

# GT40-42-44

INSTRUCTION TEST NO. 2  
MD-11-DDGTB-D

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

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This microfiche card contains a grid of frames on the left side, with the right side being a large blank area. The frames are arranged in approximately 10 rows and 5 columns. Each frame contains a small table or data set, which is too small to read clearly. The data appears to be organized in columns and rows, possibly representing test results or instructions. The frames are separated by thin white lines, and the overall layout is typical of a microfiche card used for data storage and retrieval.

B01

EOF1DBQP005E01  
DDGTBD.P11

GT990100894 INSTR00229N TEST II MAINDEC0819+DDGTB-D HDN000GIB88E063) 19-DEC-7500000080 PAGE 270224  
SEG 0001

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IDENTIFICATION

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

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1. ABSTRACT

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

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

2. REQUIREMENTS

2.1 EQUIPMENT

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

2.2 STORAGE

THIS PROGRAM USED MEMORY LOCATIONS 0-14000 <LESS THAN 4K OF MEMORY>.

3. LOADING PROCEDURE

3.1 METHOD

PROCEDURE FOR NORMAL BINARY TAPES SHOULD BE FOLLOWED.

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS

SWITCH BIT 14 = 1      LOOP ON TEST

4.2 STARTING ADDRESS OR ADDRESSES

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

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

5. OPERATING PROCEDURE

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

6. ERRORS

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

7. RESTRICTIONS

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

8. MISCELANEOUS

8.1 EXECUTION TIME

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

8.2 DEVICE ADDRESS PROGRAM LOCATIONS

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

9. PROGRAM DESCRIPTION  
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9.1 SUBTEST 1

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

9.2 SUBTEST 2

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

.ENABL ABS,AMA  
.TITLE GT-40/GT-44 INSTRUCTION TEST II MAINDEC-11-DDGTB-D

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

259									
260									
261									
279		000000				.=0			
280	000000	000000				HALT			
281	000002	000000				HALT			
282						;0 THRU 776 IS FILLED WITH A TRAP CATCHER			
289		000024				.=24			
290	000024	012434				LOWPWR			
291	000026	000340				340			
292		000030				.=30			
293	000030	012370				.WORD	SCOPEA		;EMT RETURN
294	000032	000340				340			
295									
296		000046				.=46			
297	000046	012310				LOGICAL			
298	000050	000000				0			
299	000052	000000				0			
300		000170				.=170			
301	000170	000000			SWREG:	.WORD	0		
302									
303		000200				.=200			
304	000200	000137	001406			JMP	START		
305	000204	000137	012534			JMP	START1		
306									
307		001000				.=1000			
308	001000	172000			GSADD:	172000			;GS DISPLAY STARTING ADDRESS
309	001002	000320			GSVCT:	320			;GS DISPLAY STARTING VECTOR
310	001004	000200			DSPBR:	200			;GS DISPLAY INTERRUPT LEVEL
311	001006	000016			GSCHSZ:	16			;CHARACTER SIZE (14-16)
312	001010	000030			GSLFSZ:	30			;LINE FEED SIZE (30-32)
313	001012	001777			GSYAXS:	1777			;+Y AXIS CUTOFF LOCATION
314	001014	000177			GSEND:	177			;SHIFT-OUT END CHARACTER
315									
316	001016	000000			ICNT:	0			;PASS COUNTER
317	001020	177776			PSW:	177776			
318	001022	013534			DBUF:	BUFFER			;FIRST WORD IN THE DISPLAY BUFFER
319	001024	013536			DBUF1:	BUFFER+2			;SECOND WORD
320	001026	013540			DBUF2:	BUFFER+4			;THIRD WORD
321	001030	013542			DBUF3:	BUFFER+6			;FOURTH WORD
322	001032	013544			DBUF4:	BUFFER+10			;FIFTH WORD
323	001034	013546			DBUF5:	BUFFER+12			;SIX WORD
324	001036	000000			DSAVE:	0			;TEMP REG.
325	001040	177570			SWR:	.WORD	DSWR		
326	001042	017476			SIZE:	17476			;BUFFER SIZE FOR 4K <WORD LENGTH>
327	001044	000000			CNTR:	0			
328	001046	000750			LFSIZE:	750			;LINE FEED DELTA Y SIZE
329	001050	000762			CHSIZE:	762			;BACK SPACE CHARACTER DELTA X SIZE

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340 ;GS ADDRESSES AND VECTORS
341
342 001052 172000 DPC: 172000 ;DISPLAY PC REGISTER
343 001054 172002 DSR: 172002 ;DISPLAY STATUS REGISTER
344 001056 172004 XPOS: 172004 ;X AXIS REGISTER <READ ONLY>
345 001060 172006 YPOS: 172006 ;Y AXIS REGISTER AND GRAPHLOT REGISTER <READ ONLY>
346
347 001062 000320 DDONE: 320 ;DISPLAY STOP <DONE> VECTOR
348 001064 000322 DDONE1: 322 ;
349
350 001066 000324 LPVCT: 324 ;DISPLAY LIGHT PEN VECTOR
351 001070 000326 LPVCT1: 326 ;
352
353 001072 000330 TIMEVT: 330 ;DISPLAY TIME-OUT <NXM.> ERROR VECTOR
354 001074 000332 TMEVT1: 332 ; OR "SHIFT-OUT" VECTOR
355
356 ;GS INITIALIZATION ROUTINE
357
358 001076 012700 001052 SETUP: MOV #DPC,R0 ;SET UP POINTER
359 001102 013701 001000 MOV GSADD,R1
360 001106 010120 SETUPA: MOV R1,(0)+
361 001110 062701 000002 ADD #2,R1
362 001114 022700 001062 CMP #DPC+10,R0
363 001120 001372 BNE SETUPA
364 001122 012700 001062 MOV #DDONE,R0
365 001126 013701 001002 MOV GSVCT,R1
366 001132 010120 SETUPB: MOV R1,(0)+
367 001134 062701 000002 ADD #2,R1
368 001140 022700 001076 CMP #DDONE+14,R0
369 001144 001372 BNE SETUPB
370 001146 013737 001010 001046 MOV GSLFSZ,LFSIZE ;SET UP DELTA LF
371 001154 005437 001046 NEG LFSIZE ;NEGATE IT
372 001160 042737 177000 001046 BIC #177000,LFSIZE ;MASK IT
373 001166 013737 001006 001050 MOV GSCHSZ,CHSIZE ;SET UP DELTA CHAR
374 001174 005437 001050 NEG CHSIZE ;NEGATE IT
375 001200 004737 001320 JSR PC,DCORE ;SET UP CORE SIZE
376 001204 042737 177000 001050 BIC #177000,CHSIZE ;MASK IT
377 001212 013777 001064 177642 MOV DDONE1,@DDONE ;LOAD DONE VECTOR
378 001220 005077 177640 CLR @DDONE1
379 001224 013777 001070 177634 MOV LPVCT1,@LPVCT ;LOAD LIGHT-PEN VECTOR
380 001232 005077 177632 CLR @LPVCT1
381 001236 013777 001074 177626 MOV TMEVT1,@TIMEVT ;LOAD TIME-OUT VECTOR
382 001244 005077 177624 CLR @TMEVT1
383 001250 013746 000004 MOV @#ERRVEC,-(SP) ;SAVE VECTOR CONTENTS
384 001254 012737 001302 000004 MOV #1$,@#ERRVEC ;SET UP FOR TRAP
385 001262 012737 177570 001040 MOV #DSWR,@#SWR ;SETUP TO TEST FOR SWITCH REGISTER
386 001270 022777 177777 177542 CMP #-1,@#SWR ;TEST FOR SWITCH REGISTER
387 001276 001005 BNE 3$ ;SWITCH REGISTER PRESENT
388 001300 000401 BR 2$ ;NO SWITCH REGISTER
389 001302 022626 1$: CMP (SP)+,(SP)+ ;POP 2 WORDS OFF STACK
390 001304 012737 000170 001040 2$: MOV #SWREG,@#SWR ;SET UP FOR SOFTWARE SWITCH REGISTER
391 001312 012637 000004 3$: MOV (SP)+,@#ERRVEC ;RESTORE VECTOR CONTENTS
392 001316 000207 RTS PC

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# H01

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394                                     ;SUBROUTINE TO DETERMINE THE SIZE OF CORE
395                                     ; AND SET UP LOCATION SIZE WITH THE VALUE
396
397 001320 012737 001354 000004 DOCORE: MOV      #2$, @#4           ;SET UP FOR NEM
398 001326 012701 017776          MOV      #17776, R1          ;SET UP ADDRESS
399 001332 005000          CLR      R0
400 001334 062701 020000          1$:  ADD      #20000, R1          ;MOVE TO THE NEXT BANK
401 001340 005200          INC      R0           ;INC BANK COUNTER
402 001342 005711          TST      (1)          ;TIMEOUT ?
403 001344 022701 157776          CMP      #157776, R1      ;END ?
404 001350 001371          BNE     1$
405 001352 000404          BR      3$
406 001354 022626          2$:  CMP      (SP)+, (SP)+      ;POP THE STACK X2
407 001356 005300          DEC      R0           ;DECREMENT BANK COUNT
408 001360 162701 020000          SUB      #20000, R1
409 001364 012737 000006 000004 3$:  MOV      #6, @#4           ;RESET BUSS ERROR
410 001372 010137 001042          MOV      R1, SIZE        ;LOAD SIZE
411 001376 162737 007776 001042          SUB      #7776, SIZE     ;BYPASS LOADER
412 001404 000207          RTS      PC            ;EXIT
413

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415
416 001406 012777 000340 177404 START: MOV #340, @PSW
417 001414 012706 000500 MOV #STKPTR, SP
418 001420 004737 001076 JSR PC, SETUP
419 001424 005037 001016 CLR ICNT
420 001430 012701 001436 MOV #GTBUSS+2, R1
421
422 ;TEST FOR BUSS ERRORS ON DISPLAY ADDRESSES
423
424 001434 104000 GTBUSS: SCOPE
425 001436 000005 RESET
426 001440 005077 177410 CLR @DSR ; ON DISPLAY STATUS
427 001444 000240 NOP
428 001446 005077 177404 CLR @XPOS ; ON DISPLAY X REGISTER
429 001452 000240 NOP
430 001454 005077 177400 CLR @YPOS ; ON DISPLAY Y REGISTERS
431 001460 000005 RESET
432
433 ;INCREMENT P.C. TEST
434 ;COMPLEX - BUFFER LENGTH
435
436 001462 104000 GTPC: SCOPE
437 001464 013702 001022 MOV DBUF, R2 ;SET UP POINTER
438 001470 012722 172000 1$: MOV #172000, (2)+ ;MOVE DSTOP INTO THE BUFFER
439 001474 023702 001042 CMP SIZE, R2 ;FINISHED FILLING THE BUFFER?
440 001500 001373 BNE 1$ ;NO
441
442 001502 104000 SCOPE
443 001504 013777 001022 177340 MOV DBUF, @DPC ;YES, START THE DISPLAY
444 001512 013737 001022 001036 MOV DBUF, DSAVE
445 001520 013702 001042 MOV SIZE, R2 ;SETUP A COUNT
446 001524 005302 DEC R2
447 001526 017704 177322 GTPCA: MOV @DSR, R4
448 001532 100402 BMI 1$ ;ERROR, STOP FLAG FAILED TO SET
449 001534 000000 HALT
450 001536 000421 BR GTO
451
452 001540 062737 000002 001036 1$: ADD #2, DSAVE
453 001546 017700 177300 MOV @DPC, RO ;READ DISPLAY P.C.
454 001552 023700 001036 CMP DSAVE, RO ;DID IT INCREMENT BY 2?
455 001556 001402 BEQ 2$ ;YES
456 001560 000000 HALT ;DISPLAY PC FAILED TO INCREMENT
457 001562 000407 BR GTO ;PROPERLY
458
459 001564 020037 001036 2$: CMP RO, DSAVE ;FINISHED THE BUFFER ?
460 001570 001404 BEQ GTO ;BR IF YES
461 001572 012777 000001 177252 MOV #1, @DPC ;SINGLE STEP THE DISPLAY
462 001600 000752 BR GTPCA ;TRY AGAIN
463

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465                                     ;TESTED BY "LOAD STATUS REGISTER A"
466
467 001602 104000                       GT0:  SCOPE
468 001604 012777 172040 177210        MOV    #172040, @DBUF    ;ITALICS ENABLE=1  ITALICS=0
469 001612 013777 001022 177232        MOV    DBUF, @DPC      ;LOAD DISPLAY P.C.
470 001620 017700 177230                MOV    @DSR, RO        ;READ DISPLAY STATUS REGISTER
471 001624 042700 177757                BIC    #177757, RO     ;MASK TO BIT 4
472 001630 022700 000000                CMP    #0, RO         ;TEST RO
473 001634 001401                       BEQ    .+4             ;
474 001636 000000                       HALT                   ;ITALICS BIT FAILED TO RESET
475
476 001640 104000                       GT1:  SCOPE
477 001642 012777 172060 177152        MOV    #172060, @DBUF  ;ITALICS ENABLE=1  ITALICS=1
478 001650 013777 001022 177174        MOV    DBUF, @DPC      ;LOAD DISPLAY P.C.
479 001656 017700 177172                MOV    @DSR, RO        ;READY DISPLAY STATUS REGISTER
480 001662 042700 177757                BIC    #177757, RO     ;MASK TO BIT 4
481 001666 022700 000020                CMP    #20, RO        ;TEST RO
482 001672 001401                       BEQ    .+4             ;
483 001674 000000                       HALT                   ;ITALICS BIT FAILED TO SET
484
485 001676 104000                       GT2:  SCOPE
486 001700 012777 172000 177114        MOV    #172000, @DBUF  ;ITALICS ENABLE=0  ITALICS=0
487 001706 013777 001022 177136        MOV    DBUF, @DPC      ;LOAD DISPLAY P.C.
488 001714 017700 177134                MOV    @DSR, RO        ;READ DISPLAY STATUS REGISTER
489 001720 042700 177757                BIC    #177757, RO     ;MASK TO BITS 4
490 001724 022700 000020                CMP    #20, RO        ;TEST RO
491 001730 001401                       BEQ    .+4             ;
492 001732 000000                       HALT                   ;ITALICS ENABLE FAILED TO INHIBIT
493                                     ;CLEARING OF ITALICS BIT
494
495 001734 104000                       GT3:  SCOPE
496 001736 012777 172002 177056        MOV    #172002, @DBUF  ;COLOR ENABLE=1  COLOR=0
497 001744 013777 001022 177100        MOV    DBUF, @DPC      ;LOAD DISPLAY P.C.
498 001752 004737 012422                JSR    7, DLAY1        ;EXECUTE A PROGRAM DELAY
499 001756 017700 177072                MOV    @DSR, RO        ;READ DISPLAY STATUS REGISTER
500 001762 042700 177773                BIC    #177773, RO     ;MASK TO BIT 2
501 001766 022700 000000                CMP    #0, RO         ;TEST RO
502 001772 001401                       BEQ    .+4             ;
503 001774 000240                       NOP                    ;COLOR BIT FAILED TO RESET
504
505
506 001776 104000                       GT4:  SCOPE
507 002000 012777 172003 177014        MOV    #172003, @DBUF  ;COLOR ENABLE=1  COLOR=1
508 002006 013777 001022 177036        MOV    DBUF, @DPC      ;LOAD DISPLAY P.C.
509 002014 004737 012422                JSR    7, DLAY1        ;EXECUTE A PROGRAM DELAY
510 002020 017700 177030                MOV    @DSR, RO        ;READ DISPLAY STATUS REGISTER
511 002024 042700 177773                BIC    #177773, RO     ;MASK TO BIT 2
512 002030 022700 000004                CMP    #4, RO         ;TEST RO
513 002034 001401                       BEQ    .+4             ;
514 002036 000240                       NOP                    ;COLOR BIT FAILED TO SET

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516									
517	002040	104000			GT5:	SCOPE			
518	002042	012777	172000	176752		MOV	#172000, @DBUF	; COLOR ENABLE=0 COLOR=0	
519	002050	013777	001022	176774		MOV	DBUF, @DPC	; LOAD DISPLAY P.C.	
520	002056	017700	176772			MOV	@DSR, RO	; READ DISPLAY STATUS REGISTER	
521	002062	042700	177773			BIC	#177773, RO	; MASK TO BIT 2	
522	002066	022700	000004			CMP	#4, RO	; TEST RO	
523	002072	001401				BEQ	+.4		
524	002074	000240				NOP		; COLOR ENABLE FAILED TO INHIBIT	
525								; RESETTING OF COLOR BIT	
526									
527									
528									
529	002076	104000			GT6:	SCOPE			
530	002100	012777	100004	176714		MOV	#100004, @DBUF	; LOAD LINE TYPE ENABLE =1 AND LINE TYPE VALUE =0	
531	002106	012777	172000	176710		MOV	#172000, @DBUF1		
532	002114	013777	001022	176730		MOV	DBUF, @DPC	; LOAD DISPLAY P.C.	
533	002122	017700	176726			MOV	@DSR, RO	; READ DISPLAY STATUS REGISTER	
534	002126	042700	177774			BIC	#177774, RO	; MASK TO BITS 1-0	
535	002132	022700	000000			CMP	#0, RO	; TEST RO	
536	002136	001401				BEQ	+.4		
537	002140	000000				HALT		; LINE BITS 1-0 FAILED TO RESET	
538									
539	002142	104000			GT7:	SCOPE			
540	002144	012777	100007	176650		MOV	#100007, @DBUF	; LINE TYPE ENABLE =1 LINE TYPE =3	
541	002152	012777	172000	176644		MOV	#172000, @DBUF1	; LOAD STOP	
542	002160	013777	001022	176664		MOV	DBUF, @DPC	; LOAD DISPLAY P.C.	
543	002166	017700	176662			MOV	@DSR, RO	; READ DISPLAY STATUS REGISTER	
544	002172	042700	177774			BIC	#177774, RO	; MASK TO BITS 1-0	
545	002176	022700	000003			CMP	#3, RO	; TEST RO	
546	002202	001401				BEQ	+.4		
547	002204	000000				HALT		; LINE BITS 1-0 FAILED TO SET	
548									
549	002206	104000			GT8:	SCOPE			
550	002210	012777	100005	176604		MOV	#100005, @DBUF	; LINE TYPE ENABLE =1 LINE TYPE =1	
551	002216	012777	172000	176600		MOV	#172000, @DBUF1	; LOAD STOP	
552	002224	013777	001022	176620		MOV	DBUF, @DPC	; LOAD DISPLAY P.C.	
553	002232	017700	176616			MOV	@DSR, RO	; READ DISPLAY STATUS REGISTER	
554	002236	042700	177774			BIC	#177774, RO	; MASK TO BITS 1-0	
555	002242	022700	000001			CMP	#1, RO	; TEST RO	
556	002246	001401				BEQ	+.4		
557	002250	000000				HALT		; LINE BIT 0 FAILED TO SET	
558									
559									
560	002252	104000			GT9:	SCOPE			
561	002254	012777	100006	176540		MOV	#100006, @DBUF	; LINE TYPE ENABLE =1 LINE TYPE =2	
562	002262	012777	172000	176534		MOV	#172000, @DBUF1		
563	002270	013777	001022	176554		MOV	DBUF, @DPC	; LOAD DISPLAY P.C.	
564	002276	017700	176552			MOV	@DSR, RO	; READ DISPLAY STATUS REGISTER	
565	002302	042700	177774			BIC	#177774, RO	; MASK TO BITS 1-0	
566	002306	022700	000002			CMP	#2, RO	; TEST RO	
567	002312	001401				BEQ	+.4		
568	002314	000000				HALT		; LINE BIT 1 FAILED TO SET	

570										
571	002316	104000			GT10:	SCOPE				
572	002320	012777	100003	176474		MOV	#100003, @DBUF		;LINE TYPE ENABLE =0 LINE TYPE =3	
573	002326	012777	172000	176470		MOV	#172000, @DBUF1			
574	002334	013777	001022	176510		MOV	DBUF, @DPC		;LOAD DISPLAY P.C.	
575	002342	017700	176506			MOV	@DSR, RO		;READ DISPLAY STATUS REGISTER	
576	002346	042700	177774			BIC	#177774, RO		;MASK TO BITS 1-0	
577	002352	022700	000002			CMP	#2, RO		;TEST RO	
578	002356	001401				BEQ	+.4		;SHOULD NOT CHANGE LT VALUE	
579	002360	000000				HALT			;LINE TYPE ENABLE FAILED TO INHIBIT	
580									;CHANGING OF LINETYPE VALUE	
581										
582	002362	104000			GT11:	SCOPE				
583	002364	012777	100020	176430		MOV	#100020, @DBUF		;BLINK ENABLE =1 BLINK =0	
584	002372	012777	172000	176424		MOV	#172000, @DBUF1			
585	002400	013777	001022	176444		MOV	DBUF, @DPC		;LOAD DISPLAY P.C.	
586	002406	017700	176442			MOV	@DSR, RO		;READ DISPLAY STATUS REGISTER	
587	002412	042700	177767			BIC	#177767, RO		;MASK TO BIT 3	
588	002416	022700	000000			CMP	#0, RO		;TEST RO	
589	002422	001401				BEQ	+.4			
590	002424	000000				HALT			;BLINK BIT FAILED TO RESET	
591										
592										
593	002426	104000			GT12:	SCOPE				
594	002430	012777	100030	176364		MOV	#100030, @DBUF		;BLINK ENABLE =1 BLINK =1	
595	002436	012777	172000	176360		MOV	#172000, @DBUF1			
596	002444	013777	001022	176400		MOV	DBUF, @DPC		;LOAD DISPLAY P.C.	
597	002452	017700	176376			MOV	@DSR, RO		;READ DISPLAY STATUS REGISTER	
598	002456	042700	177767			BIC	#177767, RO		;MASK TO BIT 3	
599	002462	022700	000010			CMP	#10, RO		;TEST RO	
600	002466	001401				BEQ	+.4			
601	002470	000000				HALT			;BLINK BIT FAILED TO SET	
602										
603										
604	002472	104000			GT13:	SCOPE				
605	002474	012777	100000	176320		MOV	#100000, @DBUF		;BLINK ENABLE =0 BLINK =0	
606	002502	012777	172000	176314		MOV	#172000, @DBUF1			
607	002510	013777	001022	176334		MOV	DBUF, @DPC		;LOAD DISPLAY P.C.	
608	002516	017700	176332			MOV	@DSR, RO		;READ DISPLAY STATUS REGISTER	
609	002522	042700	177767			BIC	#177767, RO		;MASK TO BIT 3	
610	002526	022700	000010			CMP	#10, RO		;TEST RO	
611	002532	001401				BEQ	+.4			
612	002534	000000				HALT			;BLINK ENABLE FAILED TO INHIBIT	
613									;CHANGING OF THE BLINK BIT	
614										
615	002536	104000			GT14:	SCOPE				
616	002540	012777	100100	176254		MOV	#100100, @DBUF		;LP ENABLE =1 LP=0	
617	002546	012777	172000	176250		MOV	#172000, @DBUF1			
618	002554	013777	001022	176270		MOV	DBUF, @DPC		;LOAD DISPLAY P.C.	
619	002562	017700	176266			MOV	@DSR, RO		;READ STATUS	
620	002566	032700	000200			BIT	#200, RO			
621	002572	001401				BEQ	+.4			
622	002574	000000				HALT			;LIGHT PEN FLAG SET IN ERROR	

## MO1

GT-40/GT-44 INSTRUCTION TEST II MAINDEC-11-DDGTB-D  
DDGTBD.P11

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SEQ 0012

624										
625	002576	104000			GT15:	SCOPE				
626	002600	012777	100140	176214		MOV	#100140, @DBUF		;LP ENABLE =1 LP=1	
627	002606	012777	172000	176210		MOV	#172000, @DBUF1			
628	002614	013777	001022	176230		MOV	DBUF, @DPC		;LOAD DISPLAY P.C.	
629	002622	017700	176226			MOV	@DSR, R0		;READ STATUS	
630	002626	032700	000200			BIT	#200, R0			
631	002632	001401				BEQ	.+4			
632	002634	000000				HALT			;LIGHT PEN FLAG SET IN ERROR	
633										
634	002636	104000			GT16:	SCOPE				
635	002640	012777	102000	176154		MOV	#102000, @DBUF		;INTENSITY LEVEL ENABLE =1 LEVEL =0	
636	002646	012777	172000	176150		MOV	#172000, @DBUF1			
637	002654	013777	001022	176170		MOV	DBUF, @DPC		;LOAD DISPLAY P.C.	
638	002662	017700	176166			MOV	@DSR, R0		;READ DISPLAY STATUS REGISTER	
639	002666	042700	174377			BIC	#174377, R0		;MASK TO BITS 8-10	
640	002672	022700	000000			CMP	#0, R0		;TEST R0	
641	002676	001401				BEQ	.+4			
642	002700	000000				HALT			;INTENSITY LEVEL BITS 8-10 FAILED TO RESET	
643										
644										
645	002702	104000			GT17:	SCOPE				
646	002704	012777	103600	176110		MOV	#103600, @DBUF		;INTENSITY LEVEL ENABLE =1 LEVEL =7	
647	002712	012777	172000	176104		MOV	#172000, @DBUF1			
648	002720	013777	001022	176124		MOV	DBUF, @DPC		;LOAD DISPLAY O.C.	
649	002726	017700	176122			MOV	@DSR, R0		;READ DISPLAY STATUS REGISTER	
650	002732	042700	174377			BIC	#174377, R0		;MASK TO BITS 8-10	
651	002736	022700	003400			CMP	#3400, R0		;TEST R0	
652	002742	001401				BEQ	.+4			
653	002744	000000				HALT			;INTENSITY LEVEL BITS 8-10 FAILED TO SET	
654										
655										
656	002746	104000			GT18:	SCOPE				
657	002750	012777	103000	176044		MOV	#103000, @DBUF		;INTENSITY LEVEL ENABLE =1 LEVEL =4	
658	002756	012777	172000	176040		MOV	#172000, @DBUF1			
659	002764	013777	001022	176060		MOV	DBUF, @DPC		;LOAD DISPLAY P.C.	
660	002772	017700	176056			MOV	@DSR, R0		;READ DISPLAY STATUS REGISTER	
661	002776	042700	174377			BIC	#174377, R0		;MASK TO BITS 8-10	
662	003002	022700	002000			CMP	#2000, R0		;TEST R0	
663	003006	001401				BEQ	.+4			
664	003010	000000				HALT			;INTENSITY LEVEL BIT 10 FAILED	
665										
666										
667	003012	104000			GT19:	SCOPE				
668	003014	012777	102400	176000		MOV	#102400, @DBUF		;INTENSITY LEVEL ENABLE =1 LEVEL =2	
669	003022	012777	172000	175774		MOV	#172000, @DBUF1			
670	003030	013777	001022	176014		MOV	DBUF, @DPC		;LOAD DISPLAY P.C.	
671	003036	017700	176012			MOV	@DSR, R0		;READ DISPLAY STATUS REGISTER	
672	003042	042700	174377			BIC	#174377, R0		;MASK TO BITS 8-10	
673	003046	022700	001000			CMP	#1000, R0		;TEST R0	
674	003052	001401				BEQ	.+4			
675	003054	000000				HALT			;INTENSITY LEVEL BIT 9 FAILED	

```

677
678 003056 104000          GT20: SCOPE
679 003060 012777 102200 175734  MOV      #102200, @DBUF      ; INTENSITY LEVEL ENABLE =1  LEVEL =1
680 003066 012777 172000 175730  MOV      #172000, @DBUF1
681 003074 013777 001022 175750  MOV      DBUF, @DPC      ; LOAD DISPLAY P.C.
682 003102 017700 175746  MOV      @DSR, RO        ; READ DISPLAY STATUS REGISTER
683 003106 042700 174377  BIC      #174377, RO     ; MASK TO BITS 8-10
684 003112 022700 000400  CMP      #400, RO       ; TEST RO
685 003116 001401  BEQ      .+4
686 003120 000000  HALT
687
688
689 003122 104000          GT21: SCOPE
690 003124 012777 101600 175670  MOV      #101600, @DBUF      ; INTENSITY LEVEL ENABLE =0  LEVEL =7
691 003132 012777 172000 175664  MOV      #172000, @DBUF1
692 003140 013777 001022 175704  MOV      DBUF, @DPC      ; LOAD DISPLAY P.C.
693 003146 017700 175702  MOV      @DSR, RO        ; READ DISPLAY STATUS REGISTER
694 003152 042700 174377  BIC      #174377, RO     ; MASK TO BITS 8-10
695 003156 022700 000400  CMP      #400, RO       ; TEST RO
696 003162 001401  BEQ      .+4
697 003164 000000  HALT
698
699
700
701
702
702 003166 104000          ; GRAPH PLOT INCREMENT REGISTER TEST
703 003170 012777 174100 175624  GT22: SCOPE
704 003176 012777 172000 175620  MOV      #174100, @DBUF      ; LOAD GRAPH PLOT COUNTER
705 003204 013777 001022 175640  MOV      #172000, @DBUF1
706 003212 017700 175640  MOV      DBUF, @DPC      ; START DISPLAY
707 003216 042700 001777  MOV      @XPOS, RO       ; READ INCREMENT REGISTER
708 003222 022700 000000  BIC      #1777, RO       ; MASK TO BITS 15-10
709 003226 001401  CMP      #0, RO
710 003230 000000  BEQ      .+4
711
712
712 003232 104000          GT23: SCOPE
713 003234 012777 174177 175560  MOV      #174177, @DBUF      ; LOAD GRAPH PLOT COUNTER
714 003242 012777 172000 175554  MOV      #172000, @DBUF1
715 003250 013777 001022 175574  MOV      DBUF, @DPC      ; START DISPLAY
716 003256 017700 175574  MOV      @XPOS, RO       ; READ INCREMENT REGISTER
717 003262 042700 001777  BIC      #1777, RO       ; MASK TO BITS 15-10
718 003266 022700 176000  CMP      #176000, RO
719 003272 001401  BEQ      .+4
720 003274 000000  HALT
721
722
722 003276 104000          GT24: SCOPE
723 003300 012777 174152 175514  MOV      #174152, @DBUF      ; LOAD GRAPH PLOT COUNTER
724 003306 012777 017200 175510  MOV      #17200, @DBUF1
725 003314 013777 001022 175530  MOV      DBUF, @DPC      ; START DISPLAY
726 003322 017700 175530  MOV      @XPOS, RO       ; READ INCREMENT REGISTER
727 003326 042700 001777  BIC      #1777, RO       ; MASK TO BITS 15-10
728 003332 022700 124000  CMP      #124000, RO
729 003336 001401  BEQ      .+4
730 003340 000000  HALT
731

```

```

732
733 003342 104000          GT25: SCOPE
734 003344 012777 174125 175450 MOV #174125, @DBUF ;LOAD GRAPHPLOT COUNTER
735 003352 012777 172000 175444 MOV #172000, @DBUF1
736 003360 013777 001022 175464 MOV DBUF, @DPC ;START DISPLAY
737 003366 017700 175464 MOV @XPOS, RO ;READ INCREMENT REGISTER
738 003372 042700 001777 BIC #1777, RO ;MASK TO BITS 15-10
739 003376 022700 052000 CMP #52000, RO
740 003402 001401 BEQ .+4
741 003404 000000 HALT ;GRAPHPLOT REGISTER IN ERROR
742
743 003406 104000          GT26: SCOPE
744 003410 012777 174100 175404 MOV #174100, @DBUF ;LOAD GRAPHPLOT COUNTER WITH 0
745 003416 012777 172000 175400 MOV #172000, @DBUF1
746 003424 013777 001022 175420 MOV DBUF, @DPC ;START DISPLAY
747 003432 004737 012410 JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
748 003436 012777 174077 175356 MOV #174077, @DBUF ;LOAD GRAPHPLOT NO ENABLE
749 003444 013777 001022 175400 MOV DBUF, @DPC ;START DISPLAY
750 003452 017700 175400 MOV @XPOS, RO ;READ INCREMENT REGISTER
751 003456 042700 001777 BIC #1777, RO ;MASK TO BITS 15-10
752 003462 022700 000000 CMP #0, RO ;ARE THEY EQUAL ?
753 003466 001401 BEQ .+4
754 003470 000000 HALT ;GRAPHPLOT REGISTER CHANGED WITHOUT
; THE ENABLE BEING SET
755
756
757 ;TEST THAT THE X POSITION REGISTER CAN BE LOADED CORRECTLY
758 ;USING GRAPHPLOT X
759
760 003472 104000          GT27: SCOPE
761 003474 012777 122000 175320 MOV #122000, @DBUF ;LOW INTENSITY - SET GRAPHPLOT X MODE
762 003502 012777 001252 175314 MOV #1252, @DBUF1 ;SET X POSITION
763 003510 012777 172000 175310 MOV #172000, @DBUF2 ;LOAD STOP
764 003516 013777 001022 175326 MOV DBUF, @DPC ;START THE DISPLAY
765 003524 004737 012410 JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
766 003530 017700 175322 MOV @XPOS, RO ;READ X POSITION
767 003534 022700 001252 CMP #1252, RO
768 003540 001401 BEQ .+4
769 003542 000000 HALT ;X POSITION REGISTER FAILED TO LOAD
770 ;PROPERLY USING GRAPHPLOT X MODE

```

```

772
773 ;TEST THAT THE X POSITION REGISTER CAN BE LOADED CORRECTLY
774 ;USING GRAPHPLOT X
775
776 003544 104000 GT28: SCOPE
777 003546 012777 122000 175246 MOV #122000, @DBUF ;LOW INTENSITY - SET GRAPH PLOT X MODE
778 003554 012777 000525 175242 MOV #525, @DBUF1 ;SET X POSITION
779 003562 012777 172000 175236 MOV #172000, @DBUF2 ;LOAD STATUS REGISTER A, STOP
780 003570 013777 001022 175254 MOV DBUF, @DPC ;LOAD THE DISPLAY P.C.
781 003576 004737 012410 JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
782 003602 017700 175250 MOV @XPOS, R0 ;READ X POSITION
783 003606 022700 000525 CMP #525, R0 ;
784 003612 001401 BEQ .+4 ;
785 003614 000000 HALT ;X POSITION REGISTER FAILED TO LAD
786 ;PROPERLY USING GRAPH PLOT X MODE
787
788 ;TEST THAT THE Y POSITION REGISTER CAN BE LOADED CORRECTLY
789 ;USING GRAPHPLOT Y MODE
790
791 003616 104000 GT29: SCOPE
792 003620 012777 126000 175174 MOV #126000, @DBUF ;LOW INTENSITY - SET GRAPHPLOT Y
793 003626 012777 001252 175170 MOV #1252, @DBUF1 ;SET Y POSITION
794 003634 012777 172000 175164 MOV #172000, @DBUF2 ;LOAD STATUS REGISTER A, STOP
795 003642 013777 001022 175202 MOV DBUF, @DPC ;LOAD THE DISPLAY P.C.
796 003650 004737 012410 JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
797 003654 017700 175200 MOV @YPOS, R0 ;READ Y POSITION
798 003660 022700 001252 CMP #1252, R0 ;
799 003664 001401 BEQ .+4 ;
800 003666 000000 HALT ;Y POSITION REGISTER FAILED TO LOAD
801 ;PROPERLY USING GRAPHPLOT Y MODE
802

```



```

804
805           ;TEST THAT THE Y POSITION REGISTER CAN BE LOADED CORRECTLY
806           ;USING GRAPHPLOT Y MODE
807
808 003670 104000
809 003672 012777 126000 175122
810 003700 012777 000525 175116
811 003706 012777 172000 175112
812 003714 013777 001022 175130
813 003722 004737 012410
814 003726 017700 175126
815 003732 022700 000525
816 003736 001401
817 003740 000000
818
819
820           ;TEST THAT THE X - Y POSITION REGISTERS CAN BE LOADED CORRECTLY
821           ;USING GRAPHPLOT X + Y MODE
822           ;TEST FOR PROPER SELECTION OF X AND Y REGISTERS
823
824 003742 104000
825 003744 012777 122000 175050
826 003752 012777 001234 175044
827 003760 012777 126000 175040
828 003766 012777 001432 175034
829 003774 012777 172000 175030
830 004002 013777 001022 175042
831 004010 004737 012410
832 004014 017700 175036
833 004020 022700 001234
834 004024 001402
835 004026 000000
836 004030 000406
837
838 004032 017700 175022
839 004036 022700 001432
840 004042 001401
841 004044 000000
842
843

```

GT30: SCOPE

```

MOV #126000, DBUF ;LOW INTENSITY - SET GRAPHPLOT Y MODE
MOV #525, DBUF1 ;SET Y POSITION
MOV #172000, DBUF2 ;LOAD STATUS REGISTER A, STOP
MOV DBUF, DPC ;LOAD THE DISPLAY P.C.
JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
MOV @YPOS, R0 ;READ Y POSITION
CMP #525, R0
BEQ .+4
HALT

```

GT31: SCOPE

```

MOV #122000, DBUF ;LOW INTENSITY - SET GRAPHPLOT X MODE
MOV #1234, DBUF1 ;SET X POSITION
MOV #126000, DBUF2 ;SET GRAPHPLOT Y MODE
MOV #1432, DBUF3 ;SET Y POSITION
MOV #172000, DBUF4 ;LOAD STATUS REGISTER A, STOP
MOV DBUF, DPC ;LOAD THE DISPLAY P.C.
JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
MOV @XPOS, R0 ;READ X POSITION
CMP #1234, R0
BEQ .+6
HALT
BR GT32
MOV @YPOS, R0 ;READ Y POSITION
CMP #1432, R0
BEQ .+4
HALT

```

Y POSITION REGISTER FAILED TO LOAD  
PROPERLY USING GRAPHPLOT Y MODE

GRAPHPLOT X MODE FAILED TO SELECT  
X POSITION PROPERLY

Y POSITION REGISTER FAILED TO LOAD  
PROPERLY USING GRAPHPLOT Y MODE

```

845
846      ;TEST THAT THE X-Y POSITION REGISTERS CAN BE RESET
847      ;USING POINT DATA MODE.
848
849      004046 104000      GT32:  SCOPE
850      004050 012777 116000 174744      MOV      #116000, @DBUF      ;LOW INTENSITY - POINT MODE
851      004056 005077 174742      CLR      @DBUF1      ;CLEAR X POSITION
852      004062 005077 174740      CLR      @DBUF2      ;CLEAR Y POSITION
853      004066 012777 172000 174734      MOV      #172000, @DBUF3      ;LOAD STATUS "A" REGISTER, STOP
854      004074 013777 001022 17475C      MOV      @DBUF, @DPC      ;LOAD DISPLAY P.C.
855      004102 004737 012410      JSR      7, DLAY      ;EXECUTE A PROGRAM DELAY
856      004106 017700 174744      MOV      @XPOS, R0      ;READ X POSITION
857      004112 001402      BEQ      .+6      ;WAS IT 0?
858      004114 000000      HALT      ;X POSITION REGISTER FAILED TO RESET
859      004116 000404      BR      GT33      ;USING POINT DATA MODE
860
861      004120 017700 174734      MOV      @YPOS, R0      ;READ Y POSITION
862      004124 001401      BEQ      .+4      ;WAS IT 0?
863      004126 000000      HALT      ;Y POSITION REGISTER FAILED TO RESET
864      ;USING POINT DATA MODE
865
866      ;TEST THAT THE X-Y POSITION REGISTERS CAN BE SET
867      ;USING POINT DATA MODE.
868
869      004130 104000      GT33:  SCOPE
870      004132 012777 116000 174662      MOV      #116000, @DBUF      ;LOW INTENSITY - POINT MODE
871      004140 012777 001777 174656      MOV      #1777, @DBUF1      ;SET X POSITION
872      004146 012777 001777 174652      MOV      #1777, @DBUF2      ;SET Y POSITION
873      004154 012777 172000 174646      MOV      #172000, @DBUF3      ;LOAD STATUS A REGISTER, STOP
874      004162 013777 001022 174662      MOV      @DBUF, @DPC      ;LOAD DISPLAY P.C.
875      004170 004737 012410      JSR      7, DLAY      ;EXECUTE A PROGRAM DELAY
876      004174 017700 174656      MOV      @XPOS, R0      ;READ X POSITION
877      004200 022700 001777      CMP      #1777, R0      ;WAS IT SET?
878      004204 001402      BEQ      .+6      ;
879      004206 000000      HALT      ;X POSITION REGISTER FAILED TO SET
880      004210 000406      BR      GT34      ;USING POINT DATA MODE
881
882      004212 017700 174642      MOV      @YPOS, R0      ;READ Y POSITION
883      004216 022700 001777      CMP      #1777, R0      ;WAS IT SET?
884      004222 001401      BEQ      .+4      ;
885      004224 000000      HALT      ;Y POSITION REGISTER FAILED TO SET
886      ;USING POINT DATA MODE
887

```

```

889
890 ;TEST THAT THE X-Y POSITION REGISTERS CAN BE LOADED CORRECTLY
891 ;USING POINT DATA MODE
892
893 004226 104000 GT34: SCOPE
894 004230 012777 116000 174564 MOV #116000, @DBUF ;LOW INTENSITY - POINT MODE
895 004236 012777 001252 174560 MOV #1252, @DBUF1 ;SET X POSITION
896 004244 012777 001252 174554 MOV #1252, @DBUF2 ;SET Y POSITION
897 004252 012777 172000 174550 MOV #172000, @DBUF3 ;LOAD STATUS REGISTER A, STOP
898 004260 013777 001022 174564 MOV DBUF, @DPC
899 004266 004737 012410 JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
900 004272 017700 174560 MOV @XPOS, R0 ;READ X POSITION
901 004276 022700 001252 CMP #1252, R0
902 004302 001402 BEQ .+6
903 004304 000000 HALT ;X POSITION REGISTER FAILED
904 004306 000406 BR GT35 ;USING POINT DATA MODE
905
906 004310 017700 174544 MOV @YPOS, R0 ;READ Y POSITION
907 004314 022700 001252 CMP #1252, R0
908 004320 001401 BEQ .+4
909 004322 000000 HALT ;Y POSITION REGISTER FAILED
910 ;USING POINT DATA MODE
911
912 ;TEST THAT THE X-Y POSITION REGISTERS CAN BE LOADED CORRECTLY
913 ;USING POINT DATA MODE
914
915 004324 104000 GT35: SCOPE
916 004326 012777 116000 174466 MOV #116000, @DBUF ;LOW INTENSITY - POINT MODE
917 004334 012777 000525 174462 MOV #525, @DBUF1 ;SET X POSITION
918 004342 012777 000525 174456 MOV #525, @DBUF2 ;SET Y POSITION
919 004350 012777 172000 174452 MOV #172000, @DBUF3 ;LOAD STATUS REGISTER A, STOP
920 004356 013777 001022 174466 MOV DBUF, @DPC
921 004364 004737 012410 JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
922 004370 017700 174462 MOV @XPOS, R0 ;READ X POSITION
923 004374 022700 000525 CMP #525, R0
924 004400 001402 BEQ .+6
925 004402 000000 HALT ;X POSITION REGISTER FAILED
926 004404 000406 BR GT36 ;USING POINT DATA MODE
927
928 004406 017700 174446 MOV @YPOS, R0 ;READ Y POSITION
929 004412 022700 000525 CMP #525, R0
930 004416 001401 BEQ .+4
931 004420 000000 HALT ;Y POSITION REGISTER FAILED
932 ;USING POINT DATA MODE
933

```

```

935
936
937
938
939 004422 104000
940 004424 012777 116000 174370
941 004432 012777 000000 174364
942 004440 012777 001777 174360
943 004446 012777 172000 174354
944 004454 013777 001022 174370
945 004462 004737 012410
946 004466 017700 174364
947 004472 022700 000000
948 004476 001402
949 004500 000000
950 004502 000406
951
952 004504 017700 174350
953 004510 022700 001777
954 004514 001401
955 004516 000000
956
957

```

```

;TEST THAT THE X-Y POSITION REGISTERS CAN BE LOADED CORRECTLY
;USING POINT DATA MODE
GT36: SCOPE
MOV #116000, @DBUF ;LOW INTENSITY - POINT MODE
MOV #0, @DBUF1 ;SET X POSITION
MOV #1777, @DBUF2 ;SET Y POSITION
MOV #172000, @DBUF3 ;LOAD STATUS REGISTER A, STOP
MOV @DBUF, @DPC
JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
MOV @XPOS, R0 ;READ X POSITION
CMP #0, R0
BEQ .+6
HALT ;X POSITION REGISTER FAILED
BR GT37 ;USING POINT DATA MODE
MOV @YPOS, R0 ;READ Y POSITION
CMP #1777, R0
BEQ .+4
HALT ;Y POSITION REGISTER FAILED
;USING POINT DATA MODE

```

```

959
960 ;TEST THAT LONG VECTOR MODE INCREMENTS X AND Y AXIS PROPERLY
961 ;COUNT 1
962
963 GT37: SCOPE
964 004520 104000 DBUF,RO
965 004522 013700 001022 MOV #116000,(0)+ ;LOAD "POINT MODE"
966 004526 012720 116000 MOV (0)+ ;CLEAR X AXIS
967 004532 005020 CLR (0)+ ;CLEAR Y AXIS
968 004534 005020 CLR (0)+ ;LOAD "LONG VECTOR MODE"
969 004536 012720 110000 MOV #110000,(0)+ ;PRESET "DELTA X AXIS"
970 004542 012720 000001 MOV #1,(0)+ ;PRESET "DELTA Y AXIS"
971 004546 012720 000001 MOV #1,(0)+ ;LOAD "DISPLAY STOP"
972 004552 012710 172000 MOV #172000,(0) ;LOAD THE DISPLAY P.C.
973 004556 013777 001022 174266 MOV DBUF,ADPC ;EXECUTE A PROGRAM DELAY
974 004564 004737 012410 JSR 7,DLAY
975 004570 017700 174262 MOV @XPOS,RO ;READ X AXIS
976 004574 022700 000001 CMP #1,RO ;DID IT INCREMENT BY 1
977 004600 001402 BEQ .+6 ;YES
978 004602 000000 HALT ;NO, INCREMENT X AXIS BY
979 004604 000406 BR GT38 ;LONG VECTOR MODE FAILED
980
981 004606 017700 174246 MOV @YPOS,RO ;READ Y AXIS
982 004612 022700 000001 CMP #1,RO ;DID IT INCREMENT BY 1
983 004616 001401 BEQ .+4 ;YES
984 004620 000000 HALT ;NO, INCREMENT Y AXIS BY
985 ;LONG VECTOR MODE FAILED
986
987 ;TEST THAT LONG VECTOR MODE DECREMENT X AND Y AXIS PROPERLY
988 ;COUNT 1
989
990 GT38: SCOPE
991 004622 104000 DBUF,RO
992 004624 013700 001022 MOV #116000,(0)+ ;LOAD "POINT MODE"
993 004630 012720 116000 MOV (0)+ ;CLEAR X AXIS
994 004634 005020 CLR (0)+ ;CLEAR Y AXIS
995 004636 005020 CLR (0)+ ;LOAD "LONG VECTOR MODE"
996 004640 012720 110000 MOV #110000,(0)+ ;PRESET "DELTA X AXIS"
997 004644 012720 020001 MOV #20001,(0)+ ;PRESET "DELTA Y AXIS"
998 004650 012720 020001 MOV #20001,(0)+ ;LOAD "DISPLAY STOP"
999 004654 012710 172000 MOV #172000,(0) ;LOAD THE DISPLAY P.C.
1000 004660 013777 001022 174164 MOV DBUF,ADPC ;EXECUTE A PROGRAM DELAY
1001 004666 004737 012410 JSR 7,DLAY
1002 004672 017700 174160 MOV @XPOS,RO ;READ X AXIS
1003 004676 022700 001777 CMP #1777,RO ;DID IT DECREMENT BY 1
1004 004702 001402 BEQ .+6 ;YES
1005 004704 000000 HALT ;NO, DECREMENT X AXIS BY
1006 004706 000406 BR GT39 ;LONG VECTOR MODE FAILED
1007
1008 004710 017700 174144 MOV @YPOS,RO ;READ Y AXIS
1009 004714 022700 001777 CMP #1777,RO ;DID IT DECREMENT BY 1
1010 004720 001401 BEQ .+4 ;YES
1011 004722 000000 HALT ;NO, DECREMENT Y AXIS BY
1012 ;LONG VECTOR MODE FAILED

```

```

1014
1015 ;TEST THAT LONG VECTOR MODE INCREMENT X AND Y AXIS PROPERLY
1016 ;COUNT 0-1777
1017
1018 004724 104000 GT39: SCOPE
1019 004726 012703 001777 MOV #1777,R3 ;SET UP A COUNTER
1020 004732 012704 000001 MOV #1,R4 ;PRESET THE COMPARED VALUE
1021
1022 004736 104000 GT39A: SCOPE
1023 004740 013700 001022 MOV DBUF,R0 ;SET UP R0
1024 004744 012720 116000 MOV #116000,(0)+ ;LOAD "POINT MODE"
1025 004750 005020 CLR (0)+ ;CLEAR X AXIS
1026 004752 005020 CLR (0)+ ;CLEAR Y AXIS
1027 004754 012720 110000 MOV #110000,(0)+ ;LOAD "LONG VECTOR MODE"
1028 004760 010420 MOV R4,(0)+ ;PRESET "DELTA X AXIS"
1029 004762 010420 MOV R4,(0)+ ;PRESET "DELTA Y AXIS"
1030 004764 012720 172000 MOV #172000,(0)+
1031 004770 013777 001022 174054 MOV DBUF,ADPC ;LOAD THE DISPLAY P.C.
1032 004776 004737 012410 JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1033
1034 005002 017700 174050 MOV @XPOS,R0 ;READ X AXIS
1035 005006 020400 CMP R4,R0 ;ARE THEY EQUAL?
1036 005010 001402 BEQ .+6 ;YES
1037 005012 000000 HALT ;NO, INCREMENT X AXIS VIA
1038 005014 000411 BR GT40 ;LONG VECTOR MODE FAILED
1039
1040 005016 017700 174036 MOV @YPOS,R0 ;READ Y AXIS
1041 005022 020400 CMP R4,R0 ;ARE THEY EQUAL?
1042 005024 001402 BEQ .+6 ;YES
1043 005026 000000 HALT ;NO, INCREMENT Y AXIS VIA
1044 005030 000403 BR GT40 ;LONG VECTOR MODE FAILED
1045
1046 005032 005204 INC R4 ;INCREMENT EXPECTED VALUE
1047 005034 005303 DEC R3 ;FINISHED?
1048 005036 001340 BNE GT39A ;NO, TEST MORE DATA

```

```

1050
1051      ;TEST THAT LONG VECTOR MODE DECREMENTS X AND Y AXIS PROPERLY
1052      ;COUNT 1777-0
1053
1054      005040  104000      GT40:  SCOPE
1055      005042  012703  002000      MOV      #2000,R3      ;SET UP A COUNTER
1056      005046  012704  001777      MOV      #1777,R4      ;PRESET THE COMPARED VALUE
1057      005052  012705  020001      MOV      #20001,R5
1058
1059      005056  104000      GT40A: SCOPE
1060      005060  013700  001022      MOV      DBUF,R0      ;SET UP R0
1061      005064  012720  116000      MOV      #116000,(0)+ ;LOAD "POINT MODE"
1062      005070  005020      CLR      (0)+          ;CLEAR X AXIS
1063      005072  005020      CLR      (0)+          ;CLEAR Y AXIS
1064      005074  012720  110000      MOV      #110000,(0)+ ;LOAD "LONG VECTOR MODE"
1065      005100  010520      MOV      R5,(0)+       ;PRESET "DELTA X AXIS"
1066      005102  010520      MOV      R5,(0)+       ;PRESET "DELTA Y AXIS"
1067      005104  012710  172000      MOV      #172000,(0)
1068      005110  013777  001022  173734      MOV      DBUF,ADPC     ;LOAD THE DISPLAY P.C.
1069      005116  004737  012410      JSR      7,DLAY        ;EXECUTE A PROGRAM DELAY
1070
1071      005122  017700  173730      MOV      @XPOS,R0      ;READ X AXIS
1072      005126  020400      CMP      R4,R0          ;ARE THEY EQUAL?
1073      005130  001402      BEQ      .+6           ;YES
1074      005132  000000      HALT
1075      005134  000412      BR      GT41           ;NO, DECREMENT X AXIS VIA
1076                                     ;LONG VECTOR MODE FAILED
1077
1077      005136  017700  173716      MOV      @YPOS,R0      ;READ Y AXIS
1078      005142  020400      CMP      R4,R0          ;ARE THEY EQUAL?
1079      005144  001402      BEQ      .+6           ;YES
1080      005146  000000      HALT
1081      005150  000404      BR      GT41           ;NO, DECREMENT Y AXIS VIA
1082                                     ;LONG VECTOR MODE FAILED
1083
1083      005152  005205      INC      R5             ;INCREMENT "DELTA X-Y"
1084      005154  005304      DEC      R4             ;DECREMENT EXPECTED VALUE
1085      005156  005303      DEC      R3             ;FINISHED?
1086      005160  001337      BNE     GT40A          ;NO, TEST MORE DATA

```

```

1088          ;TEST THAT X AND Y ASIS INCREMENTS PROPERLY
1089          ;USING SHORT VECTOR MODE
1090          ;COUNT 1
1091
1092 005162 104000          GT41: SCOPE
1093 005164 013700 001022  MOV      DBUF,RO          ;SET UP RO
1094 005170 012720 116000  MOV      #116000,(0)+    ;LOAD "SET POINT MODE"
1095 005174 005020          CLR      (0)+            ;CLEAR X AXIS
1096 005176 005020          CLR      (0)+            ;CLEAR Y AXIS
1097 005200 012720 106000  MOV      #106000,(0)+    ;LOAD "SET SHORT VECTOR MODE"
1098 005204 012720 000201  MOV      #201,(0)+       ;PRESET "DELTA X AND DELTA Y"
1099 005210 012710 172000  MOV      #172000,(0)
1100 005214 013777 001022  MOV      DBUF,ADPC       ;LOAD THE DISPLAY PC
1101 005222 004737 012410  JSR      7,DLAY          ;EXECUTE A PROGRAM DELAY
1102
1103 005226 017700 173624  MOV      @XPOS,RO        ;READ X AXIS
1104 005232 022700 000001  CMP      #1,RO           ;ARE THEY EQUAL?
1105 005236 001402          BEQ      .+6             ;YES
1106 005240 000000          HALT                    ;NO, INCREMENT X AXIS FAILED USING
1107 005242 000406          BR       GT42           ;SHORT VECTOR MODE
1108
1109 005244 017700 173610  MOV      @YPOS,RO        ;READ Y AXIS
1110 005250 022700 000001  CMP      #1,RO           ;ARE THEY EQUAL?
1111 005254 001401          BEQ      .+4             ;YES
1112 005256 000000          HALT                    ;NO INCREMENT Y AXIS FAILED
1113                                     ;USING SHORT VECTOR MODE
1114
1115          ;TEST THAT X AND Y AXIS DECREMENT PROPERLY
1116          ;USING SHORT VECTOR MODE
1117          ;COUNT 1
1118
1119 005260 104000          GT42: SCOPE
1120 005262 013700 001022  MOV      DBUF,RO          ;SET UP RO
1121 005266 012720 116000  MOV      #116000,(0)+    ;LOAD "SET POINT MODE"
1122 005272 005020          CLR      (0)+            ;CLEAR X AXIS
1123 005274 005020          CLR      (0)+            ;CLEAR Y AXIS
1124 005276 012720 106000  MOV      #106000,(0)+    ;LOAD "SET SHORT VECTOR MODE"
1125 005302 012720 020301  MOV      #20301,(0)+     ;PRESET "DELTA X AND DELTA Y"
1126 005306 012710 172000  MOV      #172000,(0)
1127 005312 013777 001022  MOV      DBUF,ADPC       ;LOAD THE DISPLAY PC
1128 005320 004737 012410  JSR      7,DLAY          ;EXECUTE A PROGRAM DELAY
1129
1130 005324 017700 173526  MOV      @XPOS,RO        ;READ X AXIS
1131 005330 022700 001777  CMP      #1777,RO        ;ARE THEY EQUAL?
1132 005334 001402          BEQ      .+6             ;YES
1133 005336 000000          HALT                    ;NO, DECREMENT X AXIS FAILED USING
1134 005340 000406          BR       GT43           ;SHORT VECTOR MODE
1135
1136 005342 017700 173512  MOV      @YPOS,RO        ;READ Y AXIS
1137 005346 022700 001777  CMP      #1777,RO        ;ARE THEY EQUAL?
1138 005352 001401          BEQ      .+4             ;YES
1139 005354 000000          HALT                    ;NO DECREMENT Y AXIS FAILED
1140                                     ;USING SHORT VECTOR MODE

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173630

173532



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1142
1143
1144
1145
1146
1147 005356 104000
1148 005360 012703 000077
1149 005364 012702 000001
1150 005370 012704 000201
1151
1152 005374 104000
1153 005376 013700 001022
1154 005402 012720 116000
1155 005406 005020
1156 005410 005020
1157 005412 012720 106000
1158 005416 010420
1159 005420 012710 172000
1160 005424 013777 001022 173420
1161 005432 004737 012410
1162
1163 005436 017700 173414
1164 005442 020200
1165 005444 001402
1166 005446 000000
1167 005450 000413
1168
1169 005452 017700 173402
1170 005456 020200
1171 005460 001402
1172 005462 000000
1173 005464 000405
1174
1175 005466 062704 000201
1176 005472 005202
1177 005474 005303
1178 005476 001337

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

GT43:  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"

GT43A: SCOPE
      MOV DBUF,R0 ;SET UP R0
      MOV #116000,(0)+ ;LOAD "SET POINT DATA MODE"
      CLR (0)+ ;CLEAR X AXIS
      CLR (0)+ ;CLEAR Y AXIS
      MOV #106000,(0)+ ;LOAD "SET SHORT VECTOR MODE"
      MOV R4,(0)+ ;PRESET "DELTA X AND DELTA Y"
      MOV #172000,(0)
      MOV DBUF,@DPC ;LOAD THE DISPLAY P.C.
      JSR 7,DLAY- ;EXECUTE A PROGRAM DELAY

      MOV @XPOS,R0 ;READ X POSITION
      CMP R2,R0 ;ARE THEY EQUAL
      BEQ .+6 ;YES
      HALT ;INCREMENT X AXIS FAILED USING
      BR GT44 ;SHORT VECTOR MODE

      MOV @YPOS,R0 ;READ Y POSITION
      CMP R2,R0 ;ARE THEY EQUAL ?
      BEQ .+6 ;YES
      HALT ;INCREMENT Y AXIS FAILED USING
      BR GT44 ;SHORT VECTOR MODE

      ADD #201,R4 ;ADD DELTA X-Y
      INC R2 ;INCREMENT EXPECTED VALUE
      DEC R3 ;DECREMENT COUNT, FINISHED?
      BNE GT43A ;NO, TEST MORE DATA

```

```

1180
1181      ;TEST THAT X AND Y AXIS DECREMENT PROPERLY
1182      ;USING SHORT VECTOR MODE
1183      ;COUNT 77-0
1184
1185      005500  104000      GT44:  SCOPE
1186      005502  012703      MOV     #77,R3      ;SET UP A COUNT LOCATION
1187      005506  012702      MOV     #1777,R2     ;SET UP THE COMPARED LOCATION
1188      005512  012704      MOV     #20301,R4    ;PRESET THE "DELTA X-Y"
1189
1190      005516  104000      GT44A: SCOPE
1191      005520  013700      MOV     DBUF,R0     ;SET UP R0
1192      005524  012720      MOV     #116000,(0)+ ;LOAD "SET POINT DATA MODE"
1193      005530  005020      CLR     (0)+        ;CLEAR X AXIS
1194      005532  005020      CLR     (0)+        ;CLEAR Y AXIS
1195      005534  012720      MOV     #106000,(0)+ ;LOAD "SET SHORT VECTOR MODE"
1196      005540  010420      MOV     R4,(0)+     ;PRESET "DELTA X AND DELTA Y"
1197      005542  012710      MOV     #172000,(0)
1198      005546  013777      MOV     DBUF,ADPC   ;LOAD THE DISPLAY P.C.
1199      005554  004737      JSR     7,DLAY      ;EXECUTE A PROGRAM DELAY
1200
1201      005560  017700      MOV     @XPOS,R0    ;READ X POSITION
1202      005564  020200      CMP     R2,R0       ;ARE THEY EQUAL
1203      005566  001402      BEQ     .+6         ;YES
1204      005570  000000      HALT
1205      005572  000413      BR     GT45         ;DECREMENT X AXIS FAILED USING
1206                                     ;SHORT VECTOR MODE
1207
1207      005574  017700      MOV     @YPOS, R0   ;READ Y POSITION
1208      005600  020200      CMP     R2,R0       ;ARE THEY EQUAL ?
1209      005602  001402      BEQ     .+6         ;YES DECREMENT
1210      005604  000000      HALT
1211      005606  000405      BR     GT45         ;DECREMENT Y AXIS FAILED USING
1212                                     ;SHORT VECTOR MODE
1213
1213      005610  062704      ADD     #201,R4     ;ADD "DELTA X-Y"
1214      005614  005302      DEC     R2          ;DECREMENT EXPECTED VALUE
1215      005616  005303      DEC     R3          ;DECREMENT COUNT, FINISHED?
1216      005620  001337      BNE    GT44A       ;NO, TEST MORE DATA
1217

```



```

1273
1274
1275
1276
1277
1278 006016 104000
1279 006020 012703 000077
1280 006024 012702 000001
1281 006030 012704 000201
1282
1283 006034 104000
1284 006036 013700 001022
1285 006042 012720 116000
1286 006046 005020
1287 006050 005020
1288 006052 012720 130000
1289 006056 010420
1290 006060 012710 172000
1291 006064 013777 001022
1292 006072 004737 012410
1293
1294 006076 017700 172754
1295 006102 020200
1296 006104 001402
1297 006106 000000
1298 006110 000413
1299
1300 006112 017700 172742
1301 006116 020200
1302 006120 001402
1303 006122 000000
1304 006124 000405
1305
1306 006126 062704 000201
1307 006132 005202
1308 006134 005303
1309 006136 001337

```

```

:TEST THAT X AND Y AXIS INCREMENT PROPERLY
:USING RELATIVE POINT MODE
:COUNT 0-77
GT47:  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"
GT47A: 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 #172000,(0)
      MOV DBUF,DPFC ;LOAD THE DISPLAY P.C.
      JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
      MOV @XPOS,R0 ;READ X POSITION
      CMP R2,R0 ;ARE THEY EQUAL
      BEQ .+6 ;YES
      HALT ;INCREMENT X AXIS FAILED USING
      BR GT48 ;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 GT48 ;RELATIVE POINT MODE
      ADD #201,R4 ;ADD DELTA X-Y
      INC R2 ;INCREMENT EXPECTED VALUE
      DEC R3 ;DECREMENT COUNT, FINISHED?
      BNE GT47A ;NO, TEST MORE DATA

```

```

1311
1312
1313
1314
1315
1316 006140 104000
1317 006142 012703 000077
1318 006146 012702 001777
1319 006152 012704 020301
1320
1321 006156 104000
1322 006160 013700 001022
1323 006164 012720 116000
1324 006170 005020
1325 006172 005020
1326 006174 012720 130000
1327 006200 010420
1328 006202 012710 172000
1329 006206 013777 001022 172636
1330 006214 004737 012410
1331
1332 006220 017700 172632
1333 006224 020200
1334 006226 001402
1335 006230 000000
1336 006232 000413
1337
1338 006234 017700 172620
1339 006240 020200
1340 006242 001402
1341 006244 000000
1342 006246 00040E
1343
1344 006250 062704 000201
1345 006254 005302
1346 006256 005303
1347 006260 001337
1348

;TEST THAT X AND Y AXIS DECREMENT PROPERLY
;USING RELATIVE POINT MODE
;COUNT 77-0
GT48:  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"

GT48A: 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  #130000,(0)+   ;LOAD "SET RELATIVE POINT MODE"
      MOV  R4,(0)+        ;PRESET "DELTA X AND DELTA Y"
      MOV  #172000,(0)
      MOV  DBUF,DPIC      ;LOAD THE DISPLAY P.C.
      JSR  7,DLAY        ;EXECUTE A PROGRAM DELAY

      MOV  @XPOS,RO       ;READ X POSITION
      CMP  R2,RO          ;ARE THEY EQUAL
      BEQ  .+6            ;YES
      HALT                ;DECREMENT X AXIS FAILED USING
      BR   GT49           ;RELATIVE POINT MODE

      MOV  @YPOS,RO       ;READ Y POSITION
      CMP  R2,RO          ;ARE THEY EQUAL ?
      BEQ  .+6            ;YES DECREMENT
      HALT                ;DECREMENT Y AXIS FAILED USING
      BR   GT49           ;RELATIVE POINT MODE

      ADD  #201,R4        ;ADD "DELTA X-Y"
      DEC  R2             ;DECREMENT EXPECTED VALUE
      DEC  R3             ;DECREMENT COUNT, FINISHED?
      BNE  GT48A         ;NO, TEST MORE DATA
    
```

```

1350
1351
1352           ;LOAD STATUS B TEST
1353           ;USE GRAPHPLOT X MODE TO TEST Y AXIS IS INCREMENTED BY
1354           ;"SCALE" REGISTER
1355
1356 006262 104000          GT49:  SCOPE
1357 006264 012703 000077  MOV      #77,R3          ;SET UP EXECUTION COUNTER
1358 006270 012704 000001  MOV      #1,R4          ;SET UP COMPARED DATA
1359 006274 012737 174101 001036  MOV      #174101,DSAVE ;SET UP BASIC "LOAD STATUS B"
1360
1361 006302 104000          GT49A: SCOPE
1362 006304 013700 001022  MOV      DBUF,R0        ;SET UP R0
1363 006310 012720 116000  MOV      #116000,(0)+  ;LOAD "POINT MODE"
1364 006314 005020          CLR      (0)+          ;CLEAR X AXIS
1365 006316 005020          CLR      (0)+          ;CLEAR Y AXIS
1366 006320 013720 001036  MOV      DSAVE,(0)+   ;LOAD "SET STATUS B"
1367 006324 012720 120000  MOV      #120000,(0)+ ;LOAD "SET GRAPHPLOT X MODE"
1368 006330 005020          CLR      (0)+          ;LOAD "X GRAPHPLOT DATA"
1369 006332 012710 172000  MOV      #172000,(0)
1370 006336 013777 001022 172506  MOV      DBUF,@DPC    ;LOAD THE DISPLAY P.C.
1371 006344 004737 012410  JSR      7,DLAY       ;EXECUTE A PROGRAM DELAY
1372
1373 006350 017700 172504  MOV      @YPOS,R0     ;READ Y AXIS
1374 006354 020400          CMP      R4,R0        ;COMPARE TO EXPECTED VALUE
1375 006356 001402          BEQ      .+6         ;ARE THEY EQUAL?
1376 006360 000000          HALT
1377 006362 000405          BR      GT50         ;LOAD "STATUS B" FAILED TO LOAD
1378                                     ;THE Y AXIS CORRECTLY
1379 006364 005237 001036  INC      DSAVE
1380 006370 005204          INC      R4
1381 006372 005303          DEC      R3
1382 006374 001343          BNE     GT49A       ;INCREMENT THE STATUS B COUNT
                                     ;DECREMENT THE EXECUTION COUNT
                                     ;TEST MORE DATA

```

```

1384
1385
1386
1387
1388
1389
1389 006376 104000
1390 006400 012703 000077
1391 006404 012704 000001
1392 006410 012737 174101 001036
1393
1394 006416 104000
1395 006420 013700 001022
1396 006424 012720 116000
1397 006430 005020
1398 006432 005020
1399 006434 013720 001036
1400 006440 012720 124000
1401 006444 005020
1402 006446 012710 172000
1403 006452 013777 001022 172372
1404 006460 004737 012410
1405
1406 006464 017700 172366
1407 006470 042700 175000
1408 006474 020400
1409 006476 001402
1410 006500 000000
1411 006502 000405
1412
1413 006504 005237 001036
1414 006510 005204
1415 006512 005303
1416 006514 001341
1417
1418 006516 012777 174100 172276 GT50B:
1419 006524 012777 172000 172272 MOV
1420 006532 013777 001022 172312 MOV

```

```

:LOAD STATUS B TEST
:USE GRAPHPLOT Y MODE TO TEST X AXIS IS INCREMENTED BY
:"SCALE" REGISTER

GT50: SCOPE
MOV #77,R3 ;SET UP EXECUTION COUNTER
MOV #1,R4 ;SET UP COMPARED DATA
MOV #174101,DSAVE ;SET UP BASIC "LOAD STATUS B"

GT50A: SCOPE
MOV DBUF,RO ;SET UP RO
MOV #116000,(0)+ ;LOAD "POINT MODE"
CLR (0)+ ;CLEAR X AXIS
CLR (0)+ ;CLEAR Y AXIS
MOV DSAVE,(0)+ ;LOAD "SET STATUS B"
MOV #124000,(0)+ ;LOAD "SET GRAPHPLOT Y MODE"
CLR (0)+ ;LOAD "Y GRAPHPLOT DATA"
MOV #172000,(0)
MOV DBUF,@DPC ;LOAD THE DISPLAY P.C.
JSR 7,DLAY ;EXECUTE A PROGRAM DELAY

MOV @XPOS,RO ;READ X AXIS
BIC #176000,RO ;MASK TO BITS 0-9
CMP R4,RO ;COMPARE TO EXPECTED VALUE
BEQ .+6 ;ARE THEY EQUAL?
HALT ;LOAD "STATUS B" FAILED TO LOAD
BR GT50B ;THE X AXIS CORRECTLY

INC DSAVE
INC R4 ;INCREMENT THE STATUS B COUNT
DEC R3 ;DECREMENT THE EXECUTION COUNT
BNE GT50A ;TEST MORE DATA

GT50B: MOV #174100,@DBUF
MOV #172000,@DBUF1
MOV DBUF,@DPC

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006752 104000  
006754 013700 001022  
006760 012720 116000  
006764 012720 000000  
006770 012720 000000  
006774 012720 110000  
007000 012720 020001  
007004 012720 000000  
007010 012720 172000  
007014 013777 001022 172030  
007022 004737 012410  
  
007026 032777 000040 172020  
007034 001002  
007036 000000  
007040 000424  
  
007042 013700 001022  
007046 012720 116000  
007052 012720 000000  
007056 012720 000000  
007062 012720 172000  
007066 013777 001022 171756  
007074 004737 012410  
  
007100 032777 000040 171746  
007106 001401  
007110 000000

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

GT53: SCOPE  
MOV DBUF,RO  
MOV #116000,(0)+ ;LOAD POINT  
MOV #0,(0)+ ;LOAD MAX X  
MOV #0,(0)+ ;LOAD Y  
MOV #110000,(0)+ ;LOAD LONG VECTOR  
MOV #20001,(0)+ ;LOAD DELTA X  
MOV #0,(0)+ ;LOAD DELTA Y  
MOV #172000,(0)+ ;LOAD STOP  
MOV DBUF,ADPC ;START DISPLAY  
JSR 7,DLAY ;EXECUTE A PROGRAM DELAY  
  
BIT #40,ADSR ;TEST BIT 5  
BNE .+6  
HALT ;EDGE FLAG FAILED TO SET  
BR GT54

:SUB-TEST, TEST THAT THE EDGE FLAG CLEARS

MOV DBUF,RO  
MOV #116000,(0)+ ;LOAD POINT  
MOV #0,(0)+ ;LOAD X  
MOV #0,(0)+ ;LOAD Y  
MOV #172000,(0)+ ;LOAD STOP  
MOV DBUF,ADPC ;START DISPLAY  
JSR 7,DLAY ;EXECUTE A PROGRAM DELAY  
  
BIT #40,ADSR  
BEQ .+4  
HALT ;ERROR, DEGE FLAG FAILED TO CLEAR

```

1508      ;EDGE FLAG TEST
1509      ;TEST THAT EXCEEDING +Y AXIS SETS EDGE FLAG
1510
1511      007112  104000      GT54:  SCOPE
1512      007114  013700      MOV     DBUF,RO
1513      007120  012720  116000      MOV     #116000,(0)+ ;LOAD POINT
1514      007124  012720  000000      MOV     #0,(0)+ ;LOAD X
1515      007130  013720  001012      MOV     GSYAXS,(0)+ ;LOAD MAX Y
1516      007134  012720  110000      MOV     #110000,(0)+ ;LOAD LONG VECTOR
1517      007140  012720  000000      MOV     #0,(0)+ ;LOAD DELTA X
1518      007144  012720  000001      MOV     #1,(0)+ ;LOAD DELTA Y
1519      007150  012720  172000      MOV     #172000,(0)+ ;LOAD STOP
1520      007154  013777  001022  171670      MOV     DBUF,ADPC ;START DISPLAY
1521      007162  004737  012410      JSR     7,DLAY ;EXECUTE A PROGRAM DELAY
1522
1523      007166  032777  000040  171660      BIT     #40,ADSR ;TEST BIT 5
1524      007174  001002      BNE     .+6
1525      007176  000000      HALT ;EDGE FLAG FAILED TO SET
1526      007200  000424      BR     GT55
1527
1528      ;SUB-TEST, TEST THAT THE EDGE FLAG CLEARS
1529
1530      007202  013700  001022      MOV     DBUF,RO
1531      007206  012720  116000      MOV     #116000,(0)+ ;LOAD POINT
1532      007212  012720  000000      MOV     #0,(0)+ ;LOAD X
1533      007216  012720  000000      MOV     #0,(0)+ ;LOAD Y
1534      007222  012720  172000      MOV     #172000,(0)+ ;LOAD STOP
1535      007226  013777  001022  171616      MOV     DBUF,ADPC ;START DISPLAY
1536      007234  004737  012410      JSR     7,DLAY ;EXECUTE A PROGRAM DELAY
1537
1538      007240  032777  000040  171606      BIT     #40,ADSR
1539      007246  001401      BEQ     .+4
1540      007250  000000      HALT ;ERROR, EDGE FLAG FAILED TO CLEAR
1541
1542      ;EDGE FLAG TEST
1543      ;TEST THAT EXCEEDING -Y AXIS SETS EDGE FLAG
1544
1545      007252  104000      GT55:  SCOPE
1546      007254  013700      MOV     DBUF,RO
1547      007260  012720  116000      MOV     #116000,(0)+ ;LOAD POINT
1548      007264  012720  000000      MOV     #0,(0)+ ;LOAD X
1549      007270  012720  000000      MOV     #0,(0)+ ;LOAD Y
1550      007274  012720  110000      MOV     #110000,(0)+ ;LOAD LONG VECTOR
1551      007300  012720  000000      MOV     #0,(0)+ ;LOAD DELTA X
1552      007304  012720  020001      MOV     #20001,(0)+ ;LOAD DELTA Y
1553      007310  012720  172000      MOV     #172000,(0)+ ;LOAD STOP
1554      007314  013777  001022  171530      MOV     DBUF,ADPC ;START DISPLAY
1555      007322  004737  012410      JSR     7,DLAY ;EXECUTE A PROGRAM DELAY
1556
1557      007326  032777  000040  171520      BIT     #40,ADSR ;TEST BIT 5
1558      007334  001001      BNE     .+4
1559      007336  000000      HALT ;EDGE FLAG FAILED TO SET
1560

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1562          ;TEST THAT THE CHARACTER REGISTER IS LOADED PROPERLY
1563          ; CODE 00
1564
1565 007340 104000          GT56: SCOPE
1566 007342 012777 100000 171452      MOV      #100000, @DBUF      ;LOAD "CHARACTER MODE"
1567 007350 012777 000000 171446      MOV      #0, @DBUF1        ;LOAD "NULL" CHARACTER
1568 007356 012777 172000 171442      MOV      #172000, @DBUF2
1569 007364 013777 001022 171460      MOV      @DBUF, @DPC      ;START DISPLAY
1570 007372 004737 012410          JSR      7, DLAY          ;EXECUTE A PROGRAM DELAY
1571 007376 017700 171456          MOV      @YPOS, R0        ;READ CHARACTER REG.
1572 007402 042700 001777          BIC      #1777, R0        ;MASK TO BITS 10-15
1573 007406 022700 000000          CMP      #0, R0
1574 007412 001401          BEQ      .+4
1575 007414 000000          HALT                    ;ERROR, CHARACTER REGISTER LOADED IN ERROR
1576
1577          ;TEST THAT THE CHARACTER REGISTER IS LOADED PROPERLY
1578          ; CODE 77
1579
1580 007416 104000          GT57: SCOPE
1581 007420 012777 100000 171374      MOV      #100000, @DBUF      ;LOAD "CHARACTER MODE"
1582 007426 012777 000077 171370      MOV      #77, @DBUF1        ;LOAD CHARACTER
1583 007434 012777 172000 171364      MOV      #172000, @DBUF2
1584 007442 013777 001022 171402      MOV      @DBUF, @DPC      ;START DISPLAY
1585 007450 004737 012410          JSR      7, DLAY          ;EXECUTE A PROGRAM DELAY
1586 007454 017700 171400          MOV      @YPOS, R0        ;READ CHARACTER REG.
1587 007460 042700 001777          BIC      #1777, R0        ;MASK TO BITS 10-15
1588 007464 022700 176000          CMP      #176000, R0
1589 007470 001401          BEQ      .+4
1590 007472 000000          HALT                    ;ERROR, CHARACTER REGISTER LOADED IN ERROR
1591
1592          ;TEST THAT THE CHARACTER REGISTER IS LOADED PROPERLY
1593          ; CODE 25
1594
1595 007474 104000          GT58: SCOPE
1596 007476 012777 100000 171316      MOV      #100000, @DBUF      ;LOAD "CHARACTER MODE"
1597 007504 012777 000025 171312      MOV      #25, @DBUF1        ;LOAD CHARACTER
1598 007512 012777 172000 171306      MOV      #172000, @DBUF2
1599 007520 013777 001022 171324      MOV      @DBUF, @DPC      ;START DISPLAY
1600 007526 004737 012410          JSR      7, DLAY          ;EXECUTE A PROGRAM DELAY
1601 007532 017700 171322          MOV      @YPOS, R0        ;READ CHARACTER REG.
1602 007536 042700 001777          BIC      #1777, R0        ;MASK TO BITS 10-15
1603 007542 022700 052000          CMP      #52000, R0
1604 007546 001401          BEQ      .+4
1605 007550 000000          HALT                    ;ERROR, CHARACTER REGISTER LOADED IN ERROR

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1607
1608 ;TEST THAT THE CHARACTER REGISTER IS LOADED PROPERLY
1609 ; CODE 52
1610
1611 007552 104000 GT59: SCOPE
1612 007554 012777 100000 171240 MOV #100000, @DBUF ;LOAD "CHARACTER MODE"
1613 007562 012777 000052 171234 MOV #52, @DBUF1 ;LOAD CHARACTER
1614 007570 012777 172000 171230 MOV #172000, @DBUF2
1615 007576 013777 001022 171246 MOV DBUF, @DPC ;START DISPLAY
1616 007604 004737 012410 JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
1617 007610 017700 171244 MOV @YPOS, R0 ;READ CHARACTER REG.
1618 007614 042700 001777 BIC #1777, R0 ;MASK TO BITS 10-15
1619 007620 022700 124000 CMP #124000, R0
1620 007624 001401 BEQ .+4
1621 007626 000000 HALT ;ERROR, CHARACTER REGISTER LOADED IN ERROR
1622
1623 ;TEST THAT CHARACTER MODE DOES NOT HANG THE DISPLAY PROCESSOR
1624 ;TEST THAT "NULL" DOES NOT CHANGE X OR Y AXIS
1625
1626 007630 104000 GT60: SCOPE
1627 007632 012777 116000 171162 MOV #116000, @DBUF ;POINT MODE
1628 007640 012777 001000 171156 MOV #1000, @DBUF1
1629 007646 012777 001000 171152 MOV #1000, @DBUF2 ;1000, 1000
1630 007654 012777 100000 171146 MOV #100000, @DBUF3 ;LOAD "CHARACTER MODE"
1631 007662 005077 171144 CLR @DBUF4 ;NULL CHARACTER
1632 007666 012777 172000 171140 MOV #172000, @DBUF5
1633 007674 013777 001022 171150 MOV DBUF, @DPC ;LOAD THE DISPLAY P.C.
1634 007702 004737 012410 JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
1635
1636 007706 017700 171146 MOV @YPOS, R0 ;READ CHARACTER REGISTER
1637 007712 042700 001777 BIC #1777, R0 ;MASK TO BITS 10-15
1638 007716 022700 000000 CMP #0, R0
1639 007722 001402 BEQ .+6
1640 007724 000000 HALT ;CHARACTER REGISTER IN ERROR
1641 007726 000417 BR GT61
1642
1643 007730 017700 171122 MOV @XPOS, R0 ;READ X AXIS
1644 007734 022700 001000 CMP #1000, R0 ;ARE THEY EQUAL ?
1645 007740 001402 BEQ .+6 ;YES
1646 007742 000000 HALT ;"NULL" CHARACTER CHANGED X AXIS
1647 007744 000410 BR GT61
1648
1649 007746 017700 171106 MOV @YPOS, R0 ;READ Y AXIS
1650 007752 042700 176000 BIC #176000, R0 ;MASK TO BITS 0-9
1651 007756 022700 001000 CMP #1000, R0 ;ARE THEY EQUAL ?
1652 007762 001401 BEQ .+4 ;YES
1653 007764 000000 HALT ;"NULL" CHARACTER CHANGED Y AXIS
1654

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1661 007766 104000
1662 007770 012777 116000 171024
1663 007776 012777 001000 171020
1664 010004 012777 001000 171014
1665 010012 012777 100000 171010
1666 010020 012777 000015 171004
1667 010026 012777 172000 171000
1668 010034 013777 001022 171010
1669 010042 004737 012410
1670
1671 010046 017700 171006
1672 010052 042700 001777
1673 010056 022700 032000
1674 010062 001402
1675 010064 000000
1676 010066 000417
1677
1678 010070 017700 170762
1679 010074 022700 000000
1680 010100 001402
1681 010102 000000
1682 010104 000410
1683
1684 010106 017700 170746
1685 010112 042700 176000
1686 010116 022700 001000
1687 010122 001401
1688 010124 000000
1689

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

```

GT61: SCOPE
      MOV #116000, @DBUF ;POINT MODE
      MOV #1000, @DBUF1
      MOV #1000, @DBUF2 ;1000,1000
      MOV #100000, @DBUF3 ;LOAD "CHARACTER MODE"
      MOV #15, @DBUF4 ;LOAD "CR"
      MOV #172000, @DBUF5 ;LOAD STOP
      MOV DBUF, @DPC ;LOAD THE DISPLAY P.C.
      JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
      MOV @YPOS, R0 ;READ Y AXIS
      BIC #1777, R0 ;MASK TO BITS 10-15
      CMP #32000, R0
      BEQ .+6
      HALT ;CHARACTER REGISTER FAILED TO LOAD CORRECTLY
      BR GT62
      MOV @XPOS, R0 ;READ X AXIS
      CMP #0, R0 ;ARE THEY EQUAL ?
      BEQ .+6 ;YES
      HALT ;"CR" CHARACTER FAILED TO CHANGED X AXIS CORRECTLY
      BR GT62
      MOV @YPOS, R0 ;READ Y AXIS
      BIC #176000, R0 ;MASK TO BITS 0-9
      CMP #1000, R0 ;ARE THEY EQUAL ?
      BEQ .+4 ;YES
      HALT ;"CR" CHARACTER CHANGED Y AXIS

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1691
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1693
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1696 010126 104000
1697 010130 012777 116000 170664
1698 010136 012777 001000 170660
1699 010144 012777 001000 170654
1700 010152 012777 100000 170650
1701 010160 012777 000012 170644
1702 010166 012777 172000 170640
1703 010174 013777 001022 170650
1704 010202 004737 012410
1705
1706 010206 017700 170646
1707 010212 042700 001777
1708 010216 022700 024000
1709 010222 001402
1710 010224 000000
1711 010226 000477
1712
1713 010230 017700 170622
1714 010234 022700 001000
1715 010240 001402
1716 010242 000000
1717 010244 000470
1718
1719 010246 017700 170606
1720 010252 042700 176000
1721 010256 023700 001046
1722 010262 001401
1723 010264 000000
1724

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

```

GT62:  SCOPE
      MOV      #116000, @DBUF      ;POINT MODE
      MOV      #1000, @DBUF1
      MOV      #1000, @DBUF2      ;1000,1000
      MOV      #100000, @DBUF3    ;LOAD "CHARACTER MODE"
      MOV      #12, @DBUF4
      MOV      #172000, @DBUF5
      MOV      @DBUF, @DPC        ;LOAD THE DISPLAY P.C.
      JSR      7, DLAY            ;EXECUTE A PROGRAM DELAY
      MOV      @YPOS, R0          ;READ CHARACTER REG.
      BIC      #1777, R0          ;MASK TO BITS 10-15
      CMP      #24000, R0
      BEQ     .+6
      HALT
      BR      GT63                ;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      GT63
      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

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1726
1727
1728 ;TEST THAT CHARACTER MODE DOES NOT HANG THE DISPLAY PROCESSOR
1729 ;TEST THAT "A" DOES CHANGE X BUT NOT Y AXIS
1730
1731 010266 104000 GT62A: SCOPE
1732 010270 012777 116000 170524 MOV #116000,@DBUF ;POINT MODE
1733 010276 012777 000000 170520 MOV #0,@DBUF1
1734 010304 012777 001000 170514 MOV #1000,@DBUF2 ;0,1000
1735 010312 012777 100000 170510 MOV #100000,@DBUF3 ;LOAD "CHARACTER MODE"
1736 010320 012777 000101 170504 MOV #101,@DBUF4 ;LOAD AN "A"
1737 010326 012777 172000 170500 MOV #172000,@DBUF5
1738 010334 013777 001022 170510 MOV DBUF,@DPC ;LOAD THE DISPLAY P.C.
1739 010342 004737 012410 JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1740
1741 010346 017700 170506 MOV @YPOS,R0 ;READ CHARACTER REG
1742 010352 042700 001777 BIC #1777,R0 ;MASK TO BITS 10-15
1743 010356 022700 002000 CMP #2000,R0
1744 010362 001402 BEQ .+6
1745 010364 000000 HALT ;CHARACTER REGISTER IN ERROR
1746 010366 000417 BR GT63
1747
1748 010370 017700 170462 MOV @XPOS,R0 ;READ X AXIS
1749 010374 023700 001006 CMP GSCHSZ,R0 ;ARE THEY EQUAL ?
1750 010400 001402 BEQ .+6 ;YES
1751 010402 000000 HALT ;"A" CHARACTER FAILED TO CHANGED X AXIS CORRECTLY
1752 010404 000410 BR GT63
1753
1754 010406 017700 170446 MOV @YPOS,R0 ;READ Y AXIS
1755 010412 042700 176000 BIC #176000,R0 ;MASK TO BITS 0-9
1756 010416 022700 001000 CMP #1000,R0 ;ARE THEY EQUAL ?
1757 010422 001401 BEQ .+4 ;YES
1758 010424 000000 HALT ;"A" CHARACTER CHANGED Y AXIS
1759

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010426 104000  
010430 012777 116000 170364  
010436 012777 001000 170360  
010444 012777 001000 170354  
010452 012777 100000 170350  
010460 012777 000010 170344  
010466 012777 172000 170340  
010474 013777 001022 170350  
010502 004737 012410  
010506 017700 170346  
010512 042700 001777  
010516 022700 020000  
010522 001402  
010524 000000  
010526 000425  
010530 017700 170322  
010534 023700 001050  
010540 001402  
010542 000000  
010544 000416  
010546 017700 170306  
010552 042700 176000  
010556 022700 001000  
010562 001401  
010564 000000  
010566 017700 170262  
010572 032700 000100  
010576 001401  
010600 000000

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

GT63: SCOPE  
MOV #116000, @DBUF ;POINT MODE  
MOV #1000, @DBUF1  
MOV #1000, @DBUF2 ;1000,1000  
MOV #100000, @DBUF3 ;LOAD "CHARACTER MODE"  
MOV #10, @DBUF4  
MOV #172000, @DBUF5  
MOV @DBUF, @DPC ;LOAD THE DISPLAY P.C.  
JSR 7, DLAY ;EXECUTE A PROGRAM DELAY  
MOV @YPOS, R0 ;READ CHARACTER REG  
BIC #1777, R0 ;MASK TO BITS 10-15  
CMP #20000, R0  
BEQ .+6  
HALT ;CHARACTER REGISTER IN ERROR  
BR GT64  
MOV @XPOS, R0 ;READ X AXIS  
CMP @XSIZE, R0 ;ARE THEY EQUAL ?  
BEQ .+6 ;YES  
HALT ;"BS" CHARACTER FAILED TO CHANGED X AXIS CORRECTLY  
BR GT64  
MOV @YPOS, R0 ;READ Y AXIS  
BIC #176000, R0 ;MASK TO BITS 0-9  
CMP #1000, R0 ;ARE THEY EQUAL ?  
BEQ .+4 ;YES  
HALT ;"BS" CHARACTER CHANGED Y AXIS  
;TEST THAT "SHIFT-OUT" STATUS BIT IS NOT SET  
GT63A: MOV @DSR, R0 ;READ STATUS  
BIT #100, R0  
BEQ .+4  
HALT ;SHIFT OUT STATUS BIT IS SET



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1803
1804
1805 ;TEST THAT "SHIFT-OUT" GENERATES A STATUS BIT
1806 ;SHIFT-OUT <LOW BYTE>, FOLLOWED BY CODE 77 <HIGH BYTE>
1807 010602 104000 GT64: SCOPE
1808 010604 012777 116000 170210 MOV #116000, @DBUF ;POINT MODE
1809 010612 012777 001000 170204 MOV #1000, @DBUF1
1810 010620 012777 001000 170200 MOV #1000, @DBUF2 ;1000,1000
1811 010626 012777 100000 170174 MOV #100000, @DBUF3 ;LOAD "CHARACTER MODE"
1812 010634 012777 037416 170170 MOV #37416, @DBUF4 ;"SHIFT-OUT" IN LOW BYTE #77 IN HIGH BYTE
1813 010642 012777 172000 170164 MOV #172000, @DBUF5 ;LOAD STOP
1814 010650 013777 001022 170174 MOV @DBUF, @DPC ;START DISPALY
1815 010656 004737 012410 JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
1816
1817 010662 017700 170172 MOV @YPOS, R0 ;READ CHARACTER REG
1818 010666 042700 001777 BIC #1777, R0 ;MASK TO BITS 10-15
1819 010672 022700 176000 CMP #176000, R0
1820 010676 001402 BEQ .+6
1821 010700 000000 HALT ;CHARACTER REGISTER IN ERROR
1822 010702 000426 BR GT65 ; AFTER A SHIFT-OUT COMMAND
1823
1824 010704 017700 170144 MOV @DSR, R0 ;READ STATUS REGISTER
1825 010710 032700 000100 BIT #100, R0
1826 010714 001002 BNE .+6
1827 010716 000000 HALT ;SHIFT OUT STATUS BIT FAILED TO SET
1828 010720 000417 BR GT65
1829
1830 010722 017700 170130 MOV @XPOS, R0 ;READ X POS
1831 010726 022700 001000 CMP #1000, R0
1832 010732 001402 BEQ .+6
1833 010734 000000 HALT ;SHIFT-OUT CHARACTER CHANGED X AXIS
1834 010736 000410 BR GT65
1835
1836 010740 017700 170114 MOV @YPOS, R0 ;READ Y POS
1837 010744 042700 176000 BIC #176000, R0 ;MASK
1838 010750 022700 001000 CMP #1000, R0
1839 010754 001401 BEQ .+4
1840 010756 000000 HALT ;SHIFT-OUT CHARACTER CHANGED Y AXIS

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1842
1843 ;TEST THAT "SHIFT-OUT" DOES NOT GENERATE A STATUS BIT
1844 ;("SHIFT-OUT" FOLLOWED BY CODE 0 THRU 37 EXCEPT #17)
1845
1846 010760 104000 GT65: SCOPE
1847 010762 000005 RESET
1848 010764 005003 CLR R3
1849 010766 012777 100000 170026 MOV #100000, @DBUF ;SET 'CHAR' MODE
1850 010774 012777 000016 170022 MOV #16, @DBUF1 ;LOAD "SHIFT-OUT" INTO THE LOW BYTE
1851 011002 012777 172000 170016 MOV #172000, @DBUF2
1852 011010 110337 013537 GT65A: MOVB R3, BUFFER+3 ;LOAD HIGH BYTE
1853 011014 000240 NOP
1854 011016 013777 001022 170026 MOV DBUF, @DPC ;START THE DISPLAY
1855 011024 004737 012410 JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
1856
1857 011030 032777 000100 170016 BIT #100, @DSR ;TEST FOR SHIFT BIT
1858 011036 001402 BEQ .+6
1859 011040 000000 HALT ;SHIFT STATUS BIT SET IN ERROR
1860 011042 000407 BR GT66 ; CHARACTER IS IN R3
1861
1862 011044 005203 GT65B: INC R3
1863 011046 022703 000017 CMP #17, R3 ;TEST FOR "SHIFT-IN"
1864 011052 001774 BEQ GT65B
1865 011054 022703 000040 CMP #40, R3 ;TEST FOR #40
1866 011060 001353 BNE GT65A ;IS IT #40
1867 ;YES, NEXT TEST
1868
1869 ;TEST THAT "SHIFT-OUT" FOLLOWED BY CODE 40 GENERATE A
1870 ;SHIFT STATUS BIT
1871
1872 011062 104000 GT66: SCOPE
1873 011064 000005 RESET
1874 011066 012777 100000 167726 MOV #100000, @DBUF ;LOAD SET CHAR MODE
1875 011074 012777 000016 167722 MOV #16, @DBUF1 ;LOAD "SHIFT-OUT" INTO THE LOW BYTE
1876 011102 012777 172000 167716 MOV #172000, @DBUF2
1877 011110 112737 000040 013537 GT66A: MOVB #40, BUFFER+3 ;LOAD HIGH BYTE
1878 011116 000240 NOP
1879 011120 013777 001022 167724 MOV DBUF, @DPC ;START THE DISPLAY
1880 011126 004737 012410 JSR 7, DLAY ;EXECUTE A PROGRAM DELAY
1881
1882 011132 032777 000100 167714 BIT #100, @DSR ;TEST 'SHIFT' STATUS BIT
1883 011140 001002 BNE .+6
1884 011142 000000 HALT ;"SHIFT-OUT" STATUS BIT FAILED TO SET
1885 011144 000407 BR GT67 ;ON CHARACTER IN R3
1886

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1888
1889 011146 000005          RESET
1890 011150 032777 000100 167676  BIT      #100, @DSR      ;TEST SHIFT-OUT BIT
1891 011156 001402          BEQ      GT67        ;BR IF CLEARED
1892 011160 000000          HALT
1893 011162 000400          BR       GT67        ;SHIFT OUT STATUS BIT FAILED TO CLEAR
1894
1895          ;TEST THAT 'SHIFT-OUT' IN THE HIGH BYTE FOLLOWED BY A CHARACTER
1896          ; IN THE NEXT LOW BYTE GENERATES A STATUS BIT
1897
1898 011164 104000          GT67:  SCOPE
1899 011166 012777 100000 167626  MOV      #100000, @DBUF ;LOAD SET 'CHAR' MODE
1900 011174 005077 167624          CLR      @DBUF1
1901 011200 012777 007000 167616  MOV      #7000, @DBUF1 ;LOAD 'SHIFT-OUT' INTO THE HIGH BYTE
1902 011206 012777 000040 167612  MOV      #40, @DBUF2   ;LOAD A SHIFT-OUT CHARACTER IN THE NEXT
1903          ;WORD <LOW BYTE>
1904 011214 012777 172000 167606  MOV      #172000, @DBUF3
1905 011222 000005          RESET
1906 011224 000240          NOP
1907 011226 013777 001022 167616  MOV      DBUF, @DPC   ;START THE DISPLAY
1908 011234 004737 012410          JSR      7, DLAY     ;EXECUTE A PROGRAM DELAY
1909
1910 011240 032777 000100 167606  BIT      #100, @DSR   ;TEST THE STATUS REGISTER
1911 011246 001002          BNE      .+6
1912 011250 000000          HALT
1913 011252 000410          BR       GT68        ;SHIFT-OUT IN THE HIGH BYTE FAILED TO
1914          ;SET A STATUS BIT
1915 011254 017700 167600          MOV      @YPOS, R0   ;READ Y POS
1916 011260 042700 001777          BIC      #1777, R0   ;MASK TO BITS 15-10
1917 011264 022700 100000          CMP      #100000, R0 ;TEST FOR CHAR #40
1918 011270 001401          BEQ      .+4
1919 011272 000000          HALT
1920          ;CHARACTER REGISTER IN ERROR AFTER A
1921          ;"SHIFT-OUT" <HIGH BYTE> FOLLOWED BY
1922          ; #40 <LOW BYTE NEXT WORD>

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1924                                     ;STOP INTERRUPT TEST
1925                                     ;TEST FOR NO INTERRUPT
1926
1927 011274 104000                       GT68:  SCOPE
1928 011276 000005                       RESET
1929 011300 012777 011362 167554         MOV    #GT68A,@DDONE      ;LOAD RETURN FROM DONE INTERRUPT
1930 011306 012777 011362 167556         MOV    #GT68A,@TIMEVT    ;LOAD RETURN FROM TIME-OUT INTERRUPT
1931 011314 012777 011362 167544         MOV    #GT68A,@LPVCT     ;LOAD RETURN FROM LIGHT-PEN INTERRUPT
1932 011322 012777 164000 167472         MOV    #164000,@DBUF     ;LOAD "DISPLAY NOP"
1933 011330 012777 173000 167466         MOV    #173000,@DBUF1    ;LOAD "STATUS A"--"STOP"--"STOP INT. ENABLE"
1934 011336 005077 167456                 CLR    @PSW              ;LOWER MACHINE PRIORITY
1935 011342 013777 001022 167502         MOV    DBUF,@DPC        ;LOAD DISPLAY P.C.
1936 011350 000240                       NOP
1937 011352 000240                       NOP
1938 011354 000240                       NOP
1939 011356 000240                       NOP
1940 011360 000401                       BR     .+4
1941
1942 011362 000000                       GT68A: HALT              ;GT-40 INTERRUPTED IN ERROR
1943
1944                                     ;STOP INTERRUPT TEST
1945                                     ;TEST FOR INTERRUPT
1946
1947 011364 104000                       GT69:  SCOPE
1948 011366 000005                       RESET
1949 011370 012777 011452 167464         MOV    #GT69A,@DDONE     ;LOAD RETURN ADDRESS FROM INTERRUPT
1950 011376 012777 011464 167462         MOV    #GT69B,@LPVCT    ;LOAD LP VECTOR
1951 011404 012777 011472 167460         MOV    #GT69C,@TIMEVT   ;LOAD TO VECTOR
1952 011412 012777 164000 167402         MOV    #164000,@DBUF     ;LOAD "DISPLAY NOP"
1953 011420 012777 173400 167376         MOV    #173400,@DBUF1   ;LOAD "STATUS A"--"STOP"--"STOP INT. ENABLE-INT"
1954 011426 005077 167366                 CLR    @PSW
1955 011432 013777 001022 167412         MOV    DBUF,@DPC
1956 011440 012700 000010                 MOV    #10,@RO          ;SET UP FOR DELAY
1957 011444 005300                       1$:  DEC    RO           ;WAIT FOR INTERRUPT
1958 011446 100376                       BPL
1959 011450 000000                       HALT
1960 011452 013777 001064 167402         GT69A: MOV    DDONE1,@DDONE ;GT-40 FAILED TO GENERATE A STOP INTERRUPT
1961 011460 022626                       CMP    (SP)+,(SP)+
1962 011462 000405                       BR     GT70
1963
1964 011464 022626                       GT69B: CMP    (SP)+,(SP)+
1965 011466 000000                       HALT
1966
1967 011470 000402                       BR     GT70
1968
1969 011472 022626                       GT69C: CMP    (SP)+,(SP)+
1970 011474 000000                       HALT
1971
;GT-40 STOP (DONE) INTERRUPTED TO THE
; LIGHT-PEN VECTOR
;GT-40 STOP (DONE) INTERRUPTED TO THE
; TIME-OUT VECTOR

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011476 104000  
011500 000005  
011502 012777 011606 167352  
011510 012777 011614 167350  
011516 012777 011572 167346  
011524 012777 100000 167270  
011532 012777 020016 167264  
011540 012777 173000 167260  
011546 005077 167246  
011552 013777 001022 167272  
011560 012700 000010  
011564 005300  
011566 100376  
011570 000000  
011572 000240  
011574 013777 001074 167270  
011602 022626  
011604 000405  
011606 022626  
011610 000000  
011612 000402  
011614 022626  
011616 000000

;SHIFT OUT INTERRUPT TEST  
;TEST FOR INTERRUPT

GT70: SCOPE  
RESET  
MOV #GT70B,@DDONE  
MOV #GT70C,@LPVCT  
MOV #GT70A,@TIMEVT  
MOV #100000,@DBUF  
MOV #20016,@DBUF1  
MOV #173000,@DBUF2  
CLR @PSW  
MOV DBUF,@DPC  
MOV #10,@R0  
1\$: DEC R0  
BPL 1\$  
HALT  
GT70A: NOP  
MOV TMEVT1,@TIMEVT  
CMP (SP)+,(SP)+  
BR GT71  
GT70B: CMP (SP)+,(SP)+  
HALT  
BR GT71  
GT70C: CMP (SP)+,(SP)+  
HALT

;LOAD DONE VECTOR  
;LOAD LIGHT-PEN VECTOR  
;LOAD RETURN ADDRESS  
;LOAD "CHARACTER MODE"  
;LOAD "SHIFT-OUT"  
;START DISPLAY  
;SET UP FOR DELAY  
;WAIT FOR INTERRUPT  
;GT-40 FAILED TO INTERRUPT ON SHIFT-OUT  
;GT-40 SHIFT-OUT INTERRUPTED TO THE  
; DONE VECTOR  
;GT-40 SHIFT-OUT INTERRUPTED TO THE  
; LIGHT PEN VECTOR

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2006
2007
2008           ;TIME-OUT INTERRUPT TEST
2009
2010 011620 104000          GT71:  SCOPE
2011 011622 000005          RESET
2012 011624 013777 001064 167230      MOV      DDONE1, @DDONE
2013 011632 013777 001070 167226      MOV      LPVCT1, @LPVCT
2014 011640 012777 011666 167224      MOV      #GT71A, @TIMEVT ;LOAD RETURN ADDRESS
2015 011646 005077 167146          CLR      @PSW
2016 011652 012777 177776 167172      MOV      #177776, @DPC ;LOAD DISPLAY P.C.
2017 011660 004737 012410          JSR      7, DLAY ;EXECUTE A PROGRAM DELAY
2018 011664 000000          HALT ;GT-40 FAILED TO INTERRUPT ON TIME-OUT
2019
2020 011666 000240          GT71A: NOP
2021 011670 013777 001074 167174      MOV      TMEVT1, @TIMEVT
2022 011676 022626          CMP      (SP)+, (SP)+
2023
2024           ;NO LIGHT PEN INTERRUPT TEST
2025
2026 011700 104000          GT72:  SCOPE
2027 011702 000005          RESET
2028 011704 012777 011746 167154      MOV      #GT72A, @LPVCT ;LOAD RETURN ADDRESS
2029 011712 012777 100140 167102      MOV      #100140, @DBUF ;LOAD DISPLAY BUFFER
2030 011720 012777 173000 167076      MOV      #173000, @DBUF1
2031 011726 005077 167066          CLR      @PSW
2032 011732 013777 001022 167112      MOV      DBUF, @DPC
2033 011740 004737 012410          JSR      7, DLAY ;EXECUTE A PROGRAM DELAY
2034 011744 000401          BR      .+4
2035 011746 000000          GT72A: HALT ;GT-40 INTERRUPTED ON FALSE LIGHT PEN FLAG
2036 011750 013777 001070 167110      MOV      LPVCT1, @LPVCT

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2038                                     ;PRE BR LEVEL SETUP
2039
2040 011756 042737 177437 001004      BIC    #177437,DSPBR ;MASK TO BITS
2041 011764 001001                    BNE    .+4
2042 011766 000000                    HALT   ;BR LEVEL WAS 0
2043 011770 022737 000340 001004      CMP    #340,DSPBR
2044 011776 001001                    BNE    .+4
2045 012000 000000                    HALT   ;BR LEVEL WAS 7
2046
2047 012002 013737 001004 012026      MOV    DSPBR,BRLEV1
2048 012010 162737 000040 012026      SUB    #40,BRLEV1
2049 012016 013737 001004 012030      MOV    DSPBR,BRLEV2
2050 012024 000402                    BR     GT73
2051
2052 012026 000140                    BRLEV1: 140
2053 012030 000200                    BRLEV2: 200
2054
2055                                     ;BR LEVEL TEST (BR-1)
2056                                     ;TEST FOR INTERRUPT
2057
2058 012032 104000                    GT73:  SCOPE
2059 012034 000005                    RESET
2060 012036 012777 012100 167016      MOV    #GT73A,DDONE ;LOAD RETURN ADDRESS
2061 012044 012777 173400 166750      MOV    #173400,DBUF ;LOAD "STATUS A"-NO INTERRUPT ENABLE
2062 012052 013777 012026 166740      MOV    BRLEV1,PSW
2063 012060 013777 001022 166764      MOV    DBUF,DDPC ;LOAD THE DISPLAY P.C.
2064 012066 012700 000010            MOV    #10,R0 ;SET UP FOR DELAY
2065 012072 005300                    1$:   DEC    R0 ;WAIT FOR INTERRUPT
2066 012074 100376                    BPL    1$
2067 012076 000000                    HALT   ;NO STOP INTERRUPT ON BR LEVEL INDICATED -1
2068                                     ;CHECK TO SEE IF PROPER BR LEVEL
2069 012100 022626                    GT73A: CMP    (SP)+,(SP)+
2070
2071                                     ;BR LEVEL TEST (BR)
2072                                     ;TEST THAT THE GT-40 DOES NOT INTERRUPT AT THE LEVEL INDICATED
2073
2074 012102 104000                    GT74:  SCOPE
2075 012104 000005                    RESET
2076 012106 012777 012150 166746      MOV    #GT74A,DDONE ;LOAD RETURN ADDRESS
2077 012114 012777 173400 166700      MOV    #173400,DBUF ;LOAD "STATUS A- STOP- STOP INT ENABLE
2078 012122 013777 012030 166670      MOV    BRLEV2,PSW ;LOWER MACHINE PRIORITY TO INDICATED LEVEL
2079 012130 013777 001022 166714      MOV    DBUF,DDPC
2080 012136 000240                    NOP
2081 012140 000240                    NOP
2082 012142 000240                    NOP
2083 012144 000240                    NOP
2084 012146 000401                    BR     .+4 ;NEXT TEST
2085 012150 000000                    GT74A: HALT   ;GT-40 INTERRUPTED ON THE WRONG BR LEVEL
2086 012152 013777 001064 166702      MOV    DDONE1,DDONE ;LOAD INVERRUPT VECTOR
2087 012160 000005                    RESET
2088 012162 000005                    RESET

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2090
2091
2092          ;RESET TEST
2093          ;DOES RESET CLEAR ALL DISPLAY PC AND STATUS BITS
2094
2095          GT75:  SCOPE
2096          012164 104000          MOV      #117637, @DBUF      ;POINT INTENSITY=7,BLINK=1,LINETYPE=3
2097          012166 012777 117637 166626          CLR      @DBUF1          ; X = 0
2098          012174 005077 166624          CLR      @DBUF2          ; Y = 0
2099          012200 005077 166622          MOV      #172077, @DBUF3  ; ITALIC=1, SYNC=1, COLOR=1
2100          012204 012777 172077 166616          MOV      DBUF, @DPC      ; LOAD DISPLAY P.C.
2101          012212 013777 001022 166632          JSR      PC, DLAY        ; DELAY
2102          012220 004737 012410          RESET
2103          012224 000005          TST      @DPC            ; GENERATE "INIT"
2104          012226 005777 166620          BEQ      .+6
2105          012232 001402          HALT
2106          012234 000000          BR       END             ; RESET FAILED TO CLEAR DISPLAY PC
2107          012236 000406
2108          012240 017700 166610          MOV      @DSR, R0        ; READ DISPLAY STATUS
2109          012244 042700 074000          BIC      #74000, R0      ; MASK TO BIT 11-14
2110          012250 001401          BEQ      .+4             ; IS THE STATUS CLEARED ?
2111          012252 000000          HALT                    ; "INIT" FAILED TO RESET DISPLAY STATUS REGISTER
2112
2113          012254 104000          END:    SCOPE
2114          012256 005237 001016          INC      ICNT            ; UPDATE COUNT
2115          012262 022737 000010 001016          CMP      #10, ICNT      ; FINISHED ?
2116          012270 001402          BEQ      HERE           ; BR IF YES
2117          012272 000137 001462          JMP      GTPC           ; NO RE-DO
2118          012276 000005          HERE:  RESET
2119          012300 013700 000042          MOV      @#42, R0
2120          012304 001410          BEQ      HERE1          ; BRANCH IF OFF LINE
2121          012306 000005          RESET
2122          012310 004710          LOGICAL: JSR      PC, (0)
2123          012312 000240          NOP
2124          012314 000240          NOP
2125          012316 000240          NOP
2126          012320 000240          NOP
2127          012322 000240          NOP
2128          012324 000240          NOP
2129          012326 012777 000002 166520  HERE1: MOV      #2, @DSR        ; RING THE BELL
2130          012334 012737 000207 177566          MOV      #207, TPDBR    ; RINT THE BELL
2131          012342 105737 177564          1$:    TSTB      TPCSR    ; WAIT
2132          012346 100375          BPL      1$
2133          012350 012737 000207 177566          MOV      #207, TPDBR    ; RINT BELL
2134          012356 105737 177564          2$:    TSTB      TPCSR
2135          012362 100375          BPL      2$
2136          012364 000137 001406          JMP      START

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2138                                     ;SCOPE ROUTINE
2139
2140 012370 032777 040000 166442 SCOPEA: BIT    #40000,3SWR    ;TEST "SCOPE" SWITCH
2141 012376 001001                BNE    SCOPEB
2142 012400 011601                MOV    (SP),R1
2143 012402 012706 000500        SCOPEB: MOV    #STKPTR,SP
2144 012406 000111                JMP    (1)
2145
2146 012410 012700 001000        DLAY:  MOV    #1000,R0
2147 012414 005300                DLAYA: DEC    R0
2148 012416 001376                BNE    DLAYA
2149 012420 000207                RTS    7
2150
2151 012422 012700 001000        DLAY1: MOV    #1000,R0
2152 012426 005300                DLAY1A: DEC   R0
2153 012430 001376                BNE    DLAY1A
2154 012432 000207                RTS    7
2155
2156 012434 010046                LOWPWR: MOV   R0,-(SP)
2157 012436 010146                MOV   R1,-(SP)
2158 012440 010246                MOV   R2,-(SP)
2159 012442 010346                MOV   R3,-(SP)
2160 012444 010446                MOV   R4,-(SP)
2161 012446 010546                MOV   R5,-(SP)
2162 012450 010637 012532        MOV   SP,LOWSV
2163 012454 012737 012464 000024  MOV   #HIGPWR,3#24
2164 012462 000000                HALT
2165 012464 013706 012532        HIGPWR: MOV   LOWSV,SP
2166 012470 012605                MOV   (SP)+,R5
2167 012472 012604                MOV   (SP)+,R4
2168 012474 012603                MOV   (SP)+,R3
2169 012476 012602                MOV   (SP)+,R2
2170 012500 012601                MOV   (SP)+,R1
2171 012502 012600                MOV   (SP)+,R0
2172 012504 012737 012434 000024  MOV   #LOWPWR,3#24
2173 012512 012706 000500        MOV   #STKPTR,SP
2174 012516 000240                NOP
2175 012520 000240                NOP
2176 012522 000000                HALT
2177 012524 000240                NOP
2178 012526 000240                NOP
2179 012530 000111                JMP   (R1)
2180
2181 012532 000000                LOWSV: 0
2182

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2228			
2229			
2230	012726	117004	FRAME0: POINT!INT4!LINE0
2231	012730	041600	INTX+1600
2232	012732	000600	600
2233	012734	041000	INTX+1000
2234	012736	000600	600
2235	012740	112400	LONGV!INT2
2236	012742	040600	INTX+600
2237	012744	000000	0
2238	012746	173400	DSTOP
2239	012750	160000	DJMP
2240	012752	012726	FRAME0
2241			
2242	012754	117004	FRAME1: POINT!INT4!LINE0
2243	012756	040200	INTX+200
2244	012760	000600	600
2245	012762	041000	INTX+1000
2246	012764	000600	600
2247	012766	112400	LONGV!INT2
2248	012770	060600	INTX!MINUSX+600
2249	012772	000000	0
2250	012774	173400	DSTOP
2251	012776	160000	DJMP
2252	013000	012754	FRAME1
2253			
2254	013002	117004	FRAME2: POINT!INT4!LINE0
2255	013004	041000	INTX+1000
2256	013006	001200	1200
2257	013010	041000	INTX+1000
2258	013012	000600	600
2259	013014	112400	LONGV!INT2
2260	013016	040000	INTX
2261	013020	000400	400
2262	013022	173400	DSTOP
2263	013024	160000	DJMP
2264	013026	013002	FRAME2
2265			
2266	013030	117004	FRAME3: POINT!INT4!LINE0
2267	013032	041000	INTX+1000
2268	013034	000200	200
2269	013036	041000	INTX+1000
2270	013040	000600	600
2271	013042	112400	LONGV!INT2
2272	013044	040000	INTX
2273	013046	020400	MINUSX+400
2274	013050	173400	DSTOP
2275	013052	160000	DJMP
2276	013054	013030	FRAME3
2277			

2279			
2280	013056	117004	FRAME4: POINT!INT4!LINE0
2281	013060	000000	0
2282	013062	000000	0
2283	013064	110000	LONGV
2284	013066	041777	INTX!MAXX
2285	013070	000000	0
2286	013072	040000	INTX
2287	013074	001377	MAXY
2288	013076	061777	INTX!MINUSX!MAXX
2289	013100	000000	0
2290	013102	040000	INTX
2291	013104	021377	MINUSX!MAXY
2292	013106	173400	DSTOP
2293	013110	160000	DJMP
2294	013112	013056	FRAME4
2295			
2296	013114	117004	FRAMES: POINT!INT4!LINE0
2297	013116	000740	740
2298	013120	000540	540
2299	013122	104000	SHORTV
2300	013124	057600	INTX+17600
2301	013126	057677	INTX+17677
2302	013130	040077	INTX+77
2303	013132	077677	INTX!MINUSX+17677
2304	013134	077600	INTX!MINUSX+17600
2305	013136	077777	INTX!MINUSX+17777
2306	013140	040177	INTX+177
2307	013142	057777	INTX+17777
2308	013144	114000	POINT
2309	013146	000760	760
2310	013150	000620	620
2311	013152	130000	RELATV
2312	013154	047600	INTX+7600
2313	013156	047637	INTX+7637
2314	013160	040037	INTX+37
2315	013162	067637	INTX!MINUSX+7637
2316	013164	067600	INTX!MINUSX+7600
2317	013166	067737	INTX!MINUSX+7737
2318	013170	040137	INTX+137
2319	013172	047737	INTX+7737
2320	013174	173400	DSTOP
2321	013176	160000	DJMP
2322	013200	013114	FRAMES
2323			

2325					
2326	013202	117004			FRAME6: POINT!INT4!LINE0
2327	013204	000200			200
2328	013206	000600			600
2329	013210	100000			CHAR
2330					
(1)	013212	040500	041502	042504	.ASCII 'ABCDEFGHIJKLMNOPQRSTUVWXYZ'
(1)	013220	043506	044510	045512	
(1)	013226	046514	047516	050520	
(1)	013234	051522	052524	053526	
(1)	013242	054530	132		
(1)	013245	040	021041	022043	.ASCIZ @!"#\$%&'()*+,-./0123456789:;<=>?@
(1)	013252	023045	024047	025051	
(1)	013260	026053	027055	030057	
(1)	013266	031061	032063	033065	
(1)	013274	034067	035071	036053	
(1)	013302	037075	000077		
(1)					.EVEN
2331	013306	114000			POINT
2332	013310	000200			200
2333	013312	000540			540
2334	013314	100000			CHAR
2335					
(1)	013316	140	141	142	.BYTE 140,141,142,143,144,145,146,147
(1)	013321	143	144	145	
(1)	013324	146	147		
(1)	013326	150	151	152	.BYTE 150,151,152,153,154,155,156,157
(1)	013331	153	154	155	
(1)	013334	156	157		
(1)	013336	160	161	162	.BYTE 160,161,162,163,164,165,166,167
(1)	013341	163	164	165	
(1)	013344	166	167		
(1)	013346	170	171	172	.BYTE 170,171,172,173,174,175,176,177
(1)	013351	173	174	175	
(1)	013354	176	177		
2336					
(1)	013356	016	000	001	.BYTE 16,0,1,2,3,4,5,6,7,10,11,12,13,14,15,16
(1)	013361	002	003	004	
(1)	013364	005	006	007	
(1)	013367	010	011	012	
(1)	013372	013	014	015	
(1)	013375	016			
(1)	013376	020	021	022	.BYTE 20,21,22,23,24,25,26,27,30,31,32,33,34,35,36,37,17.0
(1)	013401	023	024	025	
(1)	013404	026	027	030	
(1)	013407	031	032	033	
(1)	013412	034	035	036	
(1)	013415	037	017	000	
(1)					.EVEN
2337	013420	173400			DSTOP
2338	013422	160000			DJMP
2339	013424	013202			FRAME6
2340					

2342										
2343	013426	117004								
2344	013430	000400								
2345	013432	000700								
2346	013434	170200								
2347	013436	110140								
2348	013440	041000								
2349	013442	000000								
2350	013444	114000								
2351	013446	000400								
2352	013450	000600								
2353	013452	170300								
2354	013454	110140								
2355	013456	041000								
2356	013460	000000								
2357	013462	114000								
2358	013464	000400								
2359	013466	000500								
2360	013470	110100								
2361	013472	041000								
2362	013474	000000								
2363	013476	173400								
2364	013500	114000								
2365	013502	000700								
2366	013504	001000								
2367	013506	100000								
2368	013510	044514	044107	026524						
	013516	042520	020116	044510						
	013524	000124								
2369										
2370	013526	173400								
2371	013530	160000								
2372	013532	013426								
2373										
2374	013534	000000								
2375										
2376		000001								

FRAME7: POINT!INT4!LINE0

400

700

STATSA!LPLITE

LONGV!LPON

INTX+1000

0

POINT

400

600

STATSA!LPDARK

LONGV!LPON

INTX+1000

0

POINT

400

500

LONGV!LPOFF

INTX+1000

0

FRM7A: DSTOP

POINT

700

1000

CHAR

.ASCIZ /LIGHT-PEN HIT/

.EVEN

DSTOP

DJMP

FRAME7

BUFFER: 0

.END

BLKOFF= 000020	196#																		
BLKON = 000030	197#																		
BRLEV1 012026	2047*	2048*	2052#	2062															
BRLEV2 012030	2049*	2053#	2078																
BUFFER 013534	318	319	320	321	322	323	1852*	1877*	2374#										
CHAR = 100000	177#	2329	2334	2367															
CHSIZE DC1050	329#	373*	374*	376*	1784														
CNTR 001044	327#																		
DBUF 001022	318#	437	443	444	468*	469	477*	478	486*	487	496*	497	507*						
	508	518*	519	530*	532	540*	542	550*	552	561*	563	572*	574						
	583*	585	594*	596	605*	607	616*	618	626*	628	635*	637	646*						
	648	657*	659	668*	670	679*	681	690*	692	703*	705	713*	715						
	723*	725	734*	736	744*	746	748*	749	761*	764	777*	780	792*						
	795	809*	812	825*	830	850*	854	870*	874	894*	898	916*	920						
	940*	944	964	972	991	999	1023	1031	1060	1068	1093	1100	1120						
	1127	1153	1160	1191	1198	1224	1231	1251	1258	1284	1291	1322	1329						
	1362	1370	1395	1403	1418*	1420	1425	1430	1441	1449	1460	1465	1478						
	1486	1496	1501	1512	1520	1530	1535	1546	1554	1566*	1585	1581*	1584						
	1596*	1599	1612*	1615	1627*	1633	1662*	1668	1697*	1703	1732*	1738	1767*						
	1773	1808*	1814	1849*	1854	1874*	1879	1899*	1907	1932*	1935	1952*	1955						
	1982*	1986	2029*	2032	2061*	2063	2077*	2079	2096*	2100									
DBUF1 001024	319#	531*	541*	551*	562*	573*	584*	595*	606*	617*	627*	636*	647*						
	658*	669*	680*	691*	704*	714*	724*	735*	745*	762*	778*	793*	810*						
	826*	851*	871*	895*	917*	941*	1419*	1567*	1582*	1597*	1613*	1628*	1663*						
DBUF2 001026	1698*	1733*	1768*	1809*	1850*	1875*	1900*	1901*	1933*	1953*	1983*	2030*	2097*						
	320#	763*	779*	794*	811*	827*	852*	872*	896*	918*	942*	1568*	1583*						
DBUF3 001030	1598*	1614*	1629*	1664*	1699*	1734*	1769*	1810*	1851*	1876*	1902*	1984*	2098*						
	321#	828*	853*	873*	897*	919*	943*	1630*	1665*	1700*	1735*	1770*	1811*						
	1904*	2099*																	
DBUF4 001032	322#	829*	1631*	1666*	1701*	1736*	1771*	1812*											
DBUF5 001034	323#	1632*	1667*	1702*	1737*	1772*	1813*												
DDONE 001062	347#	364	368	377*	1929*	1949*	1960*	1979*	2012*	2060*	2076*	2086*	2189*						
DDONE1 001064	348#	377	378*	1960	2012	2086	2190*												
DJMP = 160000	204#	2239	2251	2263	2275	2293	2321	2338	2371										
DLAY 012410	747	765	781	796	813	831	855	875	899	921	945	973	1000						
	1032	1069	1101	1128	1161	1199	1232	1259	1292	1330	1371	1404	1431						
	1450	1466	1487	1502	1521	1536	1555	1570	1585	1600	1616	1634	1669						
	1704	1739	1774	1815	1855	1880	1908	2017	2033	2101	2146#								
DLAYA 012414	2147#	2148																	
DLAY1 012422	498	509	2151#																
DLAY1A 012426	2152#	2153																	
DNOP = 164000	205#	2211																	
DDCORE 001320	375	397#																	
DPC 001052	342#	358	362	443*	453	461*	469*	478*	487*	497*	508*	519*	532*						
	542*	552*	563*	574*	585*	596*	607*	618*	628*	637*	648*	659*	670*						
	681*	692*	705*	715*	725*	736*	746*	749*	764*	790*	795*	812*	830*						
	854*	874*	898*	920*	944*	972*	999*	1031*	1068*	1100*	1127*	1160*	1198*						
	1231*	1258*	1291*	1329*	1370*	1403*	1420*	1430*	1449*	1465*	1486*	1501*	1520*						
	1535*	1554*	1569*	1584*	1599*	1615*	1633*	1668*	1703*	1738*	1773*	1814*	1854*						
	1879*	1907*	1935*	1955*	1986*	2016*	2032*	2063*	2079*	2100*	2103	2201*	2212*						
DSAVE 001036	324#	444*	452*	454	459	1359*	1366	1379*	1392*	1399	1413*								
DSPBR 001004	310#	2040*	2043	2047	2049	2190	2192												
DSPTCH 012706	2200	2217#																	
DSR 001054	343#	426*	447	470	479	488	499	510	520	533	543	553	564						





GT32	004046	836	849#			
GT33	004130	859	869#			
GT34	004226	880	893#			
GT35	004324	904	915#			
GT36	004422	926	939#			
GT37	004520	950	963#			
GT38	004622	979	990#			
GT39	004724	1006	1018#			
GT39A	004740	1023#	1048			
GT4	001776	506#				
GT40	005040	1038	1044	1054#		
GT40A	005060	1060#	1086			
GT41	005162	1075	1081	1092#		
GT42	005260	1107	1119#			
GT43	005356	1134	1147#			
GT43A	005376	1153#	1178			
GT44	005500	1167	1173	1185#		
GT44A	005520	1191#	1216			
GT45	005622	1205	1211	1223#		
GT46	005720	1238	1250#			
GT47	006016	1265	1278#			
GT47A	006036	1284#	1309			
GT48	006140	1298	1304	1316#		
GT48A	006160	1322#	1347			
GT49	006262	1336	1342	1356#		
GT49A	006304	1362#	1382			
GT5	002040	517#				
GT50	006376	1377	1389#			
GT50A	006420	1395#	1416			
GT50B	006516	1411	1418#			
GT51	006540	1424#				
GT52	006612	1440#				
GT53	006752	1455	1477#			
GT54	007112	1492	1511#			
GT55	007252	1526	1545#			
GT56	007340	1565#				
GT57	007416	1580#				
GT58	007474	1595#				
GT59	007552	1611#				
GT6	002076	529#				
GT60	007630	1626#				
GT61	007766	1641	1647	1661#		
GT62	010126	1676	1682	1696#		
GT62A	010266	1731#				
GT63	010426	1711	1717	1746	1752	1766#
GT63A	010566	1797#				
GT64	010602	1781	1787	1807#		
GT65	010760	1822	1828	1834	1846#	
GT65A	011010	1852#	1866			
GT65B	011044	1862#	1864			
GT66	011062	1860	1872#			
GT66A	011110	1877#				
GT67	011164	1885	1891	1893	1898#	
GT68	011274	1913	1927#			









ADC	361	367	400	452	1175	1213	1306	1344								
BEQ	455	460	473	482	491	502	513	523	536	546	556	567	578	589	600	
	611	621	631	641	652	663	674	685	696	709	719	729	740	753	768	
	784	799	816	834	840	857	862	878	884	902	908	924	930	948	954	
	977	983	1004	1010	1036	1042	1073	1079	1105	1111	1132	1138	1165	1171	1203	
	1209	1236	1242	1263	1269	1296	1302	1334	1340	1375	1409	1434	1469	1505	1539	
	1574	1589	1604	1620	1639	1645	1652	1674	1680	1687	1709	1715	1722	1744	1750	
	1757	1779	1785	1792	1799	1820	1832	1839	1858	1864	1891	1918	2104	2110	2116	
	2120															
BIC	372	376	471	480	489	500	511	521	534	544	554	565	576	587	598	
	609	639	650	661	672	683	694	707	717	727	738	751	1407	1572	1587	
	1602	1618	1637	1650	1672	1685	1707	1720	1742	1755	1777	1790	1818	1837	1916	
	2040	2109	2199													
BIT	620	630	1433	1452	1468	1489	1504	1523	1538	1557	1798	1825	1857	1882	1890	
	1910	2140														
BMI	448															
BNE	363	369	387	404	440	1048	1086	1178	1216	1309	1347	1382	1416	1453	1490	
	1524	1558	1826	1866	1883	1911	2041	2044	2141	2148	2153					
BPL	1958	1989	2066	2132	2135											
BR	388	405	450	457	462	836	859	880	904	926	950	979	1006	1038	1044	
	1075	1081	1107	1134	1167	1173	1205	1211	1238	1265	1298	1304	1336	1342	1377	
	1411	1455	1492	1526	1641	1647	1676	1682	1711	1717	1746	1752	1781	1787	1822	
	1828	1834	1860	1885	1893	1913	1940	1962	1967	1994	1999	2034	2050	2084	2106	
	2209	2214														
CLR	378	380	382	399	419	426	428	430	851	852	966	967	993	994	1025	
	1026	1062	1063	1095	1096	1122	1123	1155	1156	1193	1194	1226	1227	1253	1254	
	1286	1287	1324	1325	1364	1365	1368	1397	1398	1401	1631	1848	1900	1934	1954	
	1985	2015	2031	2097	2098	2205										
CMP	362	368	386	389	403	406	439	454	459	472	481	490	501	512	522	
	535	545	555	566	577	588	599	610	640	651	662	673	684	695	708	
	718	728	739	752	767	783	798	815	833	839	877	883	901	907	923	
	929	947	953	976	982	1003	1009	1035	1041	1072	1078	1104	1110	1131	1137	
	1164	1170	1202	1208	1235	1241	1262	1268	1295	1301	1333	1339	1374	1408	1573	
	1588	1603	1619	1638	1644	1651	1673	1679	1686	1708	1714	1721	1743	1749	1756	
	1778	1784	1791	1819	1831	1838	1863	1865	1917	1961	1964	1969	1993	1996	2001	
	2022	2043	2069	2115	2213											
DEC	407	446	1047	1084	1085	1177	1214	1215	1308	1345	1346	1381	1415	1957	1988	
	2065	2147	2152													
EMT	271															
HALT	280	281	287	449	456	474	483	492	537	547	557	568	579	590	601	
	612	622	632	642	653	664	675	686	697	710	720	730	741	754	764	
	785	800	817	835	841	858	863	879	885	903	909	925	931	949	955	
	978	984	1005	1011	1037	1043	1074	1080	1106	1112	1133	1139	1166	1172	1204	
	1210	1237	1243	1264	1270	1297	1303	1335	1341	1376	1410	1435	1454	1470	1491	
	1506	1525	1540	1559	1575	1590	1605	1621	1640	1646	1653	1675	1681	1688	1710	
	1716	1723	1745	1751	1758	1780	1786	1793	1800	1821	1827	1833	1840	1859	1884	
	1892	1912	1919	1942	1959	1965	1970	1990	1997	2002	2018	2035	2042	2045	2067	
	2085	2105	2111	2164	2176											
INC	401	1046	1083	1176	1307	1379	1380	1413	1414	1862	2114					
JMP	304	305	2117	2136	2144	2179										
JSR	375	418	498	509	747	765	781	796	813	831	855	875	899	921	945	
	973	1000	1032	1069	1101	1128	1161	1199	1232	1259	1292	1330	1371	1404	1431	
	1450	1466	1487	1502	1521	1536	1555	1570	1585	1600	1616	1634	1669	1704	1739	
	1774	1815	1855	1880	1908	2017	2033	2101	2122	2187						



.BYTE	2335	2336				
.ENABL	257					
.END	2376					
.EVEN	2330	2336	2369			
.LIST	3	256	259	277	288	
.MACR	331	334	337			
.MACRO	235	242	249			
.NLIST	1	2	174	260	262	283
.REM	4					
.REPT	294					
.TITLE	258					
.WORD	293	301	325			

ERRORS DETECTED: 0

\*DSKZ:DDGTBD,DDGTBD/CRF=DDGTBD  
RUN-TIME: 7 15 3 SECONDS  
CORE USED: 7K



M05