.REPT 0

IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZTMG-C-D

PRODUCT NAME: TM,A,B-11 UTILITY DRIVER

PROGRAM DATE: AUGUST 1976

MAINTAINER: DIAGNOSTIC ENGINEERING

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                1.      ABSTRACT
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                        THIS PROGRAM IS INTENDED AS A BRUTE FORCE ROUTINE
                        TO EXECUTE AN OPERATION OR SERIES OF OPERATIONS, CONTINUOUSLY
                        REGARDLESS OF THE RESULTS OF THE OPERATION.
                        THIS UTILITY DRIVER WILL  ALLOW AN OPERATOR
                        TO EXECUTE ANYTHING DESIRED IN ANY ORDER.  THERE ARE
                        NO ERROR CHECKS OR PRINTOUTS MADE, AND ANY VARIATION
                        FROM PRESET SEQUENCES AND VALUES ARE MADE BY
                        CHANGING THE APPROPIATE MEMORY LOCATIONS.
                        THIS PROGRAM IS NOT ELIGABLE FOR CHAIN MODE.

                2.      REQUIREMENTS
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                2.1     HARDWARE:

                        A.  ANY PDP-11 PROCESSOR
                        B. TM,A,B-11 TAPE CONTROLLER
                        C.  AT LEAST ONE TU10,N,W MAG TAPE DRIVE

                2.2     STORAGE:

                        THIS PROGRAM REQUIRES AT LEAST 1K OF CORE

                3.      LOADING PROCEDURE:
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                        USE STANDARD BINARY LOADING PROCEDURE

                4.      STARTING PROCEDURE
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                        THE PROGRAM IS ALWAYS STARTED AT LOCATION 200 (8)

                5.      CONTROL SWITCH SETTINGS (LOC. 176)
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                        BIT 0: 1=STOP AFTER EACH OPERATION
                               0=PROCEED
                        BIT 1: 1=STOP AT THE END OF THE OPERATION SEQUENCE
                               0=PROCEED
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6. OPERATION

THE PROGRAM OPERATION IS QUITE SIMPLE, BUT DOES REQUIRE THE OPERATOR TO HAVE KNOWLEDGE OF THE MAG TAPE SYSTEM AS OPERATED ON THE TMA-11 OR TM-11 CONTROLLER. THE OPERATOR MUST BE ABLE TO DECIDE WHICH SEQUENCE OF OPERATION IS REQUIRED, AND WHAT VALUES TO ASSIGN TO THE VARIOUS PARAMETERS REQUIRED TO EXECUTE THEM. THE OPERATION SEQUENCE IS SET UP BY LOADING A TABLE WITH THE FUNCTION CODES OF THE DESIRED OPERATIONS AND SETTING THE NUMBER OF OPERATIONS IN A COUNTER. THE PROGRAM IS SET UP TO DO A WRITE OF TWENTY (20) FRAMES OF ALL ONES DATA TO TAPE UNIT ZERO (0) WITH A DENSITY OF 800 BPI IN A NINE TRACK DRIVE. THE DATA ADDRESS IS 3000 (8). THE OPERATION SEQUENCE IS SET TO DO A SINGLE WRITE. IF LOADED AND STARTED AT 200(8) WITH NO CHANGES MADE AND LOC. 176 SET TO A ZERO (0), THIS OPERATION WILL BE EXECUTED CONTINUOUSLY.
THE FOLLOWING IS THE LIST OF PARAMETERS WHICH MAY BE VARIED AND A DESCRIPTION OF EACH ALONG WITH THEIR CORE LOACATION:

PARAMETER	LOCATION	DESCRIPTION
CONTROL SETTINGS	176	PRESET FOR CONTINUOUS OPERATION
TM,A,B-11 ADDRESS	600	ADDRESS OF TM,A,B-11 (THE FIRST REGISTER ADDRESS: MTS)
UNIT DESCRIPTION	700	SET SELECTED SLAVE NUMBER (0-7) IN BITS 8,9,10 SELECT PARITY IN BIT 11 (0=ODD 1=EVEN) SELECT DENSITY IN BITS 13,14
BYTE COUNT	702	SET NUMBER OF BYTES PER RECORD IN TWOS' COMPLEMENT
READ ADDRESS	704	SET DESIRED ADDRESS FOR START OF READ BUFFER.
WRITE ADDRESS	706	SET DESIRED ADDRESS FOR START OF WRITE BUFFER.
SPACE COUNT	710	SET NUMBER OF RECORDS TO SPACE ON SPACE COMMAND IN TWO'S COMPLEMENT. NOTE: WHEN SPACING MULTIPLE RECORDS INSURE THAT SUFFICIENT TIME IS ALLOWED BY SETTING THE REAL TIME MULTIPLIER TO THE NUMBER OF RECORDS SPACED.

	READY DELAY	712	THIS DELAY VALUE IS USED BY THE PROGRAM TO ESTABLISH A MAXIMUM TIME TO AWAIT THE COMPLETION OF AN OPERATION BEFORE PROCEEDING TO THE NEXT
	READY MULTIPLIER	714	IF THE VALUE SET INTO 712 DOES NOT ALLOW ENOUGH TIME, INCREASE THE SIZE OF THE MULTIPLIER. EACH INCREMENT OF THE MULTIPLIER WILL CAUSE THE 712 DELAY TO BE EXECUTED THAT MANY MORE TIMES.
	OPERATION DELAY	716	THIS DELAY IS USED TO ALLOW FOR SOME AMOUNT OF TIME BETWEEN THE EXECUTION OF EACH OPERATION. IT IS LOADED AND USED JUST AS IN THE READY DELAY(712)
	OPER MULTIPLIER	720	THIS IS USED JUST AS THE READY DELAY MULTIPLIER(714)
	OPERATION NUMBER	722	THIS IS THE NUMBER OF OPERATIONS TO BE PERFORMED IN A SEQUENCE AND SHOULD REFLECT THE NUMBERS OF OPERATIONS SET INTO THE OPERATION TABLE.
	OPERATION TABLE	724-754	THIS TABLE (CONSISTING OF 15 LOCATIONS) IS TO BE LOADED WITH THE FUNCTION CODES FOR EACH OPERATION TO BE PERFORMED IN SEQUENCE. THE NUMBER OF ENTIRES MAY BE FROM ONE (1) TO FIFTEEN (15). MAKE SURE THAT THE NUMBER OF FUNCTION CODES SET IN THE TABLE IS REFLECTED BY THE NUMBER IN LOCATION 722 (OPNUM)

6.1 FUNCTION CODES

0=OFFLINE
1=READ
2=WRITE
3=WRITE EOF
4=SPACE FORWARD
5=SPACE REVERSE
6=WRITE WITH EXTENDED IRG
7=REWIND

6.2 DENSITY (BITS 13,14 OF UNIT DESCRIPTION)

00=200 BPI -- 7 TRACK
01=556 BPI -- 7 TRACK
02=800 BPI -- 7 TRACK
03=800 BPI -- 9 TRACK

6.3 PARITY (BIT 11 OF UNIT DESCRIPTION)

1=EVEN PARITY
0=ODD PARITY

6.4 UNIT SELECT (BITS 8,9,10 OF UNIT DESCRIPTIONS)

SET TO DESIRED UNIT NUMBER (0-7)

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                        7.      PROGRAM DESCRIPTION
                                -------------------

                                IN ORDER TO MAINTAIN THE CONTINUOUS EXECUTION OF
                                THE OPERATIONS DESCRIBED THE PROGRAM IS ORGANIZED AS
                                FOLLOWS:

                                START
                                INITIALIZE THE TM,A,B-11
                                SET UP TAPE PARAMETERS (DENSITY, PARITY,  BYTE COUNT, DATA ADDRESS)
                                SELECT DEVICE TO TEST  (UNIT NUMBER)
                                EXECUTE OPERATION  (SET FUNCTION FROM OP TABLE AND SET GO=1)
                                AWAIT END OF OPERATION (TAPE UNIT READY)
                                STOP IF LOC. 176 BIT 0:=1
                                DO OPERATION DELAY (OP DELAY)
                                STOP IF LAST OPERATION IN SEQUENCE AND LOC 176 BIT 1:=1
                                POINT TO NEXT FUNCTION CODE IN OP TABLE
                                JUMP BACK TO START

                        7.1     FLOW:   START:          HOUSEKEEPING
                                        INIT:           CLEAR TM,A,B-11
                                        SET UP:         SET UP REQUIRED REGISTERS
                                        EXECUTE:        SET FUNCTION AND GO=1
                                        AWAIT END:      LOOP ON TUR=0 AS LONG AS ALLOWED BY READY DELAY
                                        STOP:           IF BIT 0:=1 (LOC 176)
                                        DELAY:          PER OP DELAY
                                        END OF SEQUENCE? IF NOT JUMP TO START
                                        STOP:           IF BIT 1:=1 (LOC 176)
                                        JUMP TO START   RESTART SEQUENCE


                        8.      LISTING
                                -------
                        .ENDR
```

```
                                        .TITLE  TM,A,B-11 UTILITY DRIVER
                                        ;MAINDEC-11-DZTMG-C-D
                                        ;AUGUST 76
                                        ;R. B. BARNES
                                        .ABS

                                ;CONTROL SWITCH SETTINGS  (LOC. 176)

                                ;BIT 0:=1       STOP ON EACH OPERATION
                                ;       0       CONTINUE

                                ;BIT 1:=1       STOP AT END OF SEQUENCE
                                ;       0       CONTINUE

                                ;REGISTER EQUIVALENTS

                        000000          R0=%0
                        000001          R1=%1
                        000002          R2=%2
                        000003          R3=%3
                        000004          R4=%4
                        000005          R5=%5
                        000006          SP=%6
                        000007          PC=%7

                                ;TRAP CATCHERS**************************

                        000000          .=0

                        000176          .=176
000176  000000                  SWITCH: 0

                                ;STARTING ADDRESS

                        000200          .=200
000200  000167  000574          JMP     START
                        000600          .=600

                                ;TM,A,B-11 REGISTERS

000600  172520          MTS:    172520
000602  172522          MTC:    172522
000604  172524          BRC:    172524
000606  172526          CMA:    172526

                                ;PROCESSOR ADDRESSES

000610  177776          PSW:    177776          ;PROCESSOR STATUS
000612  177570          SWR:    177570          ;SWITCH REGISTER
```

```
                        000700                          .=700
                                                        ;SET PARAMETERS DESIRED FOR UNIT UNDER TEST******

000700  060000          UDES:   60000                   ;UNIT DESCRIPTION
000702  177760          BCNT:   -20                     ;BYTE COUNT
000704  003000          RADDR:  3000                    ;READ ADDRESS
000706  002000          WADDR:  2000                    ;WRITE ADDRESS
000710  177777          SCNT:   -1                      ;SPACE COUNT
000712  100000          RDYDLY: 100000                  ;READY DELAY
000714  000001          RDYDX:  1                       ;READ DELAY MULTIPLEXER
000716  010000          OPDLY:  10000                   ;OPERATION DELAY
000720  000001          OPDX:   1                       ;OPERATION DELAY MULTIPLEXER
000722  000001          OPNUM:  1                       ;NUMBER OF OPERATIONS (1 TO 5)
```

```
                                        ;OPERATION TABLE******
                                        ;ENTER OPERATION SEQUENCE DESIRED.
                                        ;MUST HAVE AT LEAST 1 OPERATION, AND
                                        ;MAY HAVE UP TO 15(8).
                                        ;SET THE OPERATION COUNTER EQUAL
                                        ;TO THE NUMBER OF OPERATIONS IN
                                        ;THE SEQUENCE.
                                        ;
                                        ;0 = OFFLINE
                                        ;1 = READ
                                        ;2 = WRITE
                                        ;3 = WRITE EOF
                                        ;4 = SPACE FORWARD
                                        ;5 = SPACE REVERSE
                                        ;6 = WRITE WITH EXTENDED IRG
                                        ;7 = REWIND

000724  000002              OPTBL:    2
000726  000000                        0
000730  000000                        0
000732  000000                        0
000734  000000                        0
000736  000000                        0                   ;FILL WITH OPERATION SEQUENCE
000740  000000                        0
000742  000000                        0
000744  000000                        0
000746  000000                        0
000750  000000                        0
000752  000000                        0
000754  000000                        0
```

```
                    001000                          .=1000
                                                    ;START OF PROGRAM******

001000  012706  000500          START:  MOV     #500,SP
001004  012777  000340  177576          MOV     #340,@PSW
001012  016700  177704                  MOV     OPNUM,R0        ;SET COUNTER
001016  012701  000724                  MOV     #OPTBL,R1       ;SET POINTER
001022  012777  010000  177552  LOOP:   MOV     #10000,@MTC     ;POWER CLEAR THE CONTROLLER
001030  016702  177644                  MOV     UDES,R2         ;GET UNIT DESCRIPTION
001034  012103                          MOV     (R1)+,R3        ;GET OP CODE
001036  022703  000004                  CMP     #4,R3           ;IS IT A SPACE FORWARD OP?
001042  001403                          BEQ     A               ;IF SO: BR
001044  022703  000005                  CMP     #5,R3           ;IS IT A SPACE REVERSE OP?
001050  001004                          BNE     B               ;IF NOT: BR
001052  016777  177632  177524  A:      MOV     SCNT,@BRC       ;SPACE PER SPACE COUNT
001060  000414                          BR      C               ;GO AND FORM COMMAND
001062  016777  177614  177514  B:      MOV     BCNT,@BRC       ;SET BYTE COUNT
001070  016777  177612  177510          MOV     WADDR,@CMA      ;SET WRITE ADDRESS
001076  022703  000001                  CMP     #1,R3           ;IS IT A READ OP?
001102  001003                          BNE     C               ;IF NOT: BR
001104  016777  177574  177474          MOV     RADDR,@CMA      ;SET READ ADDRESS
001112  006303                  C:      ASL     R3              ;SHIFT OP CODE LEFT
001114  050302                          BIS     R3,R2           ;BUILD COMMAND WORD
001116  052702  000001                  BIS     #1,R2           ;SET GO BIT
001122  010277  177454                  MOV     R2,@MTC         ;START OPERATION
001126  016703  177560                  MOV     RDYDLY,R3       ;SET READY DELAY
001132  016704  177556                  MOV     RDYDX,R4        ;SET DELAY MULTIPLEXER
001136  032777  000001  177434  D:      BIT     #1,@MTS
001144  001004                          BNE     E               ;IF TUR: BR
001146  005303                          DEC     R3
001150  001372                          BNE     D
001152  005304                          DEC     R4              ;DELAY FOR TAPE READY
001154  001370                          BNE     D
001156  032767  000001  177012  E:      BIT     #1,SWITCH       ;SHOULD STOP ON OPERATION
001164  001401                          BEQ     F
001166  000000                          HALT
001170  016703  177522          F:      MOV     OPDLY,R3        ;SET OPERATION DELAY
001174  016704  177520                  MOV     OPDX,R4         ;SET DELAY MULTIPLEXER
001200  005303                  G:      DEC     R3
001202  001376                          BNE     G
001204  005304                          DEC     R4              ;DELAY BETWEEN OPERATIONS
001206  001374                          BNE     G
001210  005300                          DEC     R0
001212  001303                          BNE     LOOP
001214  032767  000002  176754          BIT     #2,SWITCH       ;SEE IF HALT ON PASS
001222  001666                          BEQ     START
001224  000000                          HALT
001226  000167  177546                  JMP     START
```

```
                                .=2000          ;WRITE BUFFER******
                                .REPT   100
                                -1
                                .ENDR

                                .=3000          ;READ BUFFER******
                                .REPT   100
                                0
                                .ENDR

                                .END
```

```
A       001052            362     365#
B       001062            364     367#
BCNT    000702            308#    367
BRC     000604            295#    365*    367*
C       001112            366     370     372#
CMA     000606            296#    368*    371*
D       001136            378#    381     383
E       001156            379     384#
F       001170            385     387#
G       001200            389#    390     392
LOOP    001022            358#    394
MTC     000602            294#    358*    375*
MTS     000600            293#    378
OPDLY   000716            314#    387
OPDX    000720            315#    388
OPNUM   000722            316#    356
OPTBL   000724            336#    357
PC    =%000007            275#
PSW     000610            300#    355*
RADDR   000704            309#    371
RDYDLY  000712            312#    376
RDYDX   000714            313#    377
R0    =%000000            268#    356*    393*
R1    =%000001            269#    357*    360
R2    =%000002            270#    359*    373*    374*    375
R3    =%000003            271#    360*    361     363     369     372*    373     376*    380*    387*    389*
R4    =%000004            272#    377*    382*    388*    391*
R5    =%000005            273#
SCNT    000710            311#    365
SP    =%000006            274#    354*
START   001000            288     354#    396     398
SWITCH  000176            283#    384     395
SWR     000612            301#
UDES    000700            307#    359
WADDR   000706            310#    368
.     = 003200            279#    280     282#    287#    289#    304#    351#    401#    406#
```

```
TM,A,B-11 UTILITY DRIVER       MACY11 27(732)  04-NOV-76  11:20  PAGE 15
DZTMGC.SRC      CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

ASL       372
BEQ       362     385     396
BIS       373     374
BIT       378     384     395
BNE       364     370     379     381     383     390     392     394
BR        366
CMP       361     363     369
DEC       330     382     389     391     393
HALT      280     386     397
JMP       288     398
MOV       354     355     356     357     358     359     360     365     367     368     371     375     376     377     387
          388
.ABS      256
.END      411
.LIST     280
.NLIST    280
.REPT       1     280     402     407
.TITLE    252


ERRORS DETECTED:  0
DEFAULT GLOBALS GENERATED:  0

*,DZTMGC.SEQ/SOL/CRF/PAGNUM/NL:TOC=DZTMGC.SRC
RUN-TIME: 1 2 .3 SECONDS
RUN-TIME RATIO: 50/4=10.0
CORE USED:  7K  (13 PAGES)
```