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IDENTIFICATION

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

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1. ABSTRACT

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

2. REQUIREMENTS

2.1 EQUIPMENT

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

2.2 STORAGE

THIS PROGRAM USED MEMORY LOCATIONS 0-16000 <LESS THAN 4K OF MEMORY>.

3. LOADING PROCEDURE

3.1 METHOD

PROCEDURE FOR NORMAL BINARY TAPES SHOULD BE FOLLOWED.

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS

SWITCH BIT 14 = 1 LOOP ON TEST

4.2 STARTING ADDRESS OR ADDRESSES

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

5. OPERATING PROCEDURE

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

6. ERRORS

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

7. RESTRICTIONS

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

8. MISCELANEOUS

8.1 EXECUTION TIME

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

8.2 DEVICE ADDRESS PROGRAM LOCATIONS

LOCATION 1000 CONTAINS THE GT40/GT44 DEVICE ADDRESS
LOCATION 1002 CONTAINS THE GT40/GT44 INTERRUPT VECTOR.
LOCATION 1004 CONTAINS THE GT40/GT44 INTERRUPT LEVEL.
LOCATION 1006 CONTAINS THE GT40/GT44 CHARACTER SIZE.
LOCATION 1010 CONTAINS THE GT40/GT44 LINE FEED SIZE.
LOCATION 1012 CONTAINS THE GT40/GT44 +Y AXIS CUTOFF LOCATION.
(LOC. 1012 = 1377 IF VR14 SCOPE)
(LOC. 1012 = 1777 IF VR17 SCOPE)

9. PROGRAM DESCRIPTION

9.1 SUBTEST 1

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

9.2 SUBTEST 2

<MAINT. SWITCH 1 RESET, MAINT. SWITCH 2 SET>
THIS SUBTEST IS A COMPLEX TEST OF THE DISPLAY STATUS, X AXIS AND Y AXIS REGISTERS. THE PROGRAM ALSO TESTS STOP<DONE>, LIGHT-PEN, TIME-OUT AND SHIFT-OUT INTERRUPTS AND VECTORS. ALSO INCLUDED ARE TESTS FOR MODE, LINE-TYPE, BLINK, INTENSITY LEVELS, ITALICS AND COLOR CHANGE. THE 'RESUME' <DSTEP> INSTRUCTION IS USED TO SINGLE STEP THRU THE DISPLAY FILE. ALL DISPLAY INSTRUCTIONS ARE TESTED FOR PROPER OPERATION. TESTS ARE ALSO MADE FOR SETTING OF THE 'EDGE' FLAG, WHEN EXCEEDING ALL FOUR DISPLAY EDGES. TESTS ARE ALSO MADE THAT 'NULL', 'CR', 'LF' AND 'BS' CHANGE X OR Y AXIS CORRECTLY. WITH THE MAINT. SWITCHES SET IN THIS POSITION THE PROGRAM CAN SINGLE STEP THE DISPLAY CONTROLLER THRU A DISPLAY FILE (1 NPR AT A TIME) AND CHECK FOR PROPER OPERATION.

.ENABL ABS,AMA
.TITLE GT-40/GT-44 INSTRUCTION TEST I MAINDEC-11-DOGTA-C

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

165									
166									
167									
168									
169		000000							
170	000000	000000							
171	000002	000000							
172									
173		000024							
174	000024	015556							
175	000026	000340							
176		000030							
177	000030	015512							
178	000032	000340							
179		000046							
180	000046	015432							
181									
182		000174							
183	000174	000137	001342						
184	000200	000137	001544						
185									
186		001000							
187	001000	172000							
188	001002	000320							
189	001004	000200							
190	001006	000016							
191	001010	000030							
192	001012	001777							
193	001014	000177							
194									
195	001016	000000							
196	001020	177776							
197	001022	015656							
198	001024	015660							
199	001026	015662							
200	001030	015664							
201	001032	015666							
202	001034	015670							
203	001036	000000							
204	001040	017476							
205	001042	000000							
206	001044	000750							
207	001046	000762							

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

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

.=46
LOGICAL ;XXDP-ACT FLAG

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

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

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

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;GS ADDRESSES AND VECTORS

001050	172000	DPC:	172000	;DISPLAY PC REGISTER
001052	172002	DSR:	172002	;DISPLAY STATUS REGISTER
001054	172004	XPOS:	172004	;X AXIS REGISTER <READ ONLY>
001056	172006	YPOS:	172006	;Y AXIS REGISTER AND GRAPHLOT REGISTER <READ ONLY>
001060	000320	DDONE:	320	;DISPLAY STOP <DONE> VECTOR
001062	000322	DDONE1:	322	;
001064	000324	LPVCT:	324	;DISPLAY LIGHT PEN VECTOR
001066	000326	LPVCT1:	326	;
001070	000330	TIMEVT:	330	;DISPLAY TIME-OUT <NXM.> ERROR VECTOR
001072	000332	TMEVT1:	332	; OR "SHIFT-OUT" VECTOR

;GS INITIALIZATION ROUTINE

001074	012700	001050	SETUP:	MOV	#DPC, R0	;SET UP POINTER
001100	013701	001000		MOV	GSADD, R1	
001104	010120		SETUPA:	MOV	R1, (0)+	
001106	062701	000002		ADD	#2, R1	
001112	022700	001060		CMP	#DPC+10, R0	
001116	001372			BNE	SETUPA	
001120	012700	001060		MOV	#DDONE, R0	
001124	013701	001002		MOV	GSVCT, R1	
001130	010120		SETUPB:	MOV	R1, (0)+	
001132	062701	000002		ADD	#2, R1	
001136	022700	001074		CMP	#DDONE+14, R0	
001142	001372			BNE	SETUPB	
001144	013737	001010	001044	MOV	GSIFSZ, LFSIZE	;SET UP DELTA LF
001152	005437	001044		NEG	LFSIZE	;NEGATE IT
001156	042737	177000	001044	BIC	#177000, LFSIZE	;MASK IT
001164	013737	001006	001046	MOV	GSCHSZ, CHSIZE	;SET UP DELTA CHAR
001172	005437	001046		NEG	CHSIZE	;NEGATE IT
001176	004737	001250		JSR	PC, DDCORE	
001202	042737	177000	001046	BIC	#177000, CHSIZE	;MASK IT
001210	013777	001062	177642	MOV	DDONE1, DDONE	
001216	005077	177640		CLR	DDONE1	
001222	013777	001066	177634	MOV	LPVCT1, LPVCT	
001230	005077	177632		CLR	LPVCT1	
001234	013777	001072	177626	MOV	TMEVT1, TIMEVT	
001242	005037	001072		CLR	TMEVT1	
001246	000207			RTS	PC	

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255 ;SUBROUTINE TO DETERMINE THE SIZE OF CORE
256 ; AND SET UP LOCATION SIZE WITH THE VALUE
257
258 001250 012737 001300 000004 DOCORE: MOV #25,384 ;SET UP FOR NEM
259 001251 012701 017776 MOV #17776,R1 ;SET UP ADDRESS
260 001262 062701 020000 1S: ADD #20000,R1 ;MOVE TO THE NEXT BANK
261 001266 005711 TST (R1) ;TIMEOUT ?
262 001270 022701 177776 CMP #177776,R1 ;END ?
263 001274 001372 BNE 1S
264 001276 000401 BR 3S
265 001300 022626 2S: CMP (SP)+,(SP)+ ;POP STACK
266 001302 012737 000006 000004 3S: MOV #5,384 ;RESET BUSS ERROR
267 001310 162701 020000 SUB #20000,R1
268 001314 022701 017776 CMP #17776,R1 ;TEST FOR 4K MACHINE
269 001320 001003 BNE 4S ;BR IF NOT 4K
270 001322 162701 000400 SUB #400,R1 ;SAVE LOADERS
271 001326 000402 BR 5S
272 001330 162701 010000 4S: SUB #10000,R1 ;ADJUST FOR XXDP
273 001334 010137 001040 5S: MOV R1,SIZE ;SET UP SIZE LENGTH
274 001340 000207 RTS PC ;EXIT
  
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275
276 001342 012777 000340 177450 START: MOV      #340, DPCW
277 001350 012706 000500          MOV      #STKPTR, SP
278 001354 004737 001074          JSR      PC, SETUP
279 001360 005037 001016          CLR      ICNT
280 001364 012701 001372          MOV      #PCTST0+2, R1      ;CLEAR PASS COUNT
281
282          ;DOES THE DISPLAY PC LOAD PROPERLY
283          ;BASIC TEST
284
285 001370 104000          PCTST0: SCOPE
286 001372 013737 001016 177570      MOV      ICNT, #DISPLAY
287 001400 005077 177444          CLR      DPC
288 001404 017700 177440          MOV      DPC, R0          ;CLEAR DISPLAY P.C.
289 001410 001401          BEQ      .+4             ;READ DPC AND SAVE IN R0
290 001412 000000          HALT                    ;DPC EQUAL TO ZERO?
291                                     ;NO, DISPLAY P.C. FAILED TO RESET
292
293
294 001414 104000          PCTST1: SCOPE
295 001416 012777 017776 177424      MOV      #17776, DPC
296 001424 017700 177420          MOV      DPC, R0          ;LOAD 17776 INTO DISPLAY P.C.
297 001430 022700 017776          CMP      #17776, R0      ;READ DPC AND SAVE IN R0.
298 001434 001401          BEQ      .+4             ;ARE THEY EQUAL ?
299 001436 000000          HALT                    ;YES
300                                     ;NO, DISPLAY P.C. FAILED TO SET
301
302
303 001440 104000          PCTST2: SCOPE
304 001442 012777 012524 177400      MOV      #12524, DPC
305 001450 017700 177374          MOV      DPC, R0          ;LOAD 12524 INTO DISPLAY P.C.
306 001454 022700 012524          CMP      #12524, R0      ;READ DPC AND SAVE IN R0.
307 001460 001401          BEQ      .+4             ;DPC EQUAL TO 12524
308 001462 000000          HALT                    ;DISPLAY P.C. FAILED TO LOAD PROPERLY
309                                     ;12524
310
311
312 001464 104000          PCTST3: SCOPE
313 001466 012777 005252 177354      MOV      #5252, DPC
314 001474 017700 177350          MOV      DPC, R0          ;LOAD 5252 INTO DISPLAY P.C.
315 001500 022700 005252          CMP      #5252, R0      ;READ DPC AND SAVE IN R0
316 001504 001401          BEQ      .+4             ;DPC EQUAL TO 5252?
317 001506 000000          HALT                    ;DISPLAY P.C. FAILED TO LOAD PROPERLY
318                                     ;5252
319
320
321
322 001510 005777 177334          PCTST4: TST      DPC
323 001514 005777 177332          TST      DSR
324 001520 005777 177330          TST      XPOS
325 001524 005777 177326          TST      YPOS
326
327
328 001530 005237 001016          INC      ICNT
329 001534 001315          BNE     PCTST0
330 001536 004737 015452          JSR     PC, BELL
331 001542 000712          BR      PCTST0          ;RING BELL

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326 001544 012777 000340 177246 STARTB: MOV      #340, @PSW
327 001552 012706 000500          MOV      #STKPTR, SP
328 001556 004737 001074          JSR      PC, SETUP
329 001562 005037 001016          CLR      ICNT
330 001566 012701 001574          MOV      @GTO+2, R1
331
332          ;MODE REGISTER TEST
333          ;DOES THE "MODE" REGISTER LOAD PROPERLY
334
335          GT0:  SCOPE
336 001572 104000          MOV      ICNT, @DISPLAY
337 001574 013737 001016 177570          MOV      #100000, @DBUF          ;LOAD MODE REGISTER=0
338 001602 012777 100000 177212          MOV      @DBUF, @PC           ;LOAD DISPLAY PC
339 001610 013777 001022 177232          MOV      @DSR, R0            ;READ DISPLAY STATUS REGISTER
340 001616 017700 177230          BIC      #103777, R0         ;MASK TO BITS 14-11
341 001622 042700 103777          CMP      #40000, R0         ;TEST R0
342 001626 022700 040000          BEQ      .+4
343 001632 001401          BEQ      .+4
344 001634 000000          HALT                          ;MODE BITS (14-11) FAILED TO RESET
345
346          GT1:  SCOPE
347 001636 104000          MOV      #174000, @DBUF      ;LOAD MODE REGISTER=17
348 001640 012777 174000 177154          MOV      @DBUF, @PC         ;LOAD DISPLAY PC
349 001646 013777 001022 177174          MOV      @DSR, R0          ;READ DISPLAY STATUS REGISTER
350 001654 017700 177172          BIC      #103777, R0       ;MASK TO BITS 14-11
351 001660 042700 103777          CMP      #74000, R0        ;TEST R0
352 001664 022700 074000          BEQ      .+4
353 001670 001401          BEQ      .+4
354 001672 000000          HALT                          ;MODE BITS (14-11) FAILED TO SET
355
356          GT2:  SCOPE
357 001674 104000          MOV      #140000, @DBUF     ;LOAD MODE REGISTER=10
358 001676 012777 140000 177116          MOV      @DBUF, @PC         ;LOAD DISPLAY P.C.
359 001704 013777 001022 177136          MOV      @DSR, R0          ;READ DISPLAY STATUS REGISTER
360 001712 017700 177134          BIC      #103777, R0       ;MASK TO BITS 14-11
361 001716 042700 103777          CMP      #40000, R0        ;TEST R0
362 001722 022700 040000          BEQ      .+4
363 001726 001401          BEQ      .+4
364 001730 000000          HALT                          ;MODE BIT 14 FAILED TO SET
365
366          GT3:  SCOPE
367 001732 104000          MOV      #160000, @DBUF     ;LOAD MODE REGISTER=14
368 001734 012777 160000 177060          MOV      @DBUF, @PC         ;LOAD DISPLAY P.C.
369 001742 013777 001022 177100          MOV      @DSR, R0          ;READ DISPLAY STATUS REGISTER
370 001750 017700 177076          BIC      #103777, R0       ;MASK TO BITS 14-11
371 001754 042700 103777          CMP      #60000, R0        ;TEST R0
372 001760 022700 060000          BEQ      .+4
373 001764 001401          BEQ      .+4
374 001766 000000          HALT                          ;MODE BIT 13 FAILED TO SET

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427										
429	002220	104000			GT9:	SCOPE				
429	002222	012777	100006	176572		MOV	#100006, 20BUF	;	LINE TYPE ENABLE =1 LINE TYPE =2	
430	002230	013777	001022	176612		MOV	DEUF, 20PC	;	LOAD DISPLAY P.C.	
431	002236	017700	176610			MOV	20SR, R0	;	READ DISPLAY STATUS REGISTER	
432	002242	042700	177774			BIC	#177774, R0	;	MASK TO BITS 1-0	
433	002246	022700	000002			CMP	#2, R0	;	TEST R0	
434	002252	001401				BEQ	+.4			
435	002254	000000				HALT			;	LINE BIT 1 FAILED TO SET
436										
437										
438	002256	104000			GT10:	SCOPE				
439	002260	012777	100003	176534		MOV	#100003, 20BUF	;	LINE TYPE ENABLE =0 LINE TYPE =3	
440	002266	013777	001022	176554		MOV	DEUF, 20PC	;	LOAD DISPLAY P.C.	
441	002274	017700	176552			MOV	20SR, R0	;	READ DISPLAY STATUS REGISTER	
442	002300	042700	177774			BIC	#177774, R0	;	MASK TO BITS 1-0	
443	002304	022700	000002			CMP	#2, R0	;	TEST R0	
444	002310	001401				BEQ	+.4		;	SHOULD NOT CHANGE LT VALUE
445	002312	000000				HALT			;	LINE TYPE ENABLE FAILED TO INHIBIT
446									;	CHANGING OF LINETYPE VALUE
447										
448	002314	104000			GT11:	SCOPE				
449	002316	012777	100020	176476		MOV	#100020, 20BUF	;	BLINK ENABLE =1 BLINK =0	
450	002324	013777	001022	176516		MOV	DEUF, 20PC	;	LOAD DISPLAY P.C.	
451	002332	017700	176514			MOV	20SR, R0	;	READ DISPLAY STATUS REGISTER	
452	002336	042700	177767			BIC	#177767, R0	;	MASK TO BIT 3	
453	002342	022700	000000			CMP	#0, R0	;	TEST R0	
454	002346	001401				BEQ	+.4			
455	002350	000000				HALT			;	BLINK BIT FAILED TO RESET
456										
457										
458	002352	104000			GT12:	SCOPE				
459	002354	012777	100030	176440		MOV	#100030, 20BUF	;	BLINK ENABLE =1 BLINK =1	
460	002362	013777	001022	176460		MOV	DEUF, 20PC	;	LOAD DISPLAY P.C.	
461	002370	017700	176456			MOV	20SR, R0	;	READ DISPLAY STATUS REGISTER	
462	002374	042700	177767			BIC	#177767, R0	;	MASK TO BIT 3	
463	002400	022700	000010			CMP	#10, R0	;	TEST R0	
464	002404	001401				BEQ	+.4			
465	002406	000000				HALT			;	BLINK BIT FAILED TO SET
466										
467										
468	002410	104000			GT13:	SCOPE				
469	002412	012777	100000	176402		MOV	#100000, 20BUF	;	BLINK ENABLE =0 BLINK =0	
470	002420	013777	001022	176422		MOV	DEUF, 20PC	;	LOAD DISPLAY P.C.	
471	002426	017700	176420			MOV	20SR, R0	;	READ DISPLAY STATUS REGISTER	
472	002432	042700	177767			BIC	#177767, R0	;	MASK TO BIT 3	
473	002436	022700	000010			CMP	#10, R0	;	TEST R0	
474	002442	001401				BEQ	+.4			
475	002444	000000				HALT			;	BLINK ENABLE FAILED TO INHIBIT
476									;	CHANGING OF THE BLINK BIT

477									
478	002446	104000			GT14:	SCOPE			
479	002450	012777	100100	176344		MOV	#100100,20BUF	:LP ENABLE =1 LP=0	
480	002456	013777	001022	176364		MOV	DEBUF,20PC	:LOAD DISPLAY P.C.	
481	002464	017700	176362			MOV	20SR,R0	:READ STATUS	
482	002470	032700	000200			BIT	#200,R0	:	
483	002474	001401				BEQ	+.4	:	
484	002476	000000				HALT		:LIGHT PEN FLAG SET IN ERROR	
485									
486	002500	104000			GT15:	SCOPE			
487	002502	012777	100140	176312		MOV	#100140,20BUF	:LP ENABLE =1 LP=1	
488	002510	013777	001022	176332		MOV	DEBUF,20PC	:LOAD DISPLAY P.C.	
489	002516	017700	176330			MOV	20SR,R0	:READ STATUS	
490	002522	032700	000200			BIT	#200,R0	:	
491	002526	001401				BEQ	+.4	:	
492	002530	000000				HALT		:LIGHT PEN FLAG SET IN ERROR	
493									
494	002532	104000			GT16:	SCOPE			
495	002534	012777	102000	176260		MOV	#102000,20BUF	:INTENSITY LEVEL ENABLE =1 LEVEL =0	
496	002542	013777	001022	176300		MOV	DEBUF,20PC	:LOAD DISPLAY P.C.	
497	002550	017700	176276			MOV	20SR,R0	:READ DISPLAY STATUS REGISTER	
498	002554	042700	174377			BIC	#174377,R0	:MASK TO BITS 8-10	
499	002560	022700	000000			CMR	#0,R0	:TEST R0	
500	002564	001401				BEQ	+.4	:	
501	002566	000000				HALT		:INTENSITY LEVEL BITS 8-10 FAILED TO RESET	
502									
503	002570	104000			GT17:	SCOPE			
504	002572	012777	103600	176222		MOV	#103600,20BUF	:INTENSITY LEVEL ENABLE =1 LEVEL =7	
505	002600	013777	001022	176242		MOV	DEBUF,20PC	:LOAD DISPLAY P.C.	
506	002606	017700	176240			MOV	20SR,R0	:READ DISPLAY STATUS REGISTER	
507	002612	042700	174377			BIC	#174377,R0	:MASK TO BITS 8-10	
508	002616	022700	003400			CMR	#3400,R0	:TEST R0	
509	002622	001401				BEQ	+.4	:	
510	002624	000000				HALT		:INTENSITY LEVEL BITS 8-10 FAILED TO SET	
511									
512									
513	002626	104000			GT18:	SCOPE			
514	002630	012777	103000	176164		MOV	#103000,20BUF	:INTENSITY LEVEL ENABLE =1 LEVEL =4	
515	002636	013777	001022	176204		MOV	DEBUF,20PC	:LOAD DISPLAY P.C.	
516	002644	017700	176202			MOV	20SR,R0	:READ DISPLAY STATUS REGISTER	
517	002650	042700	174377			BIC	#174377,R0	:MASK TO BITS 8-10	
518	002654	022700	002000			CMR	#2000,R0	:TEST R0	
519	002660	001401				BEQ	+.4	:	
520	002662	000000				HALT		:INTENSITY LEVEL BIT 10 FAILED	

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002664 104000          GT19: SCOPE
002666 012777 102400 176126  MOV      #102400,20BUF ; INTENSITY LEVEL ENABLE =1 LEVEL =2
002674 013777 001022 176146  MOV      DBUF,20PC   ; LOAD DISPLAY P.C.
002702 017700 176144  MOV      20SR,R0    ; READ DISPLAY STATUS REGISTER
002706 042700 174377  BIC      #174377,R0 ; MASK TO BITS 8-10
002712 022700 001000  CMP      #1000,R0   ; TEST R0
002716 001401  BEQ     .+4
002720 000000  HALT                ; INTENSITY LEVEL BIT 9 FAILED

002722 104000          GT20: SCOPE
002724 012777 102200 176070  MOV      #102200,20BUF ; INTENSITY LEVEL ENABLE =1 LEVEL =1
002732 013777 001022 176110  MOV      DBUF,20PC   ; LOAD DISPLAY P.C.
002740 017700 176106  MOV      20SR,R0    ; READ DISPLAY STATUS REGISTER
002744 042700 174377  BIC      #174377,R0 ; MASK TO BITS 8-10
002750 022700 000400  CMP      #400,R0   ; TEST R0
002754 001401  BEQ     .+4
002756 000000  HALT                ; INTENSITY LEVEL BIT 8 FAILED

002760 104000          GT21: SCOPE
002762 012777 101600 176032  MOV      #101600,20BUF ; INTENSITY LEVEL ENABLE =0 LEVEL =7
002770 013777 001022 176052  MOV      DBUF,20PC   ; LOAD DISPLAY P.C.
002776 017700 176050  MOV      20SR,R0    ; READ DISPLAY STATUS REGISTER
003002 042700 174377  BIC      #174377,R0 ; MASK TO BITS 8-10
003006 022700 000400  CMP      #400,R0   ; TEST R0
003012 001401  BEQ     .+4
003014 000000  HALT                ; INTENSITY LEVEL ENABLE FAILED TO INHIBIT
; INTENSITY LEVEL CHANGE

; TESTED BY "LOAD STATUS REGISTER A"

003016 104000          GT22: SCOPE
003020 012777 170040 175774  MOV      #170040,20BUF ; ITALICS ENABLE=1 ITALICS=0
003026 013777 001022 176014  MOV      DBUF,20PC   ; LOAD DISPLAY P.C.
003034 017700 176012  MOV      20SR,R0    ; READ DISPLAY STATUS REGISTER
003040 042700 177757  BIC      #177757,R0 ; MASK TO BIT 4
003044 022700 000000  CMP      #0,R0     ; TEST R0
003050 001401  BEQ     .+4
003052 000000  HALT                ; ITALICS BIT FAILED TO RESET

003054 104000          GT23: SCOPE
003056 012777 170060 175736  MOV      #170060,20BUF ; ITALICS ENABLE=1 ITALICS=1
003064 013777 001022 175756  MOV      DBUF,20PC   ; LOAD DISPLAY P.C.
003072 017700 175754  MOV      20SR,R0    ; READY DISPLAY STATUS REGISTER
003076 042700 177757  BIC      #177757,R0 ; MASK TO BIT 4
003102 022700 000020  CMP      #20,R0   ; TEST R0
003106 001401  BEQ     .+4
003110 000000  HALT                ; ITALICS BIT FAILED TO SET

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573									
574	003112	104000			GT24:	SCOPE			
575	003114	012777	170000	175700		MOV	#170000, D0BUF	:	ITALICS ENABLE=0 ITALICS=0
576	003122	013777	001022	175720		MOV	D0BUF, D0PC	:	LOAD DISPLAY P.C.
577	003130	017700	175716			MOV	D0SR, R0	:	READ DISPLAY STATUS REGISTER
578	003134	042700	177757			BIC	#177757, R0	:	MASK TO BITS 4
579	003140	022700	000020			CMF	R20, R0	:	TEST R0
580	003144	001401				BEQ	.+4	:	
581	003146	000000				HALT		:	ITALICS ENABLE FAILED TO INHIBIT
582								:	CLEARING OF ITALICS BIT
583									
584	003150	104000			GT25:	SCOPE			
585	003152	012777	170000	175642		MOV	#170000, D0BUF	:	"STOP" BIT =0
586	003160	013777	001022	175662		MOV	D0BUF, D0PC	:	LOAD DISPLAY P.C.
587	003166	017700	175660			MOV	D0SR, R0	:	READ DISPLAY STATUS REGISTER
588	003172	005700				TST	R0	:	TEST BIT 15
589	003174	100001				BPL	.+4	:	
590	003176	000000				HALT		:	"STOP" BIT FAILED TO RESET
591									
592									
593	003200	104000			GT26:	SCOPE			
594	003202	012777	172000	175612		MOV	#172000, D0BUF	:	"STOP" BIT =1
595	003210	013777	001022	175632		MOV	D0BUF, D0PC	:	LOAD DISPLAY P.C.
596	003216	017700	175630			MOV	D0SR, R0	:	READ DISPLAY STATUS REGISTER
597	003222	005700				TST	R0	:	TEST BIT 15
598	003224	100401				BMI	.+4	:	
599	003226	000000				HALT		:	"STOP" BIT FAILED TO SET
600									
601									
602	003230	104000			GT27:	SCOPE			
603	003232	012777	170000	175562		MOV	#170000, D0BUF	:	"STOP" BIT =1
604	003240	013777	001022	175602		MOV	D0BUF, D0PC	:	LOAD DISPLAY P.C.
605	003246	017700	175600			MOV	D0SR, R0	:	READ DISPLAY STATUS REGISTER
606	003252	005700				TST	R0	:	TEST BIT 15
607	003254	100001				BPL	.+4	:	
608	003256	000000				HALT		:	"STOP" BIT FAILED TO RESET


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643
644
645 ;GRAPHPLOT INCREMENT REGISTER TEST
646 003422 104000 GT31: SCOPE
647 003424 012777 174100 175370 MOV #174100,20BUF ;LOAD GRAPHPLOT COUNTER
648 003432 013777 001022 175410 MOV 20BUF,20PC ;START DISPLAY
649 003440 017700 175410 MOV 20POS,R0 ;READ INCREMENT REGISTER
650 003444 042700 001777 BIC #1777,R0 ;MASK TO BITS 15-10
651 003450 022700 000000 CMP #0,R0
652 003454 001401 BEQ .+4
653 003456 000000 HALT ;GRAPHPLOT REGISTER IN ERROR
654
655 00346C 104000 GT32: SCOPE
656 003462 012777 174177 175332 MOV #174177,20BUF ;LOAD GRAPHPLOT COUNTER
657 003470 013777 001022 175352 MOV 20BUF,20PC ;START DISPLAY
658 003476 017700 175352 MOV 20POS,R0 ;READ INCREMENT REGISTER
659 003502 042700 001777 BIC #1777,R0 ;MASK TO BITS 15-10
660 003506 022700 176000 CMP #176000,R0
661 003512 001401 BEQ .+4
662 003514 000000 HALT ;GRAPHPLOT REGISTER IN ERROR
663
664 003516 104000 GT33: SCOPE
665 003520 012777 174152 175274 MOV #174152,20BUF ;LOAD GRAPHPLOT COUNTER
666 003526 013777 001022 175314 MOV 20BUF,20PC ;START DISPLAY
667 003534 017700 175314 MOV 20POS,R0 ;READ INCREMENT REGISTER
668 003540 042700 001777 BIC #1777,R0 ;MASK TO BITS 15-10
669 003544 022700 124000 CMP #124000,R0
670 003550 001401 BEQ .+4
671 003552 000000 HALT ;GRAPHPLOT REGISTER IN ERROR
672
673 003554 104000 GT34: SCOPE
674 003556 012777 174125 175236 MOV #174125,20BUF ;LOAD GRAPHPLOT COUNTER
675 003564 013777 001022 175256 MOV 20BUF,20PC ;START DISPLAY
676 003572 017700 175256 MOV 20POS,R0 ;READ INCREMENT REGISTER
677 003576 042700 001777 BIC #1777,R0 ;MASK TO BITS 15-10
678 003602 022700 052000 CMP #52000,R0
679 003606 001401 BEQ .+4
680 003610 000000 HALT ;GRAPHPLOT REGISTER IN ERROR
681
682 003612 104000 GT35: SCOPE
683 003614 012777 174100 175200 MOV #174100,20BUF ;LOAD GRAPHPLOT COUNTER WITH 0
684 003622 013777 001022 175220 MOV 20BUF,20PC ;START DISPLAY
685 003630 004737 015532 JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
686 003634 012777 174077 175160 MOV #174077,20BUF ;LOAD GRAPHPLOT NO ENABLE
687 003642 013777 001022 175200 MOV 20BUF,20PC ;START DISPLAY
688 003650 017700 175200 MOV 20POS,R0 ;READ INCREMENT REGISTER
689 003654 042700 001777 BIC #1777,R0 ;MASK TO BITS 15-10
690 003660 022700 000000 CMP #0,R0 ;ARE THEY EQUAL ?
691 003664 001401 BEQ .+4
692 003666 000000 HALT ;GRAPHPLOT REGISTER CHANGED WITHOUT
693 ; THE ENABLE BEING SET

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;NOP TEST <INCREMENT PC TEST>
;SIMPLE - 4 INCREMENTS

GT36: SCOPE

003670	104000		
003672	012777	164000	175122
003700	012777	164000	175116
003706	012777	164000	175112
003714	012777	164000	175106
003722	012777	164000	175102
003730	013777	001022	175112
003736	017700	175106	
003742	023700	001024	
003746	001402		
003750	000000		
003752	000435		
003754	012777	000001	175066
003762	017700	175062	
003766	023700	001026	
003772	001402		
003774	000000		
003776	000423		
004000	012777	000001	175042
004006	017700	175036	
004012	023700	001030	
004016	001402		
004020	000000		
004022	000411		
004024	012777	000001	175016
004032	017700	175012	
004036	023700	001032	
004042	001401		
004044	000000		

MOV	#164000,2DBUF	;MOVE DNOP INTO BUFFER
MOV	#164000,2DBUF1	;MOVE DNOP INTO BUFFER
MOV	#164000,2DBUF2	;MOVE DNOP INTO BUFFER
MOV	#164000,2DBUF3	;MOVE DNOP INTO BUFFER
MOV	#164000,2DBUF4	;MOVE DNOP INTO BUFFER
MOV	DBUF,2DPC	;START THE DISPLAY
MOV	2DPC,RO	;READ THE DISPLAY P.C.
CMP	DBUF1,RO	;DID IT INCREMENT BY 2?
BEQ	.+6	
HALT		;DISPLAY P.C. FAILED TO INCREMENT
BR	GT37	
MOV	#1,2DPC	;SINGLE STEP THE DISPLAY
MOV	2DPC,RO	;READ THE DISPLAY P.C.
CMP	DBUF2,RO	;DID IT INCREMENT BY 2?
BEQ	.+6	
HALT		;DISPLAY P.C. FAILED TO INCREMENT
BR	GT37	
MOV	#1,2DPC	;SINGLE STEP THE DISPLAY
MOV	2DPC,RO	;READ THE DISPLAY P.C.
CMP	DBUF3,RO	;DID IT INCREMENT BY 2?
BEQ	.+6	
HALT		;DISPLAY P.C. FAILED TO INCREMENT
BR	GT37	
MOV	#1,2DPC	;SINGLE STEP THE DISPLAY
MOV	2DPC,RO	;READ THE DISPLAY P.C.
CMP	DBUF4,RO	;DID IT INCREMENT BY 2?
BEQ	.+4	
HALT		;DISPLAY P.C. FAILED TO INCREMENT

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730
731      ;DNOP TEST <INCREMENT P.C. TEST>
732      ;COMPLEX - BUFFER LENGTH
733
734      004046 104000
735      004050 013702 001022
736      004054 012722 164000
737      004060 023702 001040
738      004064 001373
739
740      004066 104000
741      004070 013777 001022 174752
742      004076 013737 001022 001036
743      004104 013702 001040
744      004110 024242
745      004112 062737 000002 001036 GT37A:
746      004120 017700 174724
747      004124 023700 001036
748      004130 001402
749      004132 000000
750      004134 000407
751
752      004136 020237 001036      IS:
753      004142 001404
754      004144 012777 000001 174676
755      004152 000757
756

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;DNOP TEST <INCREMENT P.C. TEST>
;COMPLEX - BUFFER LENGTH

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GT37:  SCOPE
      MOV  DBUF,R2      ;SET UP POINTER
      IS:  MOV  #164000,(2)+ ;MOVE DNOP INTO THE BUFFER
      CMP  SIZE,R2     ;FINISHED FILLING THE BUFFER?
      BNE  IS          ;NO

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      SCOPE
      MOV  DBUF,20PC   ;YES, START THE DISPLAY
      MOV  DBUF,DSAVE
      MOV  SIZE,R2     ;SETUP A COUNT
      CMP  -(R2),-(R2) ;DEC BY 2
      ADD  #2,DSAVE
      MOV  20PC,RO     ;READ DISPLAY P.C.
      CMP  DSAVE,RO   ;DID IT INCREMENT BY 2?
      BEQ  IS          ;YES
      HALT             ;DISPLAY PC FAILED TO INCREMENT
      BR   GT40        ;PROPERLY

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      IS:  CMP  R2,DSAVE ;FINISHED THE BUFFER
      BEQ  GT40        ;YES
      MOV  #1,20PC     ;SINGLE STEP THE DISPLAY
      BR   GT37A      ;TRY AGAIN

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803          :TEST THAT THE X POSITION REGISTER CAN BE LOADED CORRECTLY
804          :USING GRAPH PLOT X
805
806 004404 104000          GT44: SCOPE
807 004406 012777 122000 174406      MOV      @122000, @DBUF      ;LOW INTENSITY - SET GRAPH PLOT X MODE
808 004414 012777 001252 174402      MOV      @1252, @DBUF1     ;SET X POSITION
809 004422 012777 172000 174376      MOV      @172000, @DBUF2   ;LOAD STATUS REGISTER A, STOP
810 004430 013777 001022 174412      MOV      @DBUF, @DPC       ;LOAD DISPLAY P.C.
811 004436 012777 000001 174404      MOV      @1, @DPC          ;SINGLE STEP THE DISPLAY
812 004444 004737 015532              JSR      7, @LAY            ;EXECUTE A PROGRAM DELAY
813 004450 017700 174400              MOV      @XPOS, R0         ;READ X POSITION
814 004454 022700 001252              CMP      @1252, R0
815 004460 001401                      BEQ      .+4
816 004462 000000                      HALT

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;X POSITION REGISTER FAILED TO LOAD
;PROPERLY USING GRAPH PLOT X MODE

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818          :TEST THAT THE X POSITION REGISTER CAN BE LOADED CORRECTLY
819          :USING GRAPH PLOT X
820

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821          GT45: SCOPE
822 004464 104000          MOV      @122000, @DBUF     ;LOW INTENSITY - SET GRAPH PLOT X MODE
823 004466 012777 122000 174326      MOV      @525, @DBUF1     ;SET X POSITION
824 004474 012777 000525 174322      MOV      @172000, @DBUF2   ;LOAD STATUS REGISTER A, STOP
825 004502 012777 172000 174316      MOV      @DBUF, @DPC       ;LOAD THE DISPLAY P.C.
826 004510 013777 001022 174332      MOV      @1, @DPC          ;SINGLE STEP THE DISPLAY
827 004516 012777 000001 174324      JSR      7, @LAY            ;EXECUTE A PROGRAM DELAY
828 004524 004737 015532              MOV      @XPOS, R0         ;READ X POSITION
829 004530 017700 174320              CMP      @525, R0
830 004534 022700 000525              BEQ      .+4
831 004540 001401                      HALT

```

```

;X POSITION REGISTER FAILED TO LAD
;PROPERLY USING GRAPH PLOT X MODE

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833          :TEST THAT THE Y POSITION REGISTER CAN BE LOADED CORRECTLY
834          :USING GRAPH PLOT Y MODE
835

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836          GT46: SCOPE
837 004544 104000          MOV      @126000, @DBUF    ;LOW INTENSITY - SET GRAPH PLOT Y
838 004546 012777 126000 174246      MOV      @1252, @DBUF1     ;SET Y POSITION
839 004554 012777 001252 174242      MOV      @172000, @DBUF2   ;LOAD STATUS REGISTER A, STOP
840 004562 012777 172000 174236      MOV      @DBUF, @DPC       ;LOAD THE DISPLAY P.C.
841 004570 013777 001022 174252      MOV      @1, @DPC          ;SINGLE STEP THE DISPLAY
842 004576 012777 000001 174244      JSR      7, @LAY            ;EXECUTE A PROGRAM DELAY
843 004604 004737 015532              MOV      @YPOS, R0         ;READ Y POSITION
844 004610 017700 174242              CMP      @1252, R0
845 004614 022700 001252              BEQ      .+4
846 004620 001401                      HALT

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```

;Y POSITION REGISTER FAILED TO LOAD
;PROPERLY USING GRAPH PLOT Y MODE

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847 004620 001401
848 004622 000000
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851
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855 004624 104000
856 004626 012777 126000 174166
857 004634 012777 000525 174162
858 004642 012777 172000 174156
859 004650 013777 001022 174172
860 004656 012777 000001 174164
861 004664 004737 015532
862 004670 017700 174162
863 004674 022700 000525
864 004700 001401
865 004702 000000
866
867
868
869
870
871
872 004704 104000
873 004706 012777 122000 174106
874 004714 012777 001234 174102
875 004722 012777 126000 174076
876 004730 012777 001432 174072
877 004736 012777 172000 174066
878 004744 013777 001022 174076
879 004752 012777 000001 174070
880 004760 004737 015532
881 004764 017700 174064
882 004770 022700 001234
883 004774 001402
884 004776 000000
885 005000 000416
886
887 005002 012777 000001 174040
888 005010 012777 000001 174032
889 005016 004737 015532
890 005022 017700 174030
891 005026 022700 001432
892 005032 001401
893 005034 000000
894
895
    
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:TEST THAT THE Y POSITION REGISTER CAN BE LOADED CORRECTLY
:USING GRAPHPLOT Y MODE
    
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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, @PC         ;LOAD THE DISPLAY P.C.
      JSR      @1, @PC            ;SINGLE STEP THE DISPLAY
      JSR      @7, @LAY           ;EXECUTE A PROGRAM DELAY
      MOV      @YPOS, R0          ;READ Y POSITION
      CMP      @525, R0
      BEQ      .+4
      HALT
    
```

```

: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
    
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```

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, @PC         ;LOAD THE DISPLAY P.C.
      JSR      @1, @PC            ;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
      MOV      @1, @PC            ;SINGLE STEP THE DISPLAY
      MOV      @1, @PC            ;SINGLE STEP THE DISPLAY
      JSR      @7, @LAY           ;EXECUTE A PROGRAM DELAY
      MOV      @YPOS, R0          ;READ Y POSITION
      CMP      @1432, R0
      BEQ      .+4
      HALT
    
```

```

:Y POSITION REGISTER FAILED TO LOAD
:PROPERLY USING GRAPHPLOT Y MODE
    
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```

896
897          ;TEST THAT THE X-Y POSITION REGISTERS CAN BE RESET
898          ;USING POINT DATA MODE.
899
900          GT49:  SCOPE
901          005036 104000          MOV      #116000,2DBUF  ;LOW INTENSITY - POINT MODE
902          005040 012777 116000 173754 CLR      2DBUF1        ;CLEAR X POSITION
903          005046 005077 173752 CLR      2DBUF2        ;CLEAR Y POSITION
904          005052 005077 173750 MOV      #172000,2DBUF3 ;LOAD STATUS "A" REGISTER, STOP
905          005056 012777 172000 173744 MOV      DBUF,2DPC     ;LOAD DISPLAY P.C.
906          005064 013777 001022 173756 MOV      #1,2DPC      ;SINGLE STEP THE DISPLAY
907          005072 012777 000001 173750 JSR      7,DLAY       ;EXECUTE A PROGRAM DELAY
908          005100 004737 015532 MOV      2XPOS,RO    ;READ X POSITION
909          005104 017700 173744 BEQ      .+6         ;WAS IT 0?
910          005110 001402          HALT                    ;X POSITION REGISTER FAILED TO RESET
911          005112 000000          BR      GT50          ;USING POINT DATA MODE
912          005114 000411
913
914          005116 012777 000001 173724 MOV      #1,2DPC      ;SINGLE STEP THE DISPLAY
915          005124 004737 015532 JSR      7,DLAY       ;EXECUTE A PROGRAM DELAY
916          005130 017700 173722 MOV      2YPOS,RO    ;READ Y POSITION
917          005134 001401 BEQ      .+4         ;WAS IT 0?
918          005136 000000          HALT                    ;Y POSITION REGISTER FAILED TO RESET
919
920          ;TEST THAT THE X-Y POSITION REGISTERS CAN BE SET
921          ;USING POINT DATA MODE.
922
923          GT50:  SCOPE
924          005140 104000          MOV      #116000,2DBUF  ;LOW INTENSITY - POINT MODE
925          005142 012777 116000 173652 MOV      #1777,2DBUF1 ;SET X POSITION
926          005150 012777 001777 173646 MOV      #1777,2DBUF2 ;SET Y POSITION
927          005156 012777 001777 173642 MOV      #172000,2DBUF3 ;LOAD STATUS A REGISTER, STOP
928          005164 012777 172000 173636 MOV      DBUF,2DPC     ;LOAD DISPLAY P.C.
929          005172 013777 001022 173650 MOV      #1,2DPC      ;SINGLE STEP THE DISPLAY
930          005200 012777 000001 173642 JSR      7,DLAY       ;EXECUTE A PROGRAM DELAY
931          005206 004737 015532 MOV      2XPOS,RO    ;READ X POSITION
932          005212 017700 173636 CMP      #1777,RO     ;WAS IT SET?
933          005216 022700 001777 BEQ      .+6         ;
934          005222 001402          HALT                    ;X POSITION REGISTER FAILED TO SET
935          005224 000000          BR      GT51          ;USING POINT DATA MODE
936          005226 000413
937
938          005230 012777 000001 173612 MOV      #1,2DPC      ;SINGLE STEP THE DISPLAY
939          005236 004737 015532 JSR      7,DLAY       ;EXECUTE A PROGRAM DELAY
940          005242 017700 173610 MOV      2YPOS,RO    ;READ Y POSITION
941          005246 022700 001777 CMP      #1777,RO     ;WAS IT SET?
942          005252 001401 BEQ      .+4         ;
943          005254 000000          HALT                    ;Y POSITION REGISTER FAILED TO SET
944          ;USING POINT DATA MODE

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949 005256 104000
950 005260 012777 116000 173534
951 005266 012777 001252 173530
952 005274 012777 001252 173524
953 005302 012777 172000 173520
954 005310 013777 001022 173532
955 005316 012777 000001 173524
956 005324 004737 015532
957 005330 017700 173520
958 005334 022700 001252
959 005340 001402
960 005342 000000
961 005344 000413
962
963 005346 012777 000001 173474
964 005354 004737 015532
965 005360 017700 173472
966 005364 022700 001252
967 005370 001401
968 005372 000000
969
970
971
972
973
974 005374 104000
975 005376 012777 116000 173416
976 005404 012777 000525 173412
977 005412 012777 000525 173406
978 005420 012777 172000 173402
979 005426 013777 001022 173414
980 005434 012777 000001 173406
981 005442 004737 015532
982 005446 017700 173402
983 005452 022700 000525
984 005456 001402
985 005460 000000
986 005462 000413
987
988 005464 012777 000001 173356
989 005472 004737 015532
990 005476 017700 173354
991 005502 022700 000525
992 005506 001401
993 005510 000000
994
995

```

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

GT51: SCOPE

```

MOV #116000, @DBUF ;LOW INTENSITY - POINT MODE
MOV #1252, @DBUF1 ;SET X POSITION
MOV #1252, @DBUF2 ;SET Y POSITION
MOV #172000, @DBUF3 ;LOAD STATUS REGISTER A, STOP
MOV @DBUF, @DPC
MOV #1, @DPC ;SINGLE STEP THE DISPLAY
JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
MOV @XPOS, R0 ;READ X POSITION
CMP #1252, R0
BEQ .+6
HALT
BR GT52 ;X POSITION REGISTER FAILED
;USING POINT DATA MODE

MOV #1, @DPC ;SINGLE STEP THE DISPLAY
JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
MOV @YPOS, R0 ;READ Y POSITION
CMP #1252, R0
BEQ .+4
HALT ;Y POSITION REGISTER FAILED
;USING POINT DATA MODE

```

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

GT52: SCOPE

```

MOV #116000, @DBUF ;LOW INTENSITY - POINT MODE
MOV #525, @DBUF1 ;SET X POSITION
MOV #525, @DBUF2 ;SET Y POSITION
MOV #172000, @DBUF3 ;LOAD STATUS REGISTER A, STOP
MOV @DBUF, @DPC
MOV #1, @DPC ;SINGLE STEP THE DISPLAY
JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
MOV @XPOS, R0 ;READ X POSITION
CMP #525, R0
BEQ .+6
HALT
BR GT53 ;X POSITION REGISTER FAILED
;USING POINT DATA MODE

MOV #1, @DPC ;SINGLE STEP THE DISPLAY
JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
MOV @YPOS, R0 ;READ Y POSITION
CMP #525, R0
BEQ .+4
HALT ;Y POSITION REGISTER FAILED
;USING POINT DATA MODE

```

996
997
998
999
1000
1001
1002
1003
1004
1005
1006
1007
1008
1009
1010
1011
1012
1013
1014
1015
1016
1017
1018
1019
1020
1021

005512 104000
005514 012777 116000 173300
005522 012777 000000 173274
005530 012777 001777 173270
005536 012777 172000 173264
005544 013777 001022 173276
005552 012777 000001 173270
005560 004737 015532
005564 017700 173264
005570 022700 000000
005574 001402
005576 000000
005600 000413
005602 012777 000001 173240
005610 004737 015532
005614 017700 173236
005620 022700 001777
005624 001401
005626 000000

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

GT53: SCOPE
MOV 0116000, 30BUF ;LOW INTENSITY - POINT MODE
MOV 00, 30BUF1 ;SET X POSITION
MOV 01777, 30BUF2 ;SET Y POSITION
MOV 0172000, 30BUF3 ;LOAD STATUS REGISTER A, STOP
MOV 00BUF, 30PC
MOV 01, 30PC ;SINGLE STEP THE DISPLAY
JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
MOV 3XPOS, R0 ;READ X POSITION
CMP 00, R0
BEQ .+6
HALT
BR GT54 ;X POSITION REGISTER FAILED
:USING POINT DATA MODE
MOV 01, 30PC ;SINGLE STEP THE DISPLAY
JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
MOV 3YPOS, R0 ;READ Y POSITION
CMP 01777, R0
BEQ .+4
HALT ;Y POSITION REGISTER FAILED
:USING POINT DATA MODE

```

1022
1023          :TEST THAT LONG VECTOR MODE INCREMENTS X AND Y AXIS PROPERLY
1024          :COUNT 1
1025
1026 005630 104000          GT54: SCOPE
1027 005632 013700 001022   MOV     DBUF,RO
1028 005636 012720 116000   MOV     #116000,(0)+      :LOAD "POINT MODE"
1029 005642 005020          CLR     (0)+              :CLEAR X AXIS
1030 005644 005020          CLR     (0)+              :CLEAR Y AXIS
1031 005646 012720 110000   MOV     #110000,(0)+     :LOAD "LONG VECTOR MODE"
1032 005652 012720 000001   MOV     #1,(0)+         :PRESET "DELTA X AXIS"
1033 005656 012720 000001   MOV     #1,(0)+         :PRESET "DELTA Y AXIS"
1034 005662 012710 172000   MOV     #172000,(0)     :LOAD "DISPLAY STOP"
1035 005666 013777 001022 173154   MOV     DBUF,20PC       :LOAD THE DISPLAY P.C.
1036 005674 012777 000001 173146   MOV     #1,20PC        :SINGLE STEP THE DISPLAY
1037 005702 004737 015532   JSR     7,DLAY          :EXECUTE A PROGRAM DELAY
1038 005706 012777 000001 173134   MOV     #1,20PC        :SINGLE STEP THE DISPLAY
1039 005714 004737 015532   JSR     7,DLAY          :EXECUTE A PROGRAM DELAY
1040 005720 012777 000001 173122   MOV     #1,20PC        :SINGLE STEP THE DISPLAY
1041 005726 004737 015532   JSR     7,DLAY          :EXECUTE A PROGRAM DELAY
1042 005732 012777 000001 173110   MOV     #1,20PC        :SINGLE STEP THE DISPLAY
1043 005740 004737 015532   JSR     7,DLAY          :EXECUTE A PROGRAM DELAY
1044 005744 012777 000001 173076   MOV     #1,20PC        :SINGLE STEP THE DISPLAY
1045 005752 004737 015532   JSR     7,DLAY          :EXECUTE A PROGRAM DELAY
1046 005756 012777 000001 173064   MOV     #1,20PC        :SINGLE STEP THE DISPLAY
1047 005764 004737 015532   JSR     7,DLAY          :EXECUTE A PROGRAM DELAY
1048
1049 005770 017700 173060   MOV     2XPOS,RO        :READ X AXIS
1050 005774 022700 000001   CMP     #1,RO           :DID IT INCREMENT BY 1
1051 006000 001402          BEQ     .+6             :YES
1052 006002 000000          HALT                    :NO, INCREMENT X AXIS BY
1053 006004 000406          BR      GT55           :LONG VECTOR MODE FAILED
1054
1055 006006 017700 173044   MOV     2YPOS,RO        :READ Y AXIS
1056 006012 022700 000001   CMP     #1,RO           :DID IT INCREMENT BY 1
1057 006016 001401          BEQ     .+4             :YES
1058 006020 000000          HALT                    :NO, INCREMENT Y AXIS BY
1059          :LONG VECTOR MODE FAILED

```



```

1098
1099
1100      ;TEST THAT LONG VECTOR MODE INCREMENT X AND Y AXIS PROPERLY
1101      ;COUNT 0-1777
1102      006214 104000
1103      006216 012703 001777
1104      006222 012704 000001
1105
1106      006226 104000
1107      006230 013700 001022
1108      006234 012720 116000
1109      006240 005020
1110      006242 005020
1111      006244 012720 110000
1112      006250 010420
1113      006252 010420
1114      006254 013777 001022 172566
1115      006262 012777 000001 172560
1116      006270 004737 015532
1117      006274 012777 000001 172546
1118      006302 004737 015532
1119      006306 012777 000001 172534
1120      006314 004737 015532
1121      006320 012777 000001 172522
1122      006326 004737 015532
1123      006332 012777 000001 172510
1124      006340 004737 015532
1125
1126      006344 017700 172504
1127      006350 020400
1128      006352 001402
1129      006354 000000
1130      006356 000411
1131
1132      006360 017700 172472
1133      006364 020400
1134      006366 001402
1135      006370 000000
1136      006372 000403
1137
1138      006374 005204
1139      006376 005303
1140      006400 001313

```

GT56:	SCOPE				
	MOV	#1777,R3			:SET UP A COUNTER
	MOV	#1,R4			:PRESET THE COMPARED VALUE
GT56A:	SCOPE				
	MOV	DBUF,R0			:SET UP R0
	MOV	#116000,(0)+			:LOAD "POINT MODE"
	CLR	(0)+			:CLEAR X AXIS
	CLR	(0)+			:CLEAR Y AXIS
	MOV	#110000,(0)+			:LOAD "LONG VECTOR MODE"
	MOV	R4,(0)+			:PRESET "DELTA X AXIS"
	MOV	R4,(0)+			:PRESET "DELTA Y AXIS"
	MOV	DBUF,20PC			:LOAD THE DISPLAY P.C.
	MOV	#1,20PC			:SINGLE STEP THE DISPLAY
	JSR	7,DLAY			:EXECUTE A PROGRAM DELAY
	MOV	#1,20PC			:SINGLE STEP THE DISPLAY
	JSR	7,DLAY			:EXECUTE A PROGRAM DELAY
	MOV	#1,20PC			:SINGLE STEP THE DISPLAY
	JSR	7,DLAY			:EXECUTE A PROGRAM DELAY
	MOV	#1,20PC			:SINGLE STEP THE DISPLAY
	JSR	7,DLAY			:EXECUTE A PROGRAM DELAY
	MOV	#1,20PC			:SINGLE STEP THE DISPLAY
	JSR	7,DLAY			:EXECUTE A PROGRAM DELAY
	MOV	#1,20PC			:SINGLE STEP THE DISPLAY
	JSR	7,DLAY			:EXECUTE A PROGRAM DELAY
	MOV	2XPOS,R0			:READ X AXIS
	CMP	R4,R0			:ARE THEY EQUAL?
	BEG	+.6			:YES
	HALT				:NO, INCREMENT X AXIS VIA
	BR	GT57			:LONG VECTOR MODE FAILED
	MOV	2YPOS,R0			:READ Y AXIS
	CMP	R4,R0			:ARE THEY EQUAL?
	BEG	+.6			:YES
	HALT				:NO, INCREMENT Y AXIS VIA
	BR	GT57			:LONG VECTOR MODE FAILED
	INC	R4			:INCREMENT EXPECTED VALUE
	DEC	R3			:FINISHED?
	BNE	GT56A			:NO, TEST MORE DATA

```

1141
1142
1143           ;TEST THAT LONG VECTOR MODE DECREMENTS X AND Y AXIS PROPERLY
1144           ;COUNT 1777-0
1145 006402 104000          GT57:  SCOPE
1146 006404 012703 002000      MOV      #2000,R3           ;SET UP A COUNTER
1147 006410 012704 001777      MOV      #1777,R4           ;PRESET THE COMPARED VALUE
1148 006414 012705 020001      MOV      #20001,R5
1149
1150 006420 104000          GT57A: SCOPE
1151 006422 013700 001022      MOV      DBUF,R0           ;SET UP R0
1152 006426 012720 116000      MOV      #116000,(0)+     ;LOAD "POINT MODE"
1153 006432 005020          CLR      (0)+              ;CLEAR X AXIS
1154 006434 005020          CLR      (0)+              ;CLEAR Y AXIS
1155 006436 012720 110000      MOV      #110000,(0)+     ;LOAD "LONG VECTOR MODE"
1156 006442 010520          MOV      R5,(0)+          ;PRESET "DELTA X AXIS"
1157 006444 010520          MOV      R5,(0)+          ;PRESET "DELTA Y AXIS"
1158 006446 013777 001022 172374 MOV      DBUF,3DPC         ;LOAD THE DISPLAY P.C.
1159 006454 012777 000001 172366 MOV      #1,3DPC          ;SINGLE STEP THE DISPLAY
1160 006462 004737 015532      JSR      7,DLAY           ;EXECUTE A PROGRAM DELAY
1161 006466 012777 000001 172354 MOV      #1,3DPC          ;SINGLE STEP THE DISPLAY
1162 006474 004737 015532      JSR      7,DLAY           ;EXECUTE A PROGRAM DELAY
1163 006500 012777 000001 172342 MOV      #1,3DPC          ;SINGLE STEP THE DISPLAY
1164 006506 004737 015532      JSR      7,DLAY           ;EXECUTE A PROGRAM DELAY
1165 006512 012777 000001 172330 MOV      #1,3DPC          ;SINGLE STEP THE DISPLAY
1166 006520 004737 015532      JSR      7,DLAY           ;EXECUTE A PROGRAM DELAY
1167 006524 012777 000001 172316 MOV      #1,3DPC          ;SINGLE STEP THE DISPLAY
1168 006532 004737 015532      JSR      7,DLAY           ;EXECUTE A PROGRAM DELAY
1169
1170 006536 017700 172312      MOV      2XPOS,R0         ;READ X AXIS
1171 006542 020400          CMP      R4,R0            ;ARE THEY EQUAL?
1172 006544 001402          BEQ     .+6              ;YES
1173 006546 000000          HALT                    ;NO, DECREMENT X AXIS VIA
1174 006550 000412          BR      GT58             ;LONG VECTOR MODE FAILED
1175
1176 006552 017700 172300      MOV      2YPOS,R0         ;READ Y AXIS
1177 006556 020400          CMP      R4,R0            ;ARE THEY EQUAL?
1178 006560 001402          BEQ     .+6              ;YES
1179 006562 000000          HALT                    ;NO, DECREMENT Y AXIS VIA
1180 006564 000404          BR      GT58             ;LONG VECTOR MODE FAILED
1181
1182 006566 005205          INC      R5               ;INCREMENT "DELTA X-Y"
1183 006570 005304          DEC      R4               ;DECREMENT EXPECTED VALUE
1184 006572 005303          DEC      R3               ;FINISHED?
1185 006574 001312          BNE     GT57A            ;NO, TEST MORE DATA

```



```

1218
1219
1220
1221
1222
1223 006734 104000
1224 006736 013700 001022
1225 006742 012720 116000
1226 006746 005020
1227 006750 005020
1228 006752 012720 106000
1229 006756 012720 020301
1230 006762 013777 001022 172060
1231 006770 012777 000001 172052
1232 006776 004737 015532
1233 007002 012777 000001 172040
1234 007010 004737 015532
1235 007014 012777 000001 172026
1236 007022 004737 015532
1237 007026 012777 000001 172014
1238 007034 004737 015532
1239
1240 007040 017700 172010
1241 007044 022700 001777
1242 007050 001402
1243 007052 000000
1244 007054 000406
1245
1246 007056 017700 171774
1247 007062 022700 001777
1248 007066 001401
1249 007070 000000
1250
    
```

```

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

```

GT59: SCOPE
MOV DBUF,RO ;SET UP RO
MOV @116000,(0)+ ;LOAD "SET POINT MODE"
CLR (0)+ ;CLEAR X AXIS
CLR (0)+ ;CLEAR Y AXIS
MOV @106000,(0)+ ;LOAD "SET SHORT VECTOR MODE"
MOV @20301,(0)+ ;PRESET "DELTA X AND DELTA Y"
MOV DBUF,@PC ;LOAD THE DISPLAY PC
MOV @1,@PC ;SINGLE STEP THE DISPLAY
JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
MOV @1,@PC ;SINGLE STEP THE DISPLAY
JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
MOV @1,@PC ;SINGLE STEP THE DISPLAY
JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
MOV @1,@PC ;SINGLE STEP THE DISPLAY
JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
MOV @XPOS,RO ;READ X AXIS
CMP @1777,RO ;ARE THEY EQUAL?
BEQ .+6 ;YES
HALT ;NO, DECREMENT X AXIS FAILED USING
BR GT60 ;SHORT VECTOR MODE

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

Address	OpCode	Op1	Op2	Op3	Op4	Comments
1251						: TEST THAT X AND Y AXIS INCREMENT PROPERLY
1252						: USING SHORT VECTOR MODE
1253						: COUNT 0-77
1254						
1255	007072	104000				GT60: SCOPE
1256	007074	012703	000077			MOV #77,R3 ;SET UP A COUNT LOCATION
1257	007100	012702	000001			MOV #1,R2 ;SET UP THE COMPARED LOCATION
1258	007104	012704	000201			MOV #201,R4 ;SET UP "DELTA X-Y"
1259						
1260						
1261	007110	104000				GT60A: SCOPE
1262	007112	013700	001022			MOV DBUF,R0 ;SET UP R0
1263	007116	012720	116000			MOV #116000,(0)+ ;LOAD "SET POINT DATA MODE"
1264	007122	005020				CLR (0)+ ;CLEAR X AXIS
1265	007124	005020				CLR (0)+ ;CLEAR Y AXIS
1266	007126	012720	106000			MOV #106000,(0)+ ;LOAD "SET SHORT VECTOR MODE"
1267	007132	010420				MOV R4,(0)+ ;PRESET "DELTA X AND DELTA Y"
1268	007134	013777	001022	171706		MOV DBUF,20PC ;LOAD THE DISPLAY P.C.
1269	007142	012777	000001	171700		MOV #1,20PC ;SINGLE STEP THE DISPLAY
1270	007150	004737	015532			JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1271	007154	012777	000001	171666		MOV #1,20PC ;SINGLE STEP THE DISPLAY
1272	007162	004737	015532			JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1273	007166	012777	000001	171654		MOV #1,20PC ;SINGLE STEP THE DISPLAY
1274	007174	004737	015532			JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1275	007200	012777	000001	171642		MOV #1,20PC ;SINGLE STEP THE DISPLAY
1276	007206	004737	015532			JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1277						
1278	007212	017700	171636			MOV 2XPOS,R0 ;READ X POSITION
1279	007216	020200				CMP R2,R0 ;ARE THEY EQUAL
1280	007220	001402				BEQ .+6 ;YES
1281	007222	000000				HALT ;INCREMENT X AXIS FAILED USING
1282	007224	000413				BR GT61 ;SHORT VECTOR MODE
1283						
1284	007226	017700	171624			MOV 2YPOS,R0 ;READ Y POSITION
1285	007232	020200				CMP R2,R0 ;ARE THEY EQUAL ?
1286	007234	001402				BEQ .+6 ;YES
1287	007236	000000				HALT ;INCREMENT Y AXIS FAILED USING
1288	007240	000405				BR GT61 ;SHORT VECTOR MODE
1289						
1290	007242	062704	000201			ADD #201,R4 ;ADD DELTA X-Y
1291	007246	005202				INC R2 ;INCREMENT EXPECTED VALUE
1292	007250	005303				DEC R3 ;DECREMENT COUNT, FINISHED?
1293	007252	001317				BNE GT60A ;NO, TEST MORE DATA

```

1294
1295
1296
1297
1298
1299 007254 104000
1300 007256 012703 000077
1301 007262 012702 001777
1302 007266 012704 020301
1303
1304 007272 104000
1305 007274 013700 001022
1306 007300 012720 116000
1307 007304 005020
1308 007306 005020
1309 007310 012720 106000
1310 007314 010420
1311 007316 013777 001022 171524
1312 007324 012777 000001 171516
1313 007332 004737 015532
1314 007336 012777 000001 171504
1315 007344 004737 015532
1316 007350 012777 000001 171472
1317 007356 004737 015532
1318 007362 012777 000001 171460
1319 007370 004737 015532
1320
1321 007374 017700 171454
1322 007400 020200
1323 007402 001402
1324 007404 000000
1325 007406 000413
1326
1327 007410 017700 171442
1328 007414 020200
1329 007416 001402
1330 007420 000000
1331 007422 000405
1332
1333 007424 062704 000201
1334 007430 005302
1335 007432 005303
1336 007434 001317
1337

```

: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,30PC       ;LOAD THE DISPLAY P.C.
      MOV      #1,30PC         ;SINGLE STEP THE DISPLAY
      JSR      7,0LAY          ;EXECUTE A PROGRAM DELAY
      MOV      #1,30PC         ;SINGLE STEP THE DISPLAY
      JSR      7,0LAY          ;EXECUTE A PROGRAM DELAY
      MOV      #1,30PC         ;SINGLE STEP THE DISPLAY
      JSR      7,0LAY          ;EXECUTE A PROGRAM DELAY
      MOV      #1,30PC         ;SINGLE STEP THE DISPLAY
      JSR      7,0LAY          ;EXECUTE A PROGRAM DELAY
      MOV      #1,30PC         ;SINGLE STEP THE DISPLAY
      JSR      7,0LAY          ;EXECUTE A PROGRAM DELAY

      MOV      2XPOS,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      2YPOS,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

```



```

1403
1404
1405
1406
1407
1408 007732 104000
1409 007734 012703 000077
1410 007740 012702 000001
1411 007744 012704 000201
1412
1413 007750 104000
1414 007752 013700 001022
1415 007756 012720 116000
1416 007762 005020
1417 007764 005020
1418 007766 012720 130000
1419 007772 010420
1420 007774 013777 001022 171046
1421 010002 012777 000001 171040
1422 010010 004737 015532
1423 010014 012777 000001 171026
1424 010022 004737 015532
1425 010026 012777 000001 171014
1426 010034 004737 015532
1427 010040 012777 000001 171002
1428 010046 004737 015532
1429
1430 010052 017700 170776
1431 010056 020200
1432 010060 001402
1433 010062 000000
1434 010064 000413
1435
1436 010066 017700 170764
1437 010072 020200
1438 010074 001402
1439 010076 000000
1440 010100 000405
1441
1442 010102 062704 000201
1443 010106 005202
1444 010110 005303
1445 010112 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,ADPC     :LOAD THE DISPLAY P.C.
      MOV      #1,ADPC       :SINGLE STEP THE DISPLAY
      JSR      7,DELAY       :EXECUTE A PROGRAM DELAY
      MOV      #1,ADPC       :SINGLE STEP THE DISPLAY
      JSR      7,DELAY       :EXECUTE A PROGRAM DELAY
      MOV      #1,ADPC       :SINGLE STEP THE DISPLAY
      JSR      7,DELAY       :EXECUTE A PROGRAM DELAY
      MOV      #1,ADPC       :SINGLE STEP THE DISPLAY
      JSR      7,DELAY       :EXECUTE A PROGRAM DELAY
      MOV      #1,ADPC       :SINGLE STEP THE DISPLAY
      JSR      7,DELAY       :EXECUTE A PROGRAM DELAY

      MOV      AXPOS,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

```

```

1446
1447
1448
1449
1450
1451 010114 104000
1452 010116 012703 000077
1453 010122 012702 001777
1454 010126 012704 020301
1455
1456 010132 104000
1457 010134 013700 001022
1458 010140 012720 116000
1459 010144 005020
1460 010146 005020
1461 010150 012720 130000
1462 010154 010420
1463 010156 013777 001022 170664
1464 010164 012777 000001 170656
1465 010172 004737 015532
1466 010176 012777 000001 170644
1467 010204 004737 015532
1468 010210 012777 000001 170632
1469 010216 004737 015532
1470 010222 012777 000001 170620
1471 010230 004737 015532
1472
1473 010234 017700 170614
1474 010240 020200
1475 010242 001402
1476 010244 000000
1477 010246 000413
1478
1479 010250 017700 170602
1480 010254 020200
1481 010256 001402
1482 010260 000000
1483 010262 000405
1484
1485 010264 062704 000201
1486 010270 005302
1487 010272 005303
1488 010274 001317
1489

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

GT65:  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"

GT65A: 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,ADPC     ;LOAD THE DISPLAY P.C.
      MOV  #1,ADPC       ;SINGLE STEP THE DISPLAY
      JSR  7,DELAY       ;EXECUTE A PROGRAM DELAY
      MOV  #1,ADPC       ;SINGLE STEP THE DISPLAY
      JSR  7,DELAY       ;EXECUTE A PROGRAM DELAY
      MOV  #1,ADPC       ;SINGLE STEP THE DISPLAY
      JSR  7,DELAY       ;EXECUTE A PROGRAM DELAY
      MOV  #1,ADPC       ;SINGLE STEP THE DISPLAY
      JSR  7,DELAY       ;EXECUTE A PROGRAM DELAY
      MOV  #1,ADPC       ;SINGLE STEP THE DISPLAY
      JSR  7,DELAY       ;EXECUTE A PROGRAM DELAY

      MOV  AXPOS,R0      ;READ X POSITION
      CMP  R2,R0         ;ARE THEY EQUAL
      BEQ  .+6           ;YES
      HALT                ;DECREMENT X AXIS FAILED USING
      BR   GT66          ;RELATIVE POINT MODE

      MOV  YPOS,R0      ;READ Y POSITION
      CMP  R2,R0         ;ARE THEY EQUAL ?
      BEQ  .+6           ;YES DECREMENT
      HALT                ;DECREMENT Y AXIS FAILED USING
      BR   GT66          ;RELATIVE POINT MODE

      ADD  #201,R4       ;ADD "DELTA X-Y"
      DEC  R2            ;DECREMENT EXPECTED VALUE
      DEC  R3            ;DECREMENT COUNT, FINISHED?
      BNE  GT65A        ;NO, TEST MORE DATA

```



```

1530
1531      ;LOAD STATUS B TEST
1532      ;USE GRAPHPLOT Y MODE TO TEST X AXIS IS INCREMENTED BY
1533      ;"SCALE" REGISTER
1534
1535      010464 104000      GT67:  SCOPE
1536      010466 012703 000077      MOV      #77,R3      ;SET UP EXECUTION COUNTER
1537      010472 012704 000001      MOV      #1,R4      ;SET UP COMPARED DATA
1538      010476 012737 174101 001036      MOV      #174101,DSAVE ;SET UP BASIC "LOAD STATUS B"
1539
1540      010504 104000      GT67A: SCOPE
1541      010506 013700 001022      MOV      DBUF,R0      ;SET UP R0
1542      010512 012720 116000      MOV      #116000,(0)+ ;LOAD "POINT MODE"
1543      010516 005020      CLR      (0)+      ;CLEAR X AXIS
1544      010520 005020      CLR      (0)+      ;CLEAR Y AXIS
1545      010522 013720 001036      MOV      DSAVE,(0)+ ;LOAD "SET STATUS B"
1546      010526 012720 124000      MOV      #124000,(0)+ ;LOAD "SET GRAPHPLOT Y MODE"
1547      010530 005020      CLR      (0)+      ;LOAD "Y GRAPHPLOT DATA"
1548      010534 013777 001022 170306      MOV      DBUF,30PC ;LOAD THE DISPLAY P.C.
1549      010540 012777 000001 170300      MOV      #1,30PC ;SINGLE STEP THE DISPLAY
1550      010550 004737 015532      JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1551      010554 012777 000001 170266      MOV      #1,30PC ;SINGLE STEP THE DISPLAY
1552      010562 004737 015532      JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1553      010566 012777 000001 170254      MOV      #1,30PC ;SINGLE STEP THE DISPLAY
1554      010574 004737 015532      JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1555      010600 012777 000001 170242      MOV      #1,30PC ;SINGLE STEP THE DISPLAY
1556      010606 004737 015532      JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1557      010612 012777 000001 170230      MCV      #1,30PC ;SINGLE STEP THE DISPLAY
1558      010620 004737 015532      JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1559
1560      010624 017700 170224      MOV      2XPOS,R0 ;READ X AXIS
1561      010630 042700 176000      BIC      #176000,R0 ;MASK TO BITS 0-9
1562      010634 020400      CMP      R4,R0 ;COMPARE TO EXPECTED VALUE
1563      010636 001402      BEQ      .+6 ;ARE THEY EQUAL?
1564      010640 000000      HALT ;LOAD "STATUS B" FAILED TO LOAD
1565      010642 000413      BR      GT70 ;THE X AXIS CORRECTLY
1566
1567      010644 005237 001036      INC      DSAVE ;INCREMENT THE STATUS B COUNT
1568      010650 005204      INC      R4 ;DECREMENT THE EXECUTION COUNT
1569      010652 005303      DEC      R3 ;TEST MORE DATA
1570      010654 001314      BNE      GT67A
1571
1572
1573      010656 012777 174100 170136      GT67B: MOV      #174100,30BUF
1574      010664 013777 001022 170156      MOV      DBUF,30PC
    
```

```

1575                                     ;EDGE FLAG TEST
1576                                     ;TEST THAT EXCEEDING +X AXIS SETS EDGE FLAG
1577
1578 010672 104000                       GT70: SCOPE
1579 010674 013700 001022                MOV DBUF,RO
1580 010700 012720 116000                MOV #116000,(0)+ ;LOAD POINT
1581 010704 012720 001777                MOV #1777,(0)+ ;LOAD MAX X
1582 010710 012720 000000                MOV #0,(0)+ ;LOAD Y
1583 010714 012720 110000                MOV #110000,(0)+ ;LOAD LONG VECTOR
1584 010720 012720 000001                MOV #1,(0)+ ;LOAD DELTA X
1585 010724 012720 000000                MOV #0,(0)+ ;LOAD DELTA Y
1586 010730 012720 172000                MOV #172000,(0)+ ;LOAD STOP
1587 010734 013777 001022 170106        MOV DBUF,30PC ;START DISPLAY
1588 010742 012777 000001 170100        MOV #1,30PC ;SINGLE STEP THE DISPLAY
1589 010750 004737 015532                JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1590 010754 012777 000001 170066        MOV #1,30PC ;SINGLE STEP THE DISPLAY
1591 010762 004737 015532                JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1592
1593 010766 032777 000040 170056        BIT #40,30SR ;TEST BIT 5
1594 010774 001402 ;+6
1595 010776 000000 ;EDGE FLAG SET IN ERROR
1596 011000 000454
1597
1598 011002 012777 000001 170040        MOV #1,30PC ;SINGLE STEP THE DISPLAY
1599 011010 004737 015532                JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1600 011014 012777 000001 170026        MOV #1,30PC ;SINGLE STEP THE DISPLAY
1601 011022 004737 015532                JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1602 011026 012777 000001 170014        MOV #1,30PC ;SINGLE STEP THE DISPLAY
1603 011034 004737 015532                JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1604 011040 012777 000001 170002        MOV #1,30PC ;SINGLE STEP THE DISPLAY
1605 011046 004737 015532                JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1606
1607 011052 032777 000040 167772        BIT #40,30SR ;TEST BIT 5
1608 011060 001002 ;+6
1609 011062 000000 ;EDGE FLAG FAILED TO SET
1610 011064 000422
1611
1612 011066 013777 001022 167754        MOV DBUF,30PC ;START DISPLAY AGAIN
1613 011074 012777 000001 167746        MOV #1,30PC ;SINGLE STEP THE DISPLAY
1614 011102 004737 015532                JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1615 011106 012777 000001 167734        MOV #1,30PC ;SINGLE STEP THE DISPLAY
1616 011114 004737 015532                JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1617 011120 032777 000040 167724        BIT #40,30SR ;TEST BIT 5
1618 011126 001401 ;+4
1619 011130 000000 ;EDGE FLAG FAILED TO CLEAR

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1620
1621
1622
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1624
1625 011132 104000
1626 011134 013700 001022
1627 011140 012720 116000
1628 011144 012720 000000
1629 011150 012720 000000
1630 011154 012720 110000
1631 011160 012720 020001
1632 011164 012720 000000
1633 011170 012720 172000
1634 011174 013777 001022 167646
1635 011202 012777 000001 167640
1636 011210 004737 015532
1637 011214 012777 000001 167626
1638 011222 004737 015532
1639
1640 011226 032777 000040 167616
1641 011234 001402
1642 011236 000000
1643 011240 000454
1644
1645 011242 012777 000001 167600
1646 011250 004737 015532
1647 011254 012777 000001 167566
1648 011262 004737 015532
1649 011266 012777 000001 167554
1650 011274 004737 015532
1651 011300 012777 000001 167542
1652 011306 004737 015532
1653
1654 011312 032777 000040 167532
1655 011320 001002
1656 011322 000000
1657 011324 000520
1658
1659 011326 013777 001022 167514
1660 011334 012777 000001 167506
1661 011342 004737 015532
1662 011346 012777 000001 167474
1663 011354 004737 015532
1664 011360 032777 000040 167464
1665 011366 001401
1666 011370 000000

```

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

```

GT71: SCOPE
      MOV DBUF,RO
      MOV #116000,(0)+ ;LOAD POINT
      MOV #0,(0)+ ;LOAD MAX X
      MOV #0,(0)+ ;LOAD Y
      MOV #110000,(0)+ ;LOAD LONG VECTOR
      MOV #20001,(0)+ ;LOAD DELTA X
      MOV #0,(0)+ ;LOAD DELTA Y
      MOV #172000,(0)+ ;LOAD STOP
      MOV DBUF,30PC ;START DISPLAY
      MOV #1,30PC ;SINGLE STEP THE DISPLAY
      JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
      MOV #1,30PC ;SINGLE STEP THE DISPLAY
      JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
      BIT #40,30SR ;TEST BIT 5
      BEQ .+6
      HALT ;EDGE FLAG SET IN ERROR
      BR GT72
      MOV #1,30PC ;SINGLE STEP THE DISPLAY
      JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
      MOV #1,30PC ;SINGLE STEP THE DISPLAY
      JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
      MOV #1,30PC ;SINGLE STEP THE DISPLAY
      JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
      MOV #1,30PC ;SINGLE STEP THE DISPLAY
      JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
      BIT #40,30SR ;TEST BIT 5
      BNE .+6
      HALT ;EDGE FLAG FAILED TO SET
      BR GT73
      MOV DBUF,30PC ;START DISPLAY AGAIN
      MOV #1,30PC ;SINGLE STEP THE DISPLAY
      JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
      MOV #1,30PC ;SINGLE STEP THE DISPLAY
      JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
      BIT #40,30SR ;TEST BIT 5
      BEQ .+4
      HALT ;EDGE FLAG FAILED TO CLEAR

```

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1702
1703
1704
1705

```

:EDGE FLAG TEST
:TEST THAT EXCEEDING +Y AXIS SETS EDGE FLAG

GT72:  SCOPE
      MOV  DBUF, R0
      MOV  @116000, (0)+ ;LOAD POINT
      MOV  @0, (0)+ ;LOAD X
      MOV  @6SYAXS, (0)+ ;LOAD MAX Y
      MOV  @110000, (0)+ ;LOAD LONG VECTOR
      MOV  @0, (0)+ ;LOAD DELTA X
      MOV  @1, (0)+ ;LOAD DELTA Y
      MOV  @172000, (0)+ ;LOAD STOP
      MOV  DBUF, @PC ;START DISPLAY
      MOV  @1, @PC ;SINGLE STEP THE DISPLAY
      JSR  7, @LAY ;EXECUTE A PROGRAM DELAY
      MOV  @1, @PC ;SINGLE STEP THE DISPLAY
      JSR  7, @LAY ;EXECUTE A PROGRAM DELAY

      BIT  @40, @DSR ;TEST BIT 5
      BEQ  .+6
      HALT ;EDGE FLAG SET IN ERROR
      BR   GT73

      MOV  @1, @PC ;SINGLE STEP THE DISPLAY
      JSR  7, @LAY ;EXECUTE A PROGRAM DELAY
      MOV  @1, @PC ;SINGLE STEP THE DISPLAY
      JSR  7, @LAY ;EXECUTE A PROGRAM DELAY
      MOV  @1, @PC ;SINGLE STEP THE DISPLAY
      JSR  7, @LAY ;EXECUTE A PROGRAM DELAY
      MOV  @1, @PC ;SINGLE STEP THE DISPLAY
      JSR  7, @LAY ;EXECUTE A PROGRAM DELAY
      MOV  @1, @PC ;SINGLE STEP THE DISPLAY
      JSR  7, @LAY ;EXECUTE A PROGRAM DELAY

      BIT  @40, @DSR ;TEST BIT 5
      BNE  .+6
      HALT ;EDGE FLAG FAILED TO SET
      BR   GT73
    
```

167406
167400
167366
167356
167340
167326
167314
167302
167272

```

1706
1707
1708           ;EDGE FLAG TEST
1709           ;TEST THAT EXCEEDING -Y AXIS SETS EDGE FLAG
1710
1711 011566 104000          GT73: SCOPE
1712 011570 013700 001022  MOV      DBUF,RO
1713 011574 012720 116000  MOV      #116000,(0)+ ;LOAD POINT
1714 011600 012720 000000  MOV      #0,(0)+ ;LOAD X
1715 011604 012720 000000  MOV      #0,(0)+ ;LOAD Y
1716 011610 012720 110000  MOV      #110000,(0)+ ;LOAD LONG VECTOR
1717 011614 012720 000000  MOV      #0,(0)+ ;LOAD DELTA X
1718 011620 012720 020001  MOV      #20001,(0)+ ;LOAD DELTA Y
1719 011624 012720 172000  MOV      #172000,(0)+ ;LOAD STOP
1720 011630 013777 001022 167212  MOV      DBUF,30PC ;START DISPLAY
1721 011636 012777 000001 167204  MOV      #1,30PC ;SINGLE STEP THE DISPLAY
1722 011644 004737 015532  JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1723 011650 012777 000001 167172  MOV      #1,30PC ;SINGLE STEP THE DISPLAY
1724 011656 004737 015532  JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1725
1726 011662 032777 000040 167162  BIT      #40,30SR ;TEST BIT 5
1727 011670 001402          BEQ      .+6
1728 011672 000000          HALT
1729 011674 000454          BR      GT74 ;EDGE FLAG SET IN ERROR
1730
1731 011676 012777 000001 167144  MOV      #1,30PC ;SINGLE STEP THE DISPLAY
1732 011704 004737 015532  JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1733 011710 012777 000001 167132  MOV      #1,30PC ;SINGLE STEP THE DISPLAY
1734 011716 004737 015532  JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1735 011722 012777 000001 167120  MOV      #1,30PC ;SINGLE STEP THE DISPLAY
1736 011730 004737 015532  JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1737 011734 012777 000001 167106  MOV      #1,30PC ;SINGLE STEP THE DISPLAY
1738 011742 004737 015532  JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1739
1740 011746 032777 000040 167076  BIT      #40,30SR ;TEST BIT 5
1741 011754 001002          BNE      .+6
1742 011756 000000          HALT
1743 011760 000422          BR      GT74 ;EDGE FLAG FAILED TO SET
1744
1745 011762 013777 001022 167060  MOV      DBUF,30PC ;START DISPLAY AGAIN
1746 011770 012777 000001 167052  MOV      #1,30PC ;SINGLE STEP THE DISPLAY
1747 011776 004737 015532  JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1748 012002 012777 000001 167040  MOV      #1,30PC ;SINGLE STEP THE DISPLAY
1749 012010 004737 015532  JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1750 012014 032777 000040 167030  BIT      #40,30SR ;TEST BIT 5
1751 012022 001401          BEQ      .+4
1752 012024 000000          HALT ;EDGE FLAG FAILED TO CLEAR

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1753 ;TEST THAT THE CHARACTER REGISTER IS LOADED PROPERLY
1754 ; CODE 00
1755
1756 012026 104000 GT74: SCOPE
1757 012030 012777 100000 166764 MOV #100000,2DBUF ;LOAD "CHARACTER MODE"
1758 012036 012777 000000 166760 MOV #0,2DBUF1 ;LOAD "NULL" CHARACTER
1759 012044 013777 001022 166776 MOV DBUF,2DPC ;START DISPLAY
1760 012052 004737 015532 JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1761 012056 012777 000001 166764 MOV #1,2DPC ;SINGLE STEP THE DISPLAY
1762 012064 017700 166766 MOV 2YPOS,RO ;READ CHARACTER REG.
1763 012070 042700 001777 BIC #1777,RO ;MASK TO BITS 10-15
1764 012074 022700 000000 CMP #0,RO
1765 012100 001401 BEQ .+4
1766 012102 000000 HALT ;ERROR, CHARACTER REGISTER LOADED IN ERROR
1767
1768 ;TEST THAT THE CHARACTER REGISTER IS LOADED PROPERLY
1769 ; CODE 77
1770
1771 012104 104000 GT75: SCOPE
1772 012106 012777 100000 166706 MOV #100000,2DBUF ;LOAD "CHARACTER MODE"
1773 012114 012777 000077 166702 MOV #77,2DBUF1 ;LOAD CHARACTER
1774 012122 013777 001022 166720 MOV DBUF,2DPC ;START DISPLAY
1775 012130 004737 015532 JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1776 012134 012777 000001 166706 MOV #1,2DPC ;SINGLE STEP THE DISPLAY
1777 012142 017700 166710 MOV 2YPOS,RO ;READ CHARACTER REG.
1778 012146 042700 001777 BIC #1777,RO ;MASK TO BITS 10-15
1779 012152 022700 176000 CMP #176000,RO
1780 012156 001401 BEQ .+4
1781 012160 000000 HALT ;ERROR, CHARACTER REGISTER LOADED IN ERROR
1782
1783 ;TEST THAT THE CHARACTER REGISTER IS LOADED PROPERLY
1784 ; CODE 25
1785
1786 012162 104000 GT76: SCOPE
1787 012164 012777 100000 166630 MOV #100000,2DBUF ;LOAD "CHARACTER MODE"
1788 012172 012777 000025 166624 MOV #25,2DBUF1 ;LOAD CHARACTER
1789 012200 013777 001022 166642 MOV DBUF,2DPC ;START DISPLAY
1790 012206 004737 015532 JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1791 012212 012777 000001 166630 MOV #1,2DPC ;SINGLE STEP THE DISPLAY
1792 012220 017700 166632 MOV 2YPOS,RO ;READ CHARACTER REG.
1793 012224 042700 001777 BIC #1777,RO ;MASK TO BITS 10-15
1794 012230 022700 052000 CMP #52000,RO
1795 012234 001401 BEQ .+4
1796 012236 000000 HALT ;ERROR, CHARACTER REGISTER LOADED IN ERROR

```

```

1797
1798
1799
1800
1801 012240 104000
1802 012242 012777 100000 166552
1803 012250 012777 000052 166546
1804 012256 013777 001022 166564
1805 012254 004737 015532
1806 012270 012777 000001 166552
1807 012276 017700 166554
1808 012302 042700 001777
1809 012306 022700 124000
1810 012312 001401
1811 012314 000000
1812
1813
1814
1815
1816 012316 104000
1817 012320 012777 116000 166474
1818 012326 012777 001000 166470
1819 012334 012777 001000 166464
1820 012342 012777 100000 166460
1821 012350 005077 166456
1822 012354 013777 001022 166466
1823 012362 012777 000001 166460
1824 012370 004737 015532
1825 012374 012777 000001 166446
1826 012402 004737 015532
1827 012406 012777 000001 166434
1828 012414 004737 015532
1829 012420 012777 000001 166422
1830 012426 004737 015532
1831
1832 012432 017700 166420
1833 012436 042700 001777
1834 012442 022700 000000
1835 012446 001402
1836 012450 000000
1837 012452 000417
1838
1839 012454 017700 166374
1840 012460 022700 001000
1841 012464 001402
1842 012466 000000
1843 012470 000410
1844
1845 012472 017700 166360
1846 012476 042700 176000
1847 012502 022700 001000
1848 012506 001401
1849 012510 000000
1850

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;TEST THAT THE CHARACTER REGISTER IS LOADED PROPERLY
; CODE 52
GT77: SCOPE
MOV @100000, @DBUF ;LOAD "CHARACTER MODE"
MOV @52, @DBUF1 ;LOAD CHARACTER
MOV @DBUF, @DPC ;START DISPLAY
JSR 7, DLAY ;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

;TEST THAT CHARACTER MODE DOES NOT HANG THE DISPLAY PROCESSOR
;TEST THAT "NULL" DOES NOT CHANGE X OR Y AXIS
GT78: SCOPE
MOV @116000, @DBUF ;POINT MODE
MOV @1000, @DBUF1
MOV @1000, @DBUF2 ;1000, 1000
MOV @100000, @DBUF3 ;LOAD "CHARACTER MODE"
CLR @DBUF4 ;NULL CHARACTER
MOV @DBUF, @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 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

```



```

1851
1852
1853 ;TEST THAT CHARACTER MODE DOES NOT HANG THE DISPLAY PROCESSOR
1854 ;TEST THAT "CR" DOES CHANGE X AND DOES NOT CHANGE Y AXIS
1855
1856 012512 104000
1857 012514 012777 116000 166300
1858 012522 012777 001000 166274
1859 012530 012777 001000 166270
1860 012536 012777 100000 166264
1861 012544 012777 000015 166260
1862 012552 013777 001022 166270
1863 012560 012777 000001 166262
1864 012566 004737 015532
1865 012572 012777 000001 166250
1866 012600 004737 015532
1867 012604 012777 000001 166236
1868 012612 004737 015532
1869 012616 012777 000001 166224
1870 012624 004737 015532
1871
1872 012630 017700 166222
1873 012634 042700 001777
1874 012640 022700 032000
1875 012644 001402
1876 012646 000000
1877 012650 000417
1878
1879 012652 017700 166176
1880 012656 022700 000000
1881 012662 001402
1882 012664 000000
1883 012666 000410
1884
1885 012670 017700 166162
1886 012674 042700 176000
1887 012700 022700 001000
1888 012704 001401
1889 012706 000000
1890

```

```

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

```

```

GT79: SCOPE
MOV #116000,20BUF ;POINT MODE
MOV #1000,20BUF1 ;1000,1000
MOV #1000,20BUF2 ;LOAD "CHARACTER MODE"
MOV #100000,20BUF3 ;LOAD "CR"
MOV #15,20BUF4 ;LOAD THE DISPLAY P.C.
MOV 20BUF,20PC ;SINGLE STEP THE DISPLAY
JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
MOV #1,20PC ;SINGLE STEP THE DISPLAY
JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
MOV #1,20PC ;SINGLE STEP THE DISPLAY
JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
MOV #1,20PC ;SINGLE STEP THE DISPLAY
JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
MOV #1,20PC ;SINGLE STEP THE DISPLAY
JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
MOV 20YPOS,RO ;READ Y AXIS
BIC #1777,RO ;MASK TO BITS 10-15
CMP #32000,RO
BEQ .+6 ;CHARACTER REGISTER FAILED TO LOAD CORRECTLY
HALT
BR GT80
MOV 20XPOS,RO ;READ X AXIS
CMP #0,RO ;ARE THEY EQUAL ?
BEQ .+6 ;YES
HALT ;"CR" CHARACTER FAILED TO CHANGED X AXIS CORRECTLY
BR GT80
MOV 20YPOS,RO ;READ Y AXIS
BIC #176000,RO ;MASK TO BITS 0-9
CMP #1000,RO ;ARE THEY EQUAL ?
BEQ .+4 ;YES
HALT ;"CR" CHARACTER CHANGED Y AXIS

```

```

1891
1892
1893
1894
1895
1896 012710 104000
1897 012712 012777 116000 166112
1898 012720 012777 001000 166076
1899 012726 012777 001000 166072
1900 012734 012777 100000 166066
1901 012742 012777 000012 166062
1902 012750 013777 001022 166072
1903 012756 012777 000001 166064
1904 012764 004737 015532
1905 012770 012777 000001 166052
1906 012776 004737 015532
1907 013002 012777 000001 166040
1908 013010 004737 015532
1909 013014 012777 000001 166026
1910 013022 004737 015532
1911
1912 013026 017700 166024
1913 013032 042700 001777
1914 013036 022700 024000
1915 013042 001402
1916 013044 000000
1917 013046 000417
1918
1919 013050 017700 166000
1920 013054 022700 001000
1921 013060 001402
1922 013062 000000
1923 013064 000410
1924
1925 013066 017700 165764
1926 013072 042700 176000
1927 013076 023700 001044
1928 013102 001401
1929 013104 000000
1930

```

;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, @0BUF      ;POINT MODE
      MOV      @1000, @0BUF1
      MOV      @1000, @0BUF2      ;1000,1000
      MOV      @100000, @0BUF3    ;LOAD "CHARACTER MODE"
      MOV      @12, @0BUF4
      MOV      @0BUF, @0PC        ;LOAD THE DISPLAY P.C.
      MOV      @1, @0PC          ;SINGLE STEP THE DISPLAY
      JSR      7, @LAY           ;EXECUTE A PROGRAM DELAY
      MOV      @1, @0PC          ;SINGLE STEP THE DISPLAY
      JSR      7, @LAY           ;EXECUTE A PROGRAM DELAY
      MOV      @1, @0PC          ;SINGLE STEP THE DISPLAY
      JSR      7, @LAY           ;EXECUTE A PROGRAM DELAY
      MOV      @1, @0PC          ;SINGLE STEP THE DISPLAY
      JSR      7, @LAY           ;EXECUTE A PROGRAM DELAY
      MOV      @1, @0PC          ;SINGLE STEP THE DISPLAY
      JSR      7, @LAY           ;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              ;YES
      HALT                    ;"LF" CHARACTER CHANGED X AXIS
      BR      GT80A
      MOV      @YPOS, @R0        ;READ Y AXIS
      BIC      @176000, @R0      ;MASK TO BITS 10-15
      CMP      @LFSIZE, @R0     ;ARE THEY EQUAL ?
      BEQ     .+4              ;YES
      HALT                    ;"LF" CHARACTER FAILED TO CHANGED Y AXIS CORRECTLY

```

```

1931
1932
1933          ;TEST THAT CHARACTER MODE DOES NOT HANG THE DISPLAY PROCESSOR
1934          ;TEST THAT "A" DOES CHANGE X BUT NOT Y AXIS
1935
1936 013106 104000          GT80A: SCOPE
1937 013110 012777 116000 165704      MOV      $116000,20BUF ;POINT MODE
1938 013116 012777 000000 165700      MOV      $0,20BUF1
1939 013124 012777 001000 165674      MOV      $1000,20BUF2 ;0,1000
1940 013132 012777 100000 165670      MOV      $100000,20BUF3 ;LOAD "CHARACTER MODE"
1941 013140 012777 000101 165664      MOV      $101,20BUF4 ;LOAD AN "A"
1942 013146 013777 001022 165674      MOV      20BUF,20PC ;LOAD THE DISPLAY P.C.
1943 013154 012777 000001 165666      MOV      $1,20PC ;SINGLE STEP THE DISPLAY
1944 013162 004737 015532          JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1945 013166 012777 000001 165654      MOV      $1,20PC ;SINGLE STEP THE DISPLAY
1946 013174 004737 015532          JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1947 013200 012777 000001 165642      MOV      $1,20PC ;SINGLE STEP THE DISPLAY
1948 013206 004737 015532          JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1949 013212 012777 000001 165630      MOV      $1,20PC ;SINGLE STEP THE DISPLAY
1950 013220 004737 015532          JSR      7,DLAY ;EXECUTE A PROGRAM DELAY
1951
1952 013224 017700 165626          MOV      2YPOS,RO ;READ CHARACTER REG
1953 013230 042700 001777          BIC      $1777,RO ;MASK TO BITS 10-15
1954 013234 022700 002000          CMP      $2000,RO
1955 013240 001402          BEQ      .+6
1956 013242 000000          HALT
1957 013244 000417          BR      GT81 ;CHARACTER REGISTER IN ERROR
1958
1959 013246 017700 165602          MOV      2XPOS,RO ;READ X AXIS
1960 013252 023700 001006          CMP      2GCHSZ,RO ;ARE THEY EQUAL ?
1961 013256 001402          BEQ      .+6 ;YES
1962 013260 000000          HALT ;"A" CHARACTER FAILED TO CHANGED X AXIS CORRECTLY
1963 013262 000410          BR      GT81
1964
1965 013264 017700 165566          MOV      2YPOS,RO ;READ Y AXIS
1966 013270 042700 176000          BIC      $176000,RO ;MASK TO BITS 0-9
1967 013274 022700 001000          CMP      $1000,RO ;ARE THEY EQUAL ?
1968 013300 001401          BEQ      .+4 ;YES
1969 013302 000000          HALT ;"A" CHARACTER CHANGED Y AXIS
1970

```

```

1971
1972
1973
1974
1975
1976 013304 104000
1977 013306 012777 116000 165506
1978 013314 012777 001000 165502
1979 013322 012777 001000 165476
1980 013330 012777 100000 165472
1981 013336 012777 000010 165466
1982 013344 013777 001022 165476
1983 013352 012777 000001 165470
1984 013360 004737 015532
1985 013364 012777 000001 165456
1986 013372 004737 015532
1987 013376 012777 000001 165444
1988 013404 004737 015532
1989 013410 012777 000001 165432
1990 013416 004737 015532
1991
1992 013422 017700 165430
1993 013426 042700 001777
1994 013432 022700 020000
1995 013436 001402
1996 013440 000000
1997 013442 000426
1998
1999 013444 017700 165404
2000 013450 023700 001046
2001 013454 001402
2002 013456 000000
2003 013460 000417
2004
2005 013462 017700 165370
2006 013466 042700 176000
2007 013472 022700 001000
2008 013476 001402
2009 013500 000000
2010 013502 000406
2011
2012
2013
2014 013504 017700 165342
2015 013510 032700 000100
2016 013514 001401
2017 013516 000000
2018

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

GT81: SCOPE
MOV #116000,2DBUF ;POINT MODE
MOV #1000,2DBUF1 ;1000,1000
MOV #1000,2DBUF2 ;LOAD "CHARACTER MODE"
MOV #100000,2DBUF3 ;LOAD THE DISPLAY P.C.
MOV #10,2DBUF4 ;SINGLE STEP THE DISPLAY
MOV DBUF,2DPC ;EXECUTE A PROGRAM DELAY
MOV #1,2DPC ;SINGLE STEP THE DISPLAY
JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
MOV #1,2DPC ;SINGLE STEP THE DISPLAY
JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
MOV #1,2DPC ;SINGLE STEP THE DISPLAY
JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
MOV #1,2DPC ;SINGLE STEP THE DISPLAY
JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
MOV #1,2DPC ;SINGLE STEP THE DISPLAY
JSR 7,DLAY ;EXECUTE A PROGRAM DELAY

MOV 2YPOS,RO ;READ CHARACTER REG
BIC #1777,RO ;MASK TO BITS 10-15
CMP #20000,RO
BEQ .+6 ;CHARACTER REGISTER IN ERROR
HALT
BR GT82

MOV 2XPOS,RO ;READ X AXIS
CMP CHSIZE,RO ;ARE THEY EQUAL ?
BEQ .+6 ;YES
HALT ;"BS" CHARACTER FAILED TO CHANGED X AXIS CORRECTLY
BR GT82

MOV 2YPOS,RO ;READ Y AXIS
BIC #176000,RO ;MASK TO BITS 0-9
CMP #1000,RO ;ARE THEY EQUAL ?
BEQ .+6 ;YES
HALT ;"BS" CHARACTER CHANGED Y AXIS
BR GT82

;TEST THAT "SHIFT-OUT" STATUS BIT IS NOT SET

MOV 2DSR,RO ;READ STATUS
BIT #100,RO
BEQ .+4 ;SHIFT OUT STATUS BIT IS SET
HALT

```

```

2019
2020
2021
2022
2023 013520 104000
2024 013522 012777 116000 165272
2025 013530 012777 001000 165266
2026 013536 012777 001000 165262
2027 013544 012777 100000 165256
2028 013552 012777 037416 165252
2029 013560 013777 001022 165262
2030 013566 012777 000001 165254
2031 013574 004737 015532
2032 013600 012777 000001 165242
2033 013606 004737 015532
2034 013612 012777 000001 165230
2035 013620 004737 015532
2036 013624 012777 000001 165216
2037 013632 004737 015532
2038
2039 013636 017700 165214
2040 013642 042700 001777
2041 013646 022700 176000
2042 013652 001402
2043 013654 000000
2044 013656 000426
2045
2046 013660 017700 165166
2047 013664 032700 000100
2048 013670 001002
2049 013672 000000
2050 013674 000417
2051
2052 013676 017700 165152
2053 013702 022700 001000
2054 013706 001402
2055 013710 000000
2056 013712 000410
2057
2058 013714 017700 165136
2059 013720 042700 176000
2060 013724 022700 001000
2061 013730 001401
2062 013732 000000

```

;TEST THAT "SHIFT-OUT" GENERATES A STATUS BIT
;SHIFT-OUT <LOW BYTE>, FOLLOWED BY CODE 77 <HIGH BYTE>

```

GT82: SCOPE
MOV #116000, @DBUF ;POINT MODE
MOV #1000, @DBUF1 ;1000, 1000
MOV #1000, @DBUF2 ;LOAD "CHARACTER MODE"
MOV #100000, @DBUF3 ;"SHIFT-OUT" IN LOW BYTE #77 IN HIGH BYTE
MOV #37416, @DBUF4 ;START DISPALY
MOV @DBUF, @DPC ;SINGLE STEP THE DISPLAY
MOV #1, @DPC ;EXECUTE A PROGRAM DELAY
JSR 7, DLAY ;SINGLE STEP THE DISPLAY
MOV #1, @DPC ;EXECUTE A PROGRAM DELAY
JSR 7, DLAY ;SINGLE STEP THE DISPLAY
MOV #1, @DPC ;EXECUTE A PROGRAM DELAY
JSR 7, DLAY ;SINGLE STEP THE DISPLAY
MOV #1, @DPC ;EXECUTE A PROGRAM DELAY
JSR 7, DLAY ;SINGLE STEP THE DISPLAY
MOV #1, @DPC ;EXECUTE A PROGRAM DELAY
JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
MOV @YPOS, RO ;READ CHARACTER REG
BIC #1777, RO ;MASK TO BITS 10-15
CMP #176000, RO
BEQ .+6
HALT ;CHARACTER REGISTER IN ERROR
BR GT83 ; AFTER A SHIFT-OUT COMMAND
MOV @DSR, RO ;READ STATUS REGISTER
BIT #100, RO
BNE .+6
HALT ;SHIFT OUT STATUS BIT FAILED TO SET
BR GT83
MOV @XPOS, RO ;READ X POS
CMP #1000, RO
BEQ .+6
HALT ;SHIFT-OUT CHARACTER CHANGED X AXIS
BR GT83
MOV @YPOS, RO ;READ Y POS
BIC #176000, RO ;MASK
CMP #1000, RO
BEQ .+4
HALT ;SHIFT-OUT CHARACTER CHANGED Y AXIS

```

```

2063
2064
2065
2066
2067 013734 104000
2068 013736 000005
2069 013740 005003
2070 013742 012777 100000 165052
2071 013750 012737 000016 001036
2072 013756 110337 001037
2073 013762 013777 001036 165034
2074 013770 013777 001022 165052
2075 013776 012777 000001 165044
2076 014004 004737 015532
2077
2078 014010 032777 000100 165034
2079 014016 001402
2080 014020 000000
2081 014022 000407
2082
2083 014024 005203
2084 014026 022703 000017
2085 014032 001774
2086 014034 022703 000040
2087 014040 001340
2088
2089
2090
2091
2092
2093
2094 014042 104000
2095 014044 000005
2096 014046 012777 100000 164746
2097 014054 012777 000016 164742
2098 014062 112737 000040 015661
2099 014070 013777 001022 164752
2100 014076 004737 015532
2101 014102 012777 000001 164740
2102 014110 004737 015532
2103 014114 032777 000100 164730
2104 014122 001002
2105 014124 000000
2106 014126 000441
2107

```

```

;TEST THAT "SHIFT-OUT" DOES NOT GENERATE A STATUS BIT
;("SHIFT-OUT" FOLLOWED BY CODE 0 THRU 37 EXCEPT #17)
GT83:  SCOPE
      RESET
      CLR      R3
GT83A: MOV      #100000, D0BUF ;SET 'CHAR' MODE
      MOV      #16, DSAVE ;LOAD "SHIFT-OUT" INTO THE LOW BYTE
      MOVVB   R3, DSAVE+1 ;LOAD HIGH BYTE WITH A CHARACTER
      MOV      DSAVE, D0BUF1 ;LOAD DISPLAY BUFFER
      MOV      D0BUF, D0PC ;START THE DISPLAY
      MOV      #1, D0PC ;SINGLE STEP THE DISPLAY
      JSR      7, DLAY ;EXECUTE A PROGRAM DELAY

      BIT      #100, D0SR ;TEST FOR SHIFT BIT
      BEQ     .+6
      HALT
      BR      GT84 ;SHIFT STATUS BIT SET IN ERROR
                    ; CHARACTER IS IN R3

GT83B: INC      R3
      CMP     #17, R3 ;TEST FOR "SHIFT-IN"
      BEQ     GT83B
      CMP     #40, R3 ;TEST FOR #40
      BNE     GT83A ;IS IT #40
                    ;YES, NEXT TEST

;TEST THAT "SHIFT-OUT" FOLLOWED BY CODE 40 GENERATE A
;SHIFT STATUS BIT
GT84:  SCOPE
      RESET
      MOV      #100000, D0BUF ;LOAD SET CHAR MODE
      MOV      #16, D0BUF1 ;LOAD "SHIFT-OUT" INTO THE LOW BYTE
GT84A: MOVVB   #40, BUFFER+3 ;LOAD HIGH BYTE
      MOV      D0BUF, D0PC ;START THE DISPLAY
      JSR      PC, DLAY ;DELAY
      MOV      #1, D0PC ;SINGLE STEP THE DISPLAY
      JSR      7, DLAY ;EXECUTE A PROGRAM DELAY

      BIT      #100, D0SR ;TEST 'SHIFT' STATUS BIT
      BNE     .+6
      HALT
      BR      GT85 ;"SHIFT-OUT" STATUS BIT FAILED TO SET
                    ;ON CHARACTER IN R3

```



```

2161 ;STOP INTERRUPT TEST
2162 ;TEST FOR NO INTERRUPT
2163
2164 014346 104000 GT86: SCOPE
2165 014350 000005 RESET
2166 014352 012777 014442 164500 MOV @GT86A, @DOONE ;LOAD RETURN FROM DONE INTERRUPT
2167 014360 012777 014442 164502 MOV @GT86A, @TIMEVT ;LOAD RETURN FROM TIME-OUT INTERRUPT
2168 014366 012777 014442 164470 MOV @GT86A, @LPVCT ;LOAD RETURN FROM LIGHT-PEN INTERRUPT
2169 014374 012777 164000 164420 MOV @164000, @DBUF ;LOAD "DISPLAY NOP"
2170 014402 012777 173000 164414 MOV @173000, @DBUF1 ;LOAD "STATUS A"-"STOP"-"STOP INT. ENABLE"
2171 014410 005077 164404 CLR @PSW ;LOWER MACHINE PRIORITY
2172 014414 013777 001022 164426 MOV @DBUF, @DPC ;LOAD DISPLAY P.C.
2173 014422 012777 000001 164420 MOV @1, @DPC ;SINGLE STEP THE DISPLAY
2174 014430 000240 NOP
2175 014432 000240 NOP
2176 014434 000240 NOP
2177 014436 000240 NOP
2178 014440 000401 BR .+4
2179
2180 014442 000000 GT86A: HALT ;GT-40 INTERRUPTED IN ERROR
2181
2182 ;STOP INTERRUPT TEST
2183 ;TEST FOR INTERRUPT
2184
2185 014444 104000 GT87: SCOPE
2186 014446 000005 RESET
2187 014450 012777 014540 164402 MOV @GT87A, @DOONE ;LOAD RETURN ADDRESS FROM INTERRUPT
2188 014456 012777 014552 164404 MOV @GT87B, @TIMEVT
2189 014464 012777 014560 164372 MOV @GT87C, @LPVCT
2190 014472 012777 164000 164322 MOV @164000, @DBUF ;LOAD "DISPLAY NOP"
2191 014500 012777 173400 164316 MOV @173400, @DBUF1 ;LOAD "STATUS A"-"STOP"-"STOP INT. ENABLE-INT"
2192 014506 005077 164306 CLR @PSW
2193 014512 013777 001022 164330 MOV @DBUF, @DPC
2194 014520 012777 000001 164322 MOV @1, @DPC ;SINGLE STEP THE DISPLAY
2195 014526 000240 NOP
2196 014530 000240 NOP
2197 014532 000240 NOP
2198 014534 000240 NOP
2199 014536 000000 HALT ;GT-40 FAILED TO GENERATE AN INTERRUPT
2200 014540 013777 001062 164312 GT87A: MOV @DOONE1, @DOONE
2201 014546 022626 CMP (SP)+, (SP)+
2202 014550 000405 BR GT88
2203
2204 014552 022626 GT87B: CMP (SP)+, (SP)+
2205 014554 000000 HALT ;GT-40 STOP (DONE) INTERRUPTED TO
2206 ; THE GT-40 TIME OUT VECTOR
2207 014556 000402 BR GT88
2208
2209 014560 022626 GT87C: CMP (SP)+, (SP)+
2210 014562 000000 HALT ;GT-40 STOP (DONE) INTERRUPTED
2211 ; TO THE GT-40 LIGHT-PEN VECTOR

```



```

2212
2213
2214
2215
2216 014564 104000
2217 014566 000005
2218 014570 012777 014674 164262
2219 014576 012777 014702 164260
2220 014604 012777 014660 164256
2221 014612 012777 100000 164202
2222 014620 012777 020016 164176
2223 014626 005077 164166
2224 014632 013777 001022 164210
2225 014640 012777 000001 164202
2226 014646 000240
2227 014650 000240
2228 014652 000240
2229 014654 000240
2230 014656 000000
2231 014660 000240
2232 014662 013777 001072 164200
2233 014670 022626
2234 014672 000405
2235
2236 014674 022626
2237 014676 000000
2238 014700 000402
2239
2240 014702 022626
2241 014704 000000
2242

```

```

;SHIFT OUT INTERRUPT TEST
;TEST FOR INTERRUPT
GT88:  SCOPE
      RESET
      MOV  @GT88B,@DONE ;LOAD DONE VECTOR
      MOV  @GT88C,@LPVCT ;LOAD LIGHT-PEN VECTOR
      MOV  @GT88A,@TIMEVT ;LOAD RETURN ADDRESS
      MOV  @100000,@DBUF ;LOAD "CHARACTER MODE"
      MOV  @20016,@DBUF1 ;LOAD "SHIFT-OUT"
      CLR  @PSW
      MOV  @DBUF,@DPC ;START DISPLAY
      MOV  @1,@DPC ;SINGLE STEP THE DISPLAY
      NOP
      NOP
      NOP
      NOP
      HALT ;GT-40 FAILED TO INTERRUPT ON SHIFT-OUT
GT88A: NOP
      MOV  @TIMEVT1,@TIMEVT
      CMP  (SP)+,(SP)+
      BR   GT89
GT88B: CMP  (SP)+,(SP)+
      HALT
      BR   GT89 ;GT-40 SHIFT-OUT INTERRUPTED
      ; TO STOP VECTOR
GT88C: CMP  (SP)+,(SP)+
      HALT ;GT-40 SHIFT-OUT INTERRUPTED TO
      ; THE LIGHT-PEN VECTOR

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;TIME-OUT INTERRUPT TEST

014706 104000
014710 000005
014712 013777 001062 164140
014720 013777 001066 164136
014726 012777 014754 164134
014734 005077 164060
014740 012777 177776 164102
014746 004737 015532
014752 000000

014754 000240
014756 013777 001072 164104
014764 022626

GT89: SCOPE
RESET
MOV DOONE1, DOONE
MOV LPVCT1, 2LPVCT
MOV 8GT89A, 8TIMEVT ;LOAD RETURN ADDRESS
CLR 8PSW
MOV 817776, 8DPC ;LOAD DISPLAY P.C.
JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
HALT ;GT-40 FAILED TO INTERRUPT ON TIME-OUT

GT89A: NOP
MOV TIMEVT1, 8TIMEVT
CMP (SP)+, (SP)+

;LIGHT PEN INTERRUPT TEST

014766 104000
014770 000005
014772 012777 015026 164064
015000 012777 100140 164014
015006 005077 164006
015012 013777 001022 164030
015020 004737 015532
015024 000401
015026 000000
015030 013777 001066 164026

GT90: SCOPE
RESET
MOV 8GT90A, 2LPVCT ;LOAD RETURN ADDRESS
MOV 8100140, 8DBUF ;LOAD DISPLAY BUFFER
CLR 8PSW
MOV DBUF, 8DPC ;LOAD DISPLAY P.C.
JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
BR .+4
GT90A: HALT ;GT-40 INTERRUPTED ON FALSE LIGHT PEN FLAG
MOV LPVCT1, 2LPVCT

```

2273                                     ;PRE BR LEVEL SETUP
2274
2275 015036 042737 177437 001004      BIC      #177437,DSPBR      ;MASK TO BITS
2276 015044 001001                    BNE     .+4
2277 015046 000000                    HALT     ;BR LEVEL WAS 0
2278 015050 022737 000340 001004      CMP     #340,DSPBR
2279 015056 001001                    BNE     .+4
2280 015060 000000                    HALT     ;BR LEVEL WAS 7
2281
2282 015062 013737 001004 015106      MOV     DSPBR,BRLEV1
2283 015070 162737 000040 015106      SUB     #40,BRLEV1
2284 015076 013737 001004 015110      MOV     DSPBR,BRLEV2
2285 015104 000402                    BR      GT91
2286
2287 015106 000140                    BRLEV1: 140
2288 015110 000200                    BRLEV2: 200
2289
2290                                     ;BR LEVEL TEST (BR-1)
2291                                     ;TEST FOR INTERRUPT
2292
2293 015112 104000                    GT91:   SCOPE
2294 015114 000005                    RESET
2295 015116 012777 015160 163734      MOV     #GT91A,DDONE      ;LOAD RETURN ADDRESS
2296 015124 012777 173400 163670      MOV     #173400,DBUF     ;LOAD "STATUS A"-NO INTERRUPT ENABLE
2297 015132 013777 015106 163660      MOV     BRLEV1,PSW
2298 015140 013777 001022 163702      MOV     DBUF,DBPC       ;LOAD THE DISPLAY P.C.
2299 015146 000240                    NOP
2300 015150 000240                    NOP
2301 015152 000240                    NOP
2302 015154 000240                    NOP
2303 015156 000000                    HALT     ;NO STOP INTERRUPT ON BR LEVEL INDICATED -1
2304                                     ;CHECK TO SEE IF PROPER BR LEVEL
2305 015160 022626                    GT91A:  CMP     (SP)+,(SP)+
2306
2307                                     ;BR LEVEL TEST (BR)
2308                                     ;TEST THAT THE GT-40 DOES NOT INTERRUPT AT THE LEVEL INDICATED
2309
2310 015162 104000                    GT92:   SCOPE
2311 015164 000005                    RESET
2312 015166 012777 015230 163664      MOV     #GT92A,DDONE      ;LOAD RETURN ADDRESS
2313 015174 012777 173400 163620      MOV     #173400,DBUF     ;LOAD "STATUS A- STOP- STOP INT ENABLE
2314 015202 013777 015110 163610      MOV     BRLEV2,PSW      ;LOWER MACHINE PRIORITY TO INDICATED LEVEL
2315 015210 013777 001022 163632      MOV     DBUF,DBPC
2316 015216 000240                    NOP
2317 015220 000240                    NOP
2318 015222 000240                    NOP
2319 015224 000240                    NOP
2320 015226 000401                    BR      .+4      ;NEXT TEST
2321
2322 015230 000000                    GT92A:  HALT     ;GT-40 INTERRUPTED ON THE WRONG BR LEVEL
2323
2324 015232 013777 001062 163620      MOV     DDONE1,DDONE     ;LOAD INVERRUPT VECTOR
2325 015240 000005                    RESET
2326

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2327
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2333 015242 104000
2334 015244 012777 117637 163550
2335 015252 005077 163546
2336 015256 005077 163544
2337 015262 012777 172077 163540
2338 015270 013777 001022 163552
2339 015276 004737 015532
2340 015302 012777 000001 163540
2341 015310 004737 015532
2342 015314 012777 000001 163526
2343 015322 004737 015532
2344 015326 012777 000001 163514
2345 015334 004737 015532
2346 015340 012777 000001 163502
2347 015346 000005
2348 015350 005777 163474
2349 015354 001402
2350 015356 000000
2351 015360 000406
2352 015362 017700 163464
2353 015366 042700 074000
2354 015372 001401
2355 015374 000000
2356
2357 015376 104000
2358 015400 005237 001016
2359 015404 022737 000004 001016
2360 015412 001402
2361 015414 000137 001572
2362 015420 000005
2363 015422 013700 000042
2364 015426 001405
2365 015430 000005
2366 015432 004710
2367 015434 000240
2368 015436 000240
2369 015440 000240
2370 015442 004737 015452
2371 015446 000137 001544
2372 015452 012777 000002 163372
2373 015460 012737 000207 177566
2374 015466 105737 177564
2375 015472 100375
2376 015474 012737 000207 177566
2377 015502 105737 177564
2378 015506 100375
2379 015510 000207

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

GT93: SCOPE
MOV #117637,20BUF :POINT INTENSITY=7,BLINK=1,LINETYPE=3
CLR 20BUF1 :CLEAR X
CLR 20BUF2 :CLEAR Y
MOV #172077,20BUF3 :ITALIC=1,SYNC=1,COLOR=1
MOV 20BUF,20PC :LOAD DISPLAY P.C.
JSR PC,DLAY
MOV #1,20PC :SINGLE STEP THE DISPLAY
JSR PC,DLAY :SINGLE STEP THE DISPLAY
MOV #1,20PC :SINGLE STEP THE DISPLAY
JSR PC,DLAY :SINGLE STEP THE DISPLAY
MOV #1,20PC :SINGLE STEP THE DISPLAY
RESET :GENERATE "INIT"
TST 20PC
BEQ .+6
HALT
BR END
:RESET FAILED TO CLEAR DISPLAY PC

MOV 20DSR,R0 :READ DISPLAY STATUS
BIC #74000,R0 :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 2042,R0
BEQ HERE1 :BRANCH IF OFF LINE
RESET

LOGICAL: JSR PC,(0)

NOP
NOP
NOP
HERE1: JSR PC,BELL
JMP STARTB
BELL: MOV #2,20DSR :RING THE BELL
MOV #207,20TPDBR ;RINT THE BELL
1$: TSTB TPCSR
BPL 1$
MOV #207,TPDBR
2$: TSTB TPCSR
BPL 2$
RTS PC

```

```

;SCOPE ROUTINE
015512 032737 040000 177570 SCOPEA: BIT #40000,2#DISPLAY ;TEST "SCOPE" SWITCH
015520 001001 BNE SCOPEB
015522 011601 MOV (SP),R1
015524 012706 000500 SCOPEB: MOV #STKPTR,SP
015530 000111 JMP (1)

015532 012700 000200 DLAY: MOV #200,R0
015536 005300 DLAYA: DEC R0
015540 001376 BNE DLAYA
015542 000207 RTS

015544 012700 001000 DLAY1: MOV #1000,R0
015550 005300 DLAY1A: DEC R0
015552 001376 BNE DLAY1A
015554 000207 RTS

015556 010046 LOMPWR: MOV R0,-(SP)
015558 010146 MOV R1,-(SP)
015560 010246 MOV R2,-(SP)
015562 010346 MOV R3,-(SP)
015564 010446 MOV R4,-(SP)
015566 010546 MOV R5,-(SP)
015570 010637 015654 000024 MOV SP,LOMSV
015572 012737 015606 000024 MOV #HIGPWR,2#24
015576 000000 HALT
015578 013706 015654 HIGPWR: MOV LOMSV,SP
015580 012605 MOV (SP)+,R5
015582 012604 MOV (SP)+,R4
015584 012603 MOV (SP)+,R3
015586 012602 MOV (SP)+,R2
015588 012601 MOV (SP)+,R1
015590 012600 MOV (SP)+,R0
015592 012737 015556 000024 MOV #LOMPWR,2#24
015594 012706 000500 MOV #STKPTR,SP
015596 000240 NOP
015598 000240 NOP
015600 000000 HALT
015602 000240 NOP
015604 000240 NOP
015606 000111 JMP (R1)

015654 000000 LOMSV: 0
015656 000000 BUFFER: 0
000001 .END

```


GT32	003460	655#			
GT33	003516	664#			
GT34	003554	673#			
GT35	003612	682#			
GT36	003670	699#			
GT37	004046	710	716	722	734#
GT37A	004112	745#	755		
GT4	001770	377#			
GT40	004154	750	753	760#	
GT41	004222	771#			
GT42	004270	782#			
GT43	004336	793#			
GT44	004404	806#			
GT45	004464	822#			
GT46	004544	838#			
GT47	004624	855#			
GT48	004704	872#			
GT49	005036	885	900#		
GT5	002030	388#			
GT50	005140	911	923#		
GT51	005256	935	949#		
GT52	005374	961	974#		
GT53	005512	986	1000#		
GT54	005630	1012	1026#		
GT55	006022	1053	1064#		
GT56	006214	1091	1102#		
GT56A	006230	1107#	1140		
GT57	006402	1130	1136	1145#	
GT57A	006422	1151#	1185		
GT58	006576	1174	1180	1190#	
GT59	006734	1211	1223#		
GT6	002066	400#			
GT60	007072	1244	1256#		
GT60A	007112	1262#	1293		
GT61	007254	1282	1288	1299#	
GT61A	007274	1305#	1336		
GT62	007436	1325	1331	1342#	
GT63	007574	1363	1375#		
GT64	007732	1396	1408#		
GT64A	007752	1414#	1445		
GT65	010114	1434	1440	1451#	
GT65A	010134	1457#	1488		
GT66	010276	1477	1483	1496#	
GT66A	010320	1502#	1529		
GT67	010464	1525	1535#		
GT67A	010506	1541#	1570		
GT67B	010656	1573#			
GT7	002124	409#			
GT70	010672	1565	1578#		
GT71	011132	1596	1610	1625#	
GT72	011372	1643	1672#		
GT73	011566	1657	1690	1704	1711#
GT74	012026	1729	1743	1756#	
GT75	012104	1771#			
GT76	012162	1786#			
GT77	012240	1801#			

GT78	012316	1816#																		
GT79	012512	1837	1843	1856#																
GT8	002162	418#																		
GT80	012710	1877	1883	1896#																
GT80A	013106	1917	1923	1936#																
GT81	013304	1957	1963	1976#																
GT82	013520	1997	2003	2010	2023#															
GT83	013734	2044	2050	2056	2067#															
GT83A	013742	2070#	2087																	
GT83B	014024	2083#	2085																	
GT84	014042	2081	2093#																	
GT84A	014062	2097#																		
GT85	014232	2106	2113	2124	2128	2130	2136#													
GT86	014346	2151	2164#																	
GT86A	014442	2166	2167	2168	2180#															
GT87	014444	2185#																		
GT87A	014540	2187	2200#																	
GT87B	014552	2188	2204#																	
GT87C	014560	2189	2209#																	
GT88	014564	2202	2207	2216#																
GT88A	014660	2220	2231#																	
GT88B	014674	2218	2236#																	
GT88C	014702	2219	2240#																	
GT89	014706	2234	2238	2247#																
GT89A	014754	2251	2257#																	
GT9	002220	428#																		
GT90	014766	2263#																		
GT90A	015026	2265	2271#																	
GT91	015112	2285	2293#																	
GT91A	015160	2295	2305#																	
GT92	015162	2310#																		
GT92A	015230	2312	2322#																	
GT93	015242	2332#																		
HERE	015420	2360	2362#																	
HERE1	015442	2364	2370#																	
HIGPWR	015606	2405	2407#																	
ICNT	001016	195#	279#	286	322#	329#	336	2358#	2359											
LFSIZE	001044	206#	241#	242#	243#	1927														
LOGICA	015432	180	2366#																	
LOMPWR	015556	174	2398#	2414																
LOMSV	015654	2404#	2407	2423#																
LPVCT	001064	221#	250#	2168#	2189#	2219#	2250#	2265#	2272#											
LPVCT1	001066	222#	250	251#	2250	2272														
PC	=%000007	168#	246#	254#	274#	278#	324#	328#	2099#	2117#	2119#	2338#	2340#	2342#						
		2344#	2366#	2370#	2379#															
PCTST0	001370	280	285#	323	325															
PCTST1	001414	293#																		
PCTST2	001440	301#																		
PCTST3	001464	309#																		
PCTST4	001510	317#																		
PSW	001020	196#	276#	326#	2171#	2192#	2223#	2252#	2267#	2297#	2314#									
RO	=%000000	168#	229#	233	235#	239	288#	295#	296	303#	304	311#	312	339#						
		340#	341	349#	350#	351	359#	360#	361	369#	370#	371	381#	382#						
		383	391#	392#	393	403#	404#	405	412#	413#	414	421#	422#	423						
		431#	432#	433	441#	442#	443	451#	452#	453	461#	462#	463	471#						
		472#	473	481#	482	489#	490	497#	498#	499	506#	507#	508	516#						

		517*	518	525*	526*	527	534*	535*	536	544*	545*	546	556*	557*
		558	566*	567*	568	577*	578*	579	587*	588	596*	597	605*	606
		615*	616*	617	626*	627*	628	636*	637*	638	649*	650*	651	658*
		659*	660	667*	668*	669	676*	677*	678	688*	689*	690	706*	707
		712*	713	718*	719	724*	725	746*	747	765*	766	776*	777	787*
		788	798*	799	813*	814	829*	830	845*	846	862*	863	881*	882
		890*	891	908*	915*	931*	932	939*	940	957*	958	965*	966	982*
		983	990*	991	1008*	1009	1016*	1017	1027*	1049*	1050	1055*	1056	1065*
		1087*	1088	1093*	1094	1107*	1126*	1127	1132*	1133	1151*	1170*	1171	1176*
		1177	1191*	1207*	1208	1213*	1214	1224*	1240*	1241	1246*	1247	1262*	1278*
		1279	1284*	1285	1305*	1321*	1322	1327*	1328	1343*	1359*	1360	1365*	1366
		1376*	1392*	1393	1398*	1399	1414*	1430*	1431	1436*	1437	1457*	1473*	1474
		1479*	1480	1502*	1521*	1522	1541*	1560*	1561*	1562	1579*	1626*	1673*	1712*
		1762*	1763*	1764	1777*	1778*	1779	1792*	1793*	1794	1807*	1808*	1809	1832*
		1833*	1834	1839*	1840	1845*	1846*	1847	1872*	1873*	1874	1879*	1880	1885*
		1886*	1887	1912*	1913*	1914	1919*	1920	1925*	1926*	1927	1952*	1953*	1954
		1959*	1960	1965*	1966*	1967	1992*	1993*	1994	1999*	2000	2005*	2006*	2007
		2014*	2015	2039*	2040*	2041	2046*	2047	2052*	2053	2058*	2059*	2060	2153*
		2154*	2155	2352*	2353*	2363*	2388*	2389*	2393*	2394*	2398	2413*		
R1	=%000001	168*	230*	231	232*	236*	237	238*	259*	260*	261	262	267*	268
R2	=%000002	270*	272*	273	280*	330*	2384*	2399	2412*	2421				
R3	=%000003	168*	735*	737	743*	744	752	1258*	1279	1285	1291*	1301*	1322	1328
R4	=%000004	1334*	1410*	1431	1437	1443*	1453*	1474	1480	1486*	2400	2411*		
		168*	1103*	1139*	1146*	1184*	1257*	1292*	1300*	1335*	1409*	1444*	1452*	1487*
		1497*	1528*	1536*	1569*	2069*	2072	2083*	2084	2086	2401	2410*		
		168*	1104*	1112	1113	1127	1133	1138*	1147*	1171	1177	1183*	1259*	1267
		1290*	1302*	1310	1333*	1411*	1419	1442*	1454*	1462	1485*	1498*	1522	1527*
		1537*	1562	1568*	2402	2409*								
R5	=%000005	168*	1148*	1156	1157	1182*	2403	2408*						
SCOPE	= 10400C	168*	285	293	301	309	335	346	356	366	377	388	400	409
		418	428	438	448	458	468	478	486	494	503	513	522	531
		541	553	563	574	584	593	602	611	622	633	646	655	664
		673	682	699	734	740	760	771	782	793	806	822	838	855
		872	900	923	949	974	1000	1026	1064	1102	1106	1145	1150	1190
		1223	1256	1261	1299	1304	1342	1375	1408	1413	1451	1456	1496	1501
		1535	1540	1578	1625	1672	1711	1756	1771	1786	1801	1816	1856	1896
		1936	1976	2023	2067	2093	2136	2164	2185	2216	2247	2263	2293	2310
		2332	2357											
SCOPEA	015512	177	2382*											
SCOPEB	015524	2383	2385*											
SETUP	001074	229*	278	328										
SETUPA	001104	231*	234											
SETUPB	001130	237*	240											
SIZE	001040	204*	273*	737	743									
SP	=%000006	168*	265	277*	327*	2201	2204	2209	2233	2236	2240	2259	2305	2384
		2385*	2398*	2399*	2400*	2401*	2402*	2403*	2404	2407*	2408	2409	2410	2411
		2412	2413	2415*										
START	001342	183	276*											
STARTB	001544	184	326*	2371										
STKPTR=	000500	168*	277	327	2385	2415								
TIMEVT	001070	224*	252*	2167*	2188*	2220*	2232*	2251*	2258*					
TIMEVT1	001072	225*	252	253*	2232	2258								
TPCSR =	177564	168*	2374	2377										
TPDBR =	177566	168*	2373*	2376*										
XPOS	001054	215*	319	649	658	667	676	688	813	829	881	908	931	957
		982	1008	1049	1087	1126	1170	1207	1240	1278	1321	1359	1392	1430

YPOS	001056	1473	1560	1839	1879	1919	1959	1999	2052	990	1016	1055	1093	1132
		2168	320	845	862	890	915	939	965	1479	1521	1762	1777	1792
		1176	1213	1246	1284	1327	1365	1398	1436	1965	1992	2005	2039	2058
		1807	1832	1845	1872	1885	1912	1925	1952					
		2153												
.	= 015660	1698	1738	1768	1798	1828	1868	289	297	305	313	342	352	362
		372	384	394	406	415	424	434	444	454	464	474	483	491
		500	509	519	528	537	547	559	569	580	589	598	607	618
		629	639	652	661	670	679	691	708	714	720	726	767	778
		789	800	815	831	847	864	883	892	909	916	933	941	959
		967	984	992	1010	1018	1051	1057	1089	1095	1128	1134	1172	1178
		1209	1215	1242	1248	1280	1286	1323	1329	1361	1367	1394	1400	1432
		1438	1475	1481	1523	1563	1594	1608	1618	1641	1655	1665	1688	1702
		1727	1741	1751	1765	1780	1795	1810	1835	1841	1848	1875	1881	1888
		1915	1921	1928	1955	1961	1968	1995	2001	2008	2016	2042	2048	2054
		2061	2079	2104	2122	2149	2156	2178	2270	2276	2279	2320	2348	2354

DELAY	2098	685	812	828	844	861	880	889	907	914	930	938	956	964	981
	989	1007	1015	1037	1039	1041	1043	1045	1047	1075	1077	1079	1081	1083	1085
	1116	1118	1120	1122	1124	1160	1162	1164	1166	1168	1199	1201	1203	1205	1232
	1234	1236	1238	1270	1272	1274	1276	1313	1315	1317	1319	1351	1353	1355	1357
	1384	1386	1388	1390	1422	1424	1426	1428	1465	1467	1469	1471	1511	1513	1515
	1517	1519	1550	1552	1554	1556	1558	1589	1591	1599	1601	1603	1605	1614	1616
	1636	1638	1646	1648	1650	1652	1661	1663	1683	1685	1693	1695	1697	1699	1722
	1724	1732	1734	1736	1738	1747	1749	1760	1775	1790	1805	1824	1826	1828	1830
	1864	1866	1868	1870	1904	1906	1908	1910	1944	1946	1948	1950	1984	1986	1988
	1990	2031	2033	2035	2037	2076	2101	2144	2146	2254	2269				
DELAY1	2108	614	625												
RESUME	2088	711	717	723	754	764	775	786	797	811	827	843	860	879	887
	888	906	913	929	937	955	963	980	988	1006	1014	1036	1038	1040	1042
	1044	1046	1074	1076	1078	1080	1082	1084	1115	1117	1119	1121	1123	1159	1161
	1163	1165	1167	1198	1200	1202	1204	1231	1233	1235	1237	1269	1271	1273	1275
	1312	1314	1316	1318	1350	1352	1354	1356	1383	1385	1387	1389	1421	1423	1425
	1427	1464	1466	1468	1470	1510	1512	1514	1516	1518	1549	1551	1553	1555	1557
	1588	1590	1598	1600	1602	1604	1613	1615	1635	1637	1645	1647	1649	1651	1660
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	1909	1943	1945	1947	1949	1983	1985	1987	1989	2030	2032	2034	2036	2075	2100
	2118	2143	2145	2173	2194	2225	2339	2341	2343	2345					

ADD	232	238	260	745	1290	1333	1443	1485		384	394	406	415	424	434	444
BEQ	297	297	305	313	342	353	366	372		528	537	547	559	569	580	618
	454	464	474	483	491	500	509	519		714	720	726	748	753	767	778
	629	639	652	661	670	679	691	708		909	916	933	941	959	967	984
	789	800	815	831	847	864	883	893		1134	1172	1178	1209	1215	1242	1248
	932	1010	1018	1051	1057	1089	1095	1128		1432	1438	1475	1481	1523	1563	1594
	1280	1286	1323	1329	1361	1367	1394	1400		1795	1810	1835	1841	1848	1875	1881
	1618	1641	1655	1688	1727	1751	1765	1780		2001	2008	2016	2042	2054	2061	2079
	1888	1915	1921	1928	1955	1961	1968	1995								
	2085	2111	2128	2156	2348	2354	2360	2375								
BIC	243	247	340	350	360	370	382	392		404	413	422	432	442	452	462
	472	498	507	517	526	535	545	557		567	578	616	627	637	650	659
	668	677	689	1561	1763	1778	1793	1808		1833	1846	1873	1886	1913	1926	1953
	1966	1993	2006	2040	2059	2154	2275	2353								
BIT	482	490	1593	1607	1617	1640	1654	1664		1687	1701	1726	1740	1750	2015	2047
	2078	2103	2110	2121	2127	2148	2382									
BMI	598															
BNE	234	240	263	269	323	738	1140	1185		1293	1336	1445	1488	1529	1570	1608
	1655	1702	1741	2048	2087	2104	2122	2149		2276	2279	2383	2390	2395		
BPL	589	607	2375	2378												
BR	264	271	325	710	716	722	750	755		885	911	935	961	986	1012	1053
	1091	1130	1136	1174	1180	1211	1244	1282		1288	1325	1331	1363	1396	1434	1440
	1477	1483	1525	1565	1596	1610	1643	1657		1690	1704	1729	1743	1837	1843	1877
	1883	1917	1923	1957	1963	1997	2003	2010		2044	2050	2056	2081	2106	2113	2124
	2130	2151	2178	2202	2207	2234	2238	2270		2285	2320	2350				
CLR	249	251	253	279	287	329	902	903		1029	1030	1067	1068	1109	1110	1153
	1154	1193	1194	1226	1227	1264	1265	1307		1308	1345	1346	1378	1379	1416	1417
	1459	1460	1504	1505	1508	1543	1544	1547		1821	2069	2171	2192	2223	2252	2267
	2334	2335														
CMP	233	239	262	265	268	296	304	312		341	351	361	371	383	393	405
	414	423	433	443	453	463	473	499		508	518	527	536	546	558	568
	579	617	628	638	651	660	669	678		690	707	713	719	725	737	744
	747	752	766	777	788	799	814	830		846	863	882	891	932	940	958
	966	983	991	1009	1017	1050	1056	1088		1094	1127	1133	1171	1177	1208	1214
	1241	1247	1279	1285	1322	1328	1360	1366		1393	1399	1431	1437	1474	1480	1522
	1562	1764	1779	1794	1809	1834	1840	1847		1874	1880	1887	1914	1920	1927	1954
	1960	1967	1994	2000	2007	2041	2053	2060		2084	2086	2155	2201	2204	2209	2233
	2236	2240	2259	2278	2305	2359										
DEC	1139	1183	1184	1292	1334	1335	1444	1486		1487	1528	1569	2389	2394		
EXT	168															
HALT	170	171	173	290	298	306	314	343		353	363	373	385	395	407	416
	425	435	445	455	465	475	484	492		501	510	520	529	538	548	560
	570	581	590	599	608	653	662	671		680	692	709	715	721	727	749
	768	779	790	801	816	832	848	865		884	893	910	917	934	942	960
	968	985	993	1011	1019	1052	1058	1090		1096	1129	1135	1173	1179	1210	1216
	1243	1249	1281	1287	1324	1330	1362	1368		1396	1401	1433	1439	1476	1482	1524
	1564	1595	1609	1619	1642	1656	1666	1689		1703	1728	1742	1752	1766	1781	1796
	1811	1836	1842	1849	1876	1882	1889	1916		1922	1929	1956	1963	1969	1996	2002
	2009	2017	2043	2049	2055	2062	2080	2105		2112	2123	2129	2150	2157	2180	2199
	2205	2210	2230	2237	2241	2255	2271	2277		2280	2303	2322	2349	2355	2406	2418
INC	322	1138	1182	1291	1443	1526	1527	1567		1568	2083	2358				
JMP	183	184	2361	2371	2386	2421										
JSR	246	278	324	328	614	625	685	812		828	844	861	880	889	907	914
	930	938	956	964	981	989	1007	1015		1037	1039	1041	1043	1045	1047	1075
	1077	1079	1081	1083	1085	1116	1118	1120		1122	1124	1160	1162	1164	1166	1168
	1199	1201	1203	1205	1232	1234	1236	1238		1270	1272	1274	1276	1313	1315	1317

MOV

MOVb

1319	1351	1353	1355	1357	1384	1386	1388	1390	1422	1424	1426	1428	1465	1467
1469	1471	1511	1513	1515	1517	1519	1550	1552	1554	1556	1558	1589	1591	1599
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1805	1807	1809	1808	1811	1813	1833	1841	1843	1845	1857	1859	1910	1944	1946
1948	1950	1952	1956	1958	1960	1980	1988	1990	1992	1996	1998	2101	2117	2119
2148	2150	2152	2159	2161	2163	2183	2191	2193	2195	2076	2099	2101	2117	2119
229	230	231	237	238	239	240	241	242	243	252	258	259	266	273
276	277	278	289	290	291	292	293	294	295	311	326	327	330	336
337	338	339	347	348	349	350	351	352	353	368	369	379	380	381
389	390	391	401	402	403	404	405	406	407	420	421	429	430	431
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487	488	489	497	498	499	500	501	502	503	515	516	523	524	525
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563	564	565	574	575	576	577	578	579	580	613	615	623	624	626
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594	595	596	603	604	605	606	607	608	609	637	638	646	647	648
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717	718	719	726	727	728	729	730	731	732	755	756	762	763	764
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722	723	724	731	732	733	734	735	736	737	759	760	766	767	768
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787	788	789	796	797	798	799	800	801	802	813	814	820	821	822
79														

NEG	242	245													
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	2419	2420													
RESET	378	2068	2094	2109	2126	2141	2165	2186	2217	2248	2264	2294	2311	2325	2346
	2362	2365													
RTS	254	274	2379	2391	2396										
SUB	267	270	272	2283											
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ERRORS DETECTED: 0
 DEFAULT GLOBALS GENERATED: 0

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 RUN-TIME: 8 17 4 SECONDS
 RUN-TIME RATIO: 64/30=2.0
 CORE USED: 8K (16 PAGES)

