

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 contains 50 frames of data, arranged in 10 rows and 5 columns. Each frame displays a small table or list of data points, likely representing test results or instructions. The data is organized in a structured format, with columns and rows of text and numbers. The frames are arranged in a grid, with the first frame in the top-left corner and the last frame in the bottom-right corner. The data in the frames is too small to read clearly, but it appears to be organized in a structured format, possibly representing test results or instructions.

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00910000-00 INSTRUCTION TEST I MAINDEC-11-DDGTA-D TMBYDDGZAD660 19-DEC-76 00018008AGE 1 770224
SEG 0001

.REY -

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 SJB-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

9.1 EXECUTION TIME

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

9.2 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 NPA CR
OR 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 NPA AT A TIME,
AND CHECK FOR PROPER OPERATION.

ENABL ABS AMA
 TITLE GT-40/GT-44 INSTRUCTION TEST I MAINDEC-11-DOGTA-D

.LIST ME,BIN,SEQ
 .MLIST MC,MD,CND

176								
177								
178								
179								
180								
181								
182								
183								
184								
185								
186								
187	000000	000000						
188	000002	000000						
189								
190								
191								
192								
193								
194								
195								
196								
197	000000	000000						
198	000002	000000						
199								
200								
201								
202								
203								
204								
205								
206								
207	000024	015652						
208	000026	000340						
209								
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								
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						

. =0
 HALT
 HALT
 :LOCATIONS 0-776 ARE FILLED WITH TRAP CATCHER

. =24
 LOWPWR
 340
 . =30
 .WORD SCOPEA ;EMT RETURN
 340

. =46
 LOGICAL
 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
 OSAVE: 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 GRAPHPLOT 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 00105C SETUP: MOV #DPC, R0 :SET JP POINTER
276 001100 013701 001000 MOV GSADC, R1
277 001104 010120 SETUPA: MOV R1, (0)+
278 001106 062701 000002 ADD #2, R1
279 001112 022700 001060 CMP #DPC+10, R0
280 001116 001372 BNE SETUPA
281 001120 012700 001060 MOV #DDONE, R0
282 001124 013701 001002 MOV GSVCT, R1
283 001130 010120 SETJPB: MOV R1, (0)+
284 001132 062701 000002 ADD #2, R1
285 001136 022700 001074 CMP #DDONE+14, R0
286 001142 001372 BNE SETUPB
287 001144 013737 001010 001044 MOV GS_LFSZ, 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 JSR PC, DDCORE
293 001202 042737 177000 001046 BIC #177000, CHSIZE :MASK IT
294 001210 013777 001062 177642 MOV DDONE1, DDONE
295 001216 005077 177640 CLR DDONE1
296 001222 013777 001066 177634 MOV LPVCT1, QLPVCT
297 001230 005077 177632 CLR QLPVCT1
298 001234 013777 001072 177626 MOV TMEVT1, QTIMEVT
299 001242 005037 001072 CLR TMEVT1
300 001246 013746 000004 MOV Q#ERRVEC, -(SP) :SAVE VECTORS CONTENTS
301 001252 012737 001300 000004 MOV #1$, Q#ERRVEC :SET UP FOR TRAP
302 001260 012737 177570 000172 MOV #DSWR, Q#SWR :SET UP TO TEST FOR SWITCH REGISTER
303 001266 022777 177777 176676 CMP #-1, Q#SWR :TEST FOR SWITCH REGISTER
304 001274 001005 BNE 3$ :SWITCH REGISTER IS PRESENT
305 001276 000401 BR 2$ :NO SWITCH REGISTER
306 001300 022626 1$: CMP (SP)+, (SP)+ :POP 2 WORDS OFF STACK
307 001302 012737 000170 000172 2$: MOV #SWREG, Q#SWR :SET UP FOR SOFTWARE SWITCH REGISTER
308 001310 012637 000004 3$: MOV (SP)+, Q#ERRVEC :RESTORE VECTORS CONTENTS
309 001314 000207 RTS PC

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H01

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DDGTAC.P11

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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$,R#4          ;SET UP FOR NEM
315 001324 012701 017776          MOV    #17776,R1        ;SET UP ADDRESS
316 001330 005000          CLR    RO
317 001332 062701 020000          1$:  ADD    #20000,R1        ;MOVE TO THE NEXT BANK
318 001336 005200          INC    RO              ;INC BANK COUNTER
319 001340 005711          TST   (1)             ;TIMEOUT ?
320 001342 022701 157776          CMP    #157775,R1    ;END ?
321 001346 001371          SNE   1$
322 001350 000404          BR    3$
323 001352 022626          2$:  CMP    (SP)+,(SP)+    ;POP THE STACK X2
324 001354 005300          DEC   RO              ;DECREMENT BANK COUNT
325 001356 162701 020000          SUB    #20000,R1
326 001362 012737 000006 000004 3$:  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 014737 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             ;DISFLAY 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 :MODE REGISTER TEST
390 :DOES THE "MODE" REGISTER LOAD PROPERLY
391
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, RO ;READ DISPLAY STATUS REGISTER
397 001664 042700 103777 BIC #103777, RO ;MASK TO BITS 14-11
398 001670 022700 040000 CMP #40000, RO ;TEST RO
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, RO ;READ DISPLAY STATUS REGISTER
407 001722 042700 103777 BIC #103777, RO ;MASK TO BITS 14-11
408 001726 022700 074000 CMP #74000, RO ;TEST RO
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, RO ;READ DISPLAY STATUS REGISTER
417 001760 042700 103777 BIC #103777, RO ;MASK TO BITS 14-11
418 001764 022700 040000 CMP #40000, RO ;TEST RO
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, RO ;READ DISPLAY STATUS REGISTER
427 002016 042700 103777 BIC #103777, RO ;MASK TO BITS 14-11
428 002022 022700 060000 CMP #60000, RO ;TEST RO
429 002026 001401 BEQ .+4
430 002030 000000 HALT ;MODE BIT 13 FAILED TO SET
431

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K01

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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, R0	;READ DISPLAY STATUS REGISTER	
491	002304	042700	177774			BIC	#177774, R0	;MASK TO BITS 1-0	
492	002310	022700	000002			CMP	#2, R0	;TEST R0	
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, R0	;READ DISPLAY STATUS REGISTER	
501	002342	042700	177774			BIC	#177774, R0	;MASK TO BITS 1-0	
502	002346	022700	000002			CMP	#2, R0	;TEST R0	
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, R0	;READ DISPLAY STATUS REGISTER	
511	002400	042700	177767			BIC	#177767, R0	;MASK TO BIT 3	
512	002404	022700	000000			CMP	#0, R0	;TEST R0	
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, R0	;READ DISPLAY STATUS REGISTER	
521	002436	042700	177767			BIC	#177767, R0	;MASK TO BIT 3	
522	002442	022700	000010			CMP	#10, R0	;TEST R0	
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, R0	;READ DISPLAY STATUS REGISTER	
531	002474	042700	177767			BIC	#177767, R0	;MASK TO BIT 3	
532	002500	022700	000010			CMP	#10, R0	;TEST R0	
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, RO	;READ STATUS		
542	002532	032700	000200			BIT	#200, RO			
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, RO	;READ STATUS		
550	002564	032700	000200			BIT	#200, RO			
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, RO	;READ DISPLAY STATUS REGISTER		
558	002616	042700	174377			BIC	#174377, RO	;MASK TO BITS 8-10		
559	002622	022700	000000			CMP	#0, RO	;TEST RO		
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, RO	;READ DISPLAY STATUS REGISTER		
567	002654	042700	174377			BIC	#174377, RO	;MASK TO BITS 8-10		
568	002660	022700	003400			CMP	#3400, RO	;TEST RO		
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, RO	;READ DISPLAY STATUS REGISTER		
577	002712	042700	174377			BIC	#174377, RO	;MASK TO BITS 8-10		
578	002716	022700	002000			CMP	#2000, RO	;TEST RO		
579	002722	001401				BEQ	.+4			
580	002724	000000				HALT		;INTENSITY LEVEL BIT 10 FAILED		

```

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 BIC #174377, R0 ; READ DISPLAY STATUS REGISTER
588 002754 022700 001000 CMP #1000, R0 ; MASK TO BITS 8-10
589 002760 001401 BEQ .+4 ; TEST R0
590 002762 000000 HALT ; 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 @DBUF, @DPC ; READ DISPLAY STATUS REGISTER
596 003006 042700 174377 BIC #174377, R0 ; MASK TO BITS 8-10
597 003012 022700 000400 CMP #400, R0 ; TEST R0
598 003016 001401 BEQ .+4
599 003020 000000 HALT ; INTENSITY LEVEL BIT 8 FAILED
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 @DBUF, @DPC ; READ DISPLAY STATUS REGISTER
606 003044 042700 174377 BIC #174377, R0 ; MASK TO BITS 8-10
607 003050 022700 000400 CMP #400, R0 ; TEST R0
608 003054 001401 BEQ .+4
609 003056 000000 HALT ; INTENSITY LEVEL ENABLE FAILED TO INHIBIT
610 ; INTENSITY LEVEL CHANGE
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 @DBUF, @DPC ; READ DISPLAY STATUS REGISTER
618 003102 042700 177757 BIC #177757, R0 ; MASK TO BIT 4
619 003106 022700 000000 CMP #0, R0 ; TEST R0
620 003112 001401 BEQ .+4
621 003114 000000 HALT ; ITALICS BIT FAILED TO RESET
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 @DBUF, @DPC ; READY DISPLAY STATUS REGISTER
628 003140 042700 177757 BIC #177757, R0 ; MASK TO BIT 4
629 003144 022700 000020 CMP #20, R0 ; TEST R0
630 003150 001401 BEQ .+4
631 003152 000000 HALT ; ITALICS BIT FAILED TO SET
632
633

```

635										
636	00315	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		


```

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

```

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

```

```

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
819 004204 001404
820 004206 012777 000001 174634
821 004214 000757
  
```

```

: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
828 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
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 BLFFER
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 .+4
892 004552 000000 HALT ;X POSITION REGISTER FAILED TO LOAD
;PROPERLY USING GRAPH PLOT X MODE

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 .+4
908 004632 000000 HALT ;X POSITION REGISTER FAILED TO LOAD
;PROPERLY USING GRAPH PLOT X MODE

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 GRAPH PLOT 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 .+4
924 004712 000000 HALT ;Y POSITION REGISTER FAILED TO LOAD
;PROPERLY USING GRAPH PLOT Y MODE

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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

```

```

: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

```

```

974
975 ;TEST THAT THE X-Y POSITION REGISTERS CAN BE RESET
976 ;USING POINT DATA MODE.
977
978 GT49: SCOPE
979 005126 104000 MOV #116000, @DBUF ;LOW INTENSITY - POINT MODE
979 005130 012777 116000 173664 CLR @DCIF1 ;CLEAR X POSITION
980 005136 005077 173662 CLR @DBUF2 ;CLEAR Y POSITION
981 005142 005077 173660 MOV #172000, @DBUF3 ;LOAD STATUS "A" REGISTER, STOP
982 005146 012777 172000 173654 MOV DBUF, @DPC ;LOAD DISPLAY P.C.
983 005154 013777 001022 173666 MOV #1, @DPC ;SINGLE STEP THE DISPLAY
984 005162 012777 000001 173660 JSR 7, @LAY ;EXECUTE A PROGRAM DELAY
985 005170 004737 015626 MOV @XPOS, R0 ;READ X POSITION
986 005174 017700 173654 BEQ .+6 ;WAS IT 0?
987 005200 001402 HALT ;X POSITION REGISTER FAILED TO RESET
988 005202 000000 BR GT50 ;USING POINT DATA MODE
989 005204 000411
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.
:COJ
1001 GT50: SCOPE
1002 005230 104000 MOV #116000, @DBUF ;LOW INTENSITY - POINT MODE
1003 005232 012777 116000 173562 MOV #1777, @DBUF1 ;SET X POSITION
1004 005240 012777 001777 173556 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 004777 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
1029 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

```



```

1103
1104
1105
1106
1107 005720 104000
1108 005722 013700 001022
1109 005726 012720 116000
1110 005732 005020
1111 005734 005020
1112 005736 012720 110000
1113 005742 012720 000001
1114 005746 012720 000001
1115 005752 012720 172000
1116 005756 013777 001022 173064
1117 005764 012777 000001 173056
1118 005772 004737 015626
1119 005776 012777 000001 173044
1120 006004 004737 015626
1121 006010 012777 000001 173032
1122 006016 004737 015626
1123 006022 012777 000001 173020
1124 006030 004737 015626
1125 006034 012777 000001 173006
1126 006042 004737 015626
1127 006046 012777 000001 172774
1128 006054 004737 015626
1129
1130 006060 017700 172770
1131 006064 022700 000001
1132 006070 001402
1133 006072 000000
1134 006074 000406
1135
1136 006076 017700 172754
1137 006102 022700 000001
1138 006106 001401
1139 006110 000000
1140

```

```

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

```

```

GT54: SCOPE
MOV DBUF,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 #1,(0)+ ;PRESET "DELTA X AXIS"
MOV #1,(0)+ ;PRESET "DELTA Y AXIS"
MOV #172000,(0) ;LOAD "DISPLAY STOP"
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 #1,@DPC ;SINGLE STEP THE DISPLAY
JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
MOV @XPOS,RO ;READ X AXIS
CMP #1,RO ;DID IT INCREMENT BY 1
BEQ .+6 ;YES
HALT ;NO, INCREMENT X AXIS BY
BR GT55 ;LONG VECTOR MODE FAILED

MOV @YPOS,RO ;READ Y AXIS
CMP #1,RO ;DID IT INCREMENT BY 1
BEQ .+4 ;YES
HALT ;NO, INCREMENT Y AXIS BY
;LONG VECTOR MODE FAILED

```

```

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 @XPOS,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 @YPOS,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

```

```

1181
1182      :TEST THAT LONG VECTOR MODE INCREMENT X AND Y AXIS PROPERLY
1183      :COUNT 0-1777
1184
1185      006304  104000      GT56:  SCOPE
1186      006306  012703  001777      MOV      #1777,R3      ;SET UP A COUNTER
1187      006312  012704  000001      MOV      #1,R4        ;PRESET THE COMPARED VALUE
1188
1189      006316  104000      GT56A: SCOPE
1190      006320  013700  001022      MOV      DBUF,R0      ;SET UP R0
1191      006324  012720  116000      MOV      #116000,(0)+ ;LOAD "POINT MODE"
1192      006330  005020      CLR      (0)+         ;CLEAR X AXIS
1193      006332  005020      CLR      (0)+         ;CLEAR Y AXIS
1194      006334  012720  110000      MOV      #110000,(0)+ ;LOAD "LONG VECTOR MODE"
1195      006340  010420      MOV      R4,(0)+      ;PRESET "DELTA X AXIS"
1196      006342  010420      MOV      R4,(0)+      ;PRESET "DELTA Y AXIS"
1197      006344  013777  001022  172476      MOV      DBUF,@DPC    ;LOAD THE DISPLAY P.C.
1198      006352  012777  000001  172470      MOV      #1,@DPC      ;SINGLE STEP THE DISPLAY
1199      006360  004737  015626      JSR      7,DLAY        ;EXECUTE A PROGRAM DELAY
1200      006364  012777  000001  172456      MOV      #1,@DPC      ;SINGLE STEP THE DISPLAY
1201      006372  004737  015626      JSR      7,DLAY        ;EXECUTE A PROGRAM DELAY
1202      006376  012777  000001  172444      MOV      #1,@DPC      ;SINGLE STEP THE DISPLAY
1203      006404  004737  015626      JSR      7,DLAY        ;EXECUTE A PROGRAM DELAY
1204      006410  012777  000001  172432      MOV      #1,@DPC      ;SINGLE STEP THE DISPLAY
1205      006416  004737  015626      JSR      7,DLAY        ;EXECUTE A PROGRAM DELAY
1206      006422  012777  000001  172420      MOV      #1,@DPC      ;SINGLE STEP THE DISPLAY
1207      006430  004737  015626      JSR      7,DLAY        ;EXECUTE A PROGRAM DELAY
1208
1209      006434  017700  172414      MOV      @XPOS,R0     ;READ X AXIS
1210      006440  020400      CMP      R4,R0        ;ARE THEY EQUAL?
1211      006442  001402      BEQ      .+6          ;YES
1212      006444  000000      HALT     ;NO, INCREMENT X AXIS VIA
1213      006446  000411      BR      GT57         ;LONG VECTOR MODE FAILED
1214
1215      006450  017700  172402      MOV      @YPOS,R0     ;READ Y AXIS
1216      006454  020400      CMP      R4,R0        ;ARE THEY EQUAL?
1217      006456  001402      BEQ      .+6          ;YES
1218      006460  000000      HALT     ;NO, INCREMENT Y AXIS VIA
1219      006462  000403      BR      GT57         ;LONG VECTOR MODE FAILED
1220
1221      006464  005204      INC      R4           ;INCREMENT EXPECTED VALUE
1222      006466  005303      DEC      R3           ;FINISHED?
1223      006470  001313      BNE     GT56A        ;NO, TEST MORE DATA

```

```

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,R0      ;SET UP R0
1236 006516 012720 11600C      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,@DPC     ;LOAD THE DISPLAY P.C.
1243 006544 012777 000001 172276 MOV      #1,@DPC       ;SINGLE STEP THE DISPLAY
1244 006552 004737 015626      JSR      7,DLAY        ;EXECUTE A PROGRAM DELAY
1245 006556 012777 000001 172264 MOV      #1,@DPC       ;SINGLE STEP THE DISPLAY
1246 006564 004737 015626      JSR      7,DLAY        ;EXECUTE A PROGRAM DELAY
1247 006570 012777 000001 172252 MOV      #1,@DPC       ;SINGLE STEP THE DISPLAY
1248 006576 004737 015626      JSR      7,DLAY        ;EXECUTE A PROGRAM DELAY
1249 006602 012777 000001 172240 MOV      #1,@DPC       ;SINGLE STEP THE DISPLAY
1250 006610 004737 015626      JSR      7,DLAY        ;EXECUTE A PROGRAM DELAY
1251 006614 012777 000001 172226 MOV      #1,@DPC       ;SINGLE STEP THE DISPLAY
1252 006622 004737 015626      JSR      7,DLAY        ;EXECUTE A PROGRAM DELAY
1253
1254 006626 017700 172222      MOV      @XPOS,R0     ;READ X AXIS
1255 006632 020400      CMP      R4,R0        ;ARE THEY EQUAL?
1256 006634 001402      BEQ      .+6         ;YES
1257 006636 000000      HALT                    ;NO, DECREMENT X AXIS VIA
1258 006640 000412      BR      GT58          ;LONG VECTOR MODE FAILED
1259
1260 006642 017700 172210      MOV      @YPOS,R0     ;READ Y AXIS
1261 006646 020400      CMP      R4,R0        ;ARE THEY EQUAL?
1262 006650 001402      BEQ      .+6         ;YES
1263 006652 000000      HALT                    ;NO, DECREMENT Y AXIS VIA
1264 006654 000404      BR      GT58          ;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

```

```

1271 :TEST THAT X AND Y AXIS INCREMENTS PROPERLY
1272 :USING SHORT VECTOR MODE
1273 :COUNT 1
1274
1275 006666 104000          GT58: SCOPE
1276 006670 013700 001022  MOV DBUF,RO          ;SET UP RO
1277 006674 012720 116000  MOV #116000,(0)+    ;LOAD "SET POINT MODE"
1278 006700 005020          CLR (0)+            ;CLEAR X AXIS
1279 006702 005020          CLR (0)+            ;CLEAR Y AXIS
1280 006704 012720 106000  MOV #106000,(0)+    ;LOAD "SET SHORT VECTOR MODE"
1281 006710 012720 000201  MOV #201,(0)+      ;PRESET "DELTA X AND DELTA Y"
1282 006714 013777 001022 172126  MOV DBUF,DPDC      ;LOAD THE DISPLAY PC
1283 006722 012777 000001 172120  MOV #1,DPDC        ;SINGLE STEP THE DISPLAY
1284 006730 004737 015626  JSR 7,DLAY         ;EXECUTE A PROGRAM DELAY
1285 006734 012777 000001 172106  MOV #1,DPDC        ;SINGLE STEP THE DISPLAY
1286 006742 004737 015626  JSR 7,DLAY         ;EXECUTE A PROGRAM DELAY
1287 006746 012777 000001 172074  MOV #1,DPDC        ;SINGLE STEP THE DISPLAY
1288 006754 004737 015626  JSR 7,DLAY         ;EXECUTE A PROGRAM DELAY
1289 006760 012777 000001 172062  MOV #1,DPDC        ;SINGLE STEP THE DISPLAY
1290 006766 004737 015626  JSR 7,DLAY         ;EXECUTE A PROGRAM DELAY
1291
1292 006772 017700 172056  MOV DXPOS,RO       ;READ X AXIS
1293 006776 022700 000001  CMP #1,RO          ;ARE THEY EQUAL?
1294 007002 001402          BEQ .+6            ;YES
1295 007004 000000          HALT              ;NO INCREMENT X AXIS FAILED USING
1296 007006 000406          BR GT59           ;SHORT VECTOR MODE
1297
1298 007010 017700 172042  MOV DYPOS,RO       ;READ Y AXIS
1299 007014 022700 000001  CMP #1,RO          ;ARE THEY EQUAL?
1300 007020 001401          BEQ .+4            ;YES
1301 007022 000000          HALT              ;NO INCREMENT Y AXIS FAILED
1302          USING SHORT VECTOR MODE

```

```

1304
1305      :TEST THAT X AND Y AXIS DECREMENT PROPERLY
1306      :USING SHORT VECTOR MODE
1307      :COUNT 1
1308
1309      GT59:  SCOPE
1310      007024 104000      MOV      DBUF,RO      ;SET UP RO
1311      007026 013700 001022  MOV      #116000,(0)+ ;LOAD "SET POINT MODE"
1312      007032 012720 116000  CLR      (0)+        ;CLEAR X AXIS
1313      007036 005020      CLR      (0)+        ;CLEAR Y AXIS
1314      007040 005020      MOV      #106000,(0)+ ;LOAD "SET SHORT VECTOR MODE"
1315      007042 012720 106000  MOV      #20301,(0)+ ;PRESET "DELTA X AND DELTA Y"
1316      007046 012720 020301  MOV      DBUF,@DPC   ;LOAD THE DISPLAY PC
1317      007052 013777 001022 171770  MOV      #1,@DPC    ;SINGLE STEP THE DISPLAY
1318      007060 012777 000001 171762  JSR      7,DLAY     ;EXECUTE A PROGRAM DELAY
1319      007066 004737 015626      JSR      7,DLAY     ;SINGLE STEP THE DISPLAY
1320      007072 012777 000001 171750  MOV      #1,@DPC    ;EXECUTE A PROGRAM DELAY
1321      007100 004737 015626      JSR      7,DLAY     ;SINGLE STEP THE DISPLAY
1322      007104 012777 000001 171736  MOV      #1,@DPC    ;EXECUTE A PROGRAM DELAY
1323      007112 004737 015626      JSR      7,DLAY     ;SINGLE STEP THE DISPLAY
1324      007116 012777 000001 171724  MOV      #1,@DPC    ;EXECUTE A PROGRAM DELAY
1325      007124 004737 015626      JSR      7,DLAY     ;SINGLE STEP THE DISPLAY
1326      007130 017700 171720      MOV      @XPOS,RO   ;READ X AXIS
1327      007134 022700 001777      CMP      #1777,RO   ;ARE THEY EQUAL?
1328      007140 001402      BEQ     .+6        ;YES
1329      007142 000000      HALT     ;NO, DECREMENT X AXIS FAILED USING
1330      007144 000406      BR      GT60      ;SHORT VECTOR MODE
1331
1332      007146 017700 171704      MOV      @YPOS,RO   ;READ Y AXIS
1333      007152 022700 001777      CMP      #1777,RO   ;ARE THEY EQUAL?
1334      007156 001401      BEQ     .+4        ;YES
1335      007160 000000      HALT     ;NO DECREMENT Y AXIS FAILED
1336      ;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 17161C
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,R0 :SET UP R0
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,@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 @XPOS,R0 :READ X POSITION
CMP R2,R0 :ARE THEY EQUAL
BEQ .+6 :YES
HALT :INCREMENT X AXIS FAILED USING
BR GT61 :SHORT VECTOR MODE
MOV @YPOS,R0 :READ Y POSITION
CMP R2,R0 :ARE THEY EQUAL ?
BEQ .+6 :YES
HALT :INCREMENT Y AXIS FAILED USING
BR GT61 :SHORT VECTOR MODE
ACC #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
1384
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1387 007344 104000
1388 007346 012703 000077
1389 007352 012702 001777
1390 007356 012704 020301
1391
1392 007362 104000
1393 007364 013700 001022
1394 007370 012720 116000
1395 007374 005020
1396 007376 005020
1397 007400 012720 106000
1398 007404 010420
1399 007406 013777 001022 171434
1400 007404 012777 000001 171426
1401 007422 004737 015626
1402 007426 012777 000001 171414
1403 007434 004737 015626
1404 007440 012777 000001 171402
1405 007446 004737 015626
1406 007452 012777 000001 171370
1407 007460 004737 015626
1408
1409 007464 017700 171364
1410 007470 020200
1411 007472 001402
1412 007474 000000
1413 007476 000413
1414
1415 007500 017700 171352
1416 007504 020200
1417 007506 001402
1418 007510 000000
1419 007512 000405
1420
1421 007514 062704 000201
1422 007520 005302
1423 007522 005303
1424 007524 001317
1425

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```

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

GT61:  SCOPE
      MOV  #77,R3          ;SET UP A COUNT LOCATION
      MOV  #1777,R2       ;SET UP THE COMPARED LOCATION
      MOV  #20301,R4      ;PRESET THE "DELTA X-Y"

GT61A: 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,@DPC      ;LOAD THE DISPLAY P.C.
      JSR  7,@DPC         ;SINGLE STEP THE DISPLAY
      JSR  7,@DPC         ;EXECUTE A PROGRAM DELAY
      JSR  7,@DPC         ;SINGLE STEP THE DISPLAY
      JSR  7,@DPC         ;EXECUTE A PROGRAM DELAY
      JSR  7,@DPC         ;SINGLE STEP THE DISPLAY
      JSR  7,@DPC         ;EXECUTE A PROGRAM DELAY
      JSR  7,@DPC         ;SINGLE STEP THE DISPLAY
      JSR  7,@DPC         ;EXECUTE A PROGRAM DELAY

      MOV  @XPOS,RO      ;READ X POSITION
      CMP  R2,RO         ;ARE THEY EQUAL
      BEQ  .+6           ;YES
      HALT                ;DECREMENT X AXIS FAILED USING
      BR   GT62          ;SHORT VECTOR MODE

      MOV  @YPOS,RO      ;READ Y POSITION
      CMP  R2,RO         ;ARE THEY EQUAL
      BEQ  .+6           ;YES DECREMENT
      HALT                ;DECREMENT Y AXIS FAILED USING
      BR   GT62          ;SHORT VECTOR MODE

      ADD  #201,R4        ;ADD "DELTA X-Y"
      DEC  R2             ;DECREMENT EXPECTED VALUE
      DEC  R3             ;DECREMENT COUNT "FINISHED"
      BNE  GT61A         ;NO, TEST MORE DATA

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1458

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007526 104000
007530 013700 001022
007534 012720 116000
007540 005020
007542 005020
007544 012720 130000
007550 012720 000201
007554 013777 001022 171266
007562 012777 000001 171260
007570 004737 015626
007574 012777 000001 171246
007602 004737 015626
007606 012777 000001 171234
007614 004737 015626
007620 012777 000001 171222
007626 004737 015626

007632 017700 171216
007636 022700 000001
007642 001402
007644 000000
007646 000406

007650 017700 171202
007654 022700 000001
007660 001401
007662 000000
```

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

GT62: SCOPE

```
MOV DBUF,RO
MOV #116000,(0)+
CLR (0)+
CLR (0)+
MOV #130000,(0)+
MOV #201,(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 #1,RO
BEQ .+6
HALT
BR GT63

MOV @YPOS,RO
CMP #1,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, INCREMENT X AXIS FAILED USING
:RELATIVE POINT MODE

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



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1494
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1499
1500 010022 104000
1501 010024 012703 000077
1502 010030 012702 000001
1503 010034 012704 000201
1504 010040 104000
1505 010042 013700 001022
1506 010046 012720 116000
1507 010052 005020
1508 010054 005020
1509 010056 012720 130000
1510 010062 010420
1511 010064 013777 001022 170756
1512 010072 012777 000001 170750
1513 010100 004737 015626
1514 010104 012777 000001 170736
1515 010112 004737 015626
1516 010116 012777 000001 170724
1517 010124 004737 015626
1518 010130 012777 000001 170712
1519 010136 004737 015626
1520
1521 010142 017700 170706
1522 010146 020200
1523 010150 001402
1524 010152 000000
1525 010154 000413
1526
1527 010156 017700 170674
1528 010162 020200
1529 010164 001402
1530 010166 000000
1531 010170 000405
1532
1533 010172 062704 000201
1534 010176 005202
1535 010200 005303
1536 010202 001317

```

```

: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,@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
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 GT65: SCOPE
1544 010204 104000 MOV #77,R3 ;SET UP A COUNT LOCATION
1545 010206 012703 000077 MOV #1777,R2 ;SET UP THE COMPARED LOCATION
1546 010212 012702 001777 MOV #20301,R4 ;PRESET THE "DELTA X-Y"
1547 010216 012704 020301
1548 GT65A: SCOPE
1549 010222 104000 MOV DBUF,RO ;SET UP RO
1550 010224 013700 001022 MOV #116000,(0)+ ;LOAD "SET POINT DATA MODE"
1551 010230 012720 116000 CLR (0)+ ;CLEAR X AXIS
1552 010234 005020 CLR (0)+ ;CLEAR Y AXIS
1553 010236 005020 MOV #130000,(0)+ ;LOAD "SET RELATIVE POINT MODE"
1554 010240 012720 130000 MOV R4,(0)+ ;PRESET "DELTA X AND DELTA Y"
1555 010244 010420 MOV DBUF,@DPC ;LOAD THE DISPLAY P.C.
1556 010246 013777 001022 170574 MOV #1,@DPC ;SINGLE STEP THE DISPLAY
1557 010254 012777 000001 170566 JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1558 010262 004737 015626 MOV #1,@DPC ;SINGLE STEP THE DISPLAY
1559 010266 012777 000001 170554 JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1560 010274 004737 015626 MOV #1,@DPC ;SINGLE STEP THE DISPLAY
1561 010300 012777 000001 170542 JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1562 010306 004737 015626 MOV #1,@DPC ;SINGLE STEP THE DISPLAY
1563 010312 012777 000001 170530 JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1564 010320 004737 015626
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 ;DECREMENT X AXIS FAILED USING
1569 010336 000413 BR GT66 ;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 ;DECREMENT Y AXIS FAILED USING
1575 010352 000405 BR GT66 ;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 0C1317 BNE GT65A ;NO, TEST MORE DATA
1581

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1583
1584
1585 ;LOAD STATUS B TEST
1586 ;USE GRAPHPLOT X MODE TO TEST Y AXIS IS INCREMENTED BY
1587 ;"SCALE" REGISTER
1588
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

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1624
1625 ;LOAD STATUS B TEST
1626 ;USE GRAPHLOT 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 GRAPHLOT Y MODE"
1641 010622 005020 CLR (0)+ ;LOAD "Y GRAPHLOT DATA"
1642 010624 013777 001022 170216 MOV DBUF,3DPC ;LOAD THE DISPLAY P.C.
1643 010632 012777 000001 170210 MOV #1,3DPC ;SINGLE STEP THE DISPLAY
1644 010640 004737 015626 JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1645 010644 012777 000001 170176 MOV #1,3DPC ;SINGLE STEP THE DISPLAY
1646 010652 004737 015626 JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1647 010656 012777 000001 170164 MOV #1,3DPC ;SINGLE STEP THE DISPLAY
1648 010664 004737 015626 JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1649 010670 012777 000001 170152 MOV #1,3DPC ;SINGLE STEP THE DISPLAY
1650 010676 004737 015626 JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1651 010702 012777 000001 170140 MOV #1,3DPC ;SINGLE STEP THE DISPLAY
1652 010710 004737 015626 JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1653
1654 010714 017700 170134 MOV 3XPOS,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 #174100,3DBUF
1668 010754 013777 001022 170066 MOV DBUF,3DPC

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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,DPCC ;START DISPLAY
1683 011032 012777 000001 170010      MOV      #1,DPCC ;SINGLE STEP THE DISPLAY
1684 011040 004737 015626      JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1685 011044 012777 000001 167776      MOV      #1,DPCC ;SINGLE STEP THE DISPLAY
1686 011052 004737 015626      JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1687
1688 011056 032777 000040 167766      BIT      #40,DSR ;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,DPCC ;SINGLE STEP THE DISPLAY
1694 011100 004737 015626      JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1695 011104 012777 000001 167736      MOV      #1,DPCC ;SINGLE STEP THE DISPLAY
1696 011112 004737 015626      JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1697 011115 012777 000001 167724      MOV      #1,DPCC ;SINGLE STEP THE DISPLAY
1698 011124 004737 015626      JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1699 011130 012777 000001 167712      MOV      #1,DPCC ;SINGLE STEP THE DISPLAY
1700 011136 004737 015626      JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1701
1702 011142 032777 000040 167702      BIT      #40,DSR ;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,DPCC ;START DISPLAY AGAIN
1708 011164 012777 000001 167656      MOV      #1,DPCC ;SINGLE STEP THE DISPLAY
1709 011172 004737 015626      JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1710 011176 012777 000001 167644      MOV      #1,DPCC ;SINGLE STEP THE DISPLAY
1711 011204 004737 015626      JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1712 011210 032777 000040 167634      BIT      #40,DSR ;TEST BIT 5
1713 011216 001401          BEQ      .+4
1714 011220 000000          HALT ;EDGE FLAG FAILED TO CLEAR

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1716
1717
1718           :EDGE FLAG TEST
1719           :TEST THAT EXCEEDING -X AXIS SETS EDGE FLAG
1720
1721 011222 104000          GT71: SCOPE
1722 011224 013700 001022      MOV      DBUF,RO
1723 011230 012720 116000      MOV      #116000,(0)+      ;LOAD POINT
1724 011234 012720 000000      MOV      #0,(0)+          ;LOAD MAX X
1725 011240 012720 000000      MOV      #0,(0)+          ;LOAD Y
1726 011244 012720 110000      MOV      #110000,(0)+     ;LOAD LONG VECTOR
1727 011250 012720 020001      MOV      #20001,(0)+      ;LOAD DELTA X
1728 011254 012720 000000      MOV      #0,(0)+          ;LOAD DELTA Y
1729 011260 012720 172000      MOV      #172000,(0)+     ;LOAD STOP
1730 011264 013777 001022 167556  MOV      DBUF,ADPC        ;START DISPLAY
1731 011272 012777 000001 167550  MOV      #1,ADPC          ;SINGLE STEP THE DISPLAY
1732 011300 004737 015626      JSR      7,DLAY           ;EXECUTE A PROGRAM DELAY
1733 011304 012777 000001 167536  MOV      #1,ADPC          ;SINGLE STEP THE DISPLAY
1734 011312 004737 015626      JSR      7,DLAY           ;EXECUTE A PROGRAM DELAY
1735
1736 011316 032777 000040 167526  BIT      #40,ADSR         ;TEST BIT 5
1737 011324 001402          BEQ      .+6
1738 011326 000000          HALT
1739 011330 000454          BR      GT72
1740
1741 011332 012777 000001 167510  MOV      #1,ADPC          ;SINGLE STEP THE DISPLAY
1742 011340 004737 015626      JSR      7,DLAY           ;EXECUTE A PROGRAM DELAY
1743 011344 012777 000001 167476  MOV      #1,ADPC          ;SINGLE STEP THE DISPLAY
1744 011352 004737 015626      JSR      7,DLAY           ;EXECUTE A PROGRAM DELAY
1745 011356 012777 000001 167464  MOV      #1,ADPC          ;SINGLE STEP THE DISPLAY
1746 011364 004737 015626      JSR      7,DLAY           ;EXECUTE A PROGRAM DELAY
1747 011370 012777 000001 167452  MOV      #1,ADPC          ;SINGLE STEP THE DISPLAY
1748 011376 004737 015626      JSR      7,DLAY           ;EXECUTE A PROGRAM DELAY
1749
1750 011402 032777 000040 167442  BIT      #40,ADSR         ;TEST BIT 5
1751 011410 001002          BNE      .+6
1752 011412 000000          HALT
1753 011414 000520          BR      GT73
1754
1755 011416 013777 001022 167424  MOV      DBUF,ADPC        ;START DISPLAY AGAIN
1756 011424 012777 000001 167416  MOV      #1,ADPC          ;SINGLE STEP THE DISPLAY
1757 011432 004737 015626      JSR      7,DLAY           ;EXECUTE A PROGRAM DELAY
1758 011436 012777 000001 167404  MOV      #1,ADPC          ;SINGLE STEP THE DISPLAY
1759 011444 004737 015626      JSR      7,DLAY           ;EXECUTE A PROGRAM DELAY
1760 011450 032777 000040 167374  BIT      #40,ADSR         ;TEST BIT 5
1761 011456 001401          BEQ      .+4
1762 011460 000000          HALT
           :EDGE FLAG FAILED TO CLEAR

```

```

1764
1765
1766           :EDGE FLAG TEST
1767           :TEST THAT EXCEEDING +Y AXIS SETS EDGE FLAG
1768
1769           GT72:  SCOPE
1770 011462 104000           MOV      DBUF, RD
1771 011464 013700 061022  MOV      #116000, (0)+ ;LOAD POINT
1772 011470 012720 115000  MOV      #0, (0)+ ;LOAD X
1773 011474 012720 000700  MOV      GSYAXS, (0)+ ;LOAD MAX Y
1774 011500 013720 001012  MOV      #110000, (0)+ ;LOAD LONG VECTOR
1775 011504 012720 110000  MOV      #0, (0)+ ;LOAD DELTA X
1776 011510 012720 000000  MOV      #1, (0)+ ;LOAD DELTA Y
1777 011520 012720 172000  MOV      #172000, (0)+ ;LOAD STOP
1778 011524 013777 001022 167316  MOV      DBUF, @DPC ;START DISPLAY
1779 011532 012777 000001 167310  MOV      #1, @DPC ;SINGLE STEP THE DISPLAY
1780 011540 004737 015626           JSR      7, @LAY ;EXECUTE A PROGRAM DELAY
1781 011544 012777 000001 167276  MOV      #1, @DPC ;SINGLE STEP THE DISPLAY
1782 011552 004737 015626           JSR      7, @LAY ;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, @DPC ;SINGLE STEP THE DISPLAY
1790 011600 004737 015626           JSR      7, @LAY ;EXECUTE A PROGRAM DELAY
1791 011604 012777 000001 167236  MOV      #1, @DPC ;SINGLE STEP THE DISPLAY
1792 011612 004737 015626           JSR      7, @LAY ;EXECUTE A PROGRAM DELAY
1793 011616 012777 000001 167224  MOV      #1, @DPC ;SINGLE STEP THE DISPLAY
1794 011624 004737 015626           JSR      7, @LAY ;EXECUTE A PROGRAM DELAY
1795 011630 012777 000001 167212  MOV      #1, @DPC ;SINGLE STEP THE DISPLAY
1796 011636 004737 015626           JSR      7, @LAY ;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

```

```

1804
1805
1806           ;EDGE FLAG TEST
1807           ;TEST THAT EXCEEDING -Y AXIS SETS EDGE FLAG
1808
1809           GT73:  SCOPE
1810           MOV     DBUF,RO
1811           MOV     #116000,(0)+ ;LOAD POINT
1812           MOV     #0,(0)+      ;LOAD X
1813           MOV     #0,(0)+      ;LOAD Y
1814           MOV     #110000,(0)+ ;LOAD LONG VECTOR
1815           MOV     #0,(0)+      ;LOAD DELTA X
1816           MOV     #20001,(0)+  ;LOAD DELTA Y
1817           MOV     #172000,(0)+ ;LOAD STOP
1818           MOV     DBUF,ADPC    ;START DISPLAY
1819           MOV     #1,ADPC      ;SINGLE STEP THE DISPLAY
1820           JSR     7,DLAY       ;EXECUTE A PROGRAM DELAY
1821           MOV     #1,ADPC      ;SINGLE STEP THE DISPLAY
1822           JSR     7,DLAY       ;EXECUTE A PROGRAM DELAY
1823
1824           MOV     #40,ADSR     ;TEST BIT 5
1825           BEQ     .+6
1826           HALT
1827           BR     GT74         ;EDGE FLAG SET IN ERROR
1828
1829           MOV     #1,ADPC      ;SINGLE STEP THE DISPLAY
1830           JSR     7,DLAY       ;EXECUTE A PROGRAM DELAY
1831           MOV     #1,ADPC      ;SINGLE STEP THE DISPLAY
1832           JSR     7,DLAY       ;EXECUTE A PROGRAM DELAY
1833           MOV     #1,ADPC      ;SINGLE STEP THE DISPLAY
1834           JSR     7,DLAY       ;EXECUTE A PROGRAM DELAY
1835           MOV     #1,ADPC      ;SINGLE STEP THE DISPLAY
1836           JSR     7,DLAY       ;EXECUTE A PROGRAM DELAY
1837
1838           MOV     #40,ADSR     ;TEST BIT 5
1839           BNE     .+6
1840           HALT
1841           BR     GT74         ;EDGE FLAG FAILED TO SET
1842
1843           MOV     DBUF,ADPC    ;START DISPLAY AGAIN
1844           MOV     #1,ADPC      ;SINGLE STEP THE DISPLAY
1845           JSR     7,DLAY       ;EXECUTE A PROGRAM DELAY
1846           MOV     #1,ADPC      ;SINGLE STEP THE DISPLAY
1847           JSR     7,DLAY       ;EXECUTE A PROGRAM DELAY
1848           BIT     #40,ADSR     ;TEST BIT 5
1849           BEQ     .+4
1850           HALT .             ;EDGE FLAG FAILED TO CLEAR

```

```

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, R0 ;READ CHARACTER REG.
1862 012160 042700 001777          BIC      #1777, R0 ;MASK TO BITS 10-15
1863 012164 022700 000000          CMP      #0, R0
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, R0 ;READ CHARACTER REG.
1877 012236 042700 001777          BIC      #1777, R0 ;MASK TO BITS 10-15
1878 012242 022700 176000          CMP      #176000, R0
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, R0 ;READ CHARACTER REG.
1893 012320 042700 001777          BIC      #1777, R0 ;MASK TO BITS 10-15
1894 012324 022700 052000          CMP      #52000, R0
1895 012330 001401          BEQ     .+4
1896 012332 000000          HALT ;ERROR, CHARACTER REGISTER LOADED IN ERROR

```

```

1898
1899
1900
1901
1902
1903 012334 104000
1904 012336 012777 100000 166456
1905 012344 012777 000052 166452
1906 012352 013777 001022 166470
1907 012360 004737 015626
1908 012364 012777 000001 166456
1909 012372 017700 166460
1910 012376 042700 001777
1911 012402 022700 124000
1912 012406 001401
1913 012410 000000

: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, @DPC ;START DISPLAY
JSR 7, @LAY ;EXECUTE A PROGRAM DELAY
MOV #1, @DPC ;SINGLE STEP THE DISPLAY
MOV @YPOS, R0 ;READ CHARACTER REG.
BIC #1777, R0 ;MASK TO BITS 10-15
CMP #124000, R0
BEQ .+4
HALT ;ERROR, CHARACTER REGISTER LOADED IN ERROR

1914
1915
1916
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

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, @DPC ;LOAD THE DISPLAY P.C.
MOV #1, @DPC ;SINGLE STEP THE DISPLAY
JSR 7, @LAY ;EXECUTE A PROGRAM DELAY
MOV #1, @DPC ;SINGLE STEP THE DISPLAY
JSR 7, @LAY ;EXECUTE A PROGRAM DELAY
MOV #1, @DPC ;SINGLE STEP THE DISPLAY
JSR 7, @LAY ;EXECUTE A PROGRAM DELAY
MOV #1, @DPC ;SINGLE STEP THE DISPLAY
JSR 7, @LAY ;EXECUTE A PROGRAM DELAY
MOV #1, @DPC ;SINGLE STEP THE DISPLAY
JSR 7, @LAY ;EXECUTE A PROGRAM DELAY
MOV @YPOS, R0 ;READ CHARACTER REGISTER
BIC #1777, R0 ;MASK TO BITS 10-15
CMP #0, R0
BEQ .+6
HALT ;CHARACTER REGISTER IN ERROR
BR GT79

MOV @XPOS, R0 ;READ X AXIS
CMP #1000, R0 ;ARE THEY EQUAL ?
BEQ .+6 ;YES
HALT ;"NULL" CHARACTER CHANGED X AXIS
BR GT79

MOV @YPOS, R0 ;READ Y AXIS
BIC #176000, R0 ;MASK TO BITS 0-9
CMP #1000, R0 ;ARE THEY EQUAL ?
BEQ .+4 ;YES
HALT ;"NULL" CHARACTER CHANGED Y AXIS

```

```

1953
1954
1955 :TEST THAT CHARACTER MODE DOES NOT HANG THE DISPLAY PROCESSOR
1956 :TEST THAT "CR" DOES CHANGE X AND DOES NOT CHANGE Y AXIS
1957
1958 012606 104300 GT79: SCOPE
1959 012610 012777 116000 166204 MOV #116000, @DBUF :POINT MODE
1960 012616 012777 001000 156200 MOV #1000, @DBUF1
1961 012624 012777 001000 166174 MOV #1000, @DBUF2 :1000,1000
1962 012632 012777 100000 166170 MOV #100000, @DBUF3 :LOAD "CHARACTER MODE"
1963 012640 012777 000015 166164 MOV #15, @DBUF4 :LOAD "CR"
1964 012646 013777 001022 166174 MOV @BUF, @DPC :LOAD THE DISPLAY P.C.
1965 012654 012777 000001 166166 MOV #1, @DPC :SINGLE STEP THE DISPLAY
1966 012662 004737 015626 JSR 7, @LAY :EXECUTE A PROGRAM DELAY
1967 012666 012777 000001 166154 MOV #1, @DPC :SINGLE STEP THE DISPLAY
1968 012674 004737 015626 JSR 7, @LAY :EXECUTE A PROGRAM DELAY
1969 012700 012777 000001 166142 MOV #1, @DPC :SINGLE STEP THE DISPLAY
1970 012706 004737 015626 JSR 7, @LAY :EXECUTE A PROGRAM DELAY
1971 012712 012777 000001 166130 MOV #1, @DPC :SINGLE STEP THE DISPLAY
1972 012720 004737 015626 JSR 7, @LAY :EXECUTE A PROGRAM DELAY
1973
1974 012724 017700 166126 MOV @YPOS, R0 :READ Y AXIS
1975 012730 042700 001777 BIC #1777, R0 :MASK TO BITS 10-15
1976 012734 022700 032000 CMP #32000, R0
1977 012740 001402 BEQ .+6
1978 012742 000000 HALT
1979 012744 000417 BR GT80 :CHARACTER REGISTER FAILED TO LOAD CORRECTLY
1980
1981 012746 017700 166102 MOV @XPOS, R0 :READ X AXIS
1982 012752 022700 000000 CMP #0, R0 :ARE THEY EQUAL ?
1983 012756 001402 BEQ .+6 :YES
1984 012760 000000 HALT : "CR" CHARACTER FAILED TO CHANGED X AXIS CORRECTLY
1985 012762 000410 BR GT80
1986
1987 012764 017700 166066 MOV @YPOS, R0 :READ Y AXIS
1988 012770 042700 176000 BIC #176000, R0 :MASK TO BITS 0-9
1989 012774 022700 001000 CMP #1000, R0 :ARE THEY EQUAL ?
1990 013000 001401 BEQ .+4 :YES
1991 013002 000000 HALT : "CR" CHARACTER CHANGED Y AXIS
1992

```

```

1994
1995
1996
1997
1998
1999 013004 104000
2000 013006 012777 116000 166006
2001 013014 012777 001000 166002
2002 013022 012777 001000 165776
2003 013030 012777 100000 165772
2004 013036 012777 000012 165766
2005 013044 013777 001022 165776
2006 013052 012777 000001 165770
2007 013060 004737 015626
2008 013064 012777 000001 165756
2009 013072 004737 015626
2010 013076 012777 000001 165744
2011 013104 004737 015626
2012 013110 012777 000001 165732
2013 013116 004737 015626
2014
2015 013122 017700 165730
2016 013126 042700 001777
2017 013132 022700 024000
2018 013136 001402
2019 013140 000000
2020 013142 000417
2021
2022 013144 017700 165704
2023 013150 022700 001000
2024 013154 001402
2025 013156 000000
2026 013160 000410
2027
2028 013162 017700 165670
2029 013166 042700 176000
2030 013172 023700 001044
2031 013176 001401
2032 013200 000000
2033

```

: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

```



```

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          GTB1: 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     GTB2
2103
2104 013540 017700 165310              MOV    @XPOS, R0       ;READ X AXIS
2105 013544 023700 001046              CMP    @HSIZE, 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     GTB2
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     GTB2
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

```



```

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
2188 014116 000407 BR GT84 ;SHIFT STATUS BIT SET IN ERROR
2189 ; CHARACTER IS IN R3
2190
2191 014120 005203 GT83B: INC R3
2192 014122 022703 000017 CMP #17, R3 ;TEST FOR "SHIFT-IN"
2193 014126 001774 BEQ GT83B
2194 014134 001340 000040 CMP #40, R3 ;TEST FOR #40
2195 ;IS IT #40
2196 ;YES, NEXT TEST
2197
2198 ;TEST THAT "SHIFT-OUT" FOLLOWED BY CODE 40 GENERATE A
2199 ;SHIFT STATUS BIT
2200
2201 014136 104000 GT84: SCOPE
2202 014140 000005 RESET
2203 014142 012777 100000 164652 MOV #100000, @DBUF ;LOAD SET CHAR MODE
2204 014150 012777 000016 164646 MOV #16, @DBUF1 ;LOAD "SHIFT-OUT" INTO THE LOW BYTE
2205 014156 112737 000040 015755 GT84A: MOV #40, @BUFFER+3 ;LOAD HIGH BYTE
2206 014164 013777 001022 164656 MOV @DBUF, @DPC ;START THE DISPLAY
2207 014172 004737 015626 JSR PC, @LAY ;DELAY
2208 014176 012777 000001 164644 MOV #1, @DPC ;SINGLE STEP THE DISPLAY
2209 014204 004737 015626 JSR 7, @LAY ;EXECUTE A PROGRAM DELAY
2210
2211 014210 032777 000100 164634 BIT #100, @DSR ;TEST 'SHIFT' STATUS BIT
2212 014216 001002 BNE .+6
2213 014220 000000 HALT
2214 014222 000441 BR GT85 ;"SHIFT-OUT" STATUS BIT FAILED TO SET
;ON CHARACTER IN R3

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2216
2217 014224 000005          RESET          ;POWER CLEAR
2218 014226 032777 000100 164616 BIT #100,ADSR ;TEST FOR NO "SHIFT-OUT"
2219 014234 001402          BEQ 1$          ;BR IF NOT SET
2220 014236 000000          HALT          ;"SHIFT-OUT" FLAG FAILED TO CLEAR
2221 014240 000432          BR GT85
2222
2223 014242 112737 000100 015755 1$: MOVB #100,BUFFER+3 ;LOAD HIGT BYTE
2224 014250 013777 001022 164572 MOV DBUF,ADPC ;START DISPLAY
2225 014256 004737 015626          JSR PC,DLAY ;DELAY
2226 014262 012777 000001 164560 MOV #1,ADPC ;SINGLE STEP THE DISPLAY
2227 014270 004737 015626          JSR PC,DLAY ;DELAY
2228
2229 014274 032777 000100 164550 BIT #100,ADSR ;TEST "SHIFT-OUT" STATUS BIT
2230 014302 001002          BNE .+6        ;BR IF SET
2231 014304 000000          HALT          ;"SHIFT-OUT" STATUS BIT FAILED TO SET
2232 014306 000407          BR GT85        ;ON #100
2233
2234 014310 000005          RESET          ;POWER CLEAR
2235 014312 032777 000100 164532 BIT #100,ADSR ;TEST BIT
2236 014320 001402          BEQ GT85       ;BR IF CLEARED
2237 014322 000000          HALT          ;"INIT" FAILED TO CLEAR "SHIFT-OUT"STATUS
2238 014324 000400          BR GT85
2239
2240
2241          ;TEST THAT 'SHIFT-OUT' IN THE HIGH BYTE FOLLOWED BY A CHARACTER
2242          ; IN THE NEXT LOW BYTE GENERATES A STATUS BIT
2243
2244          GT85: SCOPE
2245 014326 104000          MOV #100000,ADBUF ;LOAD SET 'CHAR' MODE
2246 014330 012777 100000 164464 MOV #7000,ADBUF1 ;LOAD 'SHIFT-OUT' INTO THE HIGH BYTE
2247 014336 012777 007000 164460 MOV #40,ADBUF2 ;LOAD A SHIFT-OUT CHARACTER IN THE NEXT
2248 014344 012777 000040 164454 ;WORD <LOW BYTE>
2249
2250 014352 000005          RESET          ;START THE DISPLAY
2251 014354 013777 001022 164466 MOV DBUF,ADPC ;SINGLE STEP THE DISPLAY
2252 014362 012777 000001 164460 MOV #1,ADPC ;EXECUTE A PROGRAM DELAY
2253 014370 004737 015626          JSR 7,DLAY ;SINGLE STEP THE DISPLAY
2254 014374 012777 000001 164446 MOV #1,ADPC ;EXECUTE A PROGRAM DELAY
2255 014402 004737 015626          JSR 7,DLAY
2256
2256 014406 032777 000100 164436 BIT #100,ADSR ;TEST THE STATUS REGISTER
2257 014414 001002          BNE .+6        ;SHIFT-OUT IN THE HIGH BYTE FAILED TO
2258 014416 000000          HALT          ;SET A STATUS BIT
2259 014420 000410          BR GT86
2260
2261 014422 017700 164430          MOV AYPOS,RO ;READ Y POS
2262 014426 042700 001777          BIC #1777,RO ;MASK TO BITS 15-10
2263 014432 022700 100000          CMP #100000,RO ;TEST FOR CHAR #40
2264 014436 001401          BEQ .+4
2265 014440 000000          HALT          ;CHARACTER REGISTER IN ERROR AFTER A
2266          ; "SHIFT-OUT" <HIGH BYTE> FOLLOWED BY
2267          ; #40 <LOW BYTE NEXT WORD>
2268

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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 ;SINGLE STEP THE DISPLAY
2303 014614 012777 000001 164226 MOV #1,@DPC
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)+ ;GT-40 STOP (DONE) INTERRUPTED TO
2314 014650 000000 HALT ; THE GT-40 TIME OUT VECTOR
2315
2316 014652 000402 BR GT88
2317
2318 014654 022626 GT87C: CMP (SP)+,(SP)+ ;GT-40 STOP (DONE) INTERRUPTED
2319 014656 000000 HALT ; 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          GT98B: 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 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 16372C      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 00106E 163732      MOV      LPVCT1, @LPVCT
  
```

```

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 ;BR LEVEL WAS 0
2390 015144 022737 000340 001004 CMP #340,DSPBR
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,@DPC ;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,@DPC
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 ;SINGLE STEP THE DISPLAY
MOV #1, @DPC ;SINGLE STEP THE DISPLAY
JSR PC, DLAY ;SINGLE STEP THE DISPLAY
MOV #1, @DPC ;SINGLE STEP THE DISPLAY
JSR PC, DLAY ;SINGLE STEP THE DISPLAY
MOV #1, @DPC ;SINGLE STEP THE DISPLAY
RESET ;GENERATE "INIT"
TST @DPC
BEQ .+6 ;RESET FAILED TO CLEAR DISPLAY PC
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

```

```

2494                                     :SCOPE ROUTINE
2495
2496 015606 032777 040000 162356 SCOPEA: BIT    #40000,DSWR    ;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 01270C 000400        DLAY:  MOV    #400,RO
2503 015632 005300                DLAYA: DEC    RO
2504 015634 001376                BNE    DLAYA
2505 015636 000207                RTS    7
2506
2507 015640 012700 001000        DLAY1: MOV    #1000,RO
2508 015644 005300                DLAY1A: DEC   RO
2509 015646 001376                BNE    DLAY1A
2510 015650 000207                RTS    7
2511
2512 015652 010046                LOWPWR: MOV   RO,-(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,2#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)+,RO
2528 015722 012737 015652 000024  MOV   #LOWPWR,2#24
2529 015730 012706 000500        MCV   #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                BUJFER: 0
2540
2541                                .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*									
CHS:ZE	001046	246*	290*	291*	293*	2105													
CONTR	001042	244*																	
CSLF	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	780*					
		807	808	829*	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					
		155	1770	1778	1810	1818	1843	1856*	1859	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										
CBJF1	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*					
CBJF2	001026	2131*	2180*	2203*	2246*	2279*	2300*	2332*	2447*										
		238*	767*	778	885*	901*	917*	935*	952*	981*	1004*	1031*	1056*	1083*					
CBJF3	001030	1920*	1961*	2002*	2043*	2084*	2132*	2247*	2448*										
		239*	768*	794	953*	982*	1005*	1032*	1057*	1084*	1921*	1962*	2003*	2044*					
CBJF4	001032	2085*	2133*	2449*															
CBJF5	001034	240*	769*	790	954*	1922*	1963*	2004*	2045*	2086*	2134*								
CCONE	001060	241*																	
CCONE1	001062	264*	281	285	294*	2275*	2296*	2309*	2328*	2360*	2407*	2424*	2435*						
CLAY	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	1479	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	1920					
		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*							
CLAYA	015632	2503*	2504																
CLAY1	015640	677	688	2507*															
CLAY1A	015644	2508*	2509																
CCOCRE	001016	292	314*																
CPC	001050	259*	275	279	343*	344	350*	351	359*	359	366*	367	373	374*					
		405*	415*	425*	438*	448*	460*	469*	478*	489*	499*	509*	519*	520*					
		540*	548*	556*	565*	575*	585*	594*	604*	616*	626*	636*	648*	649*					
		666*	676*	687*	698*	712*	721*	730*	739*	748*	751*	765*	770	780*					
		777	782*	789*	798*	809*	821*	832*	843*	857*	871*	883*	886	899*					
		845	857*	858*	859*	859*	859*	859*	859*	859*	859*	859*	859*	859*					

GT28	003322	674#			
GT29	003364	685#			
GT30	001774	423#			
GT31	003426	696#			
GT32	003464	710#			
GT33	003522	719#			
GT34	003560	728#			
GT35	003616	737#			
GT36	003654	746#			
GT37	003732	764#			
GT37A	004110	775	781	787	800#
GT4	004154	811#	921		
GT40	002032	435#			
GT41	004216	816	819	927#	
GT42	004264	838#			
GT43	004336	851#			
GT44	004414	865#			
GT45	004474	882#			
GT46	004554	898#			
GT47	004634	914#			
GT48	004714	932#			
GT49	004774	949#			
GT5	005126	962	978#		
GT50	002072	446#			
GT51	005230	989	1001#		
GT52	005346	1013	1028#		
GT53	005464	1040	1053#		
GT54	005602	1065	1080#		
GT55	005720	1092	1107#		
GT56	006112	1134	1146#		
GT56A	006304	1173	1185#		
GT57	006320	1190#	1223		
GT57A	006472	1213	1219	1229#	
GT58	006512	1235#	1269		
GT59	006666	1258	1264	1275#	
GT6	007024	1296	1309#		
GT60	002130	458#			
GT60A	007162	1330	1343#		
GT61	007202	1349#	1380		
GT61A	007344	1369	1375	1397#	
GT62	007364	1393#	1424		
GT63	007626	1413	1419	1431#	
GT64	007664	1452	1465#		
GT64A	010022	1486	1499#		
GT65	010042	1505#	1536		
GT65A	010204	1525	1531	1543#	
GT66	010224	1549#	1580		
GT66A	010366	1569	1575	1589#	
GT67	010410	1595#	1622		
GT67A	010554	1618	1629#		
GT67B	010576	1635#	1664		
GT7	010746	1667#			
GT7C	002166	467#			
	010762	1659	1673#		

DELAY	251*	749	888	904	920	938	957	966	985	992	1008	1016	1035	1043	1060
	1068	1087	1095	1118	1120	1122	1124	1126	1128	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	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
	1693	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
	2225	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	1998	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	2389	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		
	1173	1213	1219	1258	1264	1296	1330	1369	1375	1413	1419	1452	1486	1525	1531		
	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		
	1508	1551	1552	1597	1598	1601	1637	1638	1641	1922	2176	2280	2301	2333	2363		
	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	903		
	810	813	818	833	846	860	874	890	906	922	940	959	968	1010	1018		
	1037	1045	1062	1070	1089	1097	1131	1137	1170	1176	1210	1216	1255	1261	1293		
	1299	1327	1333	1366	1372	1410	1416	1449	1455	1483	1489	1522	1528	1566	1572		
	1615	1656	1863	1678	1894	1910	1935	1941	1948	1976	1982	1989	2017	2023	2030		
	2058	2064	2071	2099	2105	2112	2147	2159	2166	2191	2193	2263	2310	2313	2319		
	2342	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		
	2314	2319	2340	2347	2351	2366	2382	2389	2392	2415	2434	2462	2468	2520	2532		
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	698	749	888	904	920	938	957	966	985	992		
	1008	1016	1035	1043	1060	1068	1087	1095	1118	1120	1122	1124	1126	1128	1157		

MCV

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
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1891	1906	1925	1927	1929	1931	1966	1968	1970	1972	2007	2009	2011	2013	2048
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2227	2252	2254	2365	2380	2451	2453	2455	2457	2479	2483				
275	276	277	281	282	283	287	290	294	296	298	300	301	302	307
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	499	499	500	508	509	510	518	519	520	528
529	530	539	540	541	547	548	549	555	556	557	564	565	566	574
575	576	584	585	586	593	594	595	603	604	605	615	616	617	625
626	627	637	638	639	647	648	649	656	657	658	665	666	667	675
676	678	686	687	689	697	698	699	711	712	713	720	721	722	729
730	731	738	739	740	747	748	750	751	752	765	766	767	768	769
770	771	776	777	782	783	788	789	801	802	807	808	809	812	820
828	829	830	831	832	839	840	842	843	844	845	852	853	856	857
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937	939	950	951	952	953	954	955	956	958	964	965	967	979	982
983	984	986	991	993	1002	1003	1004	1005	1006	1007	1009	1015	1017	1029
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1153	1154	1155	1156	1158	1160	1162	1164	1156	1169	1175	1186	1187	1190	1191
1194	1195	1196	1197	1198	1200	1202	1204	1206	1209	1215	1230	1231	1232	1235
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1362	1365	1371	1388	1389	1390	1393	1394	1397	1398	1399	1400	1402	1404	1406
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1470	1471	1472	1473	1475	1477	1479	1482	1488	1500	1501	1502	1505	1506	1509
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1933	1940	1946	1959	1960	1961	1962	1963	1964	1965	1967	1969	1971	1974	1981
1987	2000	2001	2002	2003	2004	2005	2006	2008	2010	2012	2015	2022	2029	2041
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2085	2086	2087	2088	2090	2092	2094	2097	2104	2110	2119	2130	2131	2132	2133
2134	2135	2136	2138	2140	2142	2145	2152	2158	2164	2177	2178	2180	2181	2182
2202	2206	2205	2207	2224	2226	2245	2246	2247	2250	2251	2253	2261	2275	2276
2277	2278	2279	2281	2282	2296	2297	2298	2299	2300	2302	2303	2309	2328	2329
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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	582	693	703	2283	2284	2285	2286	2304	2305	2306	2307	2336	2337	2309	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												
*ST	319	373	374	375	376	650	659	668	2460						
*STB	2487	2490													
.ENABL	174														
.END	2541														
.LIST	3	176	194	205											
.MACR	248	251	254												
.NLIST	1	2	177	179	200										
.REM	4														
.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