

TMA-11

INSTRUCTION TEST
MD-11-DZTMA-H

EP-DZTMA-H-DL-A

NOV 1976

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digital

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MADE IN USA

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1. ABSTRACT

THE TM, A, B-11 INSTRUCTION TEST CONTAINS A SERIES OF BASIC TESTS THAT CHECK REGISTERS FOR PROPER OPERATION WHILE NOT INVOLVING TAPE MOTION, ALL TAPE MOTION FUNCTIONS, DATA TRANSFERS, EXTENDED MEMORY, AND MANUAL INTERVENTION TESTS OF THE TU10 OR TS03 TRANSPORTS. ***MANUAL INTERVENTION TESTS ARE SKIPPED IN CHAIN MODE***

2. REQUIREMENTS

2.1 EQUIPMENT

PDP-11 WITH TM, A, B-11 CONTROL UNIT AND 1 TS03, TU10, N, W TAPE UNIT.

2.2 STORAGE

2.2.1 PROGRAM STORAGE

THE ROUTINE REQUIRES 4K OF MEMORY.

3. LOADING PROCEDURE

3.1 METHOD

A. PROCEDURE FOR NORMAL BINARY TAPES SHOULD BE FOLLOWED.

B. PROGRAM IS LOADABLE AND CHAINABLE IN 8K OF MEMORY.

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS

STARTING AT LOC. 200 ALL SWITCHES SHOULD BE DOWN OR ZERO. ***SOFTWARE SWITCH REGISTER IS LOCATED AT LOC. 176 IF NEEDED.***

4.2 STARTING ADDRESS

200

4.3 PROGRAM AND/OR OPERATOR ACTION

1. LOAD PROGRAM INTO MEMORY.
2. PLACE ONE TAPE UNIT, ON-LINE, AT LOAD POINT (BOT), UNIT 0 SELECTED.
3. LOAD STARTING ADDRESS
4. START PROGRAM

PROGRAM WILL TYPE "SET SWD=1 IF 7 CHANNEL". (IF NOT CHAIN MODE)

CHAIN MODE DEFAULT IS DRIVE 0 9TRK ONLY.

IF APPROPRIATE SET SWD AND THEN PRESS CONTINUE OR

***IF SOFTWARE SWITCH REGISTER IS USED TYPE CNTL G AND THEN CONTINUE

-THIS WILL ALLOW THE MODIFICATION OF THE SOFTWARE SWITCH REGISTER (REFER TO S THE PROGRAM WILL BEGIN TESTING.

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5. OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

IF THE DIAGNOSTIC IS RUN ON A CPU WITHOUT A SWITCH REGISTER THEN A SOFTWARE SWITCH REGISTER IS USED WHICH ALLOWS THE USER THE SAME SWITCH OPTIONS AS THE HARDWARE SWITCH REGISTER. IF THE HARDWARE SWITCH REGISTER DOES NOT EXIST OR IF ONE DOES AND IT CONTAINS ALL ONES (177777) THEN THE SOFTWARE SWITCH REGISTER (LOC. 176) IS USED.

CONTROL:

THIS PROGRAM ALSO SUPPORTS THE DYNAMIC LOADING OF THE SOFTWARE SWITCH REGISTER (LOC. 176) FROM THE TTY. THIS CAN BE ACCOMPLISHED BY DOING THE FOLLOWING:

- 1) TYPE CONTROL G <↑G>: THIS WILL ALLOW THE TTY TO ENTER DATA INTO LOC. 176 AT SELECTED POINTS WITHIN THE PROGRAM.
- 2) THE MACHINE WILL THEN TYPE: SWR=XXXXXXNEW= (XXXXXX IS THE OCTAL CONTENTS OF THE SOFTWARE SWITCH REGISTER.)
- 3) AFTER THE "NEW=" HAS BEEN TYPED THEN THE OPERATOR CAN DO ONE OF THE FOLLOWING AT THE TTY:
 - A) TYPE A NUMBER TO BE LOADED INTO LOC. 176 FOLLOWED BY A <CR>. (ONLY NUMBERS BETWEEN 0-7 WILL BE ACCEPTED AND ONLY 6 NUMBERS WILL BE ALLOWED)
IF A <CR> IS THE FIRST KEY DEPRESSED THE SOFTWARE SWITCH REGISTER CONTENTS WILL NOT BE CHANGED.
 - B) IF A CONTROL U <↑U> IS DEPRESSED THEN THE PROGRAM WILL SEND YOU BACK TO STEP 2.

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5.1.1 WITH ALL SWITCHES DOWN THE PROGRAM WILL PRINT OUT ON ERRORS AND CONTINUE IN TEST. (END OF PASS WILL PRINT ON EACH PASS)

5.1.2 SWITCH SETTINGS ARE:

SW15 (100000) = 1 OR UP ... HALT ON ERROR
SW14 (040000) = 1 OR UP ... SCOPE LOOP
SW13 (020000) = 1 OR UP ... INHIBIT PRINTOUT.
SW12 (010000) = 1 OR UP ... INHIBIT SUB-TEST INTERACTION.
SW11 (004000) = 1 OR UP ... SINGLE PASS
SW10 (002000) = 1 OR UP ... INHIBIT MANUAL INTERVENTION TEST
SW9 (001000) = 1 OR UP ... FOR TS03 TAPE DRIVES
SW0 (000001) = 1 OR UP ... TEST 7 CHANNEL TAPE UNIT.

5.1.3 MANUAL INTERVENTION TEST

THIS TEST WILL REQUIRE THE OPERATOR TO PERFORM CERTAIN OPERATIONS WITH THE TRANSPORT AS DIRECTED BY MESSAGES PRINTED ON THE TELETYPE.

5.2 SUBROUTINE ABSTRACTS

5.2.1 SCOPE

THIS SUBROUTINE CALL IS PLACED BETWEEN EACH SUB-TEST IN THE INSTRUCTION SECTION. IT RECORDS THE STARTING ADDRESS OF EACH SUB-TEST AS IT IS BEING ENTERED. IF A SCOPE LOOP IS REQUESTED, IT WILL JUMP TO THE START OF THE SUB-TEST THAT THE SCOPE LOOP IS REQUESTING.
***CNTL G WILL BE RECOGNIZED IN THIS ROUTINE (REFER TO SECT 5.1)

5.2.2 HLT

THIS SUBROUTINE CALL PRINTS THE ADDRESS THAT TAGS THE FAILING SUBTEST AND THE CONTENTS OF ALL THE TM, A, B-11 REGISTERS.
***THIS ROUTINE RECOGNIZES CNTL G FUNCTION (REFER TO SECT. 5.1)

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6.0 ERRORS

6.1 ERROR PRINTOUT FORMAT

WITH SW13=0 (OR DOWN) THE FOLLOWING PRINTOUT WILL APPEAR ON AN ERROR:

PC	STATUS	COMAND	BYTE	CA	DATA B	READ L	TEMP	CRC CAL
XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX

PC	=	ADDRESS OF TEST WHERE ERROR OCCURED
STATUS	=	CONTENTS OF STATUS REGISTER AT TIME OF ERROR
COMAND	=	CONTENTS OF COMMAND REGISTER AT TIME OF ERROR
BYTE	=	CONTENTS OF BYTE COUNTER AT TIME OF ERROR
CA	=	CONTENTS OF CURRENT MEMORY ADDRESS AT TIME OF ERROR
DATA B	=	CONTENTS OF DATA BUFFER AT TIME OF ERROR
READ L	=	CONTENTS OF READ LINES AT TIME OF ERROR
TEMP	=	CONTENTS OF ADDRESS "TEMP" USED BY SOME TESTS
CRC CAL	=	CRC CHARACTER CALCULATED (USEFUL ONLY FOR CRC TEST)

NOTE THAT NOT ALL OF THE INFORMATION PRINTED IS INTENDED TO BE USEFUL FOR EVERY TYPE OF ERROR. THIS IS SIMPLY A STANDARD ERROR REPORT FOR ALL ERRORS. THE OPERATOR MUST REFER TO THE PROGRAM LISTING AT THE ADDRESS OF THE ERROR FOR A DESCRIPTION OF THE CAUSE OF THE ERROR. IT IS THEN UP TO HIM TO DETERMINE WHICH OF THE INFORMATION IS USEFUL.

6.2 ERROR RECOVERY

WITH SW15=1 OR UP THE PROGRAM WILL HALT ON AN ERROR. DEPRESS CONTINUE SWITCH TO RESTART TEST.

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7. RESTRICTIONS

7.1 STARTING RESTRICTION

BEFORE STARTING PROGRAM THE OPERATOR MUST MAKE CERTAIN THAT THE TRANSPORT HAS DRIVE 0 SELECTED "ON-LINE".

7.2 OPERATIONAL RESTRICTIONS

MANUAL INTERVENTION TEST MUST BE PERFORMED ON EACH PASS THRU THE PROGRAM UNLESS INHIBITED WITH SW10=1 (OR UP). IF UNIT IS A TS03 SW9 MUST BE 1 (OR UP).

8.0 MISCELLANEOUS

8.1 EXECUTION TIME

WITH MANUAL INTERVENTION TEST INHIBITED IT TAKES 1 MINUTE FOR ONE PASS THRU PROGRAM. MANUAL INTERVENTION TEST IS OPERATOR DEPENDENT BUT SHOULD TAKE APPROXIMATELY 2 MINUTES.

9.0 PROGRAM DESCRIPTION

10.0 LISTING

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%
.TITLE TM, A, B-11/TS03 OR TU10,N,W INSTRUCTION TEST(MAINDEC-11-DZTMA-H-D)
;COPYRIGHT 1971,1972,1973,1975, 1976 DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754
;JOHN RODENHISER
;REVISED AUGUST 1972, JIM LACEY
;REVISED MARCH 1973, JIM KAPADIA
;REVISED JANUARY 1975, KEN LIND
;REVISED AUG 1975, R. B. BARNES
;REVISED MAR 1976, S. K. CARPENTER - SUPPORT SOFTWARE SWITCH REGISTER
;REVISED AUG 1976, R. SOLER - INCLUDE TU10W,N
(A) MODIFIED TO SUPPORT SOFTWARE SWITCH REGISTER
(B) ALSO SUPPORTS THE DYNAMIC LOADING OF THE SOFTWARE SWITCH REGISTER FROM TTY
    BY PRESSING A CNTL G
(C) PROGRAM WILL ALLOW THE LOADING OF THE SOFTWARE SWITCH REGISTER AT START
    IF NO HARDWARE SWITCH REGISTER IS AVAILABLE OR IF THE
    HARDWARE SWITCH REGISTER CONTAINS ALL 1'S.
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```
.ENABL ABS,AMA
.MCALL .SACT11
.=0
.WORD 0,0 ;CATCH IMPROPERLY LOADED VECTORS
;TRAP CATCHER 0-776
.=30
TRAP30
340
.=34
SCOPEC
340
EMT=TRAP30
```

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000000 000000 000000
000030 014102
000032 000340
000034 000034
000034 013400
000036 000340
014102
```

H01

TM, A, B-11/TS03 OR TUI0,N,W INSTRUCTION TEST(MAINDEC-11-DZTMA-H-D)
DZTMAH.P11

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256	177776	CC=177776
257	000240	NOP=240
258	104400	SCOPE=TRAP
259	000776	BUFF=776
260	000000	R0=%0
261	000001	R1=%1
262	000002	R2=%2
263	000003	R3=%3
264	000004	R4=%4
265	000005	R5=%5
266	000006	SP=%6
267	000007	PC=%7

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*****  
;THIS PROGRAM SUPPORTS SOFTWARE SWITCH REGISTER WHICH IS LOCATED AT LOC. 176  
;BEFORE STARTING REFER TO SECTION 5.1 IN DOCUMENTIT
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*****  
;
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.SBTTL ACT11 HOOKS
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*****  
;HOOKS REQUIRED BY ACT11
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                $SVPC=.                ;SAVE PC  
                . =46  
                $ENDAD                ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .SEOP  
                . =52                ;;2)SET LOC.52 TO ZERO  
                .WORD 0                ;; RESTORE PC  
                .=$SVPC  
                . =176  
                SWREG: .WORD 2000 ;SOFTWARE SWITCH REGISTER(9TRK=2000/7TRK=2001)  
                . =200  
                JMP START  
                . =1000  
                MTV: 224 ; INTERRUPT VECTOR  
                MTVS: 226 ; INTERRUPT STATUS  
                MTS: 172520 ; STATUS REGISTER  
                MTC: 172522 ; COMMAND REGISTER  
                BC: 172524 ; BYTE COUNT  
                CA: 172526 ; CURRENT MEMORY ADDRESS  
                MTD: 172530 ; DATA BUFFER  
                MTRD: 172532 ; READ LINES  
                TPB: 177566  
                TPS: 177564  
                SWR: 177570  
                TKS: 177560  
                TKB: 177562  
                TEMP: 0  
                ICOUNT: 0  
                PCNTR: 0 ;PASS COUNTER
```

001040

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314 ;PROGRAM START*****
315 001040 012706 000776 START: MOV #BUFF,SP
316 001044 012737 177570 001024 MOV #177570,SWR ;PRESET TO CONSOLE SWITCHES
317 001052 005037 001036 CLR PCNTR ;CLEAR PASS COUNTER
318 001056 122737 000004 000041 CMPB #4,@#41 ;SEE IF LOAD MEDIUM
319 001064 001006 BNE SUSWR ;IF NOT: BR
320 001066 012702 017145 MOV #MSG21,R2
321 001072 004737 013456 JSR PC, TOP ;PRINT NO TEST
322 001076 000137 012666 JMP TSTEND ;END TEST
323 001102 013746 000006 SUSWR: MOV @#6,-(SP) ;SAVE VECTORS
324 001106 013746 000004 MOV @#4,-(SP)
325 001112 012737 001140 000004 MOV #1$,@#4 ;SET UP FOR TIMEOUT
326 001120 022777 177777 177676 CMP #-1,@SWR ;REFERENCE HARDWARE SWITCH REGISTER
327 001126 001405 BEQ 2$
328 001130 005737 000042 TST @#42
329 001134 001002 BNE 2$ ;IF CHAIN MODE: BR
330 001136 000404 BR 3$
331 001140 022626 1$: CMP (SP)+,(SP)+ ;ADJUST STACK
332 001142 012737 000176 001024 2$: MOV #SWREG,SWR ;POINT TO SOFTWARE SWITCH REG
333 001150 012637 000004 3$: MOV (SP)+,@#4 ;RESTORE VECTORS
334 001154 012637 000006 MOV (SP)+,@#6
335 001160 012702 014200 MOV #MSG0,R2
336 001164 004737 013456 JSR PC, TOP
337 001170 005002 CLR R2
338 001172 005302 4$: DEC R2 ;DELAY
339 001174 001376 BNE 4$
340 001176 005737 000042 TST @#42 ;SEE IF CHAIN MODE
341 001202 001006 BNE BEGIN ;IF SO: BR
342 001204 012702 014270 MOV #MSG01,R2
343 001210 004737 013456 JSR PC, TOP ;PRINT 7 TRK SELECT
344 001214 000000 HALT
345 001216 104002 CKSWR ;CHECK FOR A CNTL G
346 001220 012706 000776 BEGIN: MOV #BUFF,SP ;SET UP STACK FOR SCOPE LOOPS
347 001224 012737 001220 013454 MOV #BEGIN,RETURN ;SET UP RESTART OF PROGRAM
348 001232 005037 013174 CLR PRINT1 ;INITIALIZE ERROR PRINTOUT HEADING
349 001236 005037 011240 CLR CRCWRT ;INITIALIZE CRC CALCULATED FOR PRINTOUT
350 001242 005037 000006 CLR 6 ;INITIALIZE ERROR TRAP VECTOR
351
352
353
354 ;*****
355 ;TEST ALL BITS OF COMMAND REGISTER (EXCEPT CU READY, BIT 7) TO BE CLEARED BY INIT
356 001246 104400 SCOPE
357 001250 000005 RESET
358 001252 032777 177577 177526 BIT #177577,@MTC
359 001260 001401 BEQ .+4
360 001262 104000 HLT ;ERROR, INIT DIDN'T CLEAR COMMAND REGISTER
361
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363 ;*****
364 ;TEST BITS 7-13, 15 OF STATUS REGISTER TO BE CLEARED AFTER INIT
365 001264 104400 SCOPE
366 001266 000005 RESET
367 001270 032777 137600 177506 BIT #137600,@MTS

```

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TM A, S-11/TS03 OR TU10,N.W INSTRUCTION TEST(MAINDEC-11-DZTMA-H-D) MACY11 27(732) 04-NOV-76 12:11 PAGE 11
DZTMAH.P11 TEST BITS 7-13, 15 OF STATUS REGISTER TO BE CLEARED AFTER INIT

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368 001276 001401          BEQ      .+4
369 001300 104000          HLT
                                     ;ERROR, INIT DIDN'T CLEAR PROPER BITS IN STATUS REGISTER
370
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372          ;*****
373          ;TEST INIT TO CLEAR BYTE RECORD COUNT
374 001302 104400          SCOPE
375 001304 000005          RESET
376 001306 005777 177476  TST      @BC
377 001312 001401          BEQ      .+4
378 001314 104000          HLT
                                     ;ERROR, INIT DIDN'T CLEAR BYTE COUNT
379
380
381          ;*****
382          ;TEST INIT TO CLEAR CURRENT MEMORY ADDRESS REGISTER
383 001316 104400          SCOPE
384 001320 000005          RESET
385 001322 005777 177464  TST      @CA
386 001326 001401          BEQ      .+4
387 001330 104000          HLT
                                     ;ERROR, INIT DIDN'T CLEAR CURRENT MEMORY ADDRESS REGISTE
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390          ;*****
391          ;TEST INIT TO CLEAR DATA BUFFER
392 001332 104400          SCOPE
393 001334 000005          RESET
394 001336 005777 177452  TST      @MTD
395 001342 001401          BEQ      .+4
396 001344 104000          HLT
                                     ;ERROR, INIT DIDN'T CLEAR DATA BUFFER
397
398
399          ;*****
400          ;TEST CU READY (BIT 7 COMMAND REGISTER) TO BE SET BY INIT.
401 001346 104400          SCOPE
402 001350 000005          RESET
403 001352 105777 177430  TSTB    @MTC
404 001356 100401          BMI      .+4
405 001360 104000          HLT
                                     ;ERROR, INIT DIDN'T SET CU READY
406
407
408          ;*****
409          ;TEST BIT 14 OF TU10 READ LINES TO BE CLEARED BY INIT
410 001362 104400          SCOPE
411 001364 000005          RESET
412 001366 032777 040000 177422  BIT     #40000,@MTRD
413 001374 001401          BEQ      .+4
414 001376 104000          HLT
                                     ;ERROR, INIT FAILED TO CLEAR BIT 14 OF MTRD
415
416
417          ;*****
418          ;TEST COMMAND REGISTER (EXCEPT CU READY, BIT 7) TO BE CLEARED BY POWER CLEAR (BIT 12)
419 001400 104400          SCOPE
420 001402 052777 010000 177376  BIS     #10000,@MTC          ;POWER CLEAR
421 001410 032777 177577 177370  BIT     #177577,@MTC
422 001416 001401          BEQ      .+4
423 001420 104000          HLT
                                     ;ERROR, POWER CLEAR DIDN'T CLEAR COMMAND REGISTER
```

L01

TM.A, 6-11/TS03
DZTMAH.P11

OR TU10,N,W INSTRUCTION TEST(MAINDEC-11-DZTMA-H-D)
TEST COMMAND REGISTER (EXCEPT CU READY, BIT 7) TO BE CLEARED BY POWER CLEAR (BIT 12)

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429 001422 104400
430 001424 052777 010000 177354
431 001432 032777 137600 177344
432 001440 001401
433 001442 104000
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438 001444 104400
439 001446 052777 010000 177332
440 001454 005777 177330
441 001460 001401
442 001462 104000
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447 001464 104400
448 001466 052777 010000 177312
449 001474 005777 177312
450 001500 001401
451 001502 104000
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456 001504 104400
457 001506 052777 010000 177272
458 001514 005777 177274
459 001520 001401
460 001522 104000
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463
464
465 001524 104400
466 001526 052777 010000 177252
467 001534 105777 177246
468 001540 100401
469 001542 104000
470
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472
473
474 001544 104400
475 001546 052777 010000 177232
476 001554 032777 040000 177234
477 001562 001401
478 001564 104000
479

```

;*****
;TEST BITS 7-13, 15 OF STATUS REGISTER TO BE CLEARED BY POWER CLEAR (BIT12)
SCOPE
BIS #10000,AMTC ;POWER CLEAR
BIT #137600,AMTS
BEQ .+4
HLT ;ERROR, POWER CLEAR DIDN'T CLEAR PROPER BITS IN STATUS
;*****
;TEST POWER CLEAR (BIT 12) TO CLEAR BYTE RECORD COUNT
SCOPE
BIS #10000,AMTC ;POWER CLEAR
TST ABC
BEQ .+4
HLT ;ERROR, POWER CLEAR DIDN'T CLEAR BYTE COUNT
;*****
;TEST POWER CLEAR (BIT 12) TO CLEAR CURRENT MEMORY ADDRESS REGISTER
SCOPE
BIS #10000,AMTC ;POWER CLEAR
TST CA
BEQ .+4
HLT ;ERROR, POWER CLEAR DIDN'T CLEAR CURRENT ADDRESS REGISTE
;*****
;TEST POWER CLEAR (BIT 12) TO CLEAR DATA BUFFER
SCOPE
BIS #10000,AMTC ;POWER CLEAR
TST MTD
BEQ .+4
HLT ;ERROR, POWER CLEAR DIDN'T CLEAR DATA BUFFER
;*****
;TEST CU READY (BIT 7 COMMAND REGISTER) TO BE SET BY POWER CLEAR
SCOPE
BIS #10000,AMTC ;POWER CLEAR
TSTB AMTC
BMI .+4
HLT ;ERROR, POWER CLEAR DIDN'T SET CU READY
;*****
;TEST BIT 14 OF TU10 READ LINES TO BE CLEARED BY POWER CLEAR (BIT12)
SCOPE
BIS #10000,AMTC ;POWER CLEAR
BIT #40000,AMTRD
BEQ .+4
HLT ;ERROR, POWER CLEAR FAILED TO CLEAR BIT14 OF MTRD

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TM A, S-11/TS03
DZTMAH.P11

OR TUIO.N.W INSTRUCTION TEST(MAINDEC-11-DZTMA-H-D)
TEST FUNCTION BITS (1,2,3) OF COMMAND REGISTER CAN BE SET

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483 001566 104400
484 001570 012777 000016 177210
485 001576 122777 000216 177202
486 001604 001401
487 001606 104000
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492 001610 104400
493 001612 052777 000016 177166
494 001620 042777 000016 177160
495 001626 032777 000016 177152
496 001634 001401
497 001636 104000
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503 001640 104400
504 001642 012777 000002 177136
505 001650 122777 000202 177130
506 001656 001401
507 001660 104000
508 001662 104400
509 001664 012777 000004 177114
510 001672 122777 000204 177106
511 001700 001401
512 001702 104000
513 001704 104400
514 001706 012777 000006 177072
515 001714 122777 000206 177064
516 001722 001401
517 001724 104000
518 001726 104400
519 001730 012777 000010 177050
520 001736 122777 000210 177042
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522 001746 104000
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525 001760 122777 000212 177020
526 001766 001401
527 001770 104000
528 001772 104400
529 001774 012777 000014 177004
530 002002 122777 000214 176776
531 002010 001401
532 002012 104000
533 002014 104400
534 002016 012777 000016 176762
535 002024 122777 000216 176754

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;*****
;TEST FUNCTION BITS (1,2,3) OF COMMAND REGISTER CAN BE SET
SCOPE
MOV #16,DMTC
CMPB #216,DMTC
BEQ .+4
HLT ;ERROR, CU READY AND ALL FUNCTION BITS NOT SET

;*****
;TEST FUNCTION BITS (1,2,3) OF COMMAND REGISTER CAN BE CLEARED
SCOPE
BIS #16,DMTC
BIC #16,DMTC
BIT #16,DMTC
BEQ .+4
HLT ;ERROR, ALL FUNCTION BITS NOT CLEARED

;*****
;TEST FUNCTIONS BITS (1,2,3,) OF COMMAND REGISTER CAN BE SET AND CLEARED INDIVIDUALLY
SCOPE
MOV #2,DMTC
CMPB #202,DMTC
BEQ .+4
HLT ;ERROR, FUNCTION NOT =001 (READ)
SCOPE
MOV #4,DMTC
CMPB #204,DMTC
BEQ .+4
HLT ;ERROR, FUNCTION NOT =010 (WRITE)
SCOPE
MOV #6,DMTC
CMPB #206,DMTC
BEQ .+4
HLT ;ERROR, FUNCTION NOT =011 (WRITE EOF)
SCOPE
MOV #10,DMTC
CMPB #210,DMTC
BEQ .+4
HLT ;ERROR, FUNCTION NOT =100 (SPACE FORWARD)
SCOPE
MOV #12,DMTC
CMPB #212,DMTC
BEQ .+4
HLT ;ERROR, FUNCTION NOT =101 (SPACE REVERSE)
SCOPE
MOV #14,DMTC
CMPB #214,DMTC
BEQ .+4
HLT ;ERROR, FUNCTION NOT =110 (WRITE XIRG)
SCOPE
MOV #16,DMTC
CMPB #216,DMTC

NO1

TM.A. B-11/TS03
DZTMAH.P11

OR TU10,N.W INSTRUCTION TEST(MAINDEC-11-DZTMA-H-D)
TEST FUNCTIONS BITS (1,2,3,) OF COMMAND REGISTER CAN BE

MACY11 27(732) 04-NOV-76 12:11 PAGE 14
SET AND CLEARED INDIVIDUALLY

```

536 002032 001401          BEQ      .+4          ;ERROR, FUNCTION NOT =111 (REWIND)
537 002034 104000          HLT
538
539
540
541 ;*****
542 ;TEST ADDRESS BITS (4,5) OF COMMAND REGISTER CAN BE SET
543 002036 104400          SCOPE
544 002040 012777 000060 176740      MOV      #60,AMTC
545 002046 122777 000260 176732      CMPB     #260,AMTC
546 002054 001401          BEQ      .+4
547 002056 104000          HLT          ;ERROR, CU READY AND ADDRESS BITS NOT SET
548
549
550 ;*****
551 ;TEST ADDRESS BITS (4,5) OF COMMAND REGISTER CAN BE CLEARED
552 002060 104400          SCOPE
553 002062 052777 000060 176716      BIS      #60,AMTC
554 002070 042777 000060 176710      BIC      #60,AMTC
555 002076 032777 000060 176702      BIT      #60,AMTC
556 002104 001401          BEQ      .+4
557 002106 104000          HLT          ;ERROR, ADDRESS BITS NOT CLEARED
558
559
560 ;*****
561 ;CHECK BYTE LOADING OF COMMAND REGISTER
562 ;THIS 1ST SECTION WILL TEST THAT THE FUNCTION BITS CAN BE BYTE LOADED
563 002110 104400          SCOPE
564 002112 012700 000002      CHKBYTE: MOV      #2,R0          ;INITIALIZE R0
565 002116 005077 176664      CLR      AMTC          ;CLEAR OUT COMMAND REGISTER
566 002122 110077 176660      1$:  MOVB     RO,AMTC      ;LOAD LOWER BYTE OF COMMAND REGISTER
567 002126 017701 176654      MOV      AMTC,R1      ;GET THE CONTENTS OF THE COMMAND
568                                ;REGISTER JUST LOADED
569 002132 042701 000200      BIC      #200,R1      ;MASK OUT READY BIT FOR COMPARE
570 002136 020100          CMP      R1,R0          ;DID IT LOAD PROPERLY?
571 002140 001416          BEQ      2$            ;BRANCH IF YES
572 002142 010037 002332      MOV      RO,#EXPECTED ;STORE WHAT SHOULD HAVE APPEARED IN
573                                ;THE COMMAND REGISTER
574 002146 062737 000200 002332      ADD      #200,#EXPECTED ;ADD A READY BIT TO WHAT WAS BYTE LOADED
575 002154 017737 176626 002334      MOV      AMTC,#RECEIVED ;STORE WHAT DID APPEAR IN THE
576                                ;COMMAND REGISTER
577 002162 012702 016467      MOV      #MSG14,R2     ;INDICATE INCORRECT BYTE LOAD
578 002166 004737 013456      JSR      PC,TOP
579 002172 104000          HLT          ;PROGRAM PC INDICATOR
580                                ;AT THIS POINT LOCATIONS 6$ AND 7$ BELOW WILL CONTAIN THE GOOD
581                                ;AND BAD DATA, RESPECTIVELY
582 002174 000410          BR      3$            ;GO TO START LOADING THE UPPER BYTE OF
583                                ;THE COMMAND REGISTER
584 002176 062700 000002      2$:  ADD      #2,R0          ;STEP UP VALUE TO BE BYTE LOADED
585 002202 022700 000016      CMP      #16,R0       ;OK TO LOAD IT?
586 002206 100403          BMI      3$            ;BRANCH IF NO
587 002210 005077 176572      CLR      AMTC         ;CLEAR OUT THE COMMAND REGISTER
588 002214 000742          BR      1$            ;GO BACK TO LOAD NEW VALUE
589
590 ;THIS 2ND SECTION WILL TEST THAT ALL UPPER BYTE DATA COMBINATIONS
591 ;CAN BE BYTE LOADED EXCEPT FOR THOSE REQUIRING BIT12 (POWER CLEAR)
;TO BE SET

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602 002216 005000 35: CLR R0 ; INITIALIZE R0
603 002220 005077 176562 CLR QMTC ; CLEAR OUT COMMAND REGISTER
604 002224 010003 45: MOV R0,R3 ; SAVE INITIAL VALUE TO BE BYTE LOADED
605 002226 042700 000020 BIC #20,R0 ; MASK OUT POWER CLEAR BIT OF BYTE
606 ; TO BE LOADED
607 002232 110037 172523 MOVB R0,#172522+1 ; LOAD UPPER BYTE OF COMMAND REGISTER
608 002236 000300 SWAB R0 ; MOVE LOWER BYTE INTO UPPER BYTE
609 ; POSITION FOR CHECKING
610 002240 017701 176542 MOV QMTC,R1 ; GET THE CONTENTS OF THE COMMAND
611 002244 042701 000200 BIC #200,R1 ; REGISTER JUST LOADED
612 002250 020100 CMP R1,R0 ; MASK OUT READY BIT FOR COMPARE
613 002252 001417 SEQ SS ; DID IT LOAD PROPERLY?
614 002254 010037 002336 MOV R0,#GOODDATA ; BRANCH IF YES
615 ; STORE WHAT SHOULD HAVE APPEARED IN THE
616 ; COMMAND REGISTER
617 002260 062737 000200 002336 ADD #200,#GOODDATA ; ADD A READY BIT TO WHAT WAS BYTE LOADED
618 002266 017737 176514 002340 MOV QMTC,#BADDATA ; STORE WHAT DID APPEAR IN THE COMMAND
619 ; REGISTER
620 002274 012702 016600 MOV #MSG15,R2 ; INDICATE INCORRECT BYTE LOAD
621 002300 004737 013456 JSR PC, TOP
622 002304 104000 HLT ; PROGRAM PC INDICATOR
623 ; AT THIS POINT LOCATIONS 10$ AND 11$ BELOW WILL CONTAIN THE GOOD
624 ; AND BAD DATA, RESPECTIVELY
625 002306 000137 002342 JMP #BYTEOPEND ; ALL DONE
626 002312 010300 55: MOV R3,R0 ; OBTAIN INITIAL VALUE (LESS MASKING OF
627 ; POWER CLEAR BIT) THAT WAS TO BE BYTE
628 ; LOADED
629 002314 005200 INC R0 ; STEP UP VALUE TO BE BYTE LOADED
630 002316 022700 000157 CMP #157,R0 ; OK TO LOAD IT?
631 002322 100407 BMI BYTEOPEND ; BRANCH IF NO
632 002324 005077 176456 CLR QMTC ; CLEAR OUT THE COMMAND REGISTER
633 002330 000735 BR 45 ; GO BACK TO LOAD NEW VALUE
634 ; THE FOLLOWING ARE THE GOOD AND BAD DATA HOLDERS FOR THE LOWER
635 ; AND UPPER BYTE LOAD TESTS PERFORMED ABOVE
636 002332 65: EXPECTED: .WORD 0 ; HOLDS VALUE THAT SHOULD HAVE
637 002332 000000 ; APPEARED IN THE COMMAND REGISTER
638 ; ON LOW BYTE LOADING
639 002334 75: RECEIVED: .WORD 0 ; HOLDS VALUE THAT DID APPEAR IN
640 002334 000000 ; THE COMMAND REGISTER ON LOW
641 ; BYTE LOADING
642 002336 105: GOODDATA: .WORD 0 ; HOLDS VALUE THAT SHOULD HAVE
643 002336 000000 ; APPEARED IN THE COMMAND REGISTER
644 ; ON UPPER BYTE LOADING
645 002340 115: BADDATA: .WORD 0 ; HOLDS VALUE THAT DID APPEAR IN
646 002340 000000 ; THE COMMAND REGISTER ON UPPER
647 002342 005077 176440 BYTEOPEND: CLR QMTC ; CLEAR OUT COMMAND REGISTER BEFORE GOING ON

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;TEST ADDRESS BITS (4,5,6) OF COMMAND REGISTER CAN BE SET AND CLEARED INDIVIDUALLY

648	002346	104400			SCOPE			
649	002350	012777	000020	176430	MOV	#20,AMTC		
650	002356	122777	000220	176422	CMPB	#220,AMTC		
651	002364	001401			BEQ	.+4		
652	002366	104000			HLT			;ERROR ADDRESS BITS NOT =01
653	002370	104400			SCOPE			
654	002372	012777	000040	176406	MOV	#40,AMTC		
655	002400	122777	000240	176400	CMPB	#240,AMTC		
656	002406	001401			BEQ	.+4		
657	002410	104000			HLT			;ERROR, ADDRESS BITS NOT =10
658	002412	104400			SCOPE			
659	002414	012777	000060	176364	MOV	#60,AMTC		
660	002422	122777	000260	176356	CMPB	#260,AMTC		
661	002430	001401			BEQ	.+4		
662	002432	104000			HLT			;ERROR, ADDRESS BITS NOT =11
663								
664								
665								
666								
667								
668	002434	104400						
669	002436	012777	003400	176342	SCOPE			
670	002444	022777	003600	176334	MOV	#3400,AMTC		
671	002452	001401			CMP	#3600,AMTC		
672	002454	104000			BEQ	.+4		
673					HLT			;ERROR, CU READY AND ALL UNIT SELECT BITS NOT SET
674								
675								
676								
677	002456	104400						
678	002460	052777	003400	176320	SCOPE			
679	002466	042777	003400	176312	BIS	#3400,AMTC		
680	002474	032777	003400	176304	BIC	#3400,AMTC		
681	002502	001401			BIT	#3400,AMTC		
682	002504	104000			BEQ	.+4		
683					HLT			;ERROR, UNIT SELECT BITS NOT CLEARED
684								
685								
686								
687	002506	104400						
688	002510	012777	000400	176270	SCOPE			
689	002516	022777	000600	176262	MOV	#400,AMTC		
690	002524	001401			CMP	#600,AMTC		
691	002526	104000			BEQ	.+4		
692	002530	104400			HLT			;ERROR, UNIT SELECT NOT =001
693	002532	012777	001000	176246	SCOPE			
694	002540	022777	001200	176240	MOV	#1000,AMTC		
695	002546	001401			CMP	#1200,AMTC		
696	002550	104000			BEQ	.+4		
697	002552	104400			HLT			;ERROR, UNIT SELECT NOT =010
698	002554	012777	001400	176224	SCOPE			
699	002562	022777	001600	176216	MOV	#1400,AMTC		
700	002570	001401			CMP	#1600,AMTC		
701	002572	104000			BEQ	.+4		
702	002574	104400			HLT			;ERROR, UNIT SELECT NOT =011
703	002576	012777	002000	176202	SCOPE			
					MOV	#2000,AMTC		


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704 002604 022777 002200 176174      CMP      #2200,3MTC
705 002612 001401                      BEQ      .+4
706 002614 104000                      HLT
                                     ;ERROR, UNIT SELECT NOT =100
707
708
709 002616 104400                      SCOPE
710 002620 012777 002400 176160      MOV      #2400,3MTC
711 002626 022777 002600 176152      CMP      #2600,3MTC
712 002634 001401                      BEQ      .+4
713 002636 104000                      HLT
                                     ;ERROR, UNIT SELECT NOT =101
714 002640 104400                      SCOPE
715 002642 012777 003000 176136      MOV      #3000,3MTC
716 002650 022777 003200 176130      CMP      #3200,3MTC
717 002656 001401                      BEQ      .+4
718 002660 104000                      HLT
                                     ;ERROR, UNIT SELECT NOT =110
719 002662 104400                      SCOPE
720 002664 012777 003400 176114      MOV      #3400,3MTC
721 002672 022777 003600 176106      CMP      #3600,3MTC
722 002700 001401                      BEQ      .+4
723 002702 104000                      HLT
                                     ;ERROR, UNIT SELECT NOT =111
724
725
726
727
728                                     ;*****
728                                     ;TEST PARITY BIT (BIT 11) CAN BE SET
729 002704 104400                      SCOPE
730 002706 052777 004000 176072      BIS      #4000,3MTC
731 002714 032777 004000 176064      BIT      #4000,3MTC
732 002722 001001                      BNE     .+4
733 002724 104000                      HLT
                                     ;ERROR, PARITY NOT SET
734
735
736                                     ;*****
737                                     ;TEST PARITY BIT (BIT 11) CAN BE CLEARED
738 002726 104400                      SCOPE
739 002730 052777 004000 176050      BIS      #4000,3MTC
740 002736 042777 004000 176042      BIC      #4000,3MTC
741 002744 032777 004000 176034      BIT      #4000,3MTC
742 002752 001401                      BEQ      .+4
743 002754 104000                      HLT
                                     ;ERROR, PARITY BIT NOT CLEARED
744
745
746                                     ;*****
747                                     ;TEST DENSITY BITS (13,14) OF COMMAND REGISTER CAN BE SET
748 002756 104400                      SCOPE
749 002760 012777 060000 176020      MOV      #60000,3MTC
750 002766 022777 060200 176012      CMP      #60200,3MTC
751 002774 001401                      BEQ      .+4
752 002776 104000                      HLT
                                     ;ERROR, CU READY AND DENSITY BITS NOT SET
753
754
755
756                                     ;*****
757                                     ;TEST DENSITY BITS (13,14) OF COMMAND REGISTER CAN BE CLEARED
758 003000 104400                      SCOPE
759 003002 052777 060000 175776      BIS      #60000,3MTC

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E02

760 003010 042777 060000 175770 BIC #60000, @MTC
761 003016 032777 060000 175762 BIT #60000, @MTC
762 003024 001401 BEQ .+4
763 003026 104000 HLT

;TEST DENSITY BITS (13,14) OF COMMAND REGISTER CAN BE SET AND CLEARED INDIVIDUALLY

770 003030 104400 SCOPE
771 003032 012777 020000 175746 MOV #20000, @MTC
772 003040 022777 020200 175740 CMP #20200, @MTC
773 003046 001401 BEQ .+4
774 003050 104000 HLT ;ERROR, DENSITY NOT =01
775 003052 104400 SCOPE
776 003054 012777 040000 175724 MOV #40000, @MTC
777 003062 022777 040200 175716 CMP #40200, @MTC
778 003070 001401 BEQ .+4
779 003072 104000 HLT ;ERROR, DENSITY NOT =10
780 003074 104400 SCOPE
781 003076 012777 060000 175702 MOV #60000, @MTC
782 003104 022777 060200 175674 CMP #60200, @MTC
783 003112 001401 BEQ .+4
784 003114 104000 HLT ;ERROR DENSITY NOT =11

;TEST ALL BITS OF BYTE COUNT TO ACCEPT COUNT PATTERN

789 003116 104400 SCOPE
790 003120 005037 001034 CLR ICOUNT
791 003124 005037 001032 CLR TEMP
792 003130 013777 001032 175652 TBC: MOV TEMP, @BC
793 003136 023777 001032 175644 CMP TEMP, @BC
794 003144 001401 BEQ .+4
795 003146 104000 HLT ;ERROR, BYTE COUNT NOT =TEMP
796 003150 005237 001032 INC TEMP
797 003154 001365 BNE TBC

;TEST ALL BITS OF CURRENT MEMORY ADDRESS REGISTER TO ACCEPT COUNT PATTERN

802 003156 104400 SCOPE
803 003160 005037 001034 CLR ICOUNT
804 003164 005037 001032 CLR TEMP
805 003170 013777 001032 175614 TMA: MOV TEMP, @CA
806 003176 023777 001032 175606 CMP TEMP, @CA
807 003204 001401 BEQ .+4
808 003206 104000 HLT ;ERROR, CA NOT = TEMP
809 003210 005237 001032 INC TEMP
810 003214 001365 BNE TMA

;TEST BITS 0-7 OF DATA BUFFER TO ACCEPT COUNT PATTERN

815 003216 104400 SCOPE

F02

TM A B-11/TS03
DZTMAH.P11

OR TU10 N,W INSTRUCTION TEST(MAINDEC-11-DZTMA-H-D)
TEST BITS 0-7 OF DATA BUFFER TO ACCEPT COUNT PATTERN

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816	003220	005037	001034			CLR	ICOUNT	
817	003224	005037	001032			CLR	TEMP	
818	003230	113777	001032	175556	TDB:	MOV B	TEMP, 2MTD	
819	003236	123777	001032	175550		CMP B	TEMP, 2MTD	
820	003244	001401				BEQ	.+4	
821	003246	104000				HLT		;ERROR, DATA BUFFER NOT=TEMP
822	003250	105237	001032			INCB	TEMP	
823	003254	001365				BNE	TDB	

824								
825								
826								
827								
828								
829								

;TEST BIT 14 OF MTRD CAN BE SET AND CLEARED

830	003256	104400				SCOPE		
831	003260	052777	040000	175530		BIS	#40000, 2MTRD	
832	003266	032777	040000	175522		BIT	#40000, 2MTRD	
833	003274	001001				BNE	.+4	
834	003276	104000				HLT		;ERROR, BIT 14 OF MTRD NOT=1
835	003300	042777	040000	175510		BIC	#40000, 2MTRD	
836	003306	032777	040000	175502		BIT	#40000, 2MTRD	
837	003314	001401				BEQ	.+4	
838	003316	104000				HLT		;ERROR, BIT 14 OF MTRD NOT=0

839								
840								
841								
842								

;TEST FOR TAPE UNIT READY (BIT 0) SET

843	003320	104400				SCOPE		
844	003322	042777	003400	175456		BIC	#3400, 2MTC	;SELECT DRIVE 0
845	003330	032777	000001	175446		BIT	#1, 2MTC	
846	003336	001001				BNE	.+4	
847	003340	104000				HLT		;ERROR TU READY NOT SET

848								
849								
850								
851								

;TEST FOR REWIND STATUS (BIT 1) CLEARED

852	003342	104400				SCOPE		
853	003344	032777	000002	175432		BIT	#2, 2MTC	
854	003352	001401				BEQ	.+4	
855	003354	104000				HLT		;ERROR, REWIND STATUS IS SET

856								
857								
858								
859								

;TEST FOR WRITE LOCK (BIT 2) CLEARED

860	003356	104400				SCOPE		
861	003360	032777	000004	175416		BIT	#4, 2MTC	
862	003366	001401				BEQ	.+4	
863	003370	104000				HLT		;ERROR, WRITE LOCK IS SET

864								
865								
866								
867								

;TEST FOR SETTLEDOWN (BIT 3) CLEARED

868	003372	104400				SCOPE		
869	003374	032777	000010	175402		BIT	#10, 2MTC	
870	003402	001401				BEQ	.+4	
871	003404	104000				HLT		;ERROR, SETTLEDOWN IS SET

```

872
873
874
875
876 003406 132777 000001 175410
877 003414 001007
878 003416 104400
879 003420 032777 000020 175356
880 003426 001401
881 003430 104000
882 003432 000417
883
884
885
886
887 003434 104400
888 003436 032777 000020 175340
889 003444 001001
890 003446 104000
891
892
893
894
895 003450 104400
896 003452 042777 003400 175326
897 003460 032777 000040 175316
898 003466 001001
899 003470 104000
900
901
902
903
904 003472 104400
905 003474 032777 000100 175302
906 003502 001001
907 003504 104000
908
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917 003506 104400
918 003510 005077 175272
919 003514 105777 175266
920 003520 100375
921 003522 006077 175256
922 003526 103375
923 003530 032777 000040 175246
924 003536 001014
925 003540 005737 000042
926 003544 001410
927 003546 012777 060017 175232

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;*****
;TEST FOR 7 CHANNEL (BIT 4) CLEARED IF 9 CHANNEL SELECTED
BITB #1,ASWR ;IS SWO=1
BNE T7CH ;YES SKIP 9 CHANNEL TEST
SCOPE
BIT #20,AMTS
BEQ .+4
HLT ;ERROR, 7 CHANNEL SET WITH 9 TRACK DOWN SELECTED
BR TSR ;SKIP 7 CHANNEL TEST

;*****
;TEST FOR 7 CHANNEL (BIT 4) SET IF 7 CHANNEL SELECTED
T7CH: SCOPE
BIT #20,AMTS
BNE .+4
HLT ;ERROR, 7 CHANNEL NOT SET

;*****
;TEST FOR BEGINNING OF TAPE (BIT 5) SET
SCOPE
BIC #3400,AMTC ;SELECT DRIVE 0
BIT #40,AMTS
BNE .+4
HLT ;ERROR, BOT NOT SET (DRIVE SHOULD BE AT BOT)

;*****
;TEST FOR SELECT/REMOTE (BIT 6) SET
TSR: SCOPE
BIT #100,AMTS
BNE .+4
HLT ;ERROR, SELECT/REMOTE NOT SET

;*****
;WRITE 1 BYTE RECORD FROM BOT
;BOT (BIT 5) SHOULD CLEAR, CU READY SHOULD SET, BYTE COUNT AND
;CURRENT ADDRESS SHOULD INCREMENT
SCOPE
CLR AMTC ;SELECT UNIT 0
TSTB AMTC
BPL -4 ;WAIT FOR CU READY
ROR AMTS
BCC -4 ;WAIT FOR TU READY
BIT #40,AMTS ;SEE IF AT BOT
BNE 3$ ;IF SO: BR
TST AM42 ;SEE IF CHAIN MODE
BEQ 2$ ;IF NOT: BR
MOV #60017,AMTC ;START REWIND

```

```

928 003554 032777 000001 175222 1$: BIT #1, @MTS ;SEE IF TUR
929 003562 001774 BEQ 1$ ;IF NOT:AWAIT TUR
930 003564 000401 BR 3$
931 003566 104000 2$: HLT ;ERROR, DRIVE 0 NOT AT BOT
932 003570 012777 177777 175212 3$: MOV #-1, @BC ;SET BYTE COUNT=-1
933 003576 012777 017230 175206 MOV #WBUF, @CA ;INIT CURRENT MEMORY ADDRESS
934 003604 005000 CLR RO ;INIT DELAY COUNTER
935 003606 012701 000020 MOV #20, R1
936 003612 012777 060005 175166 MOV #60005, @MTC ;WRITE, 800 BPI, GO
937 003620 005200 INC RO
938 003622 001376 BNE -2 ;DELAY LONG ENOUGH TO MOVE OFF BOT
939 003624 005301 DEC R1
940 003626 001374 BNE -6
941 003630 032777 000040 175146 BIT #40, @MTS ;TEST FOR BOT
942 003636 001401 BEQ .+4
943 003640 104000 HLT ;ERROR, BOT (BIT 5) NOT CLEARED
944 003642 105777 175140 TSTB @MTC ;TEST FOR CU READY
945 003646 100401 BMI .+4
946 003650 104000 HLT ;ERROR, CU READY NOT SET AFTER WRITE FINISHED
947 003652 005777 175132 TST @BC ;TEST BYTE COUNT TO = 0
948 003656 001401 BEQ .+4
949 003660 104000 HLT ;ERROR, BYTE COUNT DIDN'T INCREMENT
950 003662 022777 017231 175122 CMP #WBUF+1, @CA ;TEST CURRENT MEMORY ADDRESS TO COUNT
951 003670 001401 BEQ .+4
952 003672 104000 HLT ;ERROR, CURRENT MEMORY ADDRESS DIDN'T INCREMENT TO 0
953
954
955 ;*****
956 ;TEST WRITE A 3 BYTE RECORD
957 003674 104400 SCOPE
958 003676 012777 177775 175104 MOV #-3, @BC ;SET BYTE COUNT = -3
959 003704 012777 017230 175100 MOV #WBUF, @CA ;INIT CURRENT MEMORY ADDRESS
960 003712 005000 CLR RO ;INIT DELAY COUNTER
961 003714 005077 175066 CLR @MTC ;SELECT UNIT 0
962 003720 105777 175062 TSTB @MTC
963 003724 100375 BPL -4 ;WAIT FOR CU READY
964 003726 006077 175052 ROR @MTS
965 003732 103375 BCC -4 ;WAIT FOR TU READY
966 003734 005000 CLR RO
967 003736 012777 060005 175042 MOV #60005, @MTC ;WRITE, 800BPI, GO
968 003744 105777 175036 TSTB @MTC
969 003750 100403 BMI .+10
970 003752 005200 INC RO
971 003754 001373 BNE -10
972 003756 104000 HLT ;ERROR, CU READY DIDN'T SET AFTER 3 BYTE RECORD
973
974
975 003760 022777 017233 175024 CMP #WBUF+3, @CA
976 003766 001401 BEQ .+4
977 003770 104000 HLT ;ERROR, CURRENT MEMORY ADDRESS DIDN'T INCREMENT
978 003772 005777 175012 TST @BC
979 003776 001401 BEQ .+4
980 004000 104000 HLT ;ERROR, BYTE COUNT DIDN'T INCREMENT TO 0
981 004002 005777 175000 TST @MTC
982 004006 100001 BPL .+4
983 004010 104000 HLT ;ERROR, BIT 15 SET IN COMMAND REGISTER

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988
989 004012 104400
990 004014 012777 177775 174766
991 004022 012777 017230 174762
992 004030 105777 174752
993 004034 100375
994 004036 012777 060005 174742
995 004044 105777 174736
996 004050 100375
997 004052 006077 174726
998 004056 103375
999 004060 012777 060017 174720
1000 004066 105777 174714
1001 004072 100375
1002 004074 032777 000002 174702
1003 004102 001001
1004 004104 104000
1005 004106 006077 174672
1006 004112 103001
1007 004114 104000
1008 004116 032777 000002 174660
1009 004124 001374
1010 004126 032777 000010 174650
1011 004134 001774
1012 004136 032777 000040 174640
1013 004144 001001
1014 004146 104000
1015 004150 032777 000010 174626
1016 004156 001374
1017 004160 006077 174620
1018 004164 103401
1019 004166 104000
1020
1021
1022
1023
1024
1025
1026
1027
1028 004170 104400
1029 004172 005077 174610
1030 004176 105777 174604
1031 004202 100375
1032 004204 006077 174574
1033 004210 103375
1034 004212 032777 000040 174564
1035 004220 001001
1036 004222 104000
1037 004224 012777 177777 174556
1038 004232 012777 017230 174552
1039 004240 005000

;*****
;TEST REWIND FUNCTION
SCOPE
MOV #-3, @BC ;WRITE SHORT RECORD TO BE CERTAIN THAT BOT NOT SE
MOV #WBUF, @CA
TSTB @MTC
BPL .-4
MOV #60005, @MTC ;WRITE, 800 BPI, GO
TSTB @MTC
BPL .-4 ;WAIT FOR CU READY
ROR @MTC
BCC .-4 ;WAIT FOR TU READY
MOV #60017, @MTC ;REWIND, GO
TSTB @MTC
BPL .-4
BIT #2, @MTC
BNE .+4
HLT ;ERROR, REWIND STATUS (BIT 1) NOT = 1 DURING REWIND
ROR @MTC
BCC .+4
HLT ;ERROR, TU READY NOT = 0
BIT #2, @MTC
BNE .-6 ;WAIT FOR RWS TO CLEAR
BIT #10, @MTC
BEQ .-6 ;WAIT FOR SETTLEDOWN TO SET
BIT #40, @MTC
BNE .+4
HLT ;ERROR, BOT (BIT 5) NOT = 1 WHEN SDWN (BIT 3) SET ON REW
BIT #10, @MTC
BNE .-6
ROR @MTC
BCS .+4
HLT ;ERROR, TU READY NOT SET AFTER SDWN CLEARED ON REWIND

;*****
;READ 1 BYTE RECORD FROM BOT
;BOT (BIT 5) SHOULD CLEAR, CU READY SHOULD SET, BYTE COUNT AND
;CURRENT ADDRESS SHOULD INCREMENT
SCOPE
CLR @MTC ;SELECT UNIT 0
TSTB @MTC
BPL .-4 ;WAIT FOR CU READY
ROR @MTC
BCC .-4 ;WAIT FOR TU READY
BIT #40, @MTC
BNE .+4
HLT ;ERROR, DRIVE 0 NOT AT BOT
MOV #-1, @BC ;SET BYTE COUNT=-1
MOV #WBUF, @CA ;INIT CURRENT MEMORY ADDRESS
CLR RD ;INIT DELAY COUNTER
    
```

```

1040 004242 012701 000020          MOV    #20,R1
1041 004246 012777 060003 174532    MOV    #60003,DMTC ;READ, 800 BPI, GO
1042 004254 005200          INC    RO
1043 004256 001376          BNE   -2           ;DELAY LONG ENOUGH TO MOVE OFF BOT
1044 004260 005301          DEC    R1
1045 004262 001374          BNE   -6
1046 004264 032777 000040 174512    BIT    #40,DMTS ;TEST FOR BOT
1047 004272 001401          BEQ   .+4
1048 004274 104000          HLT
1049 004276 105777 174504    TSTB  DMTC ;ERROR, BOT (BIT 5) NOT CLEARED
1050 004302 100401          BMI   .+4 ;TEST FOR CU READY
1051 004304 104000          HLT
1052 004306 005777 174476    TST   DBC ;ERROR, CU READY NOT SET AFTER WRITE FINISHED
1053 004312 001401          BEQ   .+4 ;TEST BYTE COUNT TO = 0
1054 004314 104000          HLT
1055 004316 022777 017231 174466    CMP   #WBUF+1,ACA ;ERROR, BYTE COUNT DIDN'T INCREMENT
1056 004324 001401          BEQ   .+4 ;TEST CURRENT MEMORY ADDRESS TO COUNT
1057 004326 104000          HLT ;ERROR, CURRENT MEMORY ADDRESS DIDN'T INCREMENT TO 0
1058
1059
1060
1061

```

 ;TEST READ A 3 BYTE RECORD

```

1062 004330 104400          SCOPE
1063 004332 012777 177775 174450    MOV    #-3,DBC ;SET BYTE COUNT = -3
1064 004340 012777 017230 174444    MOV    #WBUF,ACA ;INIT CURRENT MEMORY ADDRESS
1065 004346 005000          CLR    RO ;INIT DELAY COUNTER
1066 004350 005077 174432    CLR    DMTC ;SELECT UNIT 0
1067 004354 105777 174426    TSTB  DMTC
1068 004360 100375          BPL   -4           ;WAIT FOR CU READY
1069 004362 006077 174416    ROR   DMTS
1070 004366 103375          BCC   -4           ;WAIT FOR TU READY
1071 004370 005000          CLR    RO
1072 004372 012777 060003 174406    MOV    #60003,DMTC ;READ, 800BPI, GO
1073 004400 105777 174402    TSTB  DMTC
1074 004404 100403          BMI   .+10
1075 004406 005200          INC    RO
1076 004410 001373          BNE   -10
1077 004412 104000          HLT ;ERROR, CU READY DIDN'T SET AFTER 3 BYTE RECORD
1078 004414 022777 017233 174370    CMP   #WBUF+3,ACA
1079 004422 001401          BEQ   .+4
1080 004424 104000          HLT ;ERROR, CURRENT MEMORY ADDRESS DIDN'T INCREMENT
1081
1082 004426 005777 174356    TST   DBC
1083 004432 001401          BEQ   .+4
1084 004434 104000          HLT ;ERROR, BYTE COUNT DIDN'T INCREMENT TO 0
1085 004436 005777 174344    TST   DMTC
1086 004442 100001          BPL   .+4
1087 004444 104000          HLT ;ERROR, BIT 15 SET IN COMMAND REGISTER
1088
1089
1090
1091

```

 ;TEST WRITE EOF

```

1092 004446 104400          SCOPE
1093 004450 105777 174332    TSTB  DMTC
1094 004454 100375          BPL   -4
1095 004456 012777 060017 174322    MOV    #60017,DMTC ;REWIND UNIT TO BOT

```

K02

1096	004464	105777	174316	TSTB	AMTC	
1097	004470	100375		BPL	.-4	
1098	004472	012777	177777 174310	MOV	#-1, ABC	
1099	004500	012777	017230 174304	MOV	#WBUF, ACA	
1100	004506	012777	060007 174272	MOV	#60007, AMTC	;WRITE EOF
1101	004514	105777	174266	TSTB	AMTC	
1102	004520	100375		BPL	.-4	
1103	004522	005777	174262	TST	ABC	
1104	004526	001001		BNE	+.4	
1105	004530	104000		HLT		;ERROR, BYTE COUNT SHOULD NOT INCREMENT ON WRITE EOF
1106	004532	022777	017230 174252	CMP	#WBUF, ACA	
1107	004540	001401		BEQ	+.4	
1108	004542	104000		HLT		;ERROR, CURRENT ADDRESS SHOULD NOT INCREMENT ON WRITE EO
1109						
1110						
1111						
1112				;***** ;TEST SPACE FORWARD TO STOP ON FIRST EOF		
1113	004544	012777	060017 174234	MOV	#60017, AMTC	;REWIND
1114	004552	105777	174230	TSTB	AMTC	
1115	004556	100375		BPL	.-4	
1116	004560	012777	177776 174222	MOV	#-2, ABC	
1117	004566	012777	060011 174212	MOV	#60011, AMTC	;SPACE FORWARD 2 RECORDS
1118	004574	105777	174206	TSTB	AMTC	
1119	004600	100375		BPL	.-4	
1120	004602	032777	040000 174174	BIT	#40000, AMTS	
1121	004610	001001		BNE	+.4	
1122	004612	104000		HLT		;ERROR, EOF (BIT 14) NOT =1
1123	004614	005777	174166	TST	AMTC	
1124	004620	100401		BMI	+.4	
1125	004622	104000		HLT		;ERROR, (BIT 15) OF COMMAND REGISTER NOT=1 WITH EOF=1
1126	004624	022777	177777 174156	CMP	#-1, ABC	
1127	004632	001401		BEQ	+.4	
1128	004634	104000		HLT		;ERROR, BYTE COUNT SHOULD HAVE INCREMENTED FROM -2 TO -1
1129	004636	022777	017230 174146	CMP	#WBUF, ACA	
1130	004644	001401		BEQ	+.4	
1131	004646	104000		HLT		;ERROR, CURRENT ADDRESS REGISTER SHOULD NOT INCREMENT.
1132	004650	052777	010000 174130	BIS	#10000, AMTC	;PWR CLEAR
1133	004656	032777	040000 174120	BIT	#40000, AMTS	
1134	004664	001401		BEQ	+.4	
1135	004666	104000		HLT		;ERROR, PWR CLEAR DIDN'T CLEAR EOF (BIT 14)
1136						
1137						
1138						
1139						
1140				;***** ;TEST SPACE REVERSE TO STOP IN FIRST EOF		
1141						
1142	004670	012777	177776 174112	MOV	#-2, ABC	
1143	004676	012777	017230 174106	MOV	#WBUF, ACA	
1144	004704	012777	060013 174074	MOV	#60013, AMTC	;SPACE REVERSE 2 RECORDS
1145	004712	105777	174070	TSTB	AMTC	
1146	004716	100375		BPL	.-4	
1147	004720	032777	040000 174056	BIT	#40000, AMTS	
1148	004726	001001		BNE	+.4	
1149	004730	104000		HLT		;ERROR, EOF (BIT 14) NOT =1
1150	004732	032777	000040 174044	BIT	#40, AMTS	
1151	004740	001401		BEQ	+.4	

1152	004742	104000			HLT				; ERROR, BOT=1, SHOULD NOT HAVE REACHED BOT
1153	004744	022777	177777	174036	CMP	#-1,ABC			
1154	004752	001401			BEQ	.+4			
1155	004754	104000			HLT				;ERROR, BYTE COUNT SHOULD HAVE INCREMENTED FROM -2 TO-1
1156	004756	022777	017230	174026	CMP	#WBUF,ACA			
1157	004764	001401			BEQ	.+4			
1158	004766	104000			HLT				;ERROR, CURRENT ADDRESS REGISTER SHOULD NOT INCREMENT

1159
1160
1161

```

;*****
;TEST SPACE FORWARD
;FIRST WRITE 2 RECORDS FOLLOWED BY EOF
;SPACE FORWARD 2 RECORDS, SHOULD NOT REACH EOF

```

1165	004770	104400			SCOPE				
1166	004772	105777	174010		TSTB	AMTC			
1167	004776	100375			BPL	.-4			
1168	005000	012777	060017	174000	MOV	#60017,AMTC			;REWIND TO BOT
1169	005006	105777	173774		TSTB	AMTC			
1170	005012	100375			BPL	.-4			
1171	005014	012777	177775	173766	MOV	#-3,ABC			
1172	005022	012777	017230	173762	MOV	#WBUF,ACA			
1173	005030	012777	060005	173750	MOV	#60005,AMTC			; WRITE 1ST RECORD
1174	005036	105777	173744		TSTB	AMTC			
1175	005042	100375			BPL	.-4			
1176	005044	012777	177775	173736	MOV	#-3,ABC			
1177	005052	012777	017230	173732	MOV	#WBUF,ACA			
1178	005060	012777	060005	173720	MOV	#60005,AMTC			; WRITE 2ND RECORD
1179	005066	105777	173714		TSTB	AMTC			
1180	005072	100375			BPL	.-4			
1181	005074	012777	060007	173704	MOV	#60007,AMTC			; WRITE EOF
1182	005102	105777	173700		TSTB	AMTC			
1183	005106	100375			BPL	.-4			
1184	005110	012777	060017	173670	MOV	#60017,AMTC			; REWIND
1185	005116	105777	173664		TSTB	AMTC			
1186	005122	100375			BPL	.-4			
1187	005124	012777	177776	173656	MOV	#-2,ABC			
1188	005132	012777	060011	173646	MOV	#60011,AMTC			; SPACE FORWARD 2 RECORDS
1189	005140	105777	173642		TSTB	AMTC			
1190	005144	100375			BPL	.-4			
1191	005146	032777	040000	173630	BIT	#40000,AMTS			
1192	005154	001401			BEQ	.+4			
1193	005156	104000			HLT				;ERROR, EOF (BIT 14)=1, SHOULDN'T SPACE THIS FAR

1194
1195

```

;NOW SPACE FORWARD TO EOF
;SPACE FORWARD TO EOF WITH BYTE COUNT=0

```

1196	005160	012777	060011	173620	MOV	#60011,AMTC			
1197	005166	105777	173614		TSTB	AMTC			
1198	005172	100375			BPL	.-4			
1199	005174	032777	040000	173602	BIT	#40000,AMTS			
1200	005202	001001			BNE	.+4			
1201	005204	104000			HLT				;ERROR, EOF NOT =1
1202	005206	022777	000001	173574	CMP	#1,ABC			
1203	005214	001401			BEQ	.+4			
1204	005216	104000			HLT				;ERROR BYTE COUNT SHOULD =1

1205

```

;NOW SPACE REVERSE 2 RECORDS (FIRST MUST BACKSPACE OVER EOF)

```

1206	005220	012777	177775	173562	MOV	#-3,ABC			
1207	005226	012777	017230	173556	MOV	#WBUF,ACA			

1208	005234	012777	060013	173544	MOV	#60013, @MTC	
1209	005242	105777	173540		TSTB	@MTC	
1210	005246	100375			BPL	.-4	
1211	005250	032777	040000	173526	BIT	#40000, @MTC	
1212	005256	001001			BNE	+.4	
1213	005260	104000			HLT		;ERROR, EOF (BIT 14) NOT =1 AFTER BACKSPACE OVER BOT
1214	005262	005277	173520		INC	@MTC	;RESUME BACKSPACE
1215	005266	105777	173514		TSTB	@MTC	
1216	005272	100375			BPL	.-4	
1217	005274	100377			BPL	.	
1218	005276	105777	173506		TSTB	@BC	
1219	005302	001401			BEQ	+.4	
1220	005304	104000			HLT		;ERROR, BYTE COUNT NOT=0
1221	005306	001401			BEQ	+.4	
1222	005310	104000			HLT		;ERROR, CURRENT MEMORY ADDRESS SHOULDN'T COUNT ON BACKSP
1223	005312	032777	000040	173464	BIT	#40, @MTC	
1224	005320	001401			BEQ	+.4	
1225	005322	104000			HLT		;ERROR, BACKSPACE SHOULD NOT HAVE REACHED BOT
1226							
1227							
1228							
1229							
1230	005324	104400					
1231	005326	105777	173454		SCOPE		
1232	005332	100375			TSTB	@MTC	
1233	005334	012777	060007	173444	BPL	.-4	
1234	005342	105777	173440		MOV	#60007, @MTC	;WRITE EOF
1235	005346	100375			TSTB	@MTC	
1236	005350	012777	060013	173430	BPL	.-4	
1237	005356	105777	173424		MOV	#60013, @MTC	;BACKSPACE OVER EOF
1238	005362	100375			TSTB	@MTC	
1239	005364	005037	017374		BPL	.-4	
1240	005370	012777	177771	173412	CLR	RBUF	
1241	005376	012777	017374	173406	MOV	#-7, @BC	
1242	005404	012777	060003	173374	MOV	#RBUF, @CA	
1243	005412	105777	173370		MOV	#60003, @MTC	;READ
1244	005416	100375			TSTB	@MTC	
1245	005420	032777	040000	173360	BPL	.-4	
1246	005426	001001			BIT	#40000, @MTC	
1247	005430	104000			BNE	+.4	
1248	005432	132777	000001	173364	HLT		;ERROR, EOF (BIT 14) NOT -1 DURING A READ OPERATION
1249	005440	001006			BITB	#1, @SWR	;IS 7 CHANNEL SELECTED
1250	005442	022737	011423	017374	BNE	TREOF	;YES
1251	005450	001401			CMP	#11423, RBUF	
1252	005452	104000			BEQ	+.4	
1253	005454	000405			HLT		;ERROR, EOF (23) NOT TRANSFERRED FOR 2 BYTES DURING READ
1254	005456	022737	000377	017374	BR	TRLE	
1255	005464	001401			CMP	#377, RBUF	
1256	005466	104000			BEQ	+.4	
1257					HLT		;ERROR, EOF (17-7 CHANNEL) NOT TRANSFERRED DURING READ E
1258							
1259							
1260							
1261							
1262							
1263	005470	104400					

;TEST READ TO FIND EOF

;TEST RECORD LENGTH ERROR
TRLE: SCOPE

1264	005472	105777	173310	TSTB	@MTC	
1265	005476	100375		BPL	.-4	
1266	005500	012737	177777 017230	MOV	#-1,WBUF	
1267	005506	012737	177777 017232	MOV	#-1,WBUF+2	
1268	005514	012777	177774 173256	MOV	#-4,@BC	
1269	005522	012777	017230 173262	MOV	#WBUF,@CA	
1270	005530	012777	060005 173250	MOV	#60005,@MTC	;WRITE 4 BYTE RECORD
1271	005536	105777	173244	TSTB	@MTC	
1272	005542	100375		BPL	.-4	
1273	005544	012777	177777 173236	MOV	#-1,@BC	
1274	005552	012777	060013 173226	MOV	#60013,@MTC	;BACKSPACE
1275	005560	105777	173222	TSTB	@MTC	
1276	005564	100375		BPL	.-4	
1277	005566	005037	017374	CLR	RBUF	
1278	005572	005037	017376	CLR	RBUF+2	
1279	005576	012777	177775 173204	MOV	#-3,@BC	
1280	005604	012777	017374 173200	MOV	#RBUF,@CA	
1281	005612	012777	060003 173166	MOV	#60003,@MTC	;READ 3 BYTE RECORD
1282	005620	105777	173162	TSTB	@MTC	
1283	005624	100375		BPL	.-4	
1284	005626	032777	001000 173150	BIT	#1000,@MTS	
1285	005634	001001		BNE	.+4	
1286	005636	104000		HLT		;ERROR, RECORD LENGTH ERROR (BIT 9) NOT =1
1287	005640	005777	173142	TST	@MTC	
1288	005644	100401		BMI	.+4	
1289	005646	104000		HLT		;ERROR, BIT 15 NOT =1 WHEN RLS (BIT 9) =1
1290	005650	022737	177777 017374	CMP	#-1, RBUF	
1291	005656	001401		BEQ	.+4	
1292	005660	104000		HLT		;ERROR, BYTES 1+2 NOT READ PROPERLY
1293	005662	022737	000377 017376	CMP	#377, RBUF+2	
1294	005670	001401		BEQ	.+4	
1295	005672	104000		HLT		;ERROR, BYTE 3 READ ERROR OR SOMETHING TRANSFERED TO BYTE
1296	005674	052777	010000 173104	BIS	#10000,@MTC	;PWR CLEAR
1297	005702	032777	001000 173074	BIT	#1000,@MTS	
1298	005710	001401		BEQ	.+4	
1299	005712	104000		HLT		;ERROR PWR CLEAR DIDN'T RLE (BIT 9)

;TEST ILLEGAL COMMAND TO =1 ON A DATO OR DATOB TO MTC WITH CU READY=0

1300						
1301						
1302						
1303						
1304						
1305						
1306	005714	104400		SCOPE		
1307	005716	105777	173064	TSTB	@MTC	
1308	005722	100375		BPL	.-4	
1309	005724	006077	173054	ROR	@MTS	
1310	005730	103375		BCC	.-4	
1311	005732	012777	177775 173050	MOV	#-3,@BC	
1312	005740	012777	017230 173044	MOV	#WBUF,@CA	
1313	005746	012777	060007 173032	MOV	#60007,@MTC	;WRITE EOF
1314	005754	105777	173026	TSTB	@MTC	
1315	005760	100775		BMI	.-4	;WAIT FOR CU READY TO CLEAR
1316	005762	012777	060017 173016	MOV	#60017,@MTC	;DATO TO MTC WITH CU READY =0
1317	005770	105777	173012	TSTB	@MTC	
1318	005774	100375		BPL	.-4	
1319	005776	005777	173002	TST	@MTS	

B03

TM, A, B-11/TS03
DZTMAH.P11

OR TUID, N, W INSTRUCTION TEST (MAINDEC-11-DZTMA-H-D)
TEST ILLEGAL COMMAND TO =1 ON A DATO OR DATOB TO MTC WITH CU READY=0

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1320 006002 100401 BMI .+4
1321 006004 104000 HLT ;ERROR, ILLEGAL COMMAND (BIT 15) NOT =1
1322 006006 105777 172774 TSTB @MTC
1323 006012 100401 BMI .+4
1324 006014 104000 HLT ;ERROR, (BIT 15) NOT =1 WITH ILLEGAL COMMAND
1325 006016 105777 172764 TSTB @MTC
1326 006022 100375 BPL .-4
1327 006024 006077 172754 ROR @MTC
1328 006030 103375 BCC .-4
1329
1330
1331
1332 ;*****
1333 ;TEST ILLEGAL COMMAND BY ISSUING A COMMAND TO TYPE A UNIT WITH SELECT REMOTE =0
1334 006032 104400 SCOPE
1335 006034 012777 003400 172744 MOV #3400,@MTC ;SELECT UNIT 7, SELECT REMOTE SHOULD =0
1336 006042 105777 172740 TSTB @MTC
1337 006046 100375 BPL .-4
1338 006050 032777 000100 172726 BIT #100,@MTC
1339 006056 001401 BEQ .+4
1340 006060 104000 HLT ;ERROR, SELECT REMOTE (BIT 6) NOT =0 WITH NONEXISTENT U
1341 006062 052777 000017 172716 BIS #17,@MTC ;ISSUE REWIND
1342 006070 105777 172712 TSTB @MTC
1343 006074 100375 BPL .-4
1344 006076 005777 172702 TST @MTC
1345 006102 100401 BMI .+4
1346 006104 104000 HLT ;ERROR, ILLEGAL COMMAND (BIT 15) NOT =1
1347 006106 052777 010000 172672 BIS #10000,@MTC ;PWR CLEAR
1348 006114 005777 172664 TST @MTC
1349 006120 100001 BPL .+4
1350 006122 104000 HLT ;ERROR, POWER CLEAR DIDN'T CLEAR ILC (BIT 15)
1351
1352
1353
1354 ;*****
1355 ;TEST BACKSPACE WHILE AT BOT TO BE IGNORED
1356 006124 104400 SCOPE
1357 006126 032777 000040 172652 BIT #40,@MTC ;AT BOT ?
1358 006134 001003 BNE .+10 ;YES
1359 006136 012777 060017 172642 MOV #60017,@MTC ;NO, REWIND
1360 006144 105777 172636 TSTB @MTC
1361 006150 100375 BPL .-4
1362 006152 006077 172626 ROR @MTC
1363 006156 103375 BCC .-4
1364 006160 012777 177777 172622 MOV #-1,@BC
1365 006166 012777 000013 172612 MOV #13,@MTC ;BACKSPACE
1366 006174 105777 172606 TSTB @MTC
1367 006200 100375 BPL .-4
1368 006202 005777 172576 TST @MTC
1369 006206 100001 BPL .+4
1370 006210 104000 HLT ;ERROR, ILC (BIT 15) =1 AFTER BACKSPACE WHILE AT BOT
1371 006212 032777 000040 172564 BIT #40,@MTC
1372 006220 001001 BNE .+4
1373 006222 104000 HLT ;ERROR, NOT AT BOT AFTER BACKSPACE
1374
1375

```

```

1376                                     ;*****
1377                                     ;TEST REWIND WHILE AT BOT TO BE IGNORED
1378 006224 104400                       SCOPE
1379 006226 032777 000040 172550       BIT      #40,AMTS      ;AT BOT?
1380 006234 001003                       BNE      .+10        ;YES
1381 006236 012777 060017 172542       MOV      #60017,AMTC ;NO, REWIND
1382 006244 105777 172536               TSTB     AMTC
1383 006250 100375                       BPL      -4
1384 006252 006077 172526               ROR      AMTS
1385 006256 103375                       BCC      -4
1386 006260 012777 060017 172520       MOV      #60017,AMTC ;REWIND WHILE AT BOT
1387 006266 105777 172514               TSTB     AMTC
1388 006272 100375                       BPL      -4
1389 006274 005777 172504               TST      AMTS
1390 006300 100001                       BPL      .+4
1391 006302 104000                       HLT
1392 006304 032777 000040 172472       BIT      #40,AMTS      ;ERROR, ILC(BIT15)=1 AFTER REWIND WHILE AT BOT
1393 006312 001001                       BNE
1394 006314 104000                       HLT      ;ERROR, NOT BOT AFTER REWIND
1395
1396
1397
1398                                     ;*****
1399                                     ;TEST BAD TAPE ERROR (BIT 8) TO =1
1400                                     ;USE MAINTENANCE BIT 13 OF MTRD TO SET PREMATURE CU READY TO CAUSE BAD TAPE
1401 006316 104400                       SCOPE
1402 006320 012777 177774 172462       MOV      #-4,ABC
1403 006326 012777 017230 172456       MOV      #WBUF,ACA
1404 006334 105777 172446               TSTB     AMTC
1405 006340 100375                       BPL      -4
1406 006342 012777 060005 172436       MOV      #60005,AMTC ;WRITE, 800 BPI, GO
1407 006350 005777 172434               TST      ABC
1408 006354 001375                       BNE      -4
1409 006356 052777 020000 172432       BIS      #20000,AMTRD ;SET PREMATURE CU READY
1410 006364 006077 172414               ROR      AMTS
1411 006370 103375                       BCC      -4
1412 006372 032777 000400 172404       BIT      #400,AMTS
1413 006400 001001                       BNE      .+4
1414 006402 104000                       HLT      ;ERROR, BAD TAPE ERROR (BIT 8) NOT =1
1415 006404 005777 172376               TST      AMTC
1416 006410 100401                       BMI      .+4
1417 006412 104000                       HLT      ;ERROR, BIT 15 NOT =1 WITH BTE=1
1418 006414 052777 010000 172364       BIS      #10000,AMTC
1419 006422 032777 000400 172354       BIT      #400,AMTS
1420 006430 001401                       BEQ      .+4

```

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1421 006432 104000          HLT          ;ERROR, POWER CLEAR DIDN'T CLEAR BTE (BIT 8)
1422
1423
1424
1425
1426
1427 006434 104400          SCOPE
1428 006436 012777 177777 172344  MOV      #-1,ABC          ;INIT BYTE COUNTER
1429 006444 012777 173000 172340  MOV      #173000,ACA      ;INIT CURRENT MEMORY ADDRESS FOR NON EXISTENT MEMORY
1430 006452 105777 172330  TSTB    @MTC
1431 006456 100375          BPL      -4
1432 006460 012777 060063 172320  MOV      #60063,@MTC      ;READ, EA=3, 800 BPI, GO
1433 006466 105777 172314  TSTB    @MTC
1434 006472 100375          BPL      -4
1435 006474 032777 000200 172302  BIT      #200,@MTS
1436 006502 001001          BNE      +4
1437 006504 104000          HLT          ;ERROR, NON-EXISTENT MEMORY (BIT 7) NOT =1
1438 006506 005777 172274  TST      @MTC
1439 006512 100401          BMI      +4
1440 006514 104000          HLT          ;ERROR, (BIT 15) NOT =1 WITH NXM (BIT 7) =1
1441 006516 052777 010000 172262  BIS      #10000,@MTC      ;PWR CLEAR
1442 006524 032777 000600 172252  BIT      #600,@MTS
1443 006532 001401          BEQ      +4
1444 006534 104000          HLT          ;ERROR, POWER CLEAR DIDN'T CLEAR BTE (BIT 8) OR NXM (BIT
1445
1446
1447
1448
1449
1450
1451
1452 006536 104400          SCOPE
1453 006540 012737 000200 177776  MOV      #200,CC          ;SET PRIORITY LEVEL 4
1454 006546 005077 172230  CLR      @MTVS           ;CLEAR INTERRUPT VECTOR CC
1455 006552 012777 006602 172220  MOV      #IR1,@MTV       ;INIT INTERRUPT RETURN
1456 006560 005000          CLR      R0              ;INIT DELAY COUNT
1457 006562 012777 000100 172216  MOV      #100,@MTC       ;SET INT ENABLE
1458 006570 005200          INC      R0              ;WAIT FOR INTERRUPT
1459 006572 001376          BNE      -2
1460 006574 005077 172206  CLR      @MTC           ;WAITED TOO LONG WITHOUT INTERRUPT, CLEAR INT ENABLE
1461 006600 104000          HLT          ;ERROR, INTERRUPT ENABLE FAILED TO CAUSE INT.
1462
1463
1464
1465
1466 006602 012737 000240 177776  IR1: MOV   #240,CC        ;SET PROCESSOR PRIORITY LEVEL 5
1467 006610 012777 006634 172162  MOV      #IR2,@MTV       ;INIT INTERRUPT RETURN
1468 006616 005000          CLR      R0              ;INIT DELAY COUNT
1469 006620 012777 000100 172160  MOV      #100,@MTC       ;SET INT ENABLE
1470 006626 005200          INC      R0              ;WAIT FOR INTERRUPT
1471 006630 001376          BNE      -2
1472 006632 000401          BR       +4
1473 006634 104000          IR2: HLT          ;ERROR, SHOULDN'T HAVE INTERRUPT WITH PROCESSOR PRIORITY
1474
1475
1476

```

E03

TM A, B-11/TS03
DZTMAH.P11

OR TU10, N.W INSTRUCTION TEST (MAINDEC-11-DZTMA-H-D)
TEST CU READY TO CAUSE INTERRUPT WITH INT ENABLE =1

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```
1477          :TEST CU READY TO CAUSE INTERRUPT WITH INT ENABLE =1
1478          :INT ENABLE (BIT 6) AND GO (BIT 0) SET AT SAME TIME SHOULDN'T CAUSE INTERRUPT
1479 006636 104400          SCOPE
1480 006640 012737 000200 177776  MOV      #200,CC          ;PROCESSOR PRIORITY LEVEL 4
1481 006646 012777 006704 172124  MOV      #IR3,AMTV
1482 006654 012737 000001 006702  MOV      #1,WAIT1
1483 006662 005077 172120          CLR      AMTC
1484 006666 105777 172114          TSTB    AMTC
1485 006672 100375          BPL     -4
1486 006674 012777 060107 172104  MOV      #60107,AMTC      ;WRITE EOF, INT ENABLE, GO
1487 006702 000001          WAIT1: WAIT
1488 006704 012737 000240 006702  IR3:    MOV      #240,WAIT1
1489 006712 105777 172070          TSTB    AMTC
1490 006716 100401          BMI     +4
1491 006720 104000          HLT
          ;ERROR, INTERRUPT NOT CAUSED BY CU READY
1492
1493
1494          :*****
1495          :TEST REWIND TO CAUSE TWO INTERRUPTS
1496          :1ST AFTER CU READY AND 2ND AFTER REWIND COMPLETE
1497 006722 104400          SCOPE
1498 006724 012737 000200 177776  MOV      #200,CC          ;PROCESSOR PRIORITY LEVEL 4
1499 006732 012777 007014 172040  MOV      #IR4,AMTV
1500 006740 012737 000001 007012  MOV      #1,WAIT2
1501 006746 005077 172034          CLR      AMTC
1502 006752 105777 172030          TSTB    AMTC
1503 006756 100375          BPL     -4
1504 006760 032777 000040 172016  BIT      #40,AMTS        ;AT BOT?
1505 006766 001403          BEQ     +10              ;NO
1506 006770 012777 000003 172010  MOV      #3,AMTC        ;WRITE EOF TO MOVE OFF BOT
1507 006776 105777 172004          TSTB    AMTC
1508 007002 100375          BPL     -4
1509 007004 012777 000117 171774  MOV      #117,AMTC      ;INT ENABLE, REWIND, GO
1510 007012 000001          WAIT2: WAIT
1511 007014 012737 000240 007012  IR4:    MOV      #240,WAIT2
1512 007022 105777 171760          TSTB    AMTC
1513 007026 100401          BMI     +4
1514 007030 104000          HLT
          ;ERROR, INTERRUPT NOT CAUSED BY CU READY
1515
1516
1517 007032 032777 000040 171744  BIT      #40,AMTS
1518 007040 100001          BPL     +4
1519 007042 104000          HLT
          ;ERROR, SHOULDN'T BE AT BOT SO SOON AFTER 1ST INTERRUPT
1520 007044 012737 000001 007060  MOV      #1,WAIT3
1521 007052 012777 007062 171720  MOV      #IRS,AMTV
1522 007060 000001          WAIT3: WAIT
1523 007062 012737 000240 007060  IRS:    MOV      #240,WAIT3
1524 007070 032777 000040 171706  BIT      #40,AMTS
1525 007076 001001          BNE     +4
1526 007100 104000          HLT
          ;ERROR; 2ND INTERRUPT NOT CAUSED BY REWIND COMPLETE
1527
1528
1529          :*****
1530          :DATA TRANSFER TEST
1531          :WRITE RECORD, BACKSPACE, READ RECORD
1532          :REPEAT FOR ALL BYTE PATTERNS FROM 0 THRU DATA PATTERN
```

1533	007102	005037	001032		CLR	TEMP		;INITALIZE DATA PATTERN
1534	007106	012700	017230		WBR:	MOV	#WBUF,RO	
1535	007112	013720	001032			MOV	TEMP,(RO)+	;SET UP WRITE BUFFER
1536	007116	022700	017254			CMP	#WBUF+24,RO	
1537	007122	001373				BNE	WBR+4	
1538	007124	012777	177754	171656		MOV	#-20,ABC	;INIT BYTE COUNT
1539	007132	012777	017230	171652		MOV	#WBUF,ACA	;INIT CURRENT MEMORY ADDRESS
1540	007140	105777	171642			TSTB	AMTC	
1541	007144	100375				BPL	.-4	
1542	007146	012777	060005	171632		MOV	#60005,AMTC	;WRITE, 800 BPI, GO
1543	007154	105777	171626			TSTB	AMTC	
1544	007160	100375				BPL	.-4	
1545						;AFTER WRITE, CHECK WRITE BUFFER TO MAKE CERTAIN IT WASN'T MODIFIED		
1546	007162	012700	017230			MOV	#WBUF,RO	
1547	007166	023720	001032		WBR1:	CMP	TEMP,(RO)+	
1548	007172	001401				BEQ	.-4	
1549	007174	104000				HLT		;ERROR, DATA BUFFER MODIFIED DURING WRITE
1550	007176	022700	017254			CMP	#WBUF+24,RO	
1551	007202	001371				BNE	WBR1	
1552						;BACKSPACE 1 RECORD		
1553	007204	012777	177777	171576		MOV	#-1,ABC	
1554								
1555	007212	012777	060013	171566		MOV	#60013,AMTC	
1556	007220	105777	171562			TSTB	AMTC	
1557	007224	100375				BPL	.-4	
1558	007226	012700	017374			MOV	#RBUF,RO	
1559	007232	005020			WBR2:	CLR	(RO)+	;CLEAR READ BUFFER
1560	007234	022700	017420			CMP	#RBUF+24,RO	
1561	007240	001374				BNE	WBR2	
1562						;;READ RECORD		
1563	007242	012777	177754	171540		MOV	#-20,ABC	;UNIT BYTE COUNT
1564	007250	012777	017374	171534		MOV	#RBUF,ACA	;UNIT CURRENT MEMORY ADDRESS
1565	007256	012777	060003	171522		MOV	#60003,AMTC	;READ,800 BPI, GO
1566	007264	105777	171516			TSTB	AMTC	
1567	007270	100375				BPL	.-4	
1568	007272	005777	171510			TST	AMTC	
1569	007276	100001				BPL	.-4	
1570	007300	104000				HLT		;ERROR, ERROR (BIT 15) =1 AFTER READ
1571	007302	012700	017374			MOV	#RBUF,RO	
1572								
1573								
1574	007306	023720	001032		WBR3:	CMP	TEMP,(RO)+	
1575	007312	001401				BEQ	.-4	
1576	007314	104000				HLT		;ERROR, DATA READ NOT EQUAL DATA WRITTEN
1577	007316	022700	017420			CMP	#RBUF+24,RO	
1578	007322	001371				BNE	WBR3	
1579	007324	105237	001032			INCB	TEMP	;DONE FOR ALL DATA PATTERNS?
1580	007330	001405				BEQ	WBR4	;YES, EXIT
1581	007332	113737	001032	001033		MOVB	TEMP,TEMP+1	;NO
1582	007340	000137	007106			JMP	WBR	;REPEAT
1583						;WRITE AND READ A LONG RECORD		
1584						;USES MEMORY OCCUPIED BY THE PROGRAM AS A WRITE BUFFER		
1585	007344	012777	177160	171436	WBR4:	MOV	#-400,ABC	
1586	007352	012777	002000	171432		MOV	#2000,ACA	
1587	007360	105777	171422			TSTB	AMTC	
1588	007364	100375				BPL	.-4	

1589	007366	012777	060005	171412	MOV	#60005, @MTC	;WRITE, 800 BPI, GO
1590	007374	105777	171406		TSTB	@MTC	
1591	007400	100375			BPL	.-4	
1592	007402	012777	177777	171400	MOV	#-1, @BC	
1593	007410	012777	060013	171370	MOV	#60013, @MTC	;BACKSPACE 1 RECORD
1594	007416	105777	171364		TSTB	@MTC	
1595	007422	100375			BPL	.-4	
1596	007424	012777	177160	171356	MOV	#-400., @BC	
1597	007432	012777	017374	171352	MOV	#RBUF, @CA	
1598	007440	012777	060003	171340	MOV	#60003, @MTC	;READ, 800 BPI, GO
1599	007446	105777	171334		TSTB	@MTC	
1600	007452	100375			BPL	.-4	
1601	007454	012700	002000		MOV	#2000, R0	
1602	007460	012701	017374		MOV	#RBUF, R1	
1603	007464	022021			WBR5: CMP	(R0)+, (R1)+	;DO A DATA COMPARISON
1604	007466	001401			BEQ	+.4	
1605	007470	104000			HLT		;ERROR, DATA READ NOT EQUAL DATA WRITTEN
1606	007472	022701	020214		CMP	#RBUF+400., R1	;CHECKED WHOLE BUFFER
1607	007476	001372			BNE	WBR5	;NO

;TEST PARITY
;WRITE 3 BYTE RECORD ODD PARITY, READ EVEN PARITY
;BIT 14 OF MTRD =1 SHOULD CAUSE LPC TO BE LOADED IN DATA BUFFER AFTER READ

1616	007500	104400			PAR: SCOPE		
1617	007502	012737	177777	017230	MOV	#-1, WBUF	
1618	007510	012737	177777	017232	MOV	#-1, WBUF+2	
1619	007516	012777	177775	171264	MOV	#-3, @BC	
1620	007524	012777	017230	171260	MOV	#WBUF, @CA	
1621	007532	105777	171250		TSTB	@MTC	
1622	007536	100375			BPL	.-4	
1623	007540	012777	060004	171240	MOV	#60004, @MTC	;WRITE, 800 BPI, 9 TRACK
1624	007546	132777	000001	171250	BITB	#1, @SWR	
1625	007554	001403			BEQ	+.10	
1626	007556	042777	020000	171222	BIC	#20000, @MTC	;MAKE COMMAND 7 TRACK
1627	007564	005277	171216		INC	@MTC	;GO
1628	007570	105777	171212		TSTB	@MTC	
1629	007574	100375			BPL	.-4	
1630	007576	012777	177777	171204	MOV	#-1, @BC	
1631	007604	012777	060012	171174	MOV	#60012, @MTC	;BACKSPACE, 9 TRACK
1632	007612	132777	000001	171204	BITB	#1, @SWR	
1633	007620	001403			BEQ	+.10	
1634	007622	042777	020000	171156	BIC	#20000, @MTC	;MAKE COMMAND 7 TRACK
1635	007630	005277	171152		INC	@MTC	;GO
1636	007634	105777	171146		TSTB	@MTC	
1637	007640	100375			BPL	.-4	
1638	007642	052777	040000	171146	BIS	#40000, @MTRD	
1639	007650	012777	177775	171132	MOV	#-3, @BC	
1640	007656	012777	017374	171126	MOV	#RBUF, @CA	
1641	007664	012777	064002	171114	MOV	#64002, @MTC	
1642	007672	132777	000001	171124	BITB	#1, @SWR	
1643	007700	001403			BEQ	+.10	
1644	007702	042777	020000	171076	BIC	#20000, @MTC	;MAKE COMMAND 7 TRACK


```

1701 010234 104000          HLT          ;ERROR, LPC NOT =004 OR LPC NOT READ PROPERLY
1702 010236 000404          BR          PAR4
1703 010240 022700 000077  PAR3:  CMP      #77,RO
1704 010244 001401          BEQ      .+4
1705 010246 104000          HLT          ;ERROR, LPC NOT =77 (7 TRACK)
1706 010250 052777 010000 170530 PAR4:  BIS      #10000,AMTC ;PWR CLEAR
1707 010256 032777 010000 170520  BIT      #10000,AMTS
1708 010264 001401          BEQ      .+4
1709 010266 104000          HLT          ;ERROR, POWER CLEAR DIDN'T CLEAR PARITY ERROR (BIT 11)

```

```

1710
1711
1712 ;*****
1713 ;TEST TIMER (BIT 15) TO BE COMPLIMENTING

```

```

1714 010270 104400          SCOPE
1715 010272 005000          CLR      RO
1716 010274 005777 170516  TST      AMTRD
1717 010300 001403          BEQ      .+10
1718 010302 005200          INC      RO          ;DELAY LONG TIME
1719 010304 001373          BNE      .-10
1720 010306 104000          HLT          ;ERROR, TIMER (BIT 15) NEVER =0
1721 010310 005000          CLR      RO
1722 010312 005777 170500  TST      AMTRD
1723 010316 001003          BNE      .+10
1724 010320 005200          INC      RO
1725 010322 001373          BNE      .-10
1726 010324 104000          HLT          ; ERROR, TIMER (BIT 15) NEVER =1

```

```

1727
1728 010326 132777 000001 170470 BITB     #1,ASWR    ;IS SWO=1 TO INDICATE 7 CHANNEL
1729 010334 001402          BEQ      .+6        ;NO
1730 010336 000137 011450  JMP      MIT        ;YES SKIP CRC TEST

```

```

1731
1732 ;*****
1733 ;TEST CRC GENERATION AND LPC CHARACTER
1734 ;PROCEDURE USED IS TO WRITE A 4 BYTE RECORD AND READ IT BACK.
1735 ;THEN THE CRC WRITTEN IS COMPARED WITH CRC CALCULATED.
1736 ;THEN RECORD IS READ AGAIN AND LPC SHOULD = CRC

```

```

1737
1738 ;*****
1739 ;TEST IS REPEATED FOR ALL DATA COMBINATIONS.

```

```

1740
1741 CRCTST: CLRB  TEMP          ;INITIALIZE DATA
1742 010342 105037 001032  CRCT1:  JSR      PC,CRCPAR    ;GENERATE PARITY
1743 010346 004737 011112  MOV      TEMP,CRXOR1    ;SAVE 1ST DATA BYTE (+PARITY)
1744 010352 013737 001032 211220  MOV      TEMP,RO
1745 010360 013700 001032  JSR      PC,CRCROT     ;ROTATE AND COMPLEMENT
1746 010364 004737 011152  MOV      RO,CROT1      ;SAVE ROTATE
1747 010370 010037 011222  MOV      TEMP,R1
1748 010374 013701 001032  JSR      PC,CRCXOR     ;XOR 2ND BYTE
1749 010400 004737 011206  MOV      R1,CRXOR2
1750 010404 010137 011224  MOV      CRXOR2,RO
1751 010410 013700 011224  JSR      PC,CRCROT
1752 010414 004737 011152  MOV      RO,CROT2
1753 010420 010037 011226  MOV      TEMP,R1
1754 010424 013701 001032  JSR      PC,CRCXOR     ;XOR 3RD BYTE
1755 010430 004737 011206  MOV      R1,CRXOR3
1756 010434 010137 011230

```

1757	010440	013700	011230		MOV	CRXOR3, R0	
1758	010444	004737	011152		JSR	PC, CRCROT	
1759	010450	010037	011232		MOV	R0, CRROT3	
1760	010454	013701	001032		MOV	TEMP, R1	
1761	010460	004737	011206		JSR	PC, CRXOR	;XOR 4TH BYTE
1762	010464	010137	011234		MOV	R1, CRXOR4	
1763	010470	013700	011234		MOV	CRXOR4, R0	
1764	010474	004737	011152		JSR	PC, CRCROT	
1765	010500	010037	011236		MOV	R0, CRROT4	
1766	010504	010001			MOV	R0, R1	;COMPLEMENT ALL EXCEPT 4,6
1767	010506	042701	000727		BIC	#727, R1	
1768	010512	005100			COM	R0	
1769	010514	042700	000050		BIC	#50, R0	
1770	010520	050100			BIS	R1, R0	
1771	010522	010037	011240		MOV	R0, CRCWRT	
1772	010526	042737	177000	011240	BIC	#177000, CRCWRT	;SAVE CRC CALCULATED
1773							
1774							
1775							
1776							
1777	010534	104400					
1778	010536	113737	001032	017230			
1779	010544	113737	001032	017231			
1780	010552	013737	017230	017232			
1781	010560	012777	017230	170224			
1782	010566	012777	177774	170214			
1783	010574	005077	170206				
1784	010600	105777	170202				
1785	010604	100375					
1786	010606	012777	060005	170172			
1787	010614	105777	170166				
1788	010620	100375					
1789	010622	012777	177777	170160			
1790	010630	042777	000016	170150			
1791	010636	052777	000013	170142			
1792	010644	105777	170136				
1793	010650	100375					
1794	010652	012777	017374	170132			
1795	010660	012777	177774	170122			
1796	010666	042777	000016	170112			
1797	010674	052777	000003	170104			
1798	010702	105777	170100				
1799	010706	100375					
1800	010710	023737	017230	017374			
1801	010716	001401					
1802	010720	104000					
1803	010722	023737	017232	017376			
1804	010730	001401					
1805	010732	104000					
1806	010734	017700	170054				
1807	010740	017701	170052				
1808	010744	042700	177000				
1809	010750	042701	177000				
1810	010754	001401					
1811	010756	104000					
1812	010760	020037	011240				

;WRITE A FOUR BYTE RECORD
 ;ALL BYTES ARE = THEREFORE LPC SHOULD = CRC
 CWRITE: SCOPE
 MOV B TEMP, WBUF
 MOV B TEMP, WBUF+1
 MOV WBUF, WBUF+2
 MOV #WBUF, @CA
 MOV #-4, @BC
 CLR @MTC
 TSTB @MTC
 BPL .-4
 MOV #60005, @MTC ;WRITE, 4 BYTE RECORD, GO
 TSTB @MTC
 BPL .-4
 MOV #-1, @BC
 BIC #16, @MTC
 BIS #13, @MTC ;BACKSPACE
 TSTB @MTC
 BPL .-4
 MOV #RBUF, @CA
 MOV #-4, @BC
 BIC #16, @MTC
 BIS #3, @MTC ;READ, 4 BYTE RECORD, GO
 TSTB @MTC
 BPL .-4
 CMP WBUF, RBUF ;WERE 1ST 2 BYTES WRITTEN AND READ OK?
 BEQ .+4 ;YES
 HLT ;ERROR DATA WRITTEN NOT = DATA READ
 CMP WBUF+2, RBUF+2 ;WERE 2ND 2 BYTES WRITTEN AND READ OK?
 BEQ .+4 ;YES
 HLT ;ERROR, DATA WRITTEN NOT = DATA READ
 MOV @MTC, R0 ;GET CRC
 MOV @MTRD, R1 ;GET LPC ERROR
 BIC #177000, R0 ;MASK CRC
 BIC #177000, R1 ;MASK LPC ERROR
 BEQ .+4
 HLT ;ERROR, LPC NOT = 0
 CMP R0, CRCWRT

1813	010764	001401			BEQ	.+4	
1814	010766	104000			HLT		;ERROR CRC WRITTEN NOT = CRC CALCULATED
1815	010770	012777	177777	170012	MOV	#-1, @BC	
1816	010776	012777	000013	170002	MOV	#13, @MTC	;BACKSPACE
1817	011004	105777	167776		TSTB	@MTC	
1818	011010	100375			BPL	.-4	
1819	011012	012777	177774	167770	MOV	#-4, @BC	
1820	011020	012777	017374	167764	MOV	#RBUF, @CA	
1821	011026	052777	040000	167762	BIS	#40000, @MTRD	;ENABLE LPC READ
1822	011034	012777	060003	167744	MOV	#60003, @MTC	;READ, 4 BYTE RECORD, GO
1823	011042	105777	167740		TSTB	@MTC	
1824	011046	100375			BPL	.-4	
1825							
1826							
1827	011050	017700	167740		MOV	@MTRD, RO	
1828	011054	042700	177000		BIC	#177000, RO	
1829	011060	020037	011240		CMP	RO, CRCWRT	
1830	011064	001401			BEQ	.+4	
1831	011066	104000			HLT		;ERROR, LPC NOT=CRC
1832	011070	005037	011240		CLR	CRCWRT	
1833	011074	005077	167716		CLR	@MTRD	;ENABLE CRC READ
1834	011100	105237	001032		INCB	TEMP	;+1 TO DATA PATTERN
1835	011104	001456			BEQ	ZEROCRC	
1836	011106	000137	010346		JMP	CRCT1	
1837							;CALCULATE PARITY OF DATA TO BE WRITTEN IN CRC TEST (MAKE PARITY ODD)
1838	011112	112737	000001	001033	CRCPAR: MOV	#1, TEMP+1	;INITIALIZE ODD PARITY
1839	011120	113701	001032		MOV	TEMP, R1	
1840	011124	105701			CRCP1: TSTB	R1	;IS DATA=0
1841	011126	001001			BNE	.+4	;NO
1842	011130	000207			RTS	PC	;YES, NOW TEMP+1 CONTAINS PARITY BIT
1843	011132	106301			ASLB	R1	;SHIFT DATA BITS LEFT INTO C BIT
1844	011134	103002			BCC	.+6	;WAS BIT=0?
1845	011136	105137	001033		COMB	TEMP+1	;NO, COMPLEMENT PARITY
1846	011142	042737	177000	001032	BIC	#177000, TEMP	
1847	011150	000765			BR	CRCP1	;DO AGAIN UNTIL DATA=0
1848							;SIMULATE CRC ROTATE, IF CR1 GOES TO 1 COMPLEMENT 4,5,6, AND 7.
1849	011152	042700	177000		CRCR0T: BIC	#177000, RO	
1850	011156	006000			ROR	RO	
1851	011160	103011			BCC	CRCR1	;NO EXIT
1852	011162	052700	000400		BIS	#400, RO	;MAKE BIT1=1
1853	011166	010001			MOV	RO, R1	
1854	011170	042701	000074		BIC	#74, R1	
1855	011174	005100			COM	RO	
1856	011176	042700	000703		BIC	#703, RO	
1857	011202	050100			BIS	R1, RO	;RECOMBINE COMPLEMENTED BITS
1858	011204	000207			CRCR1: RTS	PC	;EXIT
1859							;XOR RO WITH R1, SAVE RESULT IN R1
1860	011206	010103			CRCXOR: MOV	R1, R3	
1861	011210	040001			BIC	RO, R1	
1862	011212	040300			BIC	R3, RO	
1863	011214	050001			BIS	RO, R1	
1864	011216	000207			RTS	PC	
1865	011220	000000			CRXOR1: 0		
1866	011222	000000			CRROT1: 0		
1867	011224	000000			CRXOR2: 0		
1868	011226	000000			CRROT2: 0		

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1869 011230 000000          CRXOR3: 0
1870 011232 000000          CRROT3: 0
1871 011234 000000          CRXOR4: 0
1872 011236 000000          CRROT4: 0
1873 011240 000000          CRCWRT: 0
1874
1875
1876
1877
1878
1879 011242 104400          ;*****
1880 011244 012777 011370 167540  ZEROCRC: SCOPE ;TEST FOR ZERO (0) CRC CHARACTER
1881          MOV #WCRCOBUFF, @CA ;SET CURRENT MEMORY ADDRESS TO BUFFER
1882          MOV #-27, @BC ;CONTAINING '0' CRC PATTERN
1883          ;SET BYTE RECORD COUNTER TO 27(8) BYTES
1884 011260 012777 060005 167520          MOV #60005, @MTC ;TO BE WRITTEN
1885 011266 105777 167514          TSTB @MTC ;800 BPI, 9-CHANNEL, UNIT 1, WRITE, GO
1886 011272 100375          BPL -4 ;CONTROL UNIT READY?
1887 011274 012777 177777 167506          MOV #-1, @BC ;NO - WAIT
1888          ;SET BYTE RECORD COUNTER FOR A
1889 011302 012777 060013 167476          MOV #60013, @MTC ;BACKSPACE OF 1 RECORD
1890 011310 105777 167472          TSTB @MTC ;BACKSPACE 1 RECORD!!
1891 011314 100375          BPL -4 ;CONTROL UNIT READY?
1892          ;NO - WAIT
1893          ;AT THIS POINT WE MUST READ THE DATA JUST WRITTEN IN ORDER TO
1894 011316 012777 011420 167466          ;GET THE CRC CHARACTER INTO THE MAGTAPE DATA BUFFER
1895          MOV #RCRCOBUFF, @CA ;SET CURRENT MEMORY ADDRESS TO DUMP THE
1896 011324 012777 177751 167456          MOV #-27, @BC ;PATTERN JUST WRITTEN
1897          ;SET BYTE RECORD COUNTER TO 27(8) BYTES
1898 011332 012777 060003 167446          MOV #60003, @MTC ;TO BE READ
1899 011340 105777 167442          TSTB @MTC ;800 BPI, 9-CHANNEL, UNIT 0, READ, GO
1900 011344 100375          BPL -4 ;CONTROL UNIT READY?
1901 011346 017700 167442          MOV @MTD, R0 ;NO - WAIT
1902 011352 042700 177000          BIC #177000, R0 ;GET THE GENERATED CRC CHARACTER
1903          ;MASK UPPER BYTE TO SEGREGATE THE
1904 011356 001401          BEQ 1$ ;TOTAL CRC CHARACTER
1905 011360 104000          HLT ;BRANCH IF IT IS 0
1906 011362 104400          1$: SCOPE ;CRC GENERATED NOT 0!!
1907 011364 000137 011450          JMP @MIT ;GO TO MANUAL INTERVENTION TESTS
1908 011370          WCRCOBUFF:
1909 011370 020011 041056 052131 20011, 41056, 52131, 4505, 20040, 41440
1910 011376 004505 020040 041440
1911 011404 026122 043114 046054 26122, 43114, 46054, 26106, 6460, 00012
1912 011412 026106 006460 000012
1913 011420          RCRCOBUFF:
1914 011420 000014          .BLKW 14 ;RESERVE 12 WORDS FOR THE READ BUFFER
1915
1916
1917
1918
1919          ;*****
1920 011450 012777 060017 167330          ;MANUAL INTERVENTION TESTS
1921 011456 105777 167324          MIT: MOV #60017, @MTC ;REWIND
1922 011462 100375          TSTB @MTC
1923 011464 032777 002000 167332          BPL -4
1924 011472 001402          BIT #2000, @SWR
          BEQ .+6

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1925 011474 000137 012666          JMP      TSTEND
1926 011500 012702 014437          MOV      #MSG3,R2
1927 011504 004737 013456          JSR      PC, TOP          ;PRINT INSTRUCTIONS TO SELECT OR INHIBIT TEST
1928 011510 000000          HALT                    ;WAIT FOR OPERATOR TO CONTINUE
1929 011512 104002          CKSWR                    ;CHECK FOR A CNTL G
1930 011514 032777 002000 167302        BIT      #2000,ASWR      ;INHIBIT TESTS?
1931 011522 001402          BEQ      MITA            ;NO
1932 011524 000137 012666          JMP      TSTEND          ;YES
1933
1934
1935 ;*****
1936 ;MAKE SURE UNIT 0 SELECTED, ONLINE, AT BOT
1937 011530 012702 014655        MITA:   MOV      #MSG3A,R2
1938 011534 004737 013456          JSR      PC, TOP          ;REQUEST TS03 RESPONSE
1939 011540 000000          HALT
1940 011542 104400          SCOPE
1941 011544 005077 167236        CLR      @MTC            ;SELECT UNIT 0
1942 011550 105777 167232        TSTB    @MTC
1943 011554 100401          BMI     .+4
1944 011556 104000          HLT
1945 011560 104400          SCOPE                    ;ERROR, CU READY NOT SET, IS UNIT 0 SELECTED?
1946 011562 032777 000040 167214        BIT      #40,@MTC
1947 011570 001001          BNE     .+4
1948 011572 104000          HLT                        ;ERROR, BOT AND TUR NOT SET, IS UNIT 0 ON LINE AT BOT?
1949
1950
1951 ;*****
1952 ;TEST UNIT SELECT SWITCH
1953 011574 112737 000061 014750        MOVB    #61,MSG4+16      ;INITIALIZE TYPEOUT FOR UNIT 1
1954 011602 012737 000400 001032        MOV     #400,TEMP        ;INITIALIZE UNIT SELECT #1
1955 011610 012702 014732          USS:   MOV     #MSG4,R2
1956 011614 004737 013456          JSR     PC, TOP
1957 011620 000000          HALT
1958 011622 104400          SCOPE
1959 011624 013777 001032 167154        MOV     TEMP,@MTC        ;SELECT UNIT
1960 011632 005000          CLR     RO                ;INIT DELAY
1961 011634 032777 000100 167142        USS1:  BIT     #100,@MTC    ;IS SELECT REMOTE SET
1962 011642 001003          BNE     USS2              ;YES
1963 011644 005200          INC     RO                ;NO, HAVE WE WAITED LONG ENOUGH?
1964 011646 001372          BNE     USS1              ;NO, WAIT SOME MORE
1965 011650 104000          HLT
1966 011652 105237 014750          USS2:  INCB   MSG4+16      ;ERROR, PROPER UNIT NOT SELECTED
1967 011656 062737 000400 001032        ADD     #400,TEMP        ;INCREMENT UNIT #
1968 011664 032777 001000 167132        BIT     #1000,ASWR       ;SEE IF TS03
1969 011672 001405          BEQ     USS3              ;IF NOT: BR
1970 011674 022737 001000 001032        CMP     #1000,TEMP       ;SEE IF DONE ALL TS03 UNITS
1971 011702 001342          BNE     USS                ;IF NOT: BR
1972 011704 000404          BR      USS4
1973 011706 022737 004000 001032        USS3:  CMP     #4000,TEMP  ;DONE ALL UNITS?
1974 011714 001335          BNE     USS                ;NO
1975
1976
1977 ;*****
1978 ;TEST ONLINE-OFFLINE SWITCH
1979 011716 012702 014772          USS4:  MOV     #MSG5,R2
1980 011722 004737 013456          JSR     PC, TOP

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1981 011726 000000          HALT
1982 011730 104400          SCOPE
1983 011732 005077 167050 167040 CLR      @MTC      ;SELECT UNIT 0
1984 011736 032777 000100 BIT      #100, @MTS ;
1985 011744 001401 BEQ      .+4
1986 011746 104000 HLT      ;ERROR, SELECT REMOTE SET, UNIT NOT OFF-LINE
1987
1988
1989
1990
1991
1992
1993 ;*****
1994 ;TEST WRITE LOCK SWITCH
1994 011750 012702 015044 MOV      #MSG6, R2
1995 011754 004737 013456 JSR      PC, TOP
1996 011760 000000          HALT
1997 011762 104400          SCOPE
1998 011764 005077 167016 CLR      @MTC      ;SELECT UNIT 0
1999 011770 032777 000004 167006 BIT      #4, @MTS ;IS WRITE LOCK SET?
2000 011776 001001 BNE     .+4        ;YES
2001 012000 104000 HLT      ;ERROR, WRL (BIT 2) NOT SET WITH WRITE LOCK RING REMOVED
2002
2003
2004 ;*****
2005 ;TEST WRITE WITH WRITE LOCK RING REMOVED TO CAUSE ILLEGAL COMMAND
2006 012002 104400          SCOPE
2007 012004 005077 167000 CLR      @BC
2008 012010 005077 166776 CLR      @CA
2009 012014 012777 060005 166764 MOV      #60005, @MTC
2010 012022 105777 166760 TSTB    @MTC
2011 012026 100375 BPL     .-4
2012 012030 005777 166752 TST     @MTC
2013 012034 100401 BMI     .+4
2014 012036 104000 HLT      ;ERROR (BIT 15) NOT SET AFTER WRITE WITH WRITE LOCK SET
2015 012040 005777 166740 TST     @MTS
2016 012044 100401 BMI     .+4
2017 012046 104000 HLT      ;ERROR, ILLEGAL COMMAND (BIT 15) NOT SET AFTER WRITE WITH
2018
2019
2020 ;*****
2021 ;TEST OFFLINE FUNCTION TO SET UNIT OFFLINE AND REWIND TO BOT
2022 012050 104400          SCOPE
2023 012052 012702 015177 MOV      #MSG7, R2
2024 012056 004737 013456 JSR      PC, TOP
2025 012062 032777 001000 166734 BIT      #1000, @SWR ;SEE IF TS03
2026 012070 001004 BNE     1$        ;IF S0: BR
2027 012072 012702 015264 MOV      #MSG7A, R2
2028 012076 004737 013456 JSR      PC, TOP
2029 012102 012702 015340 1$: MOV     #MSG7B, R2
2030 012106 004737 013456 JSR      PC, TOP
2031 012112 000000          HALT
2032 012114 104002 CKSWR   ;CHECK FOR CNTL G
2033 012116 012777 010000 166662 MOV      #10000, @MTC ;POWER CLEAR
2034 012124 105777 166656 TSTB    @MTC
2035 012130 100375 BPL     .-4
2036 012132 032777 000100 166644 BIT      #100, @MTS

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2037	012140	001001			BNE	.+4	
2038	012142	104000			HLT		;ERROR, UNIT 0 NOT ON LINE, OFF BOT
2039	012144	104400			SCOPE		
2040	012146	012777	000001	166632	MOV	#1,DMTC	;GO OFFLINE
2041	012154	105777	166626		TSTB	DMTC	
2042	012160	100375			BPL	.-4	
2043	012162	032777	000100	166614	BIT	#100,DMTS	
2044	012170	001401			BEQ	.+4	
2045	012172	104000			HLT		;ERROR, SELR (BIT 6) NOT CLEARED BY OFFLINE COMMAND
2046					;RE-SET UNIT		
2047	012174	012702	015454		MOV	#MSG8,R2	
2048	012200	004737	013456		JSR	PC, TOP	
2049	012204	000000			HALT		
2050	012206	104002			CKSWR		;CHECK FOR CNTL G
2051							
2052							
2053							
2054							
2055							
2056							
2057	012210	012702	015535		MOV	#MSG9,R2	
2058	012214	004737	013456		JSR	PC, TOP	
2059	012220	000000			HALT		
2060	012222	104002			CKSWR		;CHECK FOR CNTL G
2061	012224	032777	000002	166572	BIT	#2,DSWR	
2062	012232	001047			BNE	BGL1	
2063	012234	012702	015655		MOV	#MSG10,R2	
2064	012240	004737	013456		JSR	PC, TOP	
2065	012244	104400			SCOPE		
2066	012246	005077	166534		CLR	DMTC	
2067	012252	105777	166530		TSTB	DMTC	
2068	012256	100375			BPL	.-4	
2069	012260	012777	177756	166522	MOV	#-18.,DBC	
2070	012266	012777	017230	166516	MOV	#WBUF,ACA	
2071	012274	012777	060005	166504	MOV	#60005,DMTC	;WRITE, 800 BPI, GO
2072	012302	022777	017232	166502	CMP	#WBUF+2,ACA	
2073	012310	003774			BLE	.-6	;WAIT FOR NPR SEQUENCE TO START
2074	012312	000000			HALT		;CAUSE BGL, WAIT FOR CONTINUE
2075	012314	104002			CKSWR		;CHECK FOR CNTL G
2076	012316	032777	004000	166460	BIT	#4000,DMTS	
2077	012324	001001			BNE	.+4	
2078	012326	104000			HLT		;ERROR, BGL (BIT 11) NOT=1.
2079	012330	052777	010000	166450	BIS	#10000,DMTC	;POWER CLEAR
2080	012336	032777	004000	166440	BIT	#4000,DMTS	
2081	012344	001401			BEQ	.+4	
2082	012346	104000			HLT		;ERROR, POWER CLEAR DIDN'T CLEAR BGL (BIT 11)
2083	012350	000443			BR	LASTTEST	
2084	012352	012702	015723		MOV	#MSG11,R2	
2085	012356	004737	013456		JSR	PC, TOP	
2086	012362	104400			SCOPE		
2087	012364	005077	166416		CLR	DMTC	
2088	012370	105777	166412		TSTB	DMTC	
2089	012374	100375			BPL	.-4	
2090	012376	012777	177756	166404	MOV	#-18.,DBC	
2091	012404	012777	017230	166400	MOV	#WBUF,ACA	
2092	012412	000000			HALT		

```

;*****
;TEST BUS GRANT LATE (BIT 11) TO=1
;HALT PROCESSOR DURING AN NPR SEQUENCE

```

BGL1:

```

2093 012414 012777 060005 166364      MOV      #60005, @MTC      ;WRITE, 800 BPI, GO
2094 012422 000240                      NOP
2095 012424 000240                      NOP
2096 012426 032777 004000 166350      BIT      #4000, @MTC
2097 012434 001001                      BNE      .+4
2098 012436 104000                      HLT
2099 012440 052777 010000 166340      BIS      #10000, @MTC      ;ERROR, BGL (BIT 11) NOT= 1
2100 012446 032777 004000 166330      BIT      #4000, @MTC      ;POWER CLEAR
2101 012454 001401                      BEQ
2102 012456 104000                      HLT      .+4
2103
2104
2105
2106
2107 012460 104400
2108 012462 012702 016211
2109 012466 004737 013456
2110 012472 000000
2111 012474 104002
2112 012476 032777 000004 166320      BIT      #4, @SWR
2113 012504 001470                      BEQ
2114 012506 012702 016313      MOV      #MSG13, R2
2115
2116 012512 004737 013456      JSR      PC, TOP
2117 012516 032777 001000 166300      BIT      #1000, @SWR
2118 012524 001004                      BNE      1$
2119 012526 012702 016366      MOV      #MSG13A, R2
2120 012532 004737 013456      JSR      PC, TOP
2121 012536 012702 016441      MOV      #MSG13B, R2
2122 012542 004737 013456      JSR      PC, TOP
2123 012546 000000                      HALT
2124 012550 104002
2125 012552 012702 016712      MOV      #MSG16, R2
2126
2127 012556 004737 013456      JSR      PC, TOP
2128 012562 000000                      HALT
2129 012564 104002
2130 012566 005077 166214      CLR      @MTC
2131
2132
2133 012572 012700 007777      MOV      #7777, R0
2134 012576 005300 3$: DEC      R0
2135 012600 001402                      BEQ      4$
2136 012602 000137 012576      JMP
2137 012606 012777 060417 166172 4$: MOV      #60417, @MTC
2138
2139
2140 012614 105777 166166      TSTB    @MTC
2141 012620 100375                      BPL      .-4
2142 012622 005777 166156      TST     @MTC
2143 012626 100401                      BMI      5$
2144 012630 000410                      BR       6$
2145 012632 104000                      HLT
2146 012634 052777 010000 166144 5$: BIS      #10000, @MTC
2147 012642 005777 166136      TST     @MTC
2148 012646 100001                      BPL      .+4

```

TEST FOR ILC ERROR ON DELAYED UNIT CHANGE

LASTTEST:

SCOPE
MOV #MSG12, R2 ;FIND OUT IF WE HAVE A 2ND TRANSPORT
JSR PC, TOP

HALT
CKSWR ;CHECK FOR CNTL G
BIT #4, @SWR ;DO WE HAVE A 2ND TRANSPORT?
BEQ TSTEND ;BRANCH IF NO
MOV #MSG13, R2 ;GET OPERATOR TO SELECT UNIT 1 ON 1ST
;TRANSPORT, ON-LINE

JSR PC, TOP
BIT #1000, @SWR ;SEE IF TS03
BNE 1\$;IF SO: BR

MOV #MSG13A, R2
JSR PC, TOP
1\$: MOV #MSG13B, R2
JSR PC, TOP

HALT
CKSWR ;CHECK FOR CNTL G
MOV #MSG16, R2 ;GET OPERATOR TO SELECT UNIT 0 ON 2ND
;TRANSPORT, ON-LINE

JSR PC, TOP
HALT
CKSWR ;CHECK FOR CNTL G
CLR @MTC ;SELECT UNIT 0
;IT SHOULD BE POWERED UP AND
;ON LINE
;DELAY BETWEEN CHANGING UNITS

MOV #7777, R0
DEC R0
BEQ 4\$;BRANCH AFTER DELAY
JMP @#3\$;KEEP DELAYING
4\$: MOV #60417, @MTC ;LOAD THE COMMAND REGISTER WITH
;800 BPI (7 OR 9-CHANNEL), REWIND, GO
;THIS COMMAND WILL CHANGE UNITS AND REWIND
;CONTROL UNIT READY?
;NO - WAIT
;ILLEGAL COMMAND ERROR PRESENT?
;BRANCH IF YES

HLT
BIS #10000, @MTC ;ILC BIT SET - SHOULDN'T BE!!
TST @MTC ;ISSUE A POWER CLEAR!!
BPL .+4 ;ILLEGAL COMMAND BIT CLEAR?
;BRANCH IF YES

```

2149 012650 104000
2150 012652 012702 017010 6$: HLT ;POWER CLEAR DIDN'T CLEAR ILC BIT
2151 ;GET OPERATOR TO RESELECT UNIT 1 TO 0
2152 012656 004737 013456 JSR PC, TOP ;AND TURN 2ND TRANSPORT OFF-LINE
2153 012662 000000 HALT
2154 012664 104400 SCOPE
2155 ;END OF PASS MESSAGE
2156 012666 012702 017124 TSTEND: MOV #MSG20, R2
2157 012672 004737 013456 JSR PC, TOP ;PRINT END OF PASS
2158 012676 013702 001036 MOV PCNTR, R2
2159 012702 004737 013176 JSR PC, OCTPRT ;PRINT END OF PASS NUMBER
2160 012706 005237 001036 INC PCNTR ;BUMP PASS COUNTER
2161 012712 105777 166070 TSTB @MTC
2162 012716 100375 BPL -4
2163 012720 012777 060017 166060 MOV #50017, @MTC ;REWIND UNIT
2164 012726 105777 166054 TSTB @MTC
2165 012732 100375 BPL -4
2166 012734 006077 166044 ROR @MTC
2167 012740 103375 BCC -4
2168 012742 013702 000042 MOV @#42, R2
2169 012746 001405 BEQ THERE
2170 012750 000005 RESET
2171 012752 004712 SENDAD: JSR PC, (R2)
2172 012754 000240 NOP
2173 012756 000240 NOP
2174 012760 000240 NOP
2175 012762 000240 THERE: NOP
2176 012764 032777 004000 166032 BIT #4000, @SWR ;SEE IF SINGLE PASS
2177 012772 001401 BEQ IS ;IF NOT: BR
2178 012774 000000 HALT
2179 012776 000137 001220 IS: JMP BEGIN ;START OF TEST WITH TRACE OFF
2180
2181 ;ENTERED WITH SYSTEM TRAP CALL (HLT)
2182 ;PRINT PC, STATUS REGISTER, COMMAND REGISTER, BYTE COUNT, CURRENT ADDRESS, DATA BUFFER
2183 013002 037727 166016 020000 PRINT: BIT @SWR, #20000 ;TEST FOR INHIBIT PRINT OUT
2184 013010 001401 BEQ +4 ;BRANCH TO PRINT
2185 013012 000466 BR IS ;INHIBIT, RETURN TO MAIN STREAM
2186 013014 012702 014322 MOV #MSG1, R2
2187 013020 005737 013174 TST PRINT1
2188 013024 001402 BEQ +6
2189 013026 012702 014434 MOV #MSG2, R2
2190 013032 004737 013456 JSR PC, TOP ;PRINT ERROR HEADING
2191 013036 005237 013174 INC PRINT1
2192 013042 011602 MOV (SP), R2
2193 013044 162702 000002 SUB #2, R2
2194 013050 004737 013176 JSR PC, OCTPRT ;PRINT PC
2195 013054 017702 165724 MOV @MTC, R2
2196 013060 004737 013176 JSR PC, OCTPRT ;PRINT STATUS REGISTER
2197 013064 017702 165716 MOV @MTC, R2
2198 013070 004737 013176 JSR PC, OCTPRT ;PRINT COMMAND REGISTER
2199 013074 017702 165710 MOV @BC, R2
2200 013100 004737 013176 JSR PC, OCTPRT ;PRINT BYTE COUNT
2201 013104 017702 165702 MOV @CA, R2
2202 013110 004737 013176 JSR PC, OCTPRT ;PRINT CURRENT ADDRESS
2203 013114 017702 165674 MOV @MD, R2
2204 013120 042702 177000 BIC #177000, R2

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2205	013124	004737	013176			JSR	PC, OCTPRT		;PRINT DATA BUFFER
2206	013130	017702	165662			MOV	3MTRD, R2		
2207	013134	004737	013176			JSR	PC, OCTPRT		;PRINT TUIO READ LINES
2208	013140	013702	001032			MOV	TEMP, R2		
2209	013144	004737	013176			JSR	PC, OCTPRT		;PRINT TEMP
2210	013150	013702	011240			MOV	CRCWRT, R2		
2211	013154	004737	013176			JSR	PC, OCTPRT		
2212	013160	005777	165640			TST	3SWR		;CHECK 3SWR FOR HALT SWITCH
2213	013164	100001				BPL	IS		
2214	013166	000000				HALT			;HALT ON ERROR UP
2215	013170	104002			IS:	CKSWR			;CHECK FOR CNTL G
2216	013172	000207				RTS	PC		;RETURN TO MAINLINE
2217	013174	000000			PRINT1:	0			
2218					:PRINT	OCTAL VALUE IN REGISTER2			
2219	013176	012737	000060	013310	OCTPRT:	MOV	#'0, CHAR		;INITIALIZE 1ST NUMBER AS 0
2220	013204	005702				TST	R2		;IS VALUE POSITIVE
2221	013206	100003				BPL	OCT1		;YES PRINT 0
2222	013210	012737	000061	013310	OCT1:	MOV	#'1, CHAR		;NO PRINT 1
2223	013216	004737	013312			JSR	PC, OCTP		
2224	013222	006102				ROL	R2		
2225	013224	006102				ROL	R2		
2226	013226	012737	177773	013306	OCT2:	MOV	#-5, OCT		;COUNT 5 DIGITS
2227	013234	006102				ROL	R2		
2228	013236	006102				ROL	R2		
2229	013240	006102				ROL	R2		
2230	013242	010237	013310			MOV	R2, CHAR		;SAVE DIGIT
2231	013246	042737	177770	013310		BIC	#177770, CHAR		;CLEAR OTHER BITS
2232	013254	052737	000060	013310		BIS	#60, CHAR		;MAKE ASCII DIGIT
2233	013262	006002				ROR	R2		
2234	013264	004737	013312			JSR	PC, OCTP		;PRINT
2235	013270	006102				ROL	R2		
2236	013272	005237	013306			INC	OCT		;+1 TO DIGIT COUNT
2237	013276	001356				BNE	OCT2		;NOT DONE
2238	013300	004737	013330			JSR	PC, SP3		
2239	013304	000207				RTS	PC		;EXIT
2240	013306	000000			OCT:	0			
2241	013310	000000			CHAR:	0			
2242	013312	105777	165504		OCTP:	TSTB	3TPS		
2243	013316	100375				BPL	-4		;WAIT FOR READY
2244	013320	013777	013310	165472		MOV	CHAR, 3TPB		;PRINT
2245	013326	000207				RTS	PC		
2246									
2247					:TYPE 3 SPACES				
2248	013330	012702	013342		SP3:	MOV	#SP3A, R2		
2249	013334	004737	013456			JSR	PC, TOP		
2250	013340	000207				RTS	PC		
2251	013342	020057	027440		SP3A:	.ASCII ;/ /;			
2252						.EVEN			
2253									
2254					:SCOPE LOOP ROUTINE ENTERED BY USER TRAP				
2255	013346	104002			SCOPEA:	CKSWR			;CHECK FOR CNTL G
2256	013350	032777	040000	165446		BIT	#40000, 3SWR		
2257	013356	001003				BNE	SCOPEB		;SCOPE, BIT IS A ONE
2258	013360	011637	013454			MOV	3SP, RETURN		;NO - SAVE PC FOR NEXT TIME
2259	013364	000002				RTI			;RETURN IN SEQUENCE
2260	013366	022606			SCOPEB:	CMP	(SP)+, SP		;REPOSITION THE STACK

```

2261 013370 012637 177776      MOV      (SP)+,CC
2262 013374 000177 000054      JMP      @RETURN      ;SCOPE RETURN
2263
2264      ;SCOPE OR/AND ITERATION LOOP FOR EACH TEST 4000 TIMES
SCOPEC: CKSWR      ;CHECK FOR CNTL G
2265 013400 104002      BIT      #40000,@SWR      ;TEST SWR FOR SCOPE
2266 013402 032777 040000 165414      BNE     SCOPEB      ;YES SCOPE
2267 013410 001366      BIT      #10000,@SWR      ;NO - TEST FOR ITERATION
2268 013412 032777 010000 165404      BNE     SCOPEG      ;INHIBIT ITERATION
2269 013420 001007      CMP      SCOPEF,ICOUNT
2270 013422 023737 013452 001034      BEQ     SCOPEG
2271 013430 001403      INC     SCOPEF
2272 013432 005237 013452      BR      SCOPEB
2273 013436 000753      SCOPEG: CLR    SCOPEF
2274 013440 005037 013452      MOV     @SP,RETURN
2275 013444 011637 013454      RTI
2276 013450 000002
2277 013452 000000      SCOPEF: 0
2278 013454 001220      RETURN: BEGIN
2279
2280      ;MOV ADDRESS OF MESSAGE TO REGISTER 2
2281 013456 142777 000177 165336      ;THEN JSR PC, TOP
TOP: BICB     #177,@TPS      ;CLR INT FLAG
2282 013464 112237 013556      MOV     (R2)+,EOMK      ;MOVE IN EOM MARKER
2283 013470 121237 013556      TOP1:  CMPB   @R2,EOMK      ;COMPARE FOR EOM
2284 013474 001001      BNE     +4
2285 013476 000207      RTS     PC
2286 013500 121227 000100      CMPB   @R2,#'a
2287 013504 001406      BEQ     TOP2
2288 013506 105777 165310      TSTB   @TPS
2289 013512 100375      BPL     -4
2290 013514 112277 165300      MOV     (R2)+,@TPB
2291 013520 000763      BR      TOP1
2292 013522 105777 165274      TOP2:  TSTB   @TPS
2293 013526 100375      BPL     -4
2294 013530 112777 000215 165262      MOV     #215,@TPB
2295 013536 105777 165260      TSTB   @TPS
2296 013542 100375      BPL     -4
2297 013544 112777 000212 165246      MOV     #212,@TPB
2298 013552 005202      INC     R2
2299 013554 000745      BR      TOP1
2300 013556 000      EOMK:  .BYTE 0
2301      .EVEN
2302
2303
2304
2305      ;*****
2306      ;SOFTWARE SWITCH REGISTER CHANGE ROUTINE
2307
2308 013560 022737 000176 001024      CKSWRR: CMP     #SWREG,SWR      ;SOFTWARE SWITCH REG PRESENT
2309 013566 001041      BNE     OUT
2310      ;NO, GET OUT
2311 013570 105777 165232      TSTB   @TKS
2312 013574 100036      BPL     OUT
2313 013576 017737 165226 014100      MOV     @TKB,TIB
2314 013604 042737 177600 014100      BIC     #177600,TIB
2315 013612 022737 000007 014100      CMP     #7,TIB
2316 013620 001024      BNE     OUT
;IS IT A <↑G>
    
```

```

2317 013622 012702 017202      MOV      #SCNTG,R2
2318 013626 004737 013456      JSR      PC, TOP
2319 013632 012702 017210      CNTLU:  MOV      #MSWR,R2
2320 013636 004737 013456      JSR      PC, TOP
2321 013642 017702 165156      MOV      @SWR,R2
2322 013646 004737 013176      JSR      PC, OCTPRT
2323 013652 012702 017217      MOV      #SMNEW,R2
2324 013656 004737 013456      JSR      PC, TOP
2325 013662 005037 014076      CLR      @TEMPST
2326 013666 004737 013674      JSR      PC, $READ
2327 013672 000207      OUT:    RTS      PC
                                           ;GO READ A LINE
                                           ;RETURN TO MAIN BODY OF PROGRAM
2328
2329 013674 005037 014076      $READ:  CLR      TEMPST
2330 013700 012737 000007 014074      MOV      #7,COUNT
2331 013706 004737 014126      1$:     JSR      PC, TTIN
2332 013712 042737 177600 014100      BIC      #177600,TIB
2333 013720 122737 000025 014100      CMPB     #25,TIB
2334 013726 001002      BNE      2$
2335 013730 005726      3$:     TST      (SP)+
2336 013732 000737      BR      CNTLU
2337 013734 122737 000015 014100      2$:     CMPB     #15,TIB
2338 013742 001012      BNE      4$
2339 013744 012702 014434      MOV      #MSG2,R2
2340 013750 004737 013456      JSR      PC, TOP
2341 013754 022737 000007 014074      CMP      #7,COUNT
2342 013762 001037      BNE      7$
2343 013764 005726      8$:     TST      (SP)+
2344 013766 000741      BR      OUT
2345 013770 122737 000060 014100      4$:     CMPB     #60,TIB
2346 013776 003004      BGT      5$
2347 014000 122737 000067 014100      CMPB     #67,TIB
2348 014006 002005      BGE      6$
2349 014010 012702 017225      5$:     MOV      #SQUEST,R2
2350 014014 004737 013456      JSR      PC, TOP
2351 014020 000743      BR      3$
2352 014022 006337 014076      6$:     ASL      TEMPST
2353 014026 006337 014076      ASL      TEMPST
2354 014032 006337 014076      ASL      TEMPST
2355 014036 142737 000060 014100      BICB     #60,TIB
2356 014044 153737 014100 014076      BISB     TIB,TEMPST
2357 014052 005337 014074      DEC      COUNT
2358 014056 001754      BEQ      5$
2359 014060 000712      BR      1$
2360 014062 013777 014076 164734      7$:     MOV      TEMPST,@SWR
2361 014070 000735      BR      8$
                                           ;START OVER IF NOT LEGAL CHARACTER
2362
2363 014072 000000      RDSW:   0
2364 014074 000000      COUNT:  0
2365 014076 000000      TEMPST: 0
2366 014100 000000      TIB:    0
2367
2368
2369
2370
                                           ;*****
                                           ;TRAP HANDLER
2371 014102 011666 000002      TRAP30: MOV      @SP,2(6)
2372 014106 162716 000002      SUB      #2,@SP

```

```

2373 014112 013646
2374 014114 062716 110122
2375 014120 013607
2376 014122 013002
2377 014124 013560
2378      104000
2379      104002
2380
2381
2382
2383
2384
2385 014126 005077 164674
2386 014132 005077 164672
2387 014136 005037 014100
2388 014142 005277 164660
2389 014146 105777 164654
2390 014152 100375
2391 014154 017737 164650 014100
2392 014162 105777 164634
2393 014166 100375
2394 014170 113777 014100 164622
2395 014176 000207
2396

```

```

MOV @6)+-(6)
ADD #TABLE-104000,@SP
MOV @SP)+,PC
TABLE: PRINT
        CKSWRR
HLT= 104000
CKSWR= 104002

```

```

;*****
;TTY READ SUBROUTINE

```

```

TTIN: CLR @TKS
      CLR @TKB
      CLR TIB
      INC @TKS
TTIN1: TSTB @TKS
      BPL TTIN1
      MOV @TKB,TIB
TTIN2: TSTB @TPS
      BPL TTIN2
      MOVB TIB,@TPB
      RTS PC

```

2397	014200	040057	046524	040454	MSG0:	.ASCII ;/QTM,A,B-11:TS03 OR TUIO,N,W INSTRUCTION TEST (DZTMA-H)/;
2398	014206	041054	030455	035061		
2399	014214	051524	031460	047440		
2400	014222	020122	052524	030061		
2401	014230	047054	053454	044440		
2402	014236	051516	051124	041525		
2403	014244	044524	047117	052040		
2404	014252	051505	020124	042050		
2405	014260	052132	040515	044055		
2406	014266	027451				
2407	014270	040057	042523	020124	MSG01:	.ASCII ;/QSET SW0=1 IF 7 CHANNELQ/;
2408	014276	053523	036460	020061		
2409	014304	043111	033440	041440		
2410	014312	040510	047116	046105		
2411	014320	027500				
2412	014322	040057	020040	041520	MSG1:	.ASCII ;/Q PC STATUS COMAND BYTE CA DATA B READ L TEMP CRC CA
2413	014330	020040	020040	052123		
2414	014336	052101	051525	020040		
2415	014344	047503	040515	042116		
2416	014352	020040	041040	052131		
2417	014360	020105	020040	020040		
2418	014366	040503	020040	020040		
2419	014374	040504	040524	041040		
2420	014402	020040	042522	042101		
2421	014410	046040	020040	052040		
2422	014416	046505	020120	041440		
2423	014424	041522	041440	046101		
2424	014432	027500				
2425	014434	040057	057		MSG2:	.ASCII ;/Q/;
2426	014437	057	052100	020117	MSG3:	.ASCII ;/QTO INHIBIT MANUAL INTERVENTION TEST: SET SW10=1 AND PRESS CONTINUE;
2427	014444	047111	044510	044502		
2428	014452	020124	040515	052516		
2429	014460	046101	044440	052116		
2430	014466	051105	042526	052116		
2431	014474	047511	020116	042524		
2432	014502	052123	020072	051440		
2433	014510	052105	051440	030527		
2434	014516	036460	020061	047101		
2435	014524	020104	051120	051505		
2436	014532	020123	047503	052116		
2437	014540	047111	042525			
2438	014544	047500	044124	051105		.ASCII ;/QOTHERWISE SET SW10=0, SELECT UNIT 0, ON LINE, AT BOT AND PRESS CONTINU
2439	014552	044527	042523	051440		
2440	014560	052105	051440	030527		
2441	014566	036460	026060	051440		
2442	014574	046105	041505	020124		
2443	014602	047125	052111	030040		
2444	014610	020054	047117	046040		
2445	014616	047111	026105	040440		
2446	014624	020124	047502	020124		
2447	014632	047101	020104	051120		
2448	014640	051505	020123	047503		
2449	014646	052116	047111	042525		
2450	014654	057				
2451	014655	057	044500	020106	MSG3A:	.ASCII ;/QIF UNIT IS TS03, SET SW9=1, PRESS CONTINUE/;
2452	014662	047125	052111	044440		

2453 014670 020123 051524 031460
 2454 014676 020054 042523 020124
 2455 014704 053523 036471 026061
 2456 014712 050040 042522 051523
 2457 014720 041440 047117 044524
 2458 014726 052516 027505
 2459 014732 040057 042523 042514
 2460 014740 052103 052440 044516
 2461 014746 020124 026061 050040
 2462 014754 042522 051523 041440
 2463 014762 047117 044524 052516
 2464 014770 027505
 2465 014772 040057 042523 042514
 2466 015000 052103 052440 044516
 2467 015006 020124 026060 047440
 2468 015014 043106 046055 047111
 2469 015022 026105 050040 042522
 2470 015030 051523 041440 047117
 2471 015036 044524 052516 027505
 2472 015044 040057 044504 046523
 2473 015052 052517 052116 052040
 2474 015060 050101 026105 051040
 2475 015066 046505 053117 020105
 2476 015074 051127 052111 020105
 2477 015102 047514 045503 051040
 2478 015110 047111 026107 046440
 2479 015116 052517 052116 052040
 2480 015124 050101 105
 2481 015127 100 042523 042514
 2482 015134 052103 052440 044516
 2483 015142 020124 026060 047440
 2484 015150 020116 044514 042516
 2485 015156 020054 051120 051505
 2486 015164 020123 047503 052116
 2487 015172 047111 042525 057
 2488 015177 057 042100 051511
 2489 015204 047515 047125 020124
 2490 015212 040524 042520 020054
 2491 015220 042522 046120 041501
 2492 015226 020105 051127 052111
 2493 015234 020105 047514 045503
 2494 015242 051040 047111 026107
 2495 015250 046440 052517 052116
 2496 015256 052040 050101 027505
 2497 015264 040057 047515 042526
 2498 015272 052040 050101 020105
 2499 015300 044123 051117 020124
 2500 015306 044504 052123 047101
 2501 015314 042503 043040 051117
 2502 015322 040527 042122 043040
 2503 015330 047522 020115 047502
 2504 015336 027524
 2505 015340 040057 042523 042514
 2506 015346 052103 052440 044516
 2507 015354 020124 026060 047440
 2508 015362 020116 044514 042516

MSG4: .ASCII ;/@SELECT UNIT 1, PRESS CONTINUE/;

MSG5: .ASCII ;/@SELECT UNIT 0, OFF-LINE, PRESS CONTINUE/;

MSG6: .ASCII ;/@DISMOUNT TAPE, REMOVE WRITE LOCK RING, MOUNT TAPE;

.ASCII ;@SELECT UNIT 0, ON LINE, PRESS CONTINUE/;

MSG7: .ASCII ;/@DISMOUNT TAPE, REPLACE WRITE LOCK RING, MOUNT TAPE/;

MSG7A: .ASCII ;/@MOVE TAPE SHORT DISTANCE FORWARD FROM BOT/;

MSG7B: .ASCII ;/@SELECT UNIT 0, ON LINE, PRESS CONTINUE;

2509	015370	020054	051120	051505	
2510	015376	020123	047503	052116	
2511	015404	047111	042525		
2512	015410	052500	044516	020124	.ASCII ;@UNIT SHOULD GO OFFLINE AND REWIND@/;
2513	015416	044123	052517	042114	
2514	015424	043440	020117	043117	
2515	015432	046106	047111	020105	
2516	015440	047101	020104	042522	
2517	015446	044527	042116	027500	
2518	015454	040057	042523	042514	MSG8: .ASCII ;/@SELECT UNIT 0, ON LINE, AT BOT, PRESS CONTINUE/;
2519	015462	052103	052440	044516	
2520	015470	020124	026060	047440	
2521	015476	020116	044514	042516	
2522	015504	020054	052101	041040	
2523	015512	052117	020054	051120	
2524	015520	051505	020123	047503	
2525	015526	052116	047111	042525	
2526	015534	057			
2527	015535	057	044500	020106	MSG9: .ASCII ;/@IF PROCESSOR IS A PDP-45, SET SW 1=1;
2528	015542	051120	041517	051505	
2529	015550	047523	020122	051511	
2530	015556	040440	050040	050104	
2531	015564	032055	026065	051440	
2532	015572	052105	051440	020127	
2533	015600	036461	061		
2534	015603	100	043111	040440	.ASCII ;@IF ANY OTHER, SET SW 1=0, PRESS CONTINUE/;
2535	015610	054516	047440	044124	
2536	015616	051105	020054	042523	
2537	015624	020124	053523	030440	
2538	015632	030075	020054	051120	
2539	015640	051505	020123	047503	
2540	015646	052116	047111	042525	
2541	015654	057			
2542	015655	057	050100	047522	MSG10: .ASCII ;/@PROCESSOR WILL HALT, PRESS CONTINUE/;
2543	015662	042503	051523	051117	
2544	015670	053440	046111	020114	
2545	015676	040510	052114	020054	
2546	015704	051120	051505	020123	
2547	015712	047503	052116	047111	
2548	015720	042525	057		
2549	015723	057	050100	047522	MSG11: .ASCII ;/@PROCESSOR WILL HALT, PUT 'ENABLE-HALT' SW ON 'HALT';
2550	015730	042503	051523	051117	
2551	015736	020040	044527	046114	
2552	015744	044040	046101	026124	
2553	015752	050040	052125	023440	
2554	015760	047105	041101	042514	
2555	015766	044055	046101	023524	
2556	015774	051440	020127	047117	
2557	016002	023440	040510	052114	
2558	016010	047			
2559	016011	100	052520	020124	.ASCII ;@PUT 'S-INST-S-BUS CYCLE' SW ON 'S-BUS CYCLE';
2560	016016	051447	044455	051516	
2561	016024	026524	026523	052502	
2562	016032	020123	054503	046103	
2563	016040	023505	051440	020127	
2564	016046	047117	023440	026523	

2565	016054	052502	020123	054503	
2566	016062	046103	023505		
2567	016066	050100	042522	051523	.ASCII ;@PRESS 'CONTINUE' 6 TIMES;
2568	016074	023440	047503	052116	
2569	016102	047111	042525	020047	
2570	016110	020066	044524	042515	
2571	016116	123			
2572	016117	100	052520	020124	.ASCII ;@PUT SW'S BACK TO 'ENABLE' & 'S-INST', PRESS 'CONTINUE'@/;
2573	016124	053523	051447	020040	
2574	016132	040502	045503	052040	
2575	016140	020117	042447	040516	
2576	016146	046102	023505	023040	
2577	016154	023440	026523	047111	
2578	016162	052123	026047	050040	
2579	016170	042522	051523	023440	
2580	016176	047503	052116	047111	
2581	016204	042525	040047	057	
2582	016211	057	051500	052105	MSG12: .ASCII ;/@SET SW2 = 1 IF A 2ND TRANSPORT IS AVAILABLE;
2583	016216	051440	031127	036440	
2584	016224	030440	044440	020106	
2585	016232	020101	047062	020104	
2586	016240	051124	047101	050123	
2587	016246	051117	020124	051511	
2588	016254	040440	040526	046111	
2589	016262	041101	042514		
2590	016266	052100	042510	020116	.ASCII ;@THEN PRESS CONTINUE/;
2591	016274	051120	051505	020123	
2592	016302	047503	052116	047111	
2593	016310	042525	057		
2594	016313	057	051500	046105	MSG13: .ASCII ;/@SELECT UNIT 1, ON-LINE, ON 1ST TRANSPORT/;
2595	016320	041505	020124	047125	
2596	016326	052111	030440	020054	
2597	016334	047117	046055	047111	
2598	016342	026105	047440	020116	
2599	016350	051461	020124	051124	
2600	016356	047101	050123	051117	
2601	016364	027524			
2602	016366	040057	047101	020104	MSG13A: .ASCII ;/@AND MOVE UNIT 1 ON 1ST TRANSPORT OFF BOT/;
2603	016374	047515	042526	052440	
2604	016402	044516	020124	020061	
2605	016410	047117	030440	052123	
2606	016416	052040	040522	051516	
2607	016424	047520	052122	047440	
2608	016432	043106	041040	052117	
2609	016440	057			
2610	016441	057	052100	042510	MSG13B: .ASCII ;@THEN PRESS CONTINUE/;
2611	016446	020116	051120	051505	
2612	016454	020123	047503	052116	
2613	016462	047111	042525	057	
2614	016467	057	046100	053517	MSG14: .ASCII ;/@LOW BYTE OF COMMAND REGISTER LOADED INCORRECTLY;
2615	016474	041040	052131	020105	
2616	016502	043117	041440	046517	
2617	016510	040515	042116	051040	
2618	016516	043505	051511	042524	
2619	016524	020122	047514	042101	
2620	016532	042105	044440	041516	

2621	016540	051117	042522	052103	
2622	016546	054514			
2623	016550	052500	044523	043516	.ASCII ;@USING BYTE INSTRUCTION/;
2624	016556	041040	052131	020105	
2625	016564	047111	052123	052522	
2626	016572	052103	047511	027516	
2627	016600	040057	044510	044107	MSG15: .ASCII ;/@HIGH BYTE OF COMMAND REGISTER LOADED INCORRECTLY;
2628	016606	041040	052131	020105	
2629	016614	043117	041440	046517	
2630	016622	040515	042116	051040	
2631	016630	043505	051511	042524	
2632	016636	020122	047514	042101	
2633	016644	042105	044440	041516	
2634	016652	051117	042522	052103	
2635	016660	054514			
2636	016662	052500	044523	043516	.ASCII ;@USING BYTE INSTRUCTION/;
2637	016670	041040	052131	020105	
2638	016676	047111	052123	052522	
2639	016704	052103	047511	027516	
2640	016712	040057	042523	042514	MSG16: .ASCII ;/@SELECT UNIT 0 ON 2ND TRANSPORT, ON-LINE;
2641	016720	052103	052440	044516	
2642	016726	020124	020060	047117	
2643	016734	031040	042116	052040	
2644	016742	040522	051516	047520	
2645	016750	052122	020054	047117	
2646	016756	046055	047111	105	
2647	016763	100	044124	047105	.ASCII ;@THEN PRESS CONTINUE/;
2648	016770	050040	042522	051523	
2649	016776	041440	047117	044524	
2650	017004	052516	027505		
2651	017010	040057	042522	042523	MSG17: .ASCII ;/@RESELECT UNIT 1 TO 0, AND TURN 2ND TRANSPORT OFF-LINE;
2652	017016	042514	052103	052440	
2653	017024	044516	020124	020061	
2654	017032	047524	030040	020054	
2655	017040	047101	020104	052524	
2656	017046	047122	031040	042116	
2657	017054	052040	040522	051516	
2658	017062	047520	052122	047440	
2659	017070	043106	046055	047111	
2660	017076	105			
2661	017077	100	044124	047105	.ASCII ;@THEN PRESS CONTINUE/;
2662	017104	050040	042522	051523	
2663	017112	041440	047117	044524	
2664	017120	052516	027505		
2665	017124	040057	042500	042116	MSG20: .ASCII ;/@END OF PASS: /;
2666	017132	047440	020106	040520	
2667	017140	051523	020072	057	
2668	017145	057	040100	040503	MSG21: .ASCII ;/@CANNOT TEST LOAD MEDIUM@/;
2669	017152	047116	052117	052040	
2670	017160	051505	020124	047514	
2671	017166	042101	046440	042105	
2672	017174	052511	040115	027500	
2673	017202	040057	043536	027500	\$CNTG: .ASCII ;/@+G@/;
2674	017210	040057	053523	036522	\$MSWR: .ASCII ;/@SWR=/;
2675	017216	057			
2676	017217	057	042516	036527	\$MNEW: .ASCII ;/@NEW=/;

N04

2677 017224 057
2678 017225 057 027477
2679
2680 017230 000000
2681 017374 017374
2682 017374 000000
2683 000001

\$QUEST: .ASCII ;/?/
.EVEN
WBUF: 0
. =WBUF+100.
RBUF: 0
.END

IR1	006602	1455	1466*												
IR2	006634	1467	1473*												
IR3	006704	1481	1488*												
IR4	007014	1499	1511*												
IR5	007062	1521	1523*												
LASTTE	012460	2083	2107*												
MIT	011450	1730	1907	1920*											
MITA	011530	1931	1937*												
MSG0	014200	335	2397*												
MSG01	014270	342	2407*												
MSG1	014322	2186	2412*												
MSG10	015655	2063	2542*												
MSG11	015723	2084	2549*												
MSG12	016211	2108	2582*												
MSG13	016313	2114	2594*												
MSG13A	016366	2119	2602*												
MSG13B	016441	2121	2610*												
MSG14	016467	577	2614*												
MSG15	016600	610	2627*												
MSG16	016712	2125	2640*												
MSG17	017010	2150	2651*												
MSG2	014434	2189	2339	2425*											
MSG20	017124	2156	2665*												
MSG21	017145	320	2668*												
MSG3	014437	1926	2426*												
MSG3A	014655	1937	2451*												
MSG4	014732	1953*	1955	1966*	2459*										
MSG5	014772	1979	2465*												
MSG6	015044	1994	2472*												
MSG7	015177	2023	2488*												
MSG7A	015264	2027	2497*												
MSG7B	015340	2029	2505*												
MSG8	015454	2047	2518*												
MSG9	015535	2057	2527*												
MTC	001006	299*	358	403	420*	421	430*	439*	448*	457*	466*	467	475*	484*	
		485	493*	494*	495	504*	505	509*	510	514*	515	519*	520	524*	
		525	529*	530	534*	535	543*	544	552*	553*	554	565*	566*	567	
		575	587*	593*	600	608	622*	642*	649*	650	654*	655	659*	660	
		669*	670	678*	679*	680	688*	689	693*	694	698*	699	703*	704	
		710*	711	715*	716	720*	721	730*	731	739*	740*	741	749*	750	
		759*	760*	761	771*	772	776*	777	781*	782	844*	896*	918*	919	
		927*	936*	944	961*	962	967*	968	981	992	994*	995	999*	1000	
		1029*	1030	1041*	1049	1066*	1067	1072*	1073	1085	1093	1095*	1096	1100*	
		1101	1113*	1114	1117*	1118	1123	1132*	1144*	1145	1166	1168*	1169	1173*	
		1174	1178*	1179	1181*	1182	1184*	1185	1188*	1189	1196*	1197	1208*	1209	
		1214*	1215	1231	1233*	1234	1236*	1237	1242*	1243	1245	1264	1270*	1271	
		1274*	1275	1281*	1282	1287	1296*	1307	1313*	1314	1316*	1317	1322	1325	
		1334*	1335	1340*	1341	1346*	1357	1359*	1360	1365*	1366	1381*	1382	1386*	
		1387	1404	1406*	1415	1418*	1430	1432*	1433	1438	1441*	1457*	1460*	1469*	
		1483*	1484	1486*	1489	1501*	1502	1506*	1507	1509*	1512	1540	1542*	1543	
		1555*	1556	1565*	1566	1568	1587	1589*	1590	1593*	1594	1598*	1599	1621	
		1623*	1626*	1627*	1628	1631*	1634*	1635*	1636	1641*	1644*	1645*	1646	1667*	
		1670*	1671*	1672	1675*	1678*	1679*	1680	1685*	1688*	1689*	1690	1706*	1783*	
		1784	1786*	1787	1790*	1791*	1792	1796*	1797*	1798	1816*	1817	1822*	1823	
		1884*	1885	1889*	1890	1898*	1899	1920*	1921	1941*	1942	1959*	1983*	1998*	
		2009*	2010	2012	2033*	2034	2040*	2041	2066*	2067	2071*	2079*	2087*	2088	

.SREAD 1*
.SR2AZ 1*
.SSAVE 1*
.SSB2D 1*
.SSB2O 1*
.SSCOP 1*
.SSIZE 1*
.SSUPR 1*
.STRAP 1*
.STYPB 1*
.STYPD 1*
.STYPE 1*
.STYPO 1*
.S4OCA 1*
.1170 1*

ADD	574	584	607	1967	2374											
ASL	2352	2353	2354													
ASLB	1843															
BCC	922	965	998	1006	1033	1070	1310	1328	1363	1385	1411	1844	1851	2167		
BOS	1018															
BEQ	327	359	368	377	386	395	413	422	432	441	450	459	477	486	496	
	506	511	516	521	526	531	536	545	555	571	604	651	656	661	671	
	681	690	695	700	705	712	717	722	742	751	762	773	778	783	794	
	807	820	837	854	862	870	880	926	929	942	948	951	976	979	1011	
	1047	1053	1056	1079	1083	1107	1127	1130	1134	1151	1154	1157	1192	1203	1219	
	1221	1224	1251	1255	1291	1294	1298	1338	1420	1443	1505	1548	1575	1580	1604	
	1625	1633	1643	1656	1660	1669	1677	1687	1700	1704	1708	1717	1729	1801	1804	
	1810	1813	1830	1835	1904	1924	1931	1969	1985	2044	2081	2101	2113	2135	2169	
	2177	2184	2188	2271	2287	2358										
BGE	2348															
BGT	2346															
BIC	494	553	569	595	602	679	740	760	835	844	896	1626	1634	1644	1652	
	1670	1678	1688	1696	1767	1769	1772	1790	1796	1808	1809	1828	1846	1849	1854	
	1856	1861	1862	1902	2204	2231	2314	2332								
BICB	2281	2355														
BIS	420	430	439	448	457	466	475	493	552	678	730	739	759	831	1132	
	1296	1340	1346	1409	1418	1441	1638	1682	1706	1770	1791	1797	1821	1852	1857	
	1863	2079	2099	2146	2232											
BISB	2356															
BIT	358	367	412	421	431	476	495	554	680	731	741	761	832	836	845	
	853	861	869	879	888	897	905	923	928	941	1002	1008	1010	1012	1015	
	1034	1046	1120	1133	1147	1150	1191	1199	1211	1223	1245	1284	1297	1337	1357	
	1371	1379	1392	1412	1419	1435	1442	1504	1517	1524	1648	1692	1707	1923	1930	
	1946	1961	1968	1984	1999	2025	2036	2043	2061	2076	2080	2096	2100	2112	2117	
	2176	2183	2256	2266	2268											
BITB	876	1248	1624	1632	1642	1653	1668	1676	1686	1697	1728					
BLE	2073															
BMI	404	468	586	621	945	969	1050	1074	1124	1288	1315	1320	1323	1344	1416	
	1439	1490	1513	1943	2013	2016	2143									
BNE	319	329	339	341	732	797	810	823	833	846	877	889	898	906	924	
	938	940	971	1003	1009	1013	1016	1035	1043	1045	1076	1104	1121	1148	1200	
	1212	1246	1249	1285	1358	1372	1380	1393	1408	1413	1436	1459	1471	1525	1537	
	1551	1561	1578	1607	1649	1654	1693	1698	1719	1723	1725	1841	1947	1962	1964	
	1971	1974	2000	2026	2037	2062	2077	2097	2118	2237	2257	2267	2269	2284	2309	
	2316	2334	2338	2342												
BPL	920	963	982	993	996	1001	1031	1068	1086	1094	1097	1102	1115	1119	1146	
	1167	1170	1175	1180	1183	1186	1190	1198	1210	1216	1217	1232	1235	1238	1244	
	1265	1272	1276	1283	1308	1318	1326	1336	1342	1348	1361	1367	1369	1383	1388	
	1390	1405	1431	1434	1485	1503	1508	1518	1541	1544	1557	1567	1569	1588	1591	
	1595	1600	1622	1629	1637	1647	1673	1681	1691	1785	1788	1793	1799	1818	1824	
	1886	1891	1900	1922	2011	2035	2042	2068	2089	2141	2148	2162	2165	2213	2221	
	2243	2289	2293	2296	2312	2390	2393									
BR	330	582	588	623	882	930	1253	1472	1658	1702	1847	1972	2083	2144	2185	
	2273	2291	2299	2336	2344	2351	2359	2361								
CLR	317	337	348	349	350	565	587	592	593	622	642	790	791	803	804	
	816	817	918	934	960	961	966	1029	1039	1065	1066	1071	1239	1277	1278	
	1454	1456	1460	1468	1483	1501	1533	1559	1715	1721	1783	1832	1833	1941	1960	
	1983	1998	2007	2008	2066	2087	2130	2274	2325	2329	2385	2386	2387			
CLRB	1742															
CMP	326	331	570	585	603	620	670	689	694	699	704	711	716	721	750	
	772	777	782	793	806	950	975	1055	1078	1106	1126	1129	1153	1156	1202	

	1250	1254	1290	1293	1536	1547	1550	1560	1574	1577	1603	1606	1655	1659	1699
	1703	1800	1803	1812	1829	1970	1973	2072	2260	2270	2308	2315	2341		2283
CMPB	318	485	505	510	515	520	525	530	535	544	650	655	660	819	
	2286	2333	2337	2345	2347										
COM	1768	1855													
COMB	1845														
DEC	338	939	1044	2134	2357										
HALT	248	344	1928	1939	1957	1981	1996	2031	2049	2059	2074	2092	2110	2123	2128
	2153	2178	2214												
INC	619	796	809	937	970	1042	1075	1214	1458	1470	1627	1635	1645	1671	1679
	1689	1718	1724	1963	2160	2191	2236	2272	2298	2388					
INCB	822	1579	1834	1966											
JMP	294	322	615	1582	1730	1836	1907	1925	1932	2136	2179	2262			
JSR	321	336	343	578	611	1743	1746	1749	1752	1755	1758	1761	1764	1927	1938
	1956	1980	1995	2024	2028	2030	2048	2058	2064	2085	2109	2116	2120	2122	2127
	2152	2157	2159	2171	2190	2194	2196	2198	2200	2202	2205	2207	2209	2211	2223
MOV	2234	2238	2249	2318	2320	2322	2324	2326	2331	2340	2350				
	315	316	320	323	324	325	332	333	334	335	342	346	347	484	504
	509	514	519	524	529	534	543	564	567	572	575	577	594	600	605
	608	610	616	649	654	659	669	688	693	698	703	710	715	720	749
	771	776	781	792	805	927	932	933	935	936	958	959	967	990	991
	994	999	1037	1038	1040	1041	1063	1064	1072	1095	1098	1099	1100	1113	1116
	1117	1142	1143	1144	1168	1171	1172	1173	1176	1177	1178	1181	1184	1187	1188
	1196	1206	1207	1208	1233	1236	1240	1241	1242	1266	1267	1268	1269	1270	1273
	1274	1279	1280	1281	1311	1312	1313	1316	1334	1359	1364	1365	1381	1386	1402
	1403	1406	1428	1429	1432	1453	1455	1457	1466	1467	1469	1480	1481	1482	1486
	1488	1498	1499	1500	1506	1509	1511	1520	1521	1523	1534	1535	1538	1539	1542
	1546	1553	1555	1558	1563	1564	1565	1571	1585	1586	1589	1592	1593	1596	1597
	1598	1601	1602	1617	1618	1619	1620	1623	1630	1631	1639	1640	1641	1651	1665
	1666	1667	1674	1675	1683	1684	1685	1695	1744	1745	1747	1748	1750	1751	1753
	1754	1756	1757	1759	1760	1762	1763	1765	1766	1771	1780	1781	1782	1786	1789
	1794	1795	1806	1807	1815	1816	1819	1820	1822	1827	1853	1860	1880	1882	1884
	1887	1889	1894	1896	1898	1901	1920	1926	1937	1954	1955	1959	1979	1994	2009
	2023	2027	2029	2033	2040	2047	2057	2063	2069	2070	2071	2084	2090	2091	2093
	2108	2114	2119	2121	2125	2133	2137	2150	2156	2158	2163	2168	2186	2189	2192
	2195	2197	2199	2201	2203	2206	2208	2210	2219	2222	2226	2230	2244	2248	2258
	2261	2275	2313	2317	2319	2321	2323	2330	2339	2349	2360	2371	2373	2375	2391
MOV8	566	597	818	1581	1778	1779	1838	1839	1953	2282	2290	2294	2297	2394	
NOP	2094	2095	2172	2173	2174	2175									
RESET	357	366	375	384	393	402	411	2170							
ROL	2224	2225	2227	2228	2229	2235									
ROR	921	964	997	1005	1017	1032	1069	1309	1327	1362	1384	1410	1850	2166	2233
RTI	2259	2276													
RTS	1842	1858	1864	2216	2239	2245	2250	2285	2327	2395					
SUB	2193	2372													
SWAB	598														
TRAP	258														
TST	328	340	376	385	394	440	449	458	925	947	978	981	1052	1082	1085
	1103	1123	1287	1319	1343	1347	1368	1389	1407	1415	1438	1568	1716	1722	2012
	2015	2142	2147	2187	2212	2220	2335	2343							
TSTB	403	467	919	944	962	968	992	995	1000	1030	1049	1067	1073	1093	1096
	1101	1114	1118	1145	1166	1169	1174	1179	1182	1185	1189	1197	1209	1215	1218
	1231	1234	1237	1243	1264	1271	1275	1282	1307	1314	1317	1322	1325	1335	1341
	1360	1366	1382	1387	1404	1430	1433	1484	1489	1502	1507	1512	1540	1543	1556
	1566	1587	1590	1594	1599	1621	1628	1636	1646	1672	1680	1690	1784	1787	1792
	1798	1817	1823	1840	1885	1890	1899	1921	1942	2010	2034	2041	2067	2088	2140

WAIT	2161	2164	2242	2288	2292	2295	2311	2389	2392						
.ASCII	1487	1510	1522												
	2251	2397	2407	2412	2425	2426	2438	2451	2459	2465	2472	2481	2488	2497	2505
	2512	2518	2527	2534	2542	2549	2559	2567	2572	2582	2590	2594	2602	2610	2614
	2623	2627	2636	2640	2647	2651	2661	2665	2668	2673	2674	2676	2678		
.BLKW	1914														
.BYTE	2300														
.ENABL	1	244													
.END	2683														
.ENDC	284	288	290												
.EVEN	2252	2301	2679												
.IF	283	286	288												
.IFF	284	288	290												
.LIST	1	248	268	269	276	352	361	370	379	388	397	406	415	425	434
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	734	744	754	766	785	798	811	826	839	848	856	864	872	883	891
	900	910	953	985	1021	1058	1088	1109	1138	1159	1226	1259	1302	1329	1352
	1374	1396	1423	1447	1462	1474	1492	1527	1610	1710	1731	1738	1875	1916	1933
	1949	1990	2002	2018	2052	2103	2303	2367	2380						
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	1374	1396	1423	1447	1462	1474	1492	1527	1610	1710	1731	1738	1875	1916	1933
	1949	1975	1990	2002	2018	2052	2103	2303	2367	2380					
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	754	766	785	798	811	826	839	848	856	864	872	883	891	900	910
	953	985	1021	1058	1088	1109	1138	1159	1226	1259	1302	1329	1352	1374	1396
	1423	1447	1462	1474	1492	1527	1610	1710	1731	1738	1875	1916	1933	1949	1975
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DEFAULT GLOBALS GENERATED: 0

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RUN-TIME RATIO: 147/67=2.1
CORE USED: 32K (63 PAGES)

