

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. The left side of the card features a vertical column of frames, each containing a small table with multiple columns and rows of data. The right side of the card is mostly blank, with a few faint frames visible near the bottom edge.

B01

ECF:DBQF00580!
DDGTBC.F11

GT990100884 INSTR00228N TEST II MAINDEC0815+DDGTB-D HDR000GIB88E063) 19-DEC-760000008C 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

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.


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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 JP PCINTER
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 SETJPB: 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 001005 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 @TIMEVT1
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 D0CORE: MOV      #2$,R#4          ;SET UP FOR NEM
398 001326 012701 017776          MOV      #17776,R1        ;SET UP ADDRESS
399 001332 005000          CLR      R0
400 001334 062701 020000          1$:  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,R#4        ;RESET BUSS ERROR
410 001372 010137 001342          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$
449 001534 000000 HALT : ERROR, STOP FLAG FAILED TO SET
450 001536 000421 BR GTO
451
452 001540 062737 000002 001036 1$: ADD #2, DSAVE
453 001546 017700 177300 MOV @DPC, R0 : READ DISPLAY P.C.
454 001552 023700 001036 CMP DSAVE, R0 : DID IT INCREMENT BY 2?
455 001556 001402 BEQ 2$ : YES
456 001560 000000 HALT : DISPLAY PC FAILED TO INCREMENT
457 001562 000407 BR GTO : PROPERLY
458
459 001564 020037 001036 2$: CMP R0, 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, R0        ;READ DISPLAY STATUS REGISTER
471 001624 042700 177757                 BIC    #177757, R0     ;MASK TO BIT 4
472 001630 022700 000000                 CMP    #0, R0          ;TEST R0
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, R0        ;READY DISPLAY STATUS REGISTER
480 001662 042700 177757                 BIC    #177757, R0     ;MASK TO BIT 4
481 001666 022700 000020                 CMP    #20, R0         ;TEST R0
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, R0        ;READ DISPLAY STATUS REGISTER
489 001720 042700 177757                 BIC    #177757, R0     ;MASK TO BITS 4
490 001724 022700 000020                 CMP    #20, R0         ;TEST R0
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, R0        ;READ DISPLAY STATUS REGISTER
500 001762 042700 177773                 BIC    #177773, R0     ;MASK TO BIT 2
501 001766 022700 000000                 CMP    #0, R0          ;TEST R0
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, R0        ;READ DISPLAY STATUS REGISTER
511 002024 042700 177773                 BIC    #177773, R0     ;MASK TO BIT 2
512 002030 022700 000004                 CMP    #4, R0          ;TEST R0
513 002034 001401                         BEQ    .+4              ;
514 002036 000240                         NOP                      ;COLOR BIT FAILED TO SET

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K01

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516
517 002040 104000
518 002042 012777 172000 176752
519 002050 013777 001022 176774
520 002056 017700 176772
521 002062 042700 177773
522 002066 022700 000004
523 002072 001401
524 002074 000240
525
526
527
528
529 002076 104000
530 002100 012777 100004 176714
531 002106 012777 172000 176710
532 002114 013777 001022 176730
533 002122 017700 176726
534 002126 042700 177774
535 002132 022700 000000
536 002136 001401
537 002140 000000
538
539 002142 104000
540 002144 012777 100007 176650
541 002152 012777 172000 176644
542 002160 013777 001022 176664
543 002166 017700 176662
544 002172 042700 177774
545 002176 022700 000003
546 002202 001401
547 002204 000000
548
549 002206 104000
550 002210 012777 100005 176604
551 002216 012777 172000 176600
552 002224 013777 001022 176620
553 002232 017700 176616
554 002236 042700 177774
555 002242 022700 000001
556 002246 001401
557 002250 000000
558
559
560 002252 104000
561 002254 012777 100006 176540
562 002262 012777 172000 176534
563 002270 013777 001022 176554
564 002276 017700 176552
565 002302 042700 177774
566 002306 022700 000002
567 002312 001401
568 002314 000000

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GT5: SCOPE
MOV #172000, @DBUF ;COLOR ENABLE=0 COLOR=0
MOV DBUF, @DPC ;LOAD DISPLAY P.C.
MOV @DSR, RO ;READ DISPLAY STATUS REGISTER
BIC #177773, RO ;MASK TO BIT 2
CMP #4, RO ;TEST RO
BEQ .+4 ;
NOP ;COLOR ENABLE FAILED TO INHIBIT
;RESETTING OF COLOR BIT

:TESTED BY "LOAD CHARACTER" MODE

GT6: SCOPE
MOV #100004, @DBUF ;LOAD LINE TYPE ENABLE =1 AND LINE TYPE VALUE =0
MOV #172000, @DBUF1
MOV DBUF, @DPC ;LOAD DISPLAY P.C.
MOV @DSR, RO ;READ DISPLAY STATUS REGISTER
BIC #177774, RO ;MASK TO BITS 1-0
CMP #0, RO ;TEST RO
BEQ .+4 ;
HALT ;LINE BITS 1-0 FAILED TO RESET

GT7: SCOPE
MOV #100007, @DBUF ;LINE TYPE ENABLE =1 LINE TYPE =3
MOV #172000, @DBUF1 ;LOAD STOP
MOV DBUF, @DPC ;LOAD DISPLAY P.C.
MOV @DSR, RO ;READ DISPLAY STATUS REGISTER
BIC #177774, RO ;MASK TO BITS 1-0
CMP #3, RO ;TEST RO
BEQ .+4 ;
HALT ;LINE BITS 1-0 FAILED TO SET

GT8: SCOPE
MOV #100005, @DBUF ;LINE TYPE ENABLE =1 LINE TYPE =1
MOV #172000, @DBUF1 ;LOAD STOP
MOV DBUF, @DPC ;LOAD DISPLAY P.C.
MOV @DSR, RO ;READ DISPLAY STATUS REGISTER
BIC #177774, RO ;MASK TO BITS 1-0
CMP #1, RO ;TEST RO
BEQ .+4 ;
HALT ;LINE BIT 0 FAILED TO SET

GT9: SCOPE
MOV #100006, @DBUF ;LINE TYPE ENABLE =1 LINE TYPE =2
MOV #172000, @DBUF1
MOV DBUF, @DPC ;LOAD DISPLAY P.C.
MOV @DSR, RO ;READ DISPLAY STATUS REGISTER
BIC #177774, RO ;MASK TO BITS 1-0
CMP #2, RO ;TEST RO
BEQ .+4 ;
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	176375			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	176324		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	

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		

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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          ; GRAPH PLOT INCREMENT REGISTER TEST
701
702 003166 104000          GT22: SCOPE
703 003170 012777 174100 175624      MOV      #174100, @DBUF      ; LOAD GRAPH PLOT COUNTER
704 003176 012777 172000 175620      MOV      #172000, @DBUF1
705 003204 013777 001022 175640      MOV      @DBUF, @DPC      ; START DISPLAY
706 003212 017700 175640      MOV      @XPOS, RO       ; READ INCREMENT REGISTER
707 003216 042700 001777      BIC      #1777, RO        ; MASK TO BITS 15-10
708 003222 022700 000000      CMP      #0, RO
709 003226 001401      BEQ      .+4
710 003230 000000      HALT
711
712
713 003232 104000          GT23: SCOPE
714 003234 012777 174177 175560      MOV      #174177, @DBUF      ; LOAD GRAPH PLOT COUNTER
715 003242 012777 172000 175554      MOV      #172000, @DBUF1
716 003250 013777 001022 175574      MOV      @DBUF, @DPC      ; START DISPLAY
717 003256 017700 175574      MOV      @XPOS, RO       ; READ INCREMENT REGISTER
718 003262 042700 001777      BIC      #1777, RO        ; MASK TO BITS 15-10
719 003266 022700 176000      CMP      #176000, RO
720 003272 001401      BEQ      .+4
721 003274 000000      HALT
722
723
724 003276 104000          GT24: SCOPE
725 003300 012777 174152 175514      MOV      #174152, @DBUF      ; LOAD GRAPH PLOT COUNTER
726 003306 012777 017200 175510      MOV      #17200, @DBUF1
727 003314 013777 001022 175530      MOV      @DBUF, @DPC      ; START DISPLAY
728 003322 017700 175530      MOV      @XPOS, RO       ; READ INCREMENT REGISTER
729 003326 042700 001777      BIC      #1777, RO        ; MASK TO BITS 15-10
730 003332 022700 124000      CMP      #124000, RO
731 003336 001401      BEQ      .+4
732 003340 000000      HALT
733
734

```



```

804
805      :TEST THAT THE Y POSITION REGISTER CAN BE LOADED CORRECTLY
806      :USING GRAPHPLOT Y MODE
807
808
809      003670  104000      GT30:  SCOPE
810      003672  012777  126000  175122      MOV      #126000, @DBUF      ;LOW INTENSITY - SET GRAPHPLOT Y MODE
811      003700  012777  000525  175116      MOV      #525, @DBUF1      ;SET Y POSITION
812      003714  013777  172000  175112      MOV      #172000, @DBUF2      ;LOAD STATUS REGISTER A, STOP
813      003722  004737  001022  175130      MOV      @DBUF, @DPC      ;LOAD THE DISPLAY P.C.
814      003726  017700  012410      JSR      7, DLAY      ;EXECUTE A PROGRAM DELAY
815      003732  022700  175126      MOV      @YPOS, R0      ;READ Y POSITION
816      003736  001401  000525      CMP      #525, R0      ;
817      003740  000000      BEQ      .+4      ;
818      ;Y POSITION REGISTER FAILED TO LOAD
819      ;PROPERLY USING GRAPHPLOT Y MODE
820
821      :TEST THAT THE X - Y POSITION REGISTERS CAN BE LOADED CORRECTLY
822      :USING GRAPHPLOT X + Y MODE
823      :TEST FOR PROPER SELECTION OF X AND Y REGISTERS
824
825      003742  104000      GT31:  SCOPE
826      003744  012777  122000  175050      MOV      #122000, @DBUF      ;LOW INTENSITY - SET GRAPHPLOT X MODE
827      003752  012777  001234  175044      MOV      #1234, @DBUF1      ;SET X POSITION
828      003760  012777  126000  175040      MOV      #126000, @DBUF2      ;SET GRAPHPLOT Y MODE
829      003766  012777  001432  175034      MOV      #1432, @DBUF3      ;SET Y POSITION
830      003774  012777  172000  175030      MOV      #172000, @DBUF4      ;LOAD STATUS REGISTER A, STOP
831      004002  013777  001022  175042      MOV      @DBUF, @DPC      ;LOAD THE DISPLAY P.C.
832      004010  004737  012410      JSR      7, DLAY      ;EXECUTE A PROGRAM DELAY
833      004014  017700  175036      MOV      @XPOS, R0      ;READ X POSITION
834      004020  022700  001234      CMP      #1234, R0      ;
835      004024  001402      BEQ      .+6      ;
836      004026  000000      HALT      ;GRAPHPLOT X MODE FAILED TO SELECT
837      004030  000406      BR      GT32      ;X POSITION PROPERLY
838
839      004032  017700  175022      MOV      @YPOS, R0      ;READ Y POSITION
840      004036  022700  001432      CMP      #1432, R0      ;
841      004042  001401      BEQ      .+4      ;
842      004044  000000      HALT      ;Y POSITION REGISTER FAILED TO LOAD
843      ;PROPERLY USING GRAPHPLOT Y MODE

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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      #116000,2DBUF  :LOW INTENSITY - POINT MODE
851 004056 005077 174742  CLR      2DBUF1       :CLEAR X POSITION
852 004062 005077 174740  CLR      2DBUF2       :CLEAR Y POSITION
853 004066 012777 172000 174734  MOV      #172000,2DBUF3 :LOAD STATUS "A" REGISTER, STOP
854 004074 013777 001022 174750  MOV      DBUF,2DPC    :LOAD DISPLAY P.C.
855 004102 004737 012410  JSR      7,DLAY       :EXECUTE A PROGRAM DELAY
856 004106 017700 174744  MOV      2XPOS,RC     :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      2YPOS,RC     :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      #116000,2DBUF  :LOW INTENSITY - POINT MODE
871 004140 012777 001777 174656  MOV      #1777,2DBUF1   :SET X POSITION
872 004146 012777 001777 174652  MOV      #1777,2DBUF2   :SET Y POSITION
873 004154 012777 172000 174646  MOV      #172000,2DBUF3 :LOAD STATUS A REGISTER, STOP
874 004162 013777 001022 174662  MOV      DBUF,2DPC    :LOAD DISPLAY P.C.
875 004170 004737 012410  JSR      7,DLAY       :EXECUTE A PROGRAM DELAY
876 004174 017700 174656  MOV      2XPOS,RC     :READ X POSITION
877 004200 022700 001777  CMP      #1777,RC     :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      2YPOS,RC     :READ Y POSITION
883 004216 022700 001777  CMP      #1777,RC     :WAS IT SET?
884 004222 001401  BEQ      .+4          :
885 004224 000000  HALT                    :Y POSITION REGISTER FAILED TO SET
886          :USING POINT DATA MODE
887

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```

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

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H02

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959
960      :TEST THAT LONG VECTOR MODE INCREMENTS X AND Y AXIS PROPERLY
961      :COJNT 1
962
963      GT37:  SCOPE
964      004520 104000      MOV      DBUF,RO
965      004522 013700 001022      MOV      #116000,(0)+      ;LOAD "POINT MODE"
966      004526 012720 116000      CLR      (0)+              ;CLEAR X AXIS
967      004532 005020      CLR      (0)+              ;CLEAR Y AXIS
968      004534 005020      MOV      #110000,(0)+      ;LOAD "LONG VECTOR MODE"
969      004536 012720 110000      MOV      #1,(0)+           ;PRESET "DELTA X AXIS"
970      004542 012720 000001      MOV      #1,(0)+           ;PRESET "DELTA Y AXIS"
971      004546 012720 000001      MOV      #172000,(0)      ;LOAD "DISPLAY STOP"
972      004552 012710 172000      MOV      #172000,(0)      ;LOAD THE DISPLAY P.C.
973      004556 013777 001022 174266      MOV      DBUF,ADPC
974      004564 004737 012410      JSR      7,DLAY           ;EXECUTE A PROGRAM DELAY
975
976      004570 017700 174262      MOV      @XPOS,RO         ;READ X AXIS
977      004574 022700 000001      CMP      #1,RO           ;DID IT INCREMENT BY 1
978      004600 001402      BEQ      .+6             ;YES
979      004602 000000      HALT
980      004604 000406      BR      GT38            ;NO, INCREMENT X AXIS BY
981
982      004606 017700 174246      MOV      @YPOS,RO         ;READ Y AXIS
983      004612 022700 000001      CMP      #1,RO           ;DID IT INCREMENT BY 1
984      004616 001401      BEQ      .+4             ;YES
985      004620 000000      HALT                    ;NO, INCREMENT Y AXIS BY
986
987      :TEST THAT LONG VECTOR MODE DECREMENT X AND Y AXIS PROPERLY
988      :COJNT 1
989
990      GT38:  SCOPE
991      004622 104000      MOV      DBUF,RO
992      004624 013700 001022      MOV      #116000,(0)+      ;LOAD "POINT MODE"
993      004630 012720 116000      CLR      (0)+              ;CLEAR X AXIS
994      004634 005020      CLR      (0)+              ;CLEAR Y AXIS
995      004636 005020      MOV      #110000,(0)+      ;LOAD "LONG VECTOR MODE"
996      004640 012720 110000      MOV      #20001,(0)+       ;PRESET "DELTA X AXIS"
997      004644 012720 020001      MOV      #20001,(0)+       ;PRESET "DELTA Y AXIS"
998      004650 012720 020001      MOV      #20001,(0)+       ;PRESET "DELTA Y AXIS"
999      004654 012710 172000      MOV      #172000,(0)      ;LOAD "DISPLAY STOP"
1000     004660 013777 001022 174164      MOV      DBUF,ADPC
1001     004666 004737 012410      JSR      7,DLAY           ;EXECUTE A PROGRAM DELAY
1002
1003     004672 017700 174160      MOV      @XPOS,RO         ;READ X AXIS
1004     004676 022700 001777      CMP      #1777,RO        ;DID IT DECREMENT BY 1
1005     004702 001402      BEQ      .+6             ;YES
1006     004704 000000      HALT
1007     004706 000406      BR      GT39            ;NO, DECREMENT X AXIS BY
1008
1009     004710 017700 174144      MOV      @YPOS,RO         ;READ Y AXIS
1010     004714 022700 001777      CMP      #1777,RO        ;DID IT DECREMENT BY 1
1011     004720 001401      BEQ      .+4             ;YES
1012     004722 000000      HALT                    ;NO, DECREMENT Y AXIS BY
1013
1014     :LONG VECTOR MODE FAILED

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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,@DPC    ;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 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 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

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1088          ;TEST THAT X AND Y ASIS INCREMENTS PROPERLY
1089          ;USING SHORT VECTOR MODE
1090          ;COUNT 1
1091
1092          GT41:  SCOPE
1093          005162 104000          MOV      DBUF,RO          ;SET UP RO
1094          005164 013700 001022  MOV      #116000,(0)+    ;LOAD "SET POINT MODE"
1095          005170 012720 116000  CLR      (0)+           ;CLEAR X AXIS
1096          005174 005020          CLR      (0)+           ;CLEAR Y AXIS
1097          005176 005020          CLR      (0)+           ;LOAD "SET SHORT VECTOR MODE"
1098          005200 012720 106000  MOV      #106000,(0)+    ;PRESET "DELTA X AND DELTA Y"
1099          005204 012720 000201  MOV      #201,(0)+
1100          005210 012710 172000  MOV      #172000,(0)
1101          005214 013777 001022  MOV      DBUF,ADPC      ;LOAD THE DISPLAY PC
1102          005222 004737 012410  JSR      7,DLAY        ;EXECUTE A PROGRAM DELAY
1103
1104          005226 017700 173624  MOV      @XPOS,RO      ;READ X AXIS
1105          005232 022700 000001  CMP      #1,RO         ;ARE THEY EQUAL?
1106          005236 001402          BEQ      .+6           ;YES
1107          005240 000000          HALT
1108          005242 000406          BR       GT42         ;NO, INCREMENT X AXIS FAILED USING
1109                                     ;SHORT VECTOR MODE
1110          005244 017700 173610  MOV      @YPOS,RO      ;READ Y AXIS
1111          005250 022700 000001  CMP      #1,RO         ;ARE THEY EQUAL?
1112          005254 001401          BEQ      .+4           ;YES
1113          005256 000000          HALT
1114                                     ;NO INCREMENT Y AXIS FAILED
1115                                     ;USING SHORT VECTOR MODE
1116
1117          ;TEST THAT X AND Y AXIS DECREMENT PROPERLY
1118          ;USING SHORT VECTOR MODE
1119          ;COUNT 1
1120
1121          GT42:  SCOPE
1122          005260 104000          MOV      DBUF,RO          ;SET UP RO
1123          005262 013700 001022  MOV      #116000,(0)+    ;LOAD "SET POINT MODE"
1124          005266 012720 116000  CLR      (0)+           ;CLEAR X AXIS
1125          005272 005020          CLR      (0)+           ;CLEAR Y AXIS
1126          005274 005020          CLR      (0)+           ;LOAD "SET SHORT VECTOR MODE"
1127          005276 012720 106000  MOV      #106000,(0)+    ;PRESET "DELTA X AND DELTA Y"
1128          005302 012720 020301  MOV      #20301,(0)+
1129          005306 012710 172000  MOV      #172000,(0)
1130          005312 013777 001022  MOV      DBUF,ADPC      ;LOAD THE DISPLAY PC
1131          005320 004737 012410  JSR      7,DLAY        ;EXECUTE A PROGRAM DELAY
1132
1133          005324 017700 173526  MOV      @XPOS,RO      ;READ X AXIS
1134          005330 022700 001777  CMP      #1777,RO      ;ARE THEY EQUAL?
1135          005334 001402          BEQ      .+6           ;YES
1136          005336 000000          HALT
1137          005340 000406          BR       GT43         ;NO, DECREMENT X AXIS FAILED USING
1138                                     ;SHORT VECTOR MODE
1139          005342 017700 173512  MOV      @YPOS,RO      ;READ Y AXIS
1140          005346 022700 001777  CMP      #1777,RO      ;ARE THEY EQUAL?
1141          005352 001401          BEQ      .+4           ;YES
1142          005354 000000          HALT
1143                                     ;NO DECREMENT Y AXIS FAILED
1144                                     ;USING SHORT VECTOR MODE

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173630

173532

```

1142
1143
1144           :TEST THAT X AND Y AXIS INCREMENT PROPERLY
1145           :USING SHORT VECTOR MODE
1146           :COUNT 0-77
1147 005356 104000          GT43:  SCOPE
1148 005360 012703 000077      MOV   #77,R3           ;SET UP A COUNT LOCATION
1149 005364 012702 000001      MOV   #1,R2            ;SET UP THE COMPARED LOCATION
1150 005370 012704 000201      MOV   #201,R4          ;SET UP "DELTA X-Y"
1151
1152 005374 104000          GT43A: SCOPE
1153 005376 013700 001022      MOV   DBUF,R0          ;SET UP R0
1154 005402 012720 116000      MOV   #116000,(0)+    ;LOAD "SET POINT DATA MODE"
1155 005406 005020          CLR   (0)+             ;CLEAR X AXIS
1156 005410 005020          CLR   (0)+             ;CLEAR Y AXIS
1157 005412 012720 106000      MOV   #106000,(0)+    ;LOAD "SET SHORT VECTOR MODE"
1158 005416 010420          MOV   R4,(0)+         ;PRESET "DELTA X AND DELTA Y"
1159 005420 012710 172000      MOV   #172000,(0)
1160 005424 013777 001022 17342C  MOV   DBUF,@DPC        ;LOAD THE DISPLAY P.C.
1161 005432 004737 012410      JSR   7,DLAY          ;EXECUTE A PROGRAM DELAY
1162
1163 005436 017700 173414      MOV   @XPOS,R0        ;READ X POSITION
1164 005442 020200          CMP   R2,R0           ;ARE THEY EQUAL
1165 005444 001402          BEQ   .+6            ;YES
1166 005446 000000          HALT                ;INCREMENT X AXIS FAILED USING
1167 005450 000413          BR    GT44           ;SHORT VECTOR MODE
1168
1169 005452 017700 173402      MOV   @YPOS,R0        ;READ Y POSITION
1170 005456 020200          CMP   R2,R0           ;ARE THEY EQUAL ?
1171 005460 001402          BEQ   .+6            ;YES
1172 005462 000000          HALT                ;INCREMENT Y AXIS FAILED USING
1173 005464 000405          BR    GT44           ;SHORT VECTOR MODE
1174
1175 005466 062704 000201      ADD   #201,R4          ;ADD DELTA X-Y
1176 005472 005202          INC   R2              ;INCREMENT EXPECTED VALUE
1177 005474 005303          DEC   R3              ;DECREMENT COUNT, FINISHED?
1178 005476 001337          BNE   GT43A          ;NO, TEST MORE DATA

```

M02

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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 000077 MOV #77,R3 ;SET UP A COUNT LOCATION
1187 005506 012702 001777 MOV #177,R2 ;SET UP THE COMPARED LOCATION
1188 005512 012704 020301 MOV #20301,R4 ;PRESET THE "DELTA X-Y"
1189
1190 005516 104000 GT44A: SCOPE
1191 005520 013700 001022 MOV DBUF,RO ;SET UP RO
1192 005524 012720 116000 MOV #116000,(0)+ ;LOAD "SET POINT DATA MODE"
1193 005530 005020 CLR (0)+ ;CLEAR X AXIS
1194 005532 005120 CLR (0)+ ;CLEAR Y AXIS
1195 005534 012720 106000 MOV #106000,(0)+ ;LOAD "SET SHORT VECTOR MODE"
1196 005540 010420 MOV R4,(0)+ ;PRESET "DELTA X AND DELTA Y"
1197 005542 012710 172000 MOV #172000,(0)
1198 005546 013777 001022 173276 MOV DBUF,ADPC ;LOAD THE DISPLAY P.C.
1199 005554 004737 012410 JSR 7,DLAY ;EXECUTE A PROGRAM DELAY
1200
1201 005560 017700 173272 MOV @XPOS,RO ;READ X POSITION
1202 005564 020200 CMP R2,RO ;ARE THEY EQUAL
1203 005566 001402 BEQ .+6 ;YES
1204 005570 000000 HALT ;DECREMENT X AXIS FAILED USING
1205 005572 000413 BR GT45 ;SHORT VECTOR MODE
1206
1207 005574 017700 173260 MOV @YPOS, RO ;READ Y POSITION
1208 005600 020200 CMP R2,RO ;ARE THEY EQUAL ?
1209 005602 001402 BEQ .+6 ;YES DECREMENT
1210 005604 000000 HALT ;DECREMENT Y AXIS FAILED USING
1211 005606 000405 BR GT45 ;SHORT VECTOR MODE
1212
1213 005610 062704 000201 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

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1219          ;TEST THAT X AND Y AXIS INCREMENTS PROPERLY
1220          ;USING RELATIVE POINT MODE
1221          ;COUNT 1
1222
1223          GT45:  SCOPE
1224          MOV    DBUF,RO          ;SET UP PD
1225          MOV    #116000,(0)+    ;LOAD "SET POINT MODE"
1226          CLR    (0)+            ;CLEAR X AXIS
1227          CLR    (0)+            ;CLEAR Y AXIS
1228          MOV    #130000,(0)+    ;LOAD "SET RELATIVE POINT MODE"
1229          MOV    #201,(0)+       ;PRESET "DELTA X AND DELTA Y"
1230          MOV    #172000,(0)
1231          MOV    DBUF,ADPC       ;LOAD THE DISPLAY PC
1232          JSR    7,DLAY          ;EXECUTE A PROGRAM DELAY
1233
1234          MOV    @XPOS,RO        ;READ X AXIS
1235          CMP    #1,RO           ;ARE THEY EQUAL?
1236          BEQ    .+6             ;YES
1237          HALT                   ;NO, INCREMENT X AXIS FAILED USING
1238          BR     GT46            ;RELATIVE POINT MODE
1239
1240          MOV    @YPOS,RO        ;READ Y AXIS
1241          CMP    #1,RO           ;ARE THEY EQUAL?
1242          BEQ    .+4             ;YES
1243          HALT                   ;NO INCREMENT Y AXIS FAILED
1244          ;USING RELATIVE POINT MODE
1245
1246          ;TEST THAT X AND Y AXIS DECREMENT PROPERLY
1247          ;USING RELATIVE POINT MODE
1248          ;COUNT 1
1249
1250          GT46:  SCOPE
1251          MOV    DBUF,RO          ;SET UP RO
1252          MOV    #116000,(0)+    ;LOAD "SET POINT MODE"
1253          CLR    (0)+            ;CLEAR X AXIS
1254          CLR    (0)+            ;CLEAR Y AXIS
1255          MOV    #130000,(0)+    ;LOAD "SET RELATIVE POINT MODE"
1256          MOV    #20301,(0)+     ;PRESET "DELTA X AND DELTA Y"
1257          MOV    #172000,(0)
1258          MOV    DBUF,ADPC       ;LOAD THE DISPLAY PC
1259          JSR    7,DLAY          ;EXECUTE A PROGRAM DELAY
1260
1261          MOV    @XPOS,RO        ;READ X AXIS
1262          CMP    #1777,RO        ;ARE THEY EQUAL?
1263          BEQ    .+6             ;YES
1264          HALT                   ;NO, DECREMENT X AXIS FAILED USING
1265          BR     GT47            ;RELATIVE POINT MODE
1266
1267          MOV    @YPOS,RO        ;READ Y AXIS
1268          CMP    #1777,RO        ;ARE THEY EQUAL?
1269          BEQ    .+4             ;YES
1270          HALT                   ;NO DECREMENT Y AXIS FAILED
1271          ;USING RELATIVE POINT MODE

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173170

173072

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1273
1274           :TEST THAT X AND Y AXIS INCREMENT PROPERLY
1275           :USING RELATIVE POINT MODE
1276           :COUNT 0-77
1277
1278 006016 104000          GT47:  SCOPE
1279 006020 012703 000077      MOV      #77,R3           ;SET UP A COUNT LOCATION
1280 006024 012702 000001      MOV      #1,R2           ;SET UP THE COMPARED LOCATION
1281 006030 012704 000201      MOV      #201,R4        ;SET UP "DELTA X-Y"
1282
1283 006034 104000          GT47A: SCOPE
1284 006036 013700 001022      MOV      DBUF,R0        ;SET UP R0
1285 006042 012720 116000      MOV      #116000,(0)+  ;LOAD "SET POINT DATA MODE"
1286 006046 005020          CLR      (0)+           ;CLEAR X AXIS
1287 006050 005020          CLR      (0)+           ;CLEAR Y AXIS
1288 006052 012720 130000      MOV      #130000,(0)+  ;LOAD "SET RELATIVE POINT MODE"
1289 006056 010420          MOV      R4,(0)+       ;PRESET "DELTA X AND DELTA Y"
1290 006060 012710 172000      MOV      #172000,(0)
1291 006064 013777 001000      MOV      DBUF,ADFC     ;LOAD THE DISPLAY P.C.
1292 006072 004737 012410      JSR      7,DLAY        ;EXECUTE A PROGRAM DELAY
1293
1294 006076 017700 172754      MOV      @XPOS,R0      ;READ X POSITION
1295 006102 020200          CMP      R2,R0         ;ARE THEY EQUAL
1296 006104 001402          BEQ     .+6           ;YES
1297 006106 000000          HALT
1298 006110 000413          BR      GT48         ;INCREMENT X AXIS FAILED USING
1299                                     ;RELATIVE POINT MODE
1300 006112 017700 172742      MOV      @YPOS,R0      ;READ Y POSITION
1301 006116 020200          CMP      R2,R0         ;ARE THEY EQUAL ?
1302 006120 001402          BEQ     .+6           ;YES
1303 006122 000000          HALT
1304 006124 000405          BR      GT48         ;INCREMENT Y AXIS FAILED USING
1305                                     ;RELATIVE POINT MODE
1306 006126 062704 000201      ADD      #201,R4       ;ADD DELTA X-Y
1307 006132 005202          INC      R2           ;INCREMENT EXPECTED VALUE
1308 006134 005303          DEC      R3           ;DECREMENT COUNT, FINISHED?
1309 006136 001337          BNE     GT47A        ;NO. TEST MORE DATA

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1311
1312      :TEST THAT X AND Y AXIS DECREMENT PROPERLY
1313      :USING RELATIVE POINT MODE
1314      :COUNT 77-0
1315
1316      006140 104000      GT48:  SCOPE
1317      006142 012703 000077      MOV      #77,R3      ;SET UP A COUNT LOCATION
1318      006146 012702 001777      MOV      #1777,R2    ;SET UP THE COMPARED LOCATION
1319      006152 012704 020301      MOV      #20301,R4   ;PRESET THE "DELTA X-Y"
1320
1321      006156 104000      GT48A: SCOPE
1322      006160 013700 001022      MOV      DBUF,R0     ;SET UP R0
1323      006164 012720 116000      MOV      #116000,(0)+ ;LOAD "SET POINT DATA MODE"
1324      006170 005020      CLR      (0)+        ;CLEAR X AXIS
1325      006172 005020      CLR      (0)+        ;CLEAR Y AXIS
1326      006174 012720 130000      MOV      #130000,(0)+ ;LOAD "SET RELATIVE POINT MODE"
1327      006200 010420      MOV      R4,(0)+     ;PRESET "DELTA X AND DELTA Y"
1328      006202 012710 172000      MOV      #172000,(0)
1329      006206 013777 001022 172636      MOV      DBUF,DPIC   ;LOAD THE DISPLAY P.C.
1330      006214 004737 012410      JSR      7,DLAY      ;EXECUTE A PROGRAM DELAY
1331
1332      006220 017700 172632      MOV      @XPOS,R0    ;READ X POSITION
1333      006224 020200      CMP      R2,R0       ;ARE THEY EQUAL
1334      006226 001402      BEQ     .+6         ;YES
1335      006230 000000      HALT
1336      006232 000413      BR      GT49        ;DECREMENT X AXIS FAILED USING
1337                                     ;RELATIVE POINT MODE
1338
1338      006234 017700 172620      MOV      @YPOS, R0   ;READ Y POSITION
1339      006240 020200      CMP      R2,R0       ;ARE THEY EQUAL ?
1340      006242 001402      BEQ     .+6         ;YES DECREMENT
1341      006244 000000      HALT
1342      006246 00040E      BR      GT49        ;DECREMENT Y AXIS FAILED USING
1343                                     ;RELATIVE POINT MODE
1344
1344      006250 062704 000201      ADD      #201,R4     ;ADD "DELTA X-Y"
1345      006254 005302      DEC      R2          ;DECREMENT EXPECTED VALUE
1346      006256 005303      DEC      R3          ;DECREMENT COUNT, FINISHED?
1347      006260 001337      BNE     GT48A       ;NO, TEST MORE DATA
1348

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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,ADPC      ;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

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1390 006376 104000
1391 006400 012703 000077
1392 006404 012704 000001
1393 006410 012737 174101 001036
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
1419 006524 012777 172000 172272
1420 006532 013777 001022 172312

:LOAD STATUS B TEST
:USE GRAPHLOT 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,R0 ;SET UP R0
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 GRAPHLOT Y MODE"
CLR (0)+ ;LOAD "Y GRAPHLOT DATA"
MOV #172000,(0)
MOV DBUF,@DPC ;LOAD THE DISPLAY P.C.
JSR 7,DLAY ;EXECUTE A PROGRAM DELAY

MOV @XPOS,R0 ;READ X AXIS
BIC #176000,R0 ;MASK TO BITS 0-9
CMP R4,R0 ;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, EDGE FLAG FAILED TO CLEAR

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007112 104300
007114 013700 001022
007120 012720 116000
007124 012720 000000
007130 013720 001012
007134 012720 113000
007140 012720 000000
007144 012720 000001
007150 012720 172000
007154 013777 001022 171670
007162 004737 012410

007166 032777 000040 171660
007174 001002
007176 000000
007200 000424

007202 013700 001022
007206 012720 116000
007212 012720 000000
007216 012720 000000
007222 012720 172000
007226 013777 001022 171616
007234 004737 012410

007240 032777 000040 171608
007246 001401
007250 000000

007252 104000
007254 013700 001022
007260 012720 116000
007264 012720 000000
007270 012720 000000
007274 012720 110000
007300 012720 000000
007304 012720 020001
007310 012720 172000
007314 013777 001022 171530
007322 004737 012410

007326 032777 000040 171520
007334 001001
007336 000000

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

GT54: SCOPE
MOV DBUF,RO
MOV #15000,(0)+ ;LOAD POINT
MOV #0,(0)+ ;LOAD X
MOV GSYAXS,(0)+ ;LOAD MAX Y
MOV #110000,(0)+ ;LOAD LONG VECTOR
MOV #0,(0)+ ;LOAD DELTA X
MOV #1,(0)+ ;LOAD DELTA Y
MOV #172000,(0)+ ;LOAD STOP
MOV DBUF,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 GT55

: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, EDGE FLAG FAILED TO CLEAR

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

GT55: SCOPE
MOV DBUF,RO
MOV #116000,(0)+ ;LOAD POINT
MOV #0,(0)+ ;LOAD X
MOV #0,(0)+ ;LOAD Y
MOV #110000,(0)+ ;LOAD LONG VECTOR
MOV #0,(0)+ ;LOAD DELTA X
MOV #20001,(0)+ ;LOAD DELTA Y
MOV #172000,(0)+ ;LOAD STOP
MOV DBUF,ADPC ;START DISPLAY
JSR 7,DLAY ;EXECUTE A PROGRAM DELAY

BIT #40,ADSR ;TEST BIT 5
BNE .+4
HALT ;EDGE FLAG FAILED TO SET

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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 171450      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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1658
1659
1660
1661 007766 104300
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

```

: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

```

```

1691
1692
1693 ;TEST THAT CHARACTER MODE DOES NOT HANG THE DISPLAY PROCESSOR
1694 ;TEST THAT "LF" DOES NOT CHANGE X BUT DOES CHANGE Y AXIS
1695
1696 010126 104000          GT62:  SCOPE
1697 010130 012777 116000 170664      MOV      #116000, @DBUF      ;POINT MODE
1698 010136 012777 001000 170660      MOV      #1000, @DBUF1
1699 010144 012777 001000 170654      MOV      #1000, @DBUF2      ;1000,1000
1700 010152 012777 100000 170650      MOV      #100000, @DBUF3    ;LOAD "CHARACTER MODE"
1701 010160 012777 000012 170644      MOV      #12, @DBUF4
1702 010166 012777 172000 170640      MOV      #172000, @DBUF5
1703 010174 013777 001022 170650      MOV      @DBUF, @DPC        ;LOAD THE DISPLAY P.C.
1704 010202 004737 012410          JSR      7, DLAY            ;EXECUTE A PROGRAM DELAY
1705
1706 010206 017700 170646      MOV      @YPOS, R0          ;READ CHARACTER REG.
1707 010212 042700 001777      BIC      #1777, R0          ;MASK TO BITS 10-15
1708 010216 022700 024000      CMP      #24000, R0
1709 010222 001402          BEQ      .+6
1710 010224 000000          HALT
1711 010226 000477          BR      GT63              ;CHARACTER REGISTER IN ERROR
1712
1713 010230 017700 170622      MOV      @XPOS, R0          ;READ X AXIS
1714 010234 022700 001000      CMP      #1000, R0         ;ARE THEY EQUAL ?
1715 010240 001402          BEQ      .+6              ;YES
1716 010242 000000          HALT                      ;"LF" CHARACTER CHANGED X AXIS
1717 010244 000470          BR      GT63
1718
1719 010246 017700 170606      MOV      @YPOS, R0          ;READ Y AXIS
1720 010252 042700 176000      BIC      #176000, R0       ;MASK TO BITS 10-15
1721 010256 023700 001046      CMP      LFSIZE, R0        ;ARE THEY EQUAL ?
1722 010262 001401          BEQ      .+4              ;YES
1723 010264 000000          HALT                      ;"LF" CHARACTER FAILED TO CHANGED Y AXIS CORRECTLY
1724

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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

```



```

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
1822 010702 000426      BR      GT65      ; CHARACTER REGISTER IN ERROR
1823                                     ; AFTER A SHIFT-OUT COMMAND
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-IN"
1954 011426 005077 167366 CLR @PSW
1955 011432 013777 001022 167412 MOV DBUF,@DPC
1956 011440 012700 000010 MOV #10,@R0 ;SET UP FOR DELAY
1957 011444 005300 1$: DEC R0 ;WAIT FOR INTERRUPT
1958 011446 100376 BPL 1$
1959 011450 000000 HALT ;GT-40 FAILED TO GENERATE A STOP INTERRUPT
1960 011452 013777 001064 167402 GT69A: MOV DDONE1,@DDONE
1961 011460 022626 CMP (SP)+,(SP)+
1962 011462 000405 BR GT70
1963
1964 011464 022626 GT69B: CMP (SP)+,(SP)+
1965 011466 000000 HALT ;GT-40 STOP (DONE) INTERRUPTED TO THE
1966 ; LIGHT-PEN VECTOR
1967 011470 000402 BR GT70
1968
1969 011472 022626 GT69C: CMP (SP)+,(SP)+
1970 011474 000000 HALT ;GT-40 STOP (DONE) INTERRUPTED TO THE
1971 ; 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

:LOAD DONE VECTOR
:LOAD LIGHT-PEN VECTOR
:LOAD RETURN ADDRESS
:LOAD "CHARACTER MODE"
:LOAD "SHIFT-OUT"

CLR @PSW
MOV DBUF,@DPC
MOV #10,@RO

:START DISPLAY
:SET UP FOR DELAY
:WAIT FOR INTERRUPT

1\$: DEC RO
BPL 1\$

:GT-40 FAILED TO INTERRUPT ON SHIFT-OUT

GT70A: HALT

NOP
MOV TMEVT1,@TIMEVT
CMP (SP)+,(SP)+
BR GT71

GT70B: CMP (SP)+,(SP)+
HALT

:GT-40 SHIFT-OUT INTERRUPTED TO THE
: DONE VECTOR

BR GT71

GT70C: CMP (SP)+,(SP)+
HALT

: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, @DBUF!
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: :40
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 @BUF, @DPC ;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 @BUF, @DPC
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 @DONE1, @DDONE ;LOAD INTERRUPT VECTOR
2087 012160 000005 RESET
2088 012162 000005 RESET

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2090
2091
2092          :RESET TEST
2093          :DSES 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          ENC:    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      $TPC           ; NO RE-DO
2118          012276 000005          HERE:  RESET
2119          012300 013700 000042          MOV      @#42, R0
2120          012304 001410          BEQ      HERE1          ; BRANCH IF OFF LINE
2121          012306 000005          RESET
2122          012310 004710          LOGICAL: JSR      PC, (0)
2123          012312 000240          NOP
2124          012314 000240          NOP
2125          012316 000240          NOP
2126          012320 000240          NOP
2127          012322 000240          NOP
2128          012324 000240          NOP
2129          012326 012777 000002 166520  HERE1: MOV      #2, @DSR        ; RING THE BELL
2130          012334 012737 000207 177566          MOV      #207, TPDBR    ; RING THE BELL
2131          012342 105737 177564          1$:    TSTB      TPCSR    ; WAIT
2132          012346 100375          BPL      1$
2133          012350 012737 000207 177566          MOV      #207, TPDBR    ; RING 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,DSWR      :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
2150
2151 012422 012700 001000 DLAY1: MOV      #1000,R0
2152 012426 005300 DLAY1A: DEC      R0
2153 012430 001376                                     BNE      DLAY1A
2154 012432 000207                                     RTS
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,D#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,D#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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K04

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2184
2185 012534 012777 000340 166256 START1: MOV #340, @PSW
2186 012542 012706 000500 MOV #STKPTR, SP
2187 012546 004737 001076 JSR PC, SETUP
2188 012552 012701 012534 MOV #START1, R1
2189 012556 012777 012612 166276 MOV #SPCEA, @DDONE ;SET UP DONE VECTOR
2190 012564 013777 001004 166272 MOV DSPBR, @DDONE1
2191 012572 012777 012666 166266 MOV #SPACEB, @LPVCT ;SET UP LIGHT-PEN VECTOR
2192 012600 013777 001004 166262 MOV DSPBR, @LPVCT1
2193 012606 000240 NOP
2194 012610 000240 NOP
2195 012612 012706 000500 SPCEA: MOV #STKPTR, SP
2196 012616 012737 173400 013476 MOV #DSTOP, FRM7A
2197 012624 017700 166210 MOV @SWR, R0
2198 012630 006100 ROL R0
2199 012632 042700 177761 BIC #177761, R0
2200 012636 016002 012706 MOV DSPTCH(0), R2
2201 012642 010277 166204 MOV R2, @DPC ;START THE DISPLAY
2202
2203 012646 000240 NOP
2204 012650 000240 NOP
2205 012652 005077 166142 SPCEC: CLR @PSW
2206 012656 000001 WAIT
2207 012660 000240 NOP
2208 012662 000240 NOP
2209 012664 000752 BR SPCEA
2210
2211 012666 012737 164000 013476 SPACEB: MOV #DNOP, FRM7A
2212 012674 012777 000001 166150 MOV #1, @DPC ;SINGLE STEP THE DISPLAY
2213 012702 022626 CMP (SP)+, (SP)+
2214 012704 000762 BR SPCEC
2215
2216
2217 012706 012726 DSPTCH: FRAME0
2218 012710 012754 FRAME1
2219 012712 013002 FRAME2
2220 012714 013030 FRAME3
2221 012716 013056 FRAME4
2222 012720 013114 FRAME5
2223 012722 013202 FRAME6
2224 012724 013426 FRAME7
2225
2226

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2228			
2229			
2230	012726	117004	FRAMED: 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	FRAMED
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	FRAME5: 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	FRAME5
2323			

2325					
2326	013202	117004			FRAME6: POINT!INT4!LINED
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	C31	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					

	575	586	597	608	619	629	638	649	660	671	682	693	1433
	1452	1468	1489	1504	1523	1538	1557	1797	1824	1857	1882	1890	1910
DSTOP = 173400	2108	2129*											
DSWR = 177570	207*	2196	2238	2250	2262	2274	2292	2320	2337	2363	2370		
END 012254	274*	325	385										
ERRVEC= 000004	2106	2113*											
FRAME0 012726	272*	383	384*	391*									
FRAME1 012754	2217	2230*	2240										
FRAME2 013002	2218	2242*	2252										
FRAME3 013030	2219	2254*	2264										
FRAME4 013056	2220	2266*	2276										
FRAME5 013114	2221	2280*	2294										
FRAME6 013202	2222	2296*	2322										
FRAME7 013426	2223	2326*	2339										
FRM7A 013476	2224	2343*	2372										
GRAPHX= 120000	2196*	2211*	2363*										
GRAPHY= 124000	181*												
GREEN = 000002	182*												
GSADD 001000	215*												
GSCHSZ 001006	309*	359											
GSLFSZ 001010	311*	373	1749										
GSSEND 001014	312*	370											
GSVCT 001002	314*												
GSYAXS 001012	309*	365											
GTBUSS 001434	313*	1515											
GTPC 001462	420	424*											
GTPCA 001526	436*	2117											
GTC 001602	447*	462											
GT1 001640	450	457	460	467*									
GT10 002316	476*												
GT11 002362	571*												
GT12 002426	582*												
GT13 002472	593*												
GT14 002536	604*												
GT15 002576	615*												
GT16 002636	625*												
GT17 002702	634*												
GT18 002746	645*												
GT19 003012	656*												
GT2 001676	667*												
GT20 003056	485*												
GT21 003122	678*												
GT22 003166	689*												
GT23 003232	702*												
GT24 003276	712*												
GT25 003342	722*												
GT26 003406	733*												
GT27 003472	743*												
GT28 003544	750*												
GT29 003616	776*												
GT3 001734	791*												
GT30 003670	495*												
GT31 002742	809*												
	824*												

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
GT63A	010566	1797#			1766#
GT64	010602	1781	1787	1807#	
GT65	010760	1822	1828	1834	1946#
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#		

ACC	361	367	400	452	1175	1213	1306	1344							
BFC	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	1634	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	1990
	1910	2140													
BMT	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				
BP	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	1299	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									
CMR	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	1391	1415	1957	1989
	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	769
	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	1227	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				
MP	304	305	2117	2136	2144	2179									
SR	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	1615	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 USEC: 7K

M05