

TR79F

TIMING PROGRAM
MD-11-DZTRB-A

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TR79 UTILITY DRIVER
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PRODUCT NAME: TR79F TIMING PROGRAM

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1. ABSTRACT

THIS PROGRAM IS A BRUTE FORCE DRIVER INTENDED TO PROVIDE THE USER WITH A TOOL FOR TROUBLESHOOTING THE TR-79 MAGTAPE SYSTEM. ANY ONE FUNCTION OR SERIES OF FUNCTIONS CAN BE PERFORMED IN ANY DESIRED ORDER REGARDLESS OF ERROR(S) ENCOUNTERED. THERE ARE NO ERROR CHECKS OR PRINT-OUTS. ANY DEVIATION FROM THE PROGRAMMED DEFAULT PARAMETERS REQUIRES THE USER TO MODIFY THE APPROPRIATE PROGRAM LOCATIONS. INCLUDED IN THE PROGRAM ARE TWO (2) SPECIFIC ROUTINES TO ASSIST THE USER IN THE BASIC SET-UP OF THE DELAY LINES OF THE TR-79F MAGTAPE CONTROLLER.

2. REQUIREMENTS

2.1 HARDWARE

- A. PDP-11 PROCESSOR
- B. TR79 MAGTAPE TRANSPORT (HP-7970E)
- C. TR79-F MAGTAPE CONTROLLER

THE FOLLOWING IS A LIST OF THE PROGRAM PARAMETERS, A BRIEF

TR79 UTILITY DRIVER
DZTRB.P11

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E01

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DESCRIPTION OF EACH, AND THEIR ADDRESSES IN CORE.

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PARAMETER	LOCATION	DESCRIPTION
UNIT SELECT	700	BITS 8 & 9 REPRESENT THE UNIT NUMBER. A MAX OF FOUR IS ALLOWED.
BYTE COUNT	702	SET THIS TO THE TWO'S COMPLIMENT OF THE NUMBER OF WORDS TRANSFERRED.
READ ADDRESS	704	SET TO DESIRED START ADDRESS OF READ BUFFER.
WRITE ADDRESS	706	SET TO DESIRED START ADDRESS OF WRITE BUFFER.
A. THERE ARE FOUR (4) WRITE BUFFERS.		
1. 2000 (8) THIS IS AN ALL 1'S (ONE'S) PATTERN THE PARITY BIT = 1 FOR THIS DATA PATTERN.		
2. 2400 (8) THIS IS AN ALTERNATING ALL ZERO'S (0'S) WORD AND ALL ONE'S (1'S) WORD PATTERN. THE PARITY BIT = 1 FOR THIS DATA PATTERN.		
3. 3000 (8) THIS IS AN ALTERNATING 525/252 DATA PATTERN. THE PARITY BIT = 1 FOR THIS DATA PATTERN.		
4. 3400 (8) THIS IS A WALKING ONE IN A FIELD OF ZERO'S PATTERN. THE PARITY BIT = 0 FOR THIS DATA PATTERN.		
READY DELAY	710	THIS DELAY VALUE IS USED BY THE PROGRAM TO SET THE AMOUNT OF TIME TO WAIT FOR CURDY BEFORE CONTINUING.
READY DELAY MULTIPLIER	712	THIS NUMBER DETERMINES THE NUMBER OF TIMES THE "READY DELAY" TIME WILL BE REPEATED BEFORE CONTINUING.
OPERATION DELAY	714	THIS DELAY VALUE IS USED TO ALLOW A TIME LAPSE BETWEEN EACH OPERATION.
OPERATION DELAY MULTIPLIER	716	THIS NUMBER DETERMINES THE NUMBER OF TIMES THE "OPERATION DELAY" WILL BE REPEATED BEFORE CONTINUING.
OPERATION NUMBER	720	THIS IS THE NUMBER OF OPERATIONS TO BE EXECUTED IN A SEQUENCE. IT SHOULD EQUAL THE NUMBER OF OPERATIONS IN THE OPERATION TABLE.

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OPERATION TABLE 722

THIS TABLE IS LOADED WITH THE
FUNCTION CODE FOR EACH OPERA-
TION IN THE DESIRED SEQUENCE
TO A MAX OF 27 (8) OPERATIONS.
THE NUMBER OF OPERATIONS IN
THIS TABLE SHOULD EQUAL THE
NUMBER IN 720 (8) (OPER. #)

6.1 FUNCTION CODES

01 = WRITE
02 = READ FORWARD
04 = SPACE REVERSE
07 = ERASE
10 = REWIND
13 = FAST FORWARD
15 = WRITE IDB
16 = WRITE TAPE MARK
17 = OFF LINE

NOTE: ALL OTHER FUNCTIONS ARE ILLEGAL.

7. PROGRAM FLOW

7.1 NORMAL START

START;	HOUSEKEEPING
(A) LEGAL FUNC. CHK;	CHECK IF FUNCTION IS LEGAL. IF NOT, HALT WITH DISPLAY REG = 777777
CLR TRS;	CLEAR OUT INHIBIT BIT
CHK FUNC;	GO TO PROPER ROUTINE
SET-UP;	SET-UP REGISTERS
GO;	EXECUTE FUNCTION
READY DELAY;	WAIT FOR READY
HALT AFTER OPER;	CHECK SW15; IF = 1 HALT WITH DISPLAY REG = 000000
OPER DELAY;	DELAY BETWEEN OPERATIONS
MORE OPERATIONS ?;	YES - GOTO (A) NO - CONT.
HALT AFTER SEQ;	CHECK SW14; IF = 1 HALT WITH DISPLAY REG = 000001

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RETURN;                                GO TO START

7.2    POWER CLEAR ROUTINE
START;                                  SET DELAY TIMES
POWER CLEAR;                           BIS BIT 11 OF TRC
DELAY;                                  WAIT FOR POWER CLEAR TO
                                         HAPPEN.
RETURN;                                GO TO START

7.3    FORCE ERROR ROUTINE
START;                                  SET-UP BAD DATA ADDRESS
WRITE;                                  SET-UP WRITE FUNC
GO;                                       EXECUTE FUNCTION
RETURN;                                  GO TO START

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8. PROGRAM LISTING

.TITLE TR79 UTILITY DRIVER
.ENABL ABS
.NLIST TTM

7/28/75
D.A.WILLIAMS

REGISTER DEF.

R0=%0
R1=%1
R2=%2
R3=%3
R4=%4
R5=%5
R6=%6
R7=%7
PC=%7
SP=%6

TRAP CATCHERS

.=0
.REPT 200
.+2
HALT
.ENDR

.=200

JMP START
JMP PWRCLR
JMP FORCER

; START ADDRESS

; POWER CLEAR ROUTINE
; FORCE ERROR ROUTINE

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295      000000
296      000001
297      000002
298      000003
299      000004
300      000005
301      000006
302      000007
303      000007
304      000006
305
306
307      000000
308
309
310
311
312
313      000200
314      000200 000167 000574
315      000204 000167 001100
316      000210 000167 001124

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317
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319
320      000600      ;      .=600
321      ;      TR79 REGISTERS
322
323      000600      164000      ;TR79 CONTROL REG.
324      000602      164002      ;TR79 STATUS REG.
325      000604      164004      ;TR79 WORD CONT REG.
326      000606      164006      ;TR79 BUS ADDRESS REG.
327
328      ;
329      000610      177776      ;PROCESSOR STATUS WORD
330      000612      177570      ;SWITCH REGISTER
331      ;
332      000700      ;      .=700
333      ;      START OF PARAMETER TABLE
334      000700      000000      ;UNIT SELECT - BITS 8&9
335      000702      177760      ;BYTE COUNT
336      000704      004000      ;READ ADDRESS
337      000706      002000      ;WRITE ADDRESS - -1'S PATTERN
338      000710      100000      ;READY DELAY
339      000712      000001      ;READY DELAY MULTIPLEXER
340      000714      010000      ;OPERATION DELAY
341      000716      000001      ;OPER.DELAY MUTIPLEXER
342      000720      000001      ;NUMBER OF OPERATIONS
343      000722      000001      ;OPERATION TABLE DEFAULT WRITE
344      000724      000000
345      000726      000000      ;MAX.OF 27-OCTAL OPERATIONS
346      000730      000000
347      000732      000000
348      ;
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K01

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349
350
351
352      001000
353      001000 012706 000600
354      001004 012777 000340 177576
355      001012 016703 177702
356      001016 012704 000722
357      001022 012700 000011
358      001026 012701 001266
359      001032 012405
360      001034 020521
361      001036 001403
362      001040 005300
363      001042 001374
364      001044 000504
365      001046 016702 177626
366      001052 042702 176377
367      001056 005077 177520
368      001062 162701 001270
369      001066 060107
370      001070 000413
371      001072 000416
372      001074 000420
373      001076 000410
374      001100 000240
375      001102 000240
376      001104 000240
377      001106 000240
378      001110 006305
379      001112 050205
380      001114 005205
381      001116 000413
382      001120 016777 177562 177460
383      001126 000403
384      001130 016777 177550 177450
385      001136 016777 177540 177440
386      001144 000761

;
START:  . = 1000
        MOV #600, SP
        MOV #340, APSW
        MOV OPNUM, R3
        MOV #OPTBL, R4
LOOP:   MOV #9, R0
        MOV #LEGAL, R1
        MOV (R4)+, R5
A:      CMP R5, (R1)+
        BEQ B
        DEC R0
        BNE A
        BR OPERR
B:      MOV UNIT, R2
        BIC #176377, R2
        CLR @TRS
        SUB #LEGAL+2, R1
        ADD R1, PC
        BR WRITE
        BR READ
        BR D
        BR WRITE
        NOP
        NOP
        NOP
        NOP
C:      ASL R5
        BIS R2, R5
        INC R5
        BR GO
        MOV WADDR, @TRBA
        BR D
        MOV RADDR, @TRBA
        MOV BCNT, @TRWC
        BR C

;PRIORITY 7
;R3<= # OF OPERATIONS
;R4<= START OF OPERATIONS
;# OF LEGAL FUNCTIONS
;TABLE OF LEGAL FUNCTIONS
;GET THE FUNCTION
;SEE IF VALID
;BRANCH IF IT IS
;ONE LESS TO CHECK
;CHECK IT
;NO MATCH - OP ERROR
;GET UNIT #
;ONLY THE UNIT #
;CLEAR THE INHIBIT BIT
;GET OFFSET TO FUNC.
;GO TO IT
;WRITE
;READ
;SPACE REVERSE
;--ERASE--
;REWIND
;FAST FORWARD
;WRITE IDB
;WRITE TAPE MARK
;OFFLINE - SHIFT FUNC.
;SET UNIT #
;SET GO BIT
;GO DO IT
;ADDR. OF DATA TO BE WRITTEN
;GET WC
;ADDR. OF READ DATA
;SET WORD COUNT
;GET UNIT & GO

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L01

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387
388
389 001146 016700 177536      GO:  MOV  RDYDLY,R0      ;
390 001152 016701 177534      MOV  RDYDLX,R1      ;
391 001156 010577 177416      MOV  R5,ATRC      ;INITIATE FUNCTION
392 001162 105777 177412      E:   TSTB  ATRC      ;SEE IF UNIT READY
393 001166 100404      SMI  F      ;BR IF YES
394 001170 005300      DEC  R0      ;DEC DELAY
395 001172 001373      BNE  E      ;TRY AGAIN
396 001174 005301      DEC  R1      ;WAIT TILL ZERO OR READY
397 001176 001371      BNE  E
398 001200 005777 177406      F:   TST  ASWR      ;HALT BETWEEN OP'S
399 001204 100002      BPL  G      ;NO-BRANCH
400 001206 005000      CLR  R0      ;YES
401 001210 000000      HALT      ;STOP
402 001212 016700 177476      G:   MOV  OPDLY,R0      ;SET DELAY BETWEEN OP'S
403 001216 016701 177474      MOV  OPDLX,R1
404 001222 005300      H:   DEC  R0      ;WAIT.....
405 001224 001376      BNE  H
406 001226 005301      DEC  R1
407 001230 001374      BNE  H
408 001232 005303      DEC  R3      ;ANY MORE OP'S IN TABLE
409 001234 001272      BNE  LOOP      ;YES - GOTO LOOP
410 001236 032777 040000 177346  BIT  #40000,ASWR      ;HALT ON END OF PASS?
411 001244 001655      BEQ  START      ;IF EQUAL...NO
412 001246 012700 000001      MOV  #1,R0
413 001252 000000      HALT      ;STOP
414 001254 000651      BR  START      ;CONT
415 001256 012700 177777      OPERR: MOV  #-1,R0      ;OP ERROR - TURN ON SOME LIGHTS
416 001262 000000      HALT      ;STOP
417 001264 000776      BR  .-2
418
419 001266 000001 000002 000004 ;LEGAL: .WORD 1,2,4,7,10,13,15,16,17:      LEGAL FUNCTIONS
420 001274 000007 000010 000013
421 001302 000015 000016 000017

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424
425 001310 012700 177777      PWRCLR: MOV    #-1,R0      ;SET DELAY TIME
426 001314 012701 000003      MOV    #3,R1
427 001320 052777 004000 177252  A1:    BIS    #4000,2TRC    ;POWER CLEAR!
428 001326 005300      DEC    R0
429 001330 001376      BNE    A1      ;WAIT...
430 001332 005301      DEC    R1
431 001334 001374      BNE    A1
432 001336 000764      BR     PWRCLR    ;DO IT AGAIN!
433
434
435 001340 012777 001364 177240  FORCER: MOV    #BADATA,2TRBA  ;ADDRESS OF BAD DATA TO BUS ADDR. REG. /
436 001346 012777 177770 177230  MOV    #177770,2TRWC  ;SET WORD COUNT
437 001354 012777 000003 177216  MOV    #3,2TRC      ;WRITE & GO !
438 001362 000766      BR     FORCER    ;DO IT AGAIN!!!!
439 001364 000000 000002 000004  BADATA: .WORD 0,2,4,401,600.555,333; BAD PARITY
440 001372 000401 000600 000555
441 001400 000333

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442
443
444
445      002000      ;      . =2000      ;
446      ;      . REPT      200      ; 400 BYTES
447      ;      . WORD      000777      ; A 11111111
448      ;      . ENDR      ; 11111111 PATTERN
449
450      002400      ;      . =2400      ; 2ND WRITE BUFFER
451      ;      . REPT      100      ; 400 BYTES
452      ;      . WORD      000400      ; A 00000000
453      ;      . WORD      000777      ; 11111111 PATTERN
454      ;      . ENDR
455
456      003000      ;      . =3000      ;
457      ;      . REPT      100      ; 400 BYTES
458      ;      . WORD      000525      ; A 01010101
459      ;      . WORD      000652      ; 10101010 PATTERN
460      ;      . ENDR
461
462      003400      ;      . =3400      ; 4TH WRITE BUFFER
463      ;      . REPT      10      ; THIS PATTERN DOES NOT
464      ;      . WORD      1      ; GENERATE A PARITY BIT.
465      ;      . WORD      2
466      ;      . WORD      4      ; 00000100
467      ;      . WORD      10      ; 00001000
468      ;      . WORD      20      ; 00010000
469      ;      . WORD      40      ; 00100000
470      ;      . WORD      100      ; 01000000
471      ;      . WORD      200      ; 10000000
472      ;      . WORD      200      ; 10000000
473      ;      . WORD      100      ; 01000000
474      ;      . WORD      40      ; 00100000
475      ;      . WORD      20      ; 00010000
476      ;      . WORD      10      ; 00001000
477      ;      . WORD      4      ; 00000100
478      ;      . WORD      2      ; 00000010
479      ;      . WORD      1      ; 00000001
480      ;      . ENDR
481
482      ;
483      004000      ;      . =4000      ; READ BUFFER
484      ;      . REPT      200      ;
485      ;      . WORD      0      ; 400 BYTES 0
486      ;      . ENDR
487
488      000001      ;      . END

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21	001034	360*	363																
21	001326	428*	429	431															
21	001046	361	365*																
21	001364	435	439*																
21	000702	335*	385																
21	001110	378*	386																
21	001136	372*	383	385*															
21	001162	392*	395	397															
21	001200	393	398*																
21	001340	376	435*	438															
21	001212	399	402*																
21	001146	381	399*																
21	001222	404*	405	407															
21	001266	358	368	419*															
21	001022	357*	409																
21	000716	341*	402																
21	000714	340*	402																
21	001256	364	415*																
21	000720	342*	355																
21	000722	343*	356																
21	=%000007	303*	369*																
21	000610	329*	354*																
21	001310	315	425*	432															
21	000704	336*	384																
21	000712	339*	390																
21	000710	338*	389																
21	001130	371	384*																
21	=%000000	295*	357*	362*	389*	394*	400*	402*	404*	412*	415*	425*	428*						
21	=%000001	296*	358*	360	368*	369	390*	396*	403*	406*	426*	430*							
21	=%000002	297*	365*	366*	379														
21	=%000003	298*	355*	408*															
21	=%000004	299*	356*	359															
21	=%000005	300*	359*	360	378*	379*	380*	391											
21	=%000006	301*																	
21	=%000007	302*																	
21	=%000006	304*	353*																
21	001000	314	353*	411	414														
21	000512	330*	398	410															
21	000606	326*	382*	384*	435*														
21	000600	323*	391*	392	427*	437*													
21	000602	324*	367*																
21	000604	325*	385*	436*															
21	000700	334*	365																
21	000706	337*	382																
21	001120	370	373	382*															
21	= 004400	307*	312	313*	320*	332*	352*	417	445*	450*	456*	462*	493*						

[illegible]

ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0

*.DZTRB.SEQ/SOL/CRF=DZTRB.P11
RUN-TIME: 3 4 .5 SECONDS
RUN-TIME RATIO: 89/8=10.3
CORE USED: 6K (11 PAGES)

~~Spooler runtime 2 Seconds, 12 KCS, 43 disk reads, 3 disk writes, 15 pages~~

[illegible]