936*
                        1937*   1947*   1973*   1974*   19[illegible]3*   19[illegible]*   1[illegible]3   19[illegible]*   20[illegible]3*   2024*   2025*
R1      =%000001        169*   231*   232    233*   237*   2[illegible]   2[illegible]3*   2[illegible]0*   261*   262    263    268*   269
                        271*   273*   274    [illegible]*   1[illegible]*   1[illegible]   19[illegible]7*   20[illegible]6   2014*
R2      =%000002        169*   299*   301    307*   3[illegible]*   [illegible]*   1012   1018   10[illegible]4*   1034*   1049   1055   1061*
                        1125*   1140   1146   1152*   1162*   1177   11[illegible]3   1189*   1[illegible]5   1996*   2026*   2027
R3      =%000003        169*   870*   898*   905*   9[illegible]5*   996*   10[illegible]5*   1033*   1062*   1124*   1153*   1161*   1190*
                        1200*   1224*   1232*   1257*   1679*   16[illegible]3   16[illegible]3*   1694   16[illegible]6   19[illegible]6   1995*
R4      =%000004        169*   309*   871*   879    830    [illegible]6   632    897*   9[illegible]6*   9[illegible]2   928    934*   998*
                        1006   1023*   1035*   1043   1060*   1126*   1134   1151*   1163*   1171   1188*   1201*   1217
                        1223*   1233*   1250   1256*   1987   1994*
R5      =%000005        169*   907*   915    916    933*   1988   1993*
SCOPE = 104000          169*   286    298    304    328    337    346    356    368    379    391    401    411
                        422    432    443    454    465    476    485    494    505    516    527    537    548
                        561    571    581    591    601    618    633    648    664    680    704    724    747
                        769    792    815    842    869    873    904    909    941    968    995    1000   1032
                        1037   1069   1096   1123   1128   1160   1165   1199   1204   1231   1236   1265   1281
                        1317   1350   1384   1403   1418   1433   1448   1463   1497   1531   1565   1599   1639
                        1677   1703   1728   1756   1776   1806   1839   1855   1886   1903   1923   1941
SCOPEA    012326        178    1967*
SCOPEB    012340        1968   1970*
SETUP     001076        230*   280    2013
SETUPA    001106        232*   235
SETUPB    001132        238*   241
SHORTV= 104000          164*   2123
SIZE      001042        206*   274*   301    307
SIZE0 = 000400          164*
SIZE1 = 000600          164*
SP      =%000006        169*   266    279*   1791   1794   1799   1823   1826   1831   1851   1898   1969   1970*
                        1983*   1984*   1985*   1986*   1987*   1988*   1989   1992*   1993   1994   1995   1996   1997
                        1998   2000*   2012*   2021*   2039
SPACEB    012624        2017   2037*
SPCEA     012550        2015   2021*   2035
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DOGTBC.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

DELAY	211#	605	623	638	653	669	687	710	730	753	775	798	825	852	883
	919	950	977	1009	1046	1078	1105	1137	1174	1214	1246	1272	1291	1307	1327
	1342	1360	1375	1394	1408	1423	1438	1453	1471	1505	1539	1573	1607	1647	1686
	1711	1738	1846	1862											
DELAY1	212#	359	371												
PAT1	164#	2153													
PAT2	164#	2183													
PAT3	164#	2170													
RESUME	210#	323	2038												

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ADD      233   239   261   314   1023  1060  1151  1188
BEQ      317   322   334   343   352   364   376   3?5   398   408   418   429   439   450   461
         472   482   491   501   512   523   534   54?   5?5   5?8   578   588   598   611   626
         641   656   672   690   696   712   717   733   739   756   762   778   784   801   807
         829   835   856   862   887   893   923   929   954   960   981   987   1013  1019  1050
         1056  1082  1088  1109  1115  1141  1147  1178  1184  1218  1251  1275  1310  1345  1378
         1412  1427  1442  1457  1476  1482  1489  1510  1516  1523  1544  1550  1557  1578  1584
         1591  1612  1618  1625  1632  1652  1664  1671  1689  1695  1721  1748  1932  1938  1944
         1948
BIC      244   248   332   341   350   362   374   383   396   406   416   427   437   448   459
         470   499   510   521   532   542   553   566   576   586   596   609   1249  1410  1425
         1440  1455  1474  1487  1508  1521  1542  1555  1576  1589  1610  1623  1650  1669  1746
         1868  1937  2025
BIT      481   490   1274  1293  1309  1329  1344  1362  1377  1396  1631  1657  1688  1713  1720
         1740  1967
BMI      310
BNE      235   241   264   270   302   899   936   1026  1063  1154  1191  1225  1258  1294  1330
         1363  1397  1658  1697  1714  1741  1869  1872  1968  1975  1980
BPL      1960  1963
BR       265   272   312   319   324   692   714   735   758   780   803   831   858   889   895
         925   931   9?6   983   1015  1021  1052  1058  1084  1111  1143  1149  1180  1186  1220
         1253  12?6  13??  1??5  1478  14?4  1512  1518  1546  1552  15??  15?5  1614  1620  1654
         1660  1666  1691  1716  1723  1743  1769  1792  1797  1824  1829  1863  1878  1913  1934
         2035  2040
CLR      ?50   252   254   281   288   290   292   706   707   818   819   845   846   876   877
         912   9?3   944   945   971   972   1003  1004  1040  1041  1072  1073  1099  1100  1131
         1132  1168  1169  1207  1208  1211  1239  1240  1243  1468  1679  1730  1763  1783  1814
         1844  1860  1925  1926  2031
CMP      234   240   2?3   2?6   269   301   316   321   333   342   351   363   375   384   397
         4?7   417   4?3   4?3   449   460   471   500   511   522   533   543   554   567   577
         587   597   6??   625   640   655   671   689   695   732   738   755   761   777   783
         800   8?6   828   834   855   861   886   892   922   928   953   959   9?0   986   1012
         1018  1049  1055  1081  1097  1108  1114  1140  1146  1177  1183  1217  1250  1411  1426
         1441  14?6  1475  1481  14?8  1509  1515  1522  1543  1549  1556  1577  15?3  1530  1611
         1617  16?4  1651  1663  1670  1694  1696  1747  1791  1794  1799  1823  1826  1831  1851
         1871  18?8  1943  20?9
DEC      3?8   898   934   935   1025  1061  1062  1153  1189  1190  1224  1257  1974  1979
EMT      169
HALT     171   172   174   311   318   335   344   353   399   409   419   430   440   451   462
         473   483   492   502   513   524   535   545   556   569   579   539   599   612   627
         642   657   673   691   697   713   718   734   740   757   763   779   785   802   808
         8?0   836   8?7   863   8?8   894   924   930   955   961   982   988   1014  1020  1051
         1??7  1??3  10?9  1110  1116  1142  1148  1179  11?5  1219  1252  1276  12?5  1311  1331
         1346  1364  1379  13?8  1413  1428  1443  1458  1477  1483  1490  1511  1517  1524  1545
         1551  1558  1579  1585  1592  1613  1619  1626  1633  1653  1659  1665  1672  1690  1715
         1722  1742  1749  1771  1789  1795  1800  1820  1827  1832  1847  1864  1870  1873  1896
         1914  1933  1939  1991  2003
INC      897   933   1024  1152  1222  1223  1255  1256  1693  1942
JMP      184   185   1945  1964  1971  2006
JSR      247   280   359   371   605   623   638   653   669   687   710   730   753   775   798
         825   8?2   8?3   919   950   977   1009  1046  1078  1105  1137  1174  1214  1246  1272
         1291  1307  13?7  1342  1360  1375  1394  1408  1423  1438  1453  1471  1505  1539  1573
         1607  1647  1686  1711  1738  1846  1862  1929  1950  2013
MOV      230   231   232   236   237   238   242   245   249   251   253   259   260   267   274
         278   279   282   299   300   305   306   307   309   315   323   329   330   331   329
         339   340   347   348   349   357   358   361   369   370   373   380   381   382   392
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                393   394   395   402   403   404   405   412   413   414   415   423   424   425   426
                433   434   435   436   444   445   446   447   455   456   457   458   466   467   468
                469   477   478   479   480   486   487   488   489   495   496   497   498   506   507
                508   509   517   518   519   520   528   529   530   531   538   539   540   541   549
                550   551   552   562   563   564   565   572   573   574   575   582   533   524   5  3
                582   583   594   595   602   603   604   606   607   608   619   620   621   622   624
                634   635   636   637   639   649   650   651   652   654   665   666   667   668   670
                681   682   683   684   685   686   688   704   705   708   709   711   716   725   726
                727   728   729   731   737   748   749   750   751   752   754   760   770   771   772
                773   774   776   782   793   794   795   796   797   799   805   816   817   830   831
                822   823   824   827   833   843   844   847   848   849   850   851   854   860   870
                871   874   875   878   879   880   881   892   895   891   905   907   910   911   913
                914   915   916   917   918   921   927   933   943   946   947   953   959   963   973
                969   970   973   974   975   976   979   995   996   997   998  1011  1013  1023  1024
               1007  1008  1011  1017  1033  1034  1035  1038  1039  1042  1043  1044  1045  1048  1054
               1070  1071  1074  1075  1076  1077  1080  1095  1097  1098  1101  1102  1103  1104  1107
               1113  1124  1125  1126  1129  1130  1133  1134  1135  1136  1139  1145  1151  1162  1163
               1166  1167  1170  1171  1172  1173  1176  1192  1230  1201  1202  1205  1206  1209  1210
               1212  1213  1216  1232  1233  1234  1237  1238  1241  1242  1244  1245  1248  1250  1261
               1262  1266  1267  1268  1269  1270  1271  1282  1283  1294  1295  1296  1297  1298  1299
               1290  1301  1302  1303  1304  1305  1306  1318  1319  1320  1321  1322  1323  1324  1325
               1326  1336  1337  1338  1339  1340  1341  1351  1352  1353  1354  1355  1356  1357  1358
               1359  1369  1370  1371  1372  1373  1374  1385  1386  1387  1388  1389  1390  1391  1392
               1393  1404  1405  1406  1407  1409  1419  1420  1421  1422  1424  1434  1435  1436  1437
               1438  1448  1450  1451  1452  1454  1464  1465  1466  1467  1469  1470  1473  1480  1486
               1498  1499  1500  1501  1502  1503  1504  1507  1514  1520  1532  1533  1534  1535  1536
               1537  1538  1541  1548  1554  1566  1567  1568  1569  1570  1571  1572  1575  1582  1588
               1600  1601  1602  1603  1604  1605  1606  1609  1616  1622  1630  1640  1641  1642  1643
               1644  1645  1646  1649  1656  1662  1668  1670  1681  1682  1685  1705  1706  1707  1710
               1729  1731  1732  1734  1737  1745  1758  1759  1760  1761  1762  1764  1778  1779  1780
               1781  1782  1784  1790  1808  1809  1810  1811  1812  1813  1815  1822  1841  1842  1843
               1845  1850  1857  1858  1859  1861  1865  1875  1877  1878  1889  1890  1891  1905  1906
               1907  1908  1915  1924  1927  1928  1936  1947  1957  1958  1961  1969  1970  1973  1978
               1983  1984  1985  1986  1987  1988  1989  1990  1992  1993  1994  1995  1996  1997  1998
               1999  2000  2011  2012  2014  2015  2016  2017  2018  2021  2022  2023  2026  2027  2037
               2038
MOVB           1683  1708
NEG             243   246
NOP             289   291   365   377   386  1684  1709  1736  1765  1766  1767  1768  1785  1786  1787
               1788  1816  1817  1818  1819  1821  1849  1892  1893  1894  1895  1909  1910  1911  1912
               1951  1952  1953  1954  1955  1956  2001  2002  2004  2005  2019  2020  2029  2030  2033
               2034
RESET           287   293  1678  1704  1719  1735  1757  1777  1807  1840  1856  1887  1904  1916  1917
               1930  1946  1949
ROL            2024
RTS             255   275  1976  1981
SUB             268   271   273  1876
TST             262  1931
TSTB           1959  1962
WAIT           2032
.ASCII         2154
.ASCIZ         2159  2227
.BYTE          2171  2174  2177  2180  2184  2190
.ENABL          164
.END           2237
.EVEN          2165  2196  2230
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DDGTBC.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

.LIST	1	164	166	169	174
.MACR	210	211	212		
.MACRO	164				
.NLIST	1	164	167	169	174
.REM	1				
.REPT	174				
.TITLE	165				
.WORD	178				

ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0

*DDGTBC,DDGTBC.SEQ/SOL/CRF/DS:ERFZ/EN:ABS=DSKM:DDGTBC.P11
RUN-TIME: 6 13 3 SECONDS
RUN-TIME RATIO: 63/25=2.5
CORE USED: 8K (16 PAGES)

MOS