

# GT40-42-44

INSTRUCTION TEST NO. 1  
MD-11-DDGTA-D

EP-DDGTA-D-DL-B  
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FICHE 1 OF 1

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The microfiche card displays a grid of 40 frames, organized into 8 rows and 5 columns. Each frame contains a small, dense set of alphanumeric characters and symbols, likely representing a data set or a series of instructions for a test. The frames are arranged in a regular pattern, with some frames appearing to contain more complex data or symbols than others. The overall appearance is that of a standard microfiche card used for data storage and retrieval.

B01

EOF1DCKBBBSEGH11  
DDGTA.D.P11

00640000-44 IN878827ION TEST I MADEC-11-DDGTA-D TMBYDDGZAD660 19-DEC-76 0001800BAGE 1 770224  
SEG 0001

.REM +

IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DDGTA-D-D  
PRODUCT NAME: GT40/GT44 INSTRUCTION TEST I  
DATE: JANUARY 1977  
MAINTAINER: DIAGNOSTIC GROUP

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1. ABSTRACT

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

THIS IS A TWO PART LOGIC TEST OF THE ALPHAGRAPHIC TERMINAL. FOR THIS TEST THE TWO MAINTENANCE SWITCH WILL 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 EQUIPMENT

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

2.2 STORAGE

THIS PROGRAM USED MEMORY LOCATIONS 0-16000 <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

174      SUB-TEST 1, BASIC LOGIC TEST <BR ONLY>  
          (MAINT. SWITCH 1 SET, MAINT. SWITCH 2 RESET)  
200      SUB-TEST 2, COMPLEX LOGIC TEST <BR, NPR AND INTERRUPT>  
          (MAINT. SWITCH 1 RESET, MAINT. SWITCH 2 SET)

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 FACILITIES 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

BECAUSE BOTH SUB-TESTS USE THE MAINTENANCE SWITCHES, ADVISE NOT RUNNING TEST IN CHAIN MODE.  
IF VR14 SCOPE, LOCATION "GSYAXS" (LOC. 1012) MUST BE CHANGED TO 1377.

8. MISCELLANEOUS

8.1 EXECUTION TIME

SUB-TEST 1 TAKES APPROXIMATELY 10 SECONDS.  
SUB-TEST 2 TAKES APPROXIMATELY 30 SECONDS.

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

<MAINT. SWITCH 1 SET, MAINT. SWITCH 2 RESET>  
THIS SUBTEST IS A BASIC READ/WRITE TEST OF THE DISPLAY PROGRAM COUNTER REGISTER. WITH THE MAINT. SWITCHES SET IN THIS POSITION, THE DISPLAY SHOULD NOT REQUEST AN NPR OR BR INTERRUPT.

9.2 SUBTEST 2

<MAINT. SWITCH 1 RESET, MAINT. SWITCH 2 SET>  
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. WITH THE MAINT. SWITCHES SET IN THIS POSITION THE PROGRAM CAN SINGLE STEP THE DISPLAY CONTROLLER THRU A DISPLAY FILE (1 NPR AT A TIME) AND CHECK FOR PROPER OPERATION.

```

176
177
178
195
196
197 000000 000000
198 000000 000000
199 000002 000000
206 000024 000024
207 000024 015652
208 000026 000340
209 000030 000030
210 000030 015606
211 000032 000340
212
213
214 000046 015526
215 000050 000000
216 000052 000000
217
218 000170 000000
219 000172 177570
220
221 000174 000174
222 000174 000137 001404
223 000200 000137 001606
224
225
226 001000 172000
227 001002 000320
228 001004 000200
229 001006 000016
230 001010 000030
231 001012 001777
232 001014 000177
233
234 001016 000000
235 001020 177776
236 001022 015752
237 001024 015754
238 001026 015756
239 001030 015760
240 001032 015762
241 001034 015764
242 001036 000000
243 001040 017476
244 001042 000000
245 001044 000750
246 001046 000762

.ENABL ABS,AMA
.TITLE GT-40/GT-44 INSTRUCTION TEST I MAINDEC-11-DDGTA-D
.LIST ME,BIN,SEQ
.NLIST MC,MD,CND

.=0
HALT
HALT
;LOCATIONS 0-776 ARE FILLED WITH TRAP CATCHER
.=24
LOMPWR
340
.=30
.WORD SCOPEA ;EMT RETURN
340

.=46
LOGICAL
0
0
.=170
SWREG: .WORD 0
SWR: .WORD DSWR

.=174
JMP START ;P.C. REGISTER TEST
JMP STARTB ;LOGIC TEST (BR-NPR-INTERRUPT REQUESTS)

.=1000
GSADD: 172000 ;GS DISPLAY STARTING ADDRESS
GSVCT: 320 ;GS DISPLAY STARTING VECTOR
DSPBR: 200 ;GS DISPLAY INTERRUPT LEVEL
GSCHSZ: 16 ;CHARACTER SIZE (14-16)
GSLFSZ: 30 ;LINE FEED SIZE (30-32)
GSYAXS: 1777 ;+Y AXIS CUTOFF LOCATION
GSSEND: 177 ;SHIFT-OUT END CHARACTER

ICNT: 0 ;PASS COUNTER
PSW: 177776
DBUF: BUFFER ;FIRST WORD IN THE DISPLAY BUFFER
DBUF1: BUFFER+2 ;SECOND WORD
DBUF2: BUFFER+4 ;THIRD WORD
DBUF3: BUFFER+6 ;FOURTH WORD
DBUF4: BUFFER+10 ;FIFTH WORD
DBUF5: BUFFER+12 ;SIXTH WORD
DSAVE: 0 ;TEMP REG.
SIZE: 17476 ;BUFFER SIZE FOR 4K (WORD LENGTH)
CNTR: 0
LFSIZE: 750 ;LINE FEED DELTA Y SIZE
CHSIZE: 762 ;BACK SPACE CHARACTER DELTA X SIZE

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257      ;GS ADDRESSES AND VECTORS
258
259      001050 172000      DPC:      172000      ;DISPLAY PC REGISTER
260      001052 172002      DSR:      172002      ;DISPLAY STATUS REGISTER
261      001054 172004      XPOS:     172004      ;X AXIS REGISTER <READ ONLY>
262      001056 172006      YPOS:     172006      ;Y AXIS REGISTER AND GRAPHLOT REGISTER <READ ONLY>
263
264      001060 000320      DDONE:    320        ;DISPLAY STOP <DONE> VECTOR
265      001062 000322      DDONE1:   322        ;
266
267      001064 000324      LPVCT:    324        ;DISPLAY LIGHT PEN VECTOR
268      001066 000326      LPVCT1:   326        ;
269
270      001070 000330      TIMEVT:   330        ;DISPLAY TIME-OUT <NXM.> ERROR VECTOR
271      001072 000332      TMEVT1:   332        ; OR "SHIFT-OUT" VECTOR
272
273      ;GS INITIALIZATION ROUTINE
274
275      001074 012700 001050      SETUP:    MOV      #DPC,RO      ;SET UP POINTER
276      001100 013701 001000      MOV      GSADD,R1
277      001104 010120 001000      SETUPA:  MOV      R1,(0)+
278      001106 062701 000002      ADD      #2,R1
279      001112 022700 001060      CMP      #DPC+10,RO
280      001116 001372 001060      BNE      SETUPA
281      001120 012700 001060      MOV      #DDONE,RO
282      001124 013701 001002      MOV      GSVCT,R1
283      001130 010120 001000      SETUPB:  MOV      R1,(0)+
284      001132 062701 000002      ADD      #2,R1
285      001136 022700 001074      CMP      #DDONE+14,RO
286      001142 001372 001044      BNE      SETUPB
287      001144 013737 001010 001044      MOV      GSLFSZ,LFSIZE      ;SET UP DELTA LF
288      001152 005437 001044 001044      NEG      LFSIZE              ;NEGATE IT
289      001156 042737 177000 001044      BIC      #177000,LFSIZE      ;MASK IT
290      001164 013737 001006 001046      MOV      GSCHSZ,CHSIZE      ;SET UP DELTA CHAR
291      001172 005437 001046 001046      NEG      CHSIZE              ;NEGATE IT
292      001176 004737 001316 001046      JSR      PC,DCORE
293      001202 042737 177000 001046      BIC      #177000,CHSIZE      ;MASK IT
294      001210 013777 001062 177642      MOV      DDONE1,@DDONE
295      001216 005077 177640 177634      CLR      @DDONE1
296      001222 013777 001066 177634      MOV      LPVCT1,@LPVCT
297      001230 005077 177632 177626      CLR      @LPVCT1
298      001234 013777 001072 177626      MOV      TMEVT1,@TIMEVT
299      001242 005037 001072 177626      CLR      TMEVT1
300      001246 013746 000004 177626      MOV      @#ERRVEC,-(SP)      ;SAVE VECTORS CONTENTS
301      001252 012737 001300 000004      MOV      #1$,@#ERRVEC      ;SET UP FOR TRAP
302      001260 012737 177570 000172      MOV      #DSWR,@#SWR      ;SET UP TO TEST FOR SWITCH REGISTER
303      001266 022777 177777 176676      CMP      #-1,@#SWR
304      001274 001005 000401 176676      BNE      3$
305      001276 000401 000401 176676      BR       2$
306      001300 022626 000170 000172      1$:      CMP      (SP)+,(SP)+
307      001302 012737 000004 000172      2$:      MOV      #SWREG,@#SWR
308      001310 012637 000004 000172      3$:      MOV      (SP)+,@#ERRVEC
309      001314 000207 000004 000172      RTS      PC

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# H01

GT-40/GT-44 INSTRUCTION TEST I MAINDEC-11-DDGTA-D  
DDGTAD.P11

MACY11 27(663) 19-DEC-76 08:15 PAGE 7

SEQ 0007

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311          ;SUBROUTINE TO DETERMINE THE SIZE OF CORE
312          ; AND SET UP LOCATION SIZE WITH THE VALUE
313
314 001316 012737 001352 000004 DOCORE: MOV    #2$,R#4          ;SET UP FOR NEM
315 001324 012701 017776          MOV    #17776,R1        ;SET UP ADDRESS
316 001330 005000          CLR    R0
317 001332 062701 020000          1$:  ADD    #20000,R1        ;MOVE TO THE NEXT BANK
318 001336 005200          INC    R0            ;INC BANK COUNTER
319 001340 005711          TST    (1)          ;TIMEOUT ?
320 001342 022701 157776          CMP    #157776,R1   ;END ?
321 001346 001371          SNE    1$
322 001350 000404          BR    3$
323 001352 022626          2$:  CMP    (SP)+,(SP)+   ;POP THE STACK X2
324 001354 005300          DEC    R0            ;DECREMENT BANK COUNT
325 001356 162701 020000          SUB    #20000,R1
326 001362 012737 000006 000004 3$:  MOV    #6,R#4        ;RESET BUSS ERROR
327 001370 010137 001040          MOV    R1,SIZE      ;SET UP SIZE LENGTH
328 001374 162737 007776 001040          SUB    #7776,SIZE   ;MODIFY
329 001402 000207          RTS    PC           ;EXIT

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331
332 001404 012777 000340 177406 START: MOV #340, @PSW
333 001412 012706 000500 MOV #STKPTR, SP
334 001416 004737 001074 JSR PC, SETUP
335 001422 005037 001016 CLR ICNT ;CLEAR PASS COUNT
336 001426 012701 001434 MOV #PCTST0+2, R1
337
338 ;DOES THE DISPLAY PC LOAD PROPERLY
339 ;BASIC TEST
340
341 001432 104000 PCTST0: SCOPE
342 001434 013777 001016 176530 MOV ICNT, @SWR
343 001442 005077 177402 CLR @DPC ;CLEAR DISPLAY P.C.
344 001446 017700 177376 MOV @DPC, R0 ;READ DPC AND SAVE IN R0
345 001452 001401 BEQ .+4 ;DPC EQUAL TO ZERO?
346 001454 000000 HALT ;NO, DISPLAY P.C. FAILED TO RESET
347
348
349 001456 104000 PCTST1: SCOPE
350 001460 012777 017776 177362 MOV #17776, @DPC ;LOAD 17776 INTO DISPLAY P.C.
351 001466 017700 177356 MOV @DPC, R0 ;READ DPC AND SAVE IN R0.
352 001472 022700 017776 CMP #17776, R0 ;ARE THEY EQUAL ?
353 001476 001401 BEQ .+4 ;YES
354 001500 000000 HALT ;NO, DISPLAY P.C. FAILED TO SET
355
356
357 001502 104000 PCTST2: SCOPE
358 001504 012777 012524 177336 MOV #12524, @DPC ;LOAD 12524 INTO DISPLAY P.C.
359 001512 017700 177332 MOV @DPC, R0 ;READ DPC AND SAVE IN R0.
360 001516 022700 012524 CMP #12524, R0 ;DPC EQUAL TO 12524
361 001522 001401 BEQ .+4
362 001524 000000 HALT ;DISPLAY P.C. FAILED TO LOAD PROPERLY
363 ;12524
364
365 001526 104000 PCTST3: SCOPE
366 001530 012777 005252 177312 MOV #5252, @DPC ;LOAD 5252 INTO DISPLAY P.C.
367 001536 017700 177306 MOV @DPC, R0 ;READ DPC AND SAVE IN R0
368 001542 022700 005252 CMP #5252, R0 ;DPC EQUAL TO 5252?
369 001546 001401 BEQ .+4
370 001550 000000 HALT ;DISPLAY P.C. FAILED TO LOAD PROPERLY
371 ; 5252
372
373 001552 005777 177272 PCTST4: TST @DPC
374 001556 005777 177270 TST @DSR
375 001562 005777 177266 TST @XPOS
376 001566 005777 177264 TST @YPOS
377
378 001572 005237 001016 INC ICNT
379 001576 001315 BNE PCTST0
380 001600 004737 015546 JSR PC, BELL ;RING BELL
381 001604 000712 BR PCTST0

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383 001606 012777 000340 177204 STARTB: MOV #340, @PSW
384 001614 012706 000500          MOV #STKPTR, SP
385 001620 004737 001074          JSR PC, SETUP
386 001624 005037 001016          CLR ICNT
387 001630 012701 001636          MOV #GTO+2, R1
388
389
390          ;MODE REGISTER TEST
391          ;DOES THE "MODE" REGISTER LOAD PROPERLY
392 001634 104000          GT0:  SCOPE
393 001636 013777 001016 176326  MOV ICNT, @SWR
394 001644 012777 100000 177150  MOV #100000, @DBUF ;LOAD MODE REGISTER=0
395 001652 013777 001022 177170  MOV @DBUF, @DPC ;LOAD DISPLAY PC
396 001660 017700 177166  MOV @DSR, R0 ;READ DISPLAY STATUS REGISTER
397 001664 042700 103777  BIC #103777, R0 ;MASK TO BITS 14-11
398 001670 022700 040000  CMP #40000, R0 ;TEST R0
399 001674 001401  BEQ .+4
400 001676 000000  HALT ;MODE BITS (14-11) FAILED TO RESET
401
402
403 001700 104000          GT1:  SCOPE
404 001702 012777 174000 177112  MOV #174000, @DBUF ;LOAD MODE REGISTER=17
405 001710 013777 001022 177132  MOV @DBUF, @DPC ;LOAD DISPLAY PC
406 001716 017700 177130  MOV @DSR, R0 ;READ DISPLAY STATUS REGISTER
407 001722 042700 103777  BIC #103777, R0 ;MASK TO BITS 14-11
408 001726 022700 074000  CMP #74000, R0 ;TEST R0
409 001732 001401  BEQ .+4
410 001734 000000  HALT ;MODE BITS (14-11) FAILED TO SET
411
412
413 001736 104000          GT2:  SCOPE
414 001740 012777 140000 177054  MOV #140000, @DBUF ;LOAD MODE REGISTER=10
415 001746 013777 001022 177074  MOV @DBUF, @DPC ;LOAD DISPLAY P.C.
416 001754 017700 177072  MOV @DSR, R0 ;READ DISPLAY STATUS REGISTER
417 001760 042700 103777  BIC #103777, R0 ;MASK TO BITS 14-11
418 001764 022700 040000  CMP #40000, R0 ;TEST R0
419 001770 001401  BEQ .+4
420 001772 000000  HALT ;MODE BIT 14 FAILED TO SET
421
422
423 001774 104000          GT3:  SCOPE
424 001776 012777 160000 177016  MOV #160000, @DBUF ;LOAD MODE REGISTER=14
425 002004 013777 001022 177036  MOV @DBUF, @DPC ;LOAD DISPLAY P.C.
426 002012 017700 177034  MOV @DSR, R0 ;READ DISPLAY STATUS REGISTER
427 002016 042700 103777  BIC #103777, R0 ;MASK TO BITS 14-11
428 002022 022700 060000  CMP #60000, R0 ;TEST R0
429 002026 001401  BEQ .+4
430 002030 000000  HALT ;MODE BIT 13 FAILED TO SET
431

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433
434
435 002032 104000          GT4:  SCOPE
436 002034 000005          RESET
437 002036 012777 170000 176756  MOV #170000, @DBUF ;LOAD MODE REGISTER=16
438 002044 013777 001022 176776  MOV DBUF, @DPC ;LOAD DISPLAY P.C.
439 002052 017700 176774  MOV @DSR, RO ;READ DISPLAY STATUS REGISTER
440 002056 042700 103777  BIC #103777, RO ;MASK TO BITS 14-11
441 002062 022700 070000  CMP #70000, RO ;TEST RO
442 002066 001401  BEQ .+4 ;
443 002070 000000  HALT ;MODE BIT 12 FAILED TO SET
444
445
446 002072 104000          GT5:  SCOPE
447 002074 012777 174000 176720  MOV #174000, @DBUF ;LOAD MODE REGISTER=17
448 002102 013777 001022 176740  MOV DBUF, @DPC ;LOAD DISPLAY P.C.
449 002110 017700 176736  MOV @DSR, RO ;READ DISPLAY STATUS REGISTER
450 002114 042700 103777  BIC #103777, RO ;MASK TO BITS 14-11
451 002120 022700 074000  CMP #74000, RO ;TEST RO
452 002124 001401  BEQ .+4 ;
453 002126 000000  HALT ;MODE BIT 11 FAILED TO SET
454
455
456 ;TESTED BY "SET GRAPHIC MODE"
457
458 002130 104000          GT6:  SCOPE
459 002132 012777 100004 176662  MOV #100004, @DBUF ;LOAD LINE TYPE ENABLE =1 AND LINE TYPE VALUE =0
460 002140 013777 001022 176702  MOV DBUF, @DPC ;LOAD DISPLAY P.C.
461 002146 017700 176700  MOV @DSR, RO ;READ DISPLAY STATUS REGISTER
462 002152 042700 177774  BIC #177774, RO ;MASK TO BITS 1-0
463 002156 022700 000000  CMP #0, RO ;TEST RO
464 002162 001401  BEQ .+4 ;
465 002164 000000  HALT ;LINE BITS 1-0 FAILED TO RESET
466
467 002166 104000          GT7:  SCOPE
468 002170 012777 100007 176624  MOV #100007, @DBUF ;LINE TYPE ENABLE =1 LINE TYPE =3
469 002176 013777 001022 176644  MOV DBUF, @DPC ;LOAD DISPLAY P.C.
470 002204 017700 176642  MOV @DSR, RO ;READ DISPLAY STATUS REGISTER
471 002210 042700 177774  BIC #177774, RO ;MASK TO BITS 1-0
472 002214 022700 000003  CMP #3, RO ;TEST RO
473 002220 001401  BEQ .+4 ;
474 002222 000000  HALT ;LINE BITS 1-0 FAILED TO SET
475
476 002224 104000          GT8:  SCOPE
477 002226 012777 100005 176566  MOV #100005, @DBUF ;LINE TYPE ENABLE =1 LINE TYPE =1
478 002234 013777 001022 176606  MOV DBUF, @DPC ;LOAD DISPLAY P.C.
479 002242 017700 176604  MOV @DSR, RO ;READ DISPLAY STATUS REGISTER
480 002246 042700 177774  BIC #177774, RO ;MASK TO BITS 1-0
481 002252 022700 000001  CMP #1, RO ;TEST RO
482 002256 001401  BEQ .+4 ;
483 002260 000000  HALT ;LINE BIT 0 FAILED TO SET
484

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LO1

486											
487	002262	104000				GT9:	SCOPE				
488	002264	012777	100006	176530			MOV	#100006, @DBUF		;LINE TYPE ENABLE =1 LINE TYPE =2	
489	002272	013777	001022	176550			MOV	DBUF, @DPC		;LOAD DISPLAY P.C.	
490	002300	017700	176546				MOV	@DSR, RO		;READ DISPLAY STATUS REGISTER	
491	002304	042700	177774				BIC	#177774, RO		;MASK TO BITS 1-0	
492	002310	022700	000002				CMP	#2, RO		;TEST RO	
493	002314	001401					BEQ	+.4			
494	002316	000000					HALT			;LINE BIT 1 FAILED TO SET	
495											
496											
497	002320	104000				GT10:	SCOPE				
498	002322	012777	100003	176472			MOV	#100003, @DBUF		;LINE TYPE ENABLE =0 LINE TYPE =3	
499	002330	013777	001022	176512			MOV	DBUF, @DPC		;LOAD DISPLAY P.C.	
500	002336	017700	176510				MOV	@DSR, RO		;READ DISPLAY STATUS REGISTER	
501	002342	042700	177774				BIC	#177774, RO		;MASK TO BITS 1-0	
502	002346	022700	000002				CMP	#2, RO		;TEST RO	
503	002352	001401					BEQ	+.4		;SHOULD NOT CHANGE LT VALUE	
504	002354	000000					HALT			;LINE TYPE ENABLE FAILED TO INHIBIT	
505										;CHANGING OF LINETYPE VALUE	
506											
507	002356	104000				GT11:	SCOPE				
508	002360	012777	100020	176434			MOV	#100020, @DBUF		;BLINK ENABLE =1 BLINK =0	
509	002366	013777	001022	176454			MOV	DBUF, @DPC		;LOAD DISPLAY P.C.	
510	002374	017700	176452				MOV	@DSR, RO		;READ DISPLAY STATUS REGISTER	
511	002400	042700	177767				BIC	#177767, RO		;MASK TO BIT 3	
512	002404	022700	000000				CMP	#0, RO		;TEST RO	
513	002410	001401					BEQ	+.4			
514	002412	000000					HALT			;BLINK BIT FAILED TO RESET	
515											
516											
517	002414	104000				GT12:	SCOPE				
518	002416	012777	100030	176376			MOV	#100030, @DBUF		;BLINK ENABLE =1 BLINK =1	
519	002424	013777	001022	176416			MOV	DBUF, @DPC		;LOAD DISPLAY P.C.	
520	002432	017700	176414				MOV	@DSR, RO		;READ DISPLAY STATUS REGISTER	
521	002436	042700	177767				BIC	#177767, RO		;MASK TO BIT 3	
522	002442	022700	000010				CMP	#10, RO		;TEST RO	
523	002446	001401					BEQ	+.4			
524	002450	000000					HALT			;BLINK BIT FAILED TO SET	
525											
526											
527	002452	104000				GT13:	SCOPE				
528	002454	012777	100000	176340			MOV	#100000, @DBUF		;BLINK ENABLE =0 BLINK =0	
529	002462	013777	001022	176360			MOV	DBUF, @DPC		;LOAD DISPLAY P.C.	
530	002470	017700	176356				MOV	@DSR, RO		;READ DISPLAY STATUS REGISTER	
531	002474	042700	177767				BIC	#177767, RO		;MASK TO BIT 3	
532	002500	022700	000010				CMP	#10, RO		;TEST RO	
533	002504	001401					BEQ	+.4			
534	002506	000000					HALT			;BLINK ENABLE FAILED TO INHIBIT	
535										;CHANGING OF THE BLINK BIT	

537											
538	002510	104000			GT14:	SCOPE					
539	002512	012777	100100	176302		MOV	#100100, @DBUF		;LP ENABLE =1 LP=0		
540	002520	013777	001022	176322		MOV	DBUF, @DPC		;LOAD DISPLAY P.C.		
541	002526	017700	176320			MOV	@DSR, R0		;READ STATUS		
542	002532	032700	000200			BIT	#200, R0				
543	002536	001401				BEQ	+.4				
544	002540	000000				HALT			;LIGHT PEN FLAG SET IN ERROR		
545											
546	002542	104000			GT15:	SCOPE					
547	002544	012777	100140	176250		MOV	#100140, @DBUF		;LP ENABLE =1 LP=1		
548	002552	013777	001022	176270		MOV	DBUF, @DPC		;LOAD DISPLAY P.C.		
549	002560	017700	176266			MOV	@DSR, R0		;READ STATUS		
550	002564	032700	000200			BIT	#200, R0				
551	002570	001401				BEQ	+.4				
552	002572	000000				HALT			;LIGHT PEN FLAG SET IN ERROR		
553											
554	002574	104000			GT16:	SCOPE					
555	002576	012777	102000	176216		MOV	#102000, @DBUF		;INTENSITY LEVEL ENABLE =1 LEVEL =0		
556	002604	013777	001022	176236		MOV	DBUF, @DPC		;LOAD DISPLAY P.C.		
557	002612	017700	176234			MOV	@DSR, R0		;READ DISPLAY STATUS REGISTER		
558	002616	042700	174377			BIC	#174377, R0		;MASK TO BITS 8-10		
559	002622	022700	000000			CMP	#0, R0		;TEST R0		
560	002626	001401				BEQ	+.4				
561	002630	000000				HALT			;INTENSITY LEVEL BITS 8-10 FAILED TO RESET		
562											
563	002632	104000			GT17:	SCOPE					
564	002634	012777	103600	176160		MOV	#103600, @DBUF		;INTENSITY LEVEL ENABLE =1 LEVEL =7		
565	002642	013777	001022	176200		MOV	DBUF, @DPC		;LOAD DISPLAY P.C.		
566	002650	017700	176176			MOV	@DSR, R0		;READ DISPLAY STATUS REGISTER		
567	002654	042700	174377			BIC	#174377, R0		;MASK TO BITS 8-10		
568	002660	022700	003400			CMP	#3400, R0		;TEST R0		
569	002664	001401				BEQ	+.4				
570	002666	000000				HALT			;INTENSITY LEVEL BITS 8-10 FAILED TO SET		
571											
572											
573	002670	104000			GT18:	SCOPE					
574	002672	012777	103000	176122		MOV	#103000, @DBUF		;INTENSITY LEVEL ENABLE =1 LEVEL =4		
575	002700	013777	001022	176142		MOV	DBUF, @DPC		;LOAD DISPLAY P.C.		
576	002706	017700	176140			MOV	@DSR, R0		;READ DISPLAY STATUS REGISTER		
577	002712	042700	174377			BIC	#174377, R0		;MASK TO BITS 8-10		
578	002716	022700	002000			CMP	#2000, R0		;TEST R0		
579	002722	001401				BEQ	+.4				
580	002724	000000				HALT			;INTENSITY LEVEL BIT 10 FAILED		

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582
583 002726 104000
584 002730 012777 102400 176064 GT19: SCOPE
585 002736 013777 001022 176104 MOV #102400, @DBUF ; INTENSITY LEVEL ENABLE =1 LEVEL =2
586 002744 017700 176102 MOV @DBUF, @DPC ; LOAD DISPLAY P.C.
587 002750 042700 174377 MOV @DSR, RO ; READ DISPLAY STATUS REGISTER
588 002754 022700 001000 BIC #174377, RO ; MASK TO BITS 8-10
589 002760 001401 BEQ #1000, RO ; TEST RO
590 002762 000000 HALT .+4 ; INTENSITY LEVEL BIT 9 FAILED
591
592 002764 104000 GT20: SCOPE
593 002766 012777 102200 176026 MOV #102200, @DBUF ; INTENSITY LEVEL ENABLE =1 LEVEL =1
594 002774 013777 001022 176046 MOV @DBUF, @DPC ; LOAD DISPLAY P.C.
595 003002 017700 176044 MOV @DSR, RO ; READ DISPLAY STATUS REGISTER
596 003006 042700 174377 BIC #174377, RO ; MASK TO BITS 8-10
597 003012 022700 000400 CMP #400, RO ; TEST RO
598 003016 001401 BEQ .+4 ; INTENSITY LEVEL BIT 8 FAILED
599 003020 000000 HALT
600
601
602 003022 104000 GT21: SCOPE
603 003024 012777 101600 175770 MOV #101600, @DBUF ; INTENSITY LEVEL ENABLE =0 LEVEL =7
604 003032 013777 001022 176010 MOV @DBUF, @DPC ; LOAD DISPLAY P.C.
605 003040 017700 176006 MOV @DSR, RO ; READ DISPLAY STATUS REGISTER
606 003044 042700 174377 BIC #174377, RO ; MASK TO BITS 8-10
607 003050 022700 000400 CMP #400, RO ; TEST RO
608 003054 001401 BEQ .+4 ; INTENSITY LEVEL ENABLE FAILED TO INHIBIT
609 003056 000000 HALT ; INTENSITY LEVEL CHANGE
610
611
612 ; TESTED BY "LOAD STATUS REGISTER A"
613
614 003060 104000 GT22: SCOPE
615 003062 012777 170040 175732 MOV #170040, @DBUF ; ITALICS ENABLE=1 ITALICS=0
616 003070 013777 001022 175752 MOV @DBUF, @DPC ; LOAD DISPLAY P.C.
617 003076 017700 175750 MOV @DSR, RO ; READ DISPLAY STATUS REGISTER
618 003102 042700 177757 BIC #177757, RO ; MASK TO BIT 4
619 003106 022700 000000 CMP #0, RO ; TEST RO
620 003112 001401 BEQ .+4 ; ITALICS BIT FAILED TO RESET
621 003114 000000 HALT
622
623
624 003116 104000 GT23: SCOPE
625 003120 012777 170060 175674 MOV #170060, @DBUF ; ITALICS ENABLE=1 ITALICS=1
626 003126 013777 001022 175714 MOV @DBUF, @DPC ; LOAD DISPLAY P.C.
627 003134 017700 175712 MOV @DSR, RO ; READY DISPLAY STATUS REGISTER
628 003140 042700 177757 BIC #177757, RO ; MASK TO BIT 4
629 003144 022700 000020 CMP #20, RO ; TEST RO
630 003150 001401 BEQ .+4 ; ITALICS BIT FAILED TO SET
631 003152 000000 HALT
632
633

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635										
636	003154	104000				GT24:	SCOPE			
637	003156	012777	170000	175636			MOV	#170000, @DBUF	; ITALICS ENABLE=0	ITALICS=0
638	003164	013777	001022	175656			MOV	@DBUF, @DPC	; LOAD DISPLAY P.C.	
639	003172	017700	175654				MOV	@DSR, RO	; READ DISPLAY STATUS REGISTER	
640	003176	042700	177757				BIC	#177757, RO	; MASK TO BITS 4	
641	003202	022700	000020				CMP	#20, RO	; TEST RO	
642	003206	001401					BEG	.+4		
643	003210	000000					HALT		; ITALICS ENABLE FAILED TO INHIBIT	
644									; CLEARING OF ITALICS BIT	
645										
646	003212	104000				GT25:	SCOPE			
647	003214	012777	170000	175600			MOV	#170000, @DBUF	; "STOP" BIT =0	
648	003222	013777	001022	175620			MOV	@DBUF, @DPC	; LOAD DISPLAY P.C.	
649	003230	017700	175616				MOV	@DSR, RO	; READ DISPLAY STATUS REGISTER	
650	003234	005700					TST	RO	; TEST BIT 15	
651	003236	100001					BPL	.+4		
652	003240	000000					HALT		; "STOP" BIT FAILED TO RESET	
653										
654										
655	003242	104000				GT26:	SCOPE			
656	003244	012777	172000	175550			MOV	#172000, @DBUF	; "STOP" BIT =1	
657	003252	013777	001022	175570			MOV	@DBUF, @DPC	; LOAD DISPLAY P.C.	
658	003260	017700	175566				MOV	@DSR, RO	; READ DISPLAY STATUS REGISTER	
659	003264	005700					TST	RO	; TEST BIT 15	
660	003266	100401					BMI	.+4		
661	003270	000000					HALT		; "STOP" BIT FAILED TO SET	
662										
663										
664	003272	104000				GT27:	SCOPE			
665	003274	012777	170000	175520			MOV	#170000, @DBUF	; "STOP" BIT =1	
666	003302	013777	001022	175540			MOV	@DBUF, @DPC	; LOAD DISPLAY P.C.	
667	003310	017700	175536				MOV	@DSR, RO	; READ DISPLAY STATUS REGISTER	
668	003314	005700					TST	RO	; TEST BIT 15	
669	003316	100001					BPL	.+4		
670	003320	000000					HALT		; "STOP" BIT FAILED TO RESET	



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707
708
709           ;GRAPHPLOT INCREMENT REGISTER TEST
710 003464 104000          GT31: SCOPE
711 003466 012777 174100 175326  MOV      #174100, @DBUF      ;LOAD GRAPHPLOT COUNTER
712 003474 013777 001022 175346  MOV      DBUF, @DPC        ;START DISPLAY
713 003502 017700 175346          MOV      @XPOS, RO        ;READ INCREMENT REGISTER
714 003506 042700 001777          BIC      #1777, RO        ;MASK TO BITS 15-10
715 003512 022700 000000          CMP      #0, RO
716 003516 001401          BEQ      .+4
717 003520 000000          HALT
718
719           ;GRAPHPLOT REGISTER IN ERROR
720 003522 104000          GT32: SCOPE
721 003524 012777 174177 175270  MOV      #174177, @DBUF      ;LOAD GRAPHPLOT COUNTER
722 003532 013777 001022 175310  MOV      DBUF, @DPC        ;START DISPLAY
723 003540 017700 175310          MOV      @XPOS, RO        ;READ INCREMENT REGISTER
724 003544 042700 001777          BIC      #1777, RO        ;MASK TO BITS 15-10
725 003550 022700 176000          CMP      #176000, RO
726 003554 001401          BEQ      .+4
727 003556 000000          HALT
728           ;GRAPHPLOT REGISTER IN ERROR
729 003560 104000          GT33: SCOPE
730 003562 012777 174152 175232  MOV      #174152, @DBUF      ;LOAD GRAPHPLOT COUNTER
731 003570 013777 001022 175252  MOV      DBUF, @DPC        ;START DISPLAY
732 003576 017700 175252          MOV      @XPOS, RO        ;READ INCREMENT REGISTER
733 003602 042700 001777          BIC      #1777, RO        ;MASK TO BITS 15-10
734 003606 022700 124000          CMP      #124000, RO
735 003612 001401          BEQ      .+4
736 003614 000000          HALT
737           ;GRAPHPLOT REGISTER IN ERROR
738 003616 104000          GT34: SCOPE
739 003620 012777 174125 175174  MOV      #174125, @DBUF      ;LOAD GRAPHPLOT COUNTER
740 003626 013777 001022 175214  MOV      DBUF, @DPC        ;START DISPLAY
741 003634 017700 175214          MOV      @XPOS, RO        ;READ INCREMENT REGISTER
742 003640 042700 001777          BIC      #1777, RO        ;MASK TO BITS 15-10
743 003644 022700 052000          CMP      #52000, RO
744 003650 001401          BEQ      .+4
745 003652 000000          HALT
746           ;GRAPHPLOT REGISTER IN ERROR
747 003654 104000          GT35: SCOPE
748 003656 012777 174100 175136  MOV      #174100, @DBUF      ;LOAD GRAPHPLOT COUNTER WITH 0
749 003664 013777 001022 175156  MOV      DBUF, @DPC        ;START DISPLAY
750 003672 004737 015626          JSR      7, DLAY          ;EXECUTE A PROGRAM DELAY
751 003676 012777 174077 175116  MOV      #174077, @DBUF      ;LOAD GRAPHPLOT NO ENABLE
752 003704 013777 001022 175136  MOV      DBUF, @DPC        ;START DISPLAY
753 003712 017700 175136          MOV      @XPOS, RO        ;READ INCREMENT REGISTER
754 003716 042700 001777          BIC      #1777, RO        ;MASK TO BITS 15-10
755 003722 022700 000000          CMP      #0, RO          ;ARE THEY EQUAL ?
756 003726 001401          BEQ      .+4
757 003730 000000          HALT
           ;GRAPHPLOT REGISTER CHANGED WITHOUT
           ; THE ENABLE BEING SET

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759
760
761      ;NOP TEST <INCREMENT PC TEST>
762      ;SIMPLE - 4 INCREMENTS
763
764 003732 104000      GT36:  SCOPE
765 003734 012777 164000 175060  MOV      #164000, @DBUF      ;MOVE DNOP INTO BUFFER
766 003742 012777 164000 175054  MOV      #164000, @DBUF1    ;MOVE DNOP INTO BUFFER
767 003750 012777 164000 175050  MOV      #164000, @DBUF2    ;MOVE DNOP INTO BUFFER
768 003756 012777 164000 175044  MOV      #164000, @DBUF3    ;MOVE DNOP INTO BUFFER
769 003764 012777 164000 175040  MOV      #164000, @DBUF4    ;MOVE DNOP INTO BUFFER
770 003772 013777 001022 175050  MOV      @DBUF, @DPC        ;START THE DISPLAY
771 004000 017700 175044      MOV      @DPC, R0           ;READ THE DISPLAY P.C.
772 004004 023700 001024      CMP      DBUF1, R0         ;DID IT INCREMENT BY 2?
773 004010 001402      BEQ      .+6              ;
774 004012 000000      HALT                               ;DISPLAY P.C. FAILED TO INCREMENT
775 004014 000435      BR      GT37
776 004016 012777 000001 175024  MOV      #1, @DPC          ;SINGLE STEP THE DISPLAY
777 004024 017700 175020      MOV      @DPC, R0         ;READ THE DISPLAY P.C.
778 004030 023700 001026      CMP      DBUF2, R0         ;DID IT INCREMENT BY 2?
779 004034 001402      BEQ      .+6              ;
780 004036 000000      HALT                               ;DISPLAY P.C. FAILED TO INCREMENT
781 004040 000423      BR      GT37
782 004042 012777 000001 175000  MOV      #1, @DPC          ;SINGLE STEP THE DISPLAY
783 004050 017700 174774      MOV      @DPC, R0         ;READ THE DISPLAY P.C.
784 004054 023700 001030      CMP      DBUF3, R0         ;DID IT INCREMENT BY 2?
785 004060 001402      BEQ      .+6              ;
786 004062 000000      HALT                               ;DISPLAY P.C. FAILED TO INCREMENT
787 004064 000411      BR      GT37
788 004066 012777 000001 174754  MOV      #1, @DPC          ;SINGLE STEP THE DISPLAY
789 004074 017700 174750      MOV      @DPC, R0         ;READ THE DISPLAY P.C.
790 004100 023700 001032      CMP      DBUF4, R0         ;DID IT INCREMENT BY 2?
791 004104 001401      BEQ      .+4              ;
792 004106 000000      HALT                               ;DISPLAY P.C. FAILED TO INCREMENT
793
794

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796
797
798
799
800 004110 104000
801 004112 013702 001022
802 004116 012722 164000
803 004122 023702 001040
804 004126 001373
805
806 004130 104000
807 004132 013777 001022 174710
808 004140 013737 001022 001036
809 004146 013702 001040
810 004152 024242
811 004154 062737 000002 001036 GT37A:
812 004162 017700 174662
813 004166 023700 001036
814 004172 001402
815 004174 000000
816 004176 000407
817
818 004200 020237 001036 1$:
819 004204 001404
820 004206 012777 000001 174634
821 004214 000757
822

```

```

;DNOP TEST <INCREMENT P.C. TEST>
;COMPLEX - BUFFER LENGTH
GT37: SCOPE
MOV DBUF,R2 ;SET UP POINTER
1$: MOV #164000,(2)+ ;MOVE DNOP INTO THE BUFFER
CMP SIZE,R2 ;FINISHED FILLING THE BUFFER?
BNE 1$ ;NO
SCOPE
MOV DBUF,@DPC ;YES, START THE DISPLAY
MOV DBUF,DSAVE
MOV SIZE,R2 ;SETUP A COUNT
CMP -(R2),-(R2) ;DEC BY 2
GT37A: ADD #2,DSAVE
MOV @DPC,R0 ;READ DISPLAY P.C.
CMP DSAVE,R0 ;DID IT INCREMENT BY 2?
BEQ 1$ ;YES
HALT ;DISPLAY PC FAILED TO INCREMENT
BR GT40 ;PROPERLY
1$: CMP R2,DSAVE ;FINISHED THE BUFFER
BEQ GT40 ;YES
MOV #1,@DPC ;SINGLE STEP THE DISPLAY
BR GT37A ;TRY AGAIN

```

```

824                                     ;TEST THAT THE DISPLAY WILL JUMP TO ANOTHER ADDRESS
825                                     ;DJUMP REGISTER TEST
826
827 004216 104000 GT40: SCOPE
829 004220 012777 160000 174574 MOV #160000, @DBUF ;MOVE DJUMP INTO THE BUFFER
829 004226 012777 000000 174570 MOV #0, @DBUF+1 ;MOVE 0 INTO THE NEXT LOCATION
830 004234 013777 001022 174606 MOV @DBUF, @DPC ;START THE DISPLAY
831 004242 012777 000001 174600 MOV #1, @DPC ;SINGLE STEP THE DISPLAY
832 004250 017700 174574 MOV @DPC, R0 ;READ THE DISPLAY P.C.
833 004254 022700 000000 CMP #0, R0 ;DID THE NEW DISPLAY P.C. LOAD PROPERLY
834 004260 001401 BEQ .+4
835 004262 000000 HALT ;DJUMP FAILED TO CLEAR THE DISPLAY
836 ;PC PROPERLY
837
838 004264 104000 GT41: SCOPE
839 004266 012777 160000 174526 MOV #160000, @DBUF ;MOVE DJUMP INTO THE BUFFER
840 004274 013701 001040 MOV SIZE, R1 ;GET MODIFIED MEMORY SIZE
841 004300 062701 007776 ADD #7776, R1 ;SET UP TO LAST LOCATION
842 004304 010177 174514 MOV R1, @DBUF+1 ;MOVE LAST LOCATION INTO THE NEXT LOCATION
843 004310 013777 001022 174532 MOV @DBUF, @DPC ;START THE DISPLAY 1
844 004316 012777 000001 174524 MOV #1, @DPC ;SINGLE STEP THE DISPLAY
845 004324 017700 174520 MOV @DPC, R0 ;READ THE DISPLAY P.C.
846 004330 020100 CMP R1, R0 ;DID THE NEW DISPLAY P.C. LOAD
847 004332 001401 BEQ .+4 ;PROPERLY?
848 004334 000000 HALT ;DJUMP FAILED TO SET THE
849 ;DISPLAY P.C.
850
851 004336 104000 GT42: SCOPE
852 004340 012777 160000 174454 MOV #160000, @DBUF ;MOVE DJUMP INTO THE BUFFER
853 004346 013701 001040 MOV SIZE, R1 ;GET MODIFIED MEMORY SIZE
854 004352 062701 007776 ADD #7776, R1 ;GET LAST MEMORY LOCATION
855 004356 042701 052524 BIC #52524, R1 ;CREATE NN5252 PATTERN
856 004362 010177 174436 MOV R1, @DBUF+1 ;MOVE PATTERN INTO THE NEXT LOC.
857 004366 013777 001022 174454 MOV @DBUF, @DPC ;START THE DISPLAY
858 004374 012777 000001 174446 MOV #1, @DPC ;SINGLE STEP THE DISPLAY
859 004402 017700 174442 MOV @DPC, R0 ;READ THE DISPLAY P.C.
860 004406 020100 CMP R1, R0 ;DID THE NEW DISPLAY P.C. LOAD
861 004410 001401 BEQ .+4 ;PROPERLY?
862 004412 000000 HALT ;DJUMP FAILED TO LOAD THE NEW
863 ;DISPLAY P.C. PROPERLY
864
865 004414 104000 GT43: SCOPE
866 004416 012777 160000 174376 MOV #160000, @DBUF ;MOVE DJUMP INTO THE BUFFER
867 004424 013701 001040 MOV SIZE, R1 ;GET MODIFIED MEMORY SIZE
868 004430 062701 007776 ADD #7776, R1 ;GET LAST MEMORY LOCATION
869 004434 042701 125252 BIC #125252, R1 ;CREATE N2524 PATTERN
870 004440 010177 174360 MOV R1, @DBUF+1 ;MOVE PATTERN INTO THE NEXT LOC.
871 004444 013777 001022 174376 MOV @DBUF, @DPC ;START THE DISPLAY
872 004452 012777 000001 174370 MOV #1, @DPC ;SINGLE STEP THE DISPLAY
873 004460 017700 174364 MOV @DPC, R0 ;READ THE DISPLAY P.C.
874 004464 022700 012524 CMP #12524, R0 ;DID THE NEW DISPLAY P.C. LOAD
875 004470 001401 BEQ .+4 ;PROPERLY?
876 004472 000000 HALT ;DJUMP FAILED TO LOAD THE NEW
877 ;DISPLAY P.C. PROPERLY

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879          ;TEST THAT THE X POSITION REGISTER CAN BE LOADED CORRECTLY
880          ;USING GRAPHPLOT X
881
882 004474 104000          GT44: SCOPE
883 004476 012777 122000 174316      MOV      #122000, @DBUF      ;LOW INTENSITY - SET GRAPH PLOT X MODE
884 004504 012777 001252 174312      MOV      #1252, @DBUF1     ;SET X POSITION
885 004512 012777 172000 174306      MOV      #172000, @DBUF2   ;LOAD STATUS REGISTER A, STOP
886 004520 013777 001022 174322      MOV      DBUF, @DPC        ;LOAD DISPLAY P.C.
887 004526 012777 000001 174314      MOV      #1, @DPC          ;SINGLE STEP THE DISPLAY
888 004534 004737 015626              JSR      7, @LAY           ;EXECUTE A PROGRAM DELAY
889 004540 017700 174310              MOV      @XPOS, R0        ;READ X POSITION
890 004544 022700 001252              CMP      #1252, R0
891 004550 001401              BEQ
892 004552 000000              HALT
893
894
895          ;TEST THAT THE X POSITION REGISTER CAN BE LOADED CORRECTLY
896          ;USING GRAPHPLOT X
897
898 004554 104000          GT45: SCOPE
899 004556 012777 122000 174236      MOV      #122000, @DBUF   ;LOW INTENSITY - SET GRAPH PLOT X MODE
900 004564 012777 000525 174232      MOV      #525, @DBUF1     ;SET X POSITION
901 004572 012777 172000 174226      MOV      #172000, @DBUF2  ;LOAD STATUS REGISTER A, STOP
902 004600 013777 001022 174242      MOV      DBUF, @DPC       ;LOAD THE DISPLAY P.C.
903 004606 012777 000001 174234      MOV      #1, @DPC         ;SINGLE STEP THE DISPLAY
904 004614 004737 015626              JSR      7, @LAY           ;EXECUTE A PROGRAM DELAY
905 004620 017700 174230              MOV      @XPOS, R0        ;READ X POSITION
906 004624 022700 000525              CMP      #525, R0
907 004630 001401              BEQ
908 004632 000000              HALT
909
910
911          ;TEST THAT THE Y POSITION REGISTER CAN BE LOADED CORRECTLY
912          ;USING GRAPHPLOT Y MODE
913
914 004634 104000          GT46: SCOPE
915 004636 012777 126000 174156      MOV      #126000, @DBUF   ;LOW INTENSITY - SET GRAPHPLOT Y
916 004644 012777 001252 174152      MOV      #1252, @DBUF1    ;SET Y POSITION
917 004652 012777 172000 174146      MOV      #172000, @DBUF2  ;LOAD STATUS REGISTER A, STOP
918 004660 013777 001022 174162      MOV      DBUF, @DPC       ;LOAD THE DISPLAY P.C.
919 004666 012777 000001 174154      MOV      #1, @DPC         ;SINGLE STEP THE DISPLAY
920 004674 004737 015626              JSR      7, @LAY           ;EXECUTE A PROGRAM DELAY
921 004700 017700 174152              MOV      @YPOS, R0        ;READ Y POSITION
922 004704 022700 001252              CMP      #1252, R0
923 004710 001401              BEQ
924 004712 000000              HALT
925
926

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928
929
930
931
932 004714 104000
933 004716 012777 126000 174076
934 004724 012777 000525 174072
935 004732 012777 172000 174066
936 004740 013777 001022 174102
937 004746 012777 000001 174074
938 004754 004737 015626
939 004760 017700 174072
940 004764 022700 000525
941 004770 001401
942 004772 000000
943
944
945
946
947
948
949 004774 104000
950 004776 012777 122000 174016
951 005004 012777 001234 174012
952 005012 012777 126000 174006
953 005020 012777 001432 174002
954 005026 012777 172000 173776
955 005034 013777 001022 174006
956 005042 012777 000001 174000
957 005050 004737 015626
958 005054 017700 173774
959 005060 022700 001234
960 005064 001402
961 005066 000000
962 005070 000416
963
964 005072 012777 000001 173750
965 005100 012777 000001 173742
966 005106 004737 015626
967 005112 017700 173740
968 005116 022700 001432
969 005122 001401
970 005124 000000
971
972

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:TEST THAT THE Y POSITION REGISTER CAN BE LOADED CORRECTLY
:USING GRAPHPLOT Y MODE
GT47: SCOPE
MOV #126000, @DBUF ;LOW INTENSITY - SET GRAPHPLOT Y MODE
MOV #525, @DBUF1 ;SET Y POSITION
MOV #172000, @DBUF2 ;LOAD STATUS REGISTER A, STOP
MOV DBUF, @DPC ;LOAD THE DISPLAY P.C.
MOV #1, @DPC ;SINGLE STEP THE DISPLAY
JSR 7, @LAY ;EXECUTE A PROGRAM DELAY
MOV @YPOS, R0 ;READ Y POSITION
CMP #525, R0
BEQ .+4
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
GT48: SCOPE
MOV #122000, @DBUF ;LOW INTENSITY - SET GRAPHPLOT X MODE
MOV #1234, @DBUF1 ;SET X POSITION
MOV #126000, @DBUF2 ;SET GRAPHPLOT Y MODE
MOV #1432, @DBUF3 ;SET Y POSITION
MOV #172000, @DBUF4 ;LOAD STATUS REGISTER A, STOP
MOV DBUF, @DPC ;LOAD THE DISPLAY P.C.
MOV #1, @DPC ;SINGLE STEP THE DISPLAY
JSR 7, @LAY ;EXECUTE A PROGRAM DELAY
MOV @XPOS, R0 ;READ X POSITION
CMP #1234, R0
BEQ .+6
HALT
BR GT49
;GRAPHPLOT X MODE FAILED TO SELECT
;X POSITION PROPERLY

;SINGLE STEP THE DISPLAY
;SINGLE STEP THE DISPLAY
;EXECUTE A PROGRAM DELAY
;READ Y POSITION
;
;Y POSITION REGISTER FAILED TO LOAD
;PROPERLY USING GRAPHPLOT Y MODE

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974
975 ;TEST THAT THE X-Y POSITION REGISTERS CAN BE RESET
976 ;USING POINT DATA MODE.
977
978 005126 104000 GT49: SCOPE
979 005130 012777 116000 173664 MOV #116000, @DBUF ;LOW INTENSITY - POINT MODE
980 005136 005077 173662 CLR @DBUF1 ;CLEAR X POSITION
981 005142 005077 173660 CLR @DBUF2 ;CLEAR Y POSITION
982 005146 012777 172000 173654 MOV #172000, @DBUF3 ;LOAD STATUS "A" REGISTER, STOP
983 005154 013777 001022 173666 MOV @DBUF, @DPC ;LOAD DISPLAY P.C.
984 005162 012777 000001 173660 MOV #1, @DPC ;SINGLE STEP THE DISPLAY
985 005170 004737 015626 JSR 7, @LAY ;EXECUTE A PROGRAM DELAY
986 005174 017700 173654 MOV @XPOS, R0 ;READ X POSITION
987 005200 001402 BEQ .+6 ;WAS IT 0?
988 005202 000000 HALT ;X POSITION REGISTER FAILED TO RESET
989 005204 000411 BR GT50 ;USING POINT DATA MODE
990
991 005206 012777 000001 173634 MOV #1, @DPC ;SINGLE STEP THE DISPLAY
992 005214 004737 015626 JSR 7, @LAY ;EXECUTE A PROGRAM DELAY
993 005220 017700 173632 MOV @YPOS, R0 ;READ Y POSITION
994 005224 001401 BEQ .+4 ;WAS IT 0?
995 005226 000000 HALT ;Y POSITION REGISTER FAILED TO RESET
996 ;USING POINT DATA MODE
997
998 ;TEST THAT THE X-Y POSITION REGISTERS CAN BE SET
999 ;USING POINT DATA MODE.
1000
1001 005230 104000 GT50: SCOPE
1002 005232 012777 116000 173562 MOV #116000, @DBUF ;LOW INTENSITY - POINT MODE
1003 005240 012777 001777 173556 MOV #1777, @DBUF1 ;SET X POSITION
1004 005246 012777 001777 173552 MOV #1777, @DBUF2 ;SET Y POSITION
1005 005254 012777 172000 173546 MOV #172000, @DBUF3 ;LOAD STATUS A REGISTER, STOP
1006 005262 013777 001022 173560 MOV @DBUF, @DPC ;LOAD DISPLAY P.C.
1007 005270 012777 000001 173552 MOV #1, @DPC ;SINGLE STEP THE DISPLAY
1008 005276 004737 015626 JSR 7, @LAY ;EXECUTE A PROGRAM DELAY
1009 005302 017700 173546 MOV @XPOS, R0 ;READ X POSITION
1010 005306 022700 001777 CMP #1777, R0 ;WAS IT SET?
1011 005312 001402 BEQ .+6 ;
1012 005314 000000 HALT ;X POSITION REGISTER FAILED TO SET
1013 005316 000413 BR GT51 ;USING POINT DATA MODE
1014
1015 005320 012777 000001 173522 MOV #1, @DPC ;SINGLE STEP THE DISPLAY
1016 005326 004737 015626 JSR 7, @LAY ;EXECUTE A PROGRAM DELAY
1017 005332 017700 173520 MOV @YPOS, R0 ;READ Y POSITION
1018 005336 022700 001777 CMP #1777, R0 ;WAS IT SET?
1019 005342 001401 BEQ .+4 ;
1020 005344 000000 HALT ;Y POSITION REGISTER FAILED TO SET
1021 ;USING POINT DATA MODE
1022

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1024
1025           ;TEST THAT THE X-Y POSITION REGISTERS CAN BE LOADED CORRECTLY
1026           ;USING POINT DATA MODE
1027
1028 005346 104000          GT51: SCOPE
1029 005350 012777 116000 173444      MOV #116000, @DBUF ;LOW INTENSITY - POINT MODE
1030 005356 012777 001252 173440      MOV #1252, @DBUF1  ;SET X POSITION
1031 005364 012777 001252 173434      MOV #1252, @DBUF2  ;SET Y POSITION
1032 005372 012777 172000 173430      MOV #172000, @DBUF3 ;LOAD STATUS REGISTER A, STOP
1033 005400 013777 001022 173442      MOV DBUF, @DPC
1034 005406 012777 000001 173434      MOV #1, @DPC ;SINGLE STEP THE DISPLAY
1035 005414 004737 015626              JSR 7, @LAY ;EXECUTE A PROGRAM DELAY
1036 005420 017700 173430              MOV @XPOS, R0 ;READ X POSITION
1037 005424 022700 001252              CMP #1252, R0 ;
1038 005430 001402              BEQ .+6 ;
1039 005432 000000              HALT ;X POSITION REGISTER FAILED
1040 005434 000413              BR GT52 ;USING POINT DATA MODE
1041
1042 005436 012777 000001 173404      MOV #1, @DPC ;SINGLE STEP THE DISPLAY
1043 005444 004737 015626              JSR 7, @LAY ;EXECUTE A PROGRAM DELAY
1044 005450 017700 173402              MOV @YPOS, R0 ;READ Y POSITION
1045 005454 022700 001252              CMP #1252, R0 ;
1046 005460 001401              BEQ .+4 ;
1047 005462 000000              HALT ;Y POSITION REGISTER FAILED
1048           ;USING POINT DATA MODE
1049
1050           ;TEST THAT THE X-Y POSITION REGISTERS CAN BE LOADED CORRECTLY
1051           ;USING POINT DATA MODE
1052
1053 005464 104000          GT52: SCOPE
1054 005466 012777 116000 173326      MOV #116000, @DBUF ;LOW INTENSITY - POINT MODE
1055 005474 012777 000525 173322      MOV #525, @DBUF1  ;SET X POSITION
1056 005502 012777 000525 173316      MOV #525, @DBUF2  ;SET Y POSITION
1057 005510 012777 172000 173312      MOV #172000, @DBUF3 ;LOAD STATUS REGISTER A, STOP
1058 005516 013777 001022 173324      MOV DBUF, @DPC
1059 005524 012777 000001 173316      MOV #1, @DPC ;SINGLE STEP THE DISPLAY
1060 005532 004737 015626              JSR 7, @LAY ;EXECUTE A PROGRAM DELAY
1061 005536 017700 173312              MOV @XPOS, R0 ;READ X POSITION
1062 005542 022700 000525              CMP #525, R0 ;
1063 005546 001402              BEQ .+6 ;
1064 005550 000000              HALT ;X POSITION REGISTER FAILED
1065 005552 000413              BR GT53 ;USING POINT DATA MODE
1066
1067 005554 012777 000001 173266      MOV #1, @DPC ;SINGLE STEP THE DISPLAY
1068 005562 004737 015626              JSR 7, @LAY ;EXECUTE A PROGRAM DELAY
1069 005566 017700 173264              MOV @YPOS, R0 ;READ Y POSITION
1070 005572 022700 000525              CMP #525, R0 ;
1071 005576 001401              BEQ .+4 ;
1072 005600 000000              HALT ;Y POSITION REGISTER FAILED
1073           ;USING POINT DATA MODE
1074

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1142
1143 ;TEST THAT LONG VECTOR MODE DECREMENT X AND Y AXIS PROPERLY
1144 ;COUNT 1
1145
1145 006112 104000          GT55: SCOPE
1147 006114 013700 001022  MOV DBUF,RO
1148 006120 012720 116000  MOV #116000,(0)+ ;LOAD "POINT MODE"
1149 006124 005020          CLR (0)+ ;CLEAR X AXIS
1150 006126 005020          CLR (0)+ ;CLEAR Y AXIS
1151 006130 012720 110000  MOV #110000,(0)+ ;LOAD "LONG VECTOR MODE"
1152 006134 012720 020001  MOV #20001,(0)+ ;PRESET "DELTA X AXIS"
1153 006140 012720 020001  MOV #20001,(0)+ ;PRESET "DELTA Y AXIS"
1154 006144 012710 172000  MOV #172000,(0) ;LOAD "DISPLAY STOP"
1155 006150 013777 001022 172672  MOV DBUF,ADPC ;LOAD THE DISPLAY P.C.
1156 006156 012777 000001 172664  MOV #1,ADPC ;SINGLE STEP THE DISPLAY
1157 006164 004737 015626          JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1158 006170 012777 000001 172652  MOV #1,ADPC ;SINGLE STEP THE DISPLAY
1159 006176 004737 015626          JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1160 006202 012777 000001 172640  MOV #1,ADPC ;SINGLE STEP THE DISPLAY
1161 006210 004737 015626          JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1162 006214 012777 000001 172626  MOV #1,ADPC ;SINGLE STEP THE DISPLAY
1163 006222 004737 015626          JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1164 006226 012777 000001 172614  MOV #1,ADPC ;SINGLE STEP THE DISPLAY
1165 006234 004737 015626          JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1166 006240 012777 000001 172602  MOV #1,ADPC ;SINGLE STEP THE DISPLAY
1167 006246 004737 015626          JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1168
1169 006252 017700 172576          MOV AXPOS,RO ;READ X AXIS
1170 006256 022700 001777          CMP #1777,RO ;DID IT DECREMENT BY 1
1171 006262 001402          BEQ .+6 ;YES
1172 006264 000000          HALT ;NO, DECREMENT X AXIS BY
1173 006266 000406          BR GT56 ;LONG VECTOR MODE FAILED
1174
1175 006270 017700 172562          MOV AYPOS,RO ;READ Y AXIS
1176 006274 022700 001777          CMP #1777,RO ;DID IT DECREMENT BY 1
1177 006300 001401          BEQ .+4 ;YES
1178 006302 000000          HALT ;NO, DECREMENT Y AXIS BY
1179 ;LONG VECTOR MODE FAILED

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1181
1182
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1184
1185 006304 104000
1186 006306 012703 001777
1187 006312 012704 000001
1188
1189 006316 104000
1190 006320 013700 001022
1191 006324 012720 116000
1192 006330 005020
1193 006332 005020
1194 006334 012720 110000
1195 006340 010420
1196 006342 010420
1197 006344 013777 001022 172476
1198 006352 012777 000001 172470
1199 006360 004737 015626
1200 006364 012777 000001 172456
1201 006372 004737 015626
1202 006376 012777 000001 172444
1203 006404 004737 015626
1204 006410 012777 000001 172432
1205 006416 004737 015626
1206 006422 012777 000001 172420
1207 006430 004737 015626
1208
1209 006434 017700 172414
1210 006440 020400
1211 006442 001402
1212 006444 000000
1213 006446 000411
1214
1215 006450 017700 172402
1216 006454 020400
1217 006456 001402
1218 006460 000000
1219 006462 000403
1220
1221 006464 005204
1222 006466 005303
1223 006470 001313

;TEST THAT LONG VECTOR MODE INCREMENT X AND Y AXIS PROPERLY
;COUNT 0-1777
GT56:  SCOPE
      MOV  #1777,R3      ;SET UP A COUNTER
      MOV  #1,R4        ;PRESET THE COMPARED VALUE

GT56A: SCOPE
      MOV  DBUF,RO      ;SET UP RO
      MOV  #116000,(0)+ ;LOAD "POINT MODE"
      CLR  (0)+         ;CLEAR X AXIS
      CLR  (0)+         ;CLEAR Y AXIS
      MOV  #110000,(0)+ ;LOAD "LONG VECTOR MODE"
      MOV  R4,(0)+     ;PRESET "DELTA X AXIS"
      MOV  R4,(0)+     ;PRESET "DELTA Y AXIS"
      MOV  DBUF,JDPC   ;LOAD THE DISPLAY P.C.
      MOV  #1,JDPC     ;SINGLE STEP THE DISPLAY
      JSR  7,DLAY      ;EXECUTE A PROGRAM DELAY
      MOV  #1,JDPC     ;SINGLE STEP THE DISPLAY
      JSR  7,DLAY      ;EXECUTE A PROGRAM DELAY
      MOV  #1,JDPC     ;SINGLE STEP THE DISPLAY
      JSR  7,DLAY      ;EXECUTE A PROGRAM DELAY
      MOV  #1,JDPC     ;SINGLE STEP THE DISPLAY
      JSR  7,DLAY      ;EXECUTE A PROGRAM DELAY
      MOV  #1,JDPC     ;SINGLE STEP THE DISPLAY
      JSR  7,DLAY      ;EXECUTE A PROGRAM DELAY
      JSR  7,DLAY      ;EXECUTE A PROGRAM DELAY

      MOV  DXPOS,RO    ;READ X AXIS
      CMP  R4,RO      ;ARE THEY EQUAL?
      BEQ  .+6         ;YES
      HALT              ;NO, INCREMENT X AXIS VIA
      BR   GT57        ;LONG VECTOR MODE FAILED

      MOV  DYPOS,RO    ;READ Y AXIS
      CMP  R4,RO      ;ARE THEY EQUAL?
      BEQ  .+6         ;YES
      HALT              ;NO, INCREMENT Y AXIS VIA
      BR   GT57        ;LONG VECTOR MODE FAILED

      INC  R4          ;INCREMENT EXPECTED VALUE
      DEC  R3          ;FINISHED?
      BNE  GT56A      ;NO, TEST MORE DATA

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1225
1226           ;TEST THAT LONG VECTOR MODE DECREMENTS X AND Y AXIS PROPERLY
1227           ;COUNT 1777-0
1228
1229 006472 104000 GT57:  SCOPE
1230 006474 012703 002000      MOV      #2000,R3           ;SET UP A COUNTER
1231 006500 012704 001777      MOV      #1777,R4         ;PRESET THE COMPARED VALUE
1232 006504 012705 020001      MOV      #20001,R5
1233
1234 006510 104000 GT57A:  SCOPE
1235 006512 013700 001022      MOV      DBUF,RO         ;SET UP RO
1236 006516 012720 116000      MOV      #116000,(0)+   ;LOAD "POINT MODE"
1237 006522 005020      CLR      (0)+           ;CLEAR X AXIS
1238 006524 005020      CLR      (0)+           ;CLEAR Y AXIS
1239 006526 012720 110000      MOV      #110000,(0)+   ;LOAD "LONG VECTOR MODE"
1240 006532 010520      MOV      R5,(0)+        ;PRESET "DELTA X AXIS"
1241 006534 010520      MOV      R5,(0)+        ;PRESET "DELTA Y AXIS"
1242 006536 013777 001022 172304  MOV      DBUF,ADPC       ;LOAD THE DISPLAY P.C.
1243 006544 012777 000001 172276  MOV      #1,ADPC        ;SINGLE STEP THE DISPLAY
1244 006552 004737 015626      JSR      7,DLAY         ;EXECUTE A PROGRAM DELAY
1245 006556 012777 000001 172264  MOV      #1,ADPC        ;SINGLE STEP THE DISPLAY
1246 006564 004737 015626      JSR      7,DLAY         ;EXECUTE A PROGRAM DELAY
1247 006570 012777 000001 172252  MOV      #1,ADPC        ;SINGLE STEP THE DISPLAY
1248 006576 004737 015626      JSR      7,DLAY         ;EXECUTE A PROGRAM DELAY
1249 006602 012777 000001 172240  MOV      #1,ADPC        ;SINGLE STEP THE DISPLAY
1250 006610 004737 015626      JSR      7,DLAY         ;EXECUTE A PROGRAM DELAY
1251 006614 012777 000001 172226  MOV      #1,ADPC        ;SINGLE STEP THE DISPLAY
1252 006622 004737 015626      JSR      7,DLAY         ;EXECUTE A PROGRAM DELAY
1253
1254 006626 017700 172222      MOV      AXPOS,RO       ;READ X AXIS
1255 006632 020400      CMP      R4,RO         ;ARE THEY EQUAL?
1256 006634 001402      BEQ      .+6           ;YES
1257 006636 000000      HALT
1258 006640 000412      BR       GT58          ;NO, DECREMENT X AXIS VIA
                            ;LONG VECTOR MODE FAILED
1259
1260 006642 017700 172210      MOV      AYPOS,RO       ;READ Y AXIS
1261 006646 020400      CMP      R4,RO         ;ARE THEY EQUAL?
1262 006650 001402      BEQ      .+6           ;YES
1263 006652 000000      HALT
1264 006654 000404      BR       GT58          ;NO, DECREMENT Y AXIS VIA
                            ;LONG VECTOR MODE FAILED
1265
1266 006656 005205      INC      R5             ;INCREMENT "DELTA X-Y"
1267 006660 005304      DEC      R4             ;DECREMENT EXPECTED VALUE
1268 006662 005303      DEC      R3             ;FINISHED?
1269 006664 001312      BNE     GT57A          ;NO, TEST MORE DATA

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

GT59:  SCOPE
MOV     DBUF,RO          ;SET UP RO
MOV     #116000,(0)+    ;LOAD "SET POINT MODE"
CLR     (0)+             ;CLEAR X AXIS
CLR     (0)+             ;CLEAR Y AXIS
MOV     #106000,(0)+    ;LOAD "SET SHORT VECTOR MODE"
MOV     #20301,(0)+    ;PRESET "DELTA X AND DELTA Y"
MOV     DBUF,ADPC       ;LOAD THE DISPLAY PC
MOV     #1,ADPC         ;SINGLE STEP THE DISPLAY
JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
MOV     #1,ADPC         ;SINGLE STEP THE DISPLAY
JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
MOV     #1,ADPC         ;SINGLE STEP THE DISPLAY
JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
MOV     #1,ADPC         ;SINGLE STEP THE DISPLAY
JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY
MOV     #1,ADPC         ;SINGLE STEP THE DISPLAY
JSR     7,DLAY          ;EXECUTE A PROGRAM DELAY

MOV     AXPOS,RO        ;READ X AXIS
CMP     #1777,RO        ;ARE THEY EQUAL?
BEQ     .+6             ;YES
HALT    ;NO, DECREMENT X AXIS FAILED USING
BR      GT60           ;SHORT VECTOR MODE

MOV     AYPOS,RO        ;READ Y AXIS
CMP     #1777,RO        ;ARE THEY EQUAL?
BEQ     .+4             ;YES
HALT    ;NO DECREMENT Y AXIS FAILED
        ;USING SHORT VECTOR MODE

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1343 007162 104000
1344 007164 012703 000077
1345 007170 012702 000001
1346 007174 012704 000201
1347
1348 007200 104000
1349 007202 013700 001022
1350 007206 012720 116000
1351 007212 005020
1352 007214 005020
1353 007216 012720 106000
1354 007222 010420
1355 007224 013777 001022 171616
1356 007232 012777 000001 171610
1357 007240 004737 015626
1358 007244 012777 000001 171576
1359 007252 004737 015626
1360 007256 012777 000001 171564
1361 007264 004737 015626
1362 007270 012777 000001 171552
1363 007276 004737 015626
1364
1365 007302 017700 171546
1366 007306 020200
1367 007310 001402
1368 007312 000000
1369 007314 000413
1370
1371 007316 017700 171534
1372 007322 020200
1373 007324 001402
1374 007326 000000
1375 007330 000405
1376
1377 007332 062704 000201
1378 007336 005202
1379 007340 005303
1380 007342 001317

:TEST THAT X AND Y AXIS INCREMENT PROPERLY
:USING SHORT VECTOR MODE
:COUNT 0-77

GT60: SCOPE
      MOV #77,R3 ;SET UP A COUNT LOCATION
      MOV #1,R2 ;SET UP THE COMPARED LOCATION
      MOV #201,R4 ;SET UP "DELTA X-Y"

GT60A: SCOPE
      MOV DBUF,RO ;SET UP RO
      MOV #116000,(0)+ ;LOAD "SET POINT DATA MODE"
      CLR (0)+ ;CLEAR X AXIS
      CLR (0)+ ;CLEAR Y AXIS
      MOV #106000,(0)+ ;LOAD "SET SHORT VECTOR MODE"
      MOV R4,(0)+ ;PRESET "DELTA X AND DELTA Y"
      MOV DBUF,ADPC ;LOAD THE DISPLAY P.C.
      MOV #1,ADPC ;SINGLE STEP THE DISPLAY
      JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
      MOV #1,ADPC ;SINGLE STEP THE DISPLAY
      JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
      MOV #1,ADPC ;SINGLE STEP THE DISPLAY
      JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
      MOV #1,ADPC ;SINGLE STEP THE DISPLAY
      JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
      MOV #1,ADPC ;SINGLE STEP THE DISPLAY
      JSR 7,DLAY ;EXECUTE A PROGRAM DELAY

      MOV AXPOS,RO ;READ X POSITION
      CMP R2,RO ;ARE THEY EQUAL
      BEQ .+6 ;YES
      HALT ;INCREMENT X AXIS FAILED USING
      BR GT61 ;SHORT VECTOR MODE

      MOV AYPOS,RO ;READ Y POSITION
      CMP R2,RO ;ARE THEY EQUAL ?
      BEQ .+6 ;YES
      HALT ;INCREMENT Y AXIS FAILED USING
      BR GT61 ;SHORT VECTOR MODE

      ADD #201,R4 ;ADD DELTA X-Y
      INC R2 ;INCREMENT EXPECTED VALUE
      DEC R3 ;DECREMENT COUNT, FINISHED?
      BNE GT60A ;NO, TEST MORE DATA
    
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1382
1383      : TEST THAT X AND Y AXIS DECREMENT PROPERLY
1384      : USING SHORT VECTOR MODE
1385      : COUNT 77-0
1386
1387 007344 104000      GT61: SCOPE
1388 007346 012703 000077      MOV      #77,R3      :SET UP A COUNT LOCATION
1389 007352 012702 001777      MOV      #1777,R2    :SET UP THE COMPARED LOCATION
1390 007356 012704 020301      MOV      #20301,R4   :PRESET THE "DELTA X-Y"
1391
1392 007362 104000      GT61A: SCOPE
1393 007364 013700 001022      MOV      DBUF,R0     :SET UP R0
1394 007370 012720 116000      MOV      #116000,(0)+ :LOAD "SET POINT DATA MODE"
1395 007374 005020      CLR      (0)+        :CLEAR X AXIS
1396 007376 005020      CLR      (0)+        :CLEAR Y AXIS
1397 007400 012720 106000      MOV      #106000,(0)+ :LOAD "SET SHORT VECTOR MODE"
1398 007404 010420      MOV      R4,(0)+     :PRESET "DELTA X AND DELTA Y"
1399 007406 013777 001022 171434      MOV      DBUF,@DPC   :LOAD THE DISPLAY P.C.
1400 007414 012777 000001 171426      MOV      #1,@DPC    :SINGLE STEP THE DISPLAY
1401 007422 004737 015626      JSR      7,DLAY      :EXECUTE A PROGRAM DELAY
1402 007426 012777 000001 171414      MOV      #1,@DPC    :SINGLE STEP THE DISPLAY
1403 007434 004737 015626      JSR      7,DLAY      :EXECUTE A PROGRAM DELAY
1404 007440 012777 000001 171402      MOV      #1,@DPC    :SINGLE STEP THE DISPLAY
1405 007446 004737 015626      JSR      7,DLAY      :EXECUTE A PROGRAM DELAY
1406 007452 012777 000001 171370      MOV      #1,@DPC    :SINGLE STEP THE DISPLAY
1407 007460 004737 015626      JSR      7,DLAY      :EXECUTE A PROGRAM DELAY
1408
1409 007464 017700 171364      MOV      @XPOS,R0    :READ X POSITION
1410 007470 020200      CMP      R2,R0       :ARE THEY EQUAL
1411 007472 001402      BEQ      .+6         :YES
1412 007474 000000      HALT
1413 007476 000413      BR      GT62        :DECREMENT X AXIS FAILED USING
                          :SHORT VECTOR MODE
1414
1415 007500 017700 171352      MOV      @YPOS,R0    :READ Y POSITION
1416 007504 020200      CMP      R2,R0       :ARE THEY EQUAL ?
1417 007506 001402      BEQ      .+6         :YES DECREMENT
1418 007510 000000      HALT
1419 007512 000405      BR      GT62        :DECREMENT Y AXIS FAILED USING
                          :SHORT VECTOR MODE
1420
1421 007514 062704 000201      ADD      #201,R4     :ADD "DELTA X-Y"
1422 007520 005302      DEC      R2          :DECREMENT EXPECTED VALUE
1423 007522 005303      DEC      R3          :DECREMENT COUNT, FINISHED?
1424 007524 001317      BNE     GT61A       :NO, TEST MORE DATA
1425

```

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1427          : TEST THAT X AND Y AXIS INCREMENTS PROPERLY
1428          : USING RELATIVE POINT MODE
1429          : COUNT 1
1430
1431 007526 104000          GT62: SCOPE
1432 007530 013700 001022      MOV      DBUF,RO          : SET UP RO
1433 007534 012720 116000      MOV      #116000,(0)+   : LOAD "SET POINT MODE"
1434 007540 005020          CLR      (0)+           : CLEAR X AXIS
1435 007542 005020          CLR      (0)+           : CLEAR Y AXIS
1436 007544 012720 130000      MOV      #130000,(0)+   : LOAD "SET RELATIVE POINT MODE"
1437 007550 012720 000201      MOV      #201,(0)+     : PRESET "DELTA X AND DELTA Y"
1438 007554 013777 001022 171266  MOV      DBUF,@DPC      : LOAD THE DISPLAY PC
1439 007562 012777 000001 171260  MOV      #1,@DPC       : SINGLE STEP THE DISPLAY
1440 007570 004737 015626      JSR      7,DLAY         : EXECUTE A PROGRAM DELAY
1441 007574 012777 000001 171246  MOV      #1,@DPC       : SINGLE STEP THE DISPLAY
1442 007602 004737 015626      JSR      7,DLAY         : EXECUTE A PROGRAM DELAY
1443 007606 012777 000001 171234  MOV      #1,@DPC       : SINGLE STEP THE DISPLAY
1444 007614 004737 015626      JSR      7,DLAY         : EXECUTE A PROGRAM DELAY
1445 007620 012777 000001 171222  MOV      #1,@DPC       : SINGLE STEP THE DISPLAY
1446 007626 004737 015626      JSR      7,DLAY         : EXECUTE A PROGRAM DELAY
1447
1448 007632 017700 171216      MOV      @XPOS,RO      : READ X AXIS
1449 007636 022700 000001      CMP      #1,RO         : ARE THEY EQUAL?
1450 007642 001402          BEQ      .+6           : YES
1451 007644 000000          HALT                    : NO, INCREMENT X AXIS FAILED USING
1452 007646 000406          BR      GT63          : RELATIVE POINT MODE
1453
1454 007650 017700 171202      MOV      @YPOS,RO      : READ Y AXIS
1455 007654 022700 000001      CMP      #1,RO         : ARE THEY EQUAL?
1456 007660 001401          BEQ      .+4           : YES
1457 007662 000000          HALT                    : NO INCREMENT Y AXIS FAILED
1458          : USING RELATIVE POINT MODE

```

```

1460
1461
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1465 007664 104000
1466 007666 013700 001022
1467 007672 012720 116000
1468 007676 005020
1469 007700 005020
1470 007702 012720 130000
1471 007706 012720 020301 171130
1472 007712 013777 001022 171122
1473 007720 012777 000001 171122
1474 007726 004737 015626
1475 007732 012777 000001 171110
1476 007740 004737 015626
1477 007744 012777 000001 171076
1478 007752 004737 015626
1479 007756 012777 000001 171064
1480 007764 004737 015626
1481
1482 007770 017700 171060
1483 007774 022700 001777
1484 010000 001402
1485 010002 000000
1486 010004 000406
1487
1488 010006 017700 171044
1489 010012 022700 001777
1490 010016 001401
1491 010020 000000
1492

```

:TEST THAT X AND Y AXIS DECREMENT PROPERLY  
:USING RELATIVE POINT MODE  
:COUNT 1

```

GT63:  SCOPE
        MOV     DBUF,RO
        MOV     #116000,(0)+
        CLR     (0)+
        CLR     (0)+
        MOV     #130000,(0)+
        MOV     #20301,(0)+
        MOV     DBUF,@DPC
        MOV     #1,@DPC
        JSR     7,DLAY
        MOV     #1,@DPC
        JSR     7,DLAY
        MOV     #1,@DPC
        JSR     7,DLAY
        MOV     #1,@DPC
        JSR     7,DLAY
        MOV     #1,@DPC
        JSR     7,DLAY
        MOV     @XPOS,RO
        CMP     #1777,RO
        BEQ     .+6
        HALT
        BR      GT64

        MOV     @YPOS,RO
        CMP     #1777,RO
        BEQ     .+4
        HALT

```

:SET UP RO  
:LOAD "SET POINT MODE"  
:CLEAR X AXIS  
:CLEAR Y AXIS  
:LOAD "SET RELATIVE POINT MODE"  
:PRESET "DELTA X AND DELTA Y"  
:LOAD THE DISPLAY PC  
:SINGLE STEP THE DISPLAY  
:EXECUTE A PROGRAM DELAY  
:SINGLE STEP THE DISPLAY  
:EXECUTE A PROGRAM DELAY  
:SINGLE STEP THE DISPLAY  
:EXECUTE A PROGRAM DELAY  
:SINGLE STEP THE DISPLAY  
:EXECUTE A PROGRAM DELAY  
:READ X AXIS  
:ARE THEY EQUAL?  
:YES  
:NO, DECREMENT X AXIS FAILED USING  
:RELATIVE POINT MODE

:READ Y AXIS  
:ARE THEY EQUAL?  
:YES  
:NO DECREMENT Y AXIS FAILED  
:USING RELATIVE POINT MODE

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:TEST THAT X AND Y AXIS INCREMENT PROPERLY
:USING RELATIVE POINT MODE
:COUNT 0-77

GT64:  SCOPE
        MOV      #77,R3      ;SET UP A COUNT LOCATION
        MOV      #1,R2      ;SET UP THE COMPARED LOCATION
        MOV      #201,R4    ;SET UP "DELTA X-Y"

GT64A: SCOPE
        MOV      DBUF,R0    ;SET UP R0
        MOV      #116000,(0)+ ;LOAD "SET POINT DATA MODE"
        CLR      (0)+      ;CLEAR X AXIS
        CLR      (0)+      ;CLEAR Y AXIS
        MOV      #130000,(0)+ ;LOAD "SET RELATIVE POINT MODE"
        MOV      R4,(0)+   ;PRESET "DELTA X AND DELTA Y"
        MOV      DBUF,DPDC ;LOAD THE DISPLAY P.C.
        MOV      #1,DPDC   ;SINGLE STEP THE DISPLAY
        JSR      7,DLAY    ;EXECUTE A PROGRAM DELAY
        MOV      #1,DPDC   ;SINGLE STEP THE DISPLAY
        JSR      7,DLAY    ;EXECUTE A PROGRAM DELAY
        MOV      #1,DPDC   ;SINGLE STEP THE DISPLAY
        JSR      7,DLAY    ;EXECUTE A PROGRAM DELAY
        MOV      #1,DPDC   ;SINGLE STEP THE DISPLAY
        JSR      7,DLAY    ;EXECUTE A PROGRAM DELAY
        JSR      7,DLAY    ;EXECUTE A PROGRAM DELAY

        MOV      @XPOS,R0  ;READ X POSITION
        CMP      R2,R0     ;ARE THEY EQUAL
        BEQ      .+6       ;YES
        HALT      ;INCREMENT X AXIS FAILED USING
        BR       GT65      ;RELATIVE POINT MODE

        MOV      @YPOS,R0  ;READ Y POSITION
        CMP      R2,R0     ;ARE THEY EQUAL ?
        BEQ      .+6       ;YES
        HALT      ;INCREMENT Y AXIS FAILED USING
        BR       GT65      ;RELATIVE POINT MODE

        ADD      #201,R4   ;ADD DELTA X-Y
        INC      R2        ;INCREMENT EXPECTED VALUE
        DEC      R3        ;DECREMENT COUNT, FINISHED?
        BNE     GT64A     ;NO, TEST MORE DATA

```

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1538
1539
1540      ;TEST THAT X AND Y AXIS DECREMENT PROPERLY
1541      ;USING RELATIVE POINT MODE
1542      ;COUNT 77-0
1543      010204 104000      GT65:  SCOPE
1544      010206 012703 000077      MOV      #77,R3      ;SET UP A COUNT LOCATION
1545      010212 012702 001777      MOV      #1777,R2     ;SET UP THE COMPARED LOCATION
1546      010216 012704 020301      MOV      #20301,R4    ;PRESET THE "DELTA X-Y"
1547
1548      010222 104000      GT65A: SCOPE
1549      010224 013700 001022      MOV      DBUF,RO      ;SET UP RO
1550      010230 012720 116000      MOV      #116000,(0)+ ;LOAD "SET POINT DATA MODE"
1551      010234 005020      CLR      (0)+         ;CLEAR X AXIS
1552      010236 005020      CLR      (0)+         ;CLEAR Y AXIS
1553      010240 012720 130000      MOV      #130000,(0)+ ;LOAD "SET RELATIVE POINT MODE"
1554      010244 010420      MOV      R4,(0)+      ;PRESET "DELTA X AND DELTA Y"
1555      010246 013777 001022 170574      MOV      DBUF,@DPC    ;LOAD THE DISPLAY P.C.
1556      010254 012777 000001 170566      MOV      #1,@DPC      ;SINGLE STEP THE DISPLAY
1557      010262 004737 015626      JSR      7,DLAY       ;EXECUTE A PROGRAM DELAY
1558      010266 012777 000001 170554      MOV      #1,@DPC      ;SINGLE STEP THE DISPLAY
1559      010274 004737 015626      JSR      7,DLAY       ;EXECUTE A PROGRAM DELAY
1560      010300 012777 000001 170542      MOV      #1,@DPC      ;SINGLE STEP THE DISPLAY
1561      010306 004737 015626      JSR      7,DLAY       ;EXECUTE A PROGRAM DELAY
1562      010312 012777 000001 170530      MOV      #1,@DPC      ;SINGLE STEP THE DISPLAY
1563      010320 004737 015626      JSR      7,DLAY       ;EXECUTE A PROGRAM DELAY
1564
1565      010324 017700 170524      MOV      @XPOS,RO     ;READ X POSITION
1566      010330 020200      CMP      R2,RO        ;ARE THEY EQUAL
1567      010332 001402      BEQ      .+6          ;YES
1568      010334 000000      HALT
1569      010336 000413      BR      GT66          ;DECREMENT X AXIS FAILED USING
                          ;RELATIVE POINT MODE
1570
1571      010340 017700 170512      MOV      @YPOS,RO     ;READ Y POSITION
1572      010344 020200      CMP      R2,RO        ;ARE THEY EQUAL ?
1573      010346 001402      BEQ      .+6          ;YES DECREMENT
1574      010350 000000      HALT
1575      010352 000405      BR      GT66          ;DECREMENT Y AXIS FAILED USING
                          ;RELATIVE POINT MODE
1576
1577      010354 062704 000201      ADD      #201,R4      ;ADD "DELTA X-Y"
1578      010360 005302      DEC      R2           ;DECREMENT EXPECTED VALUE
1579      010362 005303      DEC      R3           ;DECREMENT COUNT, FINISHED?
1580      010364 001317      BNE     GT65A        ;NO, TEST MORE DATA
1581

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1583
1584
1585
1586          ;LOAD STATUS B TEST
1587          ;USE GRAPHPLOT X MODE TO TEST Y AXIS IS INCREMENTED BY
1588          ;"SCALE" REGISTER
1589 010366 104000          GT66:  SCOPE
1590 010370 012703 000077      MOV      #77,R3          ;SET UP EXECUTION COUNTER
1591 010374 012704 000001      MOV      #1,R4           ;SET UP COMPARED DATA
1592 010400 012737 174101 001036  MOV      #174101,DSAVE ;SET UP BASIC "LOAD STATUS B"
1593
1594 010406 104000          GT66A: SCOPE
1595 010410 013700 001022      MOV      DBUF,RO        ;SET UP RO
1596 010414 012720 116000      MOV      #116000,(0)+ ;LOAD "POINT MODE"
1597 010420 005020          CLR      (0)+          ;CLEAR X AXIS
1598 010422 005020          CLR      (0)+          ;CLEAR Y AXIS
1599 010424 013720 001036      MOV      DSAVE,(0)+   ;LOAD "SET STATUS B"
1600 010430 012720 120000      MOV      #120000,(0)+ ;LOAD "SET GRAPHPLOT X MODE"
1601 010434 005020          CLR      (0)+          ;LOAD "X GRAPHPLOT DATA"
1602 010436 013777 001022 170404  MOV      DBUF,ADPC     ;LOAD THE DISPLAY P.C.
1603 010444 012777 000001 170376  MOV      #1,ADPC      ;SINGLE STEP THE DISPLAY
1604 010452 004737 015626      JSR      7,DLAY       ;EXECUTE A PROGRAM DELAY
1605 010456 012777 000001 170364  MOV      #1,ADPC      ;SINGLE STEP THE DISPLAY
1606 010464 004737 015626      JSR      7,DLAY       ;EXECUTE A PROGRAM DELAY
1607 010470 012777 000001 170352  MOV      #1,ADPC      ;SINGLE STEP THE DISPLAY
1608 010476 004737 015626      JSR      7,DLAY       ;EXECUTE A PROGRAM DELAY
1609 010502 012777 000001 170340  MOV      #1,ADPC      ;SINGLE STEP THE DISPLAY
1610 010510 004737 015626      JSR      7,DLAY       ;EXECUTE A PROGRAM DELAY
1611 010514 012777 000001 170326  MOV      #1,ADPC      ;SINGLE STEP THE DISPLAY
1612 010522 004737 015626      JSR      7,DLAY       ;EXECUTE A PROGRAM DELAY
1613
1614 010526 017700 170324      MOV      AYPOS,RO     ;READ Y AXIS
1615 010532 020400          CMP      R4,RO        ;COMPARE TO EXPECTED VALUE
1616 010534 001402          BEQ     .+6          ;ARE THEY EQUAL?
1617 010536 000000          HALT                ;LOAD "STATUS B" FAILED TO LOAD
1618 010540 000405          BR      GT67         ;THE Y AXIS CORRECTLY
1619 010542 005237 001036      INC      DSAVE
1620 010546 005204          INC      R4           ;INCREMENT THE STATUS B COUNT
1621 010550 005303          DEC      R3           ;DECREMENT THE EXECUTION COUNT
1622 010552 001316          BNE     GT66A        ;TEST MORE DATA

```

```

1624
1625 ;LOAD STATUS B TEST
1626 ;USE GRAPHPLOT Y MODE TO TEST X AXIS IS INCREMENTED BY
1627 ;"SCALE" REGISTER
1628
1629 010554 104000 GT67: SCOPE
1630 010556 012703 000077 MOV #77,R3 ;SET UP EXECUTION COUNTER
1631 010562 012704 000001 MOV #1,R4 ;SET UP COMPARED DATA
1632 010566 012737 174101 001036 MOV #174101,DSAVE ;SET UP BASIC "LOAD STATUS B"
1633
1634 010574 104000 GT67A: SCOPE
1635 010576 013700 001022 MOV DBUF,RO ;SET UP RO
1636 010602 012720 116000 MOV #116000,(0)+ ;LOAD "POINT MODE"
1637 010606 005020 CLR (0)+ ;CLEAR X AXIS
1638 010610 005020 CLR (0)+ ;CLEAR Y AXIS
1639 010612 013720 001036 MOV DSAVE,(0)+ ;LOAD "SET STATUS B"
1640 010616 012720 124000 MOV #124000,(0)+ ;LOAD "SET GRAPHPLOT Y MODE"
1641 010622 005020 CLR (0)+ ;LOAD "Y GRAPHPLOT DATA"
1642 010624 013777 001022 170216 MOV DBUF,ADPC ;LOAD THE DISPLAY P.C.
1643 010632 012777 000001 170210 MOV #1,ADPC ;SINGLE STEP THE DISPLAY
1644 010640 004737 015626 JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1645 010644 012777 000001 170176 MOV #1,ADPC ;SINGLE STEP THE DISPLAY
1646 010652 004737 015626 JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1647 010656 012777 000001 170164 MOV #1,ADPC ;SINGLE STEP THE DISPLAY
1648 010664 004737 015626 JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1649 010670 012777 000001 170152 MOV #1,ADPC ;SINGLE STEP THE DISPLAY
1650 010676 004737 015626 JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1651 010702 012777 000001 170140 MOV #1,ADPC ;SINGLE STEP THE DISPLAY
1652 010710 004737 015626 JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1653
1654 010714 017700 170134 MOV AXPOS,RO ;READ X AXIS
1655 010720 042700 176000 BIC #176000,RO ;MASK TO BITS 0-9
1656 010724 020400 CMP R4,RO ;COMPARE TO EXPECTED VALUE
1657 010726 001402 BEQ .+6 ;ARE THEY EQUAL?
1658 010730 000000 HALT ;LOAD "STATUS B" FAILED TO LOAD
1659 010732 000413 BR GT70 ;THE X AXIS CORRECTLY
1660
1661 010734 005237 001036 INC DSAVE
1662 010740 005204 INC R4 ;INCREMENT THE STATUS B COUNT
1663 010742 005303 DEC R3 ;DECREMENT THE EXECUTION COUNT
1664 010744 001314 BNE GT67A ;TEST MORE DATA
1665
1666
1667 010746 012777 174100 170046 GT67B: MOV #174100,ADBUF
1668 010754 013777 001022 170066 MOV DBUF,ADPC

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1670          ;EDGE FLAG TEST
1671          ;TEST THAT EXCEEDING +X AXIS SETS EDGE FLAG
1672
1673 010762 104000          GT70: SCOPE
1674 010764 013700 001022  MOV DBUF,RO
1675 010770 012720 116000  MOV #116000,(0)+ ;LOAD POINT
1676 010774 012720 001777  MOV #1777,(0)+ ;LOAD MAX X
1677 011000 012720 000000  MOV #0,(0)+ ;LOAD Y
1678 011004 012720 110000  MOV #110000,(0)+ ;LOAD LONG VECTOR
1679 011010 012720 000001  MOV #1,(0)+ ;LOAD DELTA X
1680 011014 012720 000000  MOV #0,(0)+ ;LOAD DELTA Y
1681 011020 012720 172000  MOV #172000,(0)+ ;LOAD STOP
1682 011024 013777 001022 170016  MOV DBUF,ADPC ;START DISPLAY
1683 011032 012777 000001 170010  MOV #1,ADPC ;SINGLE STEP THE DISPLAY
1684 011040 004737 015626  JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1685 011044 012777 000001 167776  MOV #1,ADPC ;SINGLE STEP THE DISPLAY
1686 011052 004737 015626  JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1687
1688 011056 032777 000040 167766  BIT #40,ADSR ;TEST BIT 5
1689 011064 001402  BEQ .+6
1690 011066 000000  HALT ;EDGE FLAG SET IN ERROR
1691 011070 000454  BR GT71
1692
1693 011072 012777 000001 167750  MOV #1,ADPC ;SINGLE STEP THE DISPLAY
1694 011100 004737 015626  JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1695 011104 012777 000001 167736  MOV #1,ADPC ;SINGLE STEP THE DISPLAY
1696 011112 004737 015626  JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1697 011116 012777 000001 167724  MOV #1,ADPC ;SINGLE STEP THE DISPLAY
1698 011124 004737 015626  JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1699 011130 012777 000001 167712  MOV #1,ADPC ;SINGLE STEP THE DISPLAY
1700 011136 004737 015626  JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1701
1702 011142 032777 000040 167702  BIT #40,ADSR ;TEST BIT 5
1703 011150 001002  BNE .+6
1704 011152 000000  HALT ;EDGE FLAG FAILED TO SET
1705 011154 000422  BR GT71
1706
1707 011156 013777 001022 167664  MOV DBUF,ADPC ;START DISPLAY AGAIN
1708 011164 012777 000001 167656  MOV #1,ADPC ;SINGLE STEP THE DISPLAY
1709 011172 004737 015626  JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1710 011176 012777 000001 167644  MOV #1,ADPC ;SINGLE STEP THE DISPLAY
1711 011204 004737 015626  JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1712 011210 032777 000040 167634  BIT #40,ADSR ;TEST BIT 5
1713 011216 001401  BEQ .+4
1714 011220 000000  HALT ;EDGE FLAG FAILED TO CLEAR

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1716
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1721 011222 104000
1722 011224 013700 001022
1723 011230 012720 116000
1724 011234 012720 000000
1725 011240 012720 000000
1726 011244 012720 110000
1727 011250 012720 020001
1728 011254 012720 000000
1729 011260 012720 172000
1730 011264 013777 001022 167556
1731 011272 012777 000001 167550
1732 011300 004737 015626
1733 011304 012777 000001 167536
1734 011312 004737 015626
1735
1736 011316 032777 000040 167526
1737 011324 001402
1738 011326 000000
1739 011330 000454
1740
1741 011332 012777 000001 167510
1742 011340 004737 015626
1743 011344 012777 000001 167476
1744 011352 004737 015626
1745 011356 012777 000001 167464
1746 011364 004737 015626
1747 011370 012777 000001 167452
1748 011376 004737 015626
1749
1750 011402 032777 000040 167442
1751 011410 001002
1752 011412 000000
1753 011414 000520
1754
1755 011416 013777 001022 167424
1756 011424 012777 000001 167416
1757 011432 004737 015626
1758 011436 012777 000001 167404
1759 011444 004737 015626
1760 011450 032777 000040 167374
1761 011456 001401
1762 011460 000000

```

```

;EDGE FLAG TEST
;TEST THAT EXCEEDING -X AXIS SETS EDGE FLAG

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```

GT71: SCOPE
      MOV      DBUF,RO
      MOV      #116000,(0)+ ;LOAD POINT
      MOV      #0,(0)+ ;LOAD MAX X
      MOV      #0,(0)+ ;LOAD Y
      MOV      #110000,(0)+ ;LOAD LONG VECTOR
      MOV      #20001,(0)+ ;LOAD DELTA X
      MOV      #0,(0)+ ;LOAD DELTA Y
      MOV      #172000,(0)+ ;LOAD STOP
      MOV      DBUF,ADPC ;START DISPLAY
      MOV      #1,ADPC ;SINGLE STEP THE DISPLAY
      JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
      MOV      #1,ADPC ;SINGLE STEP THE DISPLAY
      JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
      BIT      #40,ADSR ;TEST BIT 5
      BEQ      .+6
      HALT
      BR      GT72
      MOV      #1,ADPC ;SINGLE STEP THE DISPLAY
      JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
      MOV      #1,ADPC ;SINGLE STEP THE DISPLAY
      JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
      MOV      #1,ADPC ;SINGLE STEP THE DISPLAY
      JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
      MOV      #1,ADPC ;SINGLE STEP THE DISPLAY
      JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
      MOV      #1,ADPC ;SINGLE STEP THE DISPLAY
      JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
      BIT      #40,ADSR ;TEST BIT 5
      BNE      .+6
      HALT
      BR      GT73
      MOV      DBUF,ADPC ;START DISPLAY AGAIN
      MOV      #1,ADPC ;SINGLE STEP THE DISPLAY
      JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
      MOV      #1,ADPC ;SINGLE STEP THE DISPLAY
      JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
      BIT      #40,ADSR ;TEST BIT 5
      BEQ      .+4
      HALT
      ;EDGE FLAG FAILED TO CLEAR

```

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1764
1765
1766           ;EDGE FLAG TEST
1767           ;TEST THAT EXCEEDING +Y AXIS SETS EDGE FLAG
1768
1769 011462 104000          GT72: SCOPE
1770 011464 013700 001022  MOV      DBUF,RO
1771 011470 012720 115000  MOV      #116000,(0)+ ;LOAD POINT
1772 011474 012720 000700  MOV      #0,(0)+ ;LOAD X
1773 011500 013720 001012  MOV      GSYAXS,(0)+ ;LOAD MAX Y
1774 011504 012720 110000  MOV      #110000,(0)+ ;LOAD LONG VECTOR
1775 011510 012720 000000  MOV      #0,(0)+ ;LOAD DELTA X
1776 011514 012720 000001  MOV      #1,(0)+ ;LOAD DELTA Y
1777 011520 012720 172000  MOV      #172000,(0)+ ;LOAD STOP
1778 011524 013777 001022 167316  MOV      DBUF,DPDC ;START DISPLAY
1779 011532 012777 000001 167310  MOV      #1,DPDC ;SINGLE STEP THE DISPLAY
1780 011540 004737 015626  JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1781 011544 012777 000001 167276  MOV      #1,DPDC ;SINGLE STEP THE DISPLAY
1782 011552 004737 015626  JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1783
1784 011556 032777 000040 167266  BIT      #40,DSR ;TEST BIT 5
1785 011564 001402  BEQ      .+6
1786 011566 000000  HALT
1787 011570 000432  BR      GT73 ;EDGE FLAG SET IN ERROR
1788
1789 011572 012777 000001 167250  MOV      #1,DPDC ;SINGLE STEP THE DISPLAY
1790 011600 004737 015626  JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1791 011604 012777 000001 167236  MOV      #1,DPDC ;SINGLE STEP THE DISPLAY
1792 011612 004737 015626  JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1793 011616 012777 000001 167224  MOV      #1,DPDC ;SINGLE STEP THE DISPLAY
1794 011624 004737 015626  JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1795 011630 012777 000001 167212  MOV      #1,DPDC ;SINGLE STEP THE DISPLAY
1796 011636 004737 015626  JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1797
1798 011642 032777 000040 167202  BIT      #40,DSR ;TEST BIT 5
1799 011650 001002  BNE      .+6
1800 011652 000000  HALT
1801 011654 000400  BR      GT73 ;EDGE FLAG FAILED TO SET
1802

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1804
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1809 011656 104000
1810 011660 013700 001022
1811 011664 012720 116000
1812 011670 012720 000000
1813 011674 012720 000000
1814 011700 012720 110000
1815 011704 012720 000000
1816 011710 012720 020001
1817 011714 012720 172000
1818 011720 013777 001022 167122
1819 011726 012777 000001 167114
1820 011734 004737 015626
1821 011740 012777 000001 167102
1822 011746 004737 015626
1823
1824 011752 032777 000040 167072
1825 011760 001402
1826 011762 000000
1827 011764 000454
1828
1829 011766 012777 000001 167054
1830 011774 004737 015626
1831 012000 012777 000001 167042
1832 012006 004737 015626
1833 012012 012777 000001 167030
1834 012020 004737 015626
1835 012024 012777 000001 167016
1836 012032 004737 015626
1837
1838 012036 032777 000040 167006
1839 012044 001002
1840 012046 000000
1841 012050 000422
1842
1843 012052 013777 001022 166770
1844 012060 012777 000001 166762
1845 012066 004737 015626
1846 012072 012777 000001 166750
1847 012100 004737 015626
1848 012104 032777 000040 166740
1849 012112 001401
1850 012114 000000

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```

;EDGE FLAG TEST
;TEST THAT EXCEEDING -Y AXIS SETS EDGE FLAG

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GT73: SCOPE
      MOV DBUF,RO
      MOV #116000,(0)+ ;LOAD POINT
      MOV #0,(0)+ ;LOAD X
      MOV #0,(0)+ ;LOAD Y
      MOV #110000,(0)+ ;LOAD LONG VECTOR
      MOV #0,(0)+ ;LOAD DELTA X
      MOV #20001,(0)+ ;LOAD DELTA Y
      MOV #172000,(0)+ ;LOAD STOP
      MOV DBUF,DPDC ;START DISPLAY
      MOV #1,DPDC ;SINGLE STEP THE DISPLAY
      JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
      MOV #1,DPDC ;SINGLE STEP THE DISPLAY
      JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
      BIT #40,DSR ;TEST BIT 5
      BEQ .+6 ;EDGE FLAG SET IN ERROR
      HALT
      BR GT74
      MOV #1,DPDC ;SINGLE STEP THE DISPLAY
      JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
      MOV #1,DPDC ;SINGLE STEP THE DISPLAY
      JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
      MOV #1,DPDC ;SINGLE STEP THE DISPLAY
      JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
      MOV #1,DPDC ;SINGLE STEP THE DISPLAY
      JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
      BIT #40,DSR ;TEST BIT 5
      BNE .+6 ;EDGE FLAG FAILED TO SET
      HALT
      BR GT74
      MOV DBUF,DPDC ;START DISPLAY AGAIN
      MOV #1,DPDC ;SINGLE STEP THE DISPLAY
      JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
      MOV #1,DPDC ;SINGLE STEP THE DISPLAY
      JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
      BIT #40,DSR ;TEST BIT 5
      BEQ .+4 ;EDGE FLAG FAILED TO CLEAR
      HALT

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1852          ;TEST THAT THE CHARACTER REGISTER IS LOADED PROPERLY
1853          ; CODE 00
1854
1855 012116 104000          GT74: SCOPE
1856 012120 012777 100000 166674  MOV #100000, @DBUF ;LOAD "CHARACTER MODE"
1857 012126 012777 000000 166670  MOV #0, @DBUF1 ;LOAD "NULL" CHARACTER
1858 012134 013777 001022 166706  MOV DBUF, @DPC ;START DISPLAY
1859 012142 004737 015626          JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
1860 012146 012777 000001 166674  MOV #1, @DPC ;SINGLE STEP THE DISPLAY
1861 012154 017700 166676          MOV @YPOS, RO ;READ CHARACTER REG.
1862 012160 042700 001777          BIC #1777, RO ;MASK TO BITS 10-15
1863 012164 022700 000000          CMP #0, RO
1864 012170 001401          BEQ .+4
1865 012172 000000          HALT ;ERROR, CHARACTER REGISTER LOADED IN ERROR
1866
1867          ;TEST THAT THE CHARACTER REGISTER IS LOADED PROPERLY
1868          ; CODE 77
1869
1870 012174 104000          GT75: SCOPE
1871 012176 012777 100000 166616  MOV #100000, @DBUF ;LOAD "CHARACTER MODE"
1872 012204 012777 000077 166612  MOV #77, @DBUF1 ;LOAD CHARACTER
1873 012212 013777 001022 166630  MOV DBUF, @DPC ;START DISPLAY
1874 012220 004737 015626          JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
1875 012224 012777 000001 166616  MOV #1, @DPC ;SINGLE STEP THE DISPLAY
1876 012232 017700 166620          MOV @YPOS, RO ;READ CHARACTER REG.
1877 012236 042700 001777          BIC #1777, RO ;MASK TO BITS 10-15
1878 012242 022700 176000          CMP #176000, RO
1879 012246 001401          BEQ .+4
1880 012250 000000          HALT ;ERROR, CHARACTER REGISTER LOADED IN ERROR
1881
1882          ;TEST THAT THE CHARACTER REGISTER IS LOADED PROPERLY
1883          ; CODE 25
1884
1885 012252 104000          GT76: SCOPE
1886 012254 012777 100000 166540  MOV #100000, @DBUF ;LOAD "CHARACTER MODE"
1887 012262 012777 000025 166534  MOV #25, @DBUF1 ;LOAD CHARACTER
1888 012270 013777 001022 166552  MOV DBUF, @DPC ;START DISPLAY
1889 012276 004737 015626          JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
1890 012302 012777 000001 166540  MOV #1, @DPC ;SINGLE STEP THE DISPLAY
1891 012310 004737 015626          JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
1892 012314 017700 166536          MOV @YPOS, RO ;READ CHARACTER REG.
1893 012320 042700 001777          BIC #1777, RO ;MASK TO BITS 10-15
1894 012324 022700 052000          CMP #52000, RO
1895 012330 001401          BEQ .+4
1896 012332 000000          HALT ;ERROR, CHARACTER REGISTER LOADED IN ERROR

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1898
1899
1900
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1902 012334 104000
1903 012336 012777 100000 166456
1904 012344 012777 000052 166452
1905 012352 013777 001022 166470
1906 012360 004737 015626
1907 012364 012777 000001 166456
1908 012372 017700 166460
1909 012376 042700 001777
1910 012402 022700 124000
1911 012406 001401
1912 012410 000000
1913
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1917 012412 104000
1918 012414 012777 116000 166400
1919 012422 012777 001000 166374
1920 012430 012777 001000 166370
1921 012436 012777 100000 166364
1922 012444 005077 166362
1923 012450 013777 001022 166372
1924 012456 012777 000001 166364
1925 012464 004737 015626
1926 012470 012777 000001 166352
1927 012476 004737 015626
1928 012502 012777 000001 166340
1929 012510 004737 015626
1930 012514 012777 000001 166326
1931 012522 004737 015626
1932
1933 012526 017700 166324
1934 012532 042700 001777
1935 012536 022700 000000
1936 012542 001402
1937 012544 000000
1938 012546 000417
1939
1940 012550 017700 166300
1941 012554 022700 001000
1942 012560 001402
1943 012562 000000
1944 012564 000410
1945
1946 012566 017700 166264
1947 012572 042700 176000
1948 012576 022700 001000
1949 012602 001401
1950 012604 000000

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;TEST THAT THE CHARACTER REGISTER IS LOADED PROPERLY
; CODE 52
GT77: SCOPE
MOV #100000, DBUF ;LOAD "CHARACTER MODE"
MOV #52, DBUF1 ;LOAD CHARACTER
MOV DBUF, DPDC ;START DISPLAY
JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
MOV #1, DPDC ;SINGLE STEP THE DISPLAY
MOV DPPOS, RO ;READ CHARACTER REG.
BIC #1777, RO ;MASK TO BITS 10-15
CMP #124000, RO
BEQ .+4
HALT ;ERROR, CHARACTER REGISTER LOADED IN ERROR

;TEST THAT CHARACTER MODE DOES NOT HANG THE DISPLAY PROCESSOR
;TEST THAT "NULL" DOES NOT CHANGE X OR Y AXIS
GT78: SCOPE
MOV #116000, DBUF ;POINT MODE
MOV #1000, DBUF1
MOV #1000, DBUF2 ;1000, 1000
MOV #100000, DBUF3 ;LOAD "CHARACTER MODE"
CLR DBUF4 ;NULL CHARACTER
MOV DBUF, DPDC ;LOAD THE DISPLAY P.C.
MOV #1, DPDC ;SINGLE STEP THE DISPLAY
JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
MOV #1, DPDC ;SINGLE STEP THE DISPLAY
JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
MOV #1, DPDC ;SINGLE STEP THE DISPLAY
JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
MOV #1, DPDC ;SINGLE STEP THE DISPLAY
JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
MOV #1, DPDC ;SINGLE STEP THE DISPLAY
JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
MOV DPPOS, RO ;READ CHARACTER REGISTER
BIC #1777, RO ;MASK TO BITS 10-15
CMP #0, RO
BEQ .+6
HALT ;CHARACTER REGISTER IN ERROR
BR GT79

MOV DPXPOS, RO ;READ X AXIS
CMP #1000, RO ;ARE THEY EQUAL ?
BEQ .+6 ;YES
HALT ;"NULL" CHARACTER CHANGED X AXIS
BR GT79

MOV DYPPOS, RO ;READ Y AXIS
BIC #176000, RO ;MASK TO BITS 0-9
CMP #1000, RO ;ARE THEY EQUAL ?
BEQ .+4 ;YES
HALT ;"NULL" CHARACTER CHANGED Y AXIS

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1958 012606 104000
1959 012610 012777 116000 166204
1960 012616 012777 001000 166200
1961 012624 012777 001000 166174
1962 012632 012777 100000 166170
1963 012640 012777 000015 166164
1964 012646 013777 001022 166174
1965 012654 012777 000001 166166
1966 012662 004737 015626
1967 012666 012777 000001 166154
1968 012674 004737 015626
1969 012700 012777 000001 166142
1970 012706 004737 015626
1971 012712 012777 000001 166130
1972 012720 004737 015626
1973
1974 012724 017700 166126
1975 012730 042700 001777
1976 012734 022700 032000
1977 012740 001402
1978 012742 000000
1979 012744 000417
1980
1981 012746 017700 166102
1982 012752 022700 000000
1983 012756 001402
1984 012760 000000
1985 012762 000410
1986
1987 012764 017700 166066
1988 012770 042700 176000
1989 012774 022700 001000
1990 013000 001401
1991 013002 000000
1992

```

:TEST THAT CHARACTER MODE DOES NOT HANG THE DISPLAY PROCESSOR  
:TEST THAT "CR" DOES CHANGE X AND DOES NOT CHANGE Y AXIS

```

GT79: SCOPE
      MOV #116000, @DBUF ;POINT MODE
      MOV #1000, @DBUF1
      MOV #1000, @DBUF2 ;1000,1000
      MOV #100000, @DBUF3 ;LOAD "CHARACTER MODE"
      MOV #15, @DBUF4 ;LOAD "CR"
      DBUF, @DPC ;LOAD THE DISPLAY P.C.
      MOV #1, @DPC ;SINGLE STEP THE DISPLAY
      JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
      MOV #1, @DPC ;SINGLE STEP THE DISPLAY
      JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
      MOV #1, @DPC ;SINGLE STEP THE DISPLAY
      JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
      MOV #1, @DPC ;SINGLE STEP THE DISPLAY
      JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
      MOV #1, @DPC ;SINGLE STEP THE DISPLAY
      JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
      MOV @YPOS, RO ;READ Y AXIS
      BIC #1777, RO ;MASK TO BITS 10-15
      CMP #32000, RO
      BEQ .+6
      HALT
      BR GT80 ;CHARACTER REGISTER FAILED TO LOAD CORRECTLY
      MOV @XPOS, RO ;READ X AXIS
      CMP #0, RO ;ARE THEY EQUAL ?
      BEQ .+6 ;YES
      HALT ;"CR" CHARACTER FAILED TO CHANGED X AXIS CORRECTLY
      BR GT80
      MOV @YPOS, RO ;READ Y AXIS
      BIC #176000, RO ;MASK TO BITS 0-9
      CMP #1000, RO ;ARE THEY EQUAL ?
      BEQ .+4 ;YES
      HALT ;"CR" CHARACTER CHANGED Y AXIS

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013004	104000		
013006	012777	116000	166006
013014	012777	001000	166002
013022	012777	001000	165776
013030	012777	100000	165772
013036	012777	000012	165766
013044	013777	001022	165776
013052	012777	000001	165770
013060	004737	015626	
013064	012777	000001	165756
013072	004737	015626	
013076	012777	000001	165744
013104	004737	015626	
013110	012777	000001	165732
013116	004737	015626	
013122	017700	165730	
013126	042700	001777	
013132	022700	024000	
013136	001402		
013140	000000		
013142	000417		
013144	017700	165704	
013150	022700	001000	
013154	001402		
013156	000000		
013160	000410		
013162	017700	165670	
013166	042700	176000	
013172	023700	001044	
013176	001401		
013200	000000		

:TEST THAT CHARACTER MODE DOES NOT HANG THE DISPLAY PROCESSOR  
:TEST THAT "LF" DOES NOT CHANGE X BUT DOES CHANGE Y AXIS

```

GT80:  SCOPE
        MOV      #116000, @DBUF      ;POINT MODE
        MOV      #1000, @DBUF1
        MOV      #1000, @DBUF2      ;1000,1000
        MOV      #100000, @DBUF3    ;LOAD "CHARACTER MODE"
        MOV      #12, @DBUF4
        MOV      @DBUF, @DPC        ;LOAD THE DISPLAY P.C.
        MOV      #1, @DPC           ;SINGLE STEP THE DISPLAY
        JSR      7, @DLAY           ;EXECUTE A PROGRAM DELAY
        MOV      #1, @DPC           ;SINGLE STEP THE DISPLAY
        JSR      7, @DLAY           ;EXECUTE A PROGRAM DELAY
        MOV      #1, @DPC           ;SINGLE STEP THE DISPLAY
        JSR      7, @DLAY           ;EXECUTE A PROGRAM DELAY
        MOV      #1, @DPC           ;SINGLE STEP THE DISPLAY
        JSR      7, @DLAY           ;EXECUTE A PROGRAM DELAY
        MOV      @YPOS, R0          ;READ CHARACTER REG.
        BIC      #1777, R0          ;MASK TO BITS 10-15
        CMP      #24000, R0
        BEQ      .+6
        HALT
        BR      GT80A              ;CHARACTER REGISTER IN ERROR

        MOV      @XPOS, R0          ;READ X AXIS
        CMP      #1000, R0          ;ARE THEY EQUAL ?
        BEQ      .+6
        HALT
        BR      GT80A              ;"LF" CHARACTER CHANGED X AXIS

        MOV      @YPOS, R0          ;READ Y AXIS
        BIC      #176000, R0        ;MASK TO BITS 10-15
        CMP      LFSIZE, R0        ;ARE THEY EQUAL ?
        BEQ      .+4
        HALT
        ;"LF" CHARACTER FAILED TO CHANGED Y AXIS CORRECTLY

```



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2076
2077
2078 ; TEST THAT CHARACTER MODE DOES NOT HANG THE DISPLAY PROCESSOR
2079 ; TEST THAT "BS" DOES CHANGE X BUT NOT Y AXIS
2080
2081 013400 104000 GT81: SCOPE
2082 013402 012777 116000 165412 MOV #116000, @DBUF ; POINT MODE
2083 013410 012777 001000 165406 MOV #1000, @DBUF1
2084 013416 012777 001000 165402 MOV #1000, @DBUF2 ; 1000, 1000
2085 013424 012777 100000 165376 MOV #100000, @DBUF3 ; LOAD "CHARACTER MODE"
2086 013432 012777 000010 165372 MOV #10, @DBUF4
2087 013440 013777 001022 165402 MOV DBUF, @DPC ; LOAD THE DISPLAY P.C.
2088 013446 012777 000001 165374 MOV #1, @DPC ; SINGLE STEP THE DISPLAY
2089 013454 004737 015626 JSR 7, @LAY ; EXECUTE A PROGRAM DELAY
2090 013460 012777 000001 165362 MOV #1, @DPC ; SINGLE STEP THE DISPLAY
2091 013466 004737 015626 JSR 7, @LAY ; EXECUTE A PROGRAM DELAY
2092 013472 012777 000001 165350 MOV #1, @DPC ; SINGLE STEP THE DISPLAY
2093 013500 004737 015626 JSR 7, @LAY ; EXECUTE A PROGRAM DELAY
2094 013504 012777 000001 165336 MOV #1, @DPC ; SINGLE STEP THE DISPLAY
2095 013512 004737 015626 JSR 7, @LAY ; EXECUTE A PROGRAM DELAY
2096
2097 013516 017700 165334 MOV @YPOS, R0 ; READ CHARACTER REG
2098 013522 042700 001777 BIC #1777, R0 ; MASK TO BITS 10-15
2099 013526 022700 020000 CMP #20000, R0
2100 013532 001402 BEQ .+6
2101 013534 000000 HALT
2102 013536 000426 BR GT82 ; CHARACTER REGISTER IN ERROR
2103
2104 013540 017700 165310 MOV @XPOS, R0 ; READ X AXIS
2105 013544 023700 001046 CMP @XSIZE, R0 ; ARE THEY EQUAL ?
2106 013550 001402 BEQ .+6 ; YES
2107 013552 000000 HALT ; "BS" CHARACTER FAILED TO CHANGED X AXIS CORRECTLY
2108 013554 000417 BR GT82
2109
2110 013556 017700 165274 MOV @YPOS, R0 ; READ Y AXIS
2111 013562 042700 176000 BIC #176000, R0 ; MASK TO BITS 0-9
2112 013566 022700 001000 CMP #1000, R0 ; ARE THEY EQUAL ?
2113 013572 001402 BEQ .+6 ; YES
2114 013574 000000 HALT ; "BS" CHARACTER CHANGED Y AXIS
2115 013576 000406 BR GT82
2116
2117 ; TEST THAT "SHIFT-OUT" STATUS BIT IS NOT SET
2118
2119 013600 017700 165246 MOV @DSR, R0 ; READ STATUS
2120 013604 032700 000100 BIT #100, R0
2121 013610 001401 BEQ .+4
2122 013612 000000 HALT ; SHIFT OUT STATUS BIT IS SET
2123

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2125
2126 ;TEST THAT "SHIFT-OUT" GENERATES A STATUS BIT
2127 ;SHIFT-OUT <LOW BYTE>, FOLLOWED BY CODE 77 <HIGH BYTE>
2128
2129 013614 104000 GT82: SCOPE
2130 013616 012777 116000 165176 MOV #116000, @DBUF ;POINT MODE
2131 013624 012777 001000 165172 MOV #1000, @DBUF1
2132 013632 012777 001000 165166 MOV #1000, @DBUF2 ;1000,1000
2133 013640 012777 100000 165162 MOV #100000, @DBUF3 ;LOAD "CHARACTER MODE"
2134 013646 012777 037416 165156 MOV #37416, @DBUF4 ;"SHIFT-OUT" IN LOW BYTE #77 IN HIGH BYTE
2135 013654 013777 001022 165166 MOV @DBUF, @DPC ;START DISPALY
2136 013662 012777 000001 165160 MOV #1, @DPC ;SINGLE STEP THE DISPLAY
2137 013670 004737 015626 JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
2138 013674 012777 000001 165146 MOV #1, @DPC ;SINGLE STEP THE DISPLAY
2139 013702 004737 015626 JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
2140 013706 012777 000001 165134 MOV #1, @DPC ;SINGLE STEP THE DISPLAY
2141 013714 004737 015626 JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
2142 013720 012777 000001 165122 MOV #1, @DPC ;SINGLE STEP THE DISPLAY
2143 013726 004737 015626 JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
2144
2145 013732 017700 165120 MOV @YPOS, R0 ;READ CHARACTER REG
2146 013736 042700 001777 BIC #1777, R0 ;MASK TO BITS 10-15
2147 013742 022700 176000 CMP #176000, R0
2148 013746 001402 BEQ .+6
2149 013750 000000 HALT
2150 013752 000426 BR GT83 ;CHARACTER REGISTER IN ERROR
2151 ; AFTER A SHIFT-OUT COMMAND
2152 013754 017700 165072 MOV @DSR, R0 ;READ STATUS REGISTER
2153 013760 032700 000100 BIT #100, R0
2154 013764 001002 BNE .+6
2155 013766 000000 HALT ;SHIFT OUT STATUS BIT FAILED TO SET
2156 013770 000417 BR GT83
2157
2158 013772 017700 165056 MOV @XPOS, R0 ;READ X POS
2159 013776 022700 001000 CMP #1000, R0
2160 014002 001402 BEQ .+6
2161 014004 000000 HALT ;SHIFT-OUT CHARACTER CHANGED X AXIS
2162 014006 000410 BR GT83
2163
2164 014010 017700 165042 MOV @YPOS, R0 ;READ Y POS
2165 014014 042700 176000 BIC #176000, R0 ;MASK
2166 014020 022700 001000 CMP #1000, R0
2167 014024 001401 BEQ .+4
2168 014026 000000 HALT ;SHIFT-OUT CHARACTER CHANGED Y AXIS

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```

2170
2171 ;TEST THAT "SHIFT-OUT" DOES NOT GENERATE A STATUS BIT
2172 ;("SHIFT-OUT" FOLLOWED BY CODE 0 THRU 37 EXCEPT #17)
2173
2174 014030 104000 GT83: SCOPE
2175 014032 000005 RESET
2176 014034 005003 CLR R3
2177 014036 012777 100000 164756 GT83A: MOV #100000, @DBUF ;SET 'CHAR' MODE
2178 014044 012737 000016 001036 MOV #16, @SAVE ;LOAD "SHIFT-OUT" INTO THE LOW BYTE
2179 014052 110337 001037 MOV R3, @SAVE+1 ;LOAD HIGH BYTE WITH A CHARACTER
2180 014056 013777 001036 164740 MOV @SAVE, @DBUF1 ;LOAD DISPLAY BUFFER
2181 014064 013777 001022 164756 MOV @DBUF, @DPC ;START THE DISPLAY
2182 014072 012777 000001 164750 MOV #1, @DPC ;SINGLE STEP THE DISPLAY
2183 014100 004737 015626 JSR 7, @LAY ;EXECUTE A PROGRAM DELAY
2184
2185 014104 032777 000100 164740 BIT #100, @DSR ;TEST FOR SHIFT BIT
2186 014112 001402 BEQ .+6
2187 014114 000000 HALT ;SHIFT STATUS BIT SET IN ERROR
2188 014116 000407 BR GT84 ; CHARACTER IS IN R3
2189
2190 014120 005203 GT83B: INC R3
2191 014122 022703 000017 CMP #17, R3 ;TEST FOR "SHIFT-IN"
2192 014126 001774 BEQ GT83B
2193 014130 022703 000040 CMP #40, R3 ;TEST FOR #40
2194 014134 001340 BNE GT83A ;IS IT #40
2195 ;YES, NEXT TEST
2196
2197 ;TEST THAT "SHIFT-OUT" FOLLOWED BY CODE 40 GENERATE A
2198 ;SHIFT STATUS BIT
2199
2200 014136 104000 GT84: SCOPE
2201 014140 000005 RESET
2202 014142 012777 100000 164652 MOV #100000, @DBUF ;LOAD SET CHAR MODE
2203 014150 012777 000016 164646 MOV #16, @DBUF1 ;LOAD "SHIFT-OUT" INTO THE LOW BYTE
2204 014156 112737 000040 015755 GT84A: MOV #40, @BUFFER+3 ;LOAD HIGH BYTE
2205 014164 013777 001022 164656 MOV @DBUF, @DPC ;START THE DISPLAY
2206 014172 004737 015626 JSR PC, @LAY ;DELAY
2207 014176 012777 000001 164644 MOV #1, @DPC ;SINGLE STEP THE DISPLAY
2208 014204 004737 015626 JSR 7, @LAY ;EXECUTE A PROGRAM DELAY
2209
2210 014210 032777 000100 164634 BIT #100, @DSR ;TEST 'SHIFT' STATUS BIT
2211 014216 001002 BNE .+6
2212 014220 000000 HALT ;"SHIFT-OUT" STATUS BIT FAILED TO SET
2213 014222 000441 BR GT85 ;ON CHARACTER IN R3
2214

```



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2270 ;STOP INTERRUPT TEST
2271 ;TEST FOR NO INTERRUPT
2272
2273 014442 104000 GT86: SCOPE
2274 014444 000005 RESET
2275 014446 012777 014536 164404 MOV #GT86A,@DDONE ;LOAD RETURN FROM DONE INTERRUPT
2276 014454 012777 014536 164406 MOV #GT86A,@TIMEVT ;LOAD RETURN FROM TIME-OUT INTERRUPT
2277 014462 012777 014536 164374 MOV #GT86A,@LPVCT ;LOAD RETURN FROM LIGHT-PEN INTERRUPT
2278 014470 012777 164000 164324 MOV #164000,@DBUF ;LOAD "DISPLAY NOP"
2279 014476 012777 173000 164320 MOV #173000,@DBUF1 ;LOAD "STATUS A"--"STOP"--"STOP INT. ENABLE"
2280 014504 005077 164310 CLR @PSW ;LOWER MACHINE PRIORITY
2281 014510 013777 001022 164332 MOV DBUF,@DPC ;LOAD DISPLAY P.C.
2282 014516 012777 000001 164324 MOV #1,@DPC ;SINGLE STEP THE DISPLAY
2283 014524 000240 NOP
2284 014526 000240 NOP
2285 014530 000240 NOP
2286 014532 000240 NOP
2287 014534 000401 BR .+4
2288
2289 014536 000000 GT86A: HALT ;GT-40 INTERRUPTED IN ERROR
2290
2291 ;STOP INTERRUPT TEST
2292 ;TEST FOR INTERRUPT
2293
2294 014540 104000 GT87: SCOPE
2295 014542 000005 RESET
2296 014544 012777 014634 164306 MOV #GT87A,@DDONE ;LOAD RETURN ADDRESS FROM INTERRUPT
2297 014552 012777 014646 164310 MOV #GT87B,@TIMEVT
2298 014560 012777 014654 164276 MOV #GT87C,@LPVCT
2299 014566 012777 164000 164226 MOV #164000,@DBUF ;LOAD "DISPLAY NOP"
2300 014574 012777 173400 164222 MOV #173400,@DBUF1 ;LOAD "STATUS A"--"STOP"--"STOP INT. ENABLE-INT"
2301 014602 005077 164212 CLR @PSW
2302 014606 013777 001022 164234 MOV DBUF,@DPC
2303 014614 012777 000001 164226 MOV #1,@DPC ;SINGLE STEP THE DISPLAY
2304 014622 000240 NOP
2305 014624 000240 NOP
2306 014626 000240 NOP
2307 014630 000240 NOP
2308 014632 000000 HALT ;GT-40 FAILED TO GENERATE AN INTERRUPT
2309 014634 013777 001062 164216 GT87A: MOV DDONE1,@DDONE
2310 014642 022626 CMP (SP)+,(SP)+
2311 014644 000405 BR GT88
2312
2313 014646 022626 GT87B: CMP (SP)+,(SP)+
2314 014650 000000 HALT ;GT-40 STOP (DONE) INTERRUPTED TO
; THE GT-40 TIME OUT VECTOR
2315
2316 014652 000402 BR GT88
2317
2318 014654 022626 GT87C: CMP (SP)+,(SP)+
2319 014656 000000 HALT ;GT-40 STOP (DONE) INTERRUPTED
; TO THE GT-40 LIGHT-PEN VECTOR
2320

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```

2322
2323           ;SHIFT OUT INTERRUPT TEST
2324           ;TEST FOR INTERRUPT
2325
2326 014660 104000          GT88:  SCOPE
2327 014662 000005          RESET
2328 014664 012777 014770 164166  MOV      #GT88B,@DDONE      ;LOAD DONE VECTOR
2329 014672 012777 014776 164164  MOV      #GT88C,@LPVCT    ;LOAD LIGHT-PEN VECTOR
2330 014700 012777 014754 164162  MOV      #GT88A,@TIMEVT   ;LOAD RETURN ADDRESS
2331 014706 012777 100000 164106  MOV      #100000,@DBUF    ;LOAD "CHARACTER MODE"
2332 014714 012777 020016 164102  MOV      #20016,@DBUF1    ;LOAD "SHIFT-OUT"
2333 014722 005077 164072          CLR      @PSW
2334 014726 013777 001022 164114  MOV      DBUF,@DPC        ;START DISPLAY
2335 014734 012777 000001 164106  MOV      #1,@DPC         ;SINGLE STEP THE DISPLAY
2336 014742 000240          NOP
2337 014744 000240          NOP
2338 014746 000240          NOP
2339 014750 000240          NOP
2340 014752 000000          HALT
2341 014754 000240          GT88A: NOP
2342 014756 013777 001072 164104  MOV      TMEVT1,@TIMEVT
2343 014764 022626          CMP      (SP)+,(SP)+
2344 014766 000405          BR      GT89
2345
2346 014770 022626          GT88B: CMP      (SP)+,(SP)+
2347 014772 000000          HALT
2348 014774 000402          BR      GT89
2349
2350 014776 022626          GT88C: CMP      (SP)+,(SP)+
2351 015000 000000          HALT
2352
;GT-40 FAILED TO INTERRUPT ON SHIFT-OUT
;GT-40 SHIFT-OUT INTERRUPTED
; TO STOP VECTOR
;GT-40 SHIFT-OUT INTERRUPTED TO
; THE LIGHT-PEN VECTOR

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2354
2355
2356           ;TIME-OUT INTERRUPT TEST
2357
2358 015002 104000          GT89:  SCOPE
2359 015004 000005          RESET
2360 015006 013777 001062 164044      MOV      DDONE1, @DDONE
2361 015014 013777 001066 164042      MOV      LPVCT1, @LPVCT
2362 015022 012777 015050 164040      MOV      #GT89A, @TIMEVT ;LOAD RETURN ADDRESS
2363 015030 005077 163764          CLR      @PSW
2364 015034 012777 177776 164006      MOV      #177776, @DPC ;LOAD DISPLAY P.C.
2365 015042 004737 015626          JSR      7, DLAY ;EXECUTE A PROGRAM DELAY
2366 015046 000000          HALT ;GT-40 FAILED TO INTERRUPT ON TIME-OUT
2367
2368 015050 000240          GT89A: NOP
2369 015052 013777 001072 164010      MOV      TMEVT1, @TIMEVT
2370 015060 022626          CMP      (SP)+, (SP)+
2371
2372           ;LIGHT PEN INTERRUPT TEST
2373
2374 015062 104000          GT90:  SCOPE
2375 015064 000005          RESET
2376 015066 012777 015122 163770      MOV      #GT90A, @LPVCT ;LOAD RETURN ADDRESS
2377 015074 012777 100140 163720      MOV      #100140, @DBUF ;LOAD DISPLAY BUFFER
2378 015102 005077 163712          CLR      @PSW
2379 015106 013777 001022 163734      MOV      DBUF, @DPC ;LOAD DISPLAY P.C.
2380 015114 004737 015626          JSR      7, DLAY ;EXECUTE A PROGRAM DELAY
2381 015120 000401          BR      .+4
2382 015122 000000          GT90A: HALT
2383 015124 013777 001066 163732      MOV      LPVCT1, @LPVCT ;GT-40 INTERRUPTED ON FALSE LIGHT PEN FLAG

```

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2385          ;PRE BR LEVEL SETUP
2386
2387 015132 042737 177437 001004      BIC      #177437,DSPBR ;MASK TO BITS
2388 015140 001001                    BNE      .+4
2389 015142 000000                    HALT
2390 015144 022737 000340 001004      CMP      #340,DSPBR ;BR LEVEL WAS 0
2391 015152 001001                    BNE      .+4
2392 015154 000000                    HALT ;BR LEVEL WAS 7
2393
2394 015156 013737 001004 015202      MOV      DSPBR,BRLEV1
2395 015164 162737 000040 015202      SUB      #40,BRLEV1
2396 015172 013737 001004 015204      MOV      DSPBR,BRLEV2
2397 015200 000402                    BR       GT91
2398
2399 015202 000140                    BRLEV1: 140
2400 015204 000200                    BRLEV2: 200
2401
2402          ;BR LEVEL TEST (BR-1)
2403          ;TEST FOR INTERRUPT
2404
2405 015206 104000                    GT91:   SCOPE
2406 015210 000005                    RESET
2407 015212 012777 015254 163640      MOV      #GT91A,DDONE ;LOAD RETURN ADDRESS
2408 015220 012777 173400 163574      MOV      #173400,DBUF ;LOAD "STATUS A"-NO INTERRUPT ENABLE
2409 015226 013777 015202 163564      MOV      BRLEV1,PSW
2410 015234 013777 001022 163606      MOV      DBUF,DPCC ;LOAD THE DISPLAY P.C.
2411 015242 000240                    NOP
2412 015244 000240                    NOP
2413 015246 000240                    NOP
2414 015250 000240                    NOP
2415 015252 000000                    HALT ;NO STOP INTERRUPT ON BR LEVEL INDICATED -1
2416                                     ;CHECK TO SEE IF PROPER BR LEVEL
2417 015254 022626                    GT91A:  CMP      (SP)+,(SP)+
2418
2419          ;BR LEVEL TEST (BR)
2420          ;TEST THAT THE GT-40 DOES NOT INTERRUPT AT THE LEVEL INDICATED
2421
2422 015256 104000                    GT92:   SCOPE
2423 015260 000005                    RESET
2424 015262 012777 015324 163570      MOV      #GT92A,DDONE ;LOAD RETURN ADDRESS
2425 015270 012777 173400 163524      MOV      #173400,DBUF ;LOAD "STATUS A- STOP- STOP INT ENABLE
2426 015276 013777 015204 163514      MOV      BRLEV2,PSW ;LOWER MACHINE PRIORITY TO INDICATED LEVEL
2427 015304 013777 001022 163536      MOV      DBUF,DPCC
2428 015312 000240                    NOP
2429 015314 000240                    NOP
2430 015316 000240                    NOP
2431 015320 000240                    NOP
2432 015322 000401                    BR       .+4 ;NEXT TEST
2433
2434 015324 000000                    GT92A:  HALT ;GT-40 INTERRUPTED ON THE WRONG BR LEVEL
2435
2436 015326 013777 001062 163524      MOV      DDONE1,DDONE ;LOAD INTERRUPT VECTOR
2437 015334 000005                    RESET
2438

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```

2440
2441
2442
2443
2444
2445 015336 104000
2446 015340 012777 117637 163454
2447 015346 005077 163452
2448 015352 005077 163450
2449 015356 012777 172077 163444
2450 015364 013777 001022 163456
2451 015372 004737 015626
2452 015376 012777 000001 163444
2453 015404 004737 015626
2454 015410 012777 000001 163432
2455 015416 004737 015626
2456 015422 012777 000001 163420
2457 015430 004737 015626
2458 015434 012777 000001 163406
2459 015442 000005
2460 015444 005777 163400
2461 015450 001402
2462 015452 000000
2463 015454 000406
2464
2465 015456 017700 163370
2466 015462 042700 074000
2467 015466 001401
2468 015470 000000
2469
2470 015472 104000
2471 015474 005237 001016
2472 015500 022737 000004 001016
2473 015506 001402
2474 015510 000137 001634
2475 015514 000005
2476 015516 013700 000042
2477 015522 001405
2478 015524 000005
2479 015526 004710
2480 015530 000240
2481 015532 000240
2482 015534 000240
2483 015536 004737 015546
2484 015542 000137 001606
2485 015546 012777 000002 163276
2486 015554 012737 000207 177566
2487 015562 105737 177564
2488 015566 100375
2489 015570 012737 000207 177566
2490 015576 105737 177564
2491 015602 100375
2492 015604 000207

;RESET TEST
;DOES RESET CLEAR ALL DISPLAY PC AND STATUS BITS

GT93: SCOPE
MOV #117637, @DBUF ;POINT INTENSITY=7,BLINK=1,LINETYPE=3
CLR @DBUF1 ;CLEAR X
CLR @DBUF2 ;CLEAR Y
MOV #172077, @DBUF3 ;ITALIC=1, SYNC=1, COLOR=1
MOV @DBUF, @DPC ;LOAD DISPLAY P.C.
JSR PC, DLAY
MOV #1, @DPC ;SINGLE STEP THE DISPLAY
JSR PC, DLAY
MOV #1, @DPC ;SINGLE STEP THE DISPLAY
JSR PC, DLAY
MOV #1, @DPC ;SINGLE STEP THE DISPLAY
JSR PC, DLAY
MOV #1, @DPC ;SINGLE STEP THE DISPLAY
RESET ;GENERATE "INIT"
TST @DPC
BEQ .+6
HALT
BR END

MOV @DSR, RO ;READ DISPLAY STATUS
BIC #74000, RO ;MASK TO BIT 11-14
BEQ .+4 ;IS THE STATUS CLEARED ?
HALT ;"INIT" FAILED TO RESET DISPLAY STATUS REGISTER

END: SCOPE
INC ICNT ;UPDATE COUNTER
CMP #4, ICNT ;FINISHED ?
BEQ HERE ;BR IF YES
JMP GTO ;NO RESTART

HERE: RESET
MOV @#42, RO
BEQ HERE1 ;BRANCH IF OFF LINE
RESET

LOGICAL: JSR PC, (0)

NOP
NOP
NOP
HERE1: JSR PC, BELL
JMP STARTB
BELL: MOV #2, @DSR ;RING THE BELL
MOV #207, @TPDDBR ;RINT THE BELL
1$: TSTB TPCSR
BPL 1$
MOV #207, TPDDBR
2$: TSTB TPCSR
BPL 2$
RTS PC

```

```

;SCOPE ROUTINE
2494
2495
2496 015606 032777 040000 162356 SCOPEA: BIT #40000, @SWR ;TEST "SCOPE" SWITCH
2497 015614 001001 BNE SCOPEB
2498 015616 011601 MOV (SP), R1
2499 015620 012706 000500 SCOPEB: MOV #STKPTR, SP
2500 015624 000111 JMP (1)
2501
2502 015626 012700 000400 DLAY: MOV #400, R0
2503 015632 005300 DLAYA: DEC R0
2504 015634 001376 BNE DLAYA
2505 015636 000207 RTS 7
2506
2507 015640 012700 001000 DLAY1: MOV #1000, R0
2508 015644 005300 DLAY1A: DEC R0
2509 015646 001376 BNE DLAY1A
2510 015650 000207 RTS 7
2511
2512 015652 010046 LOWPWR: MOV R0, -(SP)
2513 015654 010146 MOV R1, -(SP)
2514 015656 010246 MOV R2, -(SP)
2515 015660 010346 MOV R3, -(SP)
2516 015662 010446 MOV R4, -(SP)
2517 015664 010546 MOV R5, -(SP)
2518 015666 010637 015750 MOV SP, LOWSV
2519 015672 012737 015702 000024 MOV #HIGPWR, @#24
2520 015700 000000 HALT
2521 015702 013706 015750 HIGPWR: MOV LOWSV, SP
2522 015706 012605 MOV (SP)+, R5
2523 015710 012604 MOV (SP)+, R4
2524 015712 012603 MOV (SP)+, R3
2525 015714 012602 MOV (SP)+, R2
2526 015716 012601 MOV (SP)+, R1
2527 015720 012600 MOV (SP)+, R0
2528 015722 012737 015652 000024 MOV #LOWPWR, @#24
2529 015730 012706 000500 MOV #STKPTR, SP
2530 015734 000240 NOP
2531 015736 000240 NOP
2532 015740 000000 HALT
2533 015742 000240 NOP
2534 015744 000240 NOP
2535 015746 000111 JMP (R1)
2536
2537 015750 000000 LOWSV: 0
2538
2539 015752 000000 BUFFER: 0
2540
2541 000001 .END

```

BELL	015546	380	2483	2485#																
BRLEV1	015202	2394*	2395*	2399#	2409															
BRLEV2	015204	2396*	2400#	2426																
BUFFER	015752	236	237	238	239	240	241	2204*	2223*	2539#										
CHSIZE	001046	246#	290*	291*	293*	2105														
CNTR	001042	244#																		
DBUF	001022	236#	394*	395	404*	405	414*	415	424*	425	437*	438	447*	448						
		459*	460	468*	469	477*	478	488*	489	498*	499	508*	509	518*						
		519	528*	529	539*	540	547*	548	555*	556	564*	565	574*	575						
		584*	585	593*	594	603*	604	615*	616	625*	626	637*	638	647*						
		648	656*	657	665*	666	675*	676	686*	687	697*	698	711*	712						
		720*	721	729*	730	738*	739	747*	748	750*	751	765*	770	801						
		807	808	828*	830	839*	843	852*	857	866*	871	883*	886	899*						
		902	915*	918	933*	936	950*	955	979*	983	1002*	1006	1029*	1033						
		1054*	1058	1081*	1085	1108	1116	1147	1155	1190	1197	1235	1242	1276						
		1282	1310	1316	1349	1355	1393	1399	1432	1438	1466	1472	1505	1511						
		1549	1555	1595	1602	1635	1642	1667*	1668	1674	1682	1707	1722	1730						
		1755	1770	1778	1810	1818	1843	1856*	1858	1871*	1873	1886*	1888	1903*						
		1905	1918*	1923	1959*	1964	2000*	2005	2041*	2046	2082*	2087	2130*	2135						
		2177*	2181	2202*	2205	2224	2245*	2250	2278*	2281	2299*	2302	2331*	2334						
		2377*	2379	2408*	2410	2425*	2427	2446*	2450											
DBUF1	001024	237#	766*	772	829*	842*	856*	870*	884*	900*	916*	934*	951*	980*						
		1003*	1030*	1055*	1082*	1857*	1872*	1887*	1904*	1919*	1960*	2001*	2042*	2083*						
DBUF2	001026	2131*	2180*	2203*	2246*	2279*	2300*	2332*	2447*											
		238#	767*	778	885*	901*	917*	935*	952*	981*	1004*	1031*	1056*	1083*						
DBUF3	001030	1920*	1961*	2002*	2043*	2084*	2132*	2247*	2448*											
		239#	768*	784	953*	982*	1005*	1032*	1057*	1084*	1921*	1962*	2003*	2044*						
DBUF4	001032	2085*	2133*	2449*																
DBUF5	001034	240#	769*	790	954*	1922*	1963*	2004*	2045*	2086*	2134*									
DDONE	001060	241#																		
DDONE1	001062	264#	281	285	294*	2275*	2296*	2309*	2328*	2360*	2407*	2424*	2436*							
DLAY	015626	265#	294	295*	2309	2360	2436													
		749	888	904	920	938	957	966	985	992	1008	1016	1035	1043						
		1060	1068	1087	1095	1118	1120	1122	1124	1126	1129	1157	1159	1161						
		1163	1165	1167	1199	1201	1203	1205	1207	1244	1246	1248	1250	1252						
		1284	1286	1288	1290	1318	1320	1322	1324	1357	1359	1361	1363	1401						
		1403	1405	1407	1440	1442	1444	1446	1474	1476	1478	1480	1513	1515						
		1517	1519	1557	1559	1561	1563	1604	1606	1608	1610	1612	1644	1646						
		1648	1650	1652	1684	1686	1694	1696	1698	1700	1709	1711	1732	1734						
		1742	1744	1746	1748	1757	1759	1780	1782	1790	1792	1794	1796	1820						
		1822	1830	1832	1834	1836	1845	1847	1859	1874	1889	1891	1906	1925						
		1927	1929	1931	1966	1968	1970	1972	2007	2009	2011	2013	2048	2050						
		2052	2054	2089	2091	2093	2095	2137	2139	2141	2143	2183	2206	2208						
		2225	2227	2252	2254	2365	2380	2451	2452	2455	2457	2502#								
		2503#	2504																	
DLAYA	015632	677	688	2507#																
DLAY1	015640	2508#	2509																	
DLAY1A	015644	292	314#																	
DOCORE	001316	259#	275	279	343*	344	350*	351	358*	359	366*	367	373	375#						
DPC	001050	405*	415*	425*	438*	448*	460*	469*	478*	489*	499*	509*	519*	529*						
		540*	548*	556*	565*	575*	585*	594*	604*	616*	626*	638*	648*	658*						
		666*	676*	687*	698*	712*	721*	730*	739*	748*	751*	763*	771*	781*						
		777	782*	789*	789*	789*	807*	812	820*	830*	831*	832*	842*	844*						
		845	857*	858*	859	871*	872*	873	886*	887*	887*	887*	887*	887*						



GT28	003322	674#			
GT29	003364	685#			
GT3	001774	423#			
GT30	003426	696#			
GT31	003464	710#			
GT32	003522	719#			
GT33	003560	728#			
GT34	003616	737#			
GT35	003654	746#			
GT36	003732	764#			
GT37	004110	775	781	787	800#
GT37A	004154	811#	821		
GT4	002032	435#			
GT40	004216	816	819	827#	
GT41	004264	838#			
GT42	004336	851#			
GT43	004414	865#			
GT44	004474	882#			
GT45	004554	898#			
GT46	004634	914#			
GT47	004714	932#			
GT48	004774	949#			
GT49	005126	962	978#		
GT5	002072	446#			
GT50	005230	989	1001#		
GT51	005346	1013	1028#		
GT52	005464	1040	1053#		
GT53	005602	1065	1080#		
GT54	005720	1092	1107#		
GT55	006112	1134	1146#		
GT56	006304	1173	1185#		
GT56A	006320	1190#	1223		
GT57	006472	1213	1219	1229#	
GT57A	006512	1235#	1269		
GT58	006666	1258	1264	1275#	
GT59	007024	1296	1309#		
GT6	002130	458#			
GT60	007162	1330	1343#		
GT60A	007202	1349#	1380		
GT61	007344	1369	1375	1387#	
GT61A	007364	1393#	1424		
GT62	007626	1413	1419	1431#	
GT63	007664	1452	1465#		
GT64	010022	1486	1499#		
GT64A	010042	1505#	1536		
GT65	010204	1525	1531	1543#	
GT65A	010224	1549#	1580		
GT66	010366	1569	1575	1589#	
GT66A	010410	1595#	1622		
GT67	010554	1618	1629#		
GT67A	010576	1635#	1664		
GT67B	010746	1667#			
GT7	002166	467#			
GT70	010762	1659	1673#		







DELAY	251#	749	888	904	920	938	957	966	985	992	1008	1016	1035	1043	1060
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	1199	1201	1203	1205	1207	1244	1246	1248	1250	1252	1284	1286	1288	1290	1318
	1320	1322	1324	1357	1359	1361	1363	1401	1403	1405	1407	1440	1442	1444	1446
	1474	1476	1478	1480	1513	1515	1517	1519	1557	1559	1561	1563	1604	1606	1608
	1610	1612	1644	1646	1648	1650	1652	1684	1686	1694	1696	1698	1700	1709	1711
	1732	1734	1742	1744	1746	1748	1757	1759	1780	1782	1790	1792	1794	1796	1820
	1822	1830	1832	1834	1836	1845	1847	1859	1874	1889	1891	1906	1925	1927	1929
	1931	1966	1968	1970	1972	2007	2009	2011	2013	2048	2050	2052	2054	2089	2091
	2093	2095	2137	2139	2141	2143	2183	2208	2252	2254	2365	2380			
DELAY1	254#	677	688												
RESUME	248#	776	782	788	820	831	844	858	872	887	903	919	937	956	964
	965	984	991	1007	1015	1034	1042	1059	1067	1086	1094	1117	1119	1121	1123
	1125	1127	1156	1158	1160	1162	1164	1166	1198	1200	1202	1204	1206	1243	1245
	1247	1249	1251	1283	1285	1287	1289	1317	1319	1321	1323	1356	1358	1360	1362
	1400	1402	1404	1406	1439	1441	1443	1445	1473	1475	1477	1479	1512	1514	1516
	1518	1556	1558	1560	1562	1603	1605	1607	1609	1611	1643	1645	1647	1649	1651
	1683	1685	1693	1695	1697	1699	1708	1710	1731	1733	1741	1743	1745	1747	1756
	1758	1779	1781	1789	1791	1793	1795	1819	1821	1829	1831	1833	1835	1844	1846
	1860	1875	1890	1907	1924	1926	1928	1930	1965	1967	1969	1971	2006	2008	2010
	2012	2047	2049	2051	2053	2088	2090	2092	2094	2136	2138	2140	2142	2182	2207
	2226	2251	2253	2282	2303	2335	2452	2454	2456	2458					

ADD	278	284	317	811	841	854	868	1377	1421	1533	1577						
BEQ	345	353	361	369	399	409	419	429	442	452	464	473	482	493	503		
	513	523	533	543	551	560	569	579	589	598	608	620	630	642	681		
	692	702	716	725	734	743	755	773	779	785	791	914	819	834	847		
	861	875	891	907	923	941	960	969	987	994	1011	1019	1038	1046	1063		
	1071	1090	1098	1132	1138	1171	1177	1211	1217	1256	1262	1294	1300	1328	1334		
	1367	1373	1411	1417	1450	1456	1484	1490	1523	1529	1567	1573	1616	1657	1689		
	1713	1737	1761	1785	1825	1849	1864	1879	1895	1911	1936	1942	1949	1977	1983		
	1990	2018	2024	2031	2059	2065	2072	2100	2106	2113	2121	2148	2160	2167	2186		
	2192	2219	2236	2264	2461	2467	2473	2477									
BIC	289	293	397	407	417	427	440	450	462	471	480	491	501	511	521		
	531	558	567	577	587	596	606	618	628	640	679	690	700	714	723		
	732	741	753	855	869	1655	1862	1877	1893	1909	1934	1947	1975	1988	2016		
BIT	2029	2057	2070	2098	2111	2146	2165	2262	2387	2466							
	542	550	1688	1702	1712	1736	1750	1760	1784	1798	1824	1838	1848	2120	2153		
	2185	2210	2218	2229	2235	2256	2496										
BMI	660																
BNE	280	286	304	321	379	804	1223	1269	1380	1424	1536	1580	1622	1664	1703		
	1751	1799	1839	2154	2194	2211	2230	2257	2388	2391	2497	2504	2509				
BPL	651	669	2488	2491													
BR	305	322	381	775	781	787	816	821	962	989	1013	1040	1065	1092	1134		
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	1569	1575	1618	1659	1691	1705	1739	1753	1787	1801	1827	1841	1938	1944	1979		
	1985	2020	2026	2061	2067	2102	2108	2115	2150	2156	2162	2188	2213	2221	2232		
	2238	2259	2287	2311	2316	2344	2348	2381	2397	2432	2463						
CLR	295	297	299	316	335	343	386	980	981	1110	1111	1149	1150	1192	1193		
	1237	1238	1278	1279	1312	1313	1351	1352	1395	1396	1434	1435	1468	1469	1507		
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	2378	2447	2448														
CMP	279	285	303	306	320	323	352	360	368	398	408	418	428	441	451		
	463	472	481	492	502	512	522	532	559	568	578	588	597	607	619		
	629	641	680	691	701	715	724	733	742	754	772	778	784	790	803		
	810	813	818	833	846	860	874	890	906	922	940	959	968	1010	1018		
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	1299	1327	1333	1366	1372	1410	1416	1449	1455	1483	1489	1522	1528	1566	1572		
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	2058	2064	2071	2099	2105	2112	2147	2159	2166	2191	2193	2263	2310	2313	2318		
	2343	2346	2350	2370	2390	2417	2472										
DEC	324	1222	1267	1268	1379	1422	1423	1535	1578	1579	1621	1663	2503	2508			
EMT	188																
HALT	197	198	204	346	354	362	370	400	410	420	430	443	453	465	474		
	483	494	504	514	524	534	544	552	561	570	580	590	599	609	621		
	631	643	652	661	670	717	726	735	744	756	774	780	786	792	815		
	835	848	862	876	892	908	924	942	961	970	988	995	1012	1020	1039		
	1047	1064	1072	1091	1099	1133	1139	1172	1178	1212	1218	1257	1263	1295	1301		
	1329	1335	1368	1374	1412	1418	1451	1457	1485	1491	1524	1530	1568	1574	1617		
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	1912	1937	1943	1950	1978	1984	1991	2019	2025	2032	2060	2066	2073	2101	2107		
	2114	2122	2149	2155	2161	2168	2187	2212	2220	2231	2237	2258	2265	2289	2308		
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INC	318	378	1221	1266	1378	1534	1619	1620	1661	1662	2190	2471					
JMP	222	223	2474	2484	2500	2535											
JSR	292	334	380	385	677	688	749	888	904	920	938	957	966	985	992		
	1008	1016	1035	1043	1060	1068	1087	1095	1118	1120	1122	1124	1126	1128	1157		

MOV

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1284	1286	1288	1290	1318	1320	1322	1324	1357	1359	1361	1363	1401	1403	1405
1407	1440	1442	1444	1446	1474	1476	1478	1480	1513	1515	1517	1519	1557	1559
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308	314	315	326	327	332	333	336	342	344	350	351	358	359	366
367	383	384	387	393	394	395	396	404	405	406	414	415	416	424
425	426	437	438	439	447	448	449	459	460	461	468	469	470	477
478	479	488	489	490	498	499	500	508	509	510	518	519	520	528
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2134	2135	2136	2138	2140	2142	2145	2152	2158	2164	2177	2178	2180	2181	2182
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	2394	2396	2407	2408	2409	2410	2424	2425	2426	2427	2436	2446	2449	2450	2452
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	2515	2516	2517	2518	2519	2521	2522	2523	2524	2525	2526	2527	2528	2529	
MOV8	2179	2204	2223												
NEG	288	291													
NOP	682	693	703	2283	2284	2285	2286	2304	2305	2306	2307	2336	2337	2338	2339
	2341	2368	2411	2412	2413	2414	2428	2429	2430	2431	2480	2481	2482	2530	2531
	2533	2534													
RESET	436	2175	2201	2217	2234	2249	2274	2295	2327	2359	2375	2406	2423	2437	2459
	2475	2478													
RTS	309	329	2492	2505	2510										
SUB	325	328	2395												
TST	319	373	374	375	376	650	659	668	2460						
TSTB	2487	2490													
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.REPT	201														
.TITLE	175														
.WORD	210	218	219												

ERRORS DETECTED: 0

\*DSKZ:DDGTAD DSKZ:DDGTAD/CRF=DDGTAD  
RUN-TIME: 9 18 4 SECONDS  
CORE USED: 8K

006