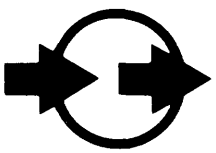
DEC - COMPATIBLE

TAPE CONTROLLER

DIAGNOSTIC MANUAL



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DEC - COMPATIBLE

TAPE CONTROLLER

DIAGNOSTIC MANUAL

FOR TAPE CONTROLLER MODELS:

TC-30, TC-50, TC-130/138, TC-131, TC-150/158,
TC-151, TC-160, TC-180, TC-190/198

WESTERN PERIPHERALS
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SUPPLEMENT NO._____

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PROGRAM CHANGE NOTICE:

Any program changes will be found at the rear of the Manual. Please refer to these chnages before operating any program.

SECTION I

DIAGNOSTIC PROGRAM

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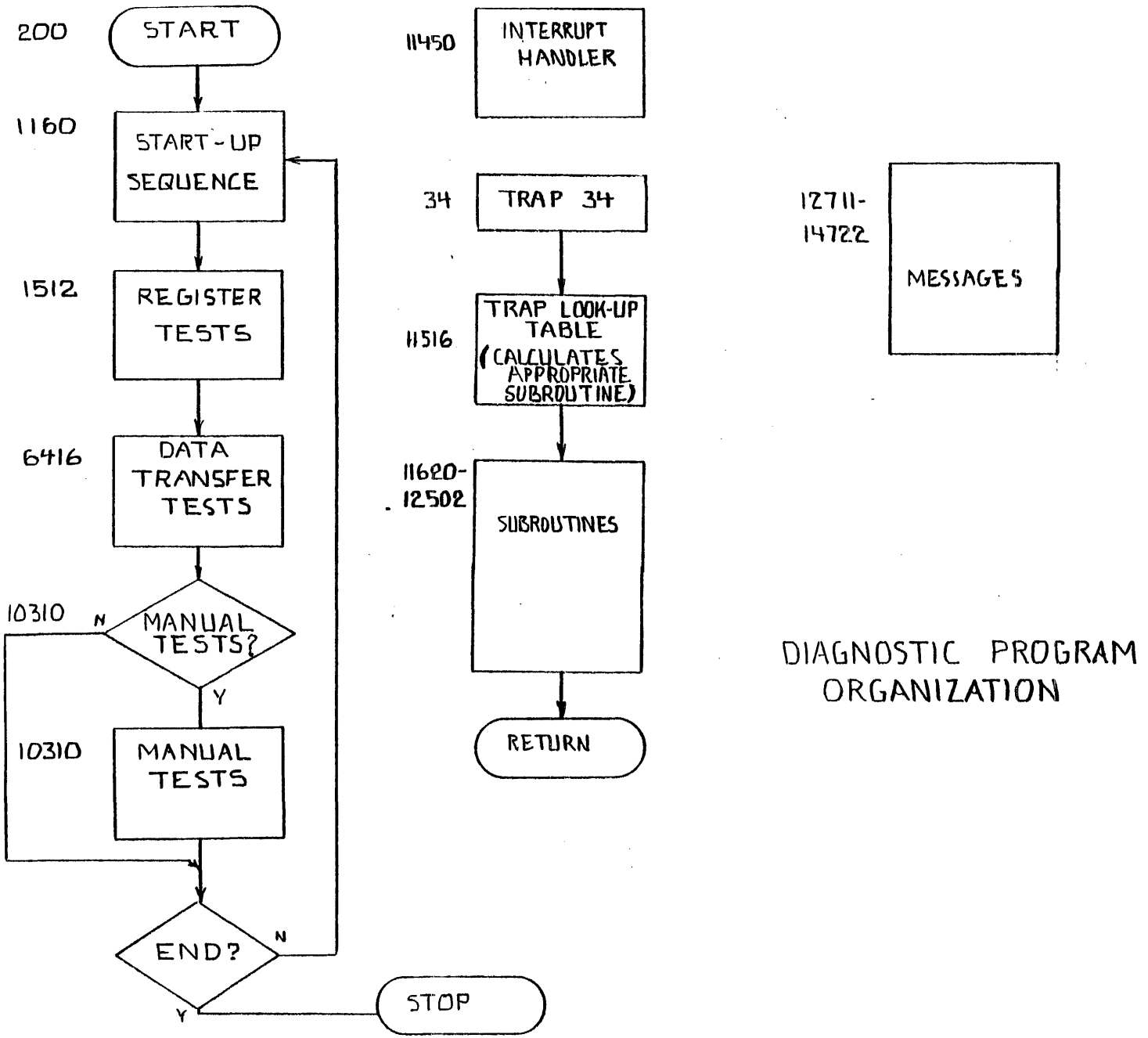


DIAGNOSTIC PROGRAM ORGANIZATION

TM-11 COMPATIBLE

MAGNETIC TAPE FUNCTIONAL DIAGNOSTIC

DESCRIPTION

The Functional Diagnostic program is used prior to the Reliability Program to check the controller board for proper operation. This program contains a series of basic tests to check controller registers for proper static operation, all tape motion functions, data transfers, extended memory and manual intervention tests for transport switch functions.

REQUIREMENTS

The Functional Diagnostic program requires a fully-operational Unibus or Q-bus based computer system with at least 8K memory, and one fully-operational tape unit connected to the tape controller board.

LOADING THE PROGRAM

There are a variety of methods to load the diagnostic program. These methods vary with the type of media and the type of system you have. For example, with an absolute loader in memory, place the diagnostic media on the loading device. Start the processor at the starting address of the loader and the device will read the program from the media. You may use a Bootstrap ROM if your processor has one.

STARTING THE PROGRAM

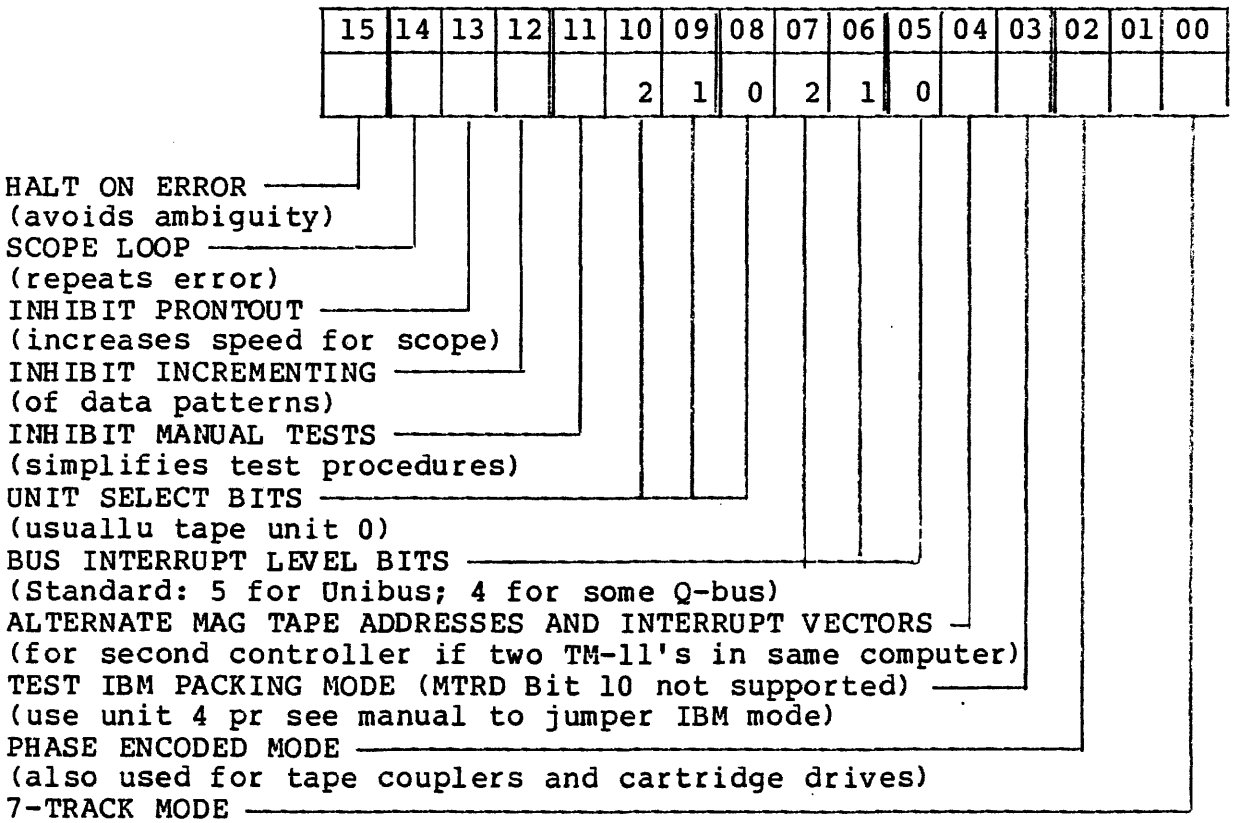
1. Load a scratch tape onto the tape unit and place the tape unit on line with the tape positioned at load point (BOT). The scratch tape should be error-free or the errors will affect test results.

2. Load the stating address of the diagnostic (the Functional Diagnostic program starts at Address 200) and start the program. NOTE: If your processor has no front panel, your special version of the diagnostic starts at location 16000 the first time only.

SETTING THE DIAGNOSTIC FEATURES (SWITCH REGISTER)

The program will ask you to set the test features which are listed below. Set these features into your processor's front panel (switch register) if it has one. You may change the feature settings at any time

If your processor has no front panel, use a version of the diagnostic designed for this purpose. These versions of the diagnostic simulate the front panel. They start at location 16000 the first time only. If you need to change the test features later, halt the program, set the new test feature bit pattern into location 176 with your monitor, and restart the program at location 200. (Disregard the printed request for switch settings. CONTINUE or PROCEED to run the test)



Some Sample Test Feature Configurations:

Test	'Switch'	Octal
Full Unibus Test (Unit 0, Bus Level 5)	15,7,5	100240
Simple Troubleshooting Verification	15,11,7,5	104240
Add for PE	2	XXXXX4
Delete for Q-bus	7	XXX0XX
Add for Scope Loop	14,13,12	07XXXX

TEST AND SUBROUTINE DESCRIPTIONS

Descriptions of tests and test subroutines are provided in the listing which begins on the next page.

```
                ;5.1.5  MANUAL INTERVENTION TEST
                ;       THIS TEST WILL REQUIRE THE OPERATOR TO PERFORM CERTAIN OPERATION
                ;       WITH THE TAPE TRANSPORT AS DIRECTED BY MESSAGES PRINTED ON THE
                ;       TELETYPE.
                ;5.2    SUBROUTINE ABSTRACTS
                ;SCOPE  (TEST LOOP ON TEST)
                ;       THIS SUBROUTINE CALL IS PLACED BETWEEN EACH SUB-TEST IN THE INST
                ;       SECTION. IT RECORDS THE STARTING ADDRESS OF EACH SUB-TEST AS IT
                ;       BEING ENTERED. IF A SCOPE LOOP IS REQUESTED, IT WILL JUMP TO THE
                ;       START OF THE SUB-TEST THAT THE SCOPE LOOP IS REQUESTING.
                ;HLT    (ERROR HALT)
                ;       THIS SUBROUTINE CALL PRINTS THE ADDRESS THAT TAGS THE FAILING
                ;       SUBTEST AND THE CONTENTS OF ALL THE CONTROLLER REGISTERS
                ;       IN FORMAT DESCRIBED IN 6.1
                ;TSTCDR (TEST FOR CONTROLLER READY)
                ;       THIS SUBROUTINE CALL WAITS A FINITE TIME FOR THE CONTROLLER
                ;       TO GO READY. IF CONTROLLER READY OCCURS BEFORE TIMEOUT, EXIT IS
                ;       TO RETURN ADDRESS+2. IF TIMEOUT OCCURES BEFORE CONTROLLER READY,
                ;       EXIT IS TO RETURN ADDRESS.
                ;WAITTR (WAIT FOR TAPE UNIT READY)
                ;       THIS SUBROUTINE CALL WAITS A FINITE TIME FOR THE TAPE UNIT
                ;       TO GO READY. IF TAPE UNIT READY OCCURES BEFORE TIMEOUT, EXIT IS
                ;       TO RETURN ADDRESS+2. IF TIMEOUT OCCURES BEFORE TAPE UNIT READY,
                ;       EXIT IS TO RETURN ADDRESS.
                ;TSTNGR (TEST FOR REGISTER BIT(S) RESET)
                ;       THIS SUBROUTINE CALL WAITS A FINITE TIME FOR THE DESIGNATED BIT(
                ;       OF THE SPECIFIED REGISTER TO GO RESET. IF RESET OF BIT(S) OCCUR
                ;       BEFORE TIMEOUT, EXIT IS TO RETURN ADDRESS+2. IF TIMEOUT OCCURS
                ;       BEFORE THE DESIGNATED BIT(S) RESET, EXIT IS TO RETURN ADDRESS.
                ;       ARGUMENTS:
                ;       R2 CONTAINS ADDRESS OF REGISTER TO BE TESTED
                ;       R3 CONTAINS MASK FOR BIT(S) TO BE TESTED
                ;       R4 CONTAINS DELAY TIMEOUT CONSTANT
                ;TSTNGS (TEST FOR REGISTER BIT(S) SET)
                ;       THIS SUBROUTINE CALL WAITS A FINITE TIME FOR THE DESIGNATED BIT(
                ;       OF THE SPECIFIED REGISTER TO GO SET. IF RESET OF BIT(S) OCCUR
                ;       BEFORE TIMEOUT, EXIT IS TO RETURN ADDRESS+2. IF TIMEOUT OCCURS
                ;       BEFORE THE DESIGNATED BIT(S) SET, EXIT IS TO RETURN ADDRESS.
                ;       ARGUMENTS:
                ;       R2 CONTAINS ADDRESS OF REGISTER TO BE TESTED
                ;       R3 CONTAINS MASK FOR BIT(S) TO BE TESTED
                ;       R4 CONTAINS DELAY TIMEOUT CONSTANT
                ;PRTMSG (PRINT MESSAGE)
                ;       THIS SUBROUTINE CALL PRINTS AN ASCII 2 MESSAGE WHOSE STARTING ADDRESS
                ;       IS CONTAINED IN R2
                ;PRTOCT (PRINT OCTAL)
                ;       THIS SUBROUTINE CALL PRINTS THE OCTAL VALUE CONTAINED IN R2
                ;MTTRP  (MAG TAPE TRAP)
                ;       THIS SUBROUTINE CALL IS USED TO SEVVICE UNEXPECTED OR ILLEGAL
                ;       MAG TAPE INTERRUPTS.
                ;PRTOUT (PRINTOUT)
                ;       THIS SUBROUTINE CALL TRANSFERS THE LOWER BYTE OF "CHAR" TO THE
                ;       PRINTOUT DEVICE. (USUALLY A TELETYPE)
                ;XCLOR  (EXCLUSIVE OR)
                ;       THIS SUBROUTINE CALL EXCLUSIVE OR'S THE CONTENTS OF R1 & R2

                ;ROTCMP (ROTATE COMPARE)
                ;       THIS SUBROUTINE CALL GENERATES THE CRC CHARACTER FROM THE
```

```
115             ;       CONTENTS OF R0
116
117             ;THE FOLLOWING SUBROUTINE CALLS EXECUTE COMMONLY USED
118             ;       "MOV" AND "BIT" INSTRUCTIONS OF THE SPECIFIED FUNCTIONS.
119             ;PWRCLR (POWER CLEAR)
120             ;       SETS BIT 12 OF MTC
121             ;WRITE  (WRITE ONE RECORD)
122             ;       INITIATES WRITE COMMAND
123             ;READ   (READ ONE RECORD)
124             ;       INITIATES READ COMMAND
125             ;WREOF  (WRITE END OF FILE)
126             ;       INITIATES WRITE FILE MARK
127             ;REWIND (REWIND TAPE)
128             ;       INITIATES REWIND OF TAPE UNIT
129             ;SPACEF (SPACE FORWARD)
130             ;       INITIATES SPACE FORWARD COMMAND
131             ;SPACEB (SPACE BACKWARDS)
132             ;       INITIATES SPACE BACKWARDS COMMAND
133             ;SELECT (SELECT TAPE UNIT)
134             ;       SELECTES TAPE UNIT TO BE TESTED
135             ;WBUFCA (WRITE BUFFER TO CA)
136             ;       SETS CA TO START OF WRITE BUFFER
137             ;RBUFCA (READ BUFFER TO CA)
138             ;       SETS CA TO START OF READ BUFFER
139             ;MIN1BC (MINUS ONE TO BC)
140             ;       SETS BC TO MINUS ONE
141             ;MIN3BC (MINUS THREE TO BC)
142             ;       SETS BC TO MINUS THREE
143             ;MIN4BC (MINUS FOUR TO BC)
144             ;       SETS BC TO MINUS FOUR
145             ;TSTEOF (TEST FOR EOF)
146             ;       TESTS FOR FILE MARK DETECTION
147
148             ;6.     ERRORS
149
150             ;6.1    ERROR PRINTOUT FORMAT
151             ;       WITH SW13=0 (OR DOWN) THE FOLLOWING PRINTOUT WILL APPEAR ON AN ERROR
152             ;         PC    STATUS COMAND  BYTE    CA     DATA B READ L TEMP    CRC CAL
153             ;       XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX
154             ;       PC       =  ADDRESS OF TEST WHERE ERROR OCCURED
155             ;       STATUS   =  CONTENTS OF STATUS REGISTER AT TIME OF ERROR
156             ;       COMAND   =  CONTENTS OF COMMAND REGISTER AT TIME OF ERROR
157             ;       BYTE     =  CONTENTS OF BYTE COUNTER AT TIME OF ERROR
158             ;       CA       =  CONTENTS OF CURRENT MEMORY ADDRESS AT TIME OF ERROR
159             ;       DATA B   =  CONTENTS OF DATA BUFFER AT TIME OF ERROR
160             ;       READ L   =  CONTENTS OF TU10 REGISTER AT TIME OF ERROR
161             ;       TEMP     =  CONTENTS OF ADDRESS "TEMP" USED BY SOME TESTS
162             ;       CRC CAL  =  CRC CHARACTER CALCULATED (USEFUL ONLY FOR CRC TEST)
163
164             ;       NOTE THAT NOT ALL OF THE INFORMATION PRINTED IS INTENDED TO BE
165             ;       USEFUL FOR EVERY TYPE OF ERROR; THIS IS SIMPLY A STANDARD ERROR
166             ;       REPORT FOR ALL ERRORS. THE OPERATOR MUST REFER TO THE PROGRAM
167             ;       LISTING AT THE ADDRESS OF THE ERROR FOR A DESCRIPTION OF THE
168             ;       CAUSE OF THE ERROR; IT IS THEN UP TO HIM TO DETERMINE WHICH
169             ;       OF THE INFORMATION IS USEFUL.
170             ;6.2    ERROR RECOVERY
171             ;       WITH SW15=1 OR UP THE PROGRAM WILL HALT ON AN ERROR. DEPRESS
```

```
                ;       CONTINUE SWITCH TO RESTART TEST.
                ;7.     RESTRICTIONS
                ;7.1    STARTING RESTRICTION
                ;       BEFORE STARTING PROGRAM THE OPERATOR MUST MAKE CERTAIN THAT THE
                ;       TRANSPORT IS "ON-LINE" AND AT "LOAD POINT".
                ;7.2    OPERATIONAL RESTRICTIONS
                ;       MANUAL INTERVENTION TEST MUST BE PERFORMED ON EACH PASS THRU
                ;       THE PROGRAM UNLESS INHIBITED WITH SW11=1 (OR UP).
                ;8.     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.     PROGRAM DESCRIPTION
                ;9.1    LISTING
                ;       STATUS AND COMMAND REGISTER BIT ASSIGNMENTS

                ;                       COMMAND REGISTER
                ;15     ERROR (ERR)

                ;14     DEN 8       00 = LO DENS 7 TRACK  10 = HI DENS 7 TRACK
                ;13     DEN 5       01 = LO DENS 7 TRACK  11 = CORE DP 7 TRACK
                ;12     POWER CLEAR (PWRCLR)

                ;11     PARITY     0 = ODD 1 = EVEN (EVP)
                ;10     UNIT SEL. BIT 2 (FAD1)
                ;9      UNIT SEL. BIT 1 (S1)

                ;8      UNIT SEL. BIT 0 (S0)
                ;7      CONTROL UNIT READY (CUR)
                ;6      INTERRUPT ENABLE (IEN)

                ;5      ADDRESS BIT 17 (AD17)
                ;4      ADDRESS BIT 16 (AD16)
                ;3      FUNCTION BIT 2 000 = OFF LINE     100 = SPACE FORWARD
                ;                      001 = READ         101 = SPACE REVERSE

                ;2      FUNCTION BIT 1 010 = WRITE        110 = WRITE XIRG
                ;1      FUNCTION BIT 0 011 = WRITE EOF    111 = REWIND
                ;0      GO

                ;                       STATUS REGISTER

                ;15     ILLEGAL COMMAND (ILC)

                ;14     END OF FILE (EOF)
                ;13     CORRECTABLE PARITY ERROR (PHASE ENCODED ONLY) (CRE)
                ;12     PARITY ERROR (PAE)

                ;11     BUS GRANT LATE (BGL)
                ;10     END OF TAPE (EOT)
                ;9      RECORD LENGTH ERROR (RLE)

                ;8      BAD TAPE ERROR (BTE)
                ;7      NON EXISTENT MEMORY (NXM)
                ;6      SELECT REMOTE (SELR)
```

```
                ;5      BEGINNING OF TAPE (BOT)
                ;4      7 CHANNEL (CH)
                ;3      SETTLE DOWN (SDWN)
                ;
                ;2      WRITE LOCK (WRL)
                ;1      REWIND STATUS (RWS)
                ;0      TAPE UNIT READY (TUR)
                ;***************ASSEMBLY LISTING*****************
                
000000                  .ENABL  ABS
                        .ENABL  AMA
                                                .NLIST  TTM
                
                000000                          .=0
                000020                          .REPT  20
                                                .+2
                                                HALT                    ;TRAPPED TO PREVIOUS ADDRESS
                                                .ENDR
                000034                          .=34
000034  011516                                  TRAP34
000036  000340                                  340
                000060                          .=60                    ;;SETUP ALL UNUSED INTERRUPT VECTORS
                000044                          .REPT  44
                                                MTTRP
                                                340
                                                .ENDR
                
                104400                          HLT    =104400          ;TRAP SUBROUTINE TABLE EQUATES
                104402                          SCOPE  =104402
                104404                          TSTCUR=104404
                104406                          TSTRGS=104406
                104410                          TSTRGR=104410
                104412                          PRTMSG=104412
                104414                          PWRCLR=104414
                104416                          WRITE  =104416
                104420                          READ   =104420
                104422                          WREOF  =104422
                104424                          REWIND=104424
                104426                          SPACEF=104426
                104430                          SPACEB=104430
                104432                          SELECT=104432
                104434                          WBUFCA=104434
                104436                          RBUFCA=104436
                104440                          MIN1BC=104440
                104442                          MIN3BC=104442
                104444                          MIN4BC=104444
                104446                          TSTEOF=104446
                104450                          WAITTR=104450
                104452                          XCLOR  =104452
                104454                          ROTCMP=104454
                104456                          PRTOCT=104456
                104460                          PRTOUT=104460
                
                177570                          SR=177570
                177776                          CC=177776
                000240                          NOP=240
                000776                          BUFF=776
```

```
                000000                  R0=%0
                000001                  R1=%1
                000002                  R2=%2
                000003                  R3=%3
                000004                  R4=%4
                000005                  R5=%5
                000006                  SP=%6
                000007                  PC=%7
                000200                  .=200
000200  000137  001160                  JMP     START
                001000                  .=1000
001000  172520                  MTNAD:  172520          ;NORMAL MAG TAPE ADDRESS
001002  172720                  MTAAD:  172720          ;ALTERNATE MAG TAPE ADDRESS
001004  000224                  MTNV:   224
001006  000226                  MTNS:   226
001010  000260                  MTAV:   260
001012  000262                  MTAS:   262
001014  000224                  MTV:    224             ;INTERRUPT VECTOR
001016  000226                  MTVS:   226             ;INTERRUPT STATUS
001020  172520                  MTS:    172520          ;STATUS REGISTER
001022  172522                  MTC:    172522          ;COMMAND REGISTER
001024  172524                  BC:     172524          ;BYTE COUNT
001026  172526                  CA:     172526          ;CURRENT MEMORY ADDRESS
001030  172530                  MTD:    172530          ;DATA BUFFER
001032  172532                  MTRD:   172532          ;TU10 READ LINES
001034  177566                  TDBR:   177566
001036  177564                  TCSR:   177564
001040  000000                  IDTST:  0
001042  000000                  TMTNFL: 0
001044  000000                  TEMP:   0
001046  000000                  TEMPP:  0
001050  000000                  TEMPS:  0
001052  000000                  CRXOR1: 0
001054  000000                  CRROT1: 0
001056  000000                  CRXOR2: 0
001060  000000                  CRROT2: 0
001062  000000                  CRXOR3: 0
001064  000000                  CRROT3: 0
001066  000000                  CRXOR4: 0
001070  000000                  CRROT4: 0
001072  000000                  CRCWRT: 0
001074  000000                  OCT:    0
001076  000000                  CHAR:   0
001100  000000                  PRINT1: 0
001102  001350                  RETURN: BEGIN           ;ADDRESS OF LAST TEST
001104  000000                  MTP:    0               ;MAG TAPE PRIORITY BUS LEVEL
001106  000000                  TCSL:   0               ;SELECT COMMAND
001110  000000                  MTPM:   0               ;MAG TAPE PRIORITY BUS LEVEL MINUS ONE
                                ;COMMAND CODES TABLE
001112  000000                  TCOL:   0               ;OFF LINE COMMAND
001114  000000                  TCRD:   0               ;READ COMMAND
001116  000000                  TCWT:   0               ;WRITE COMMAND
001120  000000                  TCWF:   0               ;WRITE FILE MARK COMMAND
001122  000000                  TCSF:   0               ;SPACE FORWARD COMMAND
001124  000000                  TCRS:   0               ;SPACE REVERSE COMMAND
001126  000000                  TCWE:   0               ;WRITE WITH EXTENDED GAP COMMAND
001130  000000                  TCRW:   0               ;REWIND COMMAND
```

HEADINGS:

```
 LINE LOC     CONTENTS                SYM     INST   OPER      REMARKS
  343 001132  000000                  USLEN:  0
  344 001134  001160                  SAVE:   .=.+20.           ;TEMP STORAGE FOR TAPE REGISTERS FOR ERROR PRINT
  345 001160                          START:
  346 001160  012706  000776                  MOV    #BUFF,SP   ;RESET STACK
  347 001164  012702  012711                  MOV    #MSG0,R2
  348 001170  104412                          PRTMSG            ;PRINT MESSAGE IN @R2
  349 001172  000000                          HALT
  350                                         ;RESET CYCLE COUNTER
  351 001174  112737  000060  014552          MOVB   #60,MSG13+11
  352 001202  112737  000060  014553          MOVB   #60,MSG13+12
  353 001210  112737  000061  014554          MOVB   #61,MSG13+13
  354                                         ;MODIFY MAG TAPE REGISTERS ADDRESS ACCORDING TO SW 4
  355 001216  012702  001020                  MOV    #MTS,R2
  356 001222  013701  001000                  MOV    MTNAD,R1
  357 001226  032737  000020  177570          BIT    #20,SR     ;IS SW 4 SET?
  358 001234  001402                          BEQ    TAMD       ;NO. GENERATE NORMAL MAG TAPE ADDRESSES
  359 001236  013701  001002                  MOV    MTAAD,R1   ;YES. GENERATE ALTERNATE MAG TAPE ADDRESSES
  360 001242  010122                  TAMD:   MOV    R1,(R2)+
  361 001244  062701  000002                  ADD    #2,R1      ;GENERATE NEXT ADDERSS
  362 001250  020227  001032                  CMP    R2,#MTRD
  363 001254  003772                          BLE    TAMD
  364                                         ;MODIFY MAG TAPE INTERRUPT VECTOR ACCORDING TO SW 4
  365 001256  032737  000020  177570          BIT    #20,SR     ;IS SW 4 SET?
  366 001264  001415                          BEQ    MTVN       ;NO. GENERATE NORMAL INTERRUPT VECTOR
  367 001266  013737  001010  001014          MOV    MTAV,MTV   ;YES. GEN ALTERNATE INTERRUPT VECTOR
  368 001274  013737  001012  001016          MOV    MTAS,MTVS
  369 001302  012777  011450  177474          MOV    #MTTRP,@MTNV
  370 001310  012737  000340  001006          MOV    #340,MTNS
  371 001316  000414                          BR     BEGIN
  372 001320  013737  001004  001014  MTVN:   MOV    MTNV,MTV
  373 001326  013737  001006  001016          MOV    MTNS,MTVS
  374 001334  012777  011450  177446          MOV    #MTTRP,@MTAV
  375 001342  012777  000340  177442          MOV    #340,@MTAS
  376 001350  012737  001350  001102  BEGIN:  MOV    #BEGIN,RETURN;SET UP RESTART OF PROGRAM
  377 001356  012706  000776                  MOV    #BUFF,SP   ;RESET STACK
  378 001362  005037  001042                  CLR    TMTNFL     ;CLEAR TAPE MOTION FLAG
  379 001366  005037  177776                  CLR    CC         ;SET PROCESSOR PRIORITY TO 0
  380 001372  005037  000036                  CLR    @#36       ;SET TRAP PRIORITY TO
  381 001376  012777  011450  177410          MOV    #MTTRP,@MTV ;SET UP ILLEGAL INTERRUPT RETURN
  382 001404  012737  000340  001016          MOV    #340,MTVS  ;SET INTERRUPT VECTOR  C      <-- @ MTVS
  383 001412  005037  001100                  CLR    PRINT1     ;INITIALIZE ERROR PRINTOUT HEADING
  384 001416  005037  001072                  CLR    CRCWRT     ;INITIALIZE CRC CALCULATED FOR PRINTOUT
  385 001422  005037  000006                  CLR    6          ;INITIALIZE ERROR TRAP VECTOR
  386                                         ;CALCULATE MAG TAPE PRIORITY BUS #
  387 001426  013700  177570                  MOV    SR,R0
  388 001432  042700  177437                  BIC #177437,R0    ;CHECK SWITCHES
  389 001436  010037  001104                  MOV    R0,MTP     ;STORE MAG TAPE PRIORITY BUS #
  390 001442  162700  000040                  SUB    #40,R0     ;DECRIMENT BUS #
  391 001446  010037  001110                  MOV    R0,MTPM    ;STORE MAG TAPE BUS LEVEL MINUS ONE
  392                                         ;GENERATE MAG TAPE COMMAND TABLE
  393 001452  013700  177570                  MOV    SR,R0
  394 001456  042700  174377                  BIC    #174377,R0
  395 001462  010037  001106                  MOV    R0,TCSL    ;STORE SELECT COMMAND
  396 001466  052700  060001                  BIS    #60001,R0
  397 001472  012701  001112                  MOV    #TCOL,R1
  398 001476  010021                          MOV    R0,(R1)+   ;STORE NEXT COMMAND
  399 001500  062700  000002                  ADD    #2,R0
```

```
    400 001504  022701  001132                 CMP     #TCOL+20,R1  ;TEST FOR TABLE COMPLETION
    401 001510  001372                         BNE     .-12         ;LOOP IF NOT COMPLETE
    402
    403                                        ;**** REGISTERS TESTS ****
    404
    405                                ;*********************************************** **********************
    406                                ;TEST ALL BITS OF COMMAND REGISTER (EXCEPT CU READY, BIT 7)TO BE CLEARED
    407 001512  104402                         SCOPE
    408 001514  000005                         RESET
    409 001516  032777  177577  177276         BIT     #177577,@MTC
    410 001524  001401                         BEQ     .+4
    411 001526  104400                         HLT                  ;ERROR, INIT DIDN'T CLEAR COMMAND REGISTER
    412                                ;*********************************************** **********************
    413                                ;TEST BITS 7-13,15 OF STATUS REGISTER TO BE CLEARED AFTER INIT
    414 001530  104402                         SCOPE
    415 001532  000005                         RESET
    416 001534  032777  137600  177256         BIT     #137600,@MTS
    417 001542  001401                         BEQ     .+4
    418 001544  104400                         HLT                  ;ERROR, INIT DIDN'T CLEAR PROPER BITS IN STATUS
    419                                ;*********************************************** **********************
    420                                ;TEST UINIT TO CLEAR BYTE RECORD COUNT
    421 001546  104402                         SCOPE
    422 001550  000005                         RESET
    423 001552  005777  177246                 TST     @BC
    424 001556  001401                         BEQ     .+4
    425 001560  104400                         HLT                  ;ERROR, INIT DIDN'T CLEAR BYTE COUNT
    426                                ;*********************************************** **********************
    427                                ;TEST INIT TO CLEAR CURRENT MEMORY ADDRESS REGISTER
    428 001562  104402                         SCOPE
    429 001564  000005                         RESET
    430 001566  005777  177234                 TST     @CA
    431 001572  001401                         BEQ     .+4
    432 001574  104400                         HLT                  ;ERROR,INIT DIDN'T CLEAR CURRENT MEMORY ADDRESS
    433                                ;*********************************************** **********************
    434                                ;TEST INIT TO CLEAR DATA BUFFER
    435 001576  104402                         SCOPE
    436 001600  000005                         RESET
    437 001602  005777  177222                 TST     @MTD
    438 001606  001401                         BEQ     .+4
    439 001610  104400                         HLT                  ;ERROR, INIT DIDN'T CLEAR DATA BUFFER
    440                                ;*********************************************** **********************
    441                                ;TEST CU READY (BIT 7 COMMAND REGISTER) TO BE SET ON INIT,
    442 001612  104402                         SCOPE
    443 001614  000005                         RESET
    444 001616  105777  177200                 TSTB    @MTC
    445 001622  100401                         BMI     .+4
    446 001624  104400                         HLT                  ;ERROR, INIT DIDN'T SET CU READY
    447                                ;*********************************************** **********************
    448                                ;TEST BIT 14 OF TU10 READ LINES TO BE CLEARED BY INIT
    449 001626  104402                         SCOPE
    450 001630  000005                         RESET
    451 001632  032777  040000  177172         BIT     #40000,@MTRD
    452 001640  001401                         BEQ     .+4
    453 001642  104400                         HLT                  ;ERROR, INIT FAILED TO CLEAR BIT 14 OF MTRD
    454                                ;*********************************************** **********************
    455                                ;TEST COMMAND REGISTER (EXCEPT CU READY,BIT 7)TO BE CLEARED BY POWER CLEAR
    456 001644  104402                         SCOPE
```

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457 001646  104414                          PWRCLR
458 001650  032777  177577  177144          BIT     #177577,@MTC
459 001656  001401                          BEQ     .+4
460 001660  104400                          HLT                 ;ERROR, POWER CLEAR DIDN'T CLEAR COMMAND REGISTE
461                                     ;********************************************** **********************
462
463                                     ;TEST BITS 7-13, 15 OF STATUS REGISTER TO BE CLEARED BY POWER CLEAR (BIT
464 001662  104402                          SCOPE
465 001664  104414                          PWRCLR
466 001666  032777  137600  177124          BIT     #137600,@MTS
467 001674  001401                          BEQ     .+4
468 001676  104400                          HLT                 ;ERROR, POWER CLEAR DIDN'T CLEAR PROPER BITS IN REG
469                                     ;********************************************** **********************
470                                     ;TEST POWER CLEAR (BIT 12) TO CLEAR BYTE RECORD COUNT
471 001700  104402                          SCOPE
472 001702  104414                          PWRCLR
473 001704  005777  177114                  TST     @BC
474 001710  001401                          BEQ     .+4
475 001712  104400                          HLT                 ;ERROR, POWER CLEAR DIDN'T CLEAR BYTE COUNT
476                                     ;********************************************** **********************
477                                     ;TEST POWER CLEAR (BIT 12) TO CLEAR CURRENT MEMORY ADDRESS REGISTER
478 001714  104402                          SCOPE
479 001716  104414                          PWRCLR
480 001720  005777  177102                  TST     @CA
481 001724  001401                          BEQ     .+4
482 001726  104400                          HLT                     ;ERROR, POWER CLEAR DIDN,T CLEAR CURRENT ADD. REG
483                                     ;********************************************** **********************
484                                     ;TEST POWER CLEAR (BIT 12) TO CLEAR DATA BUFFER
485 001730  104402                          SCOPE
486 001732  104414                          PWRCLR
487 001734  005777  177070                  TST     @MTD
488 001740  001401                          BEQ     .+4
489 001742  104400                          HLT                 ;ERROR, POWER CLEAR DIDN'T CLEAR DATA BUFFER
490                                     ;********************************************** **********************
491                                     ;TEST CU READY (BIT 7 COMMAND REGISTER) TO BE SET BY POWER CLEAR
492 001744  104402                          SCOPE
493 001746  104414                          PWRCLR
494 001750  105777  177046                  TSTB    @MTC
495 001754  100401                          BMI     .+4
496 001756  104400                          HLT                 ;ERROR, POWER CLEAR DIDN'T SET CU READY
497                                     ;********************************************** **********************
498                                     ;TEST BIT 14 OF TU10 HEAD LINES TO BE CLEARD BY POWER CLEAR
499 001760  104402                          SCOPE
500 001762  104414                          PWRCLR
501 001764  032777  040000  177040          BIT     #40000,@MTRD
502 001772  001401                          BEQ     .+4
503 001774  104400                          HLT                     ;ERROR, POWER CLEAR FAILED TO CLEAR BIT14 OF TU10 REG
504                                     ;********************************************** **********************
505                                     ;TEST FUNCTION BITS (1,2,3) OF COMMAND REGISTER CAN BE SET
506 001776  104402                          SCOPE
507 002000  012777  000016  177014          MOV     #16,@MTC
508 002006  122777  000216  177006          CMPB    #216,@MTC
509 002014  001401                          BEQ     .+4
510 002016  104400                          HLT                 ;ERROR, CU READY AND ALL FUNCTION BITS NOT SET
511                                     ;********************************************** **********************
512                                     ;TEST FUNCTION BITS (1,2,3) OF COMMAND REGISTER CAN BE CLEARED
513 002020  104402                          SCOPE
```

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514 002022  052777  000016  176772          BIS     #16,@MTC
515 002030  042777  000016  176764          BIC     #16,@MTC
516 002036  032777  000016  176756          BIT     #16,@MTC
517 002044  001401                          BEQ     .+4
518 002046  104400                          HLT             ;ERROR, ALL FUNCTION BITS NOT CLEARED
519                                 ;*********************************************** **********************
520                                 ;TEST FUNCTIONS BITS (1,2,3,) OF COMMAND REGISTER CAN BE SET AND CLEARED
521 002050  104402                          SCOPE
522 002052  012777  000002  176742          MOV     #2,@MTC
523 002060  122777  000202  176734          CMPB    #202,@MTC
524 002066  001401                          BEQ     .+4
525 002070  104400                          HLT             ;ERROR, FUNCTION NOT =001  READ)
526 002072  104402                          SCOPE
527 002074  012777  000004  176720          MOV     #4,@MTC
528 002102  122777  000204  176712          CMPB    #204,@MTC
529 002110  001401                          BEQ     .+4
530 002112  104400                          HLT             ;ERROR, FUNCTION NOT =010  WRITE)
531 002114  104402                          SCOPE
532 002116  012777  000006  176676          MOV     #6,@MTC
533 002124  122777  000206  176670          CMPB    #206,@MTC
534 002132  001401                          BEQ     .+4
535 002134  104400                          HLT             ;ERROR, FUNCTION NOT =011  WRITE EOF)
536 002136  104402                          SCOPE
537 002140  012777  000010  176654          MOV     #10,@MTC
538 002146  122777  000210  176646          CMPB    #210,@MTC
539 002154  001401                          BEQ     .+4
540 002156  104400                          HLT             ;ERROR, FUNCTION NOT =100  SPACE FORWARD)
541 002160  104402                          SCOPE
542 002162  012777  000012  176632          MOV     #12,@MTC
543 002170  122777  000212  176624          CMPB    #212,@MTC
544 002176  001401                          BEQ     .+4
545 002200  104400                          HLT             ;ERROR, FUNCTION NOT =101  SPACE REVERSE)
546 002202  104402                          SCOPE
547 002204  012777  000014  176610          MOV     #14,@MTC
548 002212  122777  000214  176602          CMPB    #214,@MTC
549 002220  001401                          BEQ     .+4
550 002222  104400                          HLT             ;ERROR, FUNCTION NOT =110  WRITE XIRG)
551 002224  104402                          SCOPE
552 002226  012777  000016  176566          MOV     #16,@MTC
553 002234  122777  000216  176560          CMPB    #216,@MTC
554 002242  001401                          BEQ     .+4     ;ERROR, FUNCTION NOT =111  REWIND)
555 002244  104400                          HLT
556                                 ;*********************************************** **********************
557 002246  104402                          SCOPE
558                                 ;TEST ADDRESS BITS (4,5) OF COMMAND REGISTER CAN BE SET
559 002250  012777  000060  176544          MOV     #60,@MTC
560 002256  122777  000260  176536          CMPB    #260,@MTC
561 002264  001401                          BEQ     .+4
562 002266  104400                          HLT             ;ERROR, CU READY AND ADDRESS BITS NOT SET
563                                 ;*********************************************** **********************
564                                 ;TEST ADDRESS BITS (4,5) OF COMMAND REGISTER CAN BE CLEARED
565 002270  104402                          SCOPE
566 002272  052777  000060  176522          BIS     #60,@MTC
567 002300  042777  000060  176514          BIC     #60,@MTC
568 002306  032777  000060  176506          BIT     #60,@MTC
569 002314  001401                          BEQ     .+4
570 002316  104400                          HLT             ;ERROR, ADDRESS BITS NOT CLEARED
```

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571                                             !********************************************** **********************
572                                             !TEST ADDRESS BITS (4,5,6) OF COMMAND REGISTER CAN BE SET AND CLEARED IN REG.
573 002320  104402                                     SCOPE
574 002322  012777  000020  176472                     MOV     #20,@MTC
575 002330  122777  000220  176464                     CMPB    #220,@MTC
576 002336  001401                                     BEQ     .+4
577 002340  104400                                     HLT             !ERROR ADDRESS BITS NOT =2
578 002342  104402                                     SCOPE
579 002344  012777  000040  176450                     MOV     #40,@MTC
580 002352  122777  000240  176442                     CMPB    #240,@MTC
581 002360  001401                                     BEQ     .+4
582 002362  104400                                     HLT             !ERROR, ADDRESS BITS NOT = 2
583 002364  104402                                     SCOPE
584 002366  012777  000060  176426                     MOV     #60,@MTC
585 002374  122777  000260  176420                     CMPB    #260,@MTC
586 002402  001401                                     BEQ     .+4
587 002404  104400                                     HLT             !ERROR, ADDRESS BITS NOT = 1
588                                             !********************************************** **********************
589                                             !TEST UNIT SELECT BITS (8,9,10) OF COMMAND REGISTER CAN BE SET
590 002406  104402                                     SCOPE
591 002410  012777  003400  176404                     MOV     #3400,@MTC
592 002416  022777  003600  176376                     CMP     #3600,@MTC
593 002424  001401                                     BEQ     .+4
594 002426  104400                                     HLT             !ERROR, CU READY AND ALL UNIT SELECT BITS NOT SET
595                                             !********************************************** **********************
596                                             !TEST UNIT SELECT BITS (8,9,10) OF COMMAND REGISTER CAN BE CLEARED
597 002430  104402                                     SCOPE
598 002432  052777  003400  176362                     BIS     #3400,@MTC
599 002440  042777  003400  176354                     BIC     #3400,@MTC
600 002446  032777  003400  176346                     BIT     #3400,@MTC
601 002454  001401                                     BEQ     .+4
602 002456  104400                                     HLT             !ERROR, UNIT SELECT BITS NOT CLEARED
603                                             !********************************************** **********************
604                                             !TEST UNIT SELECT BITS (8,9,10) OF COMMAND REGISTER CAN BE SET AND CLEARED
605 002460  104402                                     SCOPE
606 002462  012777  000400  176332                     MOV     #400,@MTC
607 002470  022777  000600  176324                     CMP     #600,@MTC
608 002476  001401                                     BEQ     .+4
609 002500  104400                                     HLT             !ERROR, UNIT SELECT NOT =001
610 002502  104402                                     SCOPE
611 002504  012777  001000  176310                     MOV     #1000,@MTC
612 002512  022777  001200  176302                     CMP     #1200,@MTC
613 002520  001401                                     BEQ     .+4
614 002522  104400                                     HLT             !ERROR, UNIT SELECT NOT =010
615 002524  104402                                     SCOPE
616 002526  012777  001400  176266                     MOV     #1400,@MTC
617 002534  022777  001600  176260                     CMP     #1600,@MTC
618 002542  001401                                     BEQ     .+4
619 002544  104400                                     HLT             !ERROR, UNIT SELECT NOT =011
620 002546  104402                                     SCOPE
621 002550  012777  002000  176244                     MOV     #2000,@MTC
622 002556  022777  002200  176236                     CMP     #2200,@MTC
623 002564  001401                                     BEQ     .+4
624 002566  104400                                     HLT             !ERROR, UNIT SELECT NOT =100
625 002570  104402                                     SCOPE
626 002572  012777  002400  176222                     MOV     #2400,@MTC
627 002600  022777  002600  176214                     CMP     #2600,@MTC
```

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628 002606  001401                          BEQ     .+4
629 002610  104400                          HLT             ;ERROR, UNIT SELECT NOT =101
630 002612  104402                          SCOPE
631 002614  012777  003000  176200          MOV     #3000,@MTC
632 002622  022777  003200  176172          CMP     #3200,@MTC
633 002630  001401                          BEQ     .+4
634 002632  104400                          HLT             ;ERROR, UNIT SELECT NOT =110
635 002634  104402                          SCOPE
636 002636  012777  003400  176156          MOV     #3400,@MTC
637 002644  022777  003600  176150          CMP     #3600,@MTC
638 002652  001401                          BEQ     .+4
639 002654  104400                          HLT             ;ERROR, UNIT SELECT NOT =111
640                                 ;********************************************** **********
641                                 ;TEST PARITY BIT (BIT 11) CAN BE SET
642
643 002656  104402                          SCOPE
644 002660  052777  004000  176134          BIS     #4000,@MTC
645 002666  032777  004000  176126          BIT     #4000,@MTC
646 002674  001001                          BNE     .+4
647 002676  104400                          HLT             ;ERROR, PARITY NOT SET
648                                 ;********************************************** **********
649                                 ;TEST PARITY BIT (BIT 11) CAN BE CLEARED
650 002700  104402                          SCOPE
651 002702  052777  004000  176112          BIS     #4000,@MTC
652 002710  042777  004000  176104          BIC     #4000,@MTC
653 002716  032777  004000  176076          BIT     #4000,@MTC
654 002724  001401                          BEQ     .+4
655 002726  104400                          HLT             ;ERROR, PARITY BIT NOT CLEARED
656                                 ;********************************************** **********
657                                 ;TEST DENSITY BITS (13,14) OF COMMAND REGISTER CAN BE SET
658 002730  104402                          SCOPE
659 002732  012777  060000  176062          MOV     #60000,@MTC
660 002740  022777  060200  176054          CMP     #60200,@MTC
661 002746  001401                          BEQ     .+4
662 002750  104400                          HLT             ;ERROR, CU READY AND DENSITY BITS NOT SET
663                                 ;********************************************** **********
664                                 ;TEST DENSITY BITS (13,14) OF COMMAND REGISTER CAN BE CLEARED
665 002752  104402                          SCOPE
666 002754  052777  060000  176040          BIS     #60000,@MTC
667 002762  042777  060000  176032          BIC     #60000,@MTC
668 002770  032777  060000  176024          BIT     #60000,@MTC
669 002776  001401                          BEQ     .+4
670 003000  104400                          HLT
671                                 ;TEST DENSITY BITS (13,14) OF COMMAND REGISTER CAN BE SET AND CLEARED IN REG
672 003002  104402                          SCOPE
673 003004  012777  020000  176010          MOV     #20000,@MTC
674 003012  022777  020200  176002          CMP     #20200,@MTC
675 003020  001401                          BEQ     .+4
676 003022  104400                          HLT             ;ERROR, DENSITY NOT =01
677 003024  104402                          SCOPE
678 003026  012777  040000  175766          MOV     #40000,@MTC
679 003034  022777  040200  175760          CMP     #40200,@MTC
680 003042  001401                          BEQ     .+4
681 003044  104400                          HLT             ;ERROR, DENSITY NOT =10
682 003046  104402                          SCOPE
683 003050  012777  060000  175744          MOV     #60000,@MTC
684 003056  022777  060200  175736          CMP     #60200,@MTC
```

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685 003064  001401                          BEQ     .+4
686 003066  104400                          HLT             ;ERROR DENSITY NOT =11
687                                 ;*********************************************** **********************
688                                 ;TEST ALL BITS OF BYTE COUNT TO ACCEPT COUNT PATTERN
689 003070  104402                          SCOPE
690 003072  005037  001044                  CLR     TEMP
691 003076  013777  001044  175720  TBC:    MOV     TEMP,@BC
692 003104  023777  001044  175712          CMP     TEMP,@BC
693 003112  001401                          BEQ     .+4
694 003114  104400                          HLT             ;ERROR, BYTE COUNT NOT =TEMP
695 003116  032737  010000  177570          BIT     #10000,SR
696 003124  001002                          BNE     .+6             ;INHIBIT ITERATION?
697 003126  005237  001044                  INC     TEMP
698 003132  001361                          BNE     TBC
699                                 ;*********************************************** **********************
700                                 ;TEST ALL BITS OF CURRENT MEMORY ADDRESS REGISTER TO ACCEPT COUNT PATTERN
701 003134  104402                          SCOPE
702 003136  005037  001044                  CLR     TEMP
703 003142  013777  001044  175656  TMA:    MOV     TEMP,@CA
704 003150  023777  001044  175650          CMP     TEMP,@CA
705 003156  001401                          BEQ     .+4
706 003160  104400                          HLT             ;ERROR, CA NOT = TEMP
707 003162  032737  010000  177570          BIT     #10000,SR
708 003170  001002                          BNE     .+6             ;INHIBIT ITERATION?
709 003172  005237  001044                  INC     TEMP
710 003176  001361                          BNE     TMA
711                                 ;*********************************************** **********************
712                                 ;TEST BITS 0-7 OF DATA BUFFER TO ACCEPT COUNT PATTERN
713 003200  104402                          SCOPE
714 003202  005037  001044                  CLR     TEMP
715 003206  113777  001044  175614  TDB:    MOVB    TEMP,@MTD
716 003214  123777  001044  175606          CMPB    TEMP,@MTD
717 003222  001401                          BEQ     .+4
718 003224  104400                          HLT             ;ERROR, DATA BUFFER NOT = TEMP
719 003226  032737  010000  177570          BIT     #10000,SR
720 003234  001002                          BNE     .+6             ;INHIBIT ITERATION?
721 003236  105237  001044                  INCB    TEMP            ;NO
722 003242  001361                          BNE     TDB
723                                 ;*********************************************** **********************
724                                 ;TEST BIT 14 OF MTRD CAN BE SET AND CLEARED
725 003244  104402                          SCOPE
726 003246  052777  040000  175556          BIS     #40000,@MTRD
727 003254  032777  040000  175550          BIT     #40000,@MTRD
728 003262  001001                          BNE     .+4
729 003264  104400                          HLT             ;ERROR, BIT 14 OF MTRD NOT =1
730 003266  042777  040000  175536          BIC     #40000,@MTRD
731 003274  032777  040000  175530          BIT     #40000,@MTRD
732 003302  001401                          BEQ     .+4
733 003304  104400                          HLT             ;ERROR, BIT 14 OF MTRD NOT =0
734                                 ;TEST FOR TAPE UNIT READY (BIT 0) SET
735                                 ;*********************************************** **********************
736 003306  104402                          SCOPE
737 003310  104432                          SELECT
738 003312  032777  000001  175500          BIT     #1,@MTS
739 003320  001001                          BNE     .+4
740 003322  104400                          HLT             ;ERROR TU READY NOT SET
741                                 ;*********************************************** **********************
```

```
                                        ;TEST FOR REWIND STATUS (BIT 1) CLEARED
003324  104402                                SCOPE
003326  032777  000002  175464                BIT     #2,@MTS
003334  001401                                BEQ     .+4
003336  104400                                HLT             ;ERROR, REWIND STATUS IS SET
                                        ;********************************************** **********
                                        ;TEST FOR WRITE LOCK (BIT 2) CLEARED
003340  104402                                SCOPE
003342  032777  000004  175450                BIT     #4,@MTS
003350  001401                                BEQ     .+4
003352  104400                                HLT             ;ERROR, WRITE LOCK IS SET
                                        ;********************************************** **********
                                        ;TEST FOR SETTLEDOWN (BIT 3) CLEARED
003354  104402                                SCOPE
003356  032777  000010  175434                BIT     #10,@MTS
003364  001401                                BEQ     .+4
003366  104400                                HLT             ;ERROR, SETTLEDOWN IS SET
                                        ;********************************************** **********
                                        ;TEST FOR 7 CHANNEL (BIT 4) CLEARED IF 9 CHANNEL SELECTED
003370  006057  177570                        ROR     SR      ;IS SW0=1
003374  103407                                BCS     T7CH    ;YES SKIP 9 CHANNEL TEST
003376  104402                                SCOPE
003400  032777  000020  175412                BIT     #20,@MTS
003406  001401                                BEQ     .+4
003410  104400                                HLT             ;ERROR, 7 CHANNEL SET WITH 9 TRACK SELECTED
003412  000405                                BR      TSR     ;SKIP 7 CHANNEL TEST
                                        ;********************************************** **********
                                        ;TEST FOR 7 CHANNEL (BIT 4) SET IF 7 CHANNEL SELECTED
003414  104402                        T7CH:   SCOPE
003416  032777  000020  175374                BIT     #20,@MTS
003424  001001                                BNE     .+4
003426  104400                                HLT             ;ERROR, 7 CHANNEL NOT SET
                                        ;********************************************** **********
                                        ;TEST FOR BEGINNING OF TAPE (BIT 5) SET
003430  104402                        TSR:    SCOPE
003432  104432                                SELECT
003434  032777  000040  175356                BIT     #40,@MTS
003442  001001                                BNE     .+4
003444  104400                                HLT             ;ERROR, BOT NOT SET (DRIVE SHOULD BE AT BOT)
                                        ;********************************************** **********
                                        ;TEST FOR SELECT/REMOTE (BIT 6) SET
003446  104402                                SCOPE
003450  032777  000100  175342                BIT     #100,@MTS
003456  001001                                BNE     .+4
003460  104400                                HLT             ;ERROR, SELECT/REMOTE NOT SET
003462  005057  001040                        CLR     IDTST       ;ALLOW IDEN STATUS CHECK (PE ONLY)

                                        ;**** TAPE MOTION TESTS ****

                                        ;********************************************** **********
                                        ;TEST WRITE EOF
003466  005257  001042                        INC     TMTNFL      ;SET TAPE MOTION FLAG
003472  104402                                SCOPE
003474  104404                                TSTCUR              ;TEST CONTROLLER READY
003476  104400                                HLT                 ;ERROR, CONTROLLER DID NOT GO READY
003500  104440                                MIN1BC              ;SET BYTE COUNT TO MINUS ONE
003502  104434                                WBUFCA
```

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799 003504  104422                          WREOF
800 003506  105777  175310                  TSTB    @MTC
801 003512  100001                          BPL     .+4
802 003514  104400                          HLT                     ;ERROR, CONTROLLER DID NOT GO BUSY
803 003516  013702  001020                  MOV     MTS,R2          ;ASSIGN STATUS REG TO BE TESTED
804 003522  012703  000040                  MOV     #40,R3          ;MASK BOT
805 003526  012704  000005                  MOV     #5,R4
806 003532  104410                          TSTRGR                  ;TEST REG FOR RESET
807 003534  104400                          HLT                 ;ERROR, BOT (BIT 5) NOT CLEARED
808 003536  104404                          TSTCUR                  ;TEST CONTROLLER READY
809 003540  104400                          HLT                     ;ERROR, CONTROLLER DID NOT GO READY
810 003542  104430                          WAITTR
811 003544  104400                          HLT                     ;ERROR, TAPE UNIT READY DID NOT GO SET
812 003546  104445                          TSTEOF
813 003550  001001                          BNE     .+4
814 003552  104400                          HLT                 ;ERROR, EOF (BIT 14) NOT =1
815 003554  005777  175244                  TST     @BC
816 003560  001001                          BNE     .+4
817 003562  104400                          HLT                 ;ERROR, BYTE COUNT SHOULD NOT INCREMENT ON WRITE EOF
818 003564  022777  014556  175234          CMP     #WBUF,@CA
819 003572  001401                          BEQ     .+4
820 003574  104400                          HLT                 ;ERROR, CURRENT ADDRESS SHOULD NOT INCREMENT ON WRITE EOF
821 003576  104414                          PWRCLR
822 003600  104446                          TSTEOF
823 003602  001401                          BEQ     .+4
824 003604  104400                          HLT                 ;ERROR, POWER CLEAR DID NOT CLEAR EOF (BIT 14)
825                                 ;********************************************** **********************
826                                 ;TEST REWIND FUNCTION
827 003606  104402                          SCOPE
828 003610  104404                          TSTCUR                  ;TEST CONTROLLER READY
829 003612  104400                          HLT                     ;ERROR, CONTROLLER DID NOT GO READY
830 003614  104422                          WREOF                   ;WRITE EOF, GO
831 003616  104404                          TSTCUR                  ;TEST CONTROLLER READY
832 003620  104400                          HLT                     ;ERROR, CONTROLLER DID NOT GO READY
833 003622  104424                          REWIND
834 003624  104404                          TSTCUR                  ;TEST CONTROLLER READY
835 003626  104400                          HLT                     ;ERROR, CONTROLLER DID NOT GO READY
836 003630  032777  000002  175162          BIT     #2,@MTS
837 003636  001001                          BNE     .+4
838 003640  104400                          HLT                 ;ERROR, REWIND STATUS (BIT 1) NOT = 1 DURING REWIND
839 003642  006077  175152                  ROR     @MTS
840 003646  103001                          BCC     .+4
841 003650  104400                          HLT                 ;ERROR, TU READY NOT =0
842 003652  013702  001020                  MOV     MTS,R2          ;ASSIGN STATUS REG TO BE TESTED
843 003656  012703  000002                  MOV     #2,R3           ;MASK REWIND BIT
844 003662  012704  000007                  MOV     #7,R4
845 003666  104410                          TSTRGR                  ;TEST REG FOR RESET
846 003670  104400                          HLT                     ;ERROR, REWIND STATUS DID NOT CLEAR
847 003672  057702  175122                  BIS     @MTS,R2         ;DELAY A SHORT TIME
848 003676  032777  000010  175114          BIT     #10,@MTS        ;CHECK SETTLE DOWN BIT
849 003704  001001                          BNE     .+4
850 003706  104400                          HLT                     ;ERROR, SETTLEDOWN STATUS DID NOT SET
851 003710  032777  000040  175102          BIT     #40,@MTS
852 003716  001001                          BNE     .+4
853 003720  104400                          HLT                 ;ERROR, BOT (BIT 5) NOT =1 WHEN SDWN (BIT 3) SET
854 003722  013702  001020                  MOV     MTS,R2          ;ASSIGN STATUS REG TO BE TESTED
855 003726  012703  000010                  MOV     #10,R3          ;MASK SETTLEDOWN STATUS
```

```
856 003732  012704  000001              MOV     #1,R4
857 003736  104410                      TSTRGR                  ;TEST REG FOR RESET
858 003740  104400                      HLT                     ;ERROR, SETTLEDOWN STATUS DID NOT RESET
859 003742  006077  175052              ROR     @MTS
860 003746  103401                      BCS     .+4
861 003750  104400                      HLT             ;ERROR, TU READY NOT SET AFTER SDWN CLEARED ON REWIND
862 003752  104414                      PWRCLR
863                             ;TEST REWIND WHILE AT BOT TO BE IGNORED
864 003754  104402                      SCOPE
865 003756  104424                      REWIND
866 003760  104404                      TSTCUR                  ;TEST CONTROLLER READY
867 003762  104400                      HLT                     ;ERROR, CONTROLLER DID NOT GO READY
868 003764  005777  175030              TST     @MTS
869 003770  100001                      BPL     .+4
870 003772  104400                      HLT             ;ERROR, ILC(BIT15)=1 AFTER REWIND WHILE AT BOT
871 003774  104414                      PWRCLR
872                             ;********************************************** **********************
873                             ;SPACE OVER EOF TEST
874                             ;TEST SPACE FORWARD TO STOP ON FIRST EOF
875 003776  104402                      SCOPE
876 004000  104424                      REWIND
877 004002  104450                      WAITTR
878 004004  104400                      HLT                     ;ERROR, TAPE UNIT READY DID NOT GO SET
879 004006  012777  177776  175010      MOV     #-2,@BC
880 004014  104436                      RBUFCA
881 004016  104426                      SPACEF
882 004020  105777  174776              TSTB    @MTC
883 004024  100001                      BPL     .+4
884 004026  104400                      HLT                     ;ERROR, CONTROLLER DID NOT GO BUSY
885 004030  104404                      TSTCUR                  ;TEST CONTROLLER READY
886 004032  104400                      HLT                     ;ERROR, CONTROLLER DID NOT GO READY
887 004034  104446                      TSTEOF
888 004036  001001                      BNE     .+4
889 004040  104400                      HLT             ;ERROR, EOF (BIT 14) NOT =1
890 004042  005777  174754              TST     @MTC
891 004046  100401                      BMI     .+4
892 004050  104400                      HLT             ;ERROR, (BIT 15) OF COMMAND REGISTER NOT=1 WITH EOF STATUS
893 004052  022777  177777  174744      CMP     #-1,@BC
894 004060  001401                      BEQ     .+4
895 004062  104400                      HLT             ;ERROR, BYTE COUNT SHOULD HAVE INCREMENTED FROM ZERO
896 004064  022777  014722  174734      CMP     #RBUF,@CA
897 004072  001401                      BEQ     .+4
898 004074  104400                      HLT             ;ERROR, CURRENT ADDRESS REGISTER SHOULD NOT INCR
899 004076  104414                      PWRCLR
900 004100  104446                      TSTEOF
901 004102  001401                      BEQ     .+4
902 004104  104400                      HLT             ;ERROR, PWR CLEAR DIDN'T CLEAR EOF (BIT 14)
903                             ;TEST SPACE REVERSE TO STOP IN FIRST EOF
904 004106  012777  177776  174710      MOV     #-2,@BC
905 004114  104436                      RBUFCA
906 004116  104430                      SPACEB
907 004120  104404                      TSTCUR                  ;TEST CONTROLLER READY
908 004122  104400                      HLT                     ;ERROR, CONTROLLER DID NOT GO READY
909 004124  104446                      TSTEOF
910 004126  001001                      BNE     .+4
911 004130  104400                      HLT             ;ERROR, EOF (BIT 14) NOT =1
912 004132  032777  000040  174660      BIT     #40,@MTS
```

```
913 004140  001401                          BEQ     .+4
914 004142  104400                          HLT             ;ERROR, BOT=1, SHOULD NOT HAVE REACHED BOT
915 004144  022777  177777  174652          CMP     #-1,@BC
916 004152  001401                          BEQ     .+4
917 004154  104400                          HLT             ;ERROR, BYTE COUNT SHOULD HAVE INCREMENTED FROM ZERO
918 004156  022777  014722  174642          CMP     #RBUF,@CA
919 004164  001401                          BEQ     .+4
920 004166  104400                          HLT             ;ERROR, CURRENT ADDRESS REGISTER SHOULD NOT INCR.
921 004170  104414                          PWRCLR
922 004172  104424                          REWIND
923 004174  104450                          WAITTR
924 004176  104400                          HLT                 ;ERROR, TAPE UNIT READY DID NOT GO TRUE
925                             ;********************************************** **********************
926                             ;WRITE 1 BYTE RECORD FROM BOT
927                             ;BOT (BIT 5) SHOULD CLEAR, CU READY SHOULD SET, BYTE COUNT AND
928                             ;CURRENT ADDRESS SHOULD INCREMENT
929 004200  104402                          SCOPE
930 004202  104440                          MIN1BC              ;SET BYTE COUNT TO MINUS ONE
931 004204  104434                          WBUFCA
932 004206  104416                          WRITE
933 004210  104404                          TSTCUR              ;TEST CONTROLLER READY
934 004212  104400                          HLT                 ;ERROR, CONTROLLER DID NOT GO READY
935 004214  032737  000004  177570          BIT     #4,SR       ;TEST IF PHASE ENCODED
936 004222  001412                          BEQ     IDBYP       ;BYPASS IDEN TEST IF NRZI
937 004224  005737  001040                  TST     IDTST       ;IS THIS FIRST OPER FROM BOT
938 004230  001007                          BNE     IDBYP       ;NO
939 004232  005237  001040                  INC     IDTST
940 004236  032777  001000  174566          BIT     #1000,@MTRD ;TEST FOR IDEN STATUS
941 004244  001001                          BNE     .+4
942 004246  104400                          HLT                 ;ERROR, IDEN STATUS NOT SET
943 004250  005777  174550          IDBYP:  TST     @BC         ;TEST BYTE COUNT TO = 0
944 004254  001401                          BEQ     .+4
945 004256  104400                          HLT             ;ERROR, BYTE COUNT DIDN'T INCREMENT
946 004260  022777  014557  174540          CMP     #WBUF+1,@CA ;TEST CURRENT MEMORY ADDRESS TO COUNT
947 004266  001401                          BEQ     .+4
948 004270  104400                          HLT             ;ERROR, CURRENT MEMORY ADDRESS DIDN'T INCREMENT
949 004272  104414                          PWRCLR
950                             ;********************************************** **********************
951                             ;READ 1 BYTE RECORD FROM BOT
952                             ;BOT (BIT 5) SHOULD CLEAR, CU READY SHOULD SET, BYTE COUNT AND
953                             ;CURRENT ADDRESS SHOULD INCREMENT
954 004274  104402                          SCOPE
955 004276  104424                          REWIND
956 004300  104450                          WAITTR
957 004302  104400                          HLT                 ;ERROR, TAPE UNIT READY DID NOT GO SET
958 004304  032777  000040  174506          BIT     #40,@MTS
959 004312  001001                          BNE     .+4
960 004314  104400                          HLT             ;ERROR, DRIVE NOT AT BOT
961 004316  104440                          MIN1BC              ;SET BYTE COUNT TO MINUS ONE
962 004320  104436                          RBUFCA
963 004322  104420                          READ
964 004324  013702  001020                  MOV     MTS,R2      ;ASSIGN STATUS REG TO BE TESTED
965 004330  012703  000040                  MOV     #40,R3      ;MASK BOT
966 004334  012704  000005                  MOV     #5,R4
967 004340  104410                          TSTRGR              ;TEST REG FOR RESET
968 004342  104400                          HLT             ;ERROR, BOT (BIT 5) NOT CLEARED
969 004344  104404                          TSTCUR              ;TEST CONTROLLER READY
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```
  970 004346  104400                        HLT                     ;ERROR, CONTROLLER DID NOT GO READY
  971 004350  005777  174450                TST     @BC             ;TEST BYTE COUNT TO =0
  972 004354  001401                        BEQ     .+4
  973 004356  104400                        HLT                     ;ERROR, BYTE COUNT DIDN'T INCREMENT
  974 004360  022777  014723  174440        CMP     #RBUF+1,@CA     ;TEST CURRENT MEMORY ADDRESS TO COUNT
  975 004366  001401                        BEQ     .+4
  976 004370  104400                        HLT                     ;ERROR, CURRENT MEMORY ADDRESS DIDN'T INCREMENT
  977 004372  104414                        PWRCLR
  978 004374  104424                        REWIND
  979 004376  104450                        WAITTR
  980 004400  104400                        HLT                     ;ERROR, TAPE UNIT READY DID NOT GO TRUE
  981                                ;********************************************** **********************
  982                                ;TEST WRITE A 3 BYTE RECORD
  983 004402  104402                        SCOPE
  984 004404  104442                        MIN3BC                  ;SET BYTE COUNT TO MINUS THREE
  985 004406  104434                        WBUFCA
  986 004410  104416                        WRITE
  987 004412  104404                        TSTCUR                  ;TEST CONTROLLER READY
  988 004414  104400                        HLT                     ;ERROR, CONTROLLER DID NOT GO READY
  989 004416  022777  014561  174402        CMP     #WBUF+3,@CA
  990 004424  001401                        BEQ     .+4
  991 004426  104400                        HLT                     ;ERROR, CURRENT MEMORY ADDRESS DIDN'T INCREMENT
  992 004430  005777  174370                TST     @BC
  993 004434  001401                        BEQ     .+4
  994 004436  104400                        HLT                     ;ERROR, BYTE COUNT DIDN'T INCREMENT TO 0
  995 004440  005777  174356                TST     @MTC
  996 004444  100001                        BPL     .+4
  997 004446  104400                        HLT                     ;ERROR, BIT 15 SET IN COMMAND REGISTER
  998 004450  104414                        PWRCLR
  999                                ;********************************************** **********************
 1000                                ;TEST READ A 3 BYTE RECORD
 1001 004452  104402                        SCOPE
 1002 004454  104424                        REWIND
 1003 004456  104450                        WAITTR
 1004 004460  104400                        HLT                     ;ERROR, TAPE UNIT READY DID NOT GO SET
 1005 004462  104436                        RBUFCA
 1006 004464  104442                        MIN3BC                  ;SET BYTE COUNT TO MINUS THREE
 1007 004466  104420                        READ
 1008 004470  104404                        TSTCUR                  ;TEST CONTROLLER READY
 1009 004472  104400                        HLT                     ;ERROR, CONTROLLER DID NOT GO READY
 1010 004474  022777  014725  174324        CMP     #RBUF+3,@CA
 1011 004502  001401                        BEQ     .+4
 1012 004504  104400                        HLT                     ;ERROR, CURRENT MEMORY ADDRESS DIDN'T INCREMENT
 1013 004506  005777  174312                TST     @BC
 1014 004512  001401                        BEQ     .+4
 1015 004514  104400                        HLT                     ;ERROR, BYTE COUNT DIDN'T INCREMENT TO 0
 1016 004516  005777  174300                TST     @MTC
 1017 004522  100001                        BPL     .+4
 1018 004524  104400                        HLT                     ;ERROR, BIT 15 SET IN COMMAND REGISTER
 1019 004526  104414                        PWRCLR
 1020                                ;********************************************** **********************
 1021                                ;TEST SPACE FORWARD & REVERSE
 1022                                ;FIRST WRITE 2 RECORDS FOLLOWED BY EOF
 1023                                ;SPACE FORWARD 2 RECORDS, SHOULD NOT REACH EOF
 1024 004530  104402                        SCOPE
 1025 004532  104404                        TSTCUR                  ;TEST CONTROLLER READY
 1026 004534  104400                        HLT                     ;ERROR, CONTROLLER DID NOT GO READY
```

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1027 004536  104424                        REWIND
1028 004540  104404                        TSTCUR              ;TEST CONTROLLER READY
1029 004542  104400                        HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1030 004544  104442                        MIN3BC              ;SET BYTE COUNT TO MINUS THREE
1031 004546  104434                        WBUFCA
1032 004550  104416                        WRITE
1033 004552  104404                        TSTCUR              ;TEST CONTROLLER READY
1034 004554  104400                        HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1035 004556  104442                        MIN3BC              ;SET BYTE COUNT TO MINUS THREE
1036 004560  104434                        WBUFCA
1037 004562  104416                        WRITE
1038 004564  104404                        TSTCUR              ;TEST CONTROLLER READY
1039 004566  104400                        HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1040 004570  104422                        WREOF
1041 004572  104404                        TSTCUR              ;TEST CONTROLLER READY
1042 004574  104400                        HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1043 004576  104424                        REWIND
1044 004600  104404                        TSTCUR              ;TEST CONTROLLER READY
1045 004602  104400                        HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1046 004604  012777  177776  174212        MOV    #-2,@BC
1047 004612  104426                        SPACEF
1048 004614  104404                        TSTCUR              ;TEST CONTROLLER READY
1049 004616  104400                        HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1050 004620  104446                        TSTEOF
1051 004622  001401                        BEQ    .+4
1052 004624  104400                        HLT                 ;ERROR, EOF (BIT 14)=1, SHOULDN'T SPACE THIS FAR
1053 004626  005777  174172                TST    @BC          ;TEST BYTE COUNT TO =0
1054 004632  001401                        BEQ    .+4
1055 004634  104400                        HLT                 ;ERROR, BYTE COUNT DIDN'T  NCREMENT TO ZERO
1056                                ;NOW SPACE FORWARD TO EOF
1057 004636  005077  174162                CLR    @BC
1058 004642  104426                        SPACEF
1059 004644  104404                        TSTCUR              ;TEST CONTROLLER READY
1060 004646  104400                        HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1061 004650  104446                        TSTEOF
1062 004652  001001                        BNE    .+4
1063 004654  104400                        HLT                 ;ERROR, EOF NOT =1
1064 004656  022777  000001  174140        CMP    #1,@BC
1065 004664  001401                        BEQ    .+4
1066 004666  104400                        HLT                 ;ERROR BYTE COUNT SHOULD =0
1067                                ;NOW SPACE REVERSE 2 RECORDS (FIRST MUST BACKSPACE OVER EOF)
1068 004670  104442                        MIN3BC              ;SET BYTE COUNT TO MINUS THREE
1069 004672  104434                        WBUFCA
1070 004674  104430                        SPACEB
1071 004676  104404                        TSTCUR              ;TEST CONTROLLER READY
1072 004700  104400                        HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1073 004702  104446                        TSTEOF
1074 004704  001001                        BNE    .+4
1075 004706  104400                        HLT                 ;ERROR, EOF (BIT 14) NOT =1 AFTER BACKSPACE OVER EOF
1076 004710  104430                        SPACEB              ;RESUME BACKSPACE
1077 004712  104404                        TSTCUR              ;TEST CONTROLLER READY
1078 004714  104400                        HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1079 004716  105777  174102                TSTB   @BC
1080 004722  001401                        BEQ    .+4
1081 004724  104400                        HLT                 ;ERROR, BYTE COUNT NOT=0
1082 004726  022777  014556  174072        CMP    #WBUF,@CA
1083 004734  001401                        BEQ    .+4
```

```
1084 004736  104400                        HLT             ;ERROR, CURRENT MEMORY ADDRESS SHOULDN'T COUNT 0
1085 004740  032777  000040  174052        BIT    #40,@MTS
1086 004746  001401                        BEQ    .+4
1087 004750  104400                        HLT             ;ERROR, BACKSPACE SHOULD NOT HAVE REACHED BOT
1088 004752  104414                        PWRCLR
1089                                ;********************************************** **********************
1090                                ;TEST READ TO FIND EOF
1091 004754  104402                        SCOPE
1092 004756  104404                        TSTCUR              ;TEST CONTROLLER READY
1093 004760  104400                        HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1094 004762  104422                        WREOF
1095 004764  104404                        TSTCUR              ;TEST CONTROLLER READY
1096 004766  104400                        HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1097 004770  104430                        SPACEB
1098 004772  104404                        TSTCUR              ;TEST CONTROLLER READY
1099 004774  104400                        HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1100 004776  005037  014722                CLR    RBUF
1101 005002  012777  177771  174014        MOV    #-7,@BC
1102 005010  104436                        RBUFCA
1103 005012  104420                        READ
1104 005014  104404                        TSTCUR              ;TEST CONTROLLER READY
1105 005016  104400                        HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1106 005020  032777  040000  173772        BIT    #40000,@MTS
1107 005026  001001                        BNE    .+4
1108 005030  104400                        HLT             ;ERROR, EOF (BIT 14) NOT -  DURING A READ OPERATION
1109 005032  032737  000004  177570        BIT    #4,SR        ;IS TAPE PHASE ENCODED
1110 005040  001024                        BNE    TRLE         ;YES
1111 005042  006037  177570                ROR    SR      . ;IS 7 CHANNEL SELECTED
1112 005046  103405                        BCS    TREOF    ;YES
1113 005050  022737  011423  014722        CMP    #11423,RBUF
1114 005056  001401                        BEQ    .+4
1115 005060  104400                        HLT             ;ERROR, EOF (23) NOT TRANSFERRED FOR 2 BYTES DURING READ
1116 005062  000413                        BR     TRLE
1117 005064  032737  000010  177570  TREOF: BIT    #10,SR       ;IS CONTROLLER CONFIGURED FOR IBM
1118 005072  001402                        BEQ    .+6          ;NO
1119 005074  000337  014722                SWAB   RBUF         ;YES
1120 005100  022737  000377  014722        CMP    #377,RBUF
1121 005106  001401                        BEQ    .+4
1122 005110  104400                        HLT             ;ERROR, EOF (17-7 CHANNEL) NOT XFERED DURING READ
1123                                ;********************************************** **********************
1124                                ;TEST RECORD LENGTH ERROR
1125 005112  104414                TRLE:   PWRCLR
1126 005114  104402                        SCOPE
1127 005116  104404                        TSTCUR              ;TEST CONTROLLER READY
1128 005120  104400                        HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1129 005122  012737  177777  014556        MOV    #-1,WBUF
1130 005130  012737  177777  014560        MOV    #-1,WBUF+2
1131 005136  104444                        MIN4BC              ;SET BYTE COUNT TO MINUS FOUR
1132 005140  104434                        WBUFCA
1133 005142  104416                        WRITE
1134 005144  104404                        TSTCUR              ;TEST CONTROLLER READY
1135 005146  104400                        HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1136 005150  104440                        MIN1BC              ;SET BYTE COUNT TO MINUS ONE
1137 005152  104430                        SPACEB
1138 005154  104404                        TSTCUR              ;TEST CONTROLLER READY
1139 005156  104400                        HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1140 005160  005037  014722                CLR    RBUF
```

```
1141 005164  005037  014724                CLR    RBUF+2
1142 005170  104442                        MIN3BC                 ;SET BYTE COUNT TO MINUS THREE
1143 005172  104436                        RBUFCA
1144 005174  104420                        READ
1145 005176  104404                        TSTCUR                 ;TEST CONTROLLER READY
1146 005200  104400                        HLT                    ;ERROR, CONTROLLER DID NOT GO READY
1147 005202  032777  001000  173610        BIT    #1000,@MTS
1148 005210  001001                        BNE    .+4
1149 005212  104400                        HLT             ;ERROR, RECORD LENGTH ERROR (BIT 9) NOT =1
1150 005214  005777  173602                TST    @MTC
1151 005220  100001                        BMI    .+4
1152 005222  104400                        HLT             ;ERROR, BIT 15 NOT =1 WHEN RLS (BIT 9) =1
1153 005224  022737  177777  014722        CMP    #-1,RBUF
1154 005232  001401                        BEQ    .+4
1155 005234  104400                        HLT             ;ERROR, BYTES 1+2 NOT READ PROPERLY
1156 005236  032737  000010  177570        BIT    #10,SR          ;IS CONTROLLER CONFIGURED FOR IBM
1157 005244  001402                        BEQ    .+6             ;NO
1158 005246  000337  014724                SWAB   RBUF+2          ;YES
1159 005252  022737  000377  014724        CMP    #377,RBUF+2
1160 005260  001401                        BEQ    .+4
1161 005262  104400                        HLT             ;ERROR,BYTE 3 READ ERROR OR SOMETHING XFERED TO
1162                                                        ;IS DEC/IBM SWITCH IN CORRECT POSITION?
1163 005264  104414                        PWRCLR
1164 005266  032777  001000  173524        BIT    #1000,@MTS
1165 005274  001401                        BEQ    .+4
1166 005276  104400                        HLT             ;ERROR PWR CLEAR DIDN'T CLR RLE (BIT 9)
1167                                ;********************************************** **********************
1168                                ;
1169                                ;TEST ILLEGAL COMMAND TO =1 ON A DATO OR DATOB TO MTC WITH CU READY=0
1170 005300  104402                        SCOPE
1171 005302  104404                        TSTCUR                 ;TEST CONTROLLER READY
1172 005304  104400                        HLT                    ;ERROR, CONTROLLER DID NOT GO READY
1173 005306  104442                        MIN3BC                 ;SET BYTE COUNT TO MINUS THREE
1174 005310  104434                        WBUFCA
1175 005312  104422                        WREOF
1176 005314  104424                        REWIND
1177 005316  104404                        TSTCUR                 ;TEST CONTROLLER READY
1178 005320  104400                        HLT                    ;ERROR, CONTROLLER DID NOT GO READY
1179 005322  005777  173472                TST    @MTS
1180 005326  100001                        BMI    .+4
1181 005330  104400                        HLT             ;ERROR, ILLEGAL COMMAND (BIT 15) NOT =1
1182 005332  005777  173464                TST    @MTC
1183 005336  100001                        BMI    .+4
1184 005340  104400                        HLT             ;ERROR, (BIT 15) NOT =1 WITH ILLEGAL COMMAND
1185 005342  104430                        WAITTR
1186 005344  104400                        HLT                    ;ERROR, TAPE UNIT READ  DIO NOT GO SET
1187 005346  104414                        PWRCLR
1188                                ;********************************************** **********************
1189                                ;TEST ILLEGAL COMMAND BY ISSUING A COMMAND TO TYPE A UNIT WITH SELECT RE
1190 005350  104402                        SCOPE
1191 005352  013700  001106                MOV    TCSL,R0
1192 005356  032700  002000                BIT    #2000,R0        ;MASK UNIT SELECT MSB
1193 005362  001004                        BNE    .+12            ;IS UNIT SELECT MSB SET?
1194 005364  042737  010000  005414        BIC    #10000,CINST    ;NO, MAKE CINST A BIC INSTRUCTION
1195 005372  000403                        BR     .+10
1196 005374  052737  010000  005414        BIS    #10000,CINST    ;YES, MAKE CINST A BIS INSTRUCTION
1197 005402  013737  001106  001044        MOV    TCSL,TEMP
```

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1198 005410  105267  001045                    INCB    TEMP+1
1199 005414  042767  002000  001044  CINST:    BIC     #2000,TEMP      ;CAN BE A BIC OR BIS INSTRUCTION
1200 005422  013777  001044  173372            MOV     TEMP,@MTC       ;SELECT OFF LINE UNIT
1201 005430  104404                            TSTCUR                  ;TEST CONTROLLER READY
1202 005432  104400                            HLT                     ;ERROR, CONTROLLER DID NOT GO READY
1203 005434  006077  173360                    ROR     @MTS
1204 005440  103001                            BCC     .+4
1205 005442  104400                            HLT                     ;ERROR  NON DESIGNATED TAPE UNIT ON LINE
1206 005444  032777  000100  173346            BIT     #100,@MTS
1207 005452  001401                            BEQ     .+4
1208 005454  104400                            HLT             ;ERROR, SELECT REMOTE (BIT 6) NOT =0 WITH NONEXISTANT DRIVE
1209 005456  052777  000017  173336            BIS     #17,@MTC ;ISSUE REWIND
1210 005464  104404                            TSTCUR                  ;TEST CONTROLLER READY
1211 005466  104400                            HLT                     ;ERROR, CONTROLLER DID NOT GO READY
1212 005470  005777  173324                    TST     @MTS
1213 005474  100401                            BMI     .+4
1214 005476  104400                            HLT             ;ERROR, ILLEGAL COMMAND (BIT 15) NOT =1
1215 005500  104414                            PWRCLR
1216 005502  005777  173312                    TST     @MTS
1217 005506  100001                            BPL     .+4
1218 005510  104400                            HLT             ;ERROR, POWER CLEAR DIDN'T CLEAR ILC (BIT 15)
1219                                 ;********************************************** **********************
1220                                 ;TEST BACKSPACE WHILE AT BOT TO BE IGNORED
1221 005512  104402                            SCOPE
1222 005514  104424                            REWIND
1223 005516  104404                            TSTCUR                  ;TEST CONTROLLER READY
1224 005520  104400                            HLT                     ;ERROR, CONTROLLER DID NOT GO READY
1225 005522  104450                            WAITTR
1226 005524  104400                            HLT                     ;ERROR, TAPE UNIT READY DID NOT GO SET
1227 005526  104440                            MIN1BC                  ;SET BYTE COUNT TO MINUS ONE
1228 005530  104430                            SPACEB
1229 005532  104404                            TSTCUR                  ;TEST CONTROLLER READY
1230 005534  104400                            HLT                     ;ERROR, CONTROLLER DID NOT GO READY
1231 005536  005777  173256                    TST     @MTS
1232 005542  100001                            BPL     .+4
1233 005544  104400                            HLT             ;ERROR, ILC (BIT 15) =1 AFTER BACKSPACE WHILE AT BOT
1234 005546  032777  000040  173244            BIT     #40,@MTS
1235 005554  001001                            BNE     .+4
1236 005556  104400                            HLT             ;ERROR, NOT AT BOT AFTER BACKSPACE
1237                                 ;********************************************** **************
1238                                 ;TEST BAD TAPE ERROR (BIT 8) TO =1
1239                                 ;USE MAINTENANCE BIT 13 OF MTRD TO SET PREMATURE CU READY TO CAUSE BAD TAPE ERROR
1240 005560  104402                            SCOPE
1241 005562  032767  000004  177570            BIT     #4,SR           ;IS TAPE PHASE ENCODED
1242 005570  001041                            BNE     NXMT            ;YES
1243 005572  104444                            MIN4BC                  ;SET BYTE COUNT TO MINUS FOUR
1244 005574  104434                            WBUFCA
1245 005576  104404                            TSTCUR                  ;TEST CONTROLLER READY
1246 005600  104400                            HLT                     ;ERROR, CONTROLLER DID NOT GO READY
1247 005602  104416                            WRITE
1248 005604  013702  001024                    MOV     BC,R2           ;ASSIGN BYTE COUNT REG TO BE TESTED
1249 005610  012703  177777                    MOV     #-1,R3          ;TEST ALL OF REG
1250 005614  012704  000001                    MOV     #1,R4
1251 005620  104410                            TSTRGR                  ;TEST REG FOR RESET
1252 005622  104400                            HLT                     ;ERROR, BYTE COUNT DID NOT GO TO ZERO
1253 005624  052777  020000  173200            BIS     #20000,@MTRD    ;SET PREMATURE CU READY
1254 005632  104450                            WAITTR
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1255 005634  104400                          HLT                 ;ERROR, TAPE UNIT READ  DID NOT GO SET
1256 005636  032777  000400  173154          BIT     #400,@MTS
1257 005644  001001                          BNE     .+4
1258 005646  104400                          HLT             ;ERROR, BAD TAPE ERROR (BIT 8) NOT =1
1259 005650  005777  173146                  TST     @MTC
1260 005654  100001                          BMI     .+4
1261 005656  104400                          HLT             ;ERROR, BIT 15 NOT =1 WITH BTE=1
1262 005660  104414                          PWRCLR
1263 005662  032777  000400  173130          BIT     #400,@MTS
1264 005670  001401                          BEQ     .+4
1265 005672  104400                          HLT             ;ERROR, POWER CLEAR DIDN'T CLEAR BTE (BIT 8)
1266                                 ;********************************************** **********************
1267                                 ;TEST NON-EXISTENT MEMORY (BIT 7) AND ERROR (BIT 15) TO =1.
1268 005674  104402                  NXMT:   SCOPE
1269 005676  104440                          MINIBC              ;SET BYTE COUNT TO MINUS ONE
1270 005700  012777  173000  173120          MOV     #173000,@CA ;INIT CURRENT MEMORY ADDRESS FOR NON EXISTENT MEM
1271 005706  104404                          TSTCUR              ;TEST CONTROLLER READY
1272 005710  104400                          HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1273 005712  012777  000060  173102          MOV     #60,@MTC    ;SET EA=0
1274 005720  053777  001116  173074          BIS     TCWT,@MTC   ;WRITE, EA=0, 800 BPI, GO
1275 005726  104404                          TSTCUR              ;TEST CONTROLLER READY
1276 005730  104400                          HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1277 005732  032777  000200  173060          BIT     #200,@MTS
1278 005740  001001                          BNE     .+4
1279 005742  104400                          HLT             ;ERROR, NON-EXISTENT MEMORY (BIT 7) NOT =1
1280 005744  005777  173052                  TST     @MTC
1281 005750  100001                          BMI     .+4
1282 005752  104400                          HLT             ;ERROR, (BIT 15) NOT =1 WITH NXM (BIT 7) =1
1283 005754  104414                          PWRCLR
1284 005756  032777  000600  173034          BIT     #600,@MTS
1285 005764  001401                          BEQ     .+4
1286 005766  104400                          HLT             ;ERROR, POWER CLEAR DIDN'T CLEAR BTE (BIT 8) OR
1287                                         ;**** INTERRUPT TESTS ****
1288                                 ;********************************************** **********************
1289                                 ;TEST FOR PROCESSOR PRIORITY LEVEL MTPM TO ALLOW INTERRUPT
1290 005770  104402                          SCOPE
1291 005772  012706  000776                  MOV     #BUFF,SP    ;SET UP STACK
1292 005776  013737  001110  177776          MOV     MTPM,CC     ;SET PRIORITY LEVEL
1293 006004  013777  001110  173004          MOV     MTPM,@MTVS  ;SET INTERRUPT VECTOR  C
1294 006012  012777  006040  172774          MOV     #IR1,@MTV   ;INIT INTERRUPT RETURN
1295 006020  012777  000100  172774          MOV     #100,@MTC   ;SET INT ENABLE
1296 006026  005777  172770                  TST     @MTC        ;WAIT FOR INTERRUPT
1297 006032  005077  172764                  CLR     @MTC    ;WAITED TOO LONG WITHOUT INTERRUPT, CLEAR INT ENABLE
1298 006036  104400                          HLT             ;ERROR, INT  ENABLE FAILED TO CAUSE INT
1299                                 ;********************************************** **********************
1300                                 ;TEST FOR PROCESSOR PRIORITY LEVEL MTP TO SUPPRESS INTERRUPT
1301 006040  104414                  IR1:    PWRCLR
1302 006042  104402                          SCOPE
1303 006044  012706  000776                  MOV     #BUFF,SP    ;SET UP STACK
1304 006050  013737  001104  177776          MOV     MTP,CC      ;SET PROCESSOR PRIORIT  TO MAG TAPE LEVEL
1305 006056  013777  001104  172732          MOV     MTP,@MTVS   ;SET INTERRUPT VECTOR  C
1306 006064  013737  001104  000036          MOV     MTP,36
1307 006072  012777  006114  172714          MOV     #IR2,@MTV   ;INIT INTERRUPT RETURN
1308 006100  012777  000100  172714          MOV     #100,@MTC   ;SET INIT ENABLE
1309 006106  005777  172710                  TST     @MTC        ;WAIT FOR INTERRUPT
1310 006112  000401                          BR      IR2A
1311 006114  104400                  IR2:    HLT             ;ERROR, SHOULDN'T HAVE INTERRUPT WITH PROCESSOR
```

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1312                                    ;********************************************** **********************
1313                                    ;TEST CU READY TO CAUSE INTERRUPT WITH INT ENABLE  1
1314                                    ;INT ENABLE (BIT6) AND GO (BIT 0) SET AT SAME TIME SHOULDN'T CAUSE INTERRUPT
1315 006116  104414                    IR2A:   PWRCLR
1316 006120  104402                            SCOPE
1317 006122  012706  000776                    MOV     #BUFF,SP        ;SET UP STACK
1318 006126  013737  001110  177776            MOV     MTPM,CC         ;SET PRIORITY LEVEL
1319 006134  013737  001110  001016            MOV     MTPM,MTVS       ;SET INTERRUPT VECTOR  C
1320 006142  013737  001110  000036            MOV     MTPM,36
1321 006150  012777  006214  172636            MOV     #IR3,@MTV
1322 006156  104452                            SELECT
1323 006160  104404                            TSTCUR                  ;TEST CONTROLLER READY
1324 006162  104400                            HLT                     ;ERROR, CONTROLLER DID NOT GO READY
1325 006164  013700  001120                    MOV     TCWF,R0
1326 006170  052700  000100                    BIS     #100,R0
1327 006174  010077  172622                    MOV     R0,@MTC         ;WRITE EOF, INT ENABLE  GO
1328 006200  104404                            TSTCUR                  ;TEST CONTROLLER READY
1329 006202  000411                            BR      IR3A-2
1330 006204  005777  172612                    TST     @MTC            ;WAIT FOR INTERRUPT
1331 006210  104400                            HLT                     ;ERROR, NO INTERRUPT AT COMPLETION OF WRITE
1332 006212  000406                            BR      IR3A
1333 006214  105777  172602            IR3:    TSTB    @MTC
1334 006220  100401                            BMI     .+4
1335 006222  104400                            HLT             ;ERROR, INTERRUPT NOT CAUSED BY CU READY
1336 006224  000401                            BR      IR3A
1337 006226  104400                            HLT                     ;ERROR, CONTROLLER DID NOT GO READY
1338 006230  104414                    IR3A:   PWRCLR
1339                                    ;********************************************** **********************
1340                                    ;TEST REWIND TO CAUSE TWO INTERRUPTS
1341                                    ;1ST AFTER CU READY AND 2ND AFTER REWIND COMPLETE
1342 006232  104402                            SCOPE
1343 006234  012706  000776                    MOV     #BUFF,SP        ;SET UP STACK
1344 006240  013737  001110  177776            MOV     MTPM,CC         ;SET PRIORITY LEVEL
1345 006246  013737  001110  000036            MOV     MTPM,36
1346 006254  012777  006326  172532            MOV     #IR4,@MTV
1347 006262  104452                            SELECT
1348 006264  104404                            TSTCUR                  ;TEST CONTROLLER READY
1349 006266  104400                            HLT                     ;ERROR, CONTROLLER DID NOT GO READY
1350 006270  104442                            WREOF
1351 006272  104404                            TSTCUR                  ;TEST CONTROLLER READY
1352 006274  104400                            HLT                     ;ERROR, CONTROLLER DID NOT GO READY
1353 006276  013700  001130                    MOV     TCRW,R0
1354 006302  052700  000100                    BIS     #100,R0
1355 006306  010077  172510                    MOV     R0,@MTC         ;INT ENABLE, REWIND, GO
1356 006312  104404                            TSTCUR                  ;TEST CONTROLLER READY
1357 006314  000416                            BR      IR4A-2
1358 006316  005777  172500                    TST     @MTC            ;WAIT FOR INTERRUPT
1359 006322  104400                            HLT                     ;ERROR, NO INT AFTER ISSUING REWIND
1360 006324  000413                            BR      IR4A
1361 006326  105777  172470            IR4:    TSTB    @MTC
1362 006332  100401                            BMI     .+4
1363 006334  104400                            HLT             ;ERROR, INTERRUPT NOT CAUSED BY CU READY
1364 006336  032777  000040  172454            BIT #40,@MTS
1365 006344  100001                            BPL     .+4
1366 006346  104400                            HLT             ;ERROR, SHOULDN'T BE AT BOT SO SOON AFTER 1ST INTERRUPT
1367 006350  000401                            BR      IR4A
1368 006352  104400                            HLT                     ;ERROR, CONTROLLER DID NOT GO READY
```

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1369 006354  012777  006376  172432  IR4A:   MOV     #IR5,@MTV
1370 006362  104450                          WAITTR
1371 006364  000412                          BR      IR5A-2
1372 006366  005777  172430                  TST     @MTC            ;WAIT FOR INTERRUPT
1373 006372  104400                          HLT                     ;ERROR, NO INT AT END OF REWIND
1374 006374  000407                          BR      IR5A
1375 006376  032777  000040  172414  IR5:    BIT #40,@MTS
1376 006404  001001                          BNE     .+4
1377 006406  104400                          HLT                     ;ERROR] 2ND INTERRUPT NOT CAUSED BY REWIND COMPLETE
1378 006410  000401                          BR      IR5A
1379 006412  104400                          HLT                     ;ERROR, TAPE UNIT READ  DID NOT GO SET
1380 006414  104414                  IR5A:   PWRCLR
1381                                         ;**** DATA TRANSFER TESTS ****
1382                                 ;*********************************************** ********************
1383                                 ;WRITE RECORD, BACKSPACE, READ RECORD
1384                                 ;REPEAT FOR ALL BYTE PATTERNS FROM 0 THRU ALL DATA PATTERNS
1385 006416  104402                          SCOPE
1386 006420  012706  000776                  MOV     #BUFF,SP        ;SET UP STACK
1387 006424  005037  177776                  CLR     CC              ;SET PROCESSORPRIORITY TO 0
1388 006430  005037  000036                  CLR     36              ;SET TRAP PRIORITY TO
1389 006434  012737  000340  001016          MOV     #340,MTVS       ;SET INTERRUPT VECTOR  C
1390 006442  012777  011450  172344          MOV     #MTTRP,@MTV     ;SET UP ILLEGAL INTERRUPT RETURN
1391 006450  005037  001044          WBRS:   CLR     TEMP            ;INITIALIZE DATA PATTERN
1392 006454  012700  014556          WBR:    MOV     #WBUF,R0
1393 006460  013720  001044                  MOV     TEMP, (R0)+     ;SET UP WRITE BUFFER
1394 006464  022700  014602                  CMP     #WBUF+24,R0
1395 006470  001375                          BNE     WBR+4
1396 006472  012777  177754  172324          MOV     #-20.,@BC;INIT BYTE COUNT
1397 006500  104434                          WBUFCA
1398 006502  104404                          TSTCUR                  ;TEST CONTROLLER READY
1399 006504  104400                          HLT                     ;ERROR, CONTROLLER DID NOT GO READY
1400 006506  104416                          WRITE
1401 006510  104404                          TSTCUR                  ;TEST CONTROLLER READY
1402 006512  104400                          HLT                     ;ERROR, CONTROLLER DID NOT GO READY
1403                                 ;AFTER WRITE, CHECK WRITE BUFFER TO MAKE CERTAIN IT WASN'T MODIFIED
1404 006514  012700  014556                  MOV     #WBUF,R0
1405 006520  023720  001044          WBR1:   CMP     TEMP, (R0)+
1406 006524  001401                          BEQ     .+4
1407 006526  104400                          HLT                     ;ERROR, DATA BUFFER MODIFIED DURING WRITE
1408 006530  022700  014602                  CMP     #WBUF+24,R0
1409 006534  001371                          BNE     WBR1
1410                                 ;BACKSPACE 1 RECORD
1411 006536  104440                          MINIBC                  ;SET BYTE COUNT TO MINUS ONE
1412 006540  104430                          SPACEB
1413 006542  104404                          TSTCUR                  ;TEST CONTROLLER READY
1414 006544  104400                          HLT                     ;ERROR, CONTROLLER DID NOT GO READY
1415 006546  012700  014722                  MOV     #RBUF,R0
1416 006552  005020                  WBR2:   CLR     (R0)+   ;CLEAR READ BUFFER
1417 006554  022700  014746                  CMP     #RBUF+24,R0
1418 006560  001374                          BNE     WBR2
1419                                 ;READ RECORD
1420 006562  012777  177754  172234          MOV     #-20.,@BC;UNIT BYTE COUNT
1421 006570  104436                          RBUFCA
1422 006572  104420                          READ
1423 006574  104404                          TSTCUR                  ;TEST CONTROLLER READY
1424 006576  104400                          HLT                     ;ERROR, CONTROLLER DID NOT GO READY
1425 006600  005777  172216                  TST     @MTC
```

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1426 006604  100001                        BPL     .+4
1427 006606  104400                        HLT             ;ERROR, ERROR (BIT 15) =1 AFTER READ
1428 006610  012700  014722                MOV     #RBUF,R0
1429 006614  023720  001044        WBR3:   CMP     TEMP,(R0)+
1430 006620  001401                        BEQ     .+4
1431 006622  104400                        HLT             ;ERROR, DATA READ NOT EQUAL DATA WRITTEN
1432 006624  022700  014746                CMP     #RBUF+24,R0
1433 006630  001371                        BNE     WBR3
1434 006632  104402                        SCOPE
1435 006634  105237  001044                INCB    TEMP    ;DONE FOR ALL DATA PATTERN ?
1436 006640  013700  001116                MOV     TCWT,R0
1437 006644  042700  117777                BIC     #117777,R0
1438 006650  022700  060000                CMP     #60000,R0       ;IS CORE DUMP MODE SELECTED?
1439 006654  001403                        BEQ     .+10            ;YES
1440 006656  142737  000300  001044        BICB    #300,TEMP       ;NO
1441 006664  105737  001044                TSTB    TEMP
1442 006670  001405                        BEQ     WBR4    ;YES, EXIT
1443 006672  113737  001044  001045        MOVB    TEMP, TEMP+1    ;NO
1444 006700  000137  006454                JMP     WBR     ;REPEAT
1445 006704  162737  020000  001116  WBR4: SUB     #20000,TCWT     ;CHANGE DENSITY OF WRITE COMMAND
1446 006712  162737  020000  001114        SUB     #20000,TCRD     ;CHANGE DENSITY OF READ COMMAND
1447 006720  032737  060000  001116        BIT     #60000,TCWT     ;MASK DENSITY STATUS
1448 006726  001250                        BNE     WBR5            ;REPEAT FOR ALL DENSITYS
1449 006730  013700  001106                MOV     TCSL,R0         ;RESTORE TCWT & TCRD
1450 006734  062700  060003                ADD     #60003,R0
1451 006740  010037  001114                MOV     R0,TCRD
1452 006744  062700  000002                ADD     #2,R0
1453 006750  010037  001116                MOV     R0,TCWT
1454                                ;WRITE AND READ A LONG RECORD
1455                                ;USES MEMORY OCCUPIED BY THE PROGRAM AS A WRITE BUFFER
1456 006754  104402                        SCOPE
1457 006756  012700  017000                MOV     #17000,R0
1458 006762  162700  014722                SUB     #RBUF,R0        ;CALCULATE SIZE OF READ BUFFER
1459 006766  005400                        NEG     R0              ;GEN 2'S COMPLIMENT
1460 006770  010037  001044                MOV     R0,TEMP
1461 006774  013777  001044  172022        MOV     TEMP,@BC
1462 007002  012777  002000  172016        MOV     #2000,@CA
1463 007010  104404                        TSTCUR                  ;TEST CONTROLLER READY
1464 007012  104400                        HLT                     ;ERROR, CONTROLLER DID NOT GO READY
1465 007014  104416                        WRITE
1466 007016  104404                        TSTCUR                  ;TEST CONTROLLER READY
1467 007020  104400                        HLT                     ;ERROR, CONTROLLER DID NOT GO READY
1468 007022  104440                        MIN1BC                  ;SET BYTE COUNT TO MINUS ONE
1469 007024  104430                        SPACEB
1470 007026  104404                        TSTCUR                  ;TEST CONTROLLER READY
1471 007030  104400                        HLT                     ;ERROR, CONTROLLER DID NOT GO READY
1472 007032  013777  001044  171764        MOV     TEMP,@BC
1473 007040  104436                        RBUFCA
1474 007042  104420                        READ
1475 007044  104404                        TSTCUR                  ;TEST CONTROLLER READY
1476 007046  104400                        HLT                     ;ERROR, CONTROLLER DID NOT GO READY
1477 007050  005777  171746                TST     @MTC            ;CHECK FOR ERROR STATUS
1478 007054  100001                        BPL     .+4
1479 007056  104400                        HLT                     ;ERROR, ERROR FLAG SET IN MTC
1480 007060  012700  002000                MOV     #2000,R0
1481 007064  012701  014722                MOV     #RBUF,R1
1482 007070  022021                WBR5:   CMP     (R0)+,(R1)+     ;DO A DATA COMPARISON
```

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1483 007072  001401                        BEQ     .+4
1484 007074  104400                        HLT                     !ERROR, DATA READ NOT EQUAL DATA WRITTEN
1485 007076  022701  017000                CMP   #17000,R1    ! CHECK THE WHOLE BUFFER
1486 007102  001372                        BNE     WBR5        !NO
1487                                !********************************************** **********************
1488                                !TEST PARITY
1489                                !WRITE 3 BYTE RECORD ODD PARITY, READ EVEN PARITY
1490                                !BIT 14 OF MTRD =1 SHOULD CAUSE LPS TO BE LOADED IN DATA BUFFER AFTER RE
1491 007104  104402                PAR:    SCOPE
1492 007106  032737  000004  177570        BIT     #4,SR           !IS TAPE PHASE ENCODED
1493 007114  001402                        BEQ     .+6             !NO
1494 007116  000137  010252                JMP     TMRT            !YES
1495 007122  012737  177777  014556        MOV     #-1,WBUF
1496 007130  012737  177777  014560        MOV     #-1,WBUF+2
1497 007136  104442                        MIN3BC                  !SET BYTE COUNT TO MINUS THREE
1498 007140  104454                        WBUFCA
1499 007142  104404                        TSTCUR                  !TEST CONTROLLER READY
1500 007144  104400                        HLT                     !ERROR, CONTROLLER DID NOT GO READY
1501 007146  013700  001116                MOV     TCWT,R0
1502 007152  005300                        DEC     R0
1503 007154  010077  171642                MOV     R0,@MTC         !WRITE, 800 BPI, 9 TRACK
1504 007160  006037  177570                ROR     SR
1505 007164  103003                        BCC     .+10
1506 007166  042777  020000  171626        BIC     #20000,@MTC     !MAKE COMMAND 7 TRACK
1507 007174  005277  171622                INC     @MTC      !GO
1508 007200  104404                        TSTCUR                  !TEST CONTROLLER READY
1509 007202  104400                        HLT                     !ERROR, CONTROLLER DID NOT GO READY
1510 007204  104440                        MIN1BC                  !SET BYTE COUNT TO MINUS ONE
1511 007206  104450                        SPACEB
1512 007210  104404                        TSTCUR                  !TEST CONTROLLER READY
1513 007212  104400                        HLT                     !ERROR, CONTROLLER DID NOT GO READY
1514 007214  052777  040000  171610        BIS     #40000,@MTRD
1515 007222  104442                        MIN3BC                  !SET BYTE COUNT TO MINUS THREE
1516 007224  104456                        RBUFCA
1517 007226  013700  001114                MOV     TCRD,R0
1518 007232  052700  004000                BIS     #4000,R0        !MAKE EVEN PARITY
1519 007236  005300                        DEC     R0
1520 007240  010077  171556                MOV     R0,@MTC         !READ
1521 007244  006037  177570                ROR     SR
1522 007250  103003                        BCC     .+10
1523 007252  042777  020000  171542        BIC     #20000,@MTC     !MAKE COMMAND 7 TRACK
1524 007260  005277  171536                INC     @MTC      !GO
1525 007264  104404                        TSTCUR                  !TEST CONTROLLER READY
1526 007266  104400                        HLT                     !ERROR, CONTROLLER DID NOT GO READY
1527 007270  032777  010000  171522        BIT     #10000,@MTS
1528 007276  001001                        BNE     .+4
1529 007300  104400                        HLT                     !ERROR, PARITY ERROR (BIT 12) NOT =1
1530 007302  017700  171522                MOV     @MTD,R0
1531 007306  042700  177000                BIC     #177000,R0
1532 007312  006037  177570                ROR     SR
1533 007316  103405                        BCS     PAR1
1534 007320  022700  000744                CMP     #744,R0
1535 007324  001401                        BEQ     .+4
1536 007326  104400                        HLT                     !ERROR, LPC NOT =744 OR BIT 14 OF MTRD DIDN'T CA
1537 007330  000404                        BR      PAR2
1538 007332  022700  000477        PAR1:   CMP     #477,R0
1539 007336  001401                        BEQ     .+4
```

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1540 007340  104400                          HLT             ;ERROR, LPC NOT =477 (7 CHANNEL) OR LPC NOT READ
1541                                 ;WRITE EVEN PARITY, READ ODD PARITY
1542 007342  104442                  PAR2:   MIN3BC                  ;SET BYTE COUNT TO MINUS THREE
1543 007344  104434                          WBUFCA
1544 007346  013700  001116                  MOV     TCWT,R0
1545 007352  052700  004000                  BIS     #4000,R0        ;MAKE EVEN PARITY
1546 007356  005300                          DEC     R0
1547 007360  010077  171436                  MOV     R0,@MTC         ;WRITE, 800 BPI, 9 TRACK
1548 007364  006037  177570                  ROR     SR
1549 007370  103003                          BCC     .+10
1550 007372  042777  020000  171422          BIC     #20000,@MTC     ;MAKE 7 TRACK
1551 007400  005277  171416                  INC     @MTC            ;GO
1552 007404  104404                          TSTCUR                  ;TEST CONTROLLER READY
1553 007406  104400                          HLT                     ;ERROR, CONTROLLER DID NOT GO READY
1554 007410  104440                          MIN1BC                  ;SET BYTE COUNT TO MINUS ONE
1555 007412  104430                          SPACEB
1556 007414  104404                          TSTCUR                  ;TEST CONTROLLER READY
1557 007416  104400                          HLT                     ;ERROR, CONTROLLER DID NOT GO READY
1558 007420  052777  040000  171404          BIS     #40000,@MTRD
1559 007426  104442                          MIN3BC                  ;SET BYTE COUNT TO MINUS THREE
1560 007430  104436                          RBUFCA
1561 007432  013700  001114                  MOV     TCRD,R0
1562 007436  005300                          DEC     R0
1563 007440  010077  171356                  MOV     R0,@MTC         ;READ, 800 BPI, 9 TRACK
1564 007444  006037  177570                  ROR     SR
1565 007450  103003                          BCC     .+10
1566 007452  042777  020000  171342          BIC     #20000,@MTC     ;MAKE 7 TRACK
1567 007460  005277  171336                  INC     @MTC            ;GO
1568 007464  104404                          TSTCUR                  ;TEST CONTROLLER READY
1569 007466  104400                          HLT                     ;ERROR, CONTROLLER DID NOT GO READY
1570 007470  032777  010000  171322          BIT     #10000,@MTS
1571 007476  001001                          BNE     .+4
1572 007500  104400                          HLT             ;ERROR, PARITY ERROR (BIT 12) NOT =1
1573 007502  017700  171322                  MOV     @MTD,R0
1574 007506  042700  177000                  BIC     #177000,R0
1575 007512  006037  177570                  ROR     SR
1576 007516  103411                          BCS     PAR4
1577 007520  022700  000004                  CMP     #4,R0
1578 007524  001401                          BEQ     .+4
1579 007526  104400                          HLT             ;ERROR, LPC NOT =004 OR LP  NOT READ PROPERLY
1580 007530  000404                          BR      PAR4
1581 007532  022700  000077          PAR3:   CMP     #77,R0
1582 007536  001401                          BEQ     .+4
1583 007540  104400                          HLT             ;ERROR, LPC NOT =77 (7 TRACK)
1584 007542  104414                  PAR4:   PWRCLR
1585 007544  032777  010000  171246          BIT     #10000,@MTS
1586 007552  001401                          BEQ     .+4
1587 007554  104400                          HLT             ;ERROR, POWER CLEAR DIDN'T CLEAR PARITY ERROR (B
1588 007556  104402                          SCOPE
1589 007560  006037  177570                  ROR     SR      ;IS SWC=1 TO INDICATE 7 CHANNEL
1590 007564  103002                          BCC     .+6     ;NO
1591 007566  000137  010252                  JMP     TMRT    ;YES SKIP CRC TEST
1592                                 ;********************************************** **********************
1593                                 ;TEST CRC GENERATION AND LPC CHARACTER
1594                                 ;PROCEDURE USED IS TC WRITE A 4 BYTE RECORD AND READ IT BACK.
1595                                 ;THEN THE CRC WRITTEN  IS COMPARED WITH CRC CALCULATED.
1596                                 ;THEN RECORD IS READ AGAIN AND LPC SHOULD = CRC
```

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1597                                            ;TEST IS REPEATED FOR ALL DATA COMBINATIONS.
1598 007572  105037  001044          CRCTST: CLRB    TEMP        ;INITIALIZE DATA
1599                                            ;CALCULATE PARITY OF DATA TO BE WRITTEN IN CRC TEST (MAKE PARITY ODD)
1600 007576  112737  000001  001045  CRCT1:  MOVB    #1,TEMP+1;INITIALIZE ODD PARITY
1601 007604  113701  001044                  MOVB    TEMP,R1
1602 007610  105701                  CRCP1:  TSTB    R1              ;IS DATA=0
1603 007612  001001                          BNE     .+4         ;NO
1604 007614  000410                          BR      CRCT2           ;YES, NOW TEMP=1 CONTAINS PARITY BIT
1605 007616  106301                          ASLB R1                 ;SHIFT DATA BITS LEFT INTO C BIT
1606 007620  103002                          BCC     .+6         ;WAS BIT=0?
1607 007622  105137  001045                  COMB    TEMP+1      ;NO, COMPLEMENT PARITY
1608 007626  042737  177000  001044          BIC     #177000,TEMP
1609 007634  000765                          BR      CRCP1       ;DO AGAIN UNTIL DATA=0
1610 007636  013737  001044  001052  CRCT2:  MOV     TEMP,CRXOR1 ;SAVE 1ST DATA BYTE (+PARITY)
1611 007644  013700  001044                  MOV     TEMP,R0
1612 007650  104454                          ROTCMP
1613 007652  010037  001054                  MOV     R0,CRROT1   ;SAVE ROTATE
1614 007656  013701  001044                  MOV     TEMP,R1
1615 007662  104452                          XCLOR
1616 007664  010137  001056                  MOV     R1,CRXOR2
1617 007670  013700  001056                  MOV     CRXOR2,R0
1618 007674  104454                          ROTCMP
1619 007676  010037  001060                  MOV     R0,CRROT2
1620 007702  013701  001044                  MOV     TEMP,R1
1621 007706  104452                          XCLOR
1622 007710  010137  001062                  MOV     R1,CRXOR3
1623 007714  013700  001062                  MOV     CRXOR3,R0
1624 007720  104454                          ROTCMP
1625 007722  010037  001064                  MOV     R0,CRROT3
1626 007726  013701  001044                  MOV     TEMP,R1
1627 007732  104452                          XCLOR
1628 007734  010137  001066                  MOV     R1,CRXOR4
1629 007740  013700  001066                  MOV     CRXOR4,R0
1630 007744  104454                          ROTCMP
1631 007746  010037  001070                  MOV     R0,CRROT4
1632 007752  010001                          MOV     R0,R1       ;COMPLEMENT ALL EXCEPT 4,6
1633 007754  042701  000727                  BIC     #727,R1
1634 007760  005100                          COM     R0
1635 007762  042700  000050                  BIC     #50,R0
1636 007766  050100                          BIS     R1,R0
1637 007770  010037  001072                  MOV     R0,CRCWRT
1638 007774  042737  177000  001072          BIC     #177000,CRCWRT;SAVE CRC CALCULATED
1639                                            ;WRITE A FOUR BYTE RECORD
1640                                            ;ALL BYTES ARE = THEREFORE LPC SHOULD = CRC
1641 010002  104402                  CWRITE: SCOPE
1642 010004  113737  001044  014556          MOVB    TEMP,WBUF
1643 010012  113737  001044  014557          MOVB    TEMP,WBUF+1
1644 010020  013737  014556  014560          MOV     WBUF,WBUF+2
1645 010026  104434                          WBUFCA
1646 010030  104444                          MIN4BC              ;SET BYTE COUNT TO MINUS FOUR
1647 010032  104432                          SELECT
1648 010034  104404                          TSTCUR              ;TEST CONTROLLER READY
1649 010036  104410                          HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1650 010040  104416                          WRITE
1651 010042  104404                          TSTCUR              ;TEST CONTROLLER READY
1652 010044  104410                          HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1653 010046  104440                          MIN1BC              ;SET BYTE COUNT TO MINUS ONE
```

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1654 010050  104430                        SPACEB
1655 010052  104404                        TSTCUR              ;TEST CONTROLLER READY
1656 010054  104400                        HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1657 010056  104436                        RBUFCA
1658 010060  104444                        MIN4BC              ;SET BYTE COUNT TO MINUS FOUR
1659 010062  104420                        READ
1660 010064  104404                        TSTCUR              ;TEST CONTROLLER READY
1661 010066  104400                        HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1662 010070  023737  014556  014722        CMP     WBUF,RBUF   ;WERE 1ST 2 BYTES WRITTEN AND READ OK?
1663 010076  001401                        BEQ     .+4         ;YES
1664 010100  104400                        HLT                 ;ERROR DATA WRITTEN NOT = DATA READ
1665 010102  023737  014560  014724        CMP     WBUF+2,RBUF+2  ;WERE 2ND 2 BYTES WRITTEN AND READ OK?
1666 010110  001401                        BEQ     .+4         ;YES
1667 010112  104400                        HLT                 ;ERROR, DATA WRITTEN NOT = DATA READ
1668 010114  017700  170710                MOV     @MTD,R0     ;GET CRC
1669 010120  017701  170706                MOV     @MTRD,R1    ;GET LPC ERROR
1670 010124  042700  177000                BIC     #177000,R0  ;MASK CRC
1671 010130  042701  177000                BIC     #177000,R1  ;MASK LPC ERROR
1672 010134  001401                        BEQ     .+4
1673 010136  104400                        HLT                 ;ERROR, LPC NOT = 0
1674 010140  020037  001072                CMP     R0,CRCWRT
1675 010144  001401                        BEQ     .+4
1676 010146  104400                        HLT                 ;ERROR CRC WRITTEN NOT = CRC CALCULATED
1677 010150  104440                        MIN1BC              ;SET BYTE COUNT TO MINUS ONE
1678 010152  104430                        SPACEB
1679 010154  104404                        TSTCUR              ;TEST CONTROLLER READY
1680 010156  104400                        HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1681 010160  104444                        MIN4BC              ;SET BYTE COUNT TO MINUS FOUR
1682 010162  104436                        RBUFCA
1683 010164  052777  040000  170640        BIS     #40000,@MTRD ;ENABLE LPC READ
1684 010172  104420                        READ
1685 010174  104404                        TSTCUR              ;TEST CONTROLLER READY
1686 010176  104400                        HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1687 010200  017700  170624                MOV     @MTD,R0
1688 010204  042700  177000                BIC     #177000,R0
1689 010210  020037  001072                CMP     R0,CRCWRT
1690 010214  001401                        BEQ     .+4
1691 010216  104400                        HLT                 ;ERROR, LPC NOT=CRC
1692 010220  005037  001072                CLR     CRCWRT
1693 010224  005077  170602                CLR     @MTRD       ;ENABLE CRC READ
1694 010230  032737  040000  177570        BIT     #40000,SR   ;IS SW 14 SET?
1695 010236  001005                        BNE     .+14
1696 010240  105237  001044                INCB    TEMP        ;+1 TO DATA PATTERN
1697 010244  001402                        BEQ     TMRT
1698 010246  000137  007576                JMP     CRCT1
1699                          ;*********************************************** *********************
1700                          ;TEST TIMER (BIT 15) TO BE COMPLIMENTING
1701 010252  104402           TMRT:   SCOPE
1702 010254  005000                    CLR     R0
1703 010256  005777  170550            TST     @MTRD
1704 010262  100003                    BPL     .+10
1705 010264  005200                    INC     R0          ;DELAY LONG TIME
1706 010266  001375                    BNE     .-10        ;
1707 010270  104400                    HLT                 ;ERROR, TIMER (BIT 15) NEVER =0
1708 010272  005000                    CLR     R0
1709 010274  005777  170532            TST     @MTRD
1710 010300  100403                    BMI     .+10
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1711 010302  005200                        INC     R0
1712 010304  001375                        BNE     .-10
1713 010306  104400                        HLT                     ;ERROR, TIMER (BIT 15) NEVER =1
1714                                       ;**** MANUAL INTERVENTION TESTS ****
1715                                ;*********************************************** **********************
1716                                ;
1717 010310  104414                        PWRCLR
1718 010312  005037  001042                CLR     TMTNFL
1719 010316  104402                        SCOPE
1720 010320  104424                        REWIND
1721 010322  104404                        TSTCUR                  ;TEST CONTROLLER READY
1722 010324  104400                        HLT                     ;ERROR, CONTROLLER DID NOT GO_READY
1723 010326  032737  004000  177570        BIT     #4000,SR
1724 010334  001402                        BEQ     .+6
1725 010336  000137  011304                JMP     TSTEND
1726 010342  012702  013144                MOV     #MSG3,R2
1727 010346  104412                        PRTMSG                  ;PRINT MESSAGE IN @R2
1728 010350  000000                        HALT                    ;WAIT FOR OPERATOR TO CONTINUE
1729 010352  032737  004000  177570        BIT     #4000,SR ;INHIBIT TESTS?
1730 010360  001402                        BEQ     .+6      ;NO
1731 010362  000137  011304                JMP     TSTEND   ;YES
1732                                ;*********************************************** **********************
1733                                ;TEST UNIT SELECT SWITCH
1734 010366  013700  001106                MOV     TCSL,R0
1735 010372  032700  002000                BIT     #2000,R0        ;IS TESTED UNIT IN MOST SIG SELECT ADDRESSES
1736 010376  001015                        BNE     USS1            ;YES
1737 010400  005077  170416                CLR     @MTC            ;NO
1738 010404  112737  000060  013276        MOVB    #60,MSG4+16
1739 010412  012737  002000  001132        MOV     #2000,USLEN
1740 010420  005037  001044                CLR     TEMP
1741 010424  000414                        BR      USS
1742 010426  112737  000064  013276 USS1:  MOVB    #64,MSG4+16
1743 010434  012777  002000  170360        MOV     #2000,@MTC
1744 010442  012737  004000  001132        MOV     #4000,USLEN
1745 010450  012737  002000  001044        MOV     #2000,TEMP
1746 010456  012702  013260        USS:    MOV     #MSG4,R2
1747 010462  104412                        PRTMSG                  ;PRINT MESSAGE IN  R2
1748 010464  000000                        HALT
1749 010466  104402                        SCOPE
1750 010470  013777  001044  170324        MOV     TEMP,@MTC;SELECT UNIT
1751 010476  032777  000100  170314        BIT     #100,@MTS;IS SELECT REMOTE SET
1752 010504  001001                        BNE     .+4
1753 010506  104400                        HLT                     ;ERROR, PROPER UNIT NOT SELECTED
1754 010510  105777  170306                TSTB    @MTC
1755 010514  100401                        BMI     .+4
1756 010516  104400                        HLT                     ;ERROR, CU READY NOT SET, IS UNIT SELECTED?
1757 010520  032777  000040  170272        BIT     #40,@MTS
1758 010526  001001                        BNE     .+4
1759 010530  104400                        HLT                     ;ERROR, BOT AND TUR NOT SET, IS UNIT ON LINE & A
1760 010532  104402                        SCOPE
1761 010534  105237  013276                INCB    MSG4+16  ;INCREMENT UNIT #
1762 010540  105237  001045                INCB    TEMP+1
1763 010544  023737  001132  001044        CMP     USLEN,TEMP      ;DONE ALL UNITS?
1764 010552  001341                        BNE     USS             ;NO
1765                                ;TEST ONLINE-OFFLINE SWITCH
1766 010554  104402                        SCOPE
1767 010556  113700  001107                MOVB    TCSL+1,R0
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1768 010562  032700  000017                BIT     #17,R0
1769 010566  052700  000060                BIS     #60,R0
1770 010572  010037  001044                MOV     R0,TEMP
1771 010576  113737  001044  013336        MOVB    TEMP,MSG5+16
1772 010604  012702  013320                MOV     #MSG5,R2
1773 010610  104412                        PRTMSG                  ;PRINT MESSAGE IN  R2
1774 010612  000000                        HALT
1775 010614  104402                        SCOPE
1776 010616  104452                        SELECT
1777 010620  032777  000100  170172        BIT     #100,@MTS
1778 010626  001401                        BEQ     .+4
1779 010630  104400                        HLT             ;ERROR, SELECT REMOTE SET, UNIT NOT OFF-LINE
1780                                    ;*********************************************** **********************
1781                                    ;TEST WRITE LOCK SWITCH
1782 010632  113737  001044  013472        MOVB    TEMP,MSG6+100
1783 010640  012702  013372                MOV     #MSG6,R2
1784 010644  104412                        PRTMSG                  ;PRINT MESSAGE IN  R2
1785 010646  000000                        HALT
1786 010650  104402                        SCOPE
1787 010652  104452                        SELECT
1788 010654  032777  000004  170136        BIT     #4,@MTS  ;IS WRITE LOCK SET?
1789 010662  001001                        BNE     .+4      ;YES
1790 010664  104400                        HLT             ;ERROR, WRL (BIT 2) NOT SET WITH WRITE LOCK RING REMOVED
1791                                    ;*********************************************** **********************
1792                                    ;TEST WRITE WITH WRITE LOCK RING REMOVED TO CAUSE ;ILLEGAL COMMAND
1793 010666  104402                        SCOPE
1794 010670  005077  170130                CLR     @BC
1795 010674  005077  170126                CLR     @CA
1796 010700  104416                        WRITE
1797 010702  104404                        TSTCUR                  ;TEST CONTROLLER READY
1798 010704  104400                        HLT                     ;ERROR, CONTROLLER DID NOT GO READY
1799 010706  005777  170110                TST     @MTC
1800 010712  100401                        BMI     .+4
1801 010714  104400                        HLT             ;ERROR (BIT 15) NOT SET AFTER WRITE WITH WRITE LK RNG REM'D
1802
1803 010716  005777  170076                TST     @MTS
1804 010722  100401                        BMI     .+4
1805 010724  104400                        HLT             ;ERROR, ILLEGAL COMMAND (BIT 15) NOT SET AFTER WRT CMD
1806                                    ;*********************************************** **********************
1807                                    ;TEST OFFLINE FUNCTION TO SET UNIT OFFLINE AND REWIND TO BOT
1808 010726  104402                        SCOPE
1809 010730  113737  001044  013700        MOVB    TEMP,MSG7+153
1810 010736  012702  013525                MOV     #MSG7,R2
1811 010742  104412                        PRTMSG                  ;PRINT MESSAGE IN  R2
1812 010744  000000                        HALT
1813 010746  104414                        PWRCLR
1814 010750  104452                        SELECT
1815 010752  104404                        TSTCUR                  ;TEST CONTROLLER READY
1816 010754  104400                        HLT                     ;ERROR, CONTROLLER DID NOT GO READY
1817 010756  032777  000100  170034        BIT     #100,@MTS
1818 010764  001001                        BNE     .+4
1819 010766  104400                        HLT             ;ERROR, UNIT 0 NOT ON LINE  OFF BOT
1820 010770  104402                        SCOPE
1821 010772  013777  001112  170022        MOV     TCOL,@MTC       ;GO OFFLINE
1822 011000  104404                        TSTCUR                  ;TEST CONTROLLER READY
1823 011002  104400                        HLT                     ;ERROR, CONTROLLER DID NOT GO READY
1824 011004  032777  000100  170006        BIT     #100,@MTS
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1825 011012  001401                        BEQ     .+4
1826 011014  104400                        HLT             ;ERROR, SELR (BIT 6) NOT CLEARED BY OFFLINE COMMAND
1827                                       ;RE-SET UNIT
1828 011016  104402                        SCOPE
1829 011020  113737  001044  014014        MOVB    TEMP,MSG8+16
1830 011026  012702  013776                MOV     #MSG8,R2
1831 011032  104412                        PRTMSG                  ;PRINT MESSAGE IN  R2
1832 011034  000000                        HALT
1833                                  ;*********************************************** **********************
1834                                  ;TEST BUS GRANT LATE (BIT 11) TO=1
1835                                  ;HALT PROCESSOR DURING AN NPR SEQUENCE
1836 011036  012702  014057                MOV     #MSG9,R2
1837 011042  104412                        PRTMSG                  ;PRINT MESSAGE IN  R2
1838 011044  000000                        HALT
1839 011046  005237  001042                INC     TMTNFL
1840 011052  032737  000002  177570        BIT     #2,SR
1841 011060  001002                        BNE     BGL1
1842 011062  012702  014201                MOV     #MSG10,R2
1843 011066  104412                        PRTMSG                  ;PRINT MESSAGE IN  R2
1844 011070  104402                        SCOPE
1845 011072  104432                        SELECT
1846 011074  104404                        TSTCUR                  ;TEST CONTROLLER READY
1847 011076  104400                        HLT                     ;ERROR, CONTROLLER DID NOT GO READY
1848 011100  012777  177756  167716        MOV     #-18.,@BC
1849 011106  104434                        WBUFCA
1850 011110  104416                        WRITE
1851 011112  005000                        CLR     R0
1852 011114  022777  014560  167704        CMP     #WBUF+2,@CA
1853 011122  002403                        BLT     .+10            ;WAIT FOR NPR SEQUENCE TO START
1854 011124  005200                        INC     R0
1855 011126  001403                        BEQ     .+10
1856 011130  000771                        BR      .-14
1857 011132  000000                        HALT                    ;CAUSE BGL, WAIT FOR CONTINUE
1858 011134  000401                        BR      .+4
1859 011136  104400                        HLT                     ;ERROR, CA DID NOT INCREMENT ON WRITE COMMAND
1860 011140  104404                        TSTCUR
1861 011142  104400                        HLT                     ;ERROR, TU DID NOT GO READY
1862 011144  032777  004000  167646        BIT     #4000,@MTS
1863 011152  001001                        BNE     .+4
1864 011154  104400                        HLT                     ;ERROR, BGL (BIT 11) NOT=1',
1865 011156  005777  167640                TST     @MTC
1866 011162  100401                        BMI     .+4
1867 011164  104400                        HLT                     ;ERROR, BGL DID NOT SET ERROR STATUS
1868 011166  104414                        PWRCLR
1869 011170  032777  004000  167622        BIT     #4000,@MTS
1870 011176  001401                        BEQ     .+4
1871 011200  104400                        HLT                     ;ERROR, POWER CLEAR DIDN'T CLEAR BGL (BIT 11)
1872 011202  104402                        SCOPE
1873 011204  000457                        BR      TSTEND
1874 011206  012702  014247          BGL1: MOV     #MSG11,R2
1875 011212  104412                        PRTMSG                  ;PRINT MESSAGE IN  R2
1876 011214  104402                        SCOPE
1877 011216  104432                        SELECT
1878 011220  104404                        TSTCUR                  ;TEST CONTROLLER READY
1879 011222  104400                        HLT                     ;ERROR, CONTROLLER DID NOT GO READY
1880 011224  012777  177756  167572        MOV     #-18.,@BC
1881 011232  104434                        WBUFCA
```

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1882 011234  000000                        HALT
1883 011236  104416                        WRITE
1884 011240  000240                        NOP
1885 011242  000240                        NOP
1886 011244  032777  004000  167546        BIT     #4000,@MTS
1887 011252  001001                        BNE     .+4
1888 011254  104400                        HLT             ;ERROR, BGL (BIT 11) NOT=1
1889 011256  005777  167540                TST     @MTC
1890 011262  100401                        BMI     .+4
1891 011264  104400                        HLT                 ;ERROR, BGL DID NOT SET ERROR STATUS
1892 011266  104414                        PWRCLR
1893 011270  032777  004000  167522        BIT     #4000,@MTS
1894 011276  001401                        BEQ     .+4
1895 011300  104400                        HLT             ;ERROR, POWER CLEAR DIDN'T CLEAR BGL (BIT 11)
1896 011302  104402                        SCOPE
1897                                ;BELL ON PASS COMPLETE
1898 011304  012702  014541        TSTEND: MOV     #MSG13,R2
1899 011310  104412                        PRTMSG              ;PRINT MESSAGE IN R2
1900 011312  105237  014554                INCB    MSG13+13
1901 011316  122737  000072  014554        CMPB    #72,MSG13+13
1902 011324  001005                        BNE     BELL
1903 011326  112737  000060  014554        MOVB    #60,MSG13+13
1904 011334  105237  014553                INCB    MSG13+12
1905 011340  122737  000072  014553        CMPB    #72,MSG13+12
1906 011346  001014                        BNE     BELL
1907 011350  112737  000060  014553        MOVB    #60,MSG13+12
1908 011356  105237  014552                INCB    MSG13+11
1909 011362  122737  000072  014552        CMPB    #72,MSG13+11
1910 011370  001003                        BNE     BELL
1911 011372  112737  000060  014552        MOVB    #60,MSG13+11
1912 011400  105777  167432        BELL:   TSTB    @TCSR
1913 011404  100375                        BPL     .-4
1914 011406  012777  000207  167420        MOV     #207,@TDBR
1915 011414  005000                        CLR     R0
1916 011416  005200                        INC     R0
1917 011420  001376                        BNE     .-2
1918 011422  104404                        TSTCUR              ;TEST CONTROLLER READY
1919 011424  104400                        HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1920 011426  104424                        REWIND
1921 011430  104404                        TSTCUR              ;TEST CONTROLLER READY
1922 011432  104400                        HLT                 ;ERROR, CONTROLLER DID NOT GO READY
1923 011434  104450                        WAITTR
1924 011436  000240                        NOP
1925 011440  104450                        WAITTR
1926 011442  104400                        HLT                 ;ERROR, TAPE UNIT READY DID NOT GO SET
1927 011444  000137  001350                JMP     BEGIN       ;GO TO START OF TEST
1928
1929                                ;**** SUBROUTINES ****
1930
1931                                ;********************************************** ********************
1932                                ;ILLEGAL TAPE INTERRUPT SUBROUTINE
1933 011450  013737  001044  001050 MTTRP:  MOV     TEMP,TEMPS  ;SAVE TEMP
1934 011456  013737  000036  001046        MOV     36,TEMPP     ;STORE TRAP PRIORITY
1935 011464  012737  000340  000036        MOV     #340,36      ;MAKE TRAP PRIORITY 7
1936 011472  011637  001044                MOV     @SP,TEMP    ;TEMP CONTAINS PC OF ILLEGAL INTERRUPT
1937 011476  104400                        HLT                 ;ERROR, ILLEGAL TAPE INTERRUPT
1938 011500  013737  001050  001044        MOV     TEMPS,TEMP  ;RESTORE TEMP
```

```
1939 011506  013737  001046  000036          MOV     TEMPP,36        !RESTORE TRAP PRIORITY
1940 011514  000002                          RTI                     !RETURN FROM INTERRUPT
1941
1942                                  !********************************************** **********************
1943                                  !TRAP HANDLER
1944 011516  011666  000002          TRAP34: MOV     @SP,2(SP)       !PUSH RETURN ADDRESS UP INTO STACK
1945 011522  162716  000002                  SUB     #2,@SP          !CALCULATE TRAP INSTRUCTION ADDRESS
1946 011526  013646                          MOV     @(SP)+,-(SP)    !GET TRAP INSTRUCTION
1947 011530  062716  105136                  ADD     #TABLE-104400,@SP !CALCULATE TABLE POINTER
1948 011534  013667                          MOV     @(SP)+,PC       !POP STACK, GO TO SUBROUTINE
1949 011536  011620                  TABLE:  PRINT
1950 011540  012034                          SCOPEA
1951 011542  012120                          CURTST
1952 011544  012174                          RGSTST
1953 011546  012204                          RGRTST
1954 011550  012240                          TOP
1955 011552  012324                          STCH12
1956 011554  012334                          STCWT
1957 011556  012344                          STCRD
1958 011560  012354                          STCEF
1959 011562  012364                          STCRW
1960 011564  012374                          STCSF
1961 011566  012404                          STCSB
1962 011570  012414                          STCSL
1963 011572  012424                          CAWB
1964 011574  012434                          CARB
1965 011576  012444                          BCM1
1966 011600  012454                          BCM3
1967 011602  012464                          BCM4
1968 011604  012474                          EOFTST
1969 011606  012146                          TSTRDY
1970 011610  012504                          CRCXOR
1971 011612  012516                          CRCROT
1972 011614  012552                          OCTPRT
1973 011616  012660                          OCTP
1974
1975                                  !********************************************** **********************
1976                                  !ENTERED WITH SYSTEM TRAP CALL(HLT)
1977                                  !PRINT PC, STATUS REGISTER, COMMAND REGISTER, BYTE COUNT, CURRENT ADDRES
1978 011620  012702  001134          PRINT:  MOV     #SAVE,R2
1979 011624  011612                          MOV     (SP),(R2)
1980 011626  162742  000002                  SUB     #2,(R2)+
1981 011632  017742  167162                  MOV     @MTS,(R2)+
1982 011636  017722  167160                  MOV     @MTC,(R2)+
1983 011642  017742  167156                  MOV     @BC,(R2)+
1984 011646  017742  167154                  MOV     @CA,(R2)+
1985 011652  017742  167152                  MOV     @MTD,(R2)+
1986 011656  042712  177000                  BIC     #177000,(R2)
1987 011662  017722  167144                  MOV     @MTRD,(R2)+
1988 011666  013742  001044                  MOV     TEMP,(R2)+
1989 011672  013722  001072                  MOV     CRCWRT,(R2)+
1990 011676  033727  177570  020000          BIT     SR,#20000!TEST FOR INHIBIT PRINT OUT
1991 011704  001401                          BEQ     .+4             !BRANCH TO PRINT
1992 011706  000207                          RTS     PC              !INHIBIT, RETURN TO MAIN STREAM
1993 011710  012702  013027                  MOV     #MSG1,R2
1994 011714  005737  001100                  TST     PRINT1
1995 011720  001402                          BEQ     .+6
```

```
1996 011722  012702  013141                MOV    #MSG2,R2
1997 011726  104412                        PRTMSG                 ;PRINT MESSAGE IN  R2
1998 011730  005237  001100                INC    PRINT1
1999 011734  013702  001134                MOV    SAVE,R2
2000 011740  104436                        PRTOCT
2001 011742  013702  001136                MOV    SAVE+2,R2
2002 011746  104436                        PRTOCT
2003 011750  013702  001140                MOV    SAVE+4,R2
2004 011754  104436                        PRTOCT
2005 011756  013702  001142                MOV    SAVE+6,R2
2006 011762  104436                        PRTOCT
2007 011764  013702  001144                MOV    SAVE+10,R2
2008 011770  104436                        PRTOCT
2009 011772  013702  001146                MOV    SAVE+12,R2
2010 011776  104436                        PRTOCT
2011 012000  013702  001150                MOV    SAVE+14,R2
2012 012004  104436                        PRTOCT
2013 012006  013702  001152                MOV    SAVE+16,R2
2014 012012  104436                        PRTOCT
2015 012014  013702  001154                MOV    SAVE+20,R2
2016 012020  104436                        PRTOCT
2017 012022  005737  177570                TST    SR             ;CHECK SR FOR HALT SWITCH
2018 012026  100001                        BPL    .+4
2019 012030  000000                        HALT                  ;HALT ON ERROR UP
2020 012032  000207                        RTS    PC             ;EXIT
2021
2022                                ;********************************************** **********************
2023                                ;ENTERED WITH SYSTEM TRAP CALL(SCOPE)
2024                                ;SCOPE LOOP FOR EACH TEST
2025 012034  032737  040000  177570 SCOPEA: BIT    #40000,SR      ;TEST SR FOR SCOPE
2026 012042  001003                        BNE    SCOPEB         ;YES SCOPE
2027 012044  011637  001102                MOV    @SP,RETURN     ;SAVE SCOPE RETURN POINTER
2028 012050  000207                        RTS    PC             ;RETURN INLINE-NEXT TEST
2029 012052  022606                SCOPEB: CMP    (SP)+,SP               ;REPOSITION THE STACK
2030 012054  005737  001042                TST    TMTNFL         ;IS PROGRAM IN TAPE MOTION TESTS?
2031 012060  001415                        BEQ    SCPRT          ;NO, RETURN TO BEGINING OF TEST
2032 012062  032777  002000  166730        BIT    #2000,@MTS     ;TEST EOT STATUS
2033 012070  001411                        BEQ    SCPRT          ;RETURN IF NOT AT EOT
2034 012072  104424                        REWIND
2035 012074  013702  001020                MOV    MTS,R2         ;SELECT STATUS REGISTE
2036 012100  012703  000001                MOV    #1,R3          ;MASK TUR BIT
2037 012104  012704  000300                MOV    #300,R4        ;SET UP DELAY
2038 012110  104406                        TSTRGS
2039 012112  104400                        HLT                   ;ERROR, UNIT DID NOT REWIND
2040 012114  000177  166762        SCPRT:  JMP    @RETURN        ;SCOPE RETURN
2041
2042                                ;********************************************** **********************
2043                                ;ENTERED WITH SYSTEM TRAP CALL(TSTCUR)
2044                                        ;TEST CONTROLLER READY SUBROUTINE
2045                                        ;ARGUEMENTS:
2046                                        ;  EXIT TO RETURN IF TIMEOUT
2047                                        ;  EXIT TO RETURN +2 IF NOT TIMEOUT
2048
2049 012120  013702  001022        CURTST: MOV    MTC,R2         ;SELECT COMMAND REGISTER
2050 012124  012703  000200                MOV    #200,R3        ;MASK CUR BIT
2051 012130  012704  000010                MOV    #10,R4         ;SET UP DELAY
2052 012134  104406                        TSTRGS
```

```
2053 012136  000207                        RTS     PC              ;EXIT
2054 012140  062716  000002                ADD     #2,@SP          ;INCREMENT STACK POINTER
2055 012144  000207                        RTS     PC              ;EXIT
2056
2057                                ;********************************************** **********************
2058                                ;ENTERED WITH SYSTEM TRAP CALL(WAITTR)
2059                                        ;TEST TAPE UNIT READY SUBROUTINE
2060                                        ;ARGUMENTS:
2061                                        ;  EXIT TO RETURN +2 IF NOT TIMEOUT
2062                                        ;  EXIT TO RETURN IF TIMEOUT
2063 012146  013702  001020          TSTRDY: MOV     MTS,R2          ;SELECT STATUS REGISTER
2064 012152  012703  000001                MOV     #1,R3           ;MASK TUR BIT
2065 012156  012704  000015                MOV     #15,R4          ;SET UP DELAY
2066 012162  104406                        TSTRGS
2067 012164  000207                        RTS     PC              ;EXIT
2068 012166  062716  000002                ADD     #2,@SP          ;INCREMENT STACK POINTER
2069 012172  000207                        RTS     PC              ;EXIT
2070
2071                                ;********************************************** **********************
2072                                ;ENTERED WITH SYSTEM TRAP CALL(TSTRGR & TSTRGS)
2073                                        ;TEST REGISTER BIT(S) SUBROUTINE
2074                                        ;ARGUEMENTS:
2075                                        ;  R2= ADDRESS OF REGISTER
2076                                        ;  R3= MASK FOR BIT(S) TO BE TESTED
2077                                        ;  R4= # OF SECONDS TO TIMEOUT
2078                                        ;  EXIT TO RETURN IF TIMEOUT
2079                                        ;  EXIT TO RETURN +2 IF NOT TIMEOUT
2080 012174  052737  000400  012216  RGSTST: BIS     #400,TSTIN      ;SETUP FOR BIT SET TEST
2081 012202  000403                        BR      TSTB
2082 012204  042737  000400  012216  RGRTST: BIC     #400,TSTIN      ;SETUP FOR BIT CLEAR TEST
2083 012212  005005                TSTB:   CLR     R5
2084 012214  031203                        BIT     @R2,R3
2085 012216  001403                TSTIN:  BEQ     TSTL            ;LOOP IF TEST NEGITIVE
2086 012220  062716  000002                ADD     #2,@SP          ;INCREMENT STACK POINTER
2087 012224  000207                        RTS     PC              ;EXIT
2088 012226  005205                TSTL:   INC     R5
2089 012230  001371                        BNE     TSTB+2          ;RETRY IF LOOP COUNTER NOT ZERO
2090 012232  005304                        DEC     R4
2091 012234  001366                        BNE     TSTB            ;START LOOP OVER IF NOT MAXIMUN TIME
2092 012236  000207                        RTS     PC              ;EXIT
2093
2094                                ;********************************************** **********************
2095                                ;ENTERED WITH SYSTEM TRAP CALL(PRTMSG)
2096                                ;MOV ADDRESS OF MESSAGE TO REGISTER 2
2097                                ;THEN PRINT MESSAGE
2098 012240  142777  000177  166570 TOP:    BICB    #177,@TCSR;CLR INT FLAG
2099 012246  112237  012710                MOVB    (R2)+,EOMK      ;MOVE IN EOM MARKER
2100 012252  121237  012710          TOP1: CMPB    @R2,EOMK        ;COMPARE FOR EOM
2101 012256  001001                        BNE     .+4         ;NO
2102 012260  000207                        RTS     PC              ;YES, EXIT
2103 012262  121237  000100                CMPB    @R2,#'@
2104 012266  001404                        BEQ     TOP2
2105 012270  112237  001076                MOVB    (R2)+,CHAR      ;PRINT MESSAGE CHARACTER
2106 012274  104400                        PRTOUT
2107 012276  000765                        BR      TOP1        ;BRANCH BACK
2108 012300  112737  000215  001076  TOP2: MOVB    #215,CHAR       ;SEND CARRIAGE RETURN
2109 012306  104400                        PRTOUT
```

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2110 012310  112747  000212  001076          MOVB   #212,CHAR     ;SEND LINE FEED
2111 012316  104460                          PRTOUT
2112 012320  005202                          INC    R2             ;INCRMTN R2
2113 012322  000753                          BR     TOP1      ;NO EOM, SO LOOP
2114
2115                                 ;********************************************** **********************
2116                                 ;ENTERED WITH SYSTEM TRAP CALLS(PWRCLR, WRITE, READ, WREOF, REWIND,
2117                                 ;SPACEF, SPACEB, SELECT, WBUFCA, RBUFCA, BC-1, BC-2, BC-4, TSTEOF)
2118                                 ;COMMONLY USED MOVE AND BIT INSTRUCTIONS
2119 012324  012777  010000  166470  STCB12: MOV    #10000,@MTC
2120 012332  000207                          RTS    PC             ;EXIT
2121 012334  013777  001116  166460  STCWT:  MOV    TCWT,@MTC
2122 012342  000207                          RTS    PC             ;EXIT
2123 012344  013777  001114  166450  STCRD:  MOV    TCRD,@MTC
2124 012352  000207                          RTS    PC             ;EXIT
2125 012354  013777  001120  166440  STCEF:  MOV    TCWF,@MTC
2126 012362  000207                          RTS    PC             ;EXIT
2127 012364  013777  001130  166430  STCRW:  MOV    TCRW,@MTC
2128 012372  000207                          RTS    PC             ;EXIT
2129 012374  013777  001122  166420  STCSF:  MOV    TCSF,@MTC
2130 012402  000207                          RTS    PC             ;EXIT
2131 012404  013777  001124  166410  STCSB:  MOV    TCRS,@MTC
2132 012412  000207                          RTS    PC             ;EXIT
2133 012414  013777  001106  166400  STCSL:  MOV    TCSL,@MTC
2134 012422  000207                          RTS    PC             ;EXIT
2135 012424  012777  014556  166374  CAWB:   MOV    #WBUF,@CA
2136 012432  000207                          RTS    PC             ;EXIT
2137 012434  012777  014722  166364  CARB:   MOV    #RBUF,@CA
2138 012442  000207                          RTS    PC             ;EXIT
2139 012444  012777  177777  166352  BCM1:   MOV    #-1,@BC
2140 012452  000207                          RTS    PC             ;EXIT
2141 012454  012777  177775  166342  BCM3:   MOV    #-3,@BC
2142 012462  000207                          RTS    PC             ;EXIT
2143 012464  012777  177774  166332  BCM4:   MOV    #-4,@BC
2144 012472  000207                          RTS    PC             ;EXIT
2145 012474  032777  040000  166316  EOFTST: BIT    #40000,@MTS
2146 012502  000207                          RTS    PC             ;EXIT
2147
2148                                 ;********************************************** **********************
2149                                 ;ENTERED WITH SYSTEM TRAP CALL(XCLOR)
2150                                 ;XOR R0 WITH R1, SAVE RESULT IN R1
2151 012504  010103                  CRCXOR: MOV    R1,R3
2152 012506  040001                          BIC    R0,R1
2153 012510  040300                          BIC    R3,R0
2154 012512  050001                          BIS    R0,R1
2155 012514  000207                          RTS    PC             ;EXIT
2156
2157                                 ;********************************************** **********************
2158                                 ;ENTERED WITH SYSTEM TRAP CALL(ROTCMP)
2159                                 ;SIMULATE CRC ROTATE, IF CR1 GOES TO 1 COMPLEMENT 4,5,6, AND 7;
2160 012516  042700  177000          CRCROT: BIC    #177000,R0
2161 012522  006000                          ROR    R0
2162 012524  103011                          BCC    CRCR1     ;NO EXIT
2163 012526  052700  000400                  BIS    #400,R0        ;MAKE BIT1=1
2164 012532  010001                          MOV    R0,R1
2165 012534  042701  000074                  BIC    #74,R1
2166 012540  005100                          COM    R0
```

```
2167 012542  042700  000703                BIC     #703,R0
2168 012546  050100                        BIS     R1,R0           ;RECOMBINE COMPLEMENTED BITS
2169 012550  000207                CRCR1:  RTS     PC              ;EXIT
2170
2171                                       ;********************************************** **********************
2172                                       ;ENTERED WITH SYSTEM TRAP CALL(PRTOCT)
2173                                       ;PRINT OCTAL VALUE IN REGISTER2
2174 012552  012737  000060  001076 OCTPRT: MOV     #'0,CHAR        ;INITIALIZE 2ST NUMBER AS 0
2175 012560  005702                        TST     R2              ;IS VALUE POSITIVE
2176 012562  100005                        BPL     OCT1        ;YES PRINT 0
2177 012564  012737  000061  001076        MOV     #'1,CHAR ;NO PRINT 1
2178 012572  104460                OCT1:   PRTOUT
2179 012574  006102                        ROL     R2
2180 012576  006102                        ROL     R2
2181 012600  012737  177773  001074        MOV     #-5,OCT  ;COUNT 5 DIGITS
2182 012606  006102                OCT2:   ROL     R2
2183 012610  006102                        ROL     R2
2184 012612  006102                        ROL     R2
2185 012614  010237  001076                MOV     R2,CHAR         ;SAVE DIGIT
2186 012620  042737  177770  001076        BIC     #177770,CHAR;CLEAR OTHER BITS
2187 012626  052737  000060  001076        BIS     #60,CHAR ;MAKE ASCII DIGIT
2188 012634  006002                        ROR     R2
2189 012636  104460                        PRTOUT
2190 012640  006102                        ROL     R2
2191 012642  005237  001074                INC     OCT         ;+1 TO DIGIT COUNT
2192 012646  001357                        BNE     OCT2        ;NOT DONE
2193                                       ;TYPE 2 SPACES
2194 012650  012702  014535                MOV   #MSG12,R2
2195 012654  104412                        PRTMSG                  ;PRINT MESSAGE IN  R2
2196 012656  000207                        RTS     PC              ;EXIT
2197
2198                                       ;********************************************** **********************
2199                                       ;ENTERED WITH SYSTEM TRAP CALL(PRTOUT)
2200 012660  032737  020000  177570 OCTP:   BIT     #20000,SR
2201 012666  001401                        BEQ     .+4             ;INHIBIT PRINTOUT?
2202 012670  000207                        RTS     PC              ;YES, EXIT
2203 012672  105777  166140                TSTB    @TCSR           ;NO, PRINT
2204 012676  100375                        BPL     .-4         ;WAIT FOR READY
2205 012700  013777  001076  166126        MOV     CHAR,@TDBR;PRINT
2206 012706  000207                        RTS     PC              ;EXIT
2207 012710     000                EOMK:   .BYTE   0
2208
2209                                       ;**** MESSAGES ****
2210
2211                                       ;********************************************** **********************
2212 012711     057     100     123 MSG0:   .ASCII ;/@SET SWITCH REGISTER ACCORDING TO ;
     012714     105     124     040
     012717     123     127     111
     012722     124     103     110
     012725     040     122     105
     012730     107     111     123
     012733     124     105     122
     012736     040     101     103
     012741     105     117     122
     012744     104     111     116
     012747     107     040     124
     012752     117     040
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2213 012754  117  120  105          .ASCII !OPERATING INSTRUCTIONS AND@PRESS CONTINUE@/!
     012757  122  101  124
     012762  101  116  107
     012765  040  111  116
     012770  103  124  122
     012773  125  103  124
     012776  111  117  116
     013001  103  040  101
     013004  116  104  100
     013007  120  122  105
     013012  123  123  040
     013015  105  117  116
     013020  124  111  116
     013023  105  105  100
     013026  057
2214 013027  057  100  040  MSG1:  .ASCII  !/@  PC    STATUS  COMAND   BYTE     CA    !
     013032  040  120  103
     013035  040  040  040
     013040  040  123  124
     013043  101  124  125
     013046  123  040  040
     013051  105  117  115
     013054  101  116  104
     013057  040  040  040
     013062  102  131  124
     013065  105  040  040
     013070  040  040  040
     013073  103  101  040
     013076  040  040  040
2215 013101  104  101  124          .ASCII  !DATA B  READ L   TEMP  CRC CAL@/!
     013104  101  040  102
     013107  040  040  122
     013112  105  101  104
     013115  040  114  040
     013120  040  040  124
     013123  105  115  120
     013126  040  040  103
     013131  102  103  040
     013134  105  101  114
     013137  100  057
2216 013141  057  100  057  MSG2:  .ASCII  !/@/!
2217 013144  057  100  123  MSG3:  .ASCII  !/@SET SW11=1 IF MANUAL INTERVENTION TEST!
     013147  105  124  040
     013152  103  127  061
     013155  061  075  061
     013160  040  111  106
     013163  040  115  101
     013166  116  125  101
     013171  114  040  111
     013174  116  124  105
     013177  122  126  105
     013202  116  124  111
     013205  117  116  040
     013210  124  105  123
     013213  124
2218 013214  100  111  123          .ASCII !@IS TO BE BYPASSED + PRESS CONTINUE/!
     013217  040  124  117
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                013222      040     102     105
                013225      040     102     131
                013230      140     101     123
                013233      143     105     104
                013236      040     053     040
                013241      140     122     105
                013244      143     123     040
                013247      103     117     116
                013252      124     111     116
                013255      145     105     057
2219            013260      057     100     123     MSG4:   .ASCII  !/@SELECT UNIT 0, PRESS CONTINUE/!
                013263      105     114     105
                013266      103     124     040
                013271      145     116     111
                013274      124     040     060
                013277      054     040     120
                013302      122     105     123
                013305      143     040     103
                013310      117     116     124
                013313      111     116     125
                013316      105     057
2220            013320      057     100     123     MSG5:   .ASCII  !/@SELECT UNIT 0, OFF-LINE, PRESS CONTINUE/!
                013323      105     114     105
                013326      103     124     040
                013331      145     116     111
                013334      124     040     060
                013337      054     040     117
                013342      106     106     055
                013345      114     111     116
                013350      105     054     040
                013353      140     122     105
                013356      143     123     040
                013361      103     117     116
                013364      124     111     116
                013367      145     105     057
2221            013372      057     100     104     MSG6:   .ASCII  !/@DISMOUNT TAPE, REMOVE WRITE LOCK RING, MOUNT TAPE!
                013375      111     123     115
                013400      117     125     116
                013403      124     040     124
                013406      101     120     105
                013411      054     040     122
                013414      105     115     117
                013417      126     105     040
                013422      127     122     111
                013425      124     105     040
                013430      114     117     103
                013433      113     040     122
                013436      111     116     107
                013441      054     040     115
                013444      117     125     116
                013447      124     040     124
                013452      101     120     105
2222            013455      140     123     105             .ASCII  !@SELECT UNIT 0, ON LINE, PRESS CONTINUE/!
                013460      114     105     103
                013463      124     040     125
                013466      116     111     124
                013471      040     060     054
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                013474  040     117     116
                013477  040     114     111
                013502  116     105     054
                013505  040     120     122
                013510  105     123     123
                013513  040     103     117
                013516  116     124     111
                013521  116     125     105
                013524  057
2223            013525  057     100     104     MSG7:   .ASCII  !/@DISMOUNT TAPE, REPLACE WRITE LOCK RING, MOUNT TAPE!
                013530  111     123     115
                013533  117     125     116
                013536  124     040     124
                013541  101     120     105
                013544  054     040     122
                013547  105     120     114
                013552  101     103     105
                013555  040     127     122
                013560  111     124     105
                013563  040     114     117
                013566  103     113     040
                013571  122     111     116
                013574  107     054     040
                013577  115     117     125
                013602  116     124     040
                013605  124     101     120
                013610  105
2224            013611  100     115     117             .ASCII  !@MOVE TAPE SHORT DISTANCE FORWARD FROM BOT!
                013614  125     105     040
                013617  124     101     120
                013622  105     040     123
                013625  110     117     122
                013630  124     040     104
                013633  111     123     124
                013636  101     116     103
                013641  105     040     106
                013644  117     122     127
                013647  101     122     104
                013652  040     106     122
                013655  117     115     040
                013660  102     117     124
2225            013663  100     123     105             .ASCII  !@SELECT UNIT 0, ON LINE, PRESS CONTINUE!
                013666  114     105     103
                013671  124     040     125
                013674  116     111     124
                013677  040     060     054
                013702  040     117     116
                013705  040     114     111
                013710  116     105     054
                013713  040     120     122
                013716  105     123     123
                013721  040     103     117
                013724  116     124     111
                013727  116     125     105
2226            013732  100     125     116             .ASCII  !@UNIT SHOULD GO OFFLINE AND REWIND@/!
                013735  111     124     040
                013740  123     110     117
```

```
                013743  125     114     104
                013746  040     107     117
                013751  040     117     106
                013754  106     114     111
                013757  116     105     040
                013762  101     116     104
                013765  040     122     105
                013770  127     111     116
                013773  104     100     057
2227            013776  057     100     123  MSG8:   .ASCII  :/@SELECT UNIT 0, ON LINE, AT BOT, PRESS CONTINUE/:
                014001  105     114     105
                014004  103     124     040
                014007  125     116     111
                014012  124     040     060
                014015  054     040     117
                014020  116     040     114
                014023  111     116     105
                014026  054     040     101
                014031  124     040     102
                014034  117     124     054
                014037  040     120     122
                014042  105     123     123
                014045  040     103     117
                014050  116     124     111
                014053  116     125     105
                014056  057
2228            014057  057     100     111  MSG9:   .ASCII  :/@IF PROCESSOR IS A pDP11-45, SET SW 1=1:
                014062  106     040     120
                014065  122     117     103
                014070  105     123     123
                014073  117     122     040
                014076  111     123     040
                014101  101     040     120
                014104  104     120     061
                014107  061     055     064
                014112  065     054     040
                014115  125     105     124
                014120  040     123     127
                014123  040     061     075
                014126  061
2229            014127  100     111     106          .ASCII  :@IF ANY OTHER, SET SW 1=0, PRESS CONTINUE/:
                014132  040     101     116
                014135  131     040     117
                014140  124     110     105
                014143  122     054     040
                014146  125     105     124
                014151  040     123     127
                014154  040     061     075
                014157  060     054     040
                014162  120     122     105
                014165  125     123     040
                014170  103     117     116
                014173  124     111     116
                014176  125     105     057
2230            014201  057     100     120  MSG10:  .ASCII  :/@PROCESSOR WILL HALT, PRESS CONTINUE/:
                014204  122     117     103
                014207  105     123     123
```

```
        014212  117     122     040
        014215  127     111     114
        014220  114     040     110
        014223  101     114     124
        014226  054     040     120
        014231  142     105     123
        014234  145     040     103
        014237  117     116     124
        014242  111     116     125
        014245  105     057
2231    014247  057     100     120     MSG11:  .ASCII  !/@PROCESSOR  WILL HALT, PUT "ENAB E-HALT" SW ON "HALT"!
        014252  122     117     103
        014255  105     123     123
        014260  117     122     040
        014263  040     127     111
        014266  114     114     040
        014271  110     101     114
        014274  124     054     040
        014277  120     125     124
        014302  040     042     105
        014305  116     101     102
        014310  114     105     055
        014313  110     101     114
        014316  124     042     040
        014321  145     127     040
        014324  117     116     040
        014327  042     110     101
        014332  114     124     042
2232    014335  100     120     125             .ASCII  !@PUT "S-INST-S-BUS CYCLE" SW ON " -BUS CYCLE"!
        014340  124     040     042
        014343  145     055     111
        014346  116     123     124
        014351  055     123     055
        014354  102     125     123
        014357  040     103     131
        014362  103     114     105
        014365  042     040     123
        014370  127     040     117
        014373  116     040     042
        014376  123     055     102
        014401  145     123     040
        014404  103     131     103
        014407  114     105     042
2233    014412  100     120     122             .ASCII  !@PRESS "CONTINUE" 6 TIMES!
        014415  105     123     123
        014420  040     042     103
        014423  117     116     124
        014426  111     116     125
        014431  105     042     040
        014434  056     040     124
        014437  111     115     105
        014442  123
2234    014443  100     120     125             .ASCII  !@PUT SW'S  BACK TO "ENABLE" & "S- NST",!
        014446  124     040     123
        014451  147     047     123
        014454  040     040     102
        014457  101     103     113
```

```
        014462     040     124     117
        014465     040     042     105
        014470     116     101     102
        014473     114     105     042
        014476     040     046     040
        014501     042     123     055
        014504     141     116     123
        014507     124     042     054
  2235  014512     040     120     122           .ASCII  ! PRESS "CONTINUE"@/!
        014515     105     123     123
        014520     040     042     103
        014523     117     116     124
        014526     111     116     125
        014531     105     042     100
        014534     057
  2236  014535     057     040     040  MSG12:   .ASCII !/  /!
        014540     057
  2237  014541     057     100     103  MSG13:   .ASCII  !/@CYCLE #001/!
        014544     131     103     114
        014547     105     040     043
        014552     060     060     061
        014555     057
  2238                                            .EVEN
  2239  014556  000000                   WBUF:    0
  2240          014722                            .=WBUF+100.
  2241  014722  000000                   RBUF:    0
  2242                                            !**************************
  2243          000001'                           .END
```

SYMBOL TABLE

```
BC      001024          BCM1    012444          BCM3    012454
BCM4    012464          BEGIN   001350          BELL    011400
BGL1    011206          BUFF  = 000776          CA      001026
CARB    012434          CAWB    012424          CC    = 177776
CHAR    001076          CINST   005414          CRCP1   007610
CRCROT  012516          CRCR1   012550          CRCTST  007572
CRCT1   007576          CRCT2   007636          CRCWRT  001072
CRCXOR  012504          CRROT1  001054          CRROT2  001060
CRROT3  001064          CRROT4  001070          CRXOR1  001052
CRXOR2  001056          CRXOR3  001062          CRXOR4  001066
CURTST  012120          CWRITE  010002          EOFTST  012474
EOMK    012710          HLT   = 104400          IDBYP   004250
IDTST   001040          IR1     006040          IR2     006114
IR2A    006116          IR3     006214          IR3A    006230
IR4     006326          IR4A    006354          IR5     006376
IR5A    006414          MIN1BC= 104440          MIN3BC= 104442
MIN4BC= 104444          MSG0    012711          MSG1    013027
MSG10   014201          MSG11   014247          MSG12   014535
MSG13   014541          MSG2    013141          MSG3    013144
MSG4    013260          MSG5    013320          MSG6    013372
MSG7    013525          MSG8    013776          MSG9    014057
MTAAD   001002          MTAS    001012          MTAV    001010
MTC     001022          MTD     001030          MTNAD   001000
MTNS    001006          MTNV    001004          MTP     001104
MTPM    001110          MTRD    001032          MTS     001020
MTTRP   011450          MTV     001014          MTVN    001320
MTVS    001016          NOP   = 000240          NXMT    005674
OCT     001074          OCTP    012660          OCTPRT  012552
OCT1    012572          OCT2    012606          PAR     007104
PAR1    007332          PAR2    007342          PAR3    007532
PAR4    007542          PRINT   011620          PRINT1  001100
PRTMSG= 104412          PRTOCT= 104456          PRTOUT= 104460
PWRCLR= 104414          RBUF    014722          RBUFCA= 104436
READ  = 104420          RETURN  001102          REWIND= 104424
RGRTST  012204          RGSTST  012174          ROTCMP= 104454
SAVE    001134          SCOPE = 104402          SCOPEA  012034
SCOPEB  012052          SCPRT   012114          SELECT= 104432
SPACEB= 104430          SPACEF= 104426          SR    = 177570
START   001160          STCH12  012324          STCEF   012354
STCRD   012344          STCRW   012364          STCSB   012404
STCSF   012374          STCSL   012414          STCWT   012334
TABLE   011536          TAMD    001242          TBC     003076
TCOL    001112          TCRD    001114          TCRS    001124
TCRW    001130          TCSF    001122          TCSL    001106
TCSR    001036          TCWE    001126          TCWF    001120
TCWT    001116          TDB     003206          TDBR    001034
TEMP    001044          TEMPP   001046          TEMPS   001050
TMA     003142          TMRT    010252          TMTNFL  001042
TOP     012240          TOP1    012252          TOP2    012300
TRAP34  011516          TRLOF   005064          TRLE    005112
TSR     003430          TSTB    012212          TSTCUR= 104404
TSTEND  011304          TSTEOF= 104446          TSTIN   012216
TSTL    012226          TSTRDY  012146          TSTRGR= 104410
TSTRGS= 104406          T7CH    003414          USLEN   001132
USS     010456          USS1    010426          WAITTR= 104450
WBR     006454          WBRS    006450          WBR1    006520
WBR2    006552          WBR3    006614          WBR4    006704
```

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.MAIN.  MACRO V06-03 05-NOV-74 12:39 PAGE 1-46
SYMBOL TABLE

WBRS    007070          WBUF    014556          WBUFCA= 104434
WREOF = 104422          WRITE = 104416          XCLOK = 104452

. ABS.  014724      000
        000000      001
ERRORS DETECTED:  0
FREE CORE:  11167. WORDS
P466,P466/CRF<P466


CROSS REFERENCE TABLE   S-1

BC      1- 307#  1- 423   1- 473   1- 691@  1- 692   1- 815   1- 879@
        1- 893   1- 904@  1- 915   1- 943   1- 971   1- 992   1-1013
        1-1046@  1-1053   1-1057@  1-1064   1-1079   1-1101@  1-1248
        1-1396@  1-1420@  1-1461@  1-1472@  1-1794@  1-1848@  1-1880@
        1-1985   1-2139@  1-2141@  1-2143@
BCM1    1-1965   1-2139#
BCM3    1-1966   1-2141#
BCM4    1-1967   1-2143#
BEGIN   1- 330   1- 371   1- 376#  1-1927
BELL    1-1902   1-1906   1-1910   1-1912#
BGL1    1-1841   1-1874#
BUFF    1- 285#  1- 346   1- 377   1-1291   1-1303   1-1317   1-1343
        1-1386
CA      1- 308#  1- 430   1- 480   1- 703@  1- 704   1- 818   1- 896
        1- 918   1- 946   1- 974   1- 989   1-1010   1-1082   1-1270@
        1-1462@  1-1795@  1-1852   1-1984   1-2135@  1-2137@
CARB    1-1964   1-2137#
CAWB    1-1963   1-2135#
CC      1- 283#  1- 979@  1-1292@  1-1304@  1-1318@  1-1344@  1-1387@
CHAR    1- 328#  1-2105@  1-2108@  1-2110@  1-2174@  1-2177@  1-2185@
        1-2186@  1-2187@  1-2205
CINST   1-1194@  1-1196@  1-1199#
CRCP1   1-1602#  1-1609
CRCROT  1-1971   1-2160#
CRCR1   1-2162   1-2169#
CRCTST  1-1598#
CRCT1   1-1600#  1-1698
CRCT2   1-1604   1-1610#
CRCWRT  1- 326#  1- 984@  1-1637@  1-1638@  1-1674   1-1689   1-1692@
        1-1989
CRCXOR  1-1970   1-2151#
CRROT1  1- 319#  1-1613@
CRROT2  1- 321#  1-1619@
CRROT3  1- 323#  1-1625@
CRROT4  1- 325#  1-1631@
CRXOR1  1- 318#  1-1610@
CRXOR2  1- 320#  1-1616@  1-1617
CRXOR3  1- 322#  1-1622@  1-1623
CRXOR4  1- 324#  1-1628@  1-1629
CURTST  1-1951   1-2049#
CWRITE  1-1641#
EOFTST  1-1968   1-2145#
EOMK    1-2099@  1-2100   1-2207#
HLT     1- 256#  1- 411   1- 418   1- 425   1- 432   1- 439   1- 446
        1- 453   1- 460   1- 468   1- 475   1- 482   1- 489   1- 496
        1- 503   1- 510   1- 518   1- 525   1- 530   1- 535   1- 540
        1- 545   1- 550   1- 555   1- 562   1- 570   1- 577   1- 582
        1- 587   1- 594   1- 602   1- 609   1- 614   1- 619   1- 624
```

1- 629	1- 634	1- 639	1- 647	1- 655	1- 662	1- 670
1- 676	1- 681	1- 686	1- 694	1- 706	1- 718	1- 729
1- 733	1- 740	1- 746	1- 752	1- 758	1- 766	1- 773
1- 780	1- 786	1- 796	1- 802	1- 807	1- 809	1- 811
1- 814	1- 817	1- 820	1- 824	1- 829	1- 832	1- 835
1- 838	1- 841	1- 846	1- 850	1- 853	1- 858	1- 861
1- 867	1- 870	1- 878	1- 884	1- 896	1- 889	1- 892
1- 895	1- 898	1- 902	1- 908	1- 911	1- 914	1- 917
1- 920	1- 924	1- 934	1- 942	1- 945	1- 948	1- 957
1- 960	1- 968	1- 970	1- 973	1- 976	1- 980	1- 988

CROSS REFERENCE TABLE S-2

	1- 991	1- 994	1- 997	1-1004	1-1009	1-1012	1-1015
	1-1018	1-1026	1-1029	1-1034	1-1039	1-1042	1-1045
	1-1049	1-1052	1-1055	1-1060	1-1063	1-1066	1-1072
	1-1075	1-1078	1-1081	1-1084	1-1087	1-1093	1-1096
	1-1099	1-1105	1-1108	1-1115	1-1122	1-1128	1-1135
	1-1139	1-1146	1-1149	1-1152	1-1155	1-1161	1-1166
	1-1172	1-1178	1-1181	1-1184	1-1186	1-1202	1-1205
	1-1208	1-1211	1-1214	1-1218	1-1224	1-1226	1-1230
	1-1233	1-1236	1-1246	1-1252	1-1255	1-1258	1-1261
	1-1265	1-1272	1-1276	1-1279	1-1282	1-1286	1-1298
	1-1311	1-1324	1-1331	1-1335	1-1337	1-1349	1-1352
	1-1359	1-1363	1-1366	1-1368	1-1373	1-1377	1-1379
	1-1399	1-1402	1-1407	1-1414	1-1424	1-1427	1-1431
	1-1464	1-1467	1-1471	1-1476	1-1479	1-1484	1-1500
	1-1509	1-1513	1-1526	1-1529	1-1536	1-1540	1-1553
	1-1557	1-1569	1-1572	1-1579	1-1583	1-1587	1-1649
	1-1652	1-1656	1-1661	1-1664	1-1667	1-1673	1-1676
	1-1680	1-1686	1-1691	1-1707	1-1713	1-1722	1-1753
	1-1756	1-1759	1-1779	1-1790	1-1798	1-1801	1-1805
	1-1816	1-1819	1-1823	1-1826	1-1847	1-1859	1-1861
	1-1864	1-1867	1-1871	1-1879	1-1888	1-1891	1-1895
	1-1919	1-1922	1-1926	1-1937	1-2039		
IOBYP	1- 936	1- 938	1- 943#				
IOTST	1- 313#	1- 787@	1- 937	1- 939@			
IR1	1-1294	1-1301#					
IR2	1-1307	1-1311#					
IR2A	1-1310	1-1315#					
IR3	1-1321	1-1333#					
IR3A	1-1329	1-1332	1-1336	1-1338#			
IR4	1-1346	1-1351#					
IR4A	1-1357	1-1360	1-1367	1-1369#			
IR5	1-1369	1-1375#					
IR5A	1-1371	1-1374	1-1378	1-1380#			
MIN1BC	1- 272#	1- 797	1- 930	1- 961	1-1136	1-1227	1-1269
	1-1411	1-1468	1-1510	1-1554	1-1653	1-1677	
MIN3BC	1- 273#	1- 984	1-1006	1-1030	1-1035	1-1068	1-1142
	1-1173	1-1497	1-1515	1-1542	1-1559		
MIN4BC	1- 274#	1-1131	1-1243	1-1646	1-1658	1-1681	
MSG0	1- 347	1-2212#					
MSG1	1-1993	1-2214#					
MSG10	1-1842	1-2230#					
MSG11	1-1874	1-2231#					
MSG12	1-2194	1-2236#					
MSG13	1- 351@	1- 352@	1- 353@	1-1898	1-1900@	1-1901	1-1903@
	1-1904@	1-1905	1-1907@	1-1908@	1-1909	1-1911@	1-2237#
MSG2	1-1996	1-2216#					
MSG3	1-1726	1-2217#					
MSG4	1-1738@	1-1742@	1-1746	1-1761@	1-2219#		
MSG5	1-1771@	1-1772	1-2220#				
MSG6	1-1782@	1-1783	1-2221#				
MSG7	1-1809@	1-1810	1-2223#				
MSG8	1-1829@	1-1830	1-2227#				
MSG9	1-1836	1-2228#					
MTAAD	1- 298#	1- 359					
MTAS	1- 302#	1- 368	1- 375@				
MTAV	1- 301#	1- 367	1- 374@				
MTC	1- 306#	1- 409	1- 444	1- 458	1- 494	1- 507@	1- 508
	1- 514@	1- 515@	1- 516	1- 522@	1- 523	1- 527@	1- 528

CROSS REFERENCE TABLE S-3

	1- 532@	1- 533	1- 537@	1- 538	1- 542@	1- 543	1- 547@
	1- 548	1- 552@	1- 553	1- 559@	1- 560	1- 566@	1- 567@
	1- 568	1- 574@	1- 575	1- 579@	1- 580	1- 584@	1- 585
	1- 591@	1- 592	1- 598@	1- 599@	1- 600	1- 606@	1- 607
	1- 611@	1- 612	1- 616@	1- 617	1- 621@	1- 622	1- 626@
	1- 627	1- 631@	1- 632	1- 636@	1- 637	1- 644@	1- 645
	1- 651@	1- 652@	1- 653	1- 659@	1- 660	1- 666@	1- 667@
	1- 668	1- 673@	1- 674	1- 678@	1- 679	1- 683@	1- 684
	1- 800	1- 882	1- 890	1- 995	1-1016	1-1106	1-1150
	1-1182	1-1200@	1-1209@	1-1259	1-1275@	1-1274@	1-1280
	1-1295@	1-1296	1-1297@	1-1308@	1-1309	1-1327@	1-1330
	1-1333	1-1355@	1-1358	1-1361	1-1372	1-1425	1-1477
	1-1503@	1-1506@	1-1507@	1-1520@	1-1523@	1-1524@	1-1547@
	1-1550@	1-1551@	1-1563@	1-1566@	1-1567@	1-1737@	1-1743@
	1-1750@	1-1754	1-1799	1-1821@	1-1865	1-1889	1-1982
	1-2049	1-2119@	1-2121@	1-2123@	1-2125@	1-2127@	1-2129@
	1-2131@	1-2133@					
MFD	1- 309#	1- 457	1- 487	1- 715@	1- 716	1-1530	1-1573
	1-1668	1-1687	1-1985				
MFNAD	1- 297#	1- 356					
MFNS	1- 300#	1- 370@	1- 373				
MFNV	1- 299#	1- 369@	1- 372				
MFP	1- 331#	1- 389@	1-1304	1-1305	1-1306		
MFPM	1- 333#	1- 391@	1-1292	1-1293	1-1318	1-1319	1-1320
	1-1344	1-1345					
MFRD	1- 310#	1- 362	1- 451	1- 501	1- 726@	1- 727	1- 730@
	1- 731	1- 940	1-1253@	1-1514@	1-1558@	1-1669	1-1683@
	1-1693@	1-1703	1-1709	1-1987			
MFS	1- 305#	1- 355	1- 416	1- 466	1- 738	1- 744	1- 750
	1- 756	1- 764	1- 771	1- 778	1- 784	1- 803	1- 836
	1- 839@	1- 842	1- 847	1- 848	1- 851	1- 854	1- 859@
	1- 868	1- 912	1- 958	1- 964	1-1085	1-1147	1-1164
	1-1179	1-1203@	1-1206	1-1212	1-1216	1-1231	1-1234
	1-1256	1-1263	1-1277	1-1284	1-1364	1-1375	1-1527
	1-1570	1-1585	1-1751	1-1757	1-1777	1-1788	1-1803
	1-1817	1-1824	1-1862	1-1869	1-1886	1-1893	1-1981
	1-2032	1-2035	1-2063	1-2145			
MFTRP	1- 254	1- 369	1- 374	1- 381	1-1390	1-1933#	
MFV	1- 303#	1- 367@	1- 372@	1- 381@	1-1294@	1-1307@	1-1321@
	1-1346@	1-1369@	1-1390@				
MFVN	1- 366	1- 372#					
MFVS	1- 304#	1- 368@	1- 373@	1- 382@	1-1293@	1-1305@	1-1319@
	1-1389@						
NOP	1- 284#						
NXMT	1-1242	1-1268#					
OCT	1- 327#	1-2181@	1-2191@				
OCTP	1-1973	1-2200#					
OCTPRT	1-1972	1-2174#					
OCT1	1-2176	1-2178#					
OCT2	1-2182#	1-2192					
PAR	1-1491#						
PAR1	1-1533	1-1538#					
PAR2	1-1537	1-1542#					
PAR3	1-1581#						
PAR4	1-1576	1-1580	1-1584#				
PC	1- 293#	1-1948@	1-1992@	1-2020@	1-2028@	1-2053@	1-2055@
	1-2067@	1-2069@	1-2087@	1-2092@	1-2102@	1-2120@	1-2122@
	1-2124@	1-2126@	1-2128@	1-2130@	1-2132@	1-2134@	1-2136@

CROSS REFERENCE TABLE S-4

	1-2138@	1-2140@	1-2142@	1-2144@	1-2146@	1-2156@	1-2169@
	1-2196@	1-2202@	1-2206@				
PRINT	1-1949	1-1978#					
PRINT1	1- 329#	1- 983@	1-1994	1-1998@			
PRTMSG	1- 261#	1- 948	1-1727	1-1747	1-1773	1-1784	1-1811
	1-1831	1-1857	1-1843	1-1875	1-1899	1-1997	1-2195
PRTOCT	1- 279#	1-2000	1-2002	1-2004	1-2006	1-200A	1-2010
	1-2012	1-2014	1-2016				
PRTOUT	1- 280#	1-2106	1-2109	1-2111	1-2178	1-2189	
PWRCLR	1- 262#	1- 457	1- 465	1- 472	1- 479	1- 486	1- 493
	1- 500	1- 821	1- 862	1- 871	1- 899	1- 921	1- 949
	1- 977	1- 998	1-1019	1-1088	1-1125	1-1163	1-1187
	1-1215	1-1662	1-1283	1-1301	1-1315	1-1338	1-1380
	1-1584	1-1717	1-1813	1-1868	1-1892		
RBUF	1- 896	1- 918	1- 974	1-1010	1-1100@	1-1113	1-1119@
	1-1120	1-1140@	1-1141@	1-1153	1-1158@	1-1159	1-1415
	1-1417	1-1428	1-1432	1-1458	1-1481	1-1662	1-1665
	1-2137	1-2241#					
RBUFCA	1- 271#	1- 880	1- 905	1- 962	1-1005	1-1102	1-1143
	1-1421	1-1473	1-1516	1-1560	1-1657	1-1682	
READ	1- 264#	1- 963	1-1007	1-1103	1-1144	1-1422	1-1474
	1-1659	1-1684					
RETURN	1- 330#	1- 976@	1-2027@	1-2040			
REWIND	1- 266#	1- 833	1- 865	1- 876	1- 922	1- 955	1- 978
	1-1002	1-1027	1-1043	1-1176	1-1222	1-1720	1-1920
	1-2034						
RGRTST	1-1953	1-2082#					
RGSTST	1-1952	1-2090#					
ROTCMP	1- 278#	1-1612	1-1618	1-1624	1-1630		
R0	1- 286#	1- 987@	1- 388@	1- 389	1- 390@	1- 391	1- 393@
	1- 394@	1- 895	1- 396@	1- 398	1- 399@	1-1191@	1-1192
	1-1325@	1-1326@	1-1327	1-1353@	1-1354@	1-1355	1-1392@
	1-1393@	1-1394	1-1404@	1-1405	1-1408	1-1415@	1-1416@
	1-1417	1-1428@	1-1429	1-1432	1-1436@	1-1437@	1-1438
	1-1449@	1-1450@	1-1451	1-1452@	1-1453	1-1457@	1-1458@
	1-1459@	1-1460	1-1480@	1-1482	1-1501@	1-1502@	1-1503
	1-1517@	1-1518@	1-1519@	1-1520	1-1530@	1-1531@	1-1534
	1-1538	1-1544@	1-1545@	1-1546@	1-1547	1-1561@	1-1562@
	1-1563	1-1573@	1-1574@	1-1577	1-1581	1-1611@	1-1613
	1-1617@	1-1619	1-1623@	1-1625	1-1629@	1-1631	1-1632
	1-1634@	1-1635@	1-1636@	1-1637	1-1668@	1-1670@	1-1674
	1-1687@	1-1698@	1-1689	1-1702@	1-1705@	1-1708@	1-1711@
	1-1734@	1-1735	1-1767@	1-1768	1-1769@	1-1770	1-1851@
	1-1854@	1-1915@	1-1916@	1-2152	1-2153@	1-2154	1-2160@
	1-2161@	1-2163@	1-2164	1-2166@	1-2167@	1-2168@	
R1	1- 287#	1- 956@	1- 359@	1- 360	1- 361@	1- 397@	1- 398@
	1- 400	1-1481@	1-1482	1-1485	1-1601@	1-1602	1-1605@
	1-1614@	1-1616	1-1620@	1-1622	1-1626@	1-162A	1-1632@
	1-1633@	1-1636	1-1669@	1-1671@	1-2151	1-2152@	1-2154@
	1-2164@	1-2165@	1-2168				
R2	1- 288#	1- 947@	1- 355@	1- 360@	1- 362	1- 803@	1- 842@
	1- 847@	1- 854@	1- 964@	1-1248@	1-1726@	1-1746@	1-1772@
	1-1783@	1-1810@	1-1830@	1-1836@	1-1842@	1-1874@	1-1898@
	1-1978@	1-1979@	1-1980@	1-1981@	1-1982@	1-1983@	1-1984@
	1-1985@	1-1986@	1-1987@	1-1988@	1-1989@	1-1993@	1-1996@
	1-1999@	1-2001@	1-2003@	1-2005@	1-2007@	1-2009@	1-2011@
	1-2013@	1-2015@	1-2035@	1-2049@	1-2063@	1-2084	1-2099
	1-2100	1-2103	1-2105	1-2112@	1-2175	1-2179@	1-2180@

CROSS REFERENCE TABLE S-5

	1-2182@	1-2183@	1-2184@	1-2185	1-2188@	1-2190@	1-2194@
R3	1- 289#	1- 804@	1- 843@	1- 855@	1- 965@	1-1249@	1-2036@
	1-2050@	1-2064@	1-2084	1-2151@	1-2153		
R4	1- 290#	1- 805@	1- 844@	1- 856@	1- 966@	1-1250@	1-2037@
	1-2051@	1-2065@	1-2090@				
R5	1- 291#	1-2083@	1-2088@				
SAVE	1- 344#	1-1978	1-1999	1-2001	1-2003	1-2005	1-2007
	1-2009	1-2011	1-2013	1-2015			
SCOPE	1- 257#	1- 407	1- 414	1- 421	1- 428	1- 435	1- 442
	1- 449	1- 456	1- 464	1- 471	1- 478	1- 485	1- 492
	1- 499	1- 506	1- 513	1- 521	1- 526	1- 531	1- 536
	1- 541	1- 546	1- 551	1- 557	1- 565	1- 573	1- 578
	1- 583	1- 590	1- 597	1- 605	1- 610	1- 615	1- 620
	1- 625	1- 630	1- 635	1- 643	1- 650	1- 658	1- 665
	1- 672	1- 677	1- 682	1- 689	1- 701	1- 713	1- 725
	1- 736	1- 743	1- 749	1- 755	1- 763	1- 770	1- 776
	1- 783	1- 794	1- 827	1- 864	1- 875	1- 929	1- 954
	1- 983	1-1001	1-1024	1-1091	1-1126	1-1170	1-1190
	1-1221	1-1240	1-1268	1-1290	1-1302	1-1316	1-1342
	1-1385	1-1434	1-1456	1-1491	1-1588	1-1641	1-1701
	1-1719	1-1749	1-1760	1-1766	1-1775	1-1786	1-1793
	1-1808	1-1820	1-1828	1-1844	1-1872	1-1876	1-1896
SCOPEA	1-1950	1-2025#					
SCOPEB	1-2026	1-2029#					
SCPRT	1-2031	1-2033	1-2040#				
SELECT	1- 269#	1- 737	1- 777	1-1322	1-1347	1-1647	1-1776
	1-1787	1-1814	1-1845	1-1877			
SP	1- 292#	1- 346@	1- 377@	1-1291@	1-1303@	1-1317@	1-1343@
	1-1386@	1-1936	1-1944@	1-1945@	1-1946@	1-1947@	1-1948
	1-1979	1-2027	1-2029	1-2054@	1-2068@	1-2086@	
SPACEB	1- 268#	1- 906	1-1070	1-1076	1-1097	1-1137	1-1228
	1-1412	1-1469	1-1511	1-1555	1-1654	1-1678	
SPACEF	1- 267#	1- 881	1-1047	1-1058			
SR	1- 282#	1- 337	1- 365	1- 387	1- 393	1- 695	1- 707
	1- 719	1- 761@	1- 935	1-1109	1-1111@	1-1117	1-1156
	1-1241	1-1492	1-1504@	1-1521@	1-1532@	1-1548@	1-1564@
	1-1575@	1-1589@	1-1694	1-1723	1-1729	1-1840	1-1990
	1-2017	1-2025	1-2200				
START	1- 295	1- 345#					
STCB12	1-1955	1-2119#					
STCEF	1-1958	1-2125#					
STCRD	1-1957	1-2123#					
STCRW	1-1959	1-2127#					
STCSB	1-1961	1-2131#					
STCSF	1-1960	1-2129#					
STCSL	1-1962	1-2133#					
STCWT	1-1956	1-2121#					
TABLE	1-1947	1-1949#					
TAMD	1- 358	1- 360#	1- 363				
TBC	1- 691#	1- 698					
TCOL	1- 335#	1- 397	1- 400	1-1821			
TCRD	1- 336#	1-1446@	1-1451@	1-1517	1-1561	1-2123	
TCRS	1- 340#	1-2131					
TCRW	1- 342#	1-1453	1-2127				
TCSF	1- 339#	1-2129					
TCSL	1- 332#	1- 395@	1-1191	1-1197	1-1449	1-1734	1-1767
	1-2133						
TCSR	1- 312#	1-1912	1-2098@	1-2203			

CROSS REFERENCE TABLE S-6

CROSS REFERENCE TABLE S-7

CROSS REFERENCE TABLE C-1

```
        054496
. ABS.  054496   1- 238
```

SECTION II

RELIABILITY PROGRAM

```
1
2                       .TITLE P468
3                       .ENABL  CDR
4               !
5               !.      ABSTRACT
6               !
7               !
8               !*****************************************************
9               !       *  WP/PDP11 DATA RELIABILITY PROGRAM (7 AND 9 TRACK) *
10              !       *PROGRAM LISTING # 708.0                          *
11              !*****************************************************
12              !
13              !       THE WP DATA RELIABILITY PROGRAM COLLECTS STATISTICAL
14              !       INFORMATION PERTAINING TO THE DATA RELIABILITY OF THE TAPE SYSTEM
15              !       WHEN RUN FOR EXTENDED PERIODS OF TIME. IT USES A NUMBER OF
16              !       DIFFERENT PARAMETERS CONTROLLING DATA PATTERNS, PARITY, DENSITY
17              !       RECORD LENGTHS, WRITING AND READING DEQUENCES AND STOPPING MODESS
18              !       (NONSTOP, START-STOP, RANDOM STALL DELAY).
19              !
20              !2.      REQUIREMENTS
21              !
22              !2.1     EQUIPMENT
23              !
24              !       PDP-11 WITH TAPE CONTROLLER AND 1 TO 8 TAPE UNITS (7 AND/OR 9 TRACK)
25              !
26              !2.2     STORAGE
27              !
28              !2.2.1   PROGRAM STORAGE
29              !
30              !       THE ROUTINE REQUIRES 4K OF MEMORY.
31              !
32              !2.3     PRELIMINARY PROGRAMS
33              !
34              !       THE 466.X TAPE INSTRUCTION TEST DIOGNOSTIC MUST RUN
35              !       PROPERLY BEFORE ATTEMPTING TO USE THIS PROGRAM.
36              !
37              !3.      LOADING PROCEDURE
38              !
39              !3.1     METHOD
40              !
41              !       PROCEDURE FOR NORMAL BINARY TAPES SHOULD BE FOLLOWED]
42              !
43              !       1. ABSOLUTE LOADER MUST BE IN MEMORY.
44              !       2. PLACE BINARY TAPE IN READER.
45              !       3. LOAD ADDRESS #7500 (* DETERMINED BY LOCATION OF LOADER)
46              !       4. PRESS "START" (PROGRAM WILL LOAD).
47              !
48              !4.      STARTING PROCEDURE
49              !
50              !  4.1     CONTROL SWITCH SETTINGS
51              !
52              !       FOR INITIAL OPERATION OF PROGRAM ALL SWITCHES SHOULD BE = 0
53              !       (OR DOWN).
54              !
55              !4.2     STARTING ADDRESS
56              !
57              !       200 - BASIC TEST (AUTOMATIC PARAMETER AND UNIT SELECTION)
```

FOR PDP-11, SET CONTROLLER TO BUS LEVEL 5

```
58              !
59              !       204 - OPERATOR CONTROLLED PARAMETER TEST (WITH 4K MEMORY AVAILABLE
60              !
61              !       210 - OPERATOR CONTROLLED PARAMETER TEST (WITH 8K MEMORY AVAILABLE
62              !
63              !4.3     PROGRAM AND/OR OPERATOR ACTION
64              !
65              !             LOAD PROGRAM INTO MEMORY
66              !             SET DESIRED TU10 TAPE UNITS ON-LINE
67              !             LOAD STARTING ADDRESS 200 (204 OR 210 TO SELECT PARAMETERS AND
68              !             UNITS)
69              !             PRESS START-PROGRAM WILL BEGIN TESTING FOR LOAD ADDRESS OF 200
70              !             OTHERWISE
71              !             SELECT TAPE UNITS (REFERENCE 4.3.1.1)
72              !             SELECT PARAMETERS (REFERENCE 4.3.2)
73              !             TYPE CARRIAGE RETURN AND PROGRAM WILL BEGIN TESTING.
74              !
75              !4.3.1   TAPE UNIT SELECTION
76              !
77              !       STARTING THE PROGRAM AT 200 WILL RESULT IN AUTOMATIC SELECTION
78              !       OF THE UNITS TO BE TESTED (REFERENCE 4.3.1.2) OTHERWISE STARTING
79              !       AT 204 OR 210 WILL ALLOW OPERATOR TO SELECT UNITS.
80              !
81              !       THE PROGRAM WILL TYPE "SELECT UNITS", ANY CONFIGURATION OF
82              !       1 TO 8 UNITS MAY BE SELECTED BY TYPING THE UNIT NUMBERS ON
83              !       THE TELETYPE. ANY SEQUENCE OF NUMBERS MAY BE TYPED, AFTER
84              !       EACH NUMBER IS TYPED A COMMA (,) WILL BE PRINTED, TYPING THE
85              !       SAME UNIT NUMBER TWICE WILL CAUSE THAT UNIT NUMBER TO BE DELETED.
86              !       TYPING ANY KEY OTHER THAN 0 THRU 7 WILL CAUSE A QUESTION MARK
87              !       (?) TO BE PRINTED AND THAT KEY WILL BE IGNORED.
88              !
89              !       TO TERMINATE UNIT SELECTION TYPE A CARRIAGE RETURN. WHEN
90              !       CARRIAGE RETURN IS TYPED THE PROGRAM WILL CONTINUE TO THE
91              !       "PARAMETER SELECTION" UNLESS NO UNITS WERE SELECTED AND IN
92              !       THAT EVENT WILL RETURN TO THE BEGINNING OF "SELECT UNITS".
93              !
94              !4.3.1.1 TAPE UNIT SELECTION EXAMPLES
95              !
96              !             SELECT UNITS 3,4,5
97              !             SELECT UNITS 5,3,4
98              !
99              !       IN EITHER CASE, UNITS 3,4,5 ARE SELECTED.
100             !
101             !             SELECT UNITS
102             !
103             !       A CARRIAGE RETURN WAS TYPED WITH NO UNITS SELECTED.
104             !
105             !             SELECT UNITS 1,97,1,2
106             !
107             !       ONLY UNIT 2 SELECTED, UNIT 1 WAS DELETED (TYPED TWICE)
108             !       AND THE 9 WAS IGNORED.
109             !
110             !4.3.1.2 STARTING AT 200 WILL RESULT IN AUTOMATIC SELECTION OF UNITS TO
111             !       BE TESTED, A UNIT WILL BE SELECTED FOR TESTING IF IT MEETS THE
112             !       FOLLOWING CRITERIA)
113             !             1. IT IS ON-LINE
114             !             2. IT IS WRITE ENABLED                                    CR
```

```
115             !
116             !       IF THE ABOVE CRITERIA ARE NOT MET BY AT LEAST ONE (1) UNIT,
117             !       OPERATOR SELECTION WILL BE REQUIRED (REFERENCE 4.3.1).
118             !
119             !4.3.2  PARAMETER SELECTION
120             !
121             !       STARTING THE PROGRAM AT 200 WILL RESULT IN AN AUTOMATIC SELECTION
122             !       OF TEST PARAMETERS (REFFRENCE 4.3.2.10) OTHERWISE STARTING AT
123             !       ADDRESS 204 OR 210 WILL ALLOW OPERATOR TO SELECT PARAMETERS,
124             !       FOR 7 TRACK UNITS THERE ARE 7 PARAMETERS TO BE CONTROLLED BY    CR
125             !       THE OPERATOR. THEY ARE: TEST NUMBER, PATTERN, PARITY, DENSITY,  CR
126             !       RECORD LENGTH, WRITE MODE, AND READ MODE.  FOR 9 TRACK UNITS    CR
127             !       THERE ARE 5 OPERATOR CONTROLLED PARAMETERS.  THEY ARE ALL THE   CR
128             !       7 TRACK PARAMETERS JUST REFFRENCED EXCEPT PARITY AND DENSITY.   CR
129             !       IN EITHER CASE, THE PROGRAM PRINTS THE FOLLOWING:               CR
130             !
131             !               "TST PAT PAR DEN RLS WMO RMO"
132             !
133             !       TST=TEST NUMBER
134             !       PAT=PATTERN
135             !       PAR=PARITY
136             !       DEN=DENSITY
137             !       RLS=RECORD LENGTH SEQUENCE
138             !       WMO=WRITE START/STOP MODE
139             !       RMO=READ START/STOP MODE
140             !
141             ! 4.3.2.1 TEST NUMBER
142             !
143             !       THERE ARE 6 TESTS AVAILABLE FOR SELECTION (0 THRU 5).
144             !
145             !       TEST            DESCRIPTION
146             !
147             !       0       WRITE 1 RECORD, REPEAT ON ALL UNITS, CONTINUE TO END
148             !               OF TAPE.
149             !
150             !       1       WRITE 256 RECORDS, REPEAT FOR ALL UNITS, CONTINUE TO END
151             !               OF TAPE.
152             !
153             !       2       WRITE 256 RECORDS, REPEAT FOR ALL UNITS, BACKSPACE 256
154             !               RECORDS, REPEAT FOR ALL UNITS, READ 256 RECORDS, REPEAT
155             !               FOR ALL UNITS, CONTINUE TO END OF TAPE.
156             !
157             !       3       WRITE 1 RECORD, REPEAT FOR ALL UNITS, BACKSPACE, REPEAT
158             !               FOR ALL UNITS, READ 1 RECORD, REPEAT FOR ALL UNITS,
159             !               CONTINUE TO END OF TAPE.
160             !
161             !       4       WRITE 1 RECORD, REPEAT FOR ALL UNITS, REPEAT FOR 256
162             !               RECORDS, BACKSPACE 256 RECORDS, REPEAT FOR ALL UNITS,
163             !               READ 1 RECORD, REPEAT FOR ALL UNITS, REPEAT FOR 256
164             !               RECORDS, CONTINUE TO END OF TAPE.
165             !       NOTE: THIS TEST WILL NOT FUNCTION PROPERLY WHEN OPERATING
166             !       ON A DUAL DENSITY SYSTEM (NRZ/PE) WHOSE DENSITY SELECTION
167             !       IS COMPUTER CONTROLED.
168             !
169             !       5       READ 1 RECORD, REPEAT FOR ALL UNITS, CONTINUE TO END
170             !               OF TAPE.
171             !
```

```
172          ! 4.4.2.2.1 PATTERN (7 TRACK)                                    CR
173          !
174          !       THERE ARE 8 DATA PATTERNS AVAILABLE FOR SELECTION (0 THRU 7) WITH EACH
175          !       PARITY.
176          !
177          !       PATTERN DESCRIPTION                     DATA
178          !
179          !       0 (EVEN) HIGH FREQUENCY OUTSIDE SKEW    01
180          !                                               01
181          !                                               ETC
182          !
183          !       0 (ODD) HALF FREQUENCY OUTSIDE SKEW     01
184          !                                               00
185          !                                               01
186          !                                               00
187          !                                               ETC
188          !
189          !       1 (EVEN) SLIDING "0"                    37
190          !                                               57
191          !                                               67
192          !                                               73
193          !                                               75
194          !                                               76
195          !                                               ETC
196          !
197          !       1 (ODD) SLIDING "1"                     40
198          !                                               20
199          !                                               10
200          !                                                4
201          !                                                2
202          !                                                1
203          !                                               ETC
204          !
205          !       2 (EVEN) HIGH FREQUENCY ALTERNATING     25
206          !       TRACKS                                  25
207          !                                               ETC
208          !
209          !       2 (ODD) HIGH FREQUENCY ALTERNATING      52
210          !       TRACKS                                  52
211          !                                               ETC
212          !
213          !       3 (EVEN) HALF FREQUENCY OUTSIDE TRACK   77
214          !             HIGH FREQUENCY INSIDE TRACKS      76
215          !                                               77
216          !                                               76
217          !                                               ETC
218          !
219          !       3 (ODD) HIGH FREQUENCY OUTSIDE TRACK    01
220          !             HIGH FREQUENCY INSIDE TRACKS      77
221          !                                               01
222          !                                               77
223          !                                               ETC
224          !
225          !       PATTERN DESCRIPTION                     DATA
226          !
227          !       4 (EVEN) INCREMENTING PATTERN           01
228          !             (NO ALL 0'S)                      02
```

```
                        !                                       03
                        !                                       .
                        !                                       .
                        !                                       77
                        !
                        !       4 (ODD) INCREMENTING PATTERN    00
                        !             INCLUDING ALL 0'S)        01
                        !                                       02
                        !                                       .
                        !                                       .
                        !                                       .
                        !                                       77
                        !
                        !       5 (EVEN) THREE 0'S EACH TRACK EVERY     37
                        !             6TH WORD                  37
                        !                                       37
                        !                                       57
                        !                                       57
                        !                                       57
                        !                                       67
                        !                                       67
                        !                                       67
                        !                                       73
                        !                                       73
                        !                                       73
                        !                                       75
                        !                                       75
                        !                                       75
                        !                                       76
                        !                                       76
                        !                                       76
                        !                                       ETC
                        !
                        !       5 (ODD) THREE 1'S EACH TRACK EVERY      40
                        !             6TH WORD                  40
                        !                                       40
                        !                                       20
                        !                                       20
                        !                                       20
                        !                                       10
                        !                                       10
                        !                                       10
                        !                                       04
                        !                                       04
                        !                                       04
                        !                                       02
                        !                                       02
                        !                                       02
                        !                                       01
                        !                                       01
                        !                                       01
                        !                                       ETC
                        !
                        !       6 (ODD,EVEN) ALL 1'S            77
                        !                                       77
                        !                                       ETC
                        !
```

```
286             !       7 (EVEN) RANDOM (NO ALL 0'S)            ?
287             !
288             !       7 (ODD) RANDOM (INCLUDING ALL 0'S)      ?
289             !
290             ! 4.3.2.2.2 PATTERN (9 TRACK)                                    CR
291             !                                                               CR
292             !       THERE ARE 8 DATA PATTERNS AVAILABLE FOR SELECTION (0 THRU 7)  CR
293             !                                                               CR
294             !       PATTERN  DESCRIPTION                    DATA    CHANNELS    CR
295             !                                                               CR
296             !       4        INCREMENTING PATTERN           000     040         CR
297             !                                               001     200         CR
298             !                                               002     002         CR
299             !                                               003     202         CR
300             !                                               .       .           CR
301             !                                               .       .           CR
302             !                                               .       .           CR
303             !                                               377     777         CR
304             !                                               ETC.    ETC.        CR
305             !
306             !       5        EACH CHANNEL 3 BITS            000     040         CR
307             !                                               000     040         CR
308             !                                               000     040         CR
309             !                                               200     004         CR
310             !                                               200     004         CR
311             !                                               200     004         CR
312             !                                               100     010         CR
313             !                                               100     010         CR
314             !                                               100     010         CR
315             !                                               040     020         CR
316             !                                               040     020         CR
317             !                                               040     020         CR
318             !                                               020     100         CR
319             !                                               020     100         CR
320             !                                               020     100         CR
321             !                                               010     001         CR
322             !                                               010     001         CR
323             !                                               010     001         CR
324             !                                               004     400         CR
325             !                                               004     400         CR
326             !                                               004     400         CR
327             !                                               002     002         CR
328             !                                               002     002         CR
329             !                                               002     002         CR
330             !                                               001     200         CR
331             !                                               001     200         CR
332             !                                               001     200         CR
333             !                                               ETC.    ETC.        CR
334             !
335             !       6        HIGH FREQUENCY ALL CHANNELS    377     777         CR
336             !                                               377     777         CR
337             !                                               ETC.    ETC.        CR
338             !
339             !       7        RANDOM                          ?       ?           CR
340             !
341             ! 4.3.2.3 PARITY (7 TRACK ONLY)                                   CR
342             !
```

```
343                 !       PARITY SELECTION IS EITHER EVEN OR ODD.
344                 !
345                 !       PAR     DESCRIPTION
346                 !
347                 !       0       EVEN PARITY.
348                 !
349                 !       1       ODD PARITY
350                 !
351                 !  4.3.2.4 DENSITY (7 TRACK ONLY)                                   CR
352                 !
353                 !       THERE ARE 4 TYPES OF DENSITIES FOR SELECTION (2,5,8,C)
354                 !
355                 !       DEN     DESCRIPTION
356                 !
357                 !       2       200 BITS PER INCH.
358                 !
359                 !       5       556 BITS PER INCH.
360                 !
361                 !       8       800 BITS PER INCH.
362                 !
363                 !       C       800 BPI CORE DUMP.
364                 !
365                 !  4.3.2.5 RECORD LENGTH SEQUENCE
366                 !
367                 !       THERE ARE 4 TYPES OF RECORD LENGTH SEQUENCES FOR SELECTION (0 THRU 3)
368                 !
369                 !       RLS     DESCRIPTION
370                 !
371                 !       0       MINIMUM LENGTH RECORDS (4 BYTES)
372                 !
373                 !       1       MAXIMUM LENGTH RECORDS (1024 BYTES)
374                 !
375                 !       2       VARYING LENGTH RECORDS, MINIMUM TO MAXIMUM (1ST RECORD=
376                 !               4 BYTES, EACH SUCCESSIVE RECORD IS 4 BYTES LONGER
377                 !               UNTIL 256TH RECORD=1024 BYTES)
378                 !
379                 !       3       VARYING LENGTH RECORDS, MAXIMUM TO MINIMUM (1ST RECORD=
380                 !               1024 BYTES, EACH SUCCESSIVE RECORD IS 4 BYTES SHORTER
381                 !               UNTIL 256TH RECORD=4 BYTES)
382                 !
383                 !  4.3.2.6 WRITE START/STOP MODE
384                 !
385                 !       THERE ARE 3 TYPES OF WRITE MODES FOR SELECTION ( 0 THRU 2)
386                 !
387                 !       WMO     DESCRIPTION
388                 !
389                 !       0       NONSTOP = NO WAITING BETWEEN WRITE OPERATIONS, NEW
390                 !                       COMMAND IS ISSUED WHEN CU READY SETS.
391                 !
392                 !       1       START/STOP - FULL STOP BETWEEN WRITE OPERATIONS, NEW
393                 !                       COMMAND IS ISSUED WHEN TU READY SETS.
394                 !
395                 !       2       RANDOM - FULL STOP WITH RANDOM DELAY (1-256 MILLISECONDS)
396                 !
397                 !  4.3.2.7 READ START/STOP MODE
398                 !
399                 !       THERE ARE 3 TYPES OF MODES FOR SELECTION (0 THRU 2)
```

```
400             !
401             !       RMO     DESCRIPTION
402             !
403             !       0       NONSTOP - NO WAITING BETWEEN READ OPERATIONS, NEW
404             !                       COMMAND IS ISSUED WHEN CU READY SETS.
405             !
406             !       1       START/STOP - FULL STOP BETWEEN READ OPERATIONS, NEW
407             !                       COMMAND IS ISSUED WHEN TU READY SETS.
408             !
409             !       2       RANDOM - FULL STOP WITH RANDOM DELAY (1-256 MILLISECONDS)
410             !
411             ! 4.3.2.8 FINAL TEST SELECT APPROVAL
412             !
413             !       AFTER SELECTING RMO. IF ALL PARAMETERS SELECTED ARE LEGAL, "OK"
414             !       WILL BE PRINTED, IF THE PARAMETERS SELECTED STILL CORRESPOND
415             !       TO THE OPERATORS INTENTIONS HE MUST TYPE A CARRIAGE RETURN
416             !       TO SAVE THE PARAMETERS. TYPING ANY OTHER KEY NOW, OR IN FACT
417             !       AT ANY TIME DURING PARAMETER SELECTION TYPING AN ILLEGAL KEY
418             !       WILL CAUSE THE PRESENT PARAMETERS TO BE DELETED AND A NEW
419             !       PARAMETER SELECTION TO BE INITIATED. UP TO TEN SETS OF
420             !       PARAMETER SELECTIONS CAN BE MADE, EACH SET WILL BE EXECUTED
421             !       AFTER THE PREVIOUS SET REACHES END OF TAPE. TO TERMINATE
422             !       PARAMETER SELECTION A SECOND CARRIAGE RETURN MUST BE TYPED AFTER
423             !               SELECTING A SET OF PARAMETERS.
424             !
425             ! 4.3.2.9 TEST SELECTION EXAMPLES
426             !
427             !               TST PAT PAR DEN RLS WMO RMO
428             !                3   2   0   2   1   0   0   OK (CR)
429             !                3   K?
430             !                0   0   1   8   2   2   2 OKX?
431             !                0   1   1   8   2   1   0   OK (CR)
432             !               (CR)
433             !
434             !       TWO PARAMETERS SETS WERE SELECTED BY THE ABOVE SEQUENCE
435             !
436             !       TEST3, PATTERN 2, EVEN PARITY, 200 BPI, MAXIMUM RECORD LENGTH,
437             !       WRITE NONSTOP, AND READ NONSTOP,
438             !       TEST 0, PATTERN 1, ODD PARITY, 800 BPI, VARYING RECORD LENGTH
439             !       (MIN TO MAX), WRITE START/STOP, READ NONSTOP,
440             !       (NOTE) EVEN THOUGH TEST 0 IS A WRITE ONLY TEST, ALL PARAMETERS
441             !       MUST BE SATISFIED.) (IN THIS CASE RMO HAS NO EFFECT)
442             !
443             !       IN THE SECOND PARAMETER SET A "K" WAS TYPED WHICH WAS ILLEGAL
444             !       AND THE SET WAS REINITIALIZED.
445             !
446             !       IN THE THIRD PARAMETER SET AN "X" WAS TYPED INSTEAD OF A CAR-
447             !       RIAGE RETURN AND THE PARAMETERS WERE IGNORED, AFTER AT LEAST
448             !       ONE GOOD SET WAS SELECTED A CARRIAGE RETURN WAS TYPED AT THE
449             !       BEGINNING OF THE PARAMETER SELECTION AND THE PROGRAM WOULD START
450             !       TESTING.
451             !
452             !       NOTE: IF NO 7 TRACK UNITS ARE AVAILABLE FOR TESTING, THE        CR
453             !       PROGRAM WILL PRINT XXX IN THE PARITY AND DENSITY POSITIONS      CR
454             !       SINCE THEIR SPECIFICATION IS NOT REQUIRED FOR 9 TRACK UNITS.    CR
455             !                                                                       CR
456             ! 4.3.2.10AUTOMATIC PARAMETER SELECTION
```

```
457
458          STARTING AT 200 WILL CAUSE THE FOLLOWING TEST PARAMETERS
459          TO BE SELECTED AUTOMATICALLY )
460
461          TST PAT PAR DEN RLS WMO RMO
462           3   7   1   C   2   1   1
463           3   0   0   8   3   1   1
464           2   1   1   5   2   0   0
465          NOTE: PARITY AND DENSITY PARAMETERS APPLICABLE TO 7 TRACK ONLY  CR
466
467     5.0      OPERATING PROCEDURE
468
469     5.1      OPERATIONAL SWITCH SETTINGS
470
471          THE OPERATIONAL SWITCH SETTINGS ARE USED TO:
472
473          A.  ALTER ERROR RECOVERY PROCEDURES
474
475          B.  DELETE ERROR PRINTOUTS
476
477          C.  CAUSE A TEST SEQUENCE TO BE REPEATED WITH A VARIATION
478              THE PATTERN, RECORD LENGTH SEQUENCE, WRITE MODE, OR READ MODE
479
480     5.1.1   SWITCHES TO ALTER ERROR RECOVERY
481
482          THE FUNCTION PERFORMED IS WITH THE SWITCH IN THE "1" (OR UP)
483          POSITION.
484
485          SW      FUNCTION                PURPOSE
486
487          4       DELETE READ RE-TRYS     USE OF THIS SWITCH WILL CAUSE
488                                          DELETION OF THE NORMAL SEQUENCE
489                                          OF TRYING TO RE-READ A RECORD
490                                          AFTER A READ ERROR, THIS WOULD
491                                          BE USEFUL FOR SCOPING READ
492                                          OPERATIONS.
493
494          5       DELETE WRITE XIRG       USE OF THIS SWITCH WILL CAUSE
495                                          RECORDS WITH WRITE ERRORS TO
496                                          BE LEFT ON TAPE. THE READ PASS
497                                          WITH DATA TYPEOUTS SELECTED
498                                          WOULD BE USEFUL FOR DETERMINING
499                                          WRITE ERROR ORIGINS.
500
501          6       WRITE STATISTICAL       USE OF THIS SWITCH WILL CAUSE
502                  RECOVERY                A BACKSPACE 2 RECORDS, SPACE
503                                          FORWARD 1 RECORD, REWRITE RECORD
504                                          SEQUENCE TO BE USED INSTEAD
505                                          OF WRITE XIRG SO THAT THE RECORD
506                                          WILL BE REWRITTEN ON APPROXI-
507                                          MATELY THE SAME AREA OF TAPE
508                                          WHERE THE WRITE ERROR OCCURRED,
509                                          THIS METHOD KEEPS THE INTER-
510                                          RECORD GAP FROM GETTING LARGER,
511                                          DATA IS WRITTEN OVER THE SAME
512                                          SPOT ON TAPE TO TRY AND FIND BAD TAPE.
513
```

```
514     5.1.2   SWITCHES TO CONTROL ERROR PRINTOUTS
515
516          THE FUNCTION PERFORMED IS WITH THE SWITCH IN THE "1" (OR
517          UP) POSITION.
518
519          SW      FUNCTION                PURPOSE
520
521          13      SUPPRESS ERROR          THE STATISTICS CONCERNING THE
522                  PRINTOUT                NUMBER AND TYPES OF ERRORS WILL
523                                          BE PRINTED WHEN THE TAPE UNIT
524                                          REACHES END OF TAPE, FOR LONG
525                                          PERIODS OF TESTING (OVERNIGHT, ETC)
526                                          IT MAY BE SUFFICIENT TO RECEIVE
527                                          THIS INFORMATION AND NOT HAVE A
528                                          TYPEOUT EACH TIME AN ERROR OCCURRED
529
530          8       PRINT ERROR STATISTICS  AFTER COMPLETION OF EVERY RECORD
531                                          LENGTH SEQUENCE INSTEAD OF AFTER
532                                          END OF TAPE AS IS NORMAL.
533
534
535     5.1.3   SWITCH TO ALTER TEST PATTERNS
536
537          SW      FUNCTION                PURPOSE
538
539          0       CHANGE PATTERN          AFTER COMPLETION OF A TEST SE-
540                                          QUENCE REPEAT WITH NEXT PATTERN.
541                                          UNTIL PATTERN 7 IS COMPLETED.
542
543          THIS FEATURE IS USEFUL FOR TESTING MANY COMBINATIONS OF TEST
544          PATTERNS WITHOUT REQUIRING THE OPERATOR TO TYPE IN A LARGE
545          NUMBER OF PARAMETERS.
546
547          EXAMPLE:   TST PAT PAR DEN RLS WMO RMO
548                      3   2   0   2   1   0   0
549                      4   6   0   2   0   0   0
550
551          WITH SW0=1
552          TEST 3 WILL BE EXECUTED 6 TIMES (PATTERNS 2-7)
553          AND THEN TEST 4 WILL BE EXECUTED 2 TIMES (PATTERNS 6,7)
554          NOTE: XXX PRINTED FOR PARITY AND DENSITY IF ONLY 9 TRACK UNITS  CR
555
556     6.       ERRORS
557
558     6.1      WRITE ERRORS
559
560          THE FOLLOWING ERROR TYPEOUTS ARE POSSIBLE DURING A WRITE
561          OPERATION.
562
563          A.  WRITE STATUS ERROR
564
565                   COMD          STATUS      RECORD   LENGTH EXPECTED ACTUAL
566                   XXXXXX        XXXXXX
567
568                   THIS WILL OCCUR IF ERROR (BIT 15 OF COMMAND REGISTER) SETS
569                   ON A WRITE COMMAND. THE CONTENTS OF THE COMMAND AND STATUS
570                   REGISTERS IS PRINTED ALONG WITH THE RECORD NUMBER AND RECOR
```

```
571                     LENGTH.
572
573             B.      XIRG WRITTEN 4 TIMES
574
575                     THIS WILL OCCUR IF A WRITE STATUS ERROR CANNOT BE ELIMIN-
576                     ATED IN 4 ATTEMPTS AT RE-WRITING THE RECORD WITH EXTENDED
577                     INTERRECORD GAP, NOT POSSIBLE DURING TEST 0 OR 1 AS THESE
578                     ARE "WRITE ONLY" TESTS AND IT IS NOT ABSOLUTELY NECESSARY
579                     FOR THE RECORDS TO BE WRITTEN PROPERLY, SETTING SWITCH
580                     5 TO A "1" WILL DELETE "WRITE" WITH XIRG.
581
582             C.      END OF TAPE
583
584                     DRV  PAT  PAR  DEN  MODE  RECORD  LENGTH
585                      0    7    0   800  SSTP   1276     MAX
586
587                     WRITE ERRORS = 5
588                     RECOVERED AT 1 = 3
589                     RECOVERED AT 3 = 1
590                     PERMANENT BADSPOT = 1
591
592                     DRV = UNIT NUMBER
593                     PAT = PATTERN NUMBER
594                     PAR = PARITY   (7 TRACK ONLY)                          CR
595                     DEN = DENSITY  (7 TRACK ONLY)                          CR
596                     MODE = WRITE START/STOP MODE
597                     RECORD = NUMBER OF RECORDS
598                     LENGTH = LENGTH OF RECORDS
599
600                     ON UNIT 0, USING PATTERN 7, EVEN PARITY, 800 BPI,  WRITE
601                     MODE START/STOP, 1276 RECORDS OF MAXIMUM (1048 BYTES) LENGT
602                     WERE WRITTEN, DURING THAT TIME 5 WRITE STATUS ERRORS
603                     OCCURRED, 3 WERE RECOVERED ON THE 1ST RE-WRITE, 1 RECOVERED
604                     ON THE 3RD RE-WRITE, THE REMAINING ERROR NOT RECOVERED IS
605                     CONSIDERED TO BE CAUSED BY A PERMANENT BAD SPOT ON TAPE.
606
607             NOTE: THE ABOVE EXAMPLE ILLUSTRATES OUTPUT FOR A 7 TRACK UNIT.  CR
608             IF THE UNIT WAS 9 TRACK,  X WOULD BE PRINTED IN THE PARITY      CR
609             AND DENSITY POSITIONS.                                         CR
610                                                                            CR
611     6.2     READ ERRORS
612
613             THE FOLLOWING ERROR TYPEOUTS ARE POSSIBLE DURING A READ
614             OPERATION:
615
616             A.      READ STATUS ERROR
617
618                     COMD          STATUS      RECORD LENGTH EXPECTED ACTUAL
619                     XXXXXX        XXXXXX          47    4
620
621                     THIS WILL OCCUR WHEN ERROR (BIT 15 OF COMMAND REGISTER)
622                     SETS DURING A READ OPERATION, THE CONTENTS OF THE COMMAND
623                     AND STATUS REGISTERS IS PRINTED ALONG WITH THE RECORD NUMBE
624                     AND RECORD LENGTH.
625
626             B.      READ DATA ERROR
627
```

```
                COMD        STATUS     RECORD LENGTH EXPECTED ACTUAL
                XXXXXX      XXXXXX       107   1024   177777  175777

                THIS WILL OCCUR WHEN THE DATA READ DOES NOT AGREE WITH THE
                DATA WRITTEN. THE CONTENTS OF THE COMMAND AND STATUS REGISTERS
                IS PRINTED, ALONG WITH THE RECORD NUMBER AND RECORD LENGTH,
                ALSO PRINTED IS THE CONTENTS OF THE MEMORY ADDRESS FROM
                WHICH THE DATA WAS WRITTEN (EXPECTED) AND THE CONTENTS OF THE
                MEMORY ADDRESS INTO WHICH IT WAS READ (ACTUAL), THIS INDI-
                CATES THE FIRST DATA TRANSFER ERROR FOUND FOR THE RECORD,
                NO ATTEMPT IS MADE TO DETERMINE IF THERE ARE OTHER DATA ERRORS
                IN THE RECORD.

        C.      READ PASS

                END OF TAPE

                DRV  PAT  PAR  DEN  MODE  RECORD  LENGTH
                 3    4    1   CD   NSTP   1276   M-MAX

                READ STATUS ERRORS = 3
                DATA ERRORS = 1
                NON RECOVERABLE ERRORS = 0

                ON UNIT 3, USING PATTERN 4, ODD PARITY, CORE DUMP, READ MODE
                NONSTOP, 1276 RECORDS OF VARYING LENGTH (4 TO 1024) WERE
                READ, DURING THAT TIME 2 READ STATUS ERRORS AND 1 DATA
                ERROR OCCURRED, THERE WERE 0 NON-RECOVERABLE ERRORS WHICH
                INDICATES THAT THE STATUS AND DATA ERRORS WERE ELIMINATED BY
                RE-READING THE RECORD UP TO THREE TIMES.

        NOTE: THE SAME OUTPUT CONVENTIONS FOR PARITY AND DENSITY ARE    CR
        APPLICABLE HERE AS IN SEC. 6.1.C                                CR
                                                                        CR
    6.3     ERROR RECOVERY PROCEDURES



    6.3.1   WRITE ERROR RECOVERY

        THE PROCEDURE TO RECOVER FROM A WRITE ERROR IS DETERMINED BY
        THE FOLLOWING:

        A.      IS IT A "WRITE ONLY" TEST OR WILL THE DATA BE READ?

        B.      IS "WRITE STATISTICAL RECOVERY" SELECTED (SW 6=1)?

        C.      IS "DELETE WRITE WITH XIRG" SELECTED (SW 5=1)?

    6.3.1.1 IF IT IS A "WRITE ONLY" TEST AND "WRITE STATISTICAL RECOVERY"
        IS NOT SELECTED (SW 6=0) THE WRITE ERROR IS SIMPLY COUNTED
        AND THE PROGRAM PROCEEDS TO THE NEXT RECORD.

    6.3.1.2 IF IT IS A "WRITE ONLY" TEST AND "WRITE STATISTICAL
        RECOVERY" IS SELECTED (SW 6=1), A WRITE ERROR IS COUNTED AND THEN
        A RECOVERY SEQUENCE (BACKSPACE 2 RECORDS, SPACE FORWARD 1 RECORD,
```

```
685             !       REWRITE RECORD) IS ENTERED, THIS RECOVERY SEQUENCE WILL BE
686             !       REPEATED UP TO 7 TIMES IF THE WRITE ERROR PERSISTS, IF A
687             !       WRITE ERROR IS NOT ELIMINATED AFTER THE 8TH ATTEMPT IT IS
688             !       COUNTED AS A PERMANENT BAD SPOT ON TAPE, STATISTICS ARE SAVED
689             !       TO INDICATE HOW MANY TIMES THE REWRITE SEQUENCE HAD TO BE RE-
690             !       PEATED TO RECOVER FROM EACH WRITE ERROR,
691             !
692             !6,3,1,3 IF IT IS A "WRITE AND READ" TEST AND "WRITE STATISTICAL RECOVERY"
693             !       IS SELECTED (SW 6=1) AND "WRITE WITH XIRG" IS NOT DELETED (SW 5=0)
694             !       THE PROGRAM WILL FIRST ATTEMPT TO DO A "WRITE STATISTICAL RECOVERY
695             !       IF A PERMANENT BAD SPOT IS ENCOUNTERED THE PROGRAM WILL THEN
696             !       ATTEMPT TO RECOVER WITH A "WRITE WITH XIRG", FAILURE TO RECOVER
697             !       AT THIS POINT SHOULD RESULT IN A READ ERROR DURING THE READ PASS,
698             !
699             !6,3,1,4 IF IT IS A "WRITE AND READ" TEST AND "WRITE STATISTICAL RECOVERY"
700             !       IS NOT SELECTED (SW 6=0) AND "WRITE WITH XIRG" IS NOT DELETED
701             !       (SW 5=0) THE PROGRAM WILL TRY TO RECOVER ONLY BY REWRITING THE
702             !       RECORD WITH EXTENDED INTERRECORD GAP, FAILURE TO RECOVER SHOULD
703             !       RESULT IN A READ ERROR DURING READ PASS,
704             !
705             !6,3,2   READ ERROR RECOVERY
706             !
707             !       A READ ERROR CAN OCCUR FOR TWO REASONS: STATUS ERROR OR DATA
708             !       ERROR, A PROPER COUNT IS TAKEN FOR EACH TYPE OF ERROR, RECOVERY
709             !       OF A READ ERROR WILL CONSIST OF TRYING TO RE-READ THE RECORD UP
710             !       TO TWO MORE TIMES (UNLESS SW4=1 TO DELETE READ RE-TRYS FOR
711             !       SCOPING PURPOSES), IF THE ERROR PERSISTS IT IS CONSIDERED "NON-
712             !       RECOVERABLE" AND THE PROGRAM WILL CONTINUE WITH THE NEXT RECORD,
713             !
714             !  7,       RESTRICTIONS
715             !
716             !       NONE
717             !
718             !  8,       MISCELLANEOUS
719             !
720             !  8,1      TAPE LENGTH
721             !
722             !       SINCE EACH OF THE TESTS DEPEND ON REACHING THE "EOT" REFLECTOR
723             !       FOR TERMINATING IT COULD BE ADVANTAGEOUS TO USE A "SHORT" TAPE,
724             !       THIS WOULD ALLOW FOR LESS TIME TO RUN A SERIES OF TESTS WHILE
725             !       VARYING THE TEST PARAMETERS (REFERENCE 5,1,3), HOWEVER, THIS
726             !       IS NOT INTENDED TO IMPLY THAT CONSTANTLY CHANGING THE TEST
727             !       PARAMETERS CONSTITUTES A MORE DIFFICULT TEST OF DATA RELIABILITY,
728             !       THE LENGTH OF TIME UNDER TEST IS MORE LIKELY TO SUPPLY THAT,
729             !       IN ANY EVENT, IF A "SHORT" TAPE IS DESIRED, JUST PLACE AN "EOT"
730             !       REFLECTIVE STRIP APPROXIMATELY 50 FEET DOWN TAPE FROM THE "BOT"
731             !       MARKER, SO THAT THE TAPE IS STILL USEFUL AS A "LONG" TAPE
732             !       ANOTHER "BOT" MARKER COULD BE PLACED A SHORT DISTANCE (APPROX-
733             !       IMATELY 10 FEET) FARTHER DOWN ON TAPE, THIS WOULD EFFECTIVELY
734             !       GIVE YOU TWO TAPES, CARE MUST BE EXERCISED WHEN MOUNTING THE TAPE
735             !       TO POSITION IT AT THE PROPER "BOT" MARKER,
736             !
737             !  8,2      MEMORY AVAILABLE
738             !
739             !       THE PROGRAM REQUIRES 4K OF MEMORY, IF 8K IS AVAILABLE,
740             !       STARTING THE PROGRAM AT ADDRESS 200 OR 210 WILL EXPAND THE WRITE
741             !       AND READ BUFFERS SO THAT MINIMUM LENGTH RECORDS WILL BE
```

```
742             !       8 BYTES AND MAXIMUM LENGTH RECORDS WILL BE 2048 BYTES.
743             !
744             !  9.       PROGRAM DESCRIPTION
745             !
746             !  9.1      GENERAL DESCRIPTION
747             !
748             !       THE PROGRAM IS DESIGNED AROUND TWO MAIN SUBROUTINES "WRITE" AND
749             !       "READ" AND A SERIES OF MINOR SUBROUTINES FOR MANIPULATING UNIT
750             !       SELECTION, HANDLING ERROR STATISTICS, AND RECORD POSITIONING,
751             !       IF MORE THAN ONE UNIT IS SELECTED THE UNIT WITH THE LOWEST
752             !       NUMBER IS SELECTED FIRST AND WHEN THE SEQUENCE IS COMPLETED
753             !       THEN THE NEXT LOWEST UNIT NUMBER IS SELECTED UNTIL ALL UNITS HAVE
754             !       BEEN SELECTED. THIS PROCESS IS REPEATED UNTIL ALL UNITS REACH
755             !       END OF TAPE.
756             !
757             !  9.2      TEST 0
758             !
759             !       THIS IS A "WRITE ONLY" TEST. THE PROCEDURE IS TO WRITE 1 RECORD,
760             !       REPEAT FOR ALL UNITS, CONTINUE UNTIL EOT. WRITE MODE OF NONSTOP
761             !       (WMO=0) WILL NOT BE AN EFFECTIVE SELECTION FOR THIS TEST BECAUSE
762             !       THE WRITE ROUTINE IS EXITED AFTER EACH RECORD TO DETERMINE IF
763             !       ANY OTHER UNITS ARE SELECTED. READ MODE (RMO) HAS NO EFFECT ON
764             !       THIS TEST.
765             !
766             !  9.3      TEST 1
767             !
768             !       THIS IS A "WRITE ONLY" TEST SIMILAR TO TEST 0 EXCEPT A SEQUENCE
769             !       OF 256 RECORDS IS WRITTEN ON EACH UNIT BEFORE CHANGING TO THE
770             !       NEXT UNIT. READ MODE (RMO) HAS NO EFFECT ON THIS TEST.
771             !
772             !  9.4      TEST 2
773             !
774             !       THIS IS A "WRITE AND READ" TEST. THE PROCEDURE IS TO WRITE 256
775             !       RECORDS ON EACH UNIT, THEN BACKSPACE 256 RECORDS ON EACH UNIT,
776             !       THEN READ 256 RECORDS ON EACH UNIT, AND THEN REPEAT THE SEQUENCE
777             !       UNTIL ALL UNITS ARE AT EOT.
778             !
779             !  9.5      TEST 3
780             !
781             !       THIS IS A "WRITE AND READ" TEST. THE PROCEDURE IS TO WRITE 1
782             !       RECORD, BACKSPACE, READ 1 RECORD AND REPEAT FOR EACH UNIT, THEN
783             !       REPEAT THE SEQUENCE UNTIL ALL UNITS ARE AT EOT. WRITE MODE OR
784             !       READ MODE OF NONSTOP (WMO=0 OR RMO=0) WILL NOT BE EFFECTIVE
785             !       FOR THIS TEST.
786             !
787             !  9.6    TEST 4
788             !
789             !       THIS IS A "WRITE AND READ" TEST. IT IS SIMILAR TO TEST 2 EXCEPT
790             !       UNITS ARE CHANGED BETWEEN EACH RECORD DURING WRITE, BACKSPACE,
791             !       AND READ. WRITE MODE OR READ MODE OF NONSTOP (WMO=0 OR RMO=0)
792             !       WILL NOT BE EFFECTIVE FOR THIS TEST.
793             !       NOTE: THIS TEST WILL NOT FUNCTION PROPERLY WHEN OPERATING
794             !       ON A DUAL DENSITY SYSTEM (NRZ/PE) WHOSE DENSITY SELECTION
795             !       IS COMPUTER CONTROLED.
796             !
797             !  9.7      TEST 5
798             !
```

```
                !       THIS IS A "READ ONLY" TEST. THE PROCEDURE IS TO READ 1 RECORD,
                !       REPEAT FOR ALL UNITS, AND CONTINUE UNTIL ALL UNITS ARE AT EOT,
                !       THE MAIN PURPOSE OF THIS TEST IS TO PROVE COMPATIBILITY AMONG
                !       TAPE UNITS. A TAPE THAT IS WRITTEN ON ONE UNIT SHOULD BE ABLE
                !       TO BE READ ON ANY OTHER UNIT. TEST PARAMETERS THAT SELECT
                !       PATTERN AND RECORD LENGTH SEQUENCE MUST BE THE SAME AS THOSE USED
                !       TO WRITE THE DATA ON TAPE, ANY OF THE OTHER TESTS (0 THRU 4)
                !       CAN BE USED TO GENERATE THE DATA.
                !
                !  10.    LISTING
                !
                !       STATUS AND COMMAND REGISTER BIT ASSIGNMENTS
                !
                !                               COMMAND REGISTER
                !
                !15      ERROR
                !
                !14      DEN 8                   00 = 200 BPI 7 TRACK    10 = 800 BPI 7 TRACK
                !13      DEN 5                   01 = 556 BPI 7 TRACK    11 = 800 BPI 9 TRACK
                !12      POWER CLEAR
                !
                !11      PARITY                  0 = ODD    1 = EVEN
                !10      UNIT SEL. BIT 2
                !9       UNIT SEL. BIT 1
                !
                !8       UNIT SEL. BIT 0
                !7       CONTROL UNIT READY
                !6       INTERRUPT ENABLE
                !
                !5       ADDRESS BIT 17
                !4       ADDRESS BIT 16
                !3       FUNCTION BIT 2  000 = OFF LINE              100 = SPACE FORWARD
                !                        001 = READ                 001 = SPACE REVERSE
                !2       FUNCTION BIT 1  010 = WRITE                110 = WRITE XIRG
                !1       FUNCTION BIT 0  011 = WRITE EOF            111 = REWIND
                !0       GO
                !
                !
                !                               STATUS REGISTER
                !
                ! 15      ILLEGAL COMMAND (ILC)
                !
                ! 14      END OF FILE (EOF)
                ! 13      CYCLICAL REDUNDANCY ERROR (CRE)
                ! 12      PARITY ERROR (PAE)
                !
                ! 11      BUS GRANT LATE (BGL)
                ! 10      END OF TAPE (EOT)
                ! 9       RECORD LENGTH ERROR (RLE)
                !
                ! 8       BAD TAPE ERROR (BTE)
                ! 7       NON EXISTENT MEMORY (NMX)
                ! 6       SELECT REMOTE (SELR)
                !
                ! 5       BEGINNING OF TAPE (BOT)
                ! 4       7 CHANNEL (7CH)
                ! 3       SETTLE DOWN (SDWN)
```

```
                        !
                        ! 2       WRITE LOCK (WRL)
                        ! 1       REWIND STATUS (RWS)
                        ! 0       TAPE UNIT READY (TUR)
                        !
                      .ENABL  AMA
                      .ENABL  ABS
                              .NLIST  TTM
                        !
                        !*********************************************** ************************ **
                        !
                        !TITLE  DATUM DATA RELIABILITY - 7 AND 9 TRACK                              CR
                 000000 R0=%0
                 000001 R1=%1
                 000002 R2=%2
                 000003 R3=%3
                 000004 R4=%4
                 000005 R5=%5
                 000006 SP=%6
                 000007 PC=%7
                 000000         .=0
                 000010         .=10                                                               CR
                 000005         .REPT   5                                                          CR
                                .+2                                                                CR
                                HALT                    !TRAPPED TO PREVIOUS ADDRESS               CR
                                .ENDR                                                              CR
                 000034         .=34
000034  012006                  TRAP34
                 000200         .=200
000200  000137  001152          JMP     AUTOST
000204  000137  001552          JMP     MEM4K
000210  000137  001556          JMP     MEM8K
000214  172520          MTS:    172520
000216  172522          MTC:    172522
000220  172524          BC:     172524
000222  172526          CA:     172526
000224  000000                  0                       !PRIMARY INTERRUPT VECTOR LOCATION         CR
000226  000000                  0                                                                  CR
000230  177776          CC:     177776
000232  177570          SR:     177570
000234  177560          TKS:    177560
000236  177562          TKB:    177562
000240  177564          TPS:    177564
000242  177566          TPB:    177566
000244  002000          MAXLEN: 1024.           ! MAX RECORD LENGTH
000246  000004          MINLEN: 4.              ! MIN RECORD LENGTH
000250  013264          WBUF:   BUFFER          ! STARTING ADDRESS OF WRITE BUFFER
000252  015324          RBUF:   BUFFER+1024.    ! STARTING ADDRESS OF READ BUFF
000254  000224          MTV:    224
                        !TEMPORARY STORAGE AREAS
000256  000000          ATST:   0
000260  000000                  0                       !SECONDARY INTERRUPT VECTOR LOCATION       CR
000262  000000                  0                                                                  CR
000264  000000          DRVSEL: 0
000266  000000          STRLEN: 0
000270  000000          LENGTH: 0
000272  000000          MSBITS: 0
```

```
913 000274  000000          SVRECR: 0
914 000276  000000          COMAND: 0
915 000300  000000          CORVBT: 0
916 000302  000000          CORIVE: 0
917 000304  000000          RDPASS: 0
918 000306  000000          WRPASS: 0
919 000310  000000          BLKINC: 0
920 000312  000000          STATRD: 0
921 000314  000000          WRCHEK: 0
922 000316  000000                  0
923 000320  000000                  0
924 000322  000000                  0
925 000324  000000                  0
926 000326  000000                  0
927 000330  000000                  0
928 000332  000000                  0
929 000334  000000          PERMBS: 0
930 000336  000000          RECORD: 0
931 000340  000000          WRRECR: 0
932 000342  000000          LASRCR: 0
933 000344  000000          RDERRS: 0
934 000346  000000          DAERRS: 0
935 000350  000000          NRREAD: 0
936 000352  000000          WRTLEN: 0
937 000354  000000          READLN: 0
938 000356  000000          MODES:  0
939 000360  000450          DRVADR: D0TAB
940 000362  000514                  D1TAB
941 000364  000560                  D2TAB
942 000366  000624                  D3TAB
943 000370  000670                  D4TAB
944 000372  000734                  D5TAB
945 000374  001000                  D6TAB
946 000376  001044                  D7TAB
947         000450          STACK=450                                          CR
948         000450                  .=450                                      CR
949 000450  000000          D0TAB:  0
950         000514                  .=D0TAB+44
951 000514  000000          D1TAB:  0
952         000560                  .=D1TAB+44
953 000560  000000          D2TAB:  0
954         000624                  .=D2TAB+44
955 000624  000000          D3TAB:  0
956         000670                  .=D3TAB+44
957 000670  000000          D4TAB:  0
958         000734                  .=D4TAB+44
959 000734  000000          D5TAB:  0
960         001000                  .=D5TAB+44
961 001000  000000          D6TAB:  0
962         001044                  .=D6TAB+44
963 001044  000000          D7TAB:  0
964         001110                  .=D7TAB+44
965 001110  000000          NUMTST: 0       ; NUMBER OF TEST
966 001112  000000          PARAM:  0       ; TEST PARAMETERS
967 001114  000000          TSTEX:  0               ; POINTS TO TESTS PARAMETE S TO BE EXECUTED
968 001116  000000          TEST:   0               ; CONTAINS CURRENT TEST NU BER
969 001120  000000          TSTTBL: 0               ; TEST TABLE
```

```
 970 001122  000000                          0              ; UP TO 10 TESTS CAN BE SE ECTED
 971 001124  000000                          0              ; BE RUN IN CONSECUTIVE OR ER
 972 001126  000000                          0
 973 001130  000000                          0
 974 001132  000000                          0
 975 001134  000000                          0
 976 001136  000000                          0
 977 001140  000000                          0
 978 001142  000000                          0
 979 001144  000000                          0
 980 001146  000000                  PGMODE: 0                  ;PATTERN GEN. MODE - 1 7T, 2=9T                CR
 981 001150  000000                  STFLGS: 0                  ;7 TRACK FLAGS-BIT SET FOR EACH 7T UNIT        CR
 982 001152  012706  000450          AUTOST: MOV    #STACK,SP   ;SET STACK POINTER                             CR
 983 001156  012737  177777  000256          MOV    #-1,ATST                                                   CR
 984 001164  012737  037745  001120          MOV    #37745,TSTTBL
 985 001172  012737  030265  001122          MOV    #30265,TSTTBL+2
 986 001200  012737  021540  001124          MOV    #21540,TSTTBL+4
 987 001206  012737  000003  001110          MOV    #3,NUMTST
 988 001214  012737  123456  007260          MOV    #123456,LONUM ; PRIME RANDOM NUMBER GENERATOR
 989 001222  012737  176543  007262          MOV    #176543,HINUM
 990                         ; DETERMINE THE SIZE OF THE WRITE AND READ BUFFERS
 991 001230  012737  001244  000004          MOV    #NXMRET,@#4   ; SET UP NSM VECTOR
 992 001236  005737  023324                  TST    BUFFER+4096.  ; OVER 4K OF MEMORY
 993 001242  000403                          BR     OVER4K   ; BR IF YES
 994 001244  022626                  NXMRET: CMP    (SP)+,(SP)+   ; POP THE STACK
 995 001246  104436                          SETM4K                                                            CR
 996 001250  000401                          BR     TU.SEL                ;
 997 001252  104440                  OVER4K: SETM8K                                                            CR
 998                         ; DETERMINE DRIVES TO BE TESTED
 999                         ; A DRIVE WILL BE TESTED IF:
1000                         ;       1. IT CAN BE SELECTED
1001                         ;       2. IT IS WRITE ENABLED                                                    CR
1002 001254  012737  000006  000004  TU.SEL: MOV    #6,@#4        ;SET TRAP CATCHER
1003 001262  012777  010000  176726          MOV    #10000,@MTC   ;PWR CLR
1004 001270  005037  000264                  CLR    DRVSEL        ;CLEAR DRIVE TABLE
1005 001274  005037  001150                  CLR    STFLGS        ;CLEAR 7 TRACK UNIT FL GS                   CR
1006 001300  005037  000272                  CLR    MSBITS
1007 001304  012700  000200                  MOV    #200,R0       ;R0=DRIVE 0
1008 001310  105777  176702                  TSTB   @MTC
1009 001314  100035                          BPL    IDSELF        ;BR IF NO CU READY
1010 001316  013777  000264  176672  NXT.TU: MOV    DRVSEL,@MTC   ;SELECT A DRIVE
1011 001324  012702  000024                  MOV    #20.,R2       ;SET UP R2 FOR WAIT LO P
1012 001330  032777  000100  176656  USSTST: BIT    #100,@MTS     ;DOES DRIVE EXIST?
1013 001336  001005                          BNE    USS.OK        ;BR IF YES
1014 001340  005302                          DEC    R2
1015 001342  003372                          BGT    USSTST
1016 001344  000414                          BR     NO.SEL        ;DRIVE IS NON-EXISTENT
1017 001346  032777  000004  176640  USS.OK: BIT    #4,@MTS       ;IS WRITE LOCK ON?                          CR
1018 001354  001010                          BNE    NO.SEL        ; YES                                       CR
1019 001356  032777  000020  176630          BIT    #20,@MTS      ;IS DRIVE 7 TRACK?                          CR
1020 001364  001402                          BEQ    USS10         ; NO                                        CR
1021 001366  050037  001150                  BIS    R0,STFLGS     ; YES - SET 7 TRACK DR VE BIT IN FLAGS WORD CR
1022 001372  050037  000272          USS10:  BIS    R0,MSBITS     ;SET DRIVE NO. IN TABL                      CR
1023 001376  105237  000265          NO.SEL: INCB   DRVSEL+1      ;INC. THE DRIVE NUMBER
1024 001402  000241                          CLC
1025 001404  006000                          ROR    R0            ;HAVE ALL DRIVES BEEN  ESTED FOR EXISTENCE?
1026 001406  001345                          BNE    NXT.TU        ;BR IF NO
```

```
1027                                    ;TYPE-OUT NAME OF PROGRAM AND MIN. AND MAX. RECORD LENGTHS.
1028 001410  012702  012502              IDSELF: MOV     #MSG10A,R2
1029 001414  104404                              TOP
1030 001416  013702  000246                      MOV     MINLEN,R2
1031 001422  104426                              DECPRT                  ;PRINT MIN. LENGTH
1032 001424  013702  000244                      MOV     MAXLEN,R2
1033 001430  104426                              DECPRT                  ;PRINT MAX. LENGTH
1034 001432  005737  000272                      TST     MSBITS          ;WERE ANY DRIVES SELEC ED?
1035 001436  001002                              BNE     .+6             ;BR IF YES
1036 001440  000137  001564                      JMP     START1          ;NO--GO HAVE OPERATOR  ELECT DRIVES
1037                                    ;TYPE-OUT THE DRIVE/S TO BE TESTED
1038 001444  012702  012604                      MOV     #MSG10B,R2
1039 001450  104404                              TOP
1040 001452  105037  013324                      CLRB    BUFFER
1041 001456  012701  013324                      MOV     #BUFFER,R1
1042 001462  005000                              CLR     R0              ;SET R0 TO DRIVE 0
1043 001464  012702  000200                      MOV     #200,R2         ;SET R2 TO DRIVE 0
1044                                    ;FORM AND SAVE DRIVE NUMBER FOR TYPE-OUT
1045 001470  105021                              CLRB    (R1)+           ;SET EOM
1046 001472  112721  000040                      MOVB    #' ,(R1)+       ;SPACE
1047 001476  030237  000272              LOOPER: BIT     R2,MSBITS       ;DID THIS DRIVE NUMBER EXIST?
1048 001502  001405                              BEQ     ZER000          ;BR IF NO
1049 001504  110011                              MOVB    R0,(R1)         ;YES--SAVE THE NUMBER
1050 001506  152721  000060                      BISB    #'0,(R1)+       ;MAKE IT ASCII
1051 001512  112721  000054                      MOVB    #',,(R1)+       ;COMMA
1052 001516  000241                      ZER000: CLC                     ;POSITION DRIVE BIT
1053 001520  006002                              ROR     R2
1054 001522  005200                              INC     R0              ;UPDATE DRIVE NUMBER
1055 001524  020027  000007                      CMP     R0,#7           ;LAST
1056 001530  003762                              BLE     LOOPER          ;BR IF NO
1057 001532  105011                              CLRB    (R1)            ;SET EOM
1058 001534  112741  000100                      MOVB    #'@,-(R1)       ;CR & LF
1059 001540  012702  013324                      MOV     #BUFFER,R2      ;TYPE THE DRIVE/S SELE TED
1060 001544  104404                              TOP
1061 001546  000137  002602                      JMP     EXECUT          ;GO START TESTING
1062
1063                                    ;MODIFY RECORD LENGTHS AND BUFFER AREAS FOR 4K.
1064 001552  104436                      MEM4K:  SETM4K                                                  CR
1065 001554  000401                              BR      START
1066                                    ;MODIFY RECORD LENGTHS AND BUFFER AREAS FOR 8K.
1067 001556  104440                      MEM8K:  SETM8K                                                  CR
1068 001560  005037  000256              START:  CLR     ATST            ;NOT AUTO START
1069 001564  012706  000450              START1: MOV     #STACK,SP       ;INITIALIZE STACK
1070 001570  012737  123456  007260              MOV     #123456,LONUM;PRIME RANDOM
1071 001576  012737  176543  007262              MOV     #176543,HINUM;NUMBER GERERATOR
1072 001604  012702  012077                      MOV     #MSG1,R2
1073 001610  104404                              TOP                     ;PRINT 'SELECT UNITS'
1074 001612  005037  000272                      CLR     MSBITS          ;CLEAR SELECTED DRIVE  NDICATOR
1075 001616  005037  001150                      CLR     STFLGS          ;CLEAR 7 TRACK UNIT FL GS               CR
1076 001622  104400                      SELDRV: WAITKY
1077 001624  122703  000015                      CMPB    #15,R3                                          CR
1078 001630  001010                              BNE     SELD1           ;NO
1079 001632  005737  000272                      TST     MSBITS          ;YES,WERE ANY DRIVES S LECTED
1080 001636  001752                              BEQ     START1          ;NO
1081 001640  005737  000256                      TST     ATST
1082 001644  001441                              BEQ     SELTST          ;YES NOW SELECT TESTS
1083 001646  000137  002602                      JMP     EXECUT
```

```
1084 001652  122703  000070          SELD1:  CMPB    #70,R3          ;IS CHARACTER A VALID  UMBER 0-7?          CR
1085 001656  003405                          BLE     SELD2           ;NO,PRINT "?"
1086 001660  122703  000060                  CMPB    #60,R3          ;IS CHARACTER A VALID  UMBER 0-7?          CR
1087 001664  003404                          BLE     VALID           ;YES
1088 001666  012705  000077          SELD2:  MOV     #'?,R5                                                     CR
1089 001672  104434                          PRC                     ;PRINT '?'                                 CR
1090 001674  000421                          BR      VAL4
1091                                 ;HAVE VALID DRIVE NUMBER
1092 001676  142703  000270          VALID:  BICB    #270,R3         ;MASK OUT NUMBER                           CR
1093 001702  105103                          COMB    R3                                                         CR
1094 001704  012700  000200                  MOV     #200,R0         ;INITIALIZE BIT POSITI N FOR DRIVE 0
1095 001710  105203                  VAL1:   INCB    R3              ;+1 TO DRIVE SELECT                        CR
1096 001712  001402                          BEQ     VAL2            ;HAVE DRIVE OF EQUAL T  ZERO
1097 001714  006200                          ASR     R0              ;MOVE BIT POSITION TO  EXT DRIVE
1098 001716  000774                          BR      VAL1            ;TRY AGAIN
1099 001720  130067  000272          VAL2:   BITB    R0,MSBITS       ;COMPARE DRIVE SELECT  ITH PREVIOUS SELECTED
1100 001724  001003                          BNE     VAL3
1101 001726  150067  000272                  BISB    R0,MSBITS       ;DRIVE WASN'T PREVIOUS Y SET, SO SET IT NOW,
1102 001732  000402                          BR      VAL4
1103 001734  140067  000272          VAL3:   BICB    R0,MSBITS       ;DRIVE WAS SET, CLEAR  T,
1104 001740  012705  000054          VAL4:   MOV     #',,R5                                                     CR
1105 001744  104434                          PRC                     ;PRINT COMMA                               CR
1106 001746  000765                          BR      SELDRV          ;RETURN TO WAIT FOR NE T KEY
1107                                 ;HAVE DRIVES SELECTED-NOW GET TEST SELECTION
1108 001750  012702  012120          SELTST: MOV     #MSG2,R2
1109 001754  104404                          TOP                     ;PRINT'SELECT TESTS'
1110 001756  005067  001110                  CLR     NUMTST          ;CLEAR TEST NUMBERS SE ECTED
1111 001762  012700  001120                  MOV     #TSTTBL,R0      ;INITIALIZE TEST TABLE POINTER
1112 001766  104400                  SELT1:  WAITKY
1113 001770  122703  000015                  CMPB    #15,R3          ;WAS CHARACTER A CARRI GE RETURN?          CR
1114 001774  001005                          BNE     SELT2
1115 001776  005767  001110                  TST     NUMTST          ;WERE ANY TESTS SELECT D?
1116 002002  001410                          BEQ     SELT3           ;NO
1117 002004  000137  002602                  JMP     EXECUT          ;YES, EXECUTE TESTS
1118 002010  122703  000066          SELT2:  CMPB    #66,R3          ;IS CHARACTER A VALID  UMBER 0-5           CR
1119 002014  003405                          BLE     SELT3           ;NO
1120 002016  122703  000060                  CMPB    #60,R3          ;IS CHARACTER A VALID  UMBER 0-5           CR
1121 002022  003404                          BLE     SELPAT          ;YES
1122 002024  012702  012072          SELT3:  MOV     #MSG0,R2
1123 002030  104404                          TOP
1124 002032  000755                          BR      SELT1           ;RETURN TO WAIT FOR TE T SELECT
1125 002034  010304                  SELPAT: MOV     R3,R4                                                      CR
1126 002036  000304                          SWAB    R4              ;ROTATE TEST NUMBER IN O POSITION
1127 002040  006104                          ROL     R4
1128 002042  006104                          ROL     R4
1129 002044  006104                          ROL     R4
1130 002046  006104                          ROL     R4
1131 002050  042704  107777                  BIC     #107777,R4
1132 002054  104430                          SP3                     ;TYPE 3 SPACES
1133                                 ;HAVE VALID TEST SELECTED, NOW GET SELECTED PATTER
1134 002056  104400                          WAITKY                  ;WAIT FOR PATTERN SELE TION
1135 002060  122703  000070                  CMPB    #70,R3          ;IS CHARACTER A VALID  UMBER 0-7           CR
1136 002064  003757                          BLE     SELT3           ;NO
1137 002066  122703  000057                  CMPB    #57,R3          ;IS CHARACTER A VALID  UMBER 0-7           CR
1138 002072  002354                          BGE     SELT3           ;NO
1139 002074  000303                          SWAB    R3              ;MOVE PATTERN SELECT I TO POSITION         CR
1140 002076  006103                          ROL     R3                                                         CR
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1141 002100  042703  170777                BIC     #170777,R3                                      CR
1142 002104  050304                        BIS     R3,R4           ;COMBINE PATTERN WITH  EST      CR
1143 002106  104450                        SP3
1144                                ;DETERMINE WHICH, IF ANY, DRIVES ARE 7 TRACK AND S T CORRESPONDING  CR
1145                                ; BITS IN THE SEVEN TRACK FLAGS WORD (STFLGS)                   CR
1146 002110  005037  000264                CLR     DRVSEL          ;INITIALIZE FOR 7 TRAC  UNIT SEARCH  CR
1147 002114  012703  000200                MOV     #200,R3                                         CR
1148 002120  013777  000264  176070  DET7T: MOV     DRVSEL,@MTC     ;SELECT NEXT DRIVE              CR
1149 002126  012702  000024                MOV     #20.,R2         ;SET UP WAIT LOOP               CR
1150 002132  032777  000100  176054  DET7T1: BIT    #100,@MTS       ;DOES DRIVE EXIST?              CR
1151 002140  001003                        BNE     DET7T2          ; YES                           CR
1152 002142  005302                        DEC     R2              ;WAIT A WHILE                   CR
1153 002144  003372                        BGT     DET7T1                                          CR
1154 002146  000406                        BR      DET7T3          ;TRY NEXT DRIVE NO.             CR
1155 002150  032777  000020  176036  DET7T2: BIT    #20,@MTS        ;IS DRIVE 7 TRACK?              CR
1156 002156  001402                        BEQ     DET7T3          ; NO                            CR
1157 002160  050037  001150                BIS     R0,STFLGS       ;SET CORRESPONDING 7 T ACK DRIVE BIT  CR
1158 002164  105237  000265          DET7T3: INCB    DRVSEL+1        ;INCREMENT DRIVE NO.            CR
1159 002170  000241                        CLC                                                     CR
1160 002172  006003                        ROR     R3              ;HAVE ALL DRIVES BEEN  HECKED?  CR
1161 002174  001351                        BNE     DET7T           ; NO                            CR
1162 002176  005737  001150                TST     STFLGS          ;ARE ANY DRIVES 7 TRAC ?        CR
1163 002202  001004                        BNE     SELPR0          ; YES - REQUEST PARITY & DENSITY  CR
1164 002204  012702  013315                MOV     #MSG31,R2       ; NO - POSITION PAST P & D      CR
1165 002210  104404                        TOP                                                     CR
1166 002212  000437                        BR      SELDN3                                          CR
1167                                ;WAIT FOR PARITY SELECTION (0-EVEN, 1-ODD)
1168 002214  104400                SELPR0: WAITKY                                                  CR
1169 002216  122703  000060                CMPB    #60,R3          ;IS CHARACTER-0                 CR
1170 002222  001405                        BEQ     SELPR           ;YES,EVEN PARITY
1171 002224  122703  000061                CMPB    #61,R3          ;IS CHARACTER=1                 CR
1172 002230  001275                        BNE     SELT3           ;NO,HAVE ILLEGAL KEY
1173 002232  052704  000400                BIS     #400,R4         ;YES,ODD PARITY
1174 002236  104450                SELPR:  SP3
1175                                ;WAIT FOR DENSITY SELECTION
1176 002240  104400                        WAITKY
1177 002242  122703  000062                CMPB    #62,R3          ;IS CHARACTER=2                 CR
1178 002246  001421                        BEQ     SELDN3          ;YES, DENSITY=200 BPI
1179 002250  122703  000065                CMPB    #65,R3          ;IS CHARACTER=5                 CR
1180 002254  001003                        BNE     SELDN1          ;NO
1181 002256  052704  000100                BIS     #100,R4         ;SET DENSITY=556 BPI
1182 002262  000413                        BR      SELDN3
1183 002264  122703  000070          SELDN1: CMPB    #70,R3          ;IS CHARACTER=8                 CR
1184 002270  001003                        BNE     SELDN2
1185 002272  052704  000200                BIS     #200,R4         ;SET DENSITY=800 BPI
1186 002276  000405                        BR      SELDN3
1187 002300  122703  000103          SELDN2: CMPB    #'C,R3          ;IS CHARACTER=C                 CR
1188 002304  001247                        BNE     SELT3           ;NO, HAVE ILLEGAL KEY
1189 002306  052704  000300                BIS     #300,R4         ;SET CORE DUMP MODE
1190 002312  104450                SELDN3: SP3
1191                                ;WAIT FOR RECORD LENGTH SEQUENCES SELECTION
1192 002314  104400                        WAITKY
1193 002316  122703  000060                CMPB    #60,R3          ;IS CHARACTER=0                 CR
1194 002322  001421                        BEQ     SELR3           ;YES, RLS=MIN
1195 002324  122703  000061                CMPB    #61,R3          ;IS CHARACTER=1                 CR
1196 002330  001003                        BNE     SELR1
1197 002332  052704  000020                BIS     #20,R4          ;SET RLS=MAX
```

```
1198 002336  000413                        BR      SELR3
1199 002340  122703  000062          SELR1: CMPB    #62,R3          ;IS CHARACTER=2                    CR
1200 002344  001003                        BNE     SELR2
1201 002346  052704  000040                BIS     #40,R4          ;SET RLS=MIN-MAX
1202 002352  000405                        BR      SELR3
1203 002354  122703  000063          SELR2: CMPB    #63,R3          ;IS CHARACTER=3                    CR
1204 002360  001221                        BNE     SELT3
1205 002362  052704  000060                BIS     #60,R4          ;SET RLS=MAX-MIN
1206 002366  104450                 SELR3: SP3
1207                                        ;WAIT FOR WRITE MODE SELECTION
1208 002370  104400                        WAITKY
1209 002372  122703  000060                CMPB    #60,R3                                             CR
1210 002376  001415                        BEQ     SELW2           ;SET WMO=NONSTOP
1211 002400  122703  000061                CMPB    #61,R3                                             CR
1212 002404  001003                        BNE     SELW1
1213 002406  052704  000004                BIS     #4,R4           ;SET WMO=START-STOP
1214 002412  000407                        BR      SELW2
1215 002414  122703  000062          SELW1: CMPB    #62,R3                                             CR
1216 002420  001402                        BEQ     SELW15                                             CR
1217 002422  000137  002024                JMP     SELT3                                              CR
1218 002426  052704  000010          SELW15: BIS   #10,R4          ;SET WMO=RANDOM
1219 002432  104450                 SELW2: SP3
1220                                        ;WAIT FOR READ MODE SELECTION
1221 002434  104400                        WAITKY
1222 002436  122703  000060                CMPB    #60,R3                                             CR
1223 002442  001415                        BEQ     SELRM2          ;SET RMO=NONSTOP
1224 002444  122703  000061                CMPB    #61,R3                                             CR
1225 002450  001003                        BNE     SELRM1
1226 002452  052704  000001                BIS     #1,R4           ;SET RMO=START-STOP
1227 002456  000407                        BR      SELRM2
1228 002460  122703  000062          SELRM1: CMPB   #62,R3                                             CR
1229 002464  001402                        BEQ     .+6
1230 002466  000137  002024                JMP     SELT3
1231 002472  052704  000002                BIS     #2,R4           ;SET RMO=RANDOM
1232 002476  104450                 SELRM2: SP3
1233                                        ;HAVE ALL PARAMETERS
1234 002500  012702  012205                MOV     #MSG6,R2
1235 002504  104404                        TOP                     ;PRINT "OK"
1236 002506  104400                        WAITKY                  ;WAIT FOR CARRIAGE RET RN
1237 002510  122703  000015                CMPB    #15,R3                                             CR
1238 002514  001402                        BEQ     .+6
1239 002516  000137  002024                JMP     SELT3
1240 002522  105777  175512                TSTB    @TPS
1241 002526  100375                        BPL     .-4
1242 002530  012777  000012  175504        MOV     #12,@TPB
1243 002536  105777  175476                TSTB    @TPS
1244 002542  100375                        BPL     .-4
1245 002544  012777  000040  175470        MOV     #40,@TPB
1246 002552  010420                        MOV     R4,(0)+
1247 002554  005237  001110                INC     NUMTST          ;+1 TO TEST COUNT
1248 002560  022737  000012  001110        CMP     #10.,NUMTST     ;EQUAL TO TEN YET
1249 002566  001402                        BEQ     SELOK1          ;YES
1250 002570  000137  001766                JMP     SELT1           ;NO,ACCEPT NEXT SET
1251 002574  012702  012160          SELOK1: MOV   #MSG5,R2
1252 002600  104404                        TOP                     ;PRINT 'MAX TESTS SELE TED'
1253                                        ;EXECUTE SELECTED TEST
1254 002602  005037  000356          EXECUT: CLR   MODES           ;INITIALIZE MODES
```

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1255 002606  012737  001120  001114          MOV    #TSTTBL,TSTEX
1256 002614  017737  176274  001112  EXEC:   MOV    @TSTEX,PARAM ;GET TEST PARAMS
1257 002622  013700  001112          EXEC1:  MOV    PARAM,R0
1258 002626  042700  007777                  BIC    #7777,R0
1259 002632  005037  001146                  CLR    PGMODE       ;ENABLE PATTERN GENERA ION
1260 002636  010037  001116                  MOV    R0,TEST
1261 002642  001460                          BEQ    TEST0
1262 002644  022700  010000                  CMP    #10000,R0
1263 002650  001500                          BEQ    TEST1
1264 002652  022700  020000                  CMP    #20000,R0
1265 002656  001501                          BEQ    TEST2
1266 002660  022700  030000                  CMP    #30000,R0
1267 002664  001544                          BEQ    TEST3
1268 002666  022700  040000                  CMP    #40000,R0
1269 002672  001402                          BEQ    .+6
1270 002674  000137  003526                  JMP    TEST5
1271 002700  000137  003206                  JMP    TEST4
1272                              ;RETURN HERE AFTER COMPLETION OF TEST
1273 002704  012702  013310          DONE:   MOV    #MSG30,R2
1274 002710  104404                          TOP
1275 002712  006077  175314                  ROR    @SR          ;IS SW0=1 TO REPEAT TE T WITH ALL PATTERNS
1276 002716  103015                          BCC    DONE1        ;NO
1277 002720  013700  001112                  MOV    PARAM,R0
1278 002724  042700  170777                  BIC    #170777,R0
1279 002730  022700  007000                  CMP    #7000,R0     ;REACHED PAT 7
1280 002734  001404                          BEQ    DONE1        ;YES
1281 002736  062737  001000  001112          ADD    #1000,PARAM  ;NO, +1 TO PAT
1282 002744  000726                          BR     EXEC1        ;REPEAT
1283 002746  005337  001110          DONE1:  DEC    NUMTST
1284 002752  001010                          BNE    DOAGN
1285 002754  013702  000042                  MOV    @#42,R2
1286 002760  001001                          BNE    ENDADR
1287 002762  000000                          HALT                ;FINISHED ALL TESTS
1288 002764  004712                  ENDADR: JSR    PC,(2)
1289 002766  000240                          240                 ;********NOP********
1290 002770  000240                          240                 ;********NOP********
1291 002772  000240                          240                 ;********NOP********
1292 002774  062737  000002  001114  DOAGN:  ADD    #2,TSTEX
1293 003002  000704                          BR     EXEC         ;DO NEXT TEST
1294                              ;TEST0
1295                              ;WRITE ONE RECORD, CHANGE DRIVES, GO TO EOT
1296 003004  052737  000002  000356  TEST0:  BIS    #2,MODES     ;EXIT WRITE EVERY RECO D, NO READ PASS
1297 003012  104420          T01ENT: CLRALL              ;CLEAR ERROR COUNTERS  ND REWIND          CR
1298 003014  104410          T0:     RSFDRV              ;RESET DRIVE SELECTION TO LOWEST NUMBER
1299 003016  104414          T0A:    MVCTRS              ;RESTORE DRIVE COUNTER
1300 003020  032737  000040  000356          BIT    #40,MODES    ;IS THIS DRIVE AT EOT?
1301 003026  001002                          BNE    T0B          ;YES, SKIP WRITE
1302 003030  104402                          WRITIT              ;WRITE
1303 003032  104406                          SVCTRS              ;SAVE DRIVE COUNTERS
1304 003034  104422          T0B:    CHGDRV              ;ANY MORE DRIVES SELEC ED?
1305 003036  000767                          BR     T0A          ;YES
1306 003040  004737  004400                  JSR    PC,ALLEOT    ;ARE ALL DRIVES AT EOT
1307 003044  000763                          BR     T0           ;NO
1308 003046  000137  002704                  JMP    DONE         ;YES, EXIT
1309                              ;TEST1
1310                              ;WRITE RECORD LENGTH SEQUENCE, GO TO NEXT DRIVE, C NTINUE TO EOT ON ALL ORIVE ,
1311 003052  052737  000001  000356  TEST1:  BIS    #1,MODES     ;EXIT WRITE AFTER RLS, NO READ PASS
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1312 003060  000754                        BR      T01ENT                                                  CR
1313                                ;TEST2
1314                                ;WRITE A RECORD LENGTH SEQUENCE , CHANGE DRIVES
1315                                ;BACKSPACE, CHANGE DRIVES, READ, CHANGE DRIVES, CO TINUE TO EOT ON ALL DRIVES
1316 003062  052737  000005  000356 TEST2:  BIS     #5,MODES        ;EXIT WRITE AFTER RLS, DO READ PASS
1317 003070  104420                T23ENT: CLRALL                  ;CLEAR ERROR COUNTERS  ND REWIND        CR
1318 003072  104410                T2:     RSFDRV                  ;SET DRIVE SELECTION T  LOWEST NUMBER
1319 003074  104414                T2A:    MVCTRS                  ;RESTORE DRIVE COUNTER
1320 003076  032737  000040  000356        BIT     #40,MODES       ;IS THIS DRIVE AT EOT?
1321 003104  001002                        BNE     T2B             ;YES, SKIP WRITE
1322 003106  104402                        WRITIT                  ;WRITE
1323 003110  104406                        SVCTRS                  ;SAVE DRIVE COUNTERS
1324 003112  104422                T2B:    CHGDRV                  ;ANYMORE DRIVES SELECT D?
1325 003114  000767                        BR      T2A             ;YES
1326 003116  104414                T2C:    MVCTRS                  ;RESTORE DRIVE COUNTER
1327 003120  032737  000020  000356        BIT     #20,MODES       ;IS THIS READ AT EOT?
1328 003126  001003                        BNE     T2D             ;YES, SKIP BACKSPACE
1329 003130  004737  010540                JSR     PC,GOBKWD       ;BACKSPACE
1330 003134  104406                        SVCTRS                  ;SAVE DRIVE COUNTERS                    CR
1331 003136  104422                T2D:    CHGDRV                  ;ANY MORE DRIVES SELEC ED?              CR
1332 003140  000766                        BR      T2C             ;YES
1333 003142  104414                T2E:    MVCTRS                  ;RESTORE DRIVE COUNTER
1334 003144  032737  000020  000356        BIT     #20,MODES       ;IS THIS READ AT EOT
1335 003152  001001                        BNE     T2F             ;YES, SKIP READ
1336 003154  104404                        READIT                  ;READ
1337 003156  104406                T2F:    SVCTRS                  ;SAVE DRIVE COUNTERS
1338 003160  104422                        CHGDRV                  ;ANYMORE DRIVES SELECT D?
1339 003162  000767                        BR      T2E             ;YES
1340 003164  004737  004400                JSR     PC,ALLEOT       ;ARE ALL DRIVES AT EOT
1341 003170  000740                        BR      T2              ;NO
1342 003172  000137  002704                JMP     DONE            ;YES EXIT
1343                                        ;
1344                                        ;
1345                                ;TEST3
1346                                ;WRITE ONE RECORD, CHANGE DRIVES, BACKSPACE, CHANG  DRIVES, READ, CHANGE DRIV S
1347 003176  052737  000006  000356 TEST3:  BIS     #6,MODES        ;EXIT WRITE EVERY RECO D, DO READ PASS
1348 003204  000731                        BR      T23ENT                                                  CR
1349                                ;TEST4
1350                                ;WRITE RECORD, CHANGE DRIVES, REPEAT FOR RECORD LE GTH SEQUENCE
1351                                ;READ RECORD, CHANGE DRIVES, REPEAT FOR RLS
1352 003206  052737  000006  000356 TEST4:  BIS     #6,MODES        ;EXIT WRITE EVERY RECO D, DO READ PASS
1353 003214  032777  000014  175672        BIT     #14,@TSTEX
1354 003222  001006                        BNE     T4
1355 003224  042737  000007  000356        BIC     #7,MODES
1356 003232  052737  000005  000356        BIS     #5,MODES        ;EXIT WRITE AFTER RLS, DO READ PASS
1357 003240  104420                T4:     CLRALL                  ;CLEAR ERROR COUNTERS  ND REWIND
1358 003242  104410                T4A:    RSFDRV                  ;SET DRIVE SELECTION T  LOWEST NUMBER
1359 003244  104414                T4B:    MVCTRS                  ;RESTORE DRIVE COUNTER
1360 003246  013737  000336  000340        MOV     RECORD,WRRECR   ;SAVE RECORD
1361 003254  104406                        SVCTRS                  ;SAVE DRIVE COUNTERS
1362 003256  104422                        CHGDRV                  ;ANYMORE DRIVES SELECT D?
1363 003260  000771                        BR      T4B             ;YES
1364 003262  042737  000010  000356        BIC     #10,MODES       ;INDICATE RLS END
1365 003270  104410                T4C:    RSFDRV
1366 003272  104414                T4D:    MVCTRS                  ;RESTORE DRIVE COUNTER
1367 003274  032737  000040  000356        BIT     #40,MODES       ;IS DRIVE AT EOT
1368 003302  001010                        BNE     T4E             ;YES, SKIP WRITE
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1369 003304  013737  000340  000274          MOV     WRRECR,SVRECR;SAVE START OF RLS
1370 003312  104402                          WRITIT                ;WRITE
1371 003314  013737  000274  000340          MOV     SVRECR,WRRECR;RESTORE START OF RLS
1372 003322  104406                          SVCTRS                ;SAVE DRIVE COUNTERS
1373 003324  104422                  T4E:    CHGDRV                ;ANYMORE DRIVES SELECT D?
1374 003326  000761                          BR      T4D           ;YES
1375 003330  032737  000010  000356          BIT     #10,MODES     ;ARE WE AT END OF RLS
1376 003336  001007                          BNE     T4G           ;YES
1377 003340  104414                  T4F:    MVCTRS                ;RESTORE DRIVE COUNTER
1378 003342  032737  000040  000356          BIT     #40,MODES     ;ARE WE AT EOT?
1379 003350  001747                          BEQ     T4C           ;NO
1380 003352  104422                          CHGDRV                ;ANYMORE DRIVES SELECT D?
1381 003354  000771                          BR      T4F           ;YES
1382 003356  104410                  T4G:    RSFDRV                ;SET DRIVE SELECTION T  LOWEST NUMBER
1383 003360  104414                  T4H:    MVCTRS                ;RESTORE DRIVE COUNTER
1384 003362  032737  000020  000356          BIT     #20,MODES     ;IS THIS DRIVE AT EOT?
1385 003370  001002                          BNE     T4J           ;YES, SKIP BACKSPACE
1386 003372  004737  010540                  JSR     PC,GOBKWD     ;BACKSPACE
1387 003376  104406                  T4J:    SVCTRS                ;SAVE DRIVE COUNTERS
1388 003400  104422                          CHGDRV                ;ANY MORE DRIVES SELEC ED?
1389 003402  000766                          BR      T4H           ;YES
1390 003404  104410                  T4K:    RSFDRV                ;SET DRIVE SELECTION T  LOWEST NUMBER
1391 003406  104414                  T4L:    MVCTRS                ;RESTORE DRIVE COUNTER
1392 003410  032737  000020  000356          BIT     #20,MODES     ;IS THIS READ AT EOT?
1393 003416  001025                          BNE     T4N           ;YES, SKIP READ
1394 003420  023737  000342  000336          CMP     LASRCR,RECORD;HAVE WE READ LAST REC RD WRITTEN?
1395 003426  001421                          BEQ     T4N           ;YES
1396 003430  013737  000342  000274          MOV     LASRCR,SVRECR;SAVE LAST RECORD
1397 003436  032737  000003  001112          BIT     #3,PARAM      ;IS READ MODE NONSTOP?
1398 003444  001405                          BEQ     T4M           ;YES
1399 003446  013737  000336  000342          MOV     RECORD,LASRCR
1400 003454  005237  000342                  INC     LASRCR        ;+1 TO LAST RECORD WRI TEN
1401 003460  104424                  T4M:    READIT                ;READ
1402 003462  013737  000274  000342          MOV     SVRECR,LASRCR;RESTORE LAST RECORD W ITTEN
1403 003470  104406                          SVCTRS                ;SAVE DRIVE COUNTERS
1404 003472  104422                  T4N:    CHGDRV                ;ANYMORE DRIVES SELECT D?
1405 003474  000744                          BR      T4L           ;YES
1406 003476  104414                  T4P:    MVCTRS                ;RESTORE DRIVE COUNTER
1407 003500  023737  000342  000336          CMP     LASRCR,RECORD;ARE WE AT END OF RLS?
1408 003506  001356                          BNE     T4K           ;NO
1409 003510  104422                          CHGDRV                ;ANYMORE DRIVES SELECT D?
1410 003512  000771                          BR      T4P           ;YES
1411 003514  004737  004400                  JSR     PC,ALLEOT     ;ARE ALL DRIVES AT EOT
1412 003520  000650                          BR      T4A           ;NO
1413 003522  000137  002704                  JMP     DONE          ;YES,EXIT
1414                                 ;
1415                                 ;
1416                                 ;TEST5
1417                                 ;READ ONLY
1418                                 ;RANDOM PATTERN INVALID EXCEPT FOR SPECIFIC CASES
1419 003526  052737  000002  000356  TEST5:  BIS     #2,MODES
1420 003534  104420                          CLRALL                ;CLEAR ERROR COUNTERS  NO REWIND
1421 003536  012737  177777  004004  T5:     MOV     #-1,T5FLAG    ;ENABLE EXIT FROM WRIT  ROUTINE
1422 003544  104402                          WRITIT                ;ENTER WRITE ONLY TO I ITIALIZE RECORD SEQUENCE
1423 003546  032737  000010  000356          BIT     #10,MODES     ;ARE WE AT END OF RLS?
1424 003554  001402                          BEQ     T5A           ;YES
1425 003556  004737  005206                  JSR     PC,TESINC     ;SLE IF RECORD LENGTH  HOULD BE CHANGED
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1426 003562  013737  000336  004006  T5A:    MOV     RECORD,T5INC
1427 003570  005037  000336                  CLR     RECORD
1428 003574  052737  000010  000356  T5B:    BIS     #10,MODES       ;INDICATE AT START OF  LS
1429 003602  104410                          RSFDRV                  ;SET DRIVE SELECTION T  LOWEST DRIVE NUMBER
1430 003604  104414                  T5C:    MVCTRS                  ;RESTORE DRIVE COUNTER
1431 003606  032737  000020  000356          BIT     #20,MODES       ;IS THIS DRIVE AT EOT
1432 003614  001007                          BNE     T5D             ;YES
1433 003616  013737  000336  000342          MOV     RECORD,LASRCR
1434 003624  063737  004006  000342          ADD     T5INC,LASRCR    ;CURRENT RECORD + SEQU NCE LENGTH
1435 003632  104406                          SVCTRS                  ;SAVE DRIVE COUNTERS
1436 003634  104402                  T5D:    CHGDRV                  ;ANYMORE DRIVES?
1437 003636  000762                          BR      T5C             ;YES
1438 003640  104410                          RSFDRV                  ;SET DRIVE SELECTION T  LOWEST NUMBER
1439 003642  104414                  T5E:    MVCTRS                  ;RESTORE DRIVE COUNTER
1440 003644  032737  000020  000356          BIT     #20,MODES       ;IS THIS DRIVE AT EOT?
1441 003652  001041                          BNE     T5G             ;YES
1442 003654  013737  000342  000274          MOV     LASRCR,SVRECR   ;SAVE END OF RLS RECOR S
1443 003662  032737  000003  001112          BIT     #3,PARAM        ;IS READ MODE NONSTOP
1444 003670  001405                          BEQ     T5F             ;YES GO TO END RLS
1445 003672  013737  000336  000342          MOV     RECORD,LASRCR   ;NEXT TO BE READ
1446 003700  005237  000342                  INC     LASRCR          ;+1 EXIT READ AFTER ON  RECORD
1447 003704  104424                  T5F:    READIT                  ;READ
1448 003706  013737  000274  000342          MOV     SVRECR,LASRCR   ;RESTORE END RECOD
1449 003714  104406                          SVCTRS                  ;SAVE DRIVE COUNTERS
1450 003716  104402                  T5G:    CHGDRV                  ;ANY MORE DRIVES?
1451 003720  000750                          BR      T5E             ;YES
1452 003722  004737  004400                  JSR     PC,ALLEOT       ;ALL AT EOT?
1453 003726  000402                          BR      T5H             ;NO
1454 003730  000137  002704                  JMP     DONE            ;YES EXIT
1455 003734  104410                  T5H:    RSFDRV                  ;SET DRIVE SELECTION T  LOWEST NUMBER
1456 003736  104414                  T5J:    MVCTRS                  ;RESTORE DRIVE COUNTER
1457 003740  023737  000336  000342          CMP     RECORD,LASRCR   ;ARE WE AT END OF RLS?
1458 003746  001005                          BNE     T5K             ;NO
1459 003750  042737  000010  000356          BIC     #10,MODES       ;YES,
1460 003756  104402                  T5K:    CHGDRV                  ;ANYMORE DRIVES SELECT D?
1461 003760  000766                          BR      T5J             ;YES
1462 003762  032737  000010  000356          BIT     #10,MODES       ;AT END OF RLS?
1463 003770  001324                          BNE     T5E             ;NO
1464 003772  004737  004400                  JSR     PC,ALLEOT       ;ALL DRIVES AT EOT?
1465 003776  000667                          BR      T5              ;NO
1466 004000  000137  002704                  JMP     DONE            ;YES, EXIT
1467 004004  000000                  T5FLAG: 0
1468 004006  000000                  T5INC:  0
1469                                 ;SAVE DR;SAVE DRIVE RECORD AND ERROR COUNTERS
1470 004010  004737  004044          SVCTR:  JSR     PC,CTRDEX
1471 004014  012021                  SVC1:   MOV     (0)+,(1)+
1472 004016  022700  000360                  CMP     #DRVADR,R0
1473 004022  001374                          BNE     SVC1
1474 004024  000207                          RTS     PC
1475                                 ;RESET DRIVE COUNTERS BACK INTO PROGRAM
1476 004026  004737  004044          MVCTR:  JSR     PC,CTRDEX
1477 004032  012120                  MV1:    MOV     (1)+,(0)+
1478 004034  022700  000360                  CMP     #DRVADR,R0
1479 004040  001374                          BNE     MV1
1480 004042  000207                          RTS     PC
1481                                 ;SET UP POINTERS FOR MOVE AND SAVE COUNTERS
1482 004044  012700  000314          CTRDEX: MOV     #WRCHEK,R0
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1483 004050  012701  000360            MOV     #DRVADR,R1
1484 004054  063701  000302            ADD     CDRIVE,R1
1485 004060  063701  000302            ADD     CDRIVE,R1
1486 004064  011101                    MOV     @R1,R1
1487 004066  000207                    RTS     PC
1488                                ;CLEAR ALL DRIVE COUNTERS
1489 004070  104410                 CLRAL: RSFDRV
1490 004072  004737  004342         CLR1:  JSR     PC,REWIND
1491 004076  004737  004506                 JSR     PC,CLRTBL
1492 004102  104406                         SVCTRS
1493 004104  104422                         CHGDRV
1494 004106  000771                         BR      CLR1
1495 004110  052737  000010  000356         BIS     #10,MODES       ;AT END OF RLS
1496 004116  005037  004004                 CLR     T5FLAG
1497 004122  000207                         RTS     PC
1498                                ;RESET DRIVE SELECTION TO LOWEST NUMBER
1499 004124  005037  000302         RSFDR: CLR     CDRIVE          ;START WITH DRIVE 0
1500 004130  012737  000200  000300         MOV     #200,CDRVBT     ;BIT FOR DRIVE 0
1501 004136  033737  000272  000300 RSF1:  BIT     MSBITS,CDRVBT   ;IS DRIVE SELECTED?
1502 004144  001006                         BNE     RSF2            ;YES
1503 004146  005237  000302                 INC     CDRIVE          ;NO + 1 TO DRIVE
1504 004152  000241                         CLC
1505 004154  006037  000300                 ROR     CDRVBT          ;ROTATE DRIVE BIT
1506 004160  000766                         BR      RSF1            ;REPEAT
1507 004162  013737  000302  000276 RSF2:  MOV     CDRIVE,COMAND
1508 004170  000337  000276                 SWAB    COMAND
1509 004174  033737  001150  000300         BIT     STFLGS,CDRVBT   ;IS DRIVE 7 TRACK?                              CR
1510 004202  001015                         BNE     RSF3            ; YES                                           CR
1511 004204  052737  060000  000276         BIS     #60000,COMAND   ;800 BPI, 9 TRACK                               CR
1512 004212  032777  001000  174012         BIT     #1000,@SR       ;TEST PARITY SELECTED                           CR
1513 004220  001403                         BEQ     .+10            ; ODD                                           CR
1514 004222  052737  004000  000276         BIS     #4000,COMAND    ; EVEN                                          CR
1515 004230  000207                         RTS     PC                                                              CR
1516 004232  105737  001112         RSF3:  TSTB    PARAM           ;SET APPROPRIATE 7 TRA K DENSITY BITS           CR
1517 004236  100003                         BPL     .+10
1518 004240  052737  040000  000276         BIS     #40000,COMAND
1519 004246  032737  000100  001112         BIT     #100,PARAM
1520 004254  001403                         BEQ     .+10
1521 004256  052737  020000  000276         BIS     #20000,COMAND
1522 004264  032737  000400  001112         BIT     #400,PARAM      ;TEST PARITY SELECTED
1523 004272  001003                         BNE     .+10            ;ODD
1524 004274  052737  004000  000276         BIS     #4000,COMAND    ;EVEN
1525 004302  000207                         RTS     PC
1526                                ;SELECT NEXT DRIVE IN SEQUENCE
1527                                ;+1 WORD TO EXIT ADDRESS IF LAST DRIVE TESTED
1528 004304  005237  000302         CHGDR: INC     CDRIVE          ;+1 TO DRIVE NUMBER
1529 004310  000241                         CLC
1530 004312  006037  000300                 ROR     CDRVBT          ;MOVE MASK BIT OVER 1  LACE
1531 004316  001004                         BNE     CHG1            ;BRANCH IF MORE DRIVES SELECTED
1532 004320  104410                         RSFDRV                  ;RESET DRIVE SELECT TO LOWEST NUMBER
1533 004322  062716  000002                 ADD     #2,@SP          ;+2 TO SKIP OVER FIRST EXIT
1534 004326  000207                         RTS     PC
1535 004330  033737  000300  000272 CHG1:  BIT     CDRVBT,MSBITS
1536 004336  001762                         BEQ     CHGDR
1537 004340  000710                         BR      RSF2
1538                                ;REWIND DRIVE TO BOT
1539 004342  105777  173650         REWIND: TSTB   @MTC
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1540 004346  100375                          BPL     .-4             ;WAIT FOR CONTROL UNIT
1541 004350  013777  000276  173640          MOV     COMAND,@MTC     ;SELECT DRIVE
1542 004356  006077  173632                  ROR     @MTS
1543 004362  103375                          BCC     .-4             ;WAIT FOR TU READY
1544 004364  052777  000016  173624          BIS     #16,@MTC        ;REWIND
1545 004372  004737  004532                  JSR     PC,GOWAIT
1546 004376  000207                          RTS     PC              ;EXIT
1547                                 ;ARE ALL DRIVES AT END OF TAPE
1548 004400  104410                  ALLEOT: RSFDRV
1549 004402  104414                  ALL1:   MVCTRS
1550 004404  032737  000060  000356          BIT     #60,MODES       ;AT EOT?
1551 004412  001403                          BEQ     ALLEOS          ;NO
1552 004414  104422                          CHGDRV                  ;DONE ALL DRIVES?
1553 004416  000771                          BR      ALL1            ;NO
1554 004420  000427                          BR      ALL3
1555 004422  032777  000400  173602  ALLEOS: BIT     #400,@SR        ;TEST SWITCH 8 TO EXIT AT END OF SEQUENCE
1556 004430  001425                          BEQ     ALL2            ;NO, GO TO EOT
1557 004432  032737  000010  000356          BIT     #10,MODES       ;AT END OF SEQUENCE
1558 004440  001421                          BEQ     ALL2            ;NO, EXIT, DON'T DUMP  RROR COUNTERS
1559                                 ;DUMP ERROR COUNTERS ON ALL DRIVES
1560 004442  104410                  CTRDMP: RSFDRV
1561 004444  104414                          MVCTRS
1562 004446  005737  004004                  TST     T5FLAG
1563 004452  001006                          BNE     CTRD1           ;DUMP READ ONLY
1564 004454  004737  005542                  JSR     PC,ENDT1
1565 004460  032737  000004  000356          BIT     #4,MODES        ;READ PASS SELECTED?
1566 004466  001402                          BEQ     COMEND          ;NO
1567 004470  004737  010110          CTRD1:  JSR     PC,RNDTP1
1568 004474  104422                  COMEND: CHGDRV                  ;DONE ALL DRIVES
1569 004476  000762                          BR      CTRDMP+2        ;NO
1570 004500  062716  000002          ALL3:   ADD     #2,(6)          ;INCREMENT RETURN POIN
1571 004504  000207                  ALL2:   RTS     PC
1572                                 ;CLEAR READ AND WRITE TABLES
1573 004506  012700  000314          CLRTBL: MOV     #WRCHEK,R0
1574 004512  005020                  CLRT1:  CLR     (0)+
1575 004514  020027  000356                  CMP     R0,#MODES
1576 004520  001374                          BNE     CLRT1
1577 004522  042737  000070  000356          BIC     #70,MODES
1578 004530  000207                          RTS     PC
1579                                 ;INTERRUPT ENABLE, GO, WAIT FOR INTERRUPT
1580 004532  012777  000200  173470  GOWAIT: MOV     #200,@CC        ;SET PRIORITY LEVEL 4
1581 004540  012777  004566  173506          MOV     #GW1,@MTV       ;SET INTERRUPT RETURN
1582 004546  052777  000101  173442          BIS     #101,@MTC       ;INTERRUPT ENABLE, GO
1583 004554  000001                          WAIT                    ;WAIT FOR INTERRUPT
1584 004556  012777  000340  173444          MOV     #340,@CC        ;RESTORE PRIORITY LEVE  7
1585 004564  000207                          RTS     PC              ;EXIT
1586 004566  000002                  GW1:    RTI                     ;RETURN FROM INTERRUPT
1587                                 ;WRITE RECORD SECTION
1588 004570  005737  000336          WRITI:  TST     RECORD          ;IS THIS THE FIRST REC RD
1589 004574  001051                          BNE     NOINCR          ;NO, SKIP SET UP OF RE ORD LENGTH AND BLOCK INCRE EN
1590 004576  013737  000244  000266          MOV     MAXLEN,STRLEN
1591 004604  012737  177774  000310          MOV     #-4.,BLKINC
1592 004612  032737  000020  001112          BIT     #20,PARAM
1593 004620  001006                          BNE     W1
1594 004622  013737  000246  000266          MOV     MINLEN,STRLEN
1595 004630  012737  000004  000310          MOV     #4.,BLKINC
1596 004636  013737  000266  000352  W1:     MOV     STRLEN,WRTLEN
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1597 004644  032767  000040  001112          BIT    #40,PARAM     ;DOES RECORD LENGTH CH NGE?
1598 004652  001002                          BNE    NOINCR        ;YES
1599 004654  005067  000310                  CLR    BLKINC        ;NO
1600 004660  013767  000336  000340  NOINCR: MOV    RECORD,WRRECR
1601 004666  013777  000276  173322          MOV    COMAND,@MTC   ;SELECT UNIT                                    CR
1602 004674  105777  173316                  TSTB   @MTC                                                         CR
1603 004700  100375                          BPL    .-4           ;WAIT FOR CU READY                             CR
1604 004702  104442                          GENPT                ;GENERATE TEST PATTERN
1605 004704  005767  004004          W3:     TST    T5FLAG                                                       CR
1606 004710  001401                          BEQ    .+4
1607 004712  000207                          RTS    PC            ;EXIT WRITE ROUTINE IF TEST 5
1608 004714  005067  000306                  CLR    WRPASS
1609 004720  006077  173270          STRTOP: ROR    @MTS          ;WAIT FOR TU READY                             CR
1610 004724  103375                          BCC    .-4
1611 004726  013777  000352  173264  NONSTP: MOV    WRTLEN,@BC    ;SET BYTE COUNT
1612 004734  005477  173260                  NEG    @BC
1613 004740  013777  000250  173254          MOV    WBUF,@CA      ;SET CURRENT ADDRESS
1614 004746  052777  000004  173242          BIS    #4,@MTC       ;WRITE
1615 004754  004767  004532                  JSR    PC,GOWAIT     ;INTERRUPT ENABLE, GO, WAIT FOR DONE
1616                              ;RETURN HERE AFTER INTERRUPT
1617 004760  017767  173230  000312          MOV    @MTS,STATRD   ;SAVE STATUS
1618 004766  005777  173224                  TST    @MTC
1619 004772  100542                          BMI    ERROR         ;HAVE ERROR FLAG, CHEC  FOR EOT
1620 004774  005767  000306                  TST    WRPASS        ;WAS THIS A RECOVERY P SS
1621 005000  001410                          BEQ    TSTSTP        ;NO
1622 005002  013700  000306                  MOV    WRPASS,R0     ;YES
1623 005006  006300                          ASL    R0
1624 005010  062700  000314                  ADD    #WRCHEK,R0
1625 005014  005210                          INC    @R0           ;+1 TO APPROPRIATE REC VERY PASS COUNTER
1626 005016  005067  000306                  CLR    WRPASS
1627 005022  032767  000014  001112  TSTSTP: BIT    #14,PARAM     ;IS WRITE MODE NONSTOP
1628 005030  001003                          BNE    STOPOP        ;NO
1629 005032  005767  000306                  TST    WRPASS        ;YES
1630 005036  001353                          BNE    NONSTP
1631 005040  004767  005206                  JSR    PC,TESINC     ;CHANGE RECORD LENGTH
1632 005044  032767  000001  000356          BIT    #1,MODES      ;EXIT AFTER RLS?
1633 005052  001405                          BEQ    W10           ;NO
1634 005054  032767  000010  000356          BIT    #10,MODES     ;YES, ARE WE AT END OF RLS?
1635 005062  001761                          BEQ    NONSTP        ;NO
1636 005064  000207                          RTS    PC            ;YES
1637 005066  032767  000002  000356  W10:    BIT    #2,MODES      ;EXIT EVERY RECORD?
1638 005074  001714                          BEQ    NONSTP        ;NO
1639 005076  000207                          RTS    PC            ;YES
1640 005100  032767  000010  001112  STOPOP: BIT    #10,PARAM     ;IS WRITE MODE RANDOM?
1641 005106  001414                          BEQ    W11           ;NO
1642
1643
1644                              ;RANDOM STALL DELAY
1645 005110  004767  007126          RANSTP: JSR    PC,RANGEN
1646 005114  052767  177400  007256          BIS    #177400,RANDOM
1647 005122  012704  177470          RAN1:   MOV    #-200.,R4     ;DELAY 1 MILLISECOND
1648 005126  005204                          INC    R4
1649 005130  001376                          BNE    .-2
1650 005132  005267  007256                  INC    RANDOM
1651 005136  001371                          BNE    RAN1
1652 005140  005767  000306          W11:    TST    WRPASS
1653 005144  001265                          BNE    STRTOP
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1654 005146  004737  005206                    JSR     PC,TESINC
1655 005152  032737  000001  000356            BIT     #1,MODES        ;EXIT AFTER RLS?
1656 005160  001405                            BEQ     W12             ;NO
1657 005162  032737  000010  000356            BIT     #10,MODES       ;YES, ARE WE AT END OF RLS?
1658 005170  001633                            BEQ     STRTOP          ;NO
1659 005172  000207                            RTS     PC              ;YES
1660 005174  032737  000002  000356  W12:      BIT     #2,MODES        ;EXIT EVERY RECORD?
1661 005202  001646                            BEQ     STRTOP          ;NO
1662 005204  000207                            RTS     PC              ;YES
1663                                   ;SEE IF RECORD LENGTH SHOULD BE CHANGED
1664 005206  005237  000336            TESINC: INC     RECORD          ;+1 TO RECORD COUNT
1665 005212  042737  000010  000356            BIC     #10,MODES       ;NOT END OF RLS UNLESS SET BELOW
1666 005220  005737  000310                    TST     BLKINC
1667 005224  001416                            BEQ     TSINC2
1668 005226  063737  000310  000352            ADD     BLKINC,WRTLEN
1669 005234  023737  000352  000246            CMP     WRTLEN,MINLEN;RECORD LENGTH TOO SHO T?
1670 005242  002404                            BLT     RESETL          ;YES,RESET
1671 005244  023737  000352  000244            CMP     WRTLEN,MAXLEN;RECORD LENGTH TOO LON ?
1672 005252  003405                            BLE     TSINC2          ;NO
1673 005254  013737  000266  000352  RESETL: MOV     STRLEN,WRTLEN;YES, RESET
1674 005262  105737  000336            TSINC2: TSTB    RECORD
1675 005266  001003                            BNE     TSINC3          ;NO
1676 005270  052737  000010  000356            BIS     #10,MODES       ;INDICATE AT END OF RL
1677 005276  000207                    TSINC3: RTS     PC
1678                                   ;HAVE AN ERROR FLAG DURING WRITE OPERATION
1679                                   ;IF ERROR IS CAUSED BY END OF TAPE FLAG, DUMP WRIT  ERROR COUNTERS
1680                                   ;FOR ALL OTHER ERRORS:  PRINT COMMAND AND STATUS R GISTERS AND RECORD NUMBER
1681                                   ;IF READ PASS IS SELECTED, TRY TO RECOVER BY WRITI G WITH XIRG,
1682 005300  032737  175600  000312  ERROR:  BIT     #175600,STATRD;AT EOT?
1683 005306  001510                            BEQ     ENDTAP          ;YES
1684 005310  005737  000306                    TST     WRPASS
1685 005314  001002                            BNE     ERR1            ;FIRST ERROR?
1686 005316  005237  000314                    INC     WRCHEK          ;YES, +1 TO WRITE ERRO
1687 005322  032777  020000  172702  ERR1:   BIT     #20000,@SR      ;TYPE ALL ERRORS?
1688 005330  001010                            BNE     TESREC          ;NO
1689 005332  012702  012212                    MOV     #MSG7,R2
1690 005336  104404                            TOP                     ;PRINT 'WRITE STATUS E ROR'
1691 005340  013737  000352  000270            MOV     WRTLEN,LENGTH
1692 005346  004737  010756                    JSR     PC,PRTS         ;PRINT STATUS, COMMAND  RECORD, LENGTH
1693 005352  032777  000100  172652  TESREC: BIT     #100,@SR        ;RECOVER STATISTICALLY SELECTED?
1694 005360  001410                            BEQ     TESRC1          ;NO
1695 005362  005237  000306                    INC     WRPASS          ;+1 TO WRITE RECOVER
1696 005366  022737  000010  000306            CMP     #8.,WRPASS      ;HAVE WE TRIED TO WRIT  RECOVER 8 TIMES?
1697 005374  001040                            BNE     STREC1          ;NO
1698 005376  005237  000334                    INC     PERMBS          ;YES, +1 TO PERMANENT  ADSPOT?
1699 005402  032737  000004  000356  TESRC1: BIT     #4,MODES        ;IS READ PASS SELECTED
1700 005410  001402                            BEQ     .+6             ;NO
1701 005412  004737  010322                    JSR     PC,XRGREC
1702 005416  005037  000306                    CLR     WRPASS
1703 005422  032737  002000  000312            BIT     #2000,STATRD
1704 005430  001037                            BNE     ENDTAP
1705 005432  000137  005140                    JMP     W11
1706 005436  004737  010032            STREC1: JSR     PC,BACK1
1707 005442  004737  010032                    JSR     PC,BACK1        ;BACKSPACE 2 RECORDS
1708 005446  032777  000040  172540            BIT     #40,@MTS
1709 005454  001402                            BEQ     .+6
1710 005456  000137  004726                    JMP     STRTOP
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1711 005462  012777  177777  172530          MOV     #-1,@BC
1712 005470  013777  000276  172520          MOV     COMAND,@MTC
1713 005476  052777  000010  172512          BIS     #10,@MTC
1714 005504  004737  004532                  JSR     PC,GOWAIT       ;SPACE FORWARD 1 RECOR
1715 005510  042777  000016  172500          BIC     #16,@MTC
1716 005516  052777  000004  172472          BIS     #4,@MTC         ;CHANGE FROM SPACE TO  RITE
1717 005524  000137  004720                  JMP     STRTOP
1718                                 ;DRIVE IS AT EOT
1719 005530  005267  000336          ENDTAP: INC     RECORD
1720 005534  052737  000040  000356          BIS     #40,MODES       ;INDICATE DRIVE AT EOT
1721 005542  012702  013142          ENDT1:  MOV     #MSG24,R2
1722 005546  104404                          TOP
1723 005550  012702  012240                  MOV     #MSG8,R2
1724 005554  104404                          TOP
1725                                 ;DUMP WRITE ERRORS
1726 005556  004737  011020          WRTDMP: JSR     PC,PRTD         ;PRINT DRIVE, PATTERN, PARITY, DENSITY
1727 005562  013705  001112                  MOV     PARAM,R5                                        CR
1728 005566  042705  177763                  BIC     #177763,R5                                      CR
1729 005572  012702  012675                  MOV     #MSG14,R2
1730 005576  022705  000004                  CMP     #4,R5                                           CR
1731 005602  001002                          BNE     .+6
1732 005604  012702  012655                  MOV     #MSG12,R2
1733 005610  022705  000010                  CMP     #10,R5                                          CR
1734 005614  001002                          BNE     .+6
1735 005616  012702  012665                  MOV     #MSG13,R2
1736 005622  104404                          TOP                     ;PRINT WRITE MODE
1737 005624  013702  000336                  MOV     RECORD,R2
1738 005630  104426                          DECPRT                  ;PRINT RECORD NUMBER
1739 005632  013705  001112                  MOV     PARAM,R5                                        CR
1740 005636  042705  177717                  BIC     #177717,R5                                      CR
1741 005642  012702  012723                  MOV     #MSG17,R2
1742 005646  022705  000020                  CMP     #20,R5                                          CR
1743 005652  001002                          BNE     .+6
1744 005654  012702  012732                  MOV     #MSG18,R2
1745 005660  022705  000040                  CMP     #40,R5                                          CR
1746 005664  001002                          BNE     .+6
1747 005666  012702  012705                  MOV     #MSG15,R2
1748 005672  022705  000060                  CMP     #60,R5                                          CR
1749 005676  001002                          BNE     .+6
1750 005700  012702  012714                  MOV     #MSG16,R2
1751 005704  104404                          TOP                     ;PRINT RECORD LENGTH S QUENCE
1752 005706  012702  012741                  MOV     #MSG19,R2
1753 005712  104404                          TOP
1754 005714  013702  000314                  MOV     WRCHEK,R2
1755 005720  104426                          DECPRT                  ;PRINT "WRITE ERRORS="
1756 005722  012700  000316                  MOV     #WRCHEK+2,R0
1757 005726  112737  000060  013002          MOVB    #60,MSG20+17
1758 005734  105237  013002          WRTD1:  INCB    MSG20+17        ;PRINT STATISTICAL REC VERY
1759 005740  005710                          TST     @R0
1760 005742  001405                          BEQ     WRTD2
1761 005744  012702  012763                  MOV     #MSG20,R2
1762 005750  104404                          TOP
1763 005752  011002                          MOV     (0),R2
1764 005754  104426                          DECPRT                  ;RECOVERED AT X
1765 005756  005720          WRTD2:  TST     (0)+            ;JUST INCREMENTING
1766 005760  020027  000334                  CMP     R0,#WRCHEK+20
1767 005764  001363                          BNE     WRTD1
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1768 005766  005737  000334          TST     PERMBS
1769 005772  001001                  BNE     .+4             ;SKIP PRINT IF = 0
1770 005774  000207                  RTS     PC
1771 005776  012702  013005          MOV     #MSG20A,R2
1772 006002  104404                  TOP
1773 006004  013702  000334          MOV     PERMBS,R2       ;PRINT "PERMANENT BADS OT"
1774 006010  104406                  DECPRT
1775 006012  000207                  RTS     PC
1776                                 ;GENERATE 7 TRACK DATA PATTERN                                          CR
1777                                 ;ALL PATTERNS HAVE BITS 15,14,7,6 SET IN CASE CORE DUMP SELECTED
1778 006014  012737  000001  001146  GENP7:  MOV     #1,PGMODE       ;SET 7 TRACK PATTERN G N, MODE          CR
1779 006022  013702  000250          MOV     WBUF,R2                                                         CR
1780 006026  013703  001112          MOV     PARAM,R3
1781 006032  000303                  SWAB    R3
1782 006034  006303                  ASL     R3
1783 006036  042703  177741          BIC     #177741,R3
1784 006042  062703  006114          ADD     #PATPST,R3
1785 006046  012746  006054          MOV     #PATCK,-(SP)    ;PUSH STACK RETURN
1786 006052  011307                  MOV     @R3,PC          ;GO TO PAT GEN SUBROUT NE
1787                                 ;FINISHED PATTERN GENERATION
1788                                 ;IF CORE DUMP NOT SELECTED CLEAR BITS 15,14,7,6 IN ALL WORDS OF WRITE DATA BU FE
1789 006054  032737  000100  001112  PATCK:  BIT     #100,PARAM      ;IS CORE DUMP SET?
1790 006062  001404                  BEQ     PATEN           ;NO
1791 006064  032737  000200  001112          BIT     #200,PARAM      ;MAYBE, IS CORE DUMP S T?
1792 006072  001007                  BNE     PATEN2          ;YES
1793 006074  013702  000250          PATEN:  MOV     WBUF,R2         ;NO
1794 006100  042742  140300          PATEN1: BIC     #140300,(2)+    ;CLEAR BITS 15,14,7,6
1795 006104  023702  000252                  CMP     RBUF,R2         ;DONE ALL?
1796 006110  001373                  BNE     PATEN1          ;NO
1797 006112  000207                  PATEN2: RTS     PC
1798 006114  006154                  PATPST: PATE0
1799 006116  006162                          PAT00
1800 006120  006170                          PATE1
1801 006122  006204                          PAT01
1802 006124  006220                          PATE2
1803 006126  006246                          PAT02
1804 006130  006264                          PATE3
1805 006132  006242                          PAT03
1806 006134  006250                          PATE4
1807 006136  006730                          PAT4
1808 006140  006274                          PATE5
1809 006142  006322                          PAT05
1810 006144  006352                          PAT6
1811 006146  006352                          PATE
1812 006150  006360                          PATE7
1813 006152  007106                          PAT7
1814                                 ;PATTERN 0
1815                                 ;HIGH FREQUENCY OUTSIDE SKEW
1816 006154  012703  140701          PATE0:  MOV     #140701,R3      ;401
1817 006160  000513                  BR      PFIL1
1818                                 ;HALF FREQUENCY OUTSIDE SKEW
1819 006162  012703  140301          PAT00:  MOV     #140301,R3      ;1
1820 006166  000510                  BR      PFIL1
1821                                 ;PATTERN 1
1822                                 ;SLIDING 0
1823 006170  012703  006176          PATE1:  MOV     #PE1,R3
1824 006174  000512                  BR      PFIL3
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1825 006176  167737                    PE1:    167737                  ;27437
1826 006200  175767                            175767                  ;35467
1827 006202  177375                            177375                  ;37075
1828                                   ;SLIDING 1
1829 006204  012703  006212            PAT01:  MOV     #P01,R3
1830 006210  000504                            BR      PFIL3
1831 006212  150340                    P01:    150340                  ;10040
1832 006214  142310                            142310                  ;2010
1833 006216  140702                            140702                  ;402
1834                                   ;PATTERN 2
1835                                   ;HIGH FREQUENCY EVERY OTHER TRACK
1836 006220  012703  152725            PAT2:   MOV     #152725,R3      ;12425
1837 006224  000471                            BR      PFIL1
1838                                   ;HIGH FREQUENCY EVERY OTHER TRACK
1839 006226  012703  165352            PAT02:  MOV     #165352,R3      ;25052
1840 006232  000466                            BR      PFIL1
1841                                   ;PATTERN 3
1842                                   ;HALF FREQUENCY OUTSIDE TRACK, HIGH FREQUENCY INSI E TRACKS
1843 006234  012703  177377            PAT3:   MOV     #177377,R3      ;37077
1844 006240  000463                            BR      PFIL1
1845                                   ;HIGH FREQUENCY OUTSIDE TRACK, HALF FREQUENCY INSI E TRACKS
1846 006242  012703  177701            PAT03:  MOV     #177701,R3      ;37401
1847 006246  000460                            BR      PFIL1
1848                                   ;PATTERN 4
1849                                   ;INCREMENTING PATTERN (NO ALL 0'S)
1850 006250  012703  000301            PAT4:   MOV     #301,R3
1851 006254  110322                            MOVB    R3,(2)+
1852 006256  023702  000252                    CMP     RBUF,R2
1853 006262  001001                            BNE     .+4
1854 006264  000207                            RTS     PC
1855 006266  105203                            INCB    R3
1856 006270  001767                            BEQ     PAT4
1857 006272  000770                            BR      PAT4+4
1858                                           ;
1859                                           ;
1860                                   ;PATTERN 5
1861                                   ;THREE 3'S EACH TRACK EVERY 6TH WORD
1862 006274  012703  006302            PAT5:   MOV     #PE5,R3
1863 006300  000405                            BR      PFIL9
1864 006302  157437                    PE5:    157437                  ;17437
1865 006304  167737                            167737                  ;27437
1866 006306  167757                            167757                  ;27457
1867 006310  173767                            173767                  ;33467
1868 006312  171767                            171767                  ;31467
1869 006314  171773                            171773                  ;31473
1870 006316  176775                            176775                  ;37075
1871 006320  177376                            177376                  ;37076
1872                                   ;THREE 1'S EACH TRACK EVERY 6TH WORD
1873 006322  012703  006330            PAT05:  MOV     #P05,R3
1874 006326  000452                            BR      PFIL9
1875 006330  160340                    P05:    160340                  ;20040
1876 006332  150340                            150340                  ;10040
1877 006334  150320                            150320                  ;10020
1878 006336  144310                            144310                  ;4010
1879 006340  142310                            142310                  ;2010
1880 006342  142304                            142304                  ;2004
1881 006344  141302                            141302                  ;1002
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1882 006346  140702                          140702              ;402
1883 006350  140701                          140701              ;401
1884                                 ;PATTERN 6
1885                                 ;ALL 1'S ALL TRACKS
1886 006352  012703  177777           PAT6:   MOV     #-1,R3
1887 006356  000414                          BR      PFIL1
1888                                 ;PATTERN 7
1889                                 ;RANDOM (NONE ALL 0'S)
1890 006360  004737  007126           PAT7:   JSR     PC,RANGEN
1891 006364  132737  000077  007256           BITB    #77,RANDOM
1892 006372  001772                          BEQ     PAT7
1893 006374  113722  007256                   MOVB    RANDOM,(2)+
1894 006400  023702  000252                   CMP     RBUF,R2
1895 006404  001365                          BNE     PAT7
1896 006406  000207                          RTS     PC
1897                                 ;FILL WRITE BUFFER WITH CONSTANT PATTERN
1898 006410  010322                 PFIL1:  MOV     R3,(2)+
1899 006412  023702  000252                   CMP     RBUF,R2
1900 006416  001374                          BNE     PFIL1
1901 006420  000207                          RTS     PC
1902                                 ;FILL WRITE BUFFER WITH 3 WORD PATTERN
1903 006422  010304                 PFIL3:  MOV     R3,R4
1904 006424  062704  000006                   ADD     #6,R4
1905 006430  012322                 PFIL3A: MOV     (3)+,(2)+
1906 006432  023702  000252                   CMP     RBUF,R2
1907 006436  001001                          BNE     .+4
1908 006440  000207                          RTS     PC
1909 006442  020304                          CMP     R3,R4
1910 006444  001002                          BNE     .+6
1911 006446  162703  000006                   SUB     #6,R3
1912 006452  000766                          BR      PFIL3A
1913                                 ;FILL WRITE BUFFER WITH 9 WORD PATTERN
1914 006454  010304                 PFIL9:  MOV     R3,R4
1915 006456  062704  000022                   ADD     #22,R4
1916 006462  012322                 PFIL9A: MOV     (3)+,(2)+
1917 006464  023702  000252                   CMP     RBUF,R2
1918 006470  001001                          BNE     .+4
1919 006472  000207                          RTS     PC
1920 006474  020304                          CMP     R3,R4
1921 006476  001002                          BNE     .+6
1922 006500  162703  000022                   SUB     #22,R3
1923 006504  000766                          BR      PFIL9A
1924                                 ;GENERATE 9 TRACK DATA PATTERN                                          CR
1925 006506  012737  000002  001146 GENP9:  MOV     #2,PGMODE      ;SET 9 TRACK PATTERN G N, MODE           CR
1926 006514  013702  000250                   MOV     WBUF,R2        ;INITIALIZE BUFFER                       CR
1927 006520  013703  001112                   MOV     PARAM,R3       ;CHECK PARAMETERS FOR  ATTERN SELECTED   CR
1928 006524  000303                          SWAB    R3
1929 006526  042703  177761                   BIC     #177761,R3
1930 006532  062703  006540                   ADD     #PATPNT,R3
1931 006536  011307                          MOV     @R3,PC
1932 006540  006560                 PATPNT: PAT0
1933 006542  006574                         PAT1
1934 006544  006644                         PAT2
1935 006546  006660                         PAT3
1936 006550  006730                         PAT4
1937 006552  006756                         PAT5
1938 006554  007072                         PAT69
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1939 006556  007106                    PAT7
1940                                   ;PATTERN 0                                                CR
1941                                   ;HALF FREQUENCEY OUTSIDE SKEW                             CR
1942 006560  012722  002012            PAT0:   MOV     #2012,(2)+    ;(010)(004)                 CR
1943 006564  023702  000252                    CMP     RBUF,R2                                   CR
1944 006570  001373                            BNE     PAT0                                      CR
1945 006572  000207                            RTS     PC                                        CR
1946                                   ;PATTERN 1                                                CR
1947                                   ;SLIDING 1 BIT (ISOLATED BIT)                             CR
1948 006574  012700  006622            PAT1:   MOV     #P1T,R0                                   CR
1949 006600  012022            PAT1A:  MOV     (0)+,(2)+                                         CR
1950 006602  023702  000252                    CMP     RBUF,R2                                   CR
1951 006606  001001                            BNE     .+4                                       CR
1952 006610  000207                            RTS     PC                                        CR
1953 006612  022700  006644                    CMP     #PAT2,R0                                  CR
1954 006616  001370                            BNE     PAT1A                                     CR
1955 006620  000765                            BR      PAT1                                      CR
1956 006622  100000            P1T:    100000                                                   CR
1957 006624  020100                            20100                                             CR
1958 006626  004020                            4020                                              CR
1959 006630  001004                            1004                                              CR
1960 006632  000001                            1                                                 CR
1961 006634  040200                            40200                                             CR
1962 006636  010040                            10040                                             CR
1963 006640  002010                            2010                                              CR
1964 006642  000402                            402                                               CR
1965                                   ;PATTERN 2                                                CR
1966                                   ;HIGH FREQUENCY EVERY OTHER TRACK                         CR
1967 006644  012722  136274            PAT2:   MOV     #136274,(2)+  ;(274)(274)                 CR
1968 006650  023702  000252                    CMP     RBUF,R2                                   CR
1969 006654  001373                            BNE     PAT2                                      CR
1970 006656  000207                            RTS     PC                                        CR
1971                                   ;PATTERN 3                                                CR
1972                                   ;THREE 0'S, THREE 1'S, THREE 0'S:                         CR
1973 006660  012700  006706            PAT3:   MOV     #P3T,R0                                   CR
1974 006664  012022            PAT3A:  MOV     (0)+,(2)+                                         CR
1975 006666  023702  000252                    CMP     RBUF,R2                                   CR
1976 006672  001001                            BNE     .+4                                       CR
1977 006674  000207                            RTS     PC                                        CR
1978 006676  022700  006730                    CMP     #PAT4,R0                                  CR
1979 006702  001370                            BNE     PAT3A                                     CR
1980 006704  000765                            BR      PAT3                                      CR
1981 006706  140037            P3T:    140037                                                   CR
1982 006710  100476                            100476                                            CR
1983 006712  001574                            1574                                              CR
1984 006714  003770                            3770                                              CR
1985 006716  017760                            17760                                             CR
1986 006720  037300                            37300                                             CR
1987 006722  076201                            76201                                             CR
1988 006724  174003                            174003                                            CR
1989 006726  170007                            170007                                            CR
1990                                   ;PATTERN 4                                                CR
1991                                   ;INCREMENTING PATTERN (0-377)                             CR
1992 006730  105037  006754            PAT4:   CLRB    P4A                                       CR
1993 006734  113722  006754            P4:     MOVB    P4A,(2)+                                  CR
1994 006740  105237  006754                    INCB    P4A                                       CR
1995 006744  023702  000252                    CMP     RBUF,R2                                   CR
```

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1996 006750  001371                    BNE     P4                              CR
1997 006752  000207                    RTS     PC                              CR
1998 006754  000000              P4A:  0                                       CR
1999                             ;PATTERN 5                                    CR
2000                             ;EACH TRACK 3 BITS                            CR
2001 006756  012700  007004      PAT5:  MOV     #P5T,R0                         CR
2002 006762  012022              PAT5A: MOV     (0)+,(2)+                       CR
2003 006764  023702  000252              CMP     RBUF,R2                         CR
2004 006770  001001                      BNE     .+4                             CR
2005 006772  000207                      RTS     PC                              CR
2006 006774  022700  007072              CMP     #PAT69,R0                       CR
2007 007000  001370                      BNE     PAT5A                           CR
2008 007002  000765                      BR      PAT5                            CR
2009 007004  000000              P5T:  0                                       CR
2010 007006  100000                    100000                                  CR
2011 007010  100200                    100200                                  CR
2012 007012  040100                    40100                                   CR
2013 007014  020100                    20100                                   CR
2014 007016  020040                    20040                                   CR
2015 007020  010020                    10020                                   CR
2016 007022  004020                    4020                                    CR
2017 007024  004010                    4010                                    CR
2018 007026  002004                    2004                                    CR
2019 007030  001004                    1004                                    CR
2020 007032  001002                    1002                                    CR
2021 007034  000401                    401                                     CR
2022 007036  000001                    1                                       CR
2023 007040  000000                    0                                       CR
2024 007042  100200                    100200                                  CR
2025 007044  040200                    40200                                   CR
2026 007046  040100                    40100                                   CR
2027 007050  020040                    20040                                   CR
2028 007052  010040                    10040                                   CR
2029 007054  010020                    10020                                   CR
2030 007056  004010                    4010                                    CR
2031 007060  002010                    2010                                    CR
2032 007062  002004                    2004                                    CR
2033 007064  001002                    1002                                    CR
2034 007066  000402                    402                                     CR
2035 007070  000401                    401                                     CR
2036                             ;PATTERN 6                                    CR
2037                             ;HIGH FREQUENCY ALL TRACKS
2038 007072  012742  177777      PAT69: MOV     #-1,(2)+                        CR
2039 007076  023702  000252              CMP     RBUF,R2                         CR
2040 007102  001375                      BNE     PAT69                           CR
2041 007104  000207                      RTS     PC                              CR
2042                             ;PATTERN 7                                    CR
2043                             ;RANDOM                                       CR
2044 007106  004737  007126      PAT7:  JSR     PC,RANGEN                       CR
2045 007112  013742  007256              MOV     RANDOM,(2)+                     CR
2046 007116  023702  000252              CMP     RBUF,R2                         CR
2047 007122  001371                      BNE     PAT7                            CR
2048 007124  000207                      RTS     PC                              CR
2049
2050                             ;RANDOM NUMBER GENERATOR
2051                             ;EXIT WITH RANDOM NUMBER IN LOCATION NAMED "RANDOM
2052 007126  010046              RANGEN: MOV    R0,-(SP)        ;SAVE REGISTERS CR
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2053 007130 010146                      MOV     R1,-(SP)                                        CR
2054 007132 010246                      MOV     R2,-(SP)                                        CR
2055 007134 010346                      MOV     R3,-(SP)                                        CR
2056 007136 013700 007260               MOV     LONUM,R0        ;SET UP LOW DIGIT
2057 007142 013701 007262               MOV     HINUM,R1        ;SET UP HIGH DIGIT
2058 007146 012703 000007               MOV     #7,R3           ;SET UP SHIFT COUNT
2059 007152 005002                      CLR     R2
2060 007154 006300              RANG1:  ASL     R0              ;SHIFT R0 LEFT AND
2061 007156 006101                      ROL     R1              ;ROTATE CARRY INTO LSB OF R1 AND
2062 007160 006102                      ROL     R2              ;ROTATE CARRY OUT OF R  INTO R2
2063 007162 005303                      DEC     R3              ;DECREMENT R3
2064 007164 001373                      BNE     RANG1           ;CONTINUE SHIFT LOOP
2065 007166 063700 007260               ADD     LONUM,R0        ;ADD NUMBER TO MAKE X1 5
2066 007172 005501                      ADC     R1              ;PROPAGATE CARRY
2067 007174 063701 007262               ADD     HINUM,R1        ;ADD NUMBER TO MAKE X  29
2068 007200 005502                      ADC     R2              ;PROPAGATE CARRY
2069 007202 062700 001057               ADD     #1057,R0        ;ADD LOW CONSTANT
2070 007206 005501                      ADC     R1              ;PROPAGATE CARRY
2071 007210 005502                      ADC     R2              ;PROPAGATE CARRY
2072 007212 062701 047401               ADD     #47401,R1       ;ADD HIGH CONSTANT
2073 007216 005502                      ADC     R2              ;PROPAGATE CARRY
2074 007220 062702 000006               ADD     #6,R2           ;ADD HIGH CONSTANT
2075 007224 060200                      ADD     R2,R0           ;RE-PRIME R0 WITH HIGH DIGIT
2076 007226 005501                      ADC     R1              ;PROPAGATE CARRY
2077 007230 010037 007256               MOV     R0,RANDOM       ;SAVE RANDOM NUMBER
2078 007234 010037 007260               MOV     R0,LONUM        ;PUT R0 BACK IN LONUM
2079 007240 010137 007262               MOV     R1,HINUM        ;PUT R1 BACK IN HINUM
2080 007244 012603                      MOV     (SP)+,R3        ;RESTORE REGISTERS                  CR
2081 007246 012602                      MOV     (SP)+,R2                                        CR
2082 007250 012601                      MOV     (SP)+,R1                                        CR
2083 007252 012600                      MOV     (SP)+,R0                                        CR
2084 007254 000207                      RTS     PC              ;EXIT
2085                                    ;
2086 007256 000000              RANDOM: 0
2087 007260 000000              LONUM:  0
2088 007262 000000              HINUM:  0
2089                                    ;READ RECORD SECTION
2090 007264 005737 000336               READI:  TST     RECORD          ;FIRST RECORD?
2091 007270 001005                      BNE     DOLLR1          ;NO
2092 007272 013737 000266 000354        MOV     STRLEN,READLN   ;SET INITIAL READ LENG H
2093 007300 012737 177775 000304 DOLLR1: MOV    #-3,ROPASS      ;INITIALIZE READ PASS  OUNTER
2094 007306 013777 000276 170702 RDSTPD: MOV    COMAND,@MTC
2095 007314 105777 170676               TSTB    @MTC
2096 007320 100375                      BPL     .-4             ;WAIT FOR CONTROL UNIT READY
2097 007322 006077 170666               ROR     @MTS
2098 007326 103375                      BCC     .-4             ;WAIT FOR TAPE UNIT RE DY
2099 007330 013700 000252               READGO: MOV     RBUF,R0
2100 007334 013701 000354                       MOV     READLN,R1
2101 007340 105020              RG1:    CLRB    (0)+            ;CLEAR READ BUFFER
2102 007342 005301                      DEC     R1
2103 007344 001375                      BNE     RG1
2104 007346 013777 000354 170644        MOV     READLN,@BC      ;SET BYTE COUNT
2105 007354 005477 170640               NEG     @BC
2106 007360 013777 000252 170634        MOV     RBUF,@CA        ;SET CURRENT ADDRESS
2107 007366 013777 000276 170622        MOV     COMAND,@MTC
2108 007374 104442                      GENPT                   ;GENERATE TEST PATTERN
2109 007376 052777 000002 170612        BIS     #2,@MTC
```

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2110 007404  004737  004532                JSR     PC,GOWAIT
2111
2112                                    ;RETURN HERE AFTER INTERRUPT
2113 007410  017737  170600  000312        MOV     @MTS,STATRD
2114 007416  005777  170574                TST     @MTC            ;ANY STATUS ERRORS
2115 007422  100504                        BMI     RDERRO          ;YES
2116
2117                                    ;CHECK FOR DATA ERRORS
2118 007424  013700  000252                MOV     RBUF,R0
2119 007430  013701  000250                MOV     WBUF,R1
2120 007434  013702  000354                MOV     READLN,R2
2121 007440  022021                DOLLR5: CMP     (0)+,(1)+       ;CHECK FOR PROPER DATA TRANSFER
2122 007442  001045                        BNE     DATERR          ;HAVE DATA ERROR
2123 007444  162702  000002                SUB     #2,R2           ;CHECKED ALL TRANSFERS
2124 007450  001375                        BNE     DOLLR5          ;NO
2125 007452  032737  000003  001112  RTSSTP: BIT    #3,PARAM
2126 007460  001007                        BNE     RDSTPC
2127 007462  004737  007762                JSR     PC,RDINCR       ;INCREMENT FOR NEXT BL CK
2128 007466  023737  000336  000342        CMP     RECORD,LASRCR
2129 007474  001315                        BNE     READGO
2130 007476  000207                        RTS     PC              ;EXIT READIT
2131 007500  032737  000002  001112  RDSTPC: BIT    #2,PARAM        ;IS READ MODE RANDOM?
2132 007506  001414                        BEQ     RDSTP           ;NO
2133 007510  004737  007126          RNDRDS: JSR    PC,RANGEN
2134 007514  052737  177400  007256        BIS     #177400,RANDOM
2135 007522  012704  177470          RNDS1:  MOV    #-200.,R4       ;DELAY 1 MILLISECOND
2136 007526  005204                        INC     R4
2137 007530  001376                        BNE     .-2
2138 007532  005237  007256                INC     RANDOM
2139 007536  001371                        BNE     RNDS1
2140 007540  004737  007762          RDSTP:  JSR    PC,RDINCR
2141 007544  023737  000336  000342        CMP     RECORD,LASRCR   ;DONE LAST RECORD?
2142 007552  001255                        BNE     RDSTPD          ;NO
2143 007554  000207                        RTS     PC              ;YES EXIT
2144                                    ;HAVE DATA ERROR
2145 007556  032777  020000  170446  DATERR: BIT    #20000,@SR      ;TYPE ALL READ ERRORS?
2146 007564  001014                        BNE     DATER1          ;NO.
2147 007566  012702  012373                MOV     #MSG9A,R2
2148 007572  104404                        TOP                     ;PRINT 'READ DATA ERRO '
2149 007574  013737  000354  000270        MOV     READLN,LENGTH
2150 007602  004737  010756                JSR     PC,PRTS
2151 007606  014102                        MOV     -(1),R2         ;PRINT EXPECTED DATA
2152 007610  104412                        OCTPRT
2153 007612  014002                        MOV     -(0),R2
2154 007614  104412                        OCTPRT                  ;PRINT ACTUAL DATA
2155 007616  022737  177775  000304  DATER1: CMP    #-3,RDPASS
2156 007624  001002                        BNE     .+6
2157 007626  005237  000346                INC     DAERRS          ;+1 TO DATA ERRORS
2158 007632  000426                        BR      RTSR1
2159                                    ;STATUS INDICATES AN ERROR, CHECK FOR EOT
2160 007634  032737  175600  000312  RDERRO: BIT    #175600,STATRD;IS ERROR LEGITIMATE  R EOT?
2161 007642  001515                        BEQ     RNDTAP          ;HAVE EOT
2162 007644  032777  020000  170360        BIT     #20000,@SR      ;TYPE ALL READ ERRORS?
2163 007652  001010                        BNE     RTSREC          ;NO
2164 007654  012702  012346                MOV     #MSG9,R2
2165 007660  104404                        TOP                     ;PRINT 'READ STATUS ER OR'
2166 007662  013737  000354  000270        MOV     READLN,LENGTH
```

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2167 007670  004737  010756                    JSR     PC,PRTS
2168                                    ;+1 TO RDEERS IF FIRST ERROR PASS
2169 007674  022737  177775  000304  RTSREC:   CMP     #-3,RDPASS
2170 007702  001002                            BNE     .+6
2171 007704  005237  000344                    INC     RDERRS          ;+1 TO STATUS ERRORS
2172 007710  032777  000020  170314  RTSR1:    BIT     #20,@SR         ;DELETE READ RETRYS (S  4)?
2173 007716  001011                            BNE     RPASS3          ;YES
2174 007720  005237  000304                    INC     RDPASS          ;DONE ALL RE-READS?
2175 007724  001404                            BEQ     RPASS1          ;YES
2176 007726  004737  010032                    JSR     PC,BACK1        ;NO, BACKSPACE TAPE
2177 007732  000137  007306                    JMP     RDSTPD          ;GO AGAIN
2178 007736  005237  000350  RPASS1:  INC     NRREAD          ;+1 TO NONRECOVERABLE  EAD
2179 007742  012737  177775  000304  RPASS3:  MOV     #-3,RDPASS
2180 007750  032737  002000  000312            BIT     #2000,STATRD    ;A  EOT?
2181 007756  001004                            BNE     RNDTP1          ;YES, TYPE "EOT"
2182 007760  000667                            BR      RDSTP
2183                                    ;SET UP POINTERS FOR NEXT RECORD
2184 007762  005237  000336  RDINCR:  INC     RECORD
2185 007766  005737  000310                    TST     BLKINC
2186 007772  001416                            BEQ     RESTR1
2187                                    ;RECORD LENGTH IS CHANGING, COUNT IT
2188 007774  063737  000310  000354            ADD     BLKINC,READLN
2189 010002  023737  000354  000246            CMP     READLN,MINLEN   ;IS LENGTH LESS THAN M NIMUM
2190 010010  002404                            BLT     RESTRL          ;NO
2191 010012  023737  000354  000244            CMP     READLN,MAXLEN   ;IS LENGTH GREATER THA  MAXIMUM?
2192 010020  003403                            BLE     RESTR1          ;NO
2193 010022  013737  000266  000354  RESTRL:  MOV     STRLEN,READLN   ;RESET INITIAL LENGTH
2194 010030  000207  RESTR1:  RTS     PC
2195                                    ;BACKSPACE ONE RECORD
2196 010032  006077  170156  BACK1:   ROR     @MTS
2197 010036  103375                            BCC     .-4             ;WAIT FOR TAPE UNIT RE DY
2198 010040  012777  177777  170152            MOV     #-1,@BC         ;COUNT 1 RECORD
2199 010046  013777  000276  170142            MOV     COMAND,@MTC     ;SELECT DRIVE
2200 010054  052777  000012  170134            BIS     #12,@MTC        ;ISSUE BACKSPACE
2201 010062  004737  004532                    JSR     PC,GOWAIT
2202 010066  042777  000016  170122            BIC     #16,@MTC
2203 010074  000207                            RTS     PC
2204                                    ;DRIVE HAS REACHED EOT IN READ MODE
2205 010076  004737  007762  RNDTAP:  JSR     PC,RDINCR
2206 010102  052737  000020  000356            BIS     #20,MODES       ;INDICATE AT EOT
2207 010110  012702  013205  RNDTP1:  MOV     #MSG25,R2
2208 010114  104404                            TOP
2209 010116  012702  012240                    MOV     #MSG8,R2
2210 010122  104404                            TOP
2211                                    ;DUMP ERROR COUNTERS
2212 010124  004737  011020  READMP:  JSR     PC,PRTD         ;PRINT DRIVE, PATTERN, PARITY, DENSITY
2213 010130  013705  001112                    MOV     PARAM,R5                                        CR
2214 010134  042705  177774                    BIC     #177774,R5                                      CR
2215 010140  012702  012675                    MOV     #MSG14,R2
2216 010144  022705  000001                    CMP     #1,R5                                           CR
2217 010150  001002                            BNE     .+6
2218 010152  012702  012655                    MOV     #MSG12,R2
2219 010156  022705  000002                    CMP     #2,R5                                           CR
2220 010162  001002                            BNE     .+6
2221 010164  012702  012665                    MOV     #MSG13,R2
2222 010170  104404                            TOP                     ;PRINT READ MODE
2223 010172  013702  000336                    MOV     RECORD,R2
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2224 010176  104426                        DECPRT              ;PRINT RECORD NUMBER
2225 010200  013705  001112                MOV    PARAM,R5                                    CR
2226 010204  042705  177717                BIC    #177717,R5                                  CR
2227 010210  012702  012723                MOV    #MSG17,R2
2228 010214  022705  000020                CMP    #20,R5                                      CR
2229 010220  001002                        BNE    .+6
2230 010222  012702  012732                MOV    #MSG18,R2
2231 010226  022705  000040                CMP    #40,R5                                      CR
2232 010232  001002                        BNE    .+6
2233 010234  012702  012705                MOV    #MSG15,R2
2234 010240  022705  000060                CMP    #60,R5                                      CR
2235 010244  001002                        BNE    .+6
2236 010246  012702  012714                MOV    #MSG16,R2
2237 010252  104404                        TOP                ;PRINT RECORD LENGTH S QUENCE
2238 010254  012702  013035                MOV    #MSG21,R2
2239 010260  104404                        TOP
2240 010262  013702  000344                MOV    RDERRS,R2
2241 010266  104426                        DECPRT
2242 010270  012702  013065                MOV    #MSG22,R2
2243 010274  104404                        TOP
2244 010276  013702  000346                MOV    DAERRS,R2
2245 010302  104426                        DECPRT
2246 010304  012702  013106                MOV    #MSG23,R2
2247 010310  104404                        TOP
2248 010312  013702  000350                MOV    NRREAD,R2
2249 010316  104426                        DECPRT
2250 010320  000207                        RTS    PC
2251                                ;WRITE RECOVERY UTILIZING EXTENDED INTERRECORD GAP
2252                                ;USED AFTER EVERY 7 REWRITES OR AFTER
2253                                ;EACH WRITE ERROR IF STATISTICAL RECOVERY NOT SELE TED
2254                                ;USED ONLY IF READ PASS SELECTED
2255 010322  012737  177774  000306 XRGREC: MOV    #-4,WRPASS    ;COUNT 4 REWRITES
2256 010330  032777  000040  167674 XRG0:  BIT    #40,@SR       ;DELETE WRITE XIRG  (S  5)
2257 010336  001036                        BNE    XRGRCD        ;YES
2258 010340  004737  010032                JSR    PC,BACK1
2259 010344  105777  167646                TSTB   @MTC
2260 010350  100375                        BPL    .-4
2261 010352  013777  000276  167636        MOV    COMAND,@MTC
2262 010360  052777  000014  167630        BIS    #14,@MTC      ;WRITE XIRG
2263 010366  013777  000352  167624        MOV    WRTLEN,@BC    ;SET BYTE COUNT
2264 010374  005477  167620                NEG    @BC
2265 010400  013777  000250  167614        MOV    WBUF,@CA      ;SET CURRENT ADDRESS
2266 010406  006077  167602                ROR    @MTS          ;WAIT FOR TU READY
2267 010412  103375                        BCC    .-4
2268 010414  004737  004532                JSR    PC,GOWAIT
2269                                ;RETURN HERE AFTER INTERRUPT
2270 010420  017737  167570  000312        MOV    @MTS,STATRD   ;SAVE STATUS
2271 010426  005777  167564                TST    @MTC
2272 010432  100405                        BMI    XRG5          ;HAVE ERROR FLAG, CHEC  FOR EOT
2273 010434  005037  000306        XRGRCD: CLR    WRPASS
2274 010440  000207                        RTS    PC            ;EXIT WRITE XIRG
2275 010442  032737  175600  000312 XRG5:  BIT    #175600,STATRD
2276 010450  001771                        BEQ    XRGRCD        ;ONLY EOT, EXIT
2277 010452  005237  000306                INC    WRPASS        ;DONE 4 XIRG
2278 010456  001324                        BNE    XRG0
2279                                ;PRINT STATUS AFTER 4 XIRG ERRORS
2280 010460  012702  012212                MOV    #MSG7,R2
```

```
2281 010464  104404                        TOP                 ;PRINT WRITE STATUS ER OR
2282 010466  013767  000352  000270        MOV     WRTLEN,LENGTH
2283 010474  004767  010756                JSR     PC,PRTS     ;PRINT STATUS, COMMAND  RECORD, LENGTH
2284 010500  012702  012627                MOV     #MSG11,R2
2285 010504  104404                        TOP                 ;PRINT "XIRG WRITTEN 4 TIMES"
2286 010506  032767  002000  000312        BIT     #2000,STATRD
2287 010514  001702                        BEQ     XRGREC
2288 010516  042777  000016  167472        BIC     #16,@MTC
2289 010524  052777  000003  167464        BIS     #3,@MTC     ;WRITE AN EOF
2290 010532  004767  004532                JSR     PC,GOWAIT
2291 010536  000207                       RTS     PC
2292                                ;GO BACKWARD ON TAPE X RECORDS
2293 010540  013767  000336  000342  GOBKWD: MOV    RECORD,LASRCR
2294 010546  013767  000340  000336        MOV     WRRECR,RECORD
2295 010554  001003                        BNE     GOB1        ;IS NEW RECORD=0
2296 010556  004767  004342                JSR     PC,REWIND   ;YES, REWIND
2297 010562  000207                       RTS     PC          ;EXIT
2298 010564  013777  000342  167426  GOB1:   MOV    LASRCR,@BC  ;SET BYTE COUNT TO DIF ERENCE
2299 010572  163777  000340  167420        SUB     WRRECR,@BC  ;BETWEEN LASRCR AND WR ECK
2300 010600  005477  167414                NEG     @BC
2301                                ;THE FOLLOWING CODE INSURES THAT BACKSPACE REQUEST  IN PHASE ENCODED     CR
2302                                ; MODE ARE PROCESSED FIRST IN THE SITUATION WHERE  RZ AND PE MODES ARE   CR
2303                                ; BOTH SELECTED FOR TESTS ON A DUAL DENSITY UNIT                         CR
2304 010604  013702  000300                MOV     CDRVBT,R2   ;GET CURRENT UNIT NO.                       CR
2305 010610  132767  000004  000277        BITB    #4,COMAND+1 ;IS CURRENT UNIT NO. 4  5, 6, OR 7?         CR
2306 010616  001007                        BNE     GOB2        ; YES                                       CR
2307 010620  004767  010716                JSR     PC,TSTUP4   ;IS UNIT NO, PLUS 4 AL O SELECTED?          CR
2308 010624  000412                        BR      GOB3        ; NO - PROCEED WITHOUT CHANGE               CR
2309 010626  152767  000004  000277        BISB    #4,COMAND+1 ; YES - ADD 4 TO COMAN  UNIT NO.            CR
2310 010634  000406                        BR      GOB3                                                    CR
2311 010636  004767  010730        GOB2:   JSR     PC,TSTUM4   ;IS UNIT NO, MINUS 4 A SO SELECTED?         CR
2312 010642  000403                        BR      GOB3        ; NO - PROCEED WITHOUT CHANGE               CR
2313 010644  142767  000004  000277        BICB    #4,COMAND+1 ; YES - SUBTRACT 4 FRO  COMAND UNIT NO,     CR
2314 010652  013777  000276  167336  GOB3:   MOV    COMAND,@MTC                                             CR
2315 010660  105777  167332                TSTB    @MTC        ;WAIT FOR CU READY
2316 010664  100375                        BPL     .-4
2317 010666  006077  167322                ROR     @MTS        ;WAIT FOR TU READY
2318 010672  103375                        BCC     .-4
2319 010674  042777  000016  167314        BIC     #16,@MTC
2320 010702  052777  000012  167306        BIS     #12,@MTC
2321 010710  004767  004532                JSR     PC,GOWAIT
2322 010714  000207                       RTS     PC
2323                                ;TSTUP4 & TSTUM4 TEST FOR SIMULTANEOUS SELECTION O  A DUAL DENSITY      CR
2324
2325
2326                                ; UNIT, SUCH AS UNIT NOS. 0 & 4, 1 & 5, ETC.                            CR
2327                                ; IF THIS CONDITION EXISTS, CONTROL RETURNS TO CAL  LOC. + 4.           CR
2328                                ; OTHERWISE RETURN IS TO CALL LOC. + 2.                                 CR
2329 010716  006202        TSTUP4: ASR     R2          ;UNIT NO. IN RANGE 0-3                              CR
2330 010720  006202                ASR     R2                                                              CR
2331 010722  006202                ASR     R2                                                              CR
2332 010724  006202                ASR     R2                                                              CR
2333 010726  000404                BR      TSTPM                                                           CR
2334 010730  006302        TSTUM4: ASL     R2          ;UNIT NO. IN RANGE 4-7                              CR
2335 010732  006302                ASL     R2                                                              CR
2336 010734  006302                ASL     R2                                                              CR
2337 010736  006302                ASL     R2                                                              CR
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2338 010740  030267  000272          TSTPM:  BIT     R2,MSBITS       ;DOES SIMULTANEOUS SEL CTION EXIST?      CR
2339 010744  001001                          BNE     SETSTK          ; YES - ALTER RETURN                     CR
2340 010746  000207                          RTS     PC              ; NO                                     CR
2341 010750  062716  000002          SETSTK: ADD     #2,@SP                                                   CR
2342 010754  000207                          RTS     PC                                                       CR
2343                                 ;PRINT COMMAND, STATUS, RECORD NUMBER, LENGTH
2344
2345                                 ;
2346 010756  012702  012416          PRTS:   MOV     #MSG9B,R2
2347 010762  104404                          TOP
2348 010764  017702  167226                  MOV     @MTC,R2
2349 010770  104412                          OCTPRT
2350 010772  013702  000312                  MOV     STATRD,R2
2351 010776  104412                          OCTPRT
2352 011000  013702  000336                  MOV     RECORD,R2
2353 011004  005202                          INC     R2
2354 011006  104426                          DECPRT
2355 011010  013702  000270                  MOV     LENGTH,R2
2356 011014  104426                          DECPRT
2357 011016  000207                          RTS     PC
2358                                 ;PRINT DRIVE, PATTERN, PARITY, DENSITY
2359 011020  012705  000240          PRTD:   MOV     #240,R5                                                  CR
2360 011024  104434                          PRC                     ;PRINT SPACE                             CR
2361 011026  013705  000276                  MOV     COMAND,R5                                                CR
2362 011032  000305                          SWAB    R5                                                       CR
2363 011034  142705  000170                  BICB    #170,R5                                                  CR
2364 011040  052705  000260                  BIS     #260,R5                                                  CR
2365 011044  104434                          PRC                     ;PRINT DRIVE NUMBER                      CR
2366 011046  104430                          SP3
2367 011050  013705  001112                  MOV     PARAM,R5                                                 CR
2368 011054  000305                          SWAB    R5                                                       CR
2369 011056  006005                          ROR     R5                                                       CR
2370 011060  042705  000170                  BIC     #170,R5                                                  CR
2371 011064  052705  000260                  BIS     #260,R5                                                  CR
2372 011070  104434                          PRC                     ;PRINT PATTERN NUMBER                    CR
2373 011072  104430                          SP3
2374 011074  013777  000276  167114          MOV     COMAND,@MTC     ;SELECT UNIT                             CR
2375 011102  105777  167110                  TSTB    @MTC                                                     CR
2376 011106  100375                          BPL     .-4             ;WAIT FOR CU READY                       CR
2377 011110  032777  000020  167076          BIT     #20,@MTS        ;IS UNIT 7 TRACK?                        CR
2378 011116  001005                          BNE     PRTD1           ; YES                                    CR
2379 011120  012702  013315                  MOV     #MSG31,R2       ;9 TRACK UNIT - POSITI N PAST P & D       CR
2380 011124  104404                          TOP                                                              CR
2381 011126  104430                          SP3                                                              CR
2382 011130  000207                          RTS     PC                                                       CR
2383 011132  013705  001112          PRTD1:  MOV     PARAM,R5                                                 CR
2384 011136  000305                          SWAB    R5                                                       CR
2385 011140  042705  000176                  BIC     #176,R5                                                  CR
2386 011144  052705  000260                  BIS     #260,R5                                                  CR
2387 011150  104434                          PRC                     ;PRINT PARITY                            CR
2388 011152  013705  001112                  MOV     PARAM,R5                                                 CR
2389 011156  042705  177477                  BIC     #177477,R5                                               CR
2390 011162  012702  013250                  MOV     #MSG26,R2
2391 011166  022705  000100                  CMP     #100,R5                                                  CR
2392 011172  001002                          BNE     .+6
2393 011174  012702  013260                  MOV     #MSG27,R2
2394 011200  022705  000200                  CMP     #200,R5                                                  CR
```

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2395 011204  001002                    BNE     .+6
2396 011206  012702  013270            MOV     #MSG28,R2
2397 011212  022705  000300            CMP     #300,R5                                  CR
2398 011216  001002                    BNE     .+6
2399 011220  012702  013300            MOV     #MSG29,R2
2400 011224  104404                    TOP
2401 011226  000207                    RTS     PC
2402                             ;PRINT OCTAL VALUE IN REGISTER 2
2403 011230  012705  000060    OCTPR:  MOV     #'0,R5          ;INITIALIZE 1ST NUMBER AS 0   CR
2404 011234  005702                    TST     R2              ;IS VALUE POSITIVE
2405 011236  100002                    BPL     OCT1            ;YES PRINT 0
2406 011240  012705  000061            MOV     #'1,R5          ;NO PRINT 1                   CR
2407 011244  104434            OCT1:   PRC                                              CR
2408 011246  006102                    ROL     R2
2409 011250  006102                    ROL     R2
2410 011252  012737  177773  011320    MOV     #-5,OCT         ;COUNT 5 DIGITS
2411 011260  006102            OCT2:   ROL     R2
2412 011262  006102                    ROL     R2
2413 011264  006102                    ROL     R2
2414 011266  010205                    MOV     R2,R5           ;SAVE DIGIT                   CR
2415 011270  042705  177770            BIC     #177770,R5      ;CLEAR OTHER BITS             CR
2416 011274  052705  000060            BIS     #60,R5          ;MAKE ASCII DIGIT             CR
2417 011300  006002                    ROR     R2
2418 011302  104434                    PRC                     ;PRINT                        CR
2419 011304  006102                    ROL     R2
2420 011306  005237  011320            INC     OCT             ;+1 TO DIGIT COUNT
2421 011312  001362                    BNE     OCT2            ;NOT DONE
2422 011314  104430                    SP3
2423 011316  000207                    RTS     PC              ;EXIT
2424 011320  000000    OCT:    0
2425 011322  105777  166712    OCTP:   TSTB    @TPS
2426 011326  100375                    BPL     .-4             ;WAIT FOR READY
2427 011330  010577  166706            MOV     R5,@TPB         ;PRINT                        CR
2428 011334  000207                    RTS     PC
2429                             ;PRINT DECIMAL VALUE IN REGISTER 2
2430 011336  012737  177773  011506  DECPR:  MOV     #-5,DIGCNT
2431 011344  012737  011514  011512            MOV     #DECPNT+2,DECPNT
2432 011352  012737  000040  011510            MOV     #40,ZERO
2433 011360  012737  177777  011504  TYPT1:  MOV     #-1,DIGIT
2434 011366  005237  011504  TYPT2:  INC     DIGIT
2435 011372  167702  000114                    SUB     @DECPNT,R2
2436 011376  100375                    BPL     TYPT2
2437 011400  067702  000106                    ADD     @DECPNT,R2
2438 011404  004737  011432                    JSR     PC,DECOUT
2439 011410  005237  011506                    INC     DIGCNT
2440 011414  001002                    BNE     TYPT3
2441 011416  104430                    SP3
2442 011420  000207                    RTS     PC
2443 011422  062737  000002  011512  TYPT3:  ADD     #2,DECPNT
2444 011430  000753                    BR      TYPT1
2445 011432  005737  011504  DECOUT: TST     DIGIT
2446 011436  001010                    BNE     DEC1
2447 011440  022737  177777  011506            CMP     #-1,DIGCNT
2448 011446  001404                    BEQ     DEC1
2449 011450  013737  011510  011504            MOV     ZERO,DIGIT
2450 011456  000406                    BR      DEC2
2451 011460  012737  000060  011510  DEC1:   MOV     #60,ZERO
```

```
2452 011466  052767  000060  011504          BIS     #60,DIGIT
2453 011474  013705  011504          DEC2:   MOV     DIGIT,R5                                        CR
2454 011500  104434                          PRC                                                     CR
2455 011502  000207                          RTS     PC
2456 011504  000000                  DIGIT:  0
2457 011506  000000                  DIGCNT: 0
2458 011510  000040                  ZERO:   40
2459 011512  011514                  DECPNT: .+2
2460 011514  023420                          10000.
2461 011516  001750                          1000.
2462 011520  000144                          100.
2463 011522  000012                          10.
2464 011524  000001                          1.
2465                                 ;KEYBOARD INPUT
2466 011526  105777  166502          WAITK:  TSTB    @TKS            ;WAIT FOR KEY
2467 011532  100375                          BPL     .-4
2468 011534  105777  166500                  TSTB    @TPS            ;WAIT FOR TELEPRINTER  EADY
2469 011540  100375                          BPL     .-4
2470 011542  117777  166470  166472          MOVB    @TKB,@TPB       ;ECHO CHARACTER
2471 011550  117703  166462                  MOVB    @TKB,R3         ;SAVE IT                        CR
2472 011554  042703  000200                  BIC     #200,R3                                         CR
2473 011560  000207                          RTS     PC              ;EXIT
2474                                 ;TYPE 3 SPACES
2475 011562  012702  011572          SP3X:   MOV     #SP3A,R2
2476 011566  104404                          TOP
2477 011570  000207                          RTS     PC
2478 011572    057     040     040  SP3A:   .ASCII  /   /
     011575    040     057
2479                                         .EVEN
2480                                 ;TELETYPE OUTPUT PACKAGE
2481 011600  142777  000177  166432  TO:     BICB    #177,@TPS       ;CLEAR TELETYPE FLAGS
2482 011606  112237  011664                  MOVB    (2)+,EOMK       ;SAVE MESSAGE DELIMETE
2483 011612  121237  011664          TOP1:   CMPB    @R2,EOMK        ;IS CHARACTER THE SECO D MESSAGE DELIMITER?
2484 011616  001001                          BNE     .+4             ;NO
2485 011620  000207                          RTS     PC              ;YES, EXIT
2486 011622  121227  000100                  CMPB    @R2,#'@         ;IS CHARACTER AN @ WHI H INDICATES A CARRIAGE RET
2487 011626  001406                          BEQ     TOP2            ;YES
2488 011630  105777  166404                  TSTB    @TPS            ;NO, WAIT FOR TELETYPE READY
2489 011634  100375                          BPL     .-4
2490 011636  112277  166400                  MOVB    (2)+,@TPB       ;PRINT CHARACTER
2491 011642  000765                          BR      TOP1
2492                                 ;CARRIAGE RETURN, LINE FEED
2493 011644  012705  000215          TOP2:   MOV     #215,R5                                         CR
2494 011650  104434                          PRC                     ;CR                             CR
2495 011652  012705  000212                  MOV     #212,R5                                         CR
2496 011656  104434                          PRC                     ;LF                             CR
2497 011660  105202                          INCB    R2
2498 011662  000753                          BR      TOP1
2499 011664  000000                  EOMK:   0
2500 011666  012737  000004  000246  SET4K:  MOV     #4,MINLEN       ;SET RECORD LENGTHS AN          CR
2501 011674  012737  002000  000244          MOV     #1024.,MAXLEN   ;BUFFER AREAS FOR 4K            CR
2502 011702  012737  015324  000252          MOV     #BUFFER+1024.,RBUF                              CR
2503 011710  000207                          RTS     PC                                              CR
2504 011712  012737  000010  000246  SET8K:  MOV     #8.,MINLEN      ;SET RECORD LENGTHS AN          CR
2505 011720  012737  004000  000244          MOV     #2048.,MAXLEN   ;BUFFER AREAS FOR 8K            CR
2506 011726  012737  017324  000252          MOV     #BUFFER+2048.,RBUF                              CR
2507 011734  000207                          RTS     PC                                              CR
```

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2508                                    ;PATERN GENERATION CONTROL
2509 011736  005037  007260             GENP:   CLR     LONUM           ;RESET RANDOM NUMBER G NERATOR
2510 011742  005037  007262                     CLR     HINUM
2511 011746  032777  000020  166240             BIT     #20,@MTS        ;IS UNIT 7 TRACK?                       CR
2512 011754  001406                             BEQ     G1              ; NO                                    CR
2513 011756  022737  000001  001146             CMP     #1,PGMODE       ;IS A 7 TRACK PATTERN  VAILABLE?        CR
2514 011764  001407                             BEQ     G2              ; YES                                   CR
2515 011766  104416                             GENPT7                  ; NO - GENERATE IT                      CR
2516 011770  000207                             RTS     PC
2517 011772  022737  000002  001146     G1:     CMP     #2,PGMODE       ;IS A 9 TRACK PATTERN_ VAILABLE?        CR
2518 012000  001401                             BEQ     G2              ; YES                                   CR
2519 012002  104432                             GENPT9                  ; NO - GENERATE IT                      CR
2520 012004  000207                     G2:     RTS     PC
2521                                    ;TRAP HANDLER
2522 012006  011646  000002             TRAP34: MOV     @SP,2(6)
2523 012012  162716  000002                     SUB     #2,@SP
2524 012016  013646                             MOV     @(6)+,-(6)
2525 012020  062716  105426                     ADD     #TABLE-104400,@SP
2526 012024  013607                             MOV     @(6)+,PC
2527 012026  011546                     TABLE:  WAITK
2528 012030  004570                             WRITI
2529 012032  011600                             TO
2530 012034  004010                             SVCTR
2531 012036  004124                             RSFDR
2532 012040  011230                             OCTPR
2533 012042  004026                             MVCTR
2534 012044  006014                             GENP7                                                           CR
2535 012046  004070                             CLRAL
2536 012050  004304                             CHGDR
2537 012052  007264                             READI
2538 012054  011336                             DECPR
2539 012056  011562                             SP3X
2540 012060  006506                             GENP9                                                           CR
2541 012062  011542                             OCTP                                                            CR
2542 012064  011606                             SET4K                                                           CR
2543 012066  011712                             SET8K                                                           CR
2544 012070  011736                             GENP
2545                 104400             WAITKY=104400
2546                 104402             WRITIT=104402
2547                 104404             TOP=104404
2548                 104406             SVCTRS=104406
2549                 104410             RSFDRV=104410
2550                 104412             OCTPRT=104412
2551                 104414             MVCTRS=104414
2552                 104416             GENPT7=104416                                                           CR
2553                 104420             CLRALL=104420
2554                 104422             CHGDRV=104422
2555                 104424             READIT=104424
2556                 104426             DECPRT=104426
2557                 104430             SP3=104430
2558                 104432             GENPT9=104432                                                           CR
2559                 104434             PRC=104434                                                              CR
2560                 104436             SETM4K=104436                                                           CR
2561                 104440             SETM8K=104440                                                           CR
2562                 104442             GENPT=104442
2563                                    ;TEXT MESSAGES
2564 012072      057     077     100     MSG0:   .ASCII          /?@ /;
```

```
                012075  040     057
2565            012077  057     100     123     MSG1:   .ASCII          !/@SELECT UNITS  /!
                012102  105     114     105
                012105  103     124     040
                012110  125     116     111
                012113  124     123     040
                012116  040     057
2566            012120  057     100     124     MSG2:   .ASCII          !/@TST PAT PAR DEN RLS WMO RMO@ /!
                012123  125     124     040
                012126  120     101     124
                012131  040     120     101
                012134  122     040     104
                012137  105     116     040
                012142  122     114     123
                012145  040     127     115
                012150  117     040     122
                012153  115     117     100
                012156  040     057
2567            012160  057     115     101     MSG5:   .ASCII          !/MAX TESTS SELECTED@/
                012163  130     040     124
                012166  105     123     124
                012171  123     040     123
                012174  105     114     105
                012177  105     124     105
                012202  104     100     057
2568            012205  057     040     117     MSG6:   .ASCII          !/ OK/!
                012210  113     057
2569            012212  057     100     127     MSG7:   .ASCII          !/@WRITE STATUS ERROR@ !
                012215  122     111     124
                012220  105     040     123
                012223  124     101     124
                012226  125     123     040
                012231  105     122     122
                012234  117     122     100
                012237  057
2570            012240  057     105     116     MSG8:   .ASCII          !/END OF TAPE********* **********@!
                012243  104     040     117
                012246  106     040     124
                012251  101     120     105
                012254  052     052     052
                012257  052     052     052
                012262  052     052     052
                012265  052     052     052
                012270  052     052     052
                012273  052     052     052
                012276  052     052     100
2571            012301  104     122     126             .ASCII          !DRV PAT PAR DEN  MODE RECORD LENGTH@/!     CR
                012304  040     120     101
                012307  124     040     120
                012312  101     122     040
                012315  104     105     116
                012320  040     040     115
                012323  117     104     105
                012326  040     122     105
                012331  103     117     122
                012334  104     040     114
                012337  105     116     107
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                012342  124     110     100
                012345  057
     2572       012346  057     100     122  MSG9:   .ASCII                 !/@READ STATUS ERROR@/
                012351  105     101     104
                012354  040     123     124
                012357  101     124     125
                012362  123     040     105
                012365  122     122     117
                012370  122     100     057
     2573       012373  057     100     122  MSG9A:  .ASCII                 !/@READ DATA ERROR@/!
                012376  105     101     104
                012401  040     104     101
                012404  124     101     040
                012407  105     122     122
                012412  117     122     100
                012415  057
     2574       012416  057     103     117  MSG9B:  .ASCII  !/COMD     STATUS   RECORD   LENGT  EXPECTED ACTUAL@/!
                012421  115     104     040
                012424  040     040     040
                012427  040     123     124
                012432  101     124     125
                012435  123     040     040
                012440  040     122     105
                012443  103     117     122
                012446  104     040     040
                012451  040     114     105
                012454  116     107     124
                012457  110     040     105
                012462  120     120     105
                012465  105     124     105
                012470  104     040     101
                012473  103     124     125
                012476  101     114     100
                012501  057
     2575       012502  057     100     104  MSG10A: .ASCII !/@        PDP11 7-9 TRK REL.!
                012505  101     124     125
                012510  115     040     120
                012513  104     120     061
                012516  061     040     067
                012521  055     071     040
                012524  124     122     113
                012527  040     122     105
                012532  114     056
     2576       012534  100     122     105          .ASCII !@RECORD LIMITS IN BYTES!
                012537  103     117     122
                012542  104     040     114
                012545  111     115     111
                012550  124     123     040
                012553  111     116     040
                012556  102     131     124
                012561  105     123
     2577       012563  100     115     111          .ASCII !@MINLEN  MAXLEN@/!
                012566  116     114     105
                012571  116     040     040
                012574  115     101     130
                012577  114     105     116
                012602  100     057
```

```
2578 012604  057  100  105  MSG10B: .ASCII !/@EXERCISING UNITS/!
     012607  130  105  122
     012612  105  111  123
     012615  111  116  107
     012620  040  125  116
     012623  111  124  123
     012626  057
2579 012627  057  130  111  MSG11: .ASCII              !/XIRG WRITTEN 4 TIMES !
     012632  122  107  040
     012635  127  122  111
     012640  124  124  105
     012643  116  040  064
     012646  040  124  111
     012651  115  105  123
     012654  057
2580 012655  057  040  123  MSG12: .ASCII              !/ SSTP /!
     012660  124  124  120
     012663  040  057
2581 012665  057  040  122  MSG13: .ASCII              !/ RNDM /!
     012670  116  104  115
     012673  040  057
2582 012675  057  040  116  MSG14: .ASCII              !/ NSTP /!
     012700  123  124  120
     012703  040  057
2583 012705  057  115  055  MSG15: .ASCII              !/M-MAX/!
     012710  115  101  130
     012713  057
2584 012714  057  115  055  MSG16: .ASCII              !/M-MIN/!
     012717  115  111  116
     012722  057
2585 012723  057  115  111  MSG17: .ASCII              !/MIN  /!
     012726  116  040  040
     012731  057
2586 012732  057  115  101  MSG18: .ASCII              !/MAX  /!
     012735  130  040  040
     012740  057
2587 012741  057  100  127  MSG19: .ASCII              !/@WRITE ERRORS = /!
     012744  122  111  124
     012747  105  040  105
     012752  122  122  117
     012755  122  123  040
     012760  075  040  057
2588 012763  057  100  122  MSG20: .ASCII              !/@RECOVERED AT 0 /!
     012766  105  103  117
     012771  126  105  122
     012774  105  104  040
     012777  101  124  040
     013002  060  040  057
2589 013005  057  100  120  MSG20A: .ASCII             !/@PERMANENT BADSPOTS   /!
     013010  105  122  115
     013013  101  116  105
     013016  116  124  040
     013021  102  101  104
     013024  123  120  117
     013027  124  123  040
     013032  075  040  057
2590 013035  057  100  122  MSG21: .ASCII              !/@READ STATUS ERRORS   /!
```

```
                013040  105     101     104
                013043  040     123     124
                013046  101     124     125
                013051  123     040     105
                013054  122     122     117
                013057  122     123     040
                013062  075     040     057
     2591       013065  057     100     104     MSG22:  .ASCII          !/@DATA ERRORS = /!
                013070  101     124     101
                013073  040     105     122
                013076  122     117     122
                013101  123     040     075
                013104  040     057
     2592       013106  057     100     116     MSG23:  .ASCII          !/@NON RECOVERABLE ERR RS = /!
                013111  117     116     040
                013114  122     105     103
                013117  117     126     105
                013122  122     101     102
                013125  114     105     040
                013130  105     122     122
                013133  117     122     123
                013136  040     075     040
                013141  057
     2593       013142  057     100     052     MSG24:  .ASCII          !/@******************** WRITE PASS  /!
                013145  052     052     052
                013150  052     052     052
                013153  052     052     052
                013156  052     052     052
                013161  052     052     052
                013164  052     052     052
                013167  052     127     122
                013172  111     124     105
                013175  040     120     101
                013200  123     123     040
                013203  040     057
     2594       013205  057     100     052     MSG25:  .ASCII          !/@******************** READ PASS   /!
                013210  052     052     052
                013213  052     052     052
                013216  052     052     052
                013221  052     052     052
                013224  052     052     052
                013227  052     052     052
                013232  052     122     105
                013235  101     104     040
                013240  120     101     123
                013243  123     040     040
                013246  040     057
     2595       013250  057     040     040     MSG26:  .ASCII          !/   200/!
                013253  040     062     060
                013256  060     057
     2596       013260  057     040     040     MSG27:  .ASCII          !/   556/!
                013263  040     065     065
                013266  066     057
     2597       013270  057     040     040     MSG28:  .ASCII          !/   800/!
                013273  040     070     060
                013276  060     057
     2598       013300  057     040     040     MSG29:  .ASCII          !/   CD /!
```

```
                013303      040     103     104
                013306      040     057
          2599  013310      057     100     100   MSG30:  .ASCII              !/@@@/!
                013313      100     057
          2600  013315      057     130     040   MSG31:  .ASCII              !/X   X/!                                  CR
                013320      040     040     130
                013323      057
          2601
          2602  013324  013324                    BUFFER: .EVEN
          2603  .       000001.                            .       ;WRITE BUFFER BEGINS HERE
                                                             .END
```

SYMBOL TABLE

ALLEOS	004422	ALLEOT	004400	ALL1	004402
ALL2	004504	ALL3	004500	ATST	000256
AUTOST	001152	BACK1	010052	BC	000220
BLKINC	000310	BUFFER	013324	CA	000222
CC	000230	CDMEND	004474	CDRIVE	000302
CDRVBT	000300	CHGDR	004304	CHGDRV=	104422
CHG1	004330	CLRAL	004070	CLRALL=	104420
CLRTBL	004506	CLRT1	004512	CLR1	004072
COMAND	000276	CTRDEX	004044	CTRDMP	004442
CTRD1	004470	DAERRS	000346	DATERR	007556
DATER1	007616	DECOUT	011432	DECPNT	011512
DECPR	011336	DECPRT=	104426	DEC1	011460
DEC2	011474	DET7T	002120	DET7T1	002132
DET7T2	002150	DET7T3	002164	DIGCNT	011506
DIGIT	011504	DOAGN	002774	DOLLR1	007300
DOLLR5	007440	DONE	002704	DONE1	002746
DRVADR	000360	DRVSEL	000264	D0TAB	000450
D1TAB	000514	D2TAB	000560	D3TAB	000624
D4TAB	000670	D5TAB	000734	D6TAB	001000
D7TAB	001044	ENDADR	002764	ENDTAP	005530
ENDT1	005542	EOMK	011664	ERROR	005300
ERR1	005322	EXEC	002614	EXECUT	002602
EXEC1	002622	GENP	011736	GENPT =	104442
GENPT7=	104416	GENPT9=	104432	GENP7	006014
GENP9	006506	GOBKWD	010540	GOB1	010564
GOB2	010636	GOB3	010652	GOWAIT	004532
GW1	004566	G1	011772	G2	012004
HINUM	007262	IDSELF	001410	LASRCH	000342
LENGTH	000270	LONUM	007260	LOOPER	001476
MAXLEN	000244	MEM4K	001552	MEM8K	001556
MINLEN	000246	MODES	000356	MSBITS	000272
MSG0	012072	MSG1	012077	MSG10A	012502
MSG10B	012604	MSG11	012627	MSG12	012655
MSG13	012665	MSG14	012675	MSG15	012705
MSG16	012714	MSG17	012723	MSG18	012732
MSG19	012741	MSG2	012120	MSG20	012763
MSG20A	013005	MSG21	013035	MSG22	013065
MSG23	013106	MSG24	013142	MSG25	013205
MSG26	013250	MSG27	013260	MSG28	013270
MSG29	013300	MSG30	013310	MSG31	013315
MSG5	012160	MSG6	012205	MSG7	012212
MSG8	012240	MSG9	012346	MSG9A	012373
MSG9B	012416	MTC	000216	MTS	000214
MTV	000254	MVCTR	004026	MVCTRS=	104414
MW1	004032	NOINCR	004660	NONSTP	004726
NO.SEL	001376	NRREAD	000350	NUMTST	001110
NXMRLT	001244	NXT.TU	001316	OCT	011320
OCTP	011322	OCTPR	011230	OCTPRT=	104412
OCT1	011244	OCT2	011260	OVER4K	001252
PARAM	001112	PATCK	006054	PATEN	006074
PATEN1	006100	PATEN2	006112	PATE0	006154
PATE1	006170	PATE2	006220	PATE3	006234
PATE4	006250	PATE5	006274	PATE7	006360
PAT00	006162	PAT01	006204	PAT02	006226
PAT03	006242	PAT05	006322	PATPNT	006540
PATPST	006114	PAT0	006560	PAT1	006574
PAT1A	006600	PAT2	006644	PAT3	006660

SYMBOL TABLE

PAT3A	006664	PAT4	006730	PAT5	006756
PAT5A	006762	PAT6	006352	PAT69	007072
PAT7	007106	PERMBS	000334	PE1	006176
PE5	006302	PFIL1	006410	PFIL3	006422
PFIL3A	006430	PFIL9	006454	PFIL9A	006462
PGMODE	001146	PO1	006212	PO5	006330
PRC =	104434	PRTD	011020	PRTD1	011132
PRTS	010756	P1T	006622	P3T	006706
P4	006734	P4A	006754	P5T	007004
RANDOM	007256	RANGEN	007126	RANG1	007154
RANSTP	005110	RAN1	005122	RBUF	000252
RDERRO	007634	RDERRS	000344	RDINCR	007762
RDPASS	000304	RDSTP	007540	RDSTPC	007500
RDSTPD	007306	READGO	007330	READI	007264
READIT=	104424	READLN	000354	READMP	010124
RECORD	000336	RESETL	005254	RESTRL	010022
RESTR1	010030	REWIND	004342	RG1	007340
RNDRDS	007510	RNDS1	007522	RNDTAP	010076
RNDTP1	010110	RPASS1	007736	RPASS3	007742
RSFDR	004124	RSFDRV=	104410	RSF1	004136
RSF2	004162	RSF3	004232	RTSREC	007674
RTSR1	007710	RTSSTP	007452	SELDN1	002264
SELDN2	002300	SELDN3	002312	SELDRV	001622
SELD1	001652	SELD2	001666	SELOK1	002574
SELPAT	002034	SELPR	002236	SELPRO	002214
SELRM1	002460	SELRM2	002476	SELR1	002340
SELR2	002354	SELR3	002366	SELTST	001750
SELT1	001766	SELT2	002010	SELT3	002024
SELW1	002414	SELW15	002426	SELW2	002432
SETM4K=	104436	SETM8K=	104440	SETSTR	010750
SET4K	011666	SET8K	011712	SP3 =	104430
SP3A	011572	SP3X	011562	SR	000232
STACK =	000450	START	001560	START1	001564
STATRD	000312	STFLGS	001150	STOPOP	005100
STREC1	005436	STRLEN	000266	STRTOP	004720
SVCTR	004010	SVCTRS=	104406	SVC1	004014
SVRECR	000274	TABLE	012026	TESINC	005206
TESRC1	005402	TESREC	005352	TEST	001116
TEST0	003004	TEST1	003052	TEST2	003062
TEST3	003176	TEST4	003206	TEST5	003526
TKB	000236	TKS	000234	TO	011600
TOP =	104404	TOP1	011612	TOP2	011644
TPB	000242	TPS	000240	TRAP34	012006
TSINC2	005262	TSINC3	005276	TSTEX	001114
TSTPM	010740	TSTSTP	005022	TSTTBL	001120
TSTUM4	010730	TSTUP4	010716	TU.SEL	001254
TYPT1	011360	TYPT2	011366	TYPT3	011422
T0	003014	T0A	003016	T0B	003034
T01ENT	003012	T2	003072	T2A	003074
T2B	003112	T2C	003116	T2D	003136
T2E	003142	T2F	003156	T23ENT	003070
T4	003240	T4A	003242	T4B	003244
T4C	003270	T4D	003272	T4E	003324
T4F	003340	T4G	003356	T4H	003360
T4J	003376	T4K	003404	T4L	003406
T4M	003460	T4N	003472	T4P	003476
T5	003536	T5A	003562	T5B	003574

SYMBOL TABLE

```
T5C     003604          T5D     003634          T5E     003642
T5F     003704          T5FLAG  004004          T5G     003716
T5H     003734          T5INC   004006          T5J     003736
T5K     003756          USSTST  001330          USS,OK  001346
USS10   001372          VALID   001676          VAL1    001710
VAL2    001720          VAL3    001734          VAL4    001740
WAITK   011526          WAITKY= 104400          WBUF    000250
WRCHEK  000314          WRITI   004570          WRITIT= 104402
WRPASS  000306          WRRECR  000340          WRTDMP  005556
WRTD1   005734          WRTD2   005756          WRTLEN  000352
W1      004636          W10     005066          W11     005140
W12     005174          W3      004704          XRGRCD  010434
XRGREC  010322          XRG0    010330          XRG5    010442
ZERO    011510          ZEROOO  001516
. ABS.  013326      000
        000000      001
ERRORS DETECTED:  0
FREE CORE:  10314. WORDS
P468,P468/CRF<P468
```

CROSS REFERENCE TABLE S-1

```
ALLEOS  1-1551   1-1555#
ALLEOT  1-1306   1-1340   1-1411   1-1452   1-1464   1-1548#
ALL1    1-1549#  1-1553
ALL2    1-1556   1-1558   1-1571#
ALL3    1-1554   1-1570#
ATST    1- 906#  1- 983@  1-1068@  1-1081
AUTOST  1- 885   1- 982#
BACK1   1-1706   1-1707   1-2176   1-2196#  1-2258
BC      1- 890#  1-1011@  1-1612@  1-1711@  1-2104@  1-2105@  1-2198@
        1-2263@  1-2264@  1-2298@  1-2299@  1-2300@
BLKINC  1- 919#  1-1591@  1-1595@  1-1599@  1-1666   1-1668   1-2185
        1-2188
BUFFER  1- 902   1- 903   1- 992   1-1040@  1-1041   1-1059   1-2502
        1-2506   1-2602#
CA      1- 891#  1-1613@  1-2106@  1-2265@
CC      1- 894#  1-1580@  1-1584@
COMEND  1-1566   1-1568#
CORIVE  1- 916#  1-1494   1-1485   1-1499@  1-1503@  1-1507   1-1528@
CORVBT  1- 915#  1-1500@  1-1501   1-1505@  1-1509   1-1530@  1-1535
        1-2304
CHGDR   1-1528#  1-1536   1-2536
CHGDRV  1-1304   1-1324   1-1331   1-1338   1-1362   1-1373   1-1380
        1-1388   1-1404   1-1409   1-1436   1-1450   1-1460   1-1493
        1-1552   1-1568   1-2554#
CHG1    1-1531   1-1535#
CLRAL   1-1489#  1-2535
CLRALL  1-1297   1-1317   1-1357   1-1420   1-2553#
CLRTBL  1-1491   1-1573#
CLRT1   1-1574#  1-1576
CLR1    1-1490#  1-1494
COMAND  1- 914#  1-1507@  1-1508@  1-1511@  1-1514@  1-1518@  1-1521@
        1-1524@  1-1541   1-1601   1-1712   1-2094   1-2107   1-2199
        1-2261   1-2305   1-2309@  1-2313@  1-2314   1-2361   1-2374
CTRDEX  1-1470   1-1476   1-1482#
CTRDMP  1-1560#  1-1569
CTRD1   1-1563   1-1567#
DAERRS  1- 934#  1-2157@  1-2244#
```

CROSS REFERENCE TABLE S-2

CROSS REFERENCE TABLE S-3

CROSS REFERENCE TABLE S-4

CROSS REFERENCE TABLE S-5

```
PFIL9     1-1863   1-1874   1-1914#
PFIL9A    1-1916#  1-1923
PGMODE    1- 980#  1-1259@  1-1770@  1-1925@  1-2513   1-2517
P01       1-1829   1-1831#
P05       1-1873   1-1875#
PRC       1-1089   1-1105   1-2360   1-2365   1-2372   1-2387   1-2407
          1-2418   1-2454   1-2494   1-2496   1-2559#
PRTD      1-1726   1-2612   1-2359#
PRTD1     1-2378   1-2383#
PRTS      1-1692   1-2150   1-2167   1-2283   1-2346#
P1T       1-1948   1-1956#
P3T       1-1973   1-1981#
P4        1-1993#  1-1996
P4A       1-1992@  1-1993   1-1994@  1-1998#
P5T       1-2001   1-2009#
RANDOM    1-1646@  1-1650@  1-1891   1-1893   1-2045   1-2077@  1-2086#
          1-2134@  1-2138@
RANGEN    1-1645   1-1650   1-2044   1-2052#  1-2133
RANG1     1-2060#  1-2064
RANSTP    1-1645#
RAN1      1-1647#  1-1651
RBUF      1- 903#  1-1795   1-1852   1-1894   1-1899   1-1906   1-1917
          1-1943   1-1950   1-1968   1-1975   1-1995   1-2003   1-2039
          1-2046   1-2099   1-2106   1-2118   1-2502@  1-2506@
RDERRO    1-2115   1-2160#
RDERRS    1- 933#  1-2171@  1-2240
RDINCR    1-2127   1-2140   1-2184#  1-2205
RDPASS    1- 917#  1-2093@  1-2155   1-2159   1-2174@  1-2179@
RDSTP     1-2132   1-2140#  1-2182
RDSTPC    1-2126   1-2151#
RDSTPD    1-2094#  1-2142   1-2177
READGO    1-2099#  1-2129
READI     1-2090#  1-2097
READIT    1-1336   1-1401   1-1447   1-2555#
READLN    1- 937#  1-2092@  1-2100   1-2104   1-2120   1-2149   1-2166
          1-2188@  1-2189   1-2191   1-2193@
READMP    1-2212#
RECORD    1- 930#  1-1360   1-1394   1-1399   1-1407   1-1426   1-1427@
          1-1433   1-1445   1-1457   1-1588   1-1600   1-1664@  1-1674
          1-1719@  1-1757   1-2090   1-2128   1-2141   1-2184@  1-2223
          1-2293   1-2294@  1-2352
RESETL    1-1670   1-1673#
RESTRL    1-2190   1-2193#
RESTR1    1-2186   1-2192   1-2194#
REWIND    1-1490   1-1539#  1-2296
RG1       1-2101#  1-2103
RNDRDS    1-2133#
RNDS1     1-2155#  1-2159
RNDTAP    1-2161   1-2205#
RNDTP1    1-1567   1-2191   1-2207#
RPASS1    1-2175   1-2178#
RPASS3    1-2173   1-2179#
RSFDR     1-1499#  1-2051
RSFDRV    1-1298   1-1518   1-1358   1-1365   1-1382   1-1390   1-1429
          1-1438   1-1455   1-1489   1-1532   1-1548   1-1560   1-2549#
RSF1      1-1501#  1-1506
RSF2      1-1502   1-1507#  1-1537
RSF3      1-1510   1-1516#
```

CROSS REFERENCE TABLE S-6

```
RTSREC  1-2163   1-2169#
RTSR1   1-2158   1-2172#
RTSSTP  1-2125#
R0      1- 868#  1-1007@  1-1021   1-1022   1-1025@  1-1042@  1-1049
        1-1054@  1-1055   1-1094@  1-1097@  1-1099   1-1101   1-1103
        1-1111@  1-1157   1-1257@  1-1258@  1-1260   1-1262   1-1264
        1-1266   1-1268   1-1277@  1-1278@  1-1279   1-1472   1-1478
        1-1482@  1-1573@  1-1575   1-1622@  1-1623@  1-1624@  1-1625@
        1-1756@  1-1759   1-1766   1-1948@  1-1953   1-1973@  1-1978
        1-2001@  1-2006   1-2052   1-2056@  1-2060@  1-2065@  1-2069@
        1-2075@  1-2077   1-2078   1-2083@  1-2099@  1-2118@
R1      1- 869#  1-1041@  1-1045@  1-1046@  1-1049@  1-1050@  1-1051@
        1-1057@  1-1058@  1-1483@  1-1484@  1-1465@  1-1486@  1-2053
        1-2057@  1-2061@  1-2066@  1-2067@  1-2070@  1-2072@  1-2076@
        1-2079   1-2082@  1-2100@  1-2102@  1-2119@
R2      1- 870#  1-1011@  1-1014@  1-1028@  1-1030@  1-1032@  1-1038@
        1-1043@  1-1047   1-1053@  1-1059@  1-1072@  1-1108@  1-1122@
        1-1149@  1-1152@  1-1164@  1-1234@  1-1251@  1-1273@  1-1285@
        1-1689@  1-1721@  1-1723@  1-1729@  1-1742@  1-1735@  1-1737@
        1-1741@  1-1744@  1-1747@  1-1750@  1-1752@  1-1754@  1-1761@
        1-1763@  1-1771@  1-1773@  1-1779@  1-1793@  1-1795   1-1852
        1-1894   1-1899   1-1906   1-1917   1-1926@  1-1943   1-1950
        1-1968   1-1975   1-1995   1-2003   1-2039   1-2046   1-2054
        1-2059@  1-2062@  1-2068@  1-2071@  1-2073@  1-2074@  1-2075
        1-2081@  1-2120@  1-2123@  1-2147@  1-2151@  1-2153@  1-2164@
        1-2207@  1-2209@  1-2215@  1-2216@  1-2221@  1-2223@  1-2227@
        1-2230@  1-2233@  1-2236@  1-2238@  1-2240@  1-2242@  1-2244@
        1-2246@  1-2248@  1-2280@  1-2284@  1-2304@  1-2329@  1-2330@
        1-2331@  1-2332@  1-2334@  1-2335@  1-2336@  1-2337@  1-2338
        1-2346@  1-2348@  1-2350@  1-2352@  1-2353@  1-2355@  1-2379@
        1-2390@  1-2393@  1-2396@  1-2399@  1-2404   1-2408@  1-2409@
        1-2411@  1-2412@  1-2413@  1-2414   1-2417@  1-2419@  1-2435@
        1-2437@  1-2475@  1-2483   1-2486   1-2497@
R3      1- 871#  1-1077   1-1084   1-1096   1-1092@  1-1093@  1-1095@
        1-1113   1-1118   1-1120   1-1125   1-1135   1-1137   1-1139@
        1-1140@  1-1141@  1-1142   1-1147@  1-1160@  1-1169   1-1171
        1-1177   1-1179   1-1183   1-1187   1-1193   1-1195   1-1199
        1-1203   1-1209   1-1211   1-1215   1-1222   1-1224   1-1228
        1-1237   1-1780@  1-1781@  1-1792@  1-1783@  1-1784@  1-1786
        1-1816@  1-1819@  1-1823@  1-1829@  1-1836@  1-1839@  1-1843@
        1-1846@  1-1850@  1-1851   1-1855@  1-1862@  1-1873@  1-1886@
        1-1898   1-1903   1-1909   1-1911@  1-1914   1-1920   1-1922@
        1-1927@  1-1928@  1-1929@  1-1930@  1-1931   1-2055   1-2058@
        1-2063@  1-2060@  1-2471@  1-2472@
R4      1- 872#  1-1125@  1-1126@  1-1127@  1-1128@  1-1129@  1-1130@
        1-1131@  1-1142@  1-1173@  1-1181@  1-1185@  1-1189@  1-1197@
        1-1201@  1-1205@  1-1213@  1-1210@  1-1226@  1-1231@  1-1246
        1-1647@  1-1648@  1-1903@  1-1904@  1-1909   1-1914@  1-1915@
        1-1920   1-2135@  1-2136@
R5      1- 873#  1-1038@  1-1104@  1-1727@  1-1728@  1-1730   1-1733
        1-1739@  1-1740@  1-1742   1-1745   1-1748   1-2213@  1-2214@
        1-2216   1-2219   1-2225@  1-2226@  1-2228   1-2231   1-2234
        1-2359@  1-2361@  1-2362@  1-2363@  1-2364@  1-2367@  1-2368@
        1-2369@  1-2370@  1-2371@  1-2383@  1-2384@  1-2385@  1-2386@
        1-2388@  1-2389@  1-2391   1-2394   1-2397   1-2403@  1-2406@
        1-2414@  1-2415@  1-2416@  1-2427   1-2453@  1-2493@  1-2495@
SELON1  1-1180   1-1193#
SELON2  1-1184   1-1187#
```

CROSS REFERENCE TABLE S-9

T5C	1-1430#	1-1457					
T5D	1-1432	1-1436#					
T5E	1-1439#	1-1451	1-1463				
T5F	1-1444	1-1447#					
T5FLAG	1-1421@	1-1467#	1-1496@	1-1562	1-1605		
T5G	1-1441	1-1450#					
T5H	1-1453	1-1455#					
T5INC	1-1426@	1-1434	1-1468#				
T5J	1-1456#	1-1461					
T5K	1-1458	1-1460#					
USSTST	1-1012#	1-1015					
USS.OK	1-1013	1-1017#					
USS10	1-1020	1-1022#					
VALID	1-1087	1-1092#					
VAL1	1-1095#	1-1098					
VAL2	1-1096	1-1099#					
VAL3	1-1100	1-1103#					
VAL4	1-1090	1-1102	1-1104#				
WAITK	1-2466#	1-2527					
WAITKY	1-1076	1-1112	1-1134	1-1168	1-1176	1-1192	1-1208
	1-1221	1-1236	1-2545#				
WBUF	1- 902#	1-1013	1-1779	1-1793	1-1926	1-2119	1-2265
WRCHEK	1- 921#	1-1482	1-1573	1-1624	1-1686@	1-1754	1-1756
	1-1766						
WRITI	1-1580#	1-2528					
WRITIT	1-1302	1-1322	1-1370	1-1422	1-2546#		
WRPASS	1- 918#	1-1008@	1-1620	1-1622	1-1626@	1-1629	1-1652
	1-1684	1-1695@	1-1696	1-1702@	1-2255@	1-2273@	1-2277@
WRRECR	1- 931#	1-1660@	1-1369	1-1371@	1-1600@	1-2294	1-2299
WRTDMP	1-1726#						
WRTD1	1-1758#	1-1767					
WRTD2	1-1760	1-1765#					
WRTLEN	1- 936#	1-1096@	1-1611	1-1668@	1-1669	1-1671	1-1673@
	1-1691	1-2463	1-2282				
W1	1-1593	1-1596#					
W10	1-1633	1-1637#					
W11	1-1641	1-1652#	1-1705				
W12	1-1656	1-1660#					
W3	1-1605#						
XRGRCD	1-2257	1-2273#	1-2276				
XRGREC	1-1701	1-2255#	1-2287				
XRG0	1-2256#	1-2278					
XRG5	1-2272	1-2275#					
ZERO	1-2432@	1-2449	1-2451@	1-2458#			
ZEROOO	1-1048	1-1052#					
	1- 876#	1- 877#	1- 881	1- 882#	1- 884#	1- 948#	1- 950#
	1- 952#	1- 954#	1- 956#	1- 958#	1- 960#	1- 962#	1- 964#
	1-1035	1-1229	1-1238	1-1241	1-1244	1-1269	1-1513
	1-1517	1-1520	1-1523	1-1540	1-1543	1-1603	1-1606
	1-1610	1-1649	1-1700	1-1709	1-1731	1-1734	1-1743
	1-1746	1-1749	1-1769	1-1853	1-1907	1-1910	1-1918
	1-1921	1-1951	1-1976	1-2004	1-2096	1-2098	1-2137
	1-2156	1-2170	1-2197	1-2217	1-2220	1-2229	1-2232
	1-2235	1-2260	1-2267	1-2316	1-2318	1-2376	1-2392
	1-2395	1-2398	1-2426	1-2459	1-2467	1-2469	1-2484
	1-2489	1-2502					

CROSS REFERENCE TABLE C-1

```
        054496
. ABS.  054496   1- 862
```

APPENDIX A

SAMPLE DRIVER PROGRAM

SAMPLE MAGNETIC TAPE DRIVER PROGRAM

FOR PDP-11 / LSI-11

While the controller is compatible with existing software, this program illustrates an example of a magnetic tape driver program. For those customers who wish to create custom software, this driver can be a starting point for the tape handling portion of the program.

A paper tape containing this program is available from Western Peripherals upon request. Ask for part number 130046.

PROGRAM LISTING

SAMPLE MAGNETIC TAPE DRIVER PROGRAM

FOR PDP-11 / LSI-11

```
        . = 400
;       MAGNETIC TAPE DRIVER CALLING SEQUENCES
;
;       JSR   R5,TAPRW          TAPE READ OR WRITE
;             SETUP WORD
;           \ CORE START ADDRESS
;             NUMBER OF BYTES TO BE TRANSFERRED
;             ERROR RETURN ADDRESS
;             RETURN FROM TAPRW SUBROUTINE
;
;       JSR   R5,SPACE          SPACE FORWARD OR BACKWARD
;             SETUP WORD
;             NUMBER OF RECORDS TO BE SKIPPED (-=BACK)
;             ERROR RETURN ADDRESS
;             RETURN FROM SPACE SUBROUTINE
;
;       JSR   R5,WEOF           WRITE AN END OF FILE
;             SETUP WORD
;             ERROR RETURN ADDRESS
;             RETURN FROM WEOF SUBROUTINE
;
;       JSR   R5,OFLINE         PUT DESIGNATED UNIT OFF LINE
;             SETUP WORD
;             ERROR RETURN ADDRESS
;             RETURN FROM OFLINE SUBROUTINE
;
;       JSR   R5,REWIND         REWIND DESIGNATED UNIT
;             SETUP WORD
;             ERROR RETURN ADDRESS
;             RETURN FROM REWIND SUBROUTINE
;
;       JSR   R5,CMPLTE         COMPLETE PREVIOUS COMMAND
;             ERROR RETURN ADDRESS
;             END OF FILE RETURN ADDRESS
;             NORMAL RETURN
;
;       JSR   R5,TAPSET         TAPE SETUP
;             SETUP WORD
;             RETURN FROM TAPSET SUBROUTINE
;
        R3 = %3
        R4 = %4
        R5 = %5
        SP = %6
        PC = %7
;
```

```
;     TAPRW SUBROUTINE
TAPRW:  JSR R4,CHECK            ;GET ARG AND CHECK READY
        .WORD 4                 ;4 ARGUMENTS
        MOV ARRAY+2,172526      ;CORE START ADDRESS INTO MTCMA
        NEG ARRAY+4             ;FORM -NUMBER OF BYTES
        MOV ARRAY+4,172524      ;2'S COMPLEMENT OF NUMBER OF BYTES
        TST ARRAY               ;CHECK FOR READ
        BMI READ                ;MINUS = READ
        MOV #105,EXTRA          ;WRITE
        BR  TWL                 ;CHECK WRITE LOCK
READ:   MOV #103,EXTRA
        MOV #-5,TRY             ;SET RETRY COUNTER TO -5
        BR  WOR
;
;     TAPSET SUBROUTINE
TAPSET:MOV (R5)+,226            ;PUT PROCESSOR PRIORITY IN 226
        MOV #10000,172522       ;ISSUE POWER CLEAR
        MOV #IRET,224           ;PUT INTERRUPT RETURN IN 224
        RTS R5
;
;     OFLINE SUBROUTINE
OFLINE:MOV #1,EXTRA             ;GO BIT + 0 FUNCTION
OR:     JSR R4,CHECK            ;GET USER ARGUMENTS AND CHECK HARDWARE
        .WORD 2                 ;NUMBER OF USER ARGUMENTS +
BOR:    BIS EXTRA,CHSET         ;USER SETUP WORD + GO BIT
        MOV CHSET,172522        ;LOAD COMMAND REG
        RTS R5                  ;RETURN TO USER
;
;     REWIND SUBROUTINE
REWIND:MOV #117,EXTRA            ;ENABLE BIT, GO BIT + 7 FUNCTION
        JSR    R4,CHECK
        .WORD  2
        BR  WOR                  ;OTHERWISE SAME AS OFLINE
;
;     SPACE SUBROUTINE
SPACE:JSR R4,CHECK              ;USER ARG AND CHECK READY
        .WORD 3                 ;3 ARGUMENTS
        TST ARRAY+2             ;TEST POS OR NEG SPACING
        BMI SPB                 ;NEG = BACKSPACE
        MOV #111,EXTRA          ;ENABLE,GO AND 4 FUNCTION
        NEG ARRAY+2             ;FORM 2'S COMPLEMENT
SOR:   MOV ARRAY+2,172524       ;LOAD MTBRC
        BR    WOR
SPB:   MOV #113,EXTRA           ;ENABLE, GO AND 5 FUNCTION
        BR    SOR
;
;     WEOF SUBROUTINE
WEOF:   MOV #107,EXTRA          ;ENABLE BIT,GO BIT AND 3 FUNCTION
        JSR R4,CHECK            ;CHECK HARDWARE AND GET USER ARG.
        .WORD 2
TWL:    BIT #4,172520           ;TEST WRITE LOCK
        BNE EER                 ;ERROR, PUSH STACK AND TAKE ERROR EXIT
WOR:    INCB BUSY               ;SET BUSY FLAG
        BR  BOR
;
```

```
; INTERNAL SUBROUTINE TO CHECK FOR CU READY AND SELR READY
CHECK: MOV (R4)+,CTR          ;PICK UP NR OF ARGUMENTS
       MOV R3,-(SP)           ;SAVE R3
       MOV #ARRAY,R3          ;SET R3 = START OF ARRAY
CH1:   MOV (R5)+,(R3)+        ;MOVE ARGUMENTS TO ARRAY
       DEC CTR                ;DECREMENT NR OF ARGUMENTS COUNTER
       BNE CH1                ;IF NOT FINISHED,CONTINUE
       MOV -(R3),ER           ;LAST ARGUMENT = ERROR RETURN TO USER
       MOV (SP)+,R3           ;RESTORE R3
       BIT #200,172522        ;TEST FOR CU READY
       BEQ CHER               ;ERROR...
       MOV ARRAY,CHSET        ;NO,MOVE SETUP WORD TO TEMPORARY LOC
       BIC  #110317,CHSET     ;SET UP PSEUDO COMMAND
       MOV CHSET,172522       ;PUT INTO COMMAND REG
       BIT #102,172520        ;READY OR REWINDING OK
       BNE CHEXIT             ;SELECTED UNIT READY CHECK
CHER:  MOV (SP)+,R4           ;ERROR, NOT READY OR CU NOT READY
EER:   MOV (SP)+,R5           ;RESTORE R4 AND R5 FROM STACK
       JMP @ER                ;GO TO USER ERROR EXIT
CHEXIT:CLRB BUSY              ;SET NOT BUSY
       CLRB ERROR             ;SET NO ERROR
       RTS R4                 ;EXIT AND RESTORE R4
EXTRA: .WORD  0
CHSET: .WORD  0               ;MASKED SETUP WORD
CTR: ER: .WORD  0             ;TEMPORARY STORAGE
ARRAY: .WORD    0,0,0,0       ;SET UP FOR OTHER ROUTINES
BUSY:  .BYTE    0             ;BUSY FLAG
ERROR: .BYTE    0             ;ERROR FLAG
TRY:   .WORD    0             ;READ RETRY COUNTER
;
;    CMPLTE SUBROUTINE
CMPLTE:TSTB BUSY
      BNE  CMPLTE             ;WAIT FOR BUSY FLAG=0
      MOV (R5)+,ARRAY         ;ERROR ADDRESS
      MOV (R5)+,ARRAY+2       ;EOF ADDRESS
      DECB ERROR               ;0,1,2 BECOME -1,0,1
      BPL EFER                ;0,1 = EOF OR ERROR
      RTS R5                  ; OK, EXIT VIA R5
EFER: BEQ NOTEF               ;0=ERROR
      MOV (SP)+,R5            ;EOF, RESTORE R5 & RETURN
      JMP @ARRAY+2
NOTEF:MOV (SP)+,R5            ;ERROR, RESTORE R5 & RETURN
      JMP @ARRAY
;
;
```

```
;INTERRUPT RETURNS HERE
IRET:   TSTB ERROR              ;IS ERROR FLAG SET
        BEQ  NEFL
        CLRB ERROR              ;YES, CLEAR IT
        BIT  #12,CHSET          ;FUNCTION .AND. 5
        BNE  NRD                ;0 = WRITE OR OFFLINE(NO INTERRUPT)...
        BIS  #10,CHSET          ;THUS IT WAS A WRITE,CHANGE EXT GAP
NRD:    MOV  ARRAY+2,172526     ;SET UP START ADDRESS
        MOV  ARRAY+4,172524     ;SET UP NR OF BYTES
        MOV  CHSET,172522       ;SET UP COMMAND
        RTI                     ;BACK THROUGH INTERRUPT
NEFL:   BIT  #40000,172520      ;EOF BIT SET
        BNE  PTEX
        MOV  CHSET,T            ;GET COMMAND
        BIC  #177761,T
        BIT  #100000,172522     ;NO, ERROR OF ANY TYPE
        BEQ  PT2
        CMP  #10,T              ;WAS IT A SPACE FORWARD
        BEQ  PT1                ;IF SO DONT TRY AGAIN
        CMP  #12,T              ;WAS IT A SPACE BACK
        BEQ PT1                 ;IF SO DONT TRY AGAIN
        CMP  #16,T              ;WAS IT A REWIND
        BEQ  PT1                ;IF SO DONT TRY AGAIN
        BIT #100200,172520      ;ILC OR NXM
        BNE PT1                 ;IF SO DONT TRY AGAIN
        BIT #2000,172520        ;EOT
        BNE PTOM                ;IF SO, CHECK READ
        BIT #4400,172520        ;BGL,BTE
        BNE RCH
        BIT #10000,172520       ;PAE?
        BEQ PT1                 ;NO, RLE ERROR
        BIT #20000,172520       ;CRE?
        BNE WCH
```

```
RCH:    CMP #2,T                ;READ?
        BEQ PT5                 ;IF SO RETRY
        BR PT4                  ;ELSE OK
WCH:    CMP #4,T                ;WRITE?
        BEQ PT4                 ; IF SO RETRY
        CMP #14,T               ;WRITE WITH A 3 INCH GAP?
        BEQ PT4                 ;IF SO RETRY
        BR  PT2                 ;ELSE OK
PTO:    CMP #2,T                ;WAS IT A READ
        BNE PT4                 ;IF NOT TRY AGAIN
PT5:    INC TRY                 ;UPDATE TRY COUNTER, LAST TRY
        BEQ PT1                 ;IF SO ERROR
PT4:    MOV CHSET,T
        BIC #110216,T           ;EXTRACT PERTINENT INFO
        BIS #12,T               ;FORM A BACKSPACE
        INCB ERROR              ;SET ERROR FLAG
        MOV #-1,172524          ;1 RECORD
        MOV T,172522            ;ISSUE COMMAND
        RTI
PTOM:   BIT #14400,172520       ;BGL,BTE OR PAE?
        BEQ PT1                 ;IF NOT, EXIT
        CMP #2,T                ;A READ?
        BNE PT1                 ;NO, ERROR
        BR PT5
T:      .WORD 0
PTEX:   INCB ERROR              ;EOF EXIT
PT1:    INCB ERROR              ;ERROR EXIT
PT2:    CLRB BUSY               ;CLEAR BUSY FLAG
        RTI
        .END
@
```

LOADING PROCEDURES

OPERATING INSTRUCTIONS

TAPE DIAGNOSTICS

PDP-11

A. TC-130 DIAGNOSTIC

1. Load Diagnostic tape on Tape Transport at BOT.

   a. For PE use first BOT marker for load point.

   b. For NRZI use second BOT marker for load point.

2. Load bootstrap loader into PDP-11.
   Example: 16K Core

   a. Enter 037000 into switches and depress LOAD ADDRESS.

   b. Enter bootstrap per Figure 1. Depress DEPOSIT for each entry.

   c. Reenter (a) above.

   d. Depress EXAMINE to verify bootstrap is correct.

   e. Depress START. Tape Transport should read one record.

   f. Enter 772520 into switch register. (This is to check status - refer to Figure 2).

   g. Depress EXAMINE - good status is 000105.

   h. Enter 000200 into switch register.

   i. Depress LOAD ADDRESS.

   j. Depress START.

      CRT or Teletype will print the following:

      Set switch register according to operating instructions and
      Press CONTINUE.

   k. Remove Diagnostic tape and mount scratch tape on transport.
      Depress ON-LINE.

   l. Set switches normally to 11-7-5 on and depress CONTINUE. Note; there will be a short pause while test on addressing performed. Refer to diagnostic manual for switch settings.

   m. Diagnostic is now running. Each good run will result in printout of:

      CYCLE #001
      CYCLE #002
      CYCLE #003
      Etc.

   n. Depress HALT to terminate test.

B. TC-130 RELIABILITY

1. Load Diagnostic tape on Tape Transport at BOT.

   a. For PE use first BOT marker for load point.

   b. For NRZI use second BOT Marker for load point.

2. Load bootstrap loader into PDP-11.

   Example: 16K Core

   a. Enter 037000 into switches and depress LOAD ADDRESS.

   b. Enter bootstrap per Figure 1. Depress DEPOSIT for each entry.

   c. Reenter (a) above.

   d. Depress EXAMINE to verify bootstrap is correct.

   e. Depress START. Tape Transport should read one record.

   f. Depress CONTINUE. Tape Transport should read one record.

   g. Enter 7725 into switch register. (This is to check status - refer to Figure 2.)

   h. Depress EXAMINE. Good status is 00105.

   i. Enter 000200 into switches.

   j. Depress LOAD ADDRESS.

   k. Remove Diagnostic tape and mount scratch tape on tape transport.

      Depress ON-LINE.

   l. Depress START. CRT or Teletype will print the following:

```
        PDP11 7-9 TRK REL.
RECORD LIMITS IN BYTES
MINLEN   MAXLEN
    8     2048
EXERCISING UNITS 0
```

   m. Reliability should now be running. Unit will run complete tape, then stop.

   n. CRT or Teletype will print following:

```
**********WRITE PASS  END OF TAPE**********
DRV PAT PAR DEN  MODE RECORD LENGTH
0   7   X   X    SSTP  3715   M-MAX
WRITE ERRORS =     0
**********READ PASS   END OF TAPE**********
DRV PAT PAR DEN  MODE RECORD LENGTH
 0   7   X   X    SSTP  3715   M-MAX
READ STATUS ERRORS =     0
DATA ERRORS =     0
NON RECOVERABLE ERRORS =     0
```

   o. Depress HALT. Test is complete.

NOTES

BOOTSTRAP LOADER/4K READ ROUTINE

37000	12737	Move
37002	10000	PWR CLR
37004	172522	To CMD.REG.
37006	12737	Move
37010	16000	BYTE CNT. (4K)
37012	172524	To BYTE CNT. REG.
37014	12737	Move
37016	60003	Read Command
37020	172522	To CMD. REG.
37022	12700	Move following location to Register Ø
37024	00000	Ø
37026	5200	INCR. RØ
37030	1376	BR≠ Ø
37032	5200	INCR. RØ
37034	1376	BR≠ Ø
37036	00000	HLT.

April 11, 1975
Ed Smith
PDP.11 Tape Loader

AUTOMATIC TAPE LOADER

Operating Instructions: Deposit in High Core, Load starting address and place desired block number in the Switch Register then press Start.

LOCATION					
XXX00	12737	10000	172522		PWR CLR
06	13702	177570			Move Sw Reg to R2
12	5402	5202			Negate R2 Inc R2
16	1411				BEQ + 11
20	10237	172524			Move R2 to Wd CNT
24	12737	0011	172522		STROBE FWD
32	32737	0001	172520	1774	Wait for TUR
42	12737	160000	172524		Move 160000 to Wd CNT
50	12737	60003	172522		READ
56	32737	0001	172520	1774	Wait for TUR
66	12737	0017	172522		Rewind
74	0000				HALT

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	PROD. REL	8-22-78	

PURPOSE

The purpose of this specification is to define type, layout and content of W.P. Diagnostic Magnetic Tape.

1. Material shall be 250 feet of magnetic tape as defined in ANSI.X3.40-1976 mounted on a six inch reel with mailer.

2. The information (data) shall be written on the tape in NRZI, 800 CPI, at the beginning (first BOT) of tape.

   A second BOT marker shall be placed on the tape approximately 10' beyond the first data field.

   The information (data) shall be repeated at 1600 CPI, PE, beginning at the second BOT.

3. On the front of the reel and the front of the mailer a label shall be affixed containing the following information:

   WP #68000009-[ ] ← LATEST REV. LTR. OF THIS DWG.
   BOT #1 NRZ
   BOT #2 PE

4. A copy of the Directory and Loading Procedure, WP document no. 66000001, shall be included with the tape.

AUG 22 1978

TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONS DEC. ANGLES ± ± ±		western peripherals ANAHEIM, CALIFORNIA		
APPROVALS	DATE	PROGRAM W.P. MASTER DIAGNOSTIC M.T.		
DRAWN W.H. Walter	8-27-78			
CHECKED		SCALE	SIZE A	DRAWING NO. 68000009
		DO NOT SCALE DRAWING		SHEET 1 of 1

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	PROD. REL.	8-22-78	WHW.

CORRECTED

MASTER DIAGNOSTIC TAPE
BOT #1 NRZ REV. C
BOT #2 PE 30-JUN-78

1. TC130 DIAGNOSTIC
2. TC130 RELIABILITY
3. TC120 DIAGNOSTIC
4. TC120 RELIABILITY
5. DC220 DIAGNOSTIC
6. DC220 RELIABILITY
7. DC220-10 FORMATTER
8. DC220-10 RELIABILITY
9. DC220-10 DIAGNOSTIC, 1ST 4K
10. DC220-10 DIAGNOSTIC, 2ND 4K
11. DC230 DIAGNOSTIC
12. DC230 RELIABILITY
13. TC130 DIAGNOSTIC 11/34
14. TC130 RELIABILITY 11/34

PDP-11 BOOTSTRAP LOADER

LOC	INST	
37000	12737	MOV NXT ADD INTO CMD REG
2	10000	POWER CLEAR
4	172522	CMD REG
6	12737	MOV NXT ADD INTO BYTE CTR
10	160000	(4K)
12	172524	BYTE CNT REG
14	12737	MOV NXT ADD INTO CMD REG
16	60003	
20	172522	CMD REG
22	12700	MOV 0 INTO REG 0
24	00000	
26	5200	INC R0
30	1376	BR≠0
32	5200	INC R0
34	1376	BR≠0
36	00000	HLT

NOV 13 1978

TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONS ± DEC. ± ANGLES ±		western peripherals ANAHEIM, CALIFORNIA		
APPROVALS	DATE	DIRECTORY AND LOADING PROCEDURE FOR WP MASTER DIAGNOSTIC M.T.		
DRAWN WHW/ltr	9-27-78			
CHECKED		SCALE	SIZE A	DRAWING NO. 66000001
		DO NOT SCALE DRAWING		SHEET 1 of 2

Sheet 2 for Nova

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	PROD. REL.	8-22-78	

PURPOSE

The purpose of this specification is to define type, layout and content of W.P. Diagnostic Magnetic Tape.

1. Material shall be 250 feet of magnetic tape as defined in ANSI.X3.40-1976 mounted on a six inch reel with mailer.

2. The information (data) shall be written on the tape in NRZI, 800 CPI, at the beginning (first BOT) of tape.

   A second BOT marker shall be placed on the tape approximately 10' beyond the first data field.

   The information (data) shall be repeated at 1600 CPI, PE, beginning at the second BOT.

3. On the front of the reel and the front of the mailer a label shall be affixed containing the following information:

   WP #68000017-[ ]
   BOT #1 NRZ
   BOT #2 PE

   ← LATEST REV. LTR. OF THIS DWG.

4. A copy of the Directory and Loading Procedure, WP document no. 66000019, shall be included with the tape.

AUG 22 1978

TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONS ± DEC. ± ANGLES ±		western peripherals ANAHEIM, CALIFORNIA		
APPROVALS	DATE	PROGRAM M.T. WPDP DIAGNOSTICS		
DRAWN WH Wallace	8-22-78			
CHECKED		SCALE	SIZE A	DRAWING NO. 68000017
		DO NOT SCALE DRAWING		SHEET 1 of 1

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	PROD. REL.	3-22-78	[illegible]
B	CORRECTED INSTR.	12-18-80	[illegible]

WPDP DIAGNOSTICS
BOT #1 NRZ
BOT #2 PE REV. D

ENTRY #	FILNAM.EXT	DATE
000001	THDP .SAV	26-JUN-78C
000002	TMDP .SAV	26-JUN-78C
000003	THDP .BIN	26-JUN-78
000004	TMDP .BIN	26-JUN-78
000005	UPD1 .BIN	26-JUN-78
000006	UPD2 .BIN	26-JUN-78
000007	RKDP .BIN	26-JUN-78
000010	RXDP .BIN	26-JUN-78
000011	COPY .BIN	26-JUN-78
000012	FORMAT.BIN	26-JUN-78
000013	WPDIAM.BIN	26-JUN-78
000014	WPRELM.BIN	26-JUN-78
000015	WPDIAD.BIN	26-JUN-78
000016	WPRELD.BIN	26-JUN-78
000017	WPDLSM.BIN	26-JUN-78
000020	WPRLSM.BIN	26-JUN-78
000021	WPDLSD.BIN	26-JUN-78
000022	WPRLSD.BIN	26-JUN-78
000023	WPDI34.BIN	26-JUN-78
000024	WPRE34.BIN	26-JUN-78
000025	WPDI03.BIN	26-JUN-78
000026	WPRE03.BIN	26-JUN-78

TOLERANCES UNLESS OTHERWISE SPECIFIED			western peripherals ANAHEIM, CALIFORNIA		
FRACTIONS ±	DEC. ±	ANGLES ±	DIRECTORY AND LOADING PROCEDURE FOR WPDP M.T.		
APPROVALS	DATE				
DRAWN [illegible]	6-22-78				
CHECKED		SCALE	SIZE A	DRAWING NO. 66000019	
		DO NOT SCALE DRAWING		SHEET 1 OF 3	

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

OPERATING INSTRUCTIONS
WPDP DIAGNOSTIC MAGNETIC TAPE

1. Load program tape on transport, position at BOT, and place ON-LINE.
2. Enter the following bootstrap loader into the computer:

LOCATION	DATA
10 000	12737
10 002	3
10 004	172522
10 006	777

PDP-11: (Location) LOAD ADDRess,
(Data) DEPosit, (Data) DEPosit, etc.

LSI-11: (Location) / ,
(Data) LINE FEED, (Data) LINE FEED,etc.

3. Execute the bootstrap program:

PDP-11		LSI-11
10000,	LOAD ADDRESS,	10000 G
START,	HALT,	Break key
10000,	LOAD ADDRESS,	10000 G
START,	HALT,	Break key
102,	LOAD ADDRESS,	102 /
402,	DEPOSIT,	402 LINE FEED
70,	LOAD ADDRESS,	70 G
START		

4. Follow printed instructions.

SCALE	SIZE	DRAWING NO.
	A	66000019
DO NOT SCALE DRAWING		SHEET 2 of 3

5. Type:
   - R(Sp) WPDIAM (Return) for tape Diagnostic Program on PDP-11
   - R(Sp) WPRELM (Return) for tape Reliability Program on PDP-11
   - R(Sp) WPDIAD (Return) for DC-230 Diagnostic Program on PDP-11
   - R(Sp) WPRELD (Return) for DC-230 Reliability Program on PDP-11
   - R(Sp) WPDLSM (Return) for tape Diagnostic Program on LSI-11 (no panel switches)
   - R(Sp) WPRLSM (Return) for tape Reliability Program on LSI-11 (no panel switches)
   - R(Sp) WPDLSD (Return) for DC-230 Diagnostic Program on LSI-11
   - R(Sp) WPRLSD (Return) for DC-230 Reliability Program on LSI-11
   - R(Sp) WPD134 (Return) for tape Diagnostic Program on PDP-11/34 (no panel switches)
   - R(Sp) WPRE34 (Return) for tape Reliability Program on PDP-11/34 (no panel switches)
   - R(Sp) WPDI03 (Return) for tape Diagnostic Program on LSI-11/03

6. Remove the program tape from the drive and load a scratch tape, positioning at BOT and placing the drive ON-LINE.

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	RELEASE	9/3/81	

APR 3 1981

TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONS ± DEC. ± ANGLES ±		western peripherals ™ TUSTIN, CALIFORNIA		
APPROVALS	DATE	DIRECTORY AND LOADING PROCEDURE FOR WP MASTER DIAGNOSTIC TAPE CARTRIDGE		
DRAWN L.Crawford	4-02-81			
CHECKED	4-07-81	SCALE	SIZE A	DRAWING NO. 66000068
		DO NOT SCALE DRAWING		SHEET 1 OF 3

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

1. MASTER DIAGNOSTIC TAPE CARTRIDGE

Record	Program
1	TC160 DIAGNOSTIC
2	TC160 RELIABILITY
3	TC170 DIAGNOSTIC
4	TC170 RELIABILITY
5	TC180 DIAGNOSTIC
6	TC180 RELIABILITY

2. DEC BOOTSTRAP LOADER

Loc	Inst	
37000	12737	MOV
2	10000	POWER CLEAR
4	172522	CMD REG
6	12737	MOV
10	160000	(4K)
12	172524	BYTE CNT REG
14	12737	MOV
16	3	READ
20	172522	CMD REG
22	32737	BIT TEST
24	1	FOR TUR BIT
26	172520	IN STATUS REG
30	1774	BRANCH IF NOT READY
32	0	HALT

3. DATA GENERAL BOOTSTRAP LOADING PROCEDURE

Clear Accumulators to 0. Load first test by starting Read routine. Load succeeding tests by pressing Continue.

NOVA Read Routine - Load in top 8 locations of memory.

67022	DOC 1
72022	DOB 2
61122	DOAS 0
63622	SKPDN
777	JMP-1
74422	DIA 3
63077	HALT
771	JMP-7

APR 3 1981

SCALE	SIZE	DRAWING NO.
	A	66000068
DO NOT SCALE DRAWING		SHEET 2 OF 3

NOVA Read Routine (Cont'd)

Accumulator	No.
COMMAND	0
WD CNT	1
STRT ADDR (DIRECT)	2
STATUS	3

Commands

0 = Read
1 = Rewind
2 = Not Used
3 = Space Forward
4 = Space Reverse
5 = Write
6 = WEOF
7 = Erase

4. REMOVE THE PROGRAM TAPE FROM THE DRIVE AND INSERT A SCRATCH TAPE.

5. REFER TO THE APPROPRIATE DIAGNOSTIC MANUAL FOR REQUIRED PATCHES AND FOR OPERATING INSTRUCTIONS.

APR 3 1981

PROGRAM PATCHES

NOTES

DIAGNOSTIC PATCHES

Enter the following changes when running the controller diagnostics:

1. Operational delay for unusual timing - related errors.

Location	Was	Should Be	Description
3664	7	12	Controller not ready
12132	5	12	Controller not ready

2. Non-existent memory error (systems with extra memory):

Location	Was	Should Be	Description
5702	173000	176000	Non-existant Memory

NOTES

MODIFICATIONS REQUIRED FOR NON-STANDARD ADDRESSES OF CONTROLLER TO RUN FUNCTIONAL AND RELIABILITY DIAGNOSTICS

FUNCTIONAL DIAGNOSTICS:

			LOC	IS
CPU	SW4	OFF	1000	172520
CPU	SW4	ON	1002	172720

Function Should Equal First Address of Controller (Status Reg.)

CPU	SW4	OFF	1004	224
CPU	SW4	ON	1010	260

Should Equal Interrupt Vector Address

CPU	SW4	OFF	1006	226
CPU	SW4	ON	1012	262

Should Equal Interrupt Vector Address +2

RELIABILITY DIAGNOSTICS:

214	172520	Should Equal Status Reg. Address
216	172522	Should Equal Command Reg. Address
220	172524	Should Equal Byte Count Reg. Address
222	172526	Should Equal Address Reg. Address
254	224	Should Equal Interrupt Vector Address

western peripherals ™

TECHNICAL AID BULLETIN

TITLE/DESCRIPTION: LSI-11 Tape Diagnostic operation with Real Time clock enabled

PRODUCT/MODEL: TC-150/TC-160

SYMPTOM/ACTIVITY: System halts with illegal tape interrupt at PC 11476.

ACTION REQUIRED: Modify address 100 with a 102
and address 102 with a 002
and restart the program.

NOTE: Reliability program will also fail but can not be modified for this problem.

DATE: 4/2/80

NOTES

MODEL TC-160 AND TC-180

FUNCTIONAL DIAGNOSTIC PROGRAM PATCHES

(SETTLEDOWN & IDENT STATUS)

ADDRESS:	WAS:	SHOULD BE:
3706	104400	400
4246	104400	400

NOTES

PROGRAM PATCHES
FOR TC-190 OPERATION

DIAGNOSTIC PROGRAM

LOCATION	WAS	SHOULD BE
3202	5037	137
3204	1044	3244
3270	40000	60000
3554	5777	403
4262	14557	14562
4362	14723	14726
4420	14561	14562
4476	14725	14726
5052	11423	46114
5254	377	170000
6474	177754	177747
6564	177754	177747
6706	20000	60000
6714	20000	60000
6760	17000	17377
7100	17000	16766
7322	744	777
7522	4	777
10140	20037	137
10142	1072	10252

RELIABILITY PROGRAM

LOCATION	WAS	SHOULD BE
100	0	10001
102	0	6200
104	0	6200
106	0	60100
110	0	5400
112	0	10037
114	0	172524
116	0	62702
120	0	4
122	0	10207
4726	13777	13700
4732	173264	10702
4734	5477	137
4736	173260	100
7346	13777	13700
7352	170644	10702
7354	5477	137
7356	170640	100
10366	13777	13700
10372	167624	10702
10374	5477	137
10376	167620	100

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	INITIAL RLSE	10-29-80	

PURPOSE: To test PDP-11/LSI-11 tape controllers that have been modified to a non-standard vector address.

1. Load diagnostic into memory.

2. Modify the following locations:

LOC	WAS	S/B
1004	224	new vector
1006	226	new vector +2
1014	224	new vector
1016	226	new vector +2

EXAMPLE: If the new vector is 320, then 1004, 1014 would contain 320 and 1006, 1016 would contain 322.

3. If the controller also has a non-standard device address, the program must also be modified. Reference test procedure 92000165.

4. Run diagnostic using standard method successfully for 3 passes.

NOTE: RELIABILITY CANNOT BE RUN WITH NON-STANDARD VECTOR.

OCT 30 1980

TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONS ± DEC. ± ANGLES ±		western peripherals ™ TUSTIN, CALIFORNIA		
APPROVALS	DATE	TEST PROCEDURE - PDP/LSI-11 ALTERNATE VECTOR		
DRAWN L. CRAWFORD	10-29-80			
CHECKED		SCALE	SIZE A	DRAWING NO. 92000157
		DO NOT SCALE DRAWING		SHEET 1 OF 1

NOTES

RUNNING THE DIAGNOSTIC ON LSI-11 OR PDP-11/34 SYSTEMS WITHOUT SWITCH PANELS

This information documents the special diagnostic versions and allows modification of the standard diagnostic.

Location	Standard	PDP-11/34	LSI-11
36	340	0	0
1166	12711	14556	14556
1232	177570	176	176
1262	177570	176	176
1366	5037	5037	106427
1370	177776	177776	0
1430	177570	176	176
1454	177570	176	176
3122	177570	176	176
3122	177570	176	176
3232	177570	176	176
3370	6037	4737	4737
3372	177570	17002	17002
3374	103407	1007	1007
4220	177570	176	176
5036	177570	176	176
5042	6037	4737	4737
5044	177570	17002	17002
5046	103406	1006	1006
5070	177570	176	176
5242	177570	176	176
5566	177570	176	176
5776	13737	13737	106437
6002	177776	177776	240
6050	13737	13737	106437
6054	177776	177776	240
6126	13737	13737	106437
6132	177776	177776	240
6240	13737	13737	106437
6244	177776	177776	240
6424	5037	5037	106427
6426	177776	177776	0
6706	20000	60000	60000
6714	20000	60000	60000
7112	177570	176	176
7160	6037	4737	4737
7162	177570	17002	17002
7164	103003	1403	1403
7244	6037	4737	4737
7246	177570	17002	17002
7250	103003	1403	1403
7364	6037	4737	4737
7366	177570	17002	17002
7370	103003	1403	1403

DIAGNOSTIC MODS

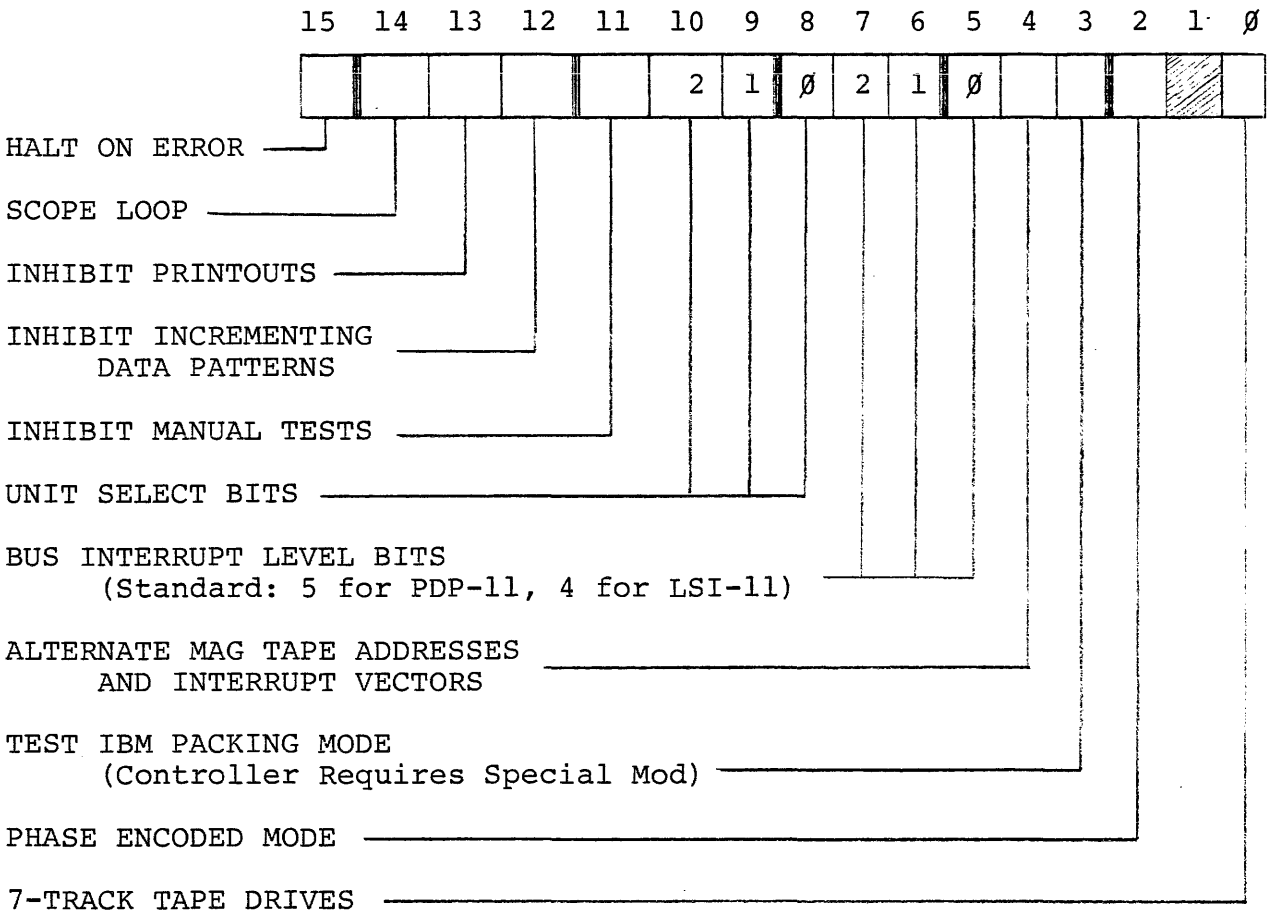
Location	Standard	PDP-11/34	LSI-11
7512	6037	4737	4737
7514	177570	17002	17002
7516	103411	1011	1011
7560	6037	4737	4737
7562	177570	17002	17002
7564	103002	1402	1402
10234	177570	176	176
10332	177570	176	176
10356	177570	176	176
11056	177570	176	176
11700	177570	176	176
12024	177570	176	176
12040	177570	176	176
12664	177570	176	176

NOTES

DIAGNSOTIC FEATURES (Switch Register)

NON-STANDARD

The diagnostic uses location 176 as a switch register and must be loaded as follows:



STARTING/RESTARTING

The diagnostic may be started at location 1ϕ000 the first time only. Thereafter, the diagnostic must be restarted at location 200. When restarting at location 200 the printed message should be disregarded, however, location 176 may be changed at this time. (Again, restart the program at location 200). The program is executed by continuing or proceeding from this programmed stopping point.

SPECIAL TEST LOOPS

NOTES

TROUBLESHOOTING LOOP

```
XXX00   12737                          START
   02   10000          POWER CLEAR
   04  172522

   06   12737
   10  177775          BYTE COUNT
   12  172524

   14   12737
   16   XXXXX          ADDRESS
   20  172526

   22   12737
   24       X          COMMAND:   3=READ    5=WRITE
   26  172522

   30   12702
   32   37000          MOV #37000, R2     DELAY CONSTANT
   34    5302          DEC R2
   36    1376          BNE

   40   32737
   42    2000
   44  172520          EOT?
   46    1754

   50   12737
   52      17          REWIND
   54  172522

   56     750          RESTART
```

NOTES

TAPE ROUTINE

Location	Instruction	Description
37000	12737	Move
2	10000	Clear
4	172522	To Command Register
6	12737	Move
10	177774	Byte Count
12	172524	To Byte Count Register
14	12737	Move
16	17000	Memory Address
20	172526	To Memory Address Register
22	12737	Move { X = 5 (Write)
24	6000X	Command { X = 3 (Read)
26	172522	To Command Register
30	32737	Bit Test
32	00001	For Tape Unit Ready Bit
34	172520	In the Status Register
36	1774	Branch if Not Ready
40	32737	Bit Test
42	2000	For EOT Bit
44	172520	In the Status Register
46	1754	Branch to Start if not EOT
50	00000	Halt
17000	(DATA)	
2	(DATA)	

For Single Record Operations (press CONTINUE for each record):

37030	00000	Halt
32	762	Branch to Start

NOTES

PDP-11 Modified Manual
Write/Read Program

Dutch Hamilton
11-4-77

NOTE: THIS PROGRAM ALLOWS IBM TEST

LOC	CODE	DESCRIPTION
36770	12737	REWIND
2	60017	
4	172522	
6	000000	HALT
37000	12737	POWER CLEAR ← START
2	10000	
4	172522	
6	12737	IBM TEST x = 0: Non IBM
10	00X000	x = 2: IBM
12	172532	
14	12737	BYTE COUNT x = 6: 2 bytes
16	77777X	X=7: 1 BYTE x = 5: 3 bytes
20	172524	x = 4: 4 bytes
22	12737	DMA ADDRESS
24	17000	
26	172526	
30	12737	COMMAND REGISTER
32	600XX	XX=03 (READ) xx = 07 (WRITE E0F)
34	172522	XX=05 (WRITE) xx = 17 (REWIND)
36	32737	Test for Tape
37040	000001	Unit Ready
42	172520	
44	1774	Branch to 37036 if $\overline{\text{TUR}}$
46	32737	Test for EOT
50	2000	
52	172520	
54	1754	Branch to 36770 if $\overline{\text{EOT}}$
56	000000	HALT
60	743	Branch to Start

NOTES:

(1) For continuous operation, enter 1751 @ LOC 37054.

(2) IBM Test (4 Bytes)
- a. Write (IBM) = 174400/174400
- b. Zero Out = 17000, -01
- c. Read (NIBM) = 000377/000377
- d. Repeat a, c above, Write (NIBM), Read IBM.

(3) For single record 37036= 000000 HALT
37040= 757 BRANCH TO START
PRESS "CONTINUE" FOR EACH RECORD

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	RELEASED	4/10/81	

APR 10 1981

TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONS ± DEC. ± ANGLES ±		western peripherals ™ TUSTIN, CALIFORNIA		
APPROVALS	DATE	PROCEDURE; MAGNETIC TAPE DUPLICATION (MASTER)		
DRAWN T. Ryan	4-10-81			
CHECKED D. Anderson	4-10-81	SCALE	SIZE A	DRAWING NO. 92000215
		DO NOT SCALE DRAWING		SHEET 1 of 5

SCOPE

This procedure defines an efficient method of duplicating "master" diagnostic tapes.

EQUIPMENT NEEDED

1. DEC computer system with 8K (minimum) memory.
2. Terminal device.
3. Controller with two tape drives. (Known-good equipment)
4. The master copy of the Master diagnostic tape.
5. Blank tape.

OPERATING INSTRUCTIONS

1. Enter the copy program into the computer. (See sheet 4)
2. Load Master diagnostic tape on drive Ø and the blank tape on drive 1.
3. Ensure that both tapes are at load point, on-line, and set to the desired density.
4. Start the program at location 1000.
5. Both tapes will begin moving as information is copied.
6. (a) If the computer halts at location 1142, an error was detected. To try again, rewind both drives and return to step 3.

   (b) If drive Ø automatically rewinds, a good copy was made.
7. (a) For serial tape cartridges, change location 1054 to:
   20405 for the second track
   40405 for the third track
   60405 for the fourth track
   Rewind drive 1 and return to step 3.

   (b) For an alternate density on the same tape: (reel-tapes only):

      (1) Move the tape forward two or three feet (manually or use FORWARD control).

      (2) Place a BOT marker on the tape (on shiny side, near front edge).

(3) Rewind to new BOT and place ON LINE.

(4) Set density control.

(5) Return to step 3.

(c) Rewind and remove the new copy. To repeat for another tape place another blank tape on drive 1 and place on-line. Return to step 3.

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

DEC MASTER TAPE COPY PROGRAM

```
1000    012706      START:  MOVE
   2    001000              1000 to SR
   4    004767      LOOP:   JSR
   6    000070              DONE
  10    012737      READ:   MOVE
  12    000000              0 TO
  14    172524              MTBRC
  16    012737              MOVE
  20    002000              2000 TO
  22    172526              MTCMA
  24    012737              MOVE
  26    000003              READ UNIT 0 TO
  30    172522              MTC
  32    004767              JSR
  34    000042              DONE
  36    001762              BEQ LOOP
  40    005437      WRITE:  NEG
  42    172524              MTBRC
  44    012737              MOVE
  46    002000              2000 TO
  50    172526              MTCMA
  52    012737              MOVE
  54    000405              WRITE UNIT 1 TO
  56    172522              MTC
  60    004767              JSR
  62    000014              DONE
  64    000747              BR LOOP
```

SCALE	SIZE	DRAWING NO.
	A	92000215
DO NOT SCALE DRAWING		SHEET 4 of 5

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

DEC MASTER TAPE COPY PROGRAM

```
1100        32737       DONE: BIT TEST
2           100200             ERR, CUR
4           172522             MTC
6           01774              BEQ DONE
10          100405             BMI EOF
12          32737       RDY:  BIT TEST
14          00001              TUR IN
16          172520             MTS
20          01774              BEQ RDY
22          00207              RTS
24          04767              JSR
26          177762             RDY
30          32737       EOF:  BIT TEST
32          40000              EOF IN
34          172520             MTS
36          01002              BNE WEOF
40          00000              NLT
42          00716              BR START
44          12737       WEOF: MOVE
46          00407              WEOF UNIT 1 TO
50          172522             MTC
52          04767              JSR
54          177734             RDY
56          12737              MOVE
60          000017             REWIND UNIT 0 TO
62          172522             MTC
64          00000              HALT
```

SCALE	SIZE	DRAWING NO.
	A	92000215
DO NOT SCALE DRAWING		SHEET 5 of 5

NOTES

BOOTSTRAP MAG TAPE PROGRAM (RELOCATABLE)