TM03/TU45

BASIC FUNCTION TEST

CZTUQA0

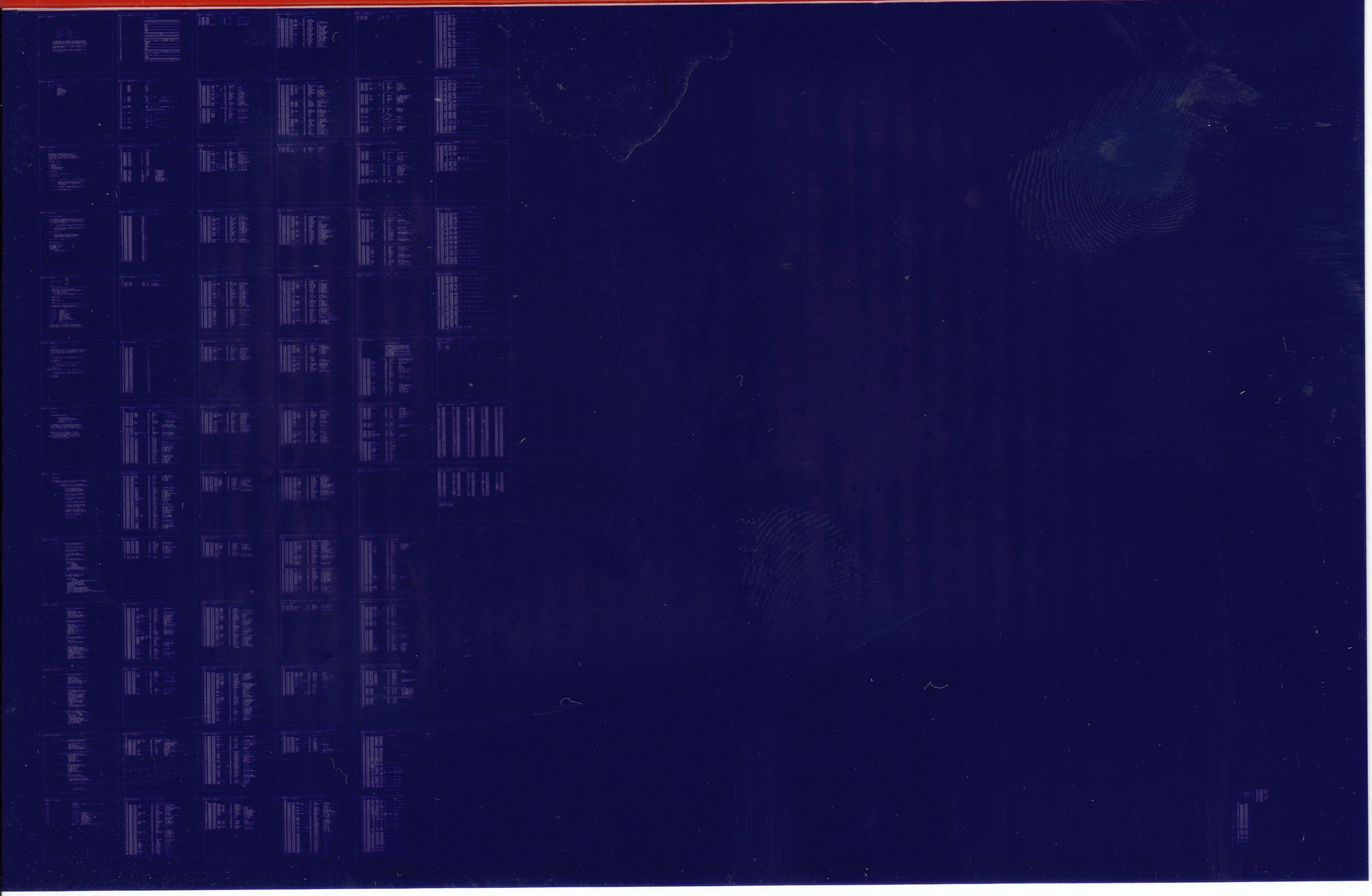
AH-E494A-MC

FICHE 1 OF 1

JUL 1978

digital

MADE IN USA



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.REM  %
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IDENTIFICATION

PRODUCT CODE: AC-E493A-MC

PRODUCT TITLE: CZTUQA0 TM03/TU45 BASIC FUNCTION TEST

DATE CREATED: 25 MAY 1978

MAINTAINER: CSS - NASHUA

AUTHOR: J. G. ADAMS/R. J. COLLINS

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1. ABSTRACT

THIS PROGRAM IS INTENDED TO TEST ALL OF THE BASIC FUNCTIONAL LEVEL OPERATIONS OF THE TM03/TU45 MAG TAPE SYSTEM. ALL FUNCTIONS; WRITE, READ, SPACE, ERASE, REWIND, ETC; WILL BE TESTED. IN ADDITION TO THE TM03/TU45 TESTS, THE RH WILL BE TESTED SEPARATELY IN SO FAR AS IT IS POSSIBLE TO SEPARATE THE RH FROM THE TM03/TU45 ITSELF.

2. REQUIREMENTS (HARDWARE)

A. ANY PDP11 PROCESSOR
B. 8K OF CORE
C. CONSOLE TTY
D. TM03 MAGTAPE CONTROLLER
E. MASS BUS CONTROLLER
F. TU45 MAG TAPE TRANSPORT

3. LOADING PROCEDURE

USE STANDARD BINARY LOADING PROCEDURE

4. STARTING PROCEDURE

THERE ARE TWO (2) STARTING ADDRESSES THAT MAYBE USED: 200(8) AND 210(8)

A. 200(8): STARTING AT THIS ADDRESS WILL CAUSE THE PROGRAM IDENTIFICATION TO BE PRINTED FOLLOWED BY REQUESTS FOR THE VARIOUS PARAMETERS NEEDED BY THE PROGRAM.

B. 210(8): THIS ADDRESS IS INTENDED FOR USE AS A RESTART ONLY AND WILL USE THE CURRENT PARAMETER VALUES.

**NOTE SEE ALSO SECTION 5-CONSOLE SWITCH SETTINGS
** TYPE C TO RESTART PROGRAM (@200)

4.1 AUTOMATIC MODE OPERATION

IF THIS PROGRAM IS LOADED AND RUN IN AUTOMATIC (CHAIN) MODES
DEFAULT RESPONSES TO OPERATOR REQUESTS ARE USED, AND ALL AVAIL-
ABLE TM03/TU45 COMBINATIONS ARE TESTED. ADDITIONALLY THE SOFTWARE
SWR IS INVOKED WITH A SWITCH SETTING OF 100000 (HALT ON ERROR)
IF LOADED VIA ACT11 CHAIN MODE.

**EXCEPTION: IF THIS PROGRAM IS LOADED VIA TMDP CHAIN MODE THE
PROGRAM WILL NOT TEST TM03 DRIVE #0, TU45 SLAVE #0.

** NOTE: THIS PROGRAM CONTAINS AN OPERATOR ASSISTED SUBTEST.THIS
SUBTEST IS NOT EXECUTED IN CHAIN MODE.TO RUN LOAD THE
PROGRAM IN DUMP MODE.

4.2 SAMPLE START AT 200

NOTE: DEFAULT RESPONSES ARE SHOWN IN ANGLE BRACKETS <>,
OPERATOR RESPONSES ARE SHOWN IN PARENTHESES (), AND
LOCATIONS CONTAINING THE DEFAULT ARE SHOWN IN .
TO INVOKE THE DEFAULT RESPONSE TYPE (CR).

PARAMETER REQUEST: <DEFAULT> (RESPONSE) LOCATION:

TM03-TU45 BASIC FUNCTIONS TEST (CZTUQA0)
TYPE C TO RESTART

REGISTER START: <172440> (CR) REGS:
VECTOR ADDRESS: <224> (CR) VECT:
DRIVE NUMBER: <0> (CR) DRVN:
SLAVE NUMBER: <0> (CR) SLVN:
SERIAL NO: 12345
RH ONLY (NO=0,YES=1): <0> (0) RHOF:
IF THE SOFTWARE SWR IS INVOKED:
SWR = <000000> NEW = (CR)

5. CONSOLE SWITCH SETTING

CONTROL:

1) CONTROL G < G>;
SELECTS THE SOFTWARE SWR AND ALLOWS THE USER TO SELECT NEW SWITCH SETTINGS.

THE MACHINE WILL THEN TYPE: SWR=XXXXXXNEW=
WHERE: XXXXXX IS THE OCTAL CONTENTS OF THE SOFTWARE SWR.
AFTER THE ''NEW='' HAS BEEN TYPED THEN THE OPERATOR CAN DO ONE
OF THE FOLLOWING AT THE TTY:
A) TYPE A NEW SWITCH SETTING
B) IF A <CR> IS THE FIRST KEY DEPRESSED THE SOFTWARE SWITCH
REGISTER CONTENTS WILL NOT BE CHANGED.

2) CONTROL A < A>;
ALTERNATES USAGE OF SWR FROM HARDWARE TO SOFTWARE & VICE VERSA.

3) CONTROL C < C>;
RESTARTS PROGRAM AT 200

4) CONTROL U < U>;
DELETES ALL CHARACTERS TYPED IN RESPONSE TO A REQUEST.

ALL SWITCHES EXCEPT 5-9 ARE USED AND THE NORMAL, OR DEFAULT,
RUN IS DONE WITH ALL SWITCHES SET TO ZERO (0).
ALL HARDWARE SWITCHES ARE DYNAMIC, AND MAY BE CHANGED AT ANY TIME.

SW15(100000):	1=HALT ON ERROR
	0=CONTINUE
SW14(040000):	1=LOOP ON ERROR (SCOPE: RH TESTS ONLY)
	0=CONTINUE
SW13(020000):	1=DO NOT PRINT ERRORS
	0=PRINT ALL ERRORS
SW12(010000):	1=CONTINUOUS CYCLE
	0=HALT AT END OF PASS
SW11(004000):	1=INHIBIT ITERATION
	0=DO ALL ITERATIONS PER TEST
SW10(002000):	1=HALT AT END OF CURRENT TEST
	0=CONTINUE
SW9-5:	N/A
SW4-0:	SELECT TEST NUMBER::00=ALL TESTS

THE USE OF SW0-4 IS TO ALLOW SELECTION AND CONTINUOUS
EXECUTION OF ANY TEST. THE TEST SELECTION MAY BE CHANGED AT
ANY TIME, HOWEVER IT IS ADVISABLE TO USE SW10 TO STOP THE
PROGRAM AT THE END OF THE CURRENT TEST BEFORE SELECTING A TEST.

6. ERROR PRINTOUTS

THE ERROR PRINTOUTS FOR EACH TEST WILL APPEAR IN THE SAME GENERAL FORMAT. THE FIRST LINE WILL ALWAYS SHOW THE TEST NUMBER AND ITS TITLE. THE SECOND LINE WILL BE AN EXPLANATION OF THE ERROR. THE FOLLOWING LINES WILL SHOW THE APPROPRIATE REGISTER OR ADDRESS VALUES THAT ARE APPLICABLE TO THE INDIVIDUAL TEST

EXAMPLES:

1. THIS EXAMPLE SHOWS A TYPICAL ERROR PRINTOUT FOR THE WRITE READ TEST: A WRITE CRC ERROR OCCURRED ON SLAVE 6.

```
FT13: WRITE-READ TEST
WRITE ERROR NRZ
CS1     WC      BA      FC      CS2     DS      ER      TC
144260  000000  015650  000000  000103  150600  100000  101306
```

2. THIS EXAMPLE SHOWS A TYPICAL SPACE ERROR: THE FC IS NOT ZERO AT THE END OF THE OPERATION.

```
FT14:SPACE TEST
SPACE REVERSE ERROR NRZ
CS1     WC      BA      FC      CS2     DS      ER      TC
144230  177700  017162  177740  000114  150600  001000  161700
```

3. THIS EXAMPLE SHOWS A SPACE OPERATION WHICH RESULTED IN INCORRECT POSITIONING. SHOULD BE AT RECORD 20, IS AT RECORD 22.

```
FT14: SPACE TEST
POSITION ERROR:
REVERSE ERROR EXPT:20 RCVD:22
```

7. OPERATION

THE PROCEDURES FOR OPERATING THIS PROGRAM ARE QUITE SIMPLE
AND REQUIRE ONLY A FEW STEPS:

1. LOAD ADDRESS 200 OR 210
2. SET SWITCHES FOR DESIRED TEST CYCLE
   ****REFER TO SECTION 5 FOR DYNAMIC LOADING
   OF SOFTWARE SWITCH REGISTER.***
3. PRESS START
4. ENTER APPROPRIATE RESPONES TO THE TTY REQUESTS

ALL HARDWARE SWITCHES ARE DYNAMIC AND MAY BE CHANGED AT ANY
TIME. THE NORMAL, OR DEFAULT, OPERATING SEQUENCE IS ALL
SWITCHES DOWN (ZERO). THE END OF EACH PASS IS NOTED BY A
MESSAGE STATING END OF PASS AND THE NUMBER OF THAT PASS.
*****FOR THE DYNAMIC LOADING OF THE SOFTWARE SWITCH REGISTER REFER TO SECTION 5 ******

SINGLE TEST SELECTION: (SW0-SW4)

WHEN SW0-4 ARE SET TO ZERO (00) THE SCHEDULAR WILL
EXECUTE ALL OF THE TESTS IN SEQUENCE . IF SW0-4 IS
SET TO SOME SPECIFIC TEST NUMBER THAT PARTICULAR TEST
WILL BE EXECUTED CONTINUOUSLY. ANY TEST MAY BE SINGLE
SELECTED IN ANY ORDER; HOWEVER, THE BEST WAY TO AFFECT
THE CHANGE IS TO USE SW10 TO HALT THE CURRENT TEST, THEN
CHANGE NUMBER AND PRESS CONTINUE.

8. SUBTEST SUMMARIES

THE FOLLOWING IS A LIST OF ALL TESTS IN THEIR PROPER SEQUENCE.
A BASIC DESCRIPTION OF EACH TEST IS PROVIDED TO AID IN UNDERSTANDING
OF THE ERROR MESSAGES ASSOCIATED WITH EACH ONE.

A. RH TESTS: THE FIRST TEN (10) TESTS WILL PERFORM BASIC RH
OPERATIONS AS FAR AS IS POSSIBLE WITHOUT REQUIRING
THE TM03/TU45 ITSELF. (SEE RH ONLY OPTION; PAR 7)

FT1: RH ADDRESSING: THIS TEST WILL ASSURE THAT THE
RH WILL RESPOND WITHOUT CAUSING A BUS
TRAP TO ALL TM02 REGISTER ADDRESS
IN SEQUENCE STARTING AT THE ADDRESS
OF CS1 ENTERED BY THE OPERATOR.

FT2: RH REGISTER BITS READ/WRITE: THIS TEST WILL ASSURE THAT
ALL BITS OF THE RH WRITE/READ REGISTERS
CAN BE SET AND RESET.

FT3: RH INITIALIZE: THIS TEST WILL ASSURE THAT A RH INITIALIZE
(BIT 5 OF CS2=1) WILL INDEED CLEAR
THE RH ERRORS.

* FT4: SILO TEST 1: THIS TEST WILL ASSURE THAT A READ FROM
AN EMPTY SILO WILL CAUSE DLT TO SET.

* FT5: SILO TEST 2: THIS TEST WILL ASSURE THAT BOTH THE
IR AND OR BITS WILL CORRECTLY RESPOND
TO LOADING OF THE SILO WITH ALL ZEROS
AND THEN A WORD OF ALL ONES.

* FT6: SILO TEST 3: THIS TEST WILL WRITE AND THEN READ
THE ENTIRE SILO TO ASSURE THAT DATA CAN
BE PROPERLY FILLED AND READ. ALSO THE
PROPER STATUS OF IR AND OR ARE CHECKED.

* FT7: SILO TEST 4: THIS TEST WILL ASSURE PROPER RH11
RESPONSE TO SILO OVERFLOW.

* FT10: SILO TEST 5: THIS TEST WILL ASSURE SILO RESET
BY RH11 INITIALIZE.

**** NOTE: SILO TESTS (FT4-FT10) ARE FOR THE RH11 ONLY. *****

B. TM03/TU45 BASIC FUNCTIONS: THE FOLLOWING FOURTEEN (14) TESTS WILL ASSURE OPERATION OF THE MAG TAPE BASIC FUNCTIONS.

FT11: NOP TEST: THIS TEST WILL ASSURE THAT THE NOP FUNCTION EXECUTES WITH NO ERROR.

FT12: REWIND TEST: THIS TEST WILL ASSURE THAT THE REWIND FUNCTION WILL POSITION THE TAPE TO BOT WITH NO ERROR.

1. ISSUE A REWIND COMMAND
2. AWAIT PIP RESET (MOTION STOPPED)
3. ASSURE THAT NO ERROR OCCURED
4. END

FT13: WRITE/READ TEST: THIS TEST WILL ASSURE THAT THE UNIT UNDER TEST CAN WRITE AND READ IN ALL DENSITIES (FOR BOTH PE AND NRZ).

1. REWIND TO BOT
2. WRITE 100 RECORDS
   A. ALL ONES DATA
   B. 200 FRAMES
   C. 200 BPI; ODD
3. CHECK FOR ERRORS ON EACH RECORD
4. READ REVERSE THEN FORWARD ALL 100 RECORDS
5. CHECK FOR ERRORS ON EACH RECORD
6. REPEAT STEPS 2 THRU 5 FOR 556,800,1600 BPI
7. END.

DATA READ IS NOT CHECKED; ONLY THE FUNCTION IS TESTED, NOT THE MEDIUM.

FT14: SPACE TEST: THIS TEST WILL ASSURE THAT PROPER POSITIONING IS MAINTAINED BY BOTH SPACE FORWARD AND REVERSE.

1. REWIND TO BOT
2. WRITE 100 RECORDS
   A. EACH RECORD IS ONE FRAME LARGER THAN THE LAST.
      THIS WILL ALLOW FOR POSITION CHECKING BY RECORD SIZE.
3. EACH RECORD IS ERROR CHECKED.
4. DATA RELATED ERRORS ARE IGNORED.
5. NOW SPACE REVERSE 77 RECORDS AND READ REVERSE 1, THE FRAME COUNT SHOULD BE 100.
   THIS IS THE SIZE OF THE FIRST RECORD.
6. NOW SPACE FORWARD 76 RECORDS AND READ FORWARD 1, THE FRAME COUNT SHOULD BE 177.
   THIS IS THE SIZE OF THE NEXT TO LAST RECORD.
7. CONTINUE THE SPACE AND READ (DECREMENTING THE RECORD COUNT EACH TIME) UNTIL ALL POSITIONS HAVE BEEN CHECKED. IF POSITION IS LOST; TEST ENDS.
8. REPEAT STEPS 1 THRU 7 FOR PE.
9. END

FT15: ERASE TEST: THIS TEST WILL ASSURE THAT THE ERASE FUNCTION WILL INDEED ERASE TAPES.

1. REWIND TO BOT
2. ISSUE 200 ERRASE COMMANDS.
3. ASSURE NO ERRORS FOR EACH COMMAND.
4. REWIND TO BOT.
5. ISSUE A READ FORWARD COMMAND.
6. THE TAPE SHOULD MOVE FORWARD UNTIL STOPPED BY OPI (APPROX 25 FT).
7. ASSURE NO ERRORS OTHER THAN OPI.
8. END

FT16: TAPE MARK WRITE/READ: THIS TEST WILL ASSURE THAT A TAPE MARK CAN BE WRITTEN AND READ IN BOTH PE AND NRZ.

1. REWIND TO BOT.
2. ISSUE A WRITE TAPE MARK COMMAND.
3. ASSURE NO ERRORS.
4. ASSURE THAT TAPE MARK STATUS IS SET IN DRIVE STATUS (BIT 2).
5. READ REVERSE.
6. ASSURE THAT TAPE MARK IS SET.
7. ASSURE THAT NO ERRORS OTHER THAN FCE OCCURED.
8. READ FORWARD.
9. REPEAT STEPS 6 AND 7
10. REPEAT STEPS 1 THRU 9 FOR PE.
11. END

FT17: TAPE MARK SPACE TEST: THIS TEST WILL ASSURE THAT SPACING WILL BE TERMINATED BY RECOGNITION OF TAPE MARK BOTH IN PE AND NRZ.

1. REWIND TO BOT.
2. WRITE THE FOLLOWING PATTERN OF TAPE MARKS AND DATA RECORDS:

TM:20 RECS:TM:40 RECS:TM:60 RECS:TM:100 RECS:TM:

3. ASSURE NO ERRORS.
4. ASSURE THAT TAPE MARK STATUS IS SET FOR TM WRITES.
5. NOW SPACE REVERSE 200 RECORDS.
6. THE SPACE OPERATION SHOULD STOP ON EACH TAPE MARK IT FINDS. THEREFOR 5 SPACE COMMANDS ARE ISSUED TO COVER THE ENTIRE PATTERN WRITTEN ON TAPE.
   BOT SHOULD NEVER BE REACHED AND THE FRAME COUNT WILL REFELCT THE NUMBER OF RECORDS BETWEEN TAPE MARKS.
7. REPEAT STEP 6 IN THE FORWARD DIRECTION.
8. ASSURE NO ERRORS OTHER THAN FCE.
9. REPEAT STEPS 1 THRU 8 FOR PE
10. END

FT20: WRITE CHECK TEST: BOTH WRITE CHECK FORWARD AND REVERSE ARE TESTED IN BOTH PE AND NRZ.

1. REWIND TO BOT.
2. WRITE A 400 FRAME RECORD USING DATA PATTERN 3 (125125).
3. ASSURE NO ERRORS OCCURED.
4. ISSUE A REVERSE WRITE CHECK COMMAND.
5. ASSURE NO ERRORS OCCURED.
6. REPEAT STEP 5 FOR A FORWARD WRITE CHECK.
7. REPEAT STEPS 1 THRU 6 FOR PE.
8. END

FT21: ERASE HEAD TEST: THIS TEST WILL ASSURE THAT THE ERASE HEAD ITSELF IS OPERATING.

1. REWIND TO BOT.
2. WRITE 2 RECORDS OF 800(10) FRAMES EACH. EACH RECORD WILL BE 1 INCH OF TAPE. DATA IS NOT ALL ONES.
3. REWIND TO BOT.
4. NOW WRITE A 400(10) FRAME RECORD. THIS RECORD WILL BE ONE HALF INCH OF TAPE. THE ERASE HEAD SHOULD CLEAR THE REMAINDER OF THE FIRST RECORD (ONE HALF INCH).
5. REWIND TO BOT.
6. NOW READ THE SHORT FIRST RECORD. IT SHOULD BE 400(10) FRAMES.
7. NOW READ THE SECOND RECORD. IT SHOULD BE STILL 800(10) FRAMES.
8. IF THE SECOND RECORD IS TOO LONG, THE ERASE HEAD DID NOT FUNCTION OR IT IS IN THE WRONG POLARITY.
10. END

FT22: BUFFERED COMMAND: THIS TEST WILL ASSURE THAT THE TM02 WILL ACCEPT AND EXECUTE ANOTHER COMMAND WHILE ITS SELECTED SLAVE IS REWINDING.

1. REWIND TO BOT.
2. ISSUE 3 LONG WRITE COMMANDS TO ASSURE BEING OFF BOT.
3. ISSUE A REWIND COMMAND.
4. AS SOON AS DRIVE READY BECOMES SET, ISSUE ANOTHER WRITE COMMAND.
5. THE NEXT DRIVE READY SHOULD BE AFTER THE TAPE HAS REACHED BOT AND EXECUTED THE BUFFERED WRITE COMMAND.
6. ASSURE NO ERRORS OCCURED.
7. END

```
          FT23: READ IN PRESET:  THIS TEST WILL ASSURE THAT UNIT 0
                                 IS REWOUND AND SET TO 800 BPI NORMAL.
                                 (ONLY IF SLAVE 0 IS SELECTED).

                                 1. ISSUE A WRITE COMMAND TO ASSURE
                                    BEING OFF BOT.
                                 2. ISSUE THE READ-IN PRESET COMMAND.
                                 3. AWAIT MOTION STOP.
                                 4. ASSURE THAT BOT WAS REACHED.
                                 5. ASSURE THAT THE TAPE CONTROL REGISTER
                                    IS SET TO 800 BPI,NORMAL,ODD.
                                 6. END

                          (THIS TEST IS ONLY PERFORMED IF THE SELECTED SLAVE IS ZERO (0).

        FT24: AUTOMATIC DENSITY SELECTION -WRITE NRZ,READPF:
                                 THIS TEST ASSURES THAT AW NRZ WRITTEN
                                 TAPE WHEN READ AS PE WILL SWITCH THE
                                 SLAVE TO NRZ MODE.
                                 1. REWIND SLAVE
                                 2. WRITE AN NRZ RECORD
                                 3. REWIND SLAVE
                                 4. READ RECORD IN PE MODE
                                 5. CHECK DS REG PES BIT=0
                                 6. END

      FT25: AUTOMATIC DENSITY SELECTION-WRITE PE,READ NRZ:
                                 THIS TEST ASSURES THAT A PE WRITTEN
                                 TAPE WHEN READ AS NRZ WILL SWITCH
                                 THE SLAVE TO PE MODE.
                                 1. REWIND SLAVE
                                 2. WRITE A PE RECORD
                                 3. REWIND A SLAVE
                                 4. READ RECORD IN NRZ MODE
                                 5. CHECK DS REG PES BIT=1
                                 6. END.

       FT26: REWIND: OFF LINE THIS TEST WILL ASSURE
                                 THAT THE UNIT WILL REWIND AND
                                 GO OFF LINE. (NOT IF IN CONTINUOUS CYCLE)

                                 1. ISSUE THE REWIND OFF-LINE COMMAND.
                                 2. ASSURE THAT MOL (BIT 12 OF DRIVE STATUS)
                                    IS RESET INDICATING THE UNIT WENT OFF LINE.
                                 3. END

                          (THIS TEST IS NOT PERFORMED WHEN CONTINUOUS CYCLE OPERATION IS SELECTED: SW 12 = 1)


    %
520                                  .LIST   BIN,LOC,SEQ
521                                  .TITLE TM03/TU45 BASIC FUNCTION TEST
522                                  ;CZTUQA0
```

```
                                        ;25 MAY 78
                                        ;R. BARNES/R. J. COLLINS
                                        .MCALL  .$ACT11,.$EOP,$CATCH,$SAVE,$RESTORE,$CHAIN,$CHNMODE
                                        .NLIST  MC
                                        .LIST   ME
                                        .ENABLE ABS,AMA


                                        ;CONSOLE SWITCHES*********
                                        ;
                                        ;SW15(100000)   1=HALT ON ERROR
                                        ;               0=CONTINUE
                                        ;SW14(040000)   1=LOOP ON ERROR (SCOPE(040000) RH TESTS ONLY)
                                        ;               0=CONTINUE
                                        ;SW13(02000):   1=DO NOT PRINT ERRORS
                                        ;               0=PRINT ERRORS
                                        ;SW12(010000):  1=CONTINUOUS CYCLE
                                        ;               0=HALT AT END OF PASS
                                        ;SW11(40000):   1=INHIBIT ITERATIONS
                                        ;               0=DO ITERATIONS
                                        ;SW10(002000):  1=HALT AT END OF EACH TEST
                                        ;               0=CONTINUE
                                        ;SW0-4:         SELECT TEST NUMBER :: 00=ALL TESTS
                                ;USE SOFTWARE SWR IF HARDWARE SWR <15::00> = 177777 OR NOT AVAIL.
```

```
                                    ;TU45 REGISTER BITS**********

                                    ;15 ;14 ;13 ;12 ;11 ;10 ;09 ;08 ;07 ;06 ;05 ;04 ;03 ;02 ;01 ;00 ;
                                    ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                              ;CS1: ;SC ;TRE;MCP;SPR;DNA;PSL;A17;A16;RDY;IE ;FUN;FUN;FUN;FUN;FUN;GO ;
                                    ;   ;   ;   ;   ;   ;   ;   ;   ;   ;   ;   ;   ;   ;   ;   ;
                                    ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                              ;WC:  ; WORD                                                          ;
                                    ; COUNT                                                         ;
                                    ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                              ;BA:  ; BUS                                                           ;
                                    ; ADDRESS                                                       ;
                                    ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                              ;FC:  ; FRAME                                                         ;
                                    ; COUNT                                                         ;
                                    ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                              ;CS2: ;DLT;WCE;UPE;NED;NEM;PGE;MXF;MDP;OR ;IR ;CLR;PAT;BAI;U2 ;U1 ;U0 ;
                                    ;   ;   ;   ;   ;   ;   ;   ;ERR;   ;   ;   ;   ;   ;   ;   ;
                                    ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                              ;DS:  ;ATA;ERR;PIP;MOL;WRL;EOT;SPR;DPR;DRY;SSC;PES;SDN;IDB;TMK;BOT;SLA;
                                    ;   ;   ;   ;   ;   ;   ;   ;   ;   ;   ;   ;   ;   ;   ;   ;
                                    ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                              ;ER:  ;CDE;UNS;OPI;DTE;NEF;CS ;FCE;NSG;PEF;INC;DAT;FMT;CNT;RMR;ILR;ILF;
                                    ;CRC;   ;   ;   ;ITM;   ;   ;LRC;VPE;BPE;   ;BPE;   ;   ;   ;
                                    ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                              ;ATS: ; ATTENTION                                                     ;
                                    ; SUMMARY                                                       ;
                                    ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                              ;CC:  ; CHECK                                                         ;
                                    ; CHARACTER                                                     ;
                                    ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                              ;DB:  ; DATA                                                          ;
                                    ; BUFFER                                                        ;
                                    ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                              ;MR:  ;DB ;DB ;DB ;DB ;DB ;DB ;DB ;DB ;WRT;MM ;OP ;OP ;OP ;OP ;MM ;
                                    ; 0 ; 1 ; 2 ; 3 ; 4 ; 5 ; 6 ; 7 ; P ;CLK;CLK; 4 ; 3 ; 2 ; 1 ;GO ;
                                    ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                              ;DT:  ; DRIVE     ; 7 ;   ;SLV;                                       ;
                                    ; TYPE      ;CH ;   ;PR ;                                       ;
                                    ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                              ;SN:  ; SERIAL                                                        ;
                                    ; NUMBER                                                        ;
                                    ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                              ;TC:  ;ACL;FCS;SAC;ENA;SPR;DEN;DEN;DEN;FMT;FMT;FMT;FMT;EVN;SSN;SSN;SSN;
                                    ;   ;   ;   ;DT ;   ; 4 ; 2 ; 1 ; 8 ; 4 ; 2 ; 1 ;PAR; 4 ; 2 ; 1 ;
                                    ;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
```

```
                                        ;REGISTER EQUIVS**********

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


                                ;ACT11 HOOK ***********
            000764                      $SVPC=.                 ;SAVE CURRENT LOCATION CTR
            000046                      .=46
 000046     003154                      .WORD   $ENDAD          ;SET LOCATION 46
            000052                      .=52
 000052     000000                      .WORD   0               ;SET LOCATION 52 = 0
            000764                      .=$SVPC                 ;RESTORE LOCATION CTR

                                        ;TTY INTERRUPT VECTOR**********

            000060                      .=60
 000060     012656                      .WORD   TTINT           ;TTY INTERRUPT HEADER ADDRESS
 000062     000340                      .WORD   340             ;PRIORITY LEVEL 7

                                        ;SOFTWARE SWITCH REGISTER**********
                                ;USED IF HARDWARE SWR <15::00> = 177777 OR NOT AVAIL.

            000176                      .=176
 000176     000000             SWREG:   0                       ;SOFTWARE SWITCH REGISTER


                                        ;START ADDRESS**********

            000200                      .=200
 000200     000137  001600              JMP     START   ;PROGRAM START

                                        ;RESTART ADDRESS**********
            000210                      .=210
 000210     000137  002542              JMP     ST4

                                        ;TM03 INTERRUPT VECTOR**********

            000224                      .=224
 000224     012646                      MTINT           ;TAPE INTERRUPT HANDLER ADDRESS
 000226     000340                      340
```

```

         000510                   .=510
                                  ;MASS BUS REGISTER EQUIVS**********

000510   172440           C1:     172440
000512   172442           WC:     172442
000514   172444           BA:     172444
000516   172446           FC:     172446
000520   172450           CS:     172450
000522   172452           DS:     172452
000524   172454           ER:     172454
000526   172456           AS:     172456
000530   172460           CC:     172460
000532   172462           DB:     172462
000534   172464           MR:     172464
000536   172466           DT:     172466
000540   172470           SN:     172470
000542   172472           TC:     172472
000544   172474           BAE:    172474

                                  ;CONSTANTS**********

000546   177776           PSW:    177776          ;PROCESSOR STATUS
000550   177570           SWR:    177570          ;SWITCH REGISTER
000552   177560           TKS:    177560          ;TTY READER STATUS
000554   177562           TKB:    177562          ;TTY READ BUFFER
000556   177564           TPS:    177564          ;TTY PUNCH STATUS
000560   177566           TPB:    177566          ;TTY PUNCH BUFFER
000562   177777           SERNUM: 177777          ;SERIAL NUMBER
000564   000011           DRVTP:  011             ;DRIVE TYPE
000566   000010           ITAMT:  10              ;ITERATION AMOUNT
000570   000224           VECT:   224             ;INTERRUPT VECTOR(RH)
000572   172440           REGS:   172440          ;STARTING REGISTER ADDRESS
000574   000004           BTRP:   4               ;BUS TRAP ADDRESS
000576   000006           BTRP2:  6               ;BUS TRAP PRIORITY LEVEL 7
```

```
                                        ;FLAGS AND COUNTERS**********

000600  000000          TOB:    0
000602  000000          TIB:    0
000604  000000          RH17F:  0
000606  000000          HDRFL:  0
000610  000000          EMADDR: 0
000612  000000          DRVN:   0
000614  000000          SLVN:   0
000616  000000          BADDR:  0
000620  000000          FCNT:   0
000622  000000          WCNT:   0
000624  000000          RCNT:   0
000626  000000          ERRP:   0
000630  000000          ERRP1:  0
000632  000000          RRD:    0
000634  000000          RFD:    0
000636  000000          RDYDX:  0
000640  000000          OPDYX:  0
000642  000000          SCNT:   0
000644  000000          PFLG:   0
000646  000000          RTRN:   0
000650  000000          ERADD:  0
000652  000000          TEMP1:  0
000654  000000          TEMP2:  0
000656  000000          TEMP3:  0
000660  000000          STMSK:  0
000662  000000          ITCNT:  0
000664  000000          DSAV:   0
000666  000000          SAV1:   0
000670  000000          SAV2:   0
000672  000000          SAV3:   0
000674  000000          SCOLP:  0
000676  000000          ITRLP:  0
000700  000000          EXFL:   0
000702  000000          PEXFL:  0
000704  000000          STFLG:  0
000706  000000          LTADD:  0
000710  000000          FUN:    0
000712  000000          SERFL:  0
000714  000000          CRCNT:  0
000716  000000          UDES:   0
000720  000000          PATRN:  0
000722  000000          RHTF:   0
000724  000000          NRZOF:  0
000726  000000          RHOF:   0
000730  000000          PCNTR:  0
000732  000000          TEMPST: 0
000734  000000          COUNT:  0
000736  000000          RDSW:   0
```

```
                                        ;DATA PATTERN GENERATORS*****

000740  000000                DATBL:  0
000742  012440                DATA0:  DAT1    ;ALL ONE BITS
000744  012460                DATA1:  DAT2    ;ALL ZERO BITS
000746  012464                DATA2:  DAT3    ;ALTERNATING ONE/ZERO BITS
000750  012472                DATA3:  DAT4    ;ALL BITS 0-377
```

```
                                        ;LOGIC TEST ENTRY TABLE**********

000752  000000              TSTTBL: 0
000754  000000                      0
000756  003216                      FT1
000760  003216                      FT1
000762  003316                      FT2
000764  003316                      FT2
000766  003640                      FT3
000770  003640                      FT3
000772  004060                      FT4
000774  004060                      FT4
000776  004206                      FT5
001000  004206                      FT5
001002  004400                      FT6
001004  004400                      FT6
001006  004652                      FT7
001010  004652                      FT7
001012  004746                      FT10
001014  004746                      FT10
001016  005102                      FT11
001020  005102                      FT11
001022  005220                      FT12
001024  005220                      FT12
001026  005332                      FT13
001030  005332                      FT13
001032  005644                      FT14
001034  005644                      FT14
001036  006516                      FT15
001040  006516                      FT15
001042  006716                      FT16
001044  006716                      FT16
001046  007144                      FT17
001050  007144                      FT17
001052  007546                      FT20
001054  007546                      FT20
001056  007772                      FT21
001060  007772                      FT21
001062  010324                      FT22
001064  010324                      FT22
001066  010530                      FT23
001070  010530                      FT23
001072  010750                      FT24
001074  010750                      FT24
001076  011142                      FT25
001100  011142                      FT25
001102  011334                      FT26
001104  011334                      FT26
001106  003110                      .WORD   TEND
001110  000026              TLAST:  .WORD   26              ;CONTAINS # OF TESTS
```

```
                        001600                          .=1600
                                                        ;PROGRAM START AND HOUSEKEEPING**********

001600  012706  000500          START:  MOV     #500,SP         ;SET STACK POINTER
001604  013746  000006                  MOV     @#6,-(SP)               ;SAVE VECTORS
001610  013746  000004                  MOV     @#4,-(SP)
001614  012737  001640  000004          MOV     #1$,@#4                 ;SET UP FOR TIMEOUT
001622  005037  000006                  CLR     @#6
001626  022777  177777  176714          CMP     #-1,@SWR                ;REFERENCE HARDWARE SWITCH REGISTER
001634  001402                          BEQ     2$
001636  000404                          BR      3$
001640  022626                  1$:     CMP     (SP)+,(SP)+             ;ADJUST STACK
001642  012737  000176  000550  2$:     MOV     #SWREG,SWR              ;POINT TO SOFTWARE SWITCH REG
001650  012637  000004          3$:     MOV     (SP)+,@#4               ;RESTORE VECTORS
001654  012637  000006                  MOV     (SP)+,@#6
001660  005027                          CLR     (PC)+           ;;CLEAR CHAIN INDICATOR
001662  000000          CHNFLG: .WORD   0               ;;CHAIN MODE IN ICATOR
                                                        ;;1/0 = CHAIN/NOT CHAIN MODE
001664  022737  003154  000042          CMP     #$ENDAD,@#42    ;;BRANCH IF LOADED VIA ACT11 CHAIN MODE
001672  001404                          BEQ     50$
001674  005737  000042                  TST     @#42            ;;BRANCH IF IN DUMP MODE
001700  001413                          BEQ     52$
001702  000406                          BR      51$
001704  012737  000176  000550  50$:    MOV     #SWREG,SWR      ;;INVOKE SOFTWARE SWR
001712  012777  100000  176630          MOV     #100000,@SWR    ;;WITH HALT ON ERROR SET
001720  005237  001662          51$:    INC     CHNFLG          ;;SET CHNFLG = CHAIN MODE
001724  000137  002556                  JMP     TSCD            ;;GO TO CHAIN ADDRESS
001730                          52$:
001730  122737  000006  000041  4$:     CMPB    #6,@#41         ;BRANCH IF LOADED VIA TMDP (DUMP MODE)
001736  001004                          BNE     5$
001740  012704  016675                  MOV     #MSG69,R4       ;ADVISE USER TO REMOVE TMDP FROM UUT
001744  004737  013442                  JSR     PC,TTOUT
001750  012704  014470          5$:     MOV     #MSG3,R4
001754  004737  013442                  JSR     PC,TTOUT        ;PRINT TITLE
001760  112737  000043  014470          MOVB    #'#,MSG3        ;DO NOT PRINT TITLE ON RESTART
001766  012704  014623          STOB:   MOV     #MSG4,R4
001772  004737  013442                  JSR     PC,TTOUT        ;REQUEST REGISTER ADDRESS
001776  013703  000572                  MOV     REGS,R3
002002  004737  013572                  JSR     PC,OCTP         ;PRINT CURRENT ADDRESS
002006  012705  000572                  MOV     #REGS,R5        ;SET ADDRESS SAVE LOC
002012  012701  000007                  MOV     #7,R1           ;SET SIZE OF RESPONSE
002016  012702  176400                  MOV     #176400,R2      ;SET UPPER LIMIT
002022  012703  172300                  MOV     #172300,R3      ;SET LOWER LIMIT
002026  004737  013120                  JSR     PC,TTR          ;GO GET RESPONSE
002032  012704  014646                  MOV     #MSG5,R4
002036  004737  013442                  JSR     PC,TTOUT        ;REQUEST VECTOR
002042  013703  000570                  MOV     VECT,R3
002046  004737  013572                  JSR     PC,OCTP         ;PRINT CURRENT VECTOR
002052  012705  000570                  MOV     #VECT,R5        ;SET ADDRESS SAVE LOC
002056  012701  000004                  MOV     #4,R1           ;SET SIZE OF RESPONSE
002062  012702  000224                  MOV     #224,R2         ;SET UPPER LIMIT
002066  012703  000150                  MOV     #150,R3         ;SET LOWER LIMIT
002072  004737  013120                  JSR     PC,TTR          ;GO GET RESPONSE
002076  013700  000570                  MOV     VECT,R0         ;GET VECTOR
002102  012720  012646                  MOV     #MTINT,(R0)+    ;LOAD INTERRUPT ADDRESS IN VECTOR
002106  012710  000340                  MOV     #340,(R0)       ;LOAD PRIORITY
```

```
  843  002112  013700  000572                  MOV     REGS,R0         ;GET START OF REGS
  844  002116  012701  000017                  MOV     #17,R1          ;SET NUMBER OF REGS
  845  002122  012702  000510                  MOV     #C1,R2          ;GET START OF TABLE
  846  002126  010022                  ST0:    MOV     R0,(R2)+        ;BUILD TABLE
  847  002130  062700  000002                  ADD     #2,R0           ;BUMP ADDRESS
  848  002134  005301                          DEC     R1              ;SEE IF DONE
  849  002136  001373                          BNE     ST0             ;IF NOT: BR
  850  002140  012702  000600                  MOV     #TOB,R2
  851  002144  012700  000054                  MOV     #54,R0
  852  002150  005022                  ST1:    CLR     (R2)+           ;CLEAR FLAGS + COUNTERS
  853  002152  005300                          DEC     R0
  854  002154  001375                          BNE     ST1
  855  002156  012737  000001  000722          MOV     #1,RHTF         ;SET ADDRESS TEST FLAG
  856  002164  000137  002750                  JMP     TSRH            ;GO DO INITIAL ADDRESS TEST PASS
  857  002170  012704  014725          ST1A:   MOV     #MSG10,R4
  858  002174  004737  013442                  JSR     PC,TTOUT        ;REQUEST DRIVE NUMBER
  859  002200  013703  000612                  MOV     DRVN,R3         ;GET CURRENT DRIVE #
  860  002204  004737  013572                  JSR     PC,OCTP         ;AND TYPE IT
  861  002210  012705  000612                  MOV     #DRVN,R5        ;SET ADDRESS OF DRIVE NUMBER SAVE
  862  002214  012701  000002                  MOV     #2,R1           ;SET SIZE OF RESPONSE
  863  002220  012702  000007                  MOV     #7,R2           ;SET UPPER LIMIT
  864  002224  012703  000000                  MOV     #0,R3           ;SET LOWER LIMIT
  865  002230  004737  013120                  JSR     PC,TTR          ;GO GET RESPONSE
  866  002234  012777  000040  176256          MOV     #40,@CS         ;SET INIT
  867  002242  053777  000612  176250          BIS     DRVN,@CS        ;SET DRIVE NUMBER
  868  002250  005777  176234                  TST     @C1             ;ACCESS DRIVE
  869  002254  032777  010000  176236          BIT     #10000,@CS      ;SEE IF NED
  870  002262  001405                          BEQ     ST2             ;IF NOT: BR
  871  002264  012704  015657                  MOV     #MSG41,R4
  872  002270  004737  013442                  JSR     PC,TTOUT        ;PRINT NOT AVAIL
  873  002274  000735                          BR      ST1A            ;REDO DRIVE REQUEST
  874  002276  012704  014745          ST2:    MOV     #MSG11,R4
  875  002302  004737  013442                  JSR     PC,TTOUT        ;REQUEST SLAVE NUMBER
  876  002306  013703  000614                  MOV     SLVN,R3         ;GET CURRENT SLAVE #
  877  002312  004737  013572                  JSR     PC,OCTP         ;AND TYPE IT
  878  002316  012705  000614                  MOV     #SLVN,R5        ;SET ADDRESS OF SLAVE SAVE
  879  002322  012701  000002                  MOV     #2,R1           ;SET SIZE OF RESPONSE
  880  002326  012702  000007                  MOV     #7,R2           ;SET UPPER LIMIT
  881  002332  012703  000000                  MOV     #0,R3           ;SET LOWER LIMIT
  882  002336  004737  013120                  JSR     PC,TTR          ;GO GET RESPONSE
  883  002342  012777  000040  176150          MOV     #40,@CS         ;INIT
  884  002350  053777  000612  176142          BIS     DRVN,@CS        ;SET DRIVE NUMBER
  885  002356  013777  000614  176156          MOV     SLVN,@TC        ;LOAD SLAVE NUMBER
  886  002364  032777  002000  176144          BIT     #2000,@DT       ;SEE IF SLAVE PRESENT
  887  002372  001005                          BNE     ST3             ;IF SO: BR
  888  002374  012704  015700                  MOV     #MSG42,R4
  889  002400  004737  013442                  JSR     PC,TTOUT        ;PRINT NON-EXIST SLAVE
  890  002404  000734                          BR      ST2             ;REDO SLAVE REQUEST
  891  002406  012704  015721          ST3:    MOV     #MSG43,R4
  892  002412  004737  013442                  JSR     PC,TTOUT        ;PRINT SERIAL NUMBER TAG
  893  002416  017703  176116                  MOV     @SN,R3
  894  002422  004737  014120                  JSR     PC,SNPT         ;PRINT SERIAL NUMBER
  895  002426  005037  000604                  CLR     RH17F           ;SET RH INDICATOR = RH11
  896  002432  013746  000004                  MOV     @#4,-(SP)       ;SAVE ERROR TRAP VECTORS
  897  002436  013746  000006                  MOV     @#6,-(SP)       ;AND PRIORITY
  898  002442  012737  002466  000004          MOV     #1$,@#4         ;SET TIME OUT TRAP TO 1$ BELOW
```

```
  899  002450  005037  000006                    CLR     @#6
  900  002454  005777  176064                    TST     @BAE            ;REFERENCE BAE REGISTER
  901  002460  012737  000001  000604            MOV     #1,RH17F        ;SET FLAG = RH70
  902  002466  012637  000006          1$:       MOV     (SP)+,@#6       ;RESTORE ERROR TRAP
  903  002472  012637  000004                    MOV     (SP)+,@#4
  904  002476  012704  016552                    MOV     #MSG62,R4       ;GET REQUEST
  905  002502  004737  013442                    JSR     PC,TTOUT        ;REQUEST RH11 ONLY RESPONSE
  906  002506  013703  000726                    MOV     RHOF,R3         ;GET CURRENT FLAG SETTING
  907  002512  004737  013572                    JSR     PC,OCTP         ;AND TYPE IT
  908  002516  012705  000726                    MOV     #RHOF,R5        ;SET FLAG ADDRESS
  909  002522  012701  000002                    MOV     #2,R1           ;SET SIZE OF RESPONSE
  910  002526  012702  000001                    MOV     #1,R2           ;SET UPPER LIMIT
  911  002532  012703  000000                    MOV     #0,R3           ;SET LOWER LIMIT
  912  002536  004737  013120                    JSR     PC,TTR          ;GO GET RESPONSE
  913
  914                                  ;START 210
  915  002542  012706  000500          ST4:      MOV     #500,SP         ;SET STACK PTR
  916  002546  005037  000730                    CLR     PCNTR           ;CLEAR PASS COUNTER
  917  002552  004737  014222                    JSR     PC,GTSWR        ;GET SWITCHES
```

```
                                        ;TEST SCHEDULAR**********

002556  052777  000100  175766  TSCD:   BIS     #100,@TKS       ;SET KEYBOARD IE BIT
002564  005037  000704                  CLR     STFLG           ;CLEAR SINGLE TEST FLAG
002570  017700  175754                  MOV     @SWR,R0
002574  042700  177740                  BIC     #177740,R0
002600  001125                          BNE     STSCD           ;GO SELECT SINGLE TEST
002602  005737  001662                  TST     CHNFLG          ;;BRANCH IF NOT IN CHAIN MODE
002606  001457                          BEQ     TSCDA
002610  012737  177777  000612          MOV     #-1,DRVN        ;;INITIALIZE DRIVE #
002616  012737  177777  000614  NXTDRV: MOV     #-1,SLVN        ;;INITIALIZE SLAVE #
002624  012777  000040  175666  1$:     MOV     #40,@CS         ;;INIT CONTROLLER
002632  005237  000612                  INC     DRVN            ;;STEP DRIVE #
002636  022737  000010  000612          CMP     #10,DRVN        ;;EXIT IF ALL DRIVES TESTED
002644  001524                          BEQ     $DONE           ;;FOR AVAILABILITY
002646  013777  000612  175644          MOV     DRVN,@CS        ;;LOAD DRIVE #
002654  005777  175630                  TST     @C1             ;;ACCESS DRIVE
002660  032777  010000  175632          BIT     #10000,@CS      ;;BRANCH IF DRIVE NON EXISTANT
002666  001356                          BNE     1$              ;;(NED = 1)
002670  005237  000614          NXTSLV: INC     SLVN            ;;STEP SLAVE # AND BRANCH
002674  001011                          BNE     1$              ;;IF NOT SLAVE 0
002676  005737  000612                  TST     DRVN            ;;BRANCH IF NOT DRIVE # 0
002702  001006                          BNE     1$
002704  122737  000006  000041          CMPB    #6,@#41         ;;BRANCH IF NOT TMDP
002712  001002                          BNE     1$
002714  005237  000614                  INC     SLVN            ;;STEP TO SLAVE # 1
002720  022737  000010  000614  1$:     CMP     #10,SLVN        ;;BRANCH IF ALL SLAVES TESTED
002726  001733                          BEQ     NXTDRV          ;;FOR AVAILABILITY
002730  013777  000614  175604          MOV     SLVN,@TC        ;;LOAD SLAVE UNIT #
002736  032777  002000  175572          BIT     #2000,@DT       ;;BRANCH IF SLAVE NOT
002744  001751                          BEQ     NXTSLV          ;;PRESENT (SPR = 0)
002746  000240                  TSCDA:  NOP
002750  012737  000752  000706  TSRH:   MOV     #TSTTBL,LTADD
002756  062737  000004  000706  TSCD0:  ADD     #4,LTADD
002764  013737  000706  000676  TSCD1:  MOV     LTADD,ITRLP
002772  062737  000002  000676          ADD     #2,ITRLP        ;SET ITERATION ADDRESS
003000  005037  000660                  CLR     STMSK
003004  005037  000626                  CLR     ERRP
003010  005037  000606                  CLR     HDRFL           ;CLEAR PRINT HEADER FLAG
003014  017700  175666                  MOV     @LTADD,R0       ;SET POINTER TO TEST
003020  000110                          JMP     (R0)            ;GO TO TEST
003022  032777  002000  175520  TSCD2:  BIT     #2000,@SWR      ;SEE IF HALT ON TEST
003030  001401                          BEQ     TSCD3           ;IF NOT: BR
003032  000000                          HALT
003034  005737  000704          TSCD3:  TST     STFLG           ;SE IF SINGLE TEST
003040  001746                          BEQ     TSCD0           ,IF NOT: BR
003042  017700  175502                  MOV     @SWR,R0
003046  042700  177740                  BIC     #177740,R0      ;BRANCH IF ALL TESTS SELECTED
003052  001641                          BEQ     TSCD
003054  012737  000001  000704  STSCD:  MOV     #1,STFLG        ;SET SINGLE TEST FLAG
003062  023700  001110                  CMP     TLAST,R0        ;SEE IF EXCEEDED TESTS
003066  002410                          BLT     TEND            ;IF SO: BR
003070  006300                          ASL     R0
003072  006100                          ROL     R0              ;SET TABLE MODIFIER
003074  012737  000752  000706          MOV     #TSTTBL,LTADD
003102  060037  000706                  ADD     R0,LTADD        ;SET TEST POINTER
```

```
  974  003106  000726                        BR      TSCD1
  975  003110  005737  001662          TEND:  TST     CHNFLG          ;BRANCH IF IN CHAIN MODE
  976  003114  001265                        BNE     NXTSLV
  977  003116  012704  014661          $DONE: MOV     #MSG6,R4
  978  003122  004737  013442                 JSR     PC,TTOUT        ;PRINT END OF PASS
  979  003126  013703  000730                 MOV     PCNTR,R3
  980  003132  004737  013572                 JSR     PC,OCTP         ;PRINT PASS NUMBER
  981  003136  005000                         CLR     R0
  982  003140  005300                   1$:   DEC     R0
  983  003142  001376                         BNE     1$
  984  003144  013700  000042                 MOV     @#42,R0         ;GET ACT11 RETURN ADDRESS
  985  003150  001405                         BEQ     HERE            ;BRANCH IF NOT ACT11
  986  003152  000005                         RESET
  987  003154  004710                   $ENDAD: JSR     PC,(R0)
  988  003156  000240                         NOP
  989  003160  000240                         NOP
  990  003162  000240                         NOP
  991  003164  000240                   HERE: NOP
  992  003166  005737  001662                 TST     CHNFLG          ;BRANCH IF IN CHAIN MODE
  993  003172  001005                         BNE     TENDX
  994  003174  032777  010000  175346         BIT     #10000,@SWR     ;SEE IF HALT ON PASS
  995  003202  001001                         BNE     TENDX           ;IF NOT: BR
  996  003204  000000                         HALT
  997  003206  005237  000730          TENDX: INC     PCNTR           ;BUMP PASS COUNTER
  998  003212  000137  002556                 JMP     TSCD            ;RESTART
```

```
  999
 1000                                          ;RH ADDRESSING TEST**********
 1001
 1002  003216  012737  016771  000610  FT1:    MOV     #MSFT1,EMADDR   ;SET HEADER
 1003  003224  012777  013004  175342          MOV     #TRAP,@BTRP     ;SET TRAP HANDLER ADDRESS
 1004  003232  012777  000340  175336          MOV     #340,@BTRP2
 1005  003240  012700  000016                  MOV     #16,R0          ;SET NUMBER OF REGISTERS
 1006  003244  013701  000510                  MOV     C1,R1           ;GET FIRST ADDRESS (CS1)
 1007  003250  005711                  FT1A:   TST     (R1)            ;REFERENCE REGISTER
 1008  003252  000240                          NOP                     ;IF ADDRESS IS BAD, BUS TRAP WILL OCCUR
 1009  003254  005300                  FT1B:   DEC     R0              ;SEE IF DONE ALL
 1010  003256  001403                          BEQ     FT1X            ;IF SO: BR
 1011  003260  062701  000002                  ADD     #2,R1           ;BUMP ADDRESS POINTER
 1012  003264  000771                          BR      FT1A            ;CONTINUE
 1013  003266  012777  000006  175300  FT1X:   MOV     #6,@BTRP        ;RESET TRAP CATCHER
 1014  003274  005737  000722                  TST     RHTF            ;SEE IF INITIAL ADDRESS TEST PASS
 1015  003300  001404                          BEQ     FT1XX           ;IF NOT: BR
 1016  003302  005037  000722                  CLR     RHTF            ;CLEAR FLAG
 1017  003306  000137  002170                  JMP     ST1A            ;RETURN
 1018  003312  000137  003022          FT1XX:  JMP     TSCD2           ;RETURN TO SCHEDULAR
```

```
 1019
 1020                                          ;RH REGISTER BITS READ/WRITE**********
 1021
 1022  003316  012737  017016  000610  FT2:    MOV     #MSFT2,EMADDR   ;SET TEST HEADER
 1023  003324  012701  177777                  MOV     #-1,R1          ;SET ALL ONES PATTERN
 1024  003330  004737  012620          FT2A:   JSR     PC,INIT1        ;GO INIT
 1025  003334  013700  000512                  MOV     WC,R0           ;GET ADDRESS OF WORD COUNT
 1026  003340  010102                          MOV     R1,R2           ;SET EXPT REGISTER BIT PATTERN
 1027  003342  010110                          MOV     R1,(R0)         ;LOAD PATTERN
 1028  003344  021002                          CMP     (R0),R2         ;SEE IF EXPT=RCVD
 1029  003346  001410                          BEQ     FT2B            ;IF SO: BR
 1030  003350  012737  015205  000650          MOV     #MSG25,ERADD    ;SET CODE
 1031  003356  012737  003330  000674          MOV     #FT2A,SCOLP     ;SET SCOPE
 1032  003364  004737  003504                  JSR     PC,FT2ER        ;GO DO ERROR
 1033  003370  013700  000514          FT2B:   MOV     BA,R0           ;GET ADDRESS OF BUS ADDRESS
 1034  003374  010102                          MOV     R1,R2
 1035  003376  042702  000001                  BIC     #1,R2           ;SET EXPT PATTERN
 1036  003402  010110                          MOV     R1,(R0)         ;LOAD PATTERN
 1037  003404  020210                          CMP     R2,(R0)         ;SEE IF EXPT=RCVD
 1038  003406  001410                          BEQ     FT2C            ;IF SO:BR
 1039  003410  012737  015213  000650          MOV     #MSG26,ERADD    ;SET ERROR CODE
 1040  003416  012737  003370  000674          MOV     #FT2B,SCOLP     ;SET SCOPE ADDRESS
 1041  003424  004737  003504                  JSR     PC,FT2ER        ;GO DO ERROR
 1042  003430  013700  000532          FT2C:   MOV     DB,R0           ;GET ADDRESS OF DATA BUFFER
 1043  003434  010102                          MOV     R1,R2
 1044  003436  010110                          MOV     R1,(R0)         ;LOAD PATTERN
 1045  003440  012703  004000                  MOV     #4000,R3
 1046  003444  005303                  FT2D:   DEC     R3              ;DELAY
 1047  003446  001376                          BNE     FT2D
 1048  003450  020210                          CMP     R2,(R0)         ;SEE IF EXPT=RCVD
 1049  003452  001410                          BEQ     FT2E            ;IF SO: BR
 1050  003454  012737  015221  000650          MOV     #MSG27,ERADD    ;SET ERROR CODE
 1051  003462  012737  003430  000674          MOV     #FT2C,SCOLP     ;SET SCOPE ADDRESS
 1052  003470  004737  003504                  JSR     PC,FT2ER        ;GO DO ERROR
 1053  003474  005701                  FT2E:   TST     R1              ;SEE IF DONE RESET
 1054  003476  001453                          BEQ     FT2X            ;IF SO: BR
 1055  003500  005001                          CLR     R1              ;SET ZERO PATTERN
 1056  003502  000712                          BR      FT2A            ;DO ZERO BITS
 1057  003504  000240                  FT2ER:  NOP
 1058  003506  032777  020000  175034          BIT     #20000,@SWR     ;SEE IF PRINT ERROR
 1059  003514  001034                          BNE     FT2ERB          ;IF NOT: BR
 1060  003516  005737  000606                  TST     HDRFL           ;SEE ID DONE HEADER
 1061  003522  001004                          BNE     FT2ERA          ;IF SO: BR
 1062  003524  013704  000610                  MOV     EMADDR,R4
 1063  003530  004737  013442                  JSR     PC,TTOUT        ;DO HEADER
 1064  003534  012737  000001  000606  FT2ERA: MOV     #1,HDRFL        ;SET FLAG
 1065  003542  013704  000650                  MOV     ERADD,R4
 1066  003546  004737  013442                  JSR     PC,TTOUT        ;PRINT ERROR CODE
 1067  003552  012704  015151                  MOV     #MSG22,R4
 1068  003556  004737  013442                  JSR     PC,TTOUT        ;PRINT EXPT TAG
 1069  003562  010103                          MOV     R1,R3
 1070  003564  004737  013560                  JSR     PC,OCTPE        ;PRINT EXPT
 1071  003570  012704  015161                  MOV     #MSG23,R4
 1072  003574  004737  013442                  JSR     PC,TTOUT        ;PRINT RCVD TAG
 1073  003600  011003                          MOV     (R0),R3
 1074  003602  004737  013560                  JSR     PC,OCTPE        ;PRINT RCVD
```

```
 1075  003606  005777  174736          FT2ERB: TST     @SWR            ;SEE IF HALT ON ERROR
 1076  003612  100001                          BPL     FT2ERC          ;IF NOT: BR
 1077  003614  000000                          HALT
 1078  003616  004737  012512          FT2ERC: JSR     PC,SCOPE        ;GO SEE IF SCOPE ON ERROR
 1079  003622  000240                          NOP
 1080  003624  000207                          RTS     PC              ;IF NO SCOPE: CONTINUE TEST
 1081  003626  000240                  FT2X:   NOP
 1082  003630  004737  012546                  JSR     PC,ITER         ;GO SEE IF ITERATIONS
 1083  003634  000137  003022                  JMP     TSCD2           ;RETURN TO SCHEDULAR
```

```
1084
1085                                        ;RH INITIALIZE TEST**********
1086
1087  003640  012737  017053  000610  FT3:  MOV   #MSFT3,EMADDR  ;SET TEST HEADER
1088  003646  012737  003640  000674        MOV   #FT3,SCOLP
1089  003654  004737  012620              .SR   PC,INIT1        ;GO INIT
1090  003660  052777  020000  174632        BIS   #20000,@CS      ;FORCE UPE =1
1091  003666  000240                       NOP
1092  003670  004737  012620              JSR   PC,INIT1        ;GO INIT
1093  003674  005777  174610              TST   @C1             ;SEE IF SC IS RESET
1094  003700  100005                       BPL   FT3A            ;IF SO: BR
1095  003702  012737  015257  000650        MOV   #MSG29,ERADD    ;SET ERROR CODE
1096  003710  004737  003774              JSR   PC,FT3ER        ;GO DO ERROR
1097  003714  032777  040000  174566  FT3A: BIT   #40000,@C1      ;SEE IF TRE IS RESET
1098  003722  001405                       BEQ   FT3B            ;IF SO: BR
1099  003724  012737  015306  000650        MOV   #MSG30,ERADD    ;SET ERROR CODE.
1100  003732  004737  003774              JSR   PC,FT3ER        ;GO DO ERROR
1101  003736  017701  174556        FT3B: MOV   @CS,R1          ;GET CS2
1102  003742  042701  000307              BIC   #307,R1         ;MARK IR/OR
1103  003746  005701                       TST   R1              ;SEE IF RESET
1104  003750  001405                       BEQ   FT3X            ;IF SO: BR
1105  003752  012737  015336  000650        MOV   #MSG31,ERADD    ;SET ERROR CODE
1106  003760  004737  003774              JSR   PC,FT3ER        ;GO DO ERROR
1107  003764  004737  012546        FT3X: JSR   PC,ITER         ;GO SEE IF ITERATION
1108  003770  000137  003022              JMP   TSCD2           ;RETURN TO SCHEDULAR
1109
1110                                        ;ERROR REPORT SUBROUTINE
1111  003774  000240                 FT3ER: NOP
1112  003776  032777  020000  174544        BIT   #20000,@SWR     ;SEE IF PRINT ERROR
1113  004004  001015                       BNE   2$              ;IF NOT: BR
1114  004006  005737  000606              TST   HDRFL           ;SEE IF DONE HEADER
1115  004012  001006                       BNE   1$              ;IF SO: BR
1116  004014  013704  000610              MOV   EMADDR,R4
1117  004020  004737  013442              JSR   PC,TTOUT        ;PRINT HEADER
1118  004024  005237  000606              INC   HDRFL
1119  004030  013704  000650        1$:   MOV   ERADD,R4
1120  004034  004737  013442              JSR   PC,TTOUT        ;PRINT ERROR CODE
1121  004040  005777  174504        2$:   TST   @SWR            ;SEE IF HALT ON ERROR
1122  004044  100001                       BPL   3$              ;IF NOT: BR
1123  004046  000000                       HALT
1124  004050  000240                 3$:   NOP
1125  004052  004737  012512              JSR   PC,SCOPE        ;GO SEE IF SCOPE
1126  004056  000207                       RTS   PC              ;IF NOT: BR
```

```
 1127
 1128                                          ;RH11 SILO TEST 1: EPMTY SILO READ**********
 1129
 1130  004060  005737  000604          FT4:    TST     RH17F
 1131  004064  001141                          BNE     FT5X            ;IF RH70: BR
 1132  004066  012737  017105  000610          MOV     #MSFT4,EMADDR   ;SET TEST TEST HEADER
 1133  004074  012777  000040  174416          MOV     #40,@CS         ;INIT
 1134  004102  017700  174424                  MOV     @DB,R0          ;READ DB
 1135  004106  005777  174406                  TST     @CS             ;SEE IF DLT IS SET
 1136  004112  100013                          BPL     FT4ER           ;IF NOT: BR
 1137  004114  005777  174370                  TST     @C1             ;SEE IF SC IS SET
 1138  004120  100014                          BPL     FT4ERA          ;IF NOT: BR
 1139  004122  032777  040000  174360          BIT     #40000,@C1      ;SEE IF TRE IS SET
 1140  004130  001414                          BEQ     FT4ERB          ;IF NOT: BR
 1141  004132  004737  012546          FT4X:   JSR     PC,ITER         ;GO SEE IF ITERATION
 1142  004136  000137  003022                  JMP     TSCD2           ;RETURN TO SCHEDULAR
 1143  004142  012737  015366  000650  FT4ER:  MOV     #MSG32,ERADD    ;SET ERROR CODE
 1144  004150  000407                          BR      FT4ERC
 1145  004152  012737  015404  000650  FT4ERA: MOV     #MSG33,ERADD    ;SET ERROR CODE
 1146  004160  000403                          BR      FT4ERC
 1147  004162  012737  015421  000650  FT4ERB: MOV     #MSG34,ERADD    ;SET ERROR CODE.
 1148  004170  000240                  FT4ERC: NOP
 1149  004172  012737  004060  000674          MOV     #FT4,SCOLP      ;SET SCOPE ADDRESS
 1150  004200  004737  003774                  JSR     PC,FT3ER        ;GO PRINT ERROR
 1151  004204  000752                          BR      FT4X
```

```
1152
1153                                        ;RH11 SILO TEST 2: IR/OR CHECK**********
1154
1155  004206  005737  000604        FT5:    TST     RH17F           ;SEE IF RH70
1156  004212  001066                         BNE     FT5X            ;IF SO: BR
1157  004214  012737  017135  000610        MOV     #MSFT5,EMADDR   ;SET TEST HEADER
1158  004222  012737  004230  000674        MOV     #FT5A,SCOLP     ;SET SCOPE ADDRESS
1159  004230  004737  012620        FT5A:   JSR     PC,INIT1        ;GO INIT
1160  004234  032777  000100  174256        BIT     #100,@CS        ;SEE IF IR IS SET
1161  004242  001005                         BNE     FT5B            ;IF SO: BR
1162  004244  012737  015437  000650        MOV     #MSG35,ERADD    ;SET ERROR CODE
1163  004252  004737  003774                JSR     PC,FT3ER        ;GO DO ERROR
1164  004256  032777  000200  174234  FT5B:  BIT     #200,@CS        ;SEE IF OR IS RESET
1165  004264  001405                         BEQ     FT5C            ;IF SO: BR
1166  004266  012737  015464  000650        MOV     #MSG36,ERADD    ;SET ERROR CODE
1167  004274  004737  003774                JSR     PC,FT3ER        ;GO DO ERROR
1168  004300  012777  000000  174224  FT5C:  MOV     #0,@DB          ;LOAD ZERO INTO SILO
1169  004306  032777  000200  174204        BIT     #200,@CS        ;SEE THAT OR RESET
1170  004314  001405                         BEQ     FT5D            ;IF IT DOES: BR
1171  004316  012737  015513  000650        MOV     #MSG37,ERADD    ;SET ERROR CODE
1172  004324  004737  003774                JSR     PC,FT3ER        ;GO DO ERROR
1173  004330  012777  177777  174174  FT5D:  MOV     #-1,@DB         ;LOAD SILO WITH -1
1174  004336  012700  004000                MOV     #4000,R0
1175  004342  032777  000200  174150  FT5E:  BIT     #200,@CS        ;SEE IF OR IS SET
1176  004350  001007                         BNE     FT5X            ;IF SO: BR
1177  004352  005300                         DEC     R0
1178  004354  001372                         BNE     FT5E            ;AWAIT OR
1179  004356  012737  015513  000650        MOV     #MSG37,ERADD    ;SET ERROR CODE
1180  004364  004737  003774                JSR     PC,FT3ER        ;GO DO ERROR
1181  004370  004737  012546        FT5X:   JSR     PC,ITER         ;GO SEE IF ITERATION
1182  004374  000137  003022                JMP     TSCD2           ;RETURN TO SCHEDULAR
```

```
1183
1184                                        ;RH11 SILO TEST 3: SILO DATA TEST**********
1185
1186  004400  005737  000604        FT6:    TST     RH17F
1187  004404  001052                       BNE     FT6X            ;IF RH70: BR
1188  004406  012737  017165  000610       MOV     #MSFT6,EMADDR   ;SET TEST HEADER
1189  004414  012737  004422  000674       MOV     #FT6A,SCOLP     ;SET SCOPE ADDRESS
1190  004422  004737  012620        FT6A:   JSR     PC,INIT1        ;GO INIT
1191  004426  005000                       CLR     R0              ;PRESET DATA
1192  004430  010077  174076        FT6B:   MOV     R0,@DB          ;LOAD SILO
1193  004434  005200                       INC     R0              ;BUMP DATA
1194  004436  022700  000102               CMP     #102,R0         ;SEE IF FILLED ALL
1195  004442  001372                       BNE     FT6B            ;IF NOT: BR
1196  004444  032777  000100  174046       BIT     #100,@CS        ;SEE IF IR IS RESET.
1197  004452  001405                       BEQ     FT6C            ;IF SO: BR
1198  004454  012737  015624  000650       MOV     #MSG40,ERADD    ;SET ERROR CODE
1199  004462  004737  003774               JSR     PC,FT3ER        ;GO DO ERROR
1200  004466  032777  000200  174024  FT6C: BIT     #200,@CS        ;SEE IF OR IS SET
1201  004474  001005                       BNE     FT6D            ;IF SO: BR
1202  004476  012737  015552  000650       MOV     #MSG38,ERADD    ;SET ERROR CODE
1203  004504  004737  003774               JSR     PC,FT3ER        ;GO DO ERROR
1204  004510  005000                FT6D:   CLR     R0              ;PRESET DATA
1205  004512  017701  174014        FT6E:   MOV     @DB,R1          ;READ SILO
1206  004516  020001                       CMP     R0,R1           ;SEE IF EXPT=RCVD
1207  004520  001010                       BNE     FT6DE           ;IF NOT: BR
1208  004522  005200                       INC     R0              ;BUMP DATA
1209  004524  022700  000102               CMP     #102,R0         ;SEE IF DONE ALL
1210  004530  001370                       BNE     FT6E            ;IF NOT: BR
1211  004532  004737  012546        FT6X:   JSR     PC,ITER         ;GO SEE IF ITERATION
1212  004536  000137  003022               JMP     TSCD2           ;RETURN TO SCHEDULAR
1213
1214  004542  000240                FT6DE:  NOP
1215  004544  032777  020000  173776       BIT     #20000,@SWR     ;SEE IF PRINT ERROR
1216  004552  001032                       BNE     FT6DEB          ;IF NOT: BR
1217  004554  005737  000606               TST     HDRFL           ;SEE IF DONE HEADER
1218  004560  013701  000610               MOV     EMADDR,R1
1219  004564  004737  013442               JSR     PC,TTOUT        ;PRINT HEADER
1220  004570  005237  000606               INC     HDRFL           ;SET FLAG
1221  004574  012704  015604        FT6DEA: MOV     #MSG39,R4
1222  004600  004737  013442               JSR     PC,TTOUT        ;PRINT SILO READ ERROR
1223  004604  012704  015151               MOV     #MSG22,R4
1224  004610  004737  013442               JSR     PC,TTOUT        ;PRINT EXPT TAG
1225  004614  010003                       MOV     R0,R3
1226  004616  004737  013572               JSR     PC,OCTP         ;PRINT EXPT
1227  004622  012704  015161               MOV     #MSG23,R4
1228  004626  004737  013442               JSR     PC,TTOUT        ;PRINT RCVD TAG
1229  004632  010103                       MOV     R1,R3
1230  004634  004737  013572               JSR     PC,OCTP         ;PRINT RCVD
1231  004640  005777  173704        FT6DEB: TST     @SWR            ;SEE IF HALT ON ERROR
1232  004644  100001                       BPL     FT6DEX          ;IF NOT: BR
1233  004646  000000                       HALT
1234  004650  000207                FT6DEX: RTS     PC              ;RETURN TO TEST
```

```
1235
1236                                        ;RH11 SILO TEST 4: SILO OVERFLOW**********
1237
1238  004652  005737  000604        FT7:    TST     RH17F
1239  004656  001021                        BNE     FT7X            ;IF RH70: BR
1240  004660  012737  017215  000610        MOV     #MSFT7,EMADDR   ;SET TEST HEADER
1241  004666  012737  004652  000674        MOV     #FT7,SCOLP      ;SET SCOPE ADDRESS
1242  004674  004737  012620                JSR     PC,INIT1        ;GO INIT
1243  004700  012700  000103                MOV     #103,R0         ;SET SIZE OF SILO +1
1244  004704  010077  173622        FT7A:   MOV     R0,@DB          ;LOAD SILO
1245  004710  005300                        DEC     R0              ;SEE IF DONE
1246  004712  001374                        BNE     FT7A            ;IF NOT: BR
1247  004714  005777  173600                TST     @CS             ;SEE IF DLT IS SET
1248  004720  100004                        BPL     FT7ER           ;IF NOT: BR
1249  004722  004737  012546        FT7X:   JSR     PC,ITER         ;GO SEE IF ITERATION
1250  004726  000137  003022                JMP     TSCD2           ;RETURN TO SCHEDULAR
1251  004732  012737  015366  000650  FT7ER: MOV     #MSG32,ERADD    ;SET ERROR CODE
1252  004740  004737  003774                JSR     PC,FT3ER        ;GO DO ERROR
1253  004744  000766                        BR      FT7X
```

```
1254
1255                                        ;RH11 SILO TEST 5: SILO RESET**********
1256
1257  004746  005737  000604        FT10:   TST     RH17F
1258  004752  001034                        BNE     FT10X           ;IF RH70: BR
1259  004754  012737  017245  000610        MOV     #MSFT10,EMADDR  ;SET TEST HEADER
1260  004762  012737  004746  000674        MOV     #FT10,SCOLP     ;SET SCOPE ADDRESS
1261  004770  012777  000040  173522        MOV     #40,@CS         ;INITIALIZE
1262  004776  012700  000004                MOV     #4,R0           ;SET NUMBER OF SILO WRITER
1263  005002  010077  173524        FT10A:  MOV     R0,@DB          ;WRITE SILO
1264  005006  005300                        DEC     R0              ;SEE IF DONE
1265  005010  001374                        BNE     FT10A           ;IF NOT: BR
1266  005012  052777  000040  173500        BIS     #40,@CS         ;INITIALIZE
1267  005020  012777  177777  173504        MOV     #-1,@DB         ;WRITE SILO
1268  005026  017701  173500                MOV     @DB,R1          ;READ SILO 1
1269  005032  017701  173474                MOV     @DB,R1          ;READ SILO 2
1270  005036  005777  173456                TST     @CS             ;SEE IF DLT IS SET
1271  005042  100011                        BPL     FT10ER          ;IF NOT: BR
1272  005044  004737  012546        FT10X:  JSR     PC,ITER         ;GO SEE IF ITERATION
1273  005050  005737  000726                TST     RH0F            ;SEE IF RH11 ONLY
1274  005054  001402                        BEQ     FT10XX          ;IF NOT: BR
1275  005056  000137  003110                JMP     TEND            ;ELSE GO TO END
1276  005062  000137  003022        FT10XX: JMP     TSCD2           ;RETURN TO SCHEDULAR
1277  005066  012737  015366  000650 FT10ER: MOV     #MSG32,ERADD    ;SET ERROR CODE
1278  005074  004737  003774                JSR     PC,FT3ER        ;GO DO ERROR
1279  005100  000761                        BR      FT10X
```

```
1280                                        ;NOP TEST*****
1281
1282  005102  000240                FT11:   NOP
1283  005104  012737  005102  000674        MOV     #FT11,SCOLP     ;SET SCOPE ADDRESS
1284  005112  004737  012620                JSR     PC,INIT1
1285  005116  012737  000300  000716        MOV     #300,UDES       ;SET TC= ALL NRZ,NORM,ODD
1286  005124  012737  177777  000620        MOV     #-1,FCNT        ;SET FC= ALL OVER
1287  005132  012737  177777  000622        MOV     #-1,WCNT        ;SET WC= ALL OVER
1288  005140  012737  177777  000616        MOV     #-1,BADDR       ;SET BA= ALL OVER
1289  005146  012737  000001  000636        MOV     #1,RDYDX        ;SET DELAY
1290  005154  012737  000001  000640        MOV     #1,OPDYX        ;SET OP DELAY
1291  005162  012737  000001  000710        MOV     #1,FUN          ;SET NOP FUNCTIONS CODE
1292  005170  004737  011546                JSR     PC,EXEC         ;GO EXECUTE COMMAND
1293  005174  000240                        NOP
1294  005176  012737  017276  000610        MOV     #MSFT11,EMADDR
1295  005204  004737  011776                JSR     PC,ERCHK        ;GO CHECK REGISTER
1296  005210  004737  012546                JSR     PC,ITER         ;GO SEE IF ITERATIONS
1297  005214  000137  003022                JMP     TSCD2           ;RETURN TO SCHEDULAR
```

```
 1298                                          ;REWIND TEST*****
 1299
 1300  005220  000240                 FT12:    NOP
 1301  005222  012737  005220  000674          MOV     #FT12,SCOLP
 1302  005230  004737  012620                  JSR     PC,INIT1        ;GO INITIALIZE
 1303  005234  052777  001700  173300          BIS     #1700,@TC       ;SET TO NRZ,NORMAL
 1304  005242  012737  177760  000620          MOV     #-20,FCNT       ;SET FC=20
 1305  005250  012737  177770  000622          MOV     #-10,WCNT       ;SET WC=10
 1306  005256  012737  020112  000616          MOV     #WDATA,BADDR    ;SET BA=WRITE BUFFER
 1307  005264  012737  000007  000710          MOV     #7,FUN          ;SET REWIND OP CODE
 1308  005272  004737  011546                  JSR     PC,EXEC         ;GO EXECUTE COMMAND
 1309  005276  000240                          NOP
 1310  005300  032777  020000  173214  FT12A:  BIT     #20000,@DS
 1311  005306  001374                          BNE     FT12A           ;AWAIT PIP
 1312  005310  012737  017316  000610          MOV     #MSFT12,EMADDR
 1313  005316  004737  011776                  JSR     PC,ERCHK        ;GO CHECK FOR ERROR
 1314  005322  004737  012546                  JSR     PC,ITER         ;GO SEE IF ITERATION
 1315  005326  000137  003022                  JMP     TSCD2           ;RETURN TO SCHEDULAR
 1316
```

```
 1317                                          ;WRITE/READ TEST*****
 1318
 1319  005332  000240                  FT13:   NOP
 1320  005334  012737  000001  000636          MOV     #1,RDYDX
 1321  005342  012737  000001  000640          MOV     #1,OPDYX
 1322  005350  012737  000100  000624          MOV     #100,RCNT       ;SET RECORD COUNT
 1323  005356  012737  017341  000610          MOV     #MSFT13,EMADDR  ;SET TEST HEADER
 1324  005364  012737  000001  000720          MOV     #1,PATRN
 1325  005372  004737  012400                  JSR     PC,DSUP         ;SET UP ALL ONES DATA PATTERN
 1326  005376  012737  001700  000716          MOV     #1700,UDES      ;SET TO 800 BPI NORMAL
 1327  005404  004737  011700          FT13A:  JSR     PC,RWND         ;GO REWIND
 1328  005410  012737  177600  000620          MOV     #-200,FCNT      ;SET FC
 1329  005416  012737  177700  000622          MOV     #-100,WCNT      ;SET WC
 1330  005424  012737  020112  000616          MOV     #WDATA,BADDR    ;SET BA
 1331  005432  012737  000061  000710          MOV     #61,FUN         ;SET WRITE OP-CODE
 1332  005440  012737  014765  000626          MOV     #MSG12,ERRP
 1333  005446  004737  011546          FT13B:  JSR     PC,EXEC         ;GO EXECUTE COMMAND
 1334  005452  005037  000674                  CLR     SCOLP           ;NO SCOPE LOOP
 1335  005456  004737  011776                  JSR     PC,ERCHK        ;GO CHECK ERROR
 1336  005462  005337  000624                  DEC     RCNT            ;SEE IF DONE ALL
 1337  005466  001367                          BNE     FT13B           ;IF NOT: BR
 1338  005470  012737  000100  000624          MOV     #100,RCNT       ;SET RECORD COUNT
 1339  005476  012737  021624  000616          MOV     #RDATA,BADDR
 1340  005504  062737  000200  000616          ADD     #200,BADDR      ;SET BA
 1341  005512  012737  000077  000710          MOV     #77,FUN         ;SET READ REVERSE OP-CPDE
 1342  005520  012737  015003  000626          MOV     #MSG13,ERRP
 1343  005526  004737  011546          FT13C:  JSR     PC,EXEC         ;GO EXECUTE COMMAND
 1344  005532  004737  011776                  JSR     PC,ERCHK        ;GO CHECK ERROR
 1345  005536  005337  000624                  DEC     RCNT            ;SEE IF READ ALL
 1346  005542  001371                          BNE     FT13C           ;IF NOT:BR
 1347  005544  162737  000200  000616          SUB     #200,BADDR      ;SET BA
 1348  005552  012737  000071  00071.          MOV     #71,FUN         ;SET READ FORWARD OP-CODE
 1349  005560  012737  015030  000626          MOV     #MSG14,ERRP
 1350  005566  012737  000100  000624          MOV     #100,RCNT       ;SET RECORD COUNT
 1351  005574  004737  011546          FT13D:  JSR     PC,EXEC         ;GO EXECUTE COMMAND
 1352  005600  004737  011776                  JSR     PC,ERCHK        ;GO CHECK ERRORS
 1353  005604  005337  000624                  DEC     RCNT            ;SEE IF DONE ALL
 1354  005610  001371                          BNE     FT13D           ;IF NOT:BR
 1355  005612  032737  002000  000716          BIT     #2000,UDES      ;SEE IF DONE PE
 1356  005620  001007                          BNE     FT13X           ;IF SO: BR
 1357  005622  012737  002300  000716          MOV     #2300,UDES      ;SET PE MODE
 1358  005630  012737  000100  000624          MOV     #100,RCNT       ;RESET RECORD COUNT
 1359  005636  000662                          BR      FT13A           ;GO DO NEXT DENSITY
 1360  005640  000137  003022          FT13X:  JMP     TSCD2           ;RETURN TO SCHEDULAR
```

```
 1361                                          ;SPACE TEST*****
 1362
 1363  005644  000240                 FT14:    NOP
 1364  005646  012737  017370  000610          MOV     #MSFT14,EMADDR  ;SET TEST HEADER
 1365  005654  012737  001700  000716          MOV     #1700,UDES      ;SET NRZ,NORMAL
 1366  005662  004737  011700         FT14A1: JSR     PC,RWND         ;GO INITIALIZE
 1367  005666  012737  000100  000624          MOV     #100,RCNT       ;SET NUMBER OF RECORDER
 1368  005674  012737  177777  020112          MOV     #-1,WDATA       ;SET DATA PATTERN
 1369  005702  012737  177700  000620          MOV     #-100,FCNT      ;PRESET FRAME CNT
 1370  005710  012737  177740  000622          MOV     #-40,WCNT       ;PRESET WORD CNT
 1371  005716  004737  012620         FT14A:  JSR     PC,INIT1        ;GO REWIND
 1372  005722  012737  001000  000640          MOV     #1000,OPDYX
 1373  005730  012737  040000  000636          MOV     #40000,RDYDX
 1374  005736  012737  000061  000710          MOV     #61,FUN         ;SET WRITE OP-CODE
 1375  005744  012737  102300  000660          MOV     #102300,STMSK   ;MASK DATA RELATED ERRORS
 1376  005752  052777  000010  172540          BIS     #10,@CS         ;INHIBIT BUS ADDRESS INCREMENT
 1377  005760  004737  011546                  JSR     PC,EXEC         ;GO EXECUTE COMMAND
 1378  005764  012737  016043  000626          MOV     #MSG46,ERRP     ;SET ERROR CODE
 1379  005772  004737  011776                  JSR     PC,ERCHK        ;GO CHECK ERRORS
 1380  005776  005737  000712                  TST     SERFL           ;SEE IF ERROR
 1381  006002  001402                          BEQ     FT14A2          ;IF NOT: BR
 1382  006004  000137  006470                  JMP     FT14X           ;ELSE EXIT
 1383  006010  005337  000620         FT14A2: DEC     FCNT            ;BUMP FC
 1384  006014  032737  000001  000620          BIT     #1,FCNT         ;SEE IF SHOULD BUMP WC
 1385  006022  001403                          BEQ     FT14A3          ;IF NOT: BR
 1386  006024  162737  000001  000622          SUB     #1,WCNT         ;BUMP WC
 1387  006032  005337  000624         FT14A3: DEC     RCNT            ;SEE IF DONE ALL
 1388  006036  001327                          BNE     FT14A           ;WRITE ALL RECORDS
 1389  006040  012737  000100  000632          MOV     #100,RRD        ;PRESET RECORD POSITION
 1390  006046  012737  000176  000634          MOV     #176,RFD
 1391  006054  012737  177701  000642          MOV     #-77,SCNT       ;SET SPACE AMOUNT
 1392  006062  012737  000033  000710  FT14B:  MOV     #33,FUN         ;SET OP-CODE SPACE REVERSE
 1393  006070  004737  011546                  JSR     PC,EXEC         ;GO EXECUTE COMMAND
 1394  006074  012737  016114  000626          MOV     #MSG48,ERRP     ;SET ERROR CODE
 1395  006102  004737  011776                  JSR     PC,ERCHK        ;GO CHECK ERRORS
 1396  006106  005737  000712                  TST     SERFL           ;SEE IF ERROR
 1397  006112  001166                          BNE     FT14X           ;IF SO: BR
 1398  006114  004737  006210                  JSR     PC,FT14RR       ;GO READ REVERSE + CHECK DATA
 1399  006120  000240                          NOP
 1400  006122  012737  000031  000710          MOV     #31,FUN         ;SET SPACE FORWARD OP-CODE
 1401  006130  005237  000642                  INC     SCNT            ;SET SPACE AMOUNT
 1402  006134  001555                          BEQ     FT14X           ;IF DONE: BR
 1403  006136  004737  011546                  JSR     PC,EXEC         ;GO EXECUTE COMMAND
 1404  006142  012737  016067  000626          MOV     #MSG47,ERRP     ;SET ERROR CODE
 1405  006150  004737  011776                  JSR     PC,ERCHK        ;GO CHECK ERROR
 1406  006154  005737  000712                  TST     SERFL           ;SEE IF ERROR FLAG
 1407  006160  001143                          BNE     FT14X           ;IF NO: BR
 1408  006162  004737  006252                  JSR     PC,FT14RF       ;GO READ FORWARD FOR POSITION CHECK
 1409  006166  000240                          NOP
 1410  006170  005237  000642                  INC     SCNT            ;DECREMENT SPACE AMOUNT
 1411  006174  001535                          BEQ     FT14X           ;IF DONE: BR
 1412  006176  005237  000632                  INC     RRD             ;BUMP DATA EXPT
 1413  006202  005337  000634                  DEC     RFD             ;BUMP DATA EXPT
 1414  006206  000725                          BR      FT14B
 1415  006210  000240                 FT14RR: NOP
 1416  006212  012737  021624  000616          MOV     #RDATA,BADDR    ;SET BA
```

```
1417  006220  012737  000077  000710          MOV     #77,FUN         ;SET READ REVERSE OP-CODE
1418  006226  004737  011546                  JSR     PC,EXEC         ;GO EXECUTE COMMAND
1419  006232  000240                          NOP
1420  006234  013705  000632                  MOV     RRD,R5
1421  006240  020577  172252                  CMP     R5,@FC          ;SEE IF CORRECT RECORD
1422  006244  001020                          BNE     FT14RER         ;IF NOT: BR
1423  006246  000137  006300                  JMP     FT14EC          ;GO CLEAR RH11 ERROR BIT
1424  006252  000240          FT14RF: NOP
1425  006254  012737  000071  000710          MOV     #71,FUN         ;SET READ FORWARD OP-CODE
1426  006262  004737  011546                  JSR     PC,EXEC         ;GO EXECUTE COMMAND
1427  006266  013705  000634                  MOV     RFD,R5
1428  006272  020577  172220                  CMP     R5,@FC          ;SEE IF CORRECT RECORD
1429  006276  001003                          BNE     FT14RER         ;IF NOT: BR
1430  006300  004737  012620          FT14EC: JSR     PC,INIT1        ;CLEAR RH
1431  006304  000207                          RTS     PC              ;RETURN
1432  006306  000240          FT14RER: NOP
1433  006310  032777  020000  172232          BIT     #20000,@SWR     ;SEE IF PRINT INHIBITED
1434  006316  001060                          BNE     FT14R3          ;IF SO: BR
1435  006320  012704  017370                  MOV     #MSFT14,R4
1436  006324  004737  013442                  JSR     PC,TTOUT        ;PRINT HEADER
1437  006330  012704  014703                  MOV     #MSG9,R4
1438  006334  004737  013442                  JSR     PC,TTOUT        ;PRINT ERROR TYPE
1439  006340  012704  015136                  MOV     #MSG20,R4       ;SET NRZ TAG POINTER
1440  006344  032737  002000  000716          BIT     #2000,UDES      ;SEE IF PE
1441  006352  001402                          BEQ     FT14R0          ;IF NOT: BR
1442  006354  012704  015144                  MOV     #MSG21,R4       ;ELSE SET PE TAG POINTER
1443  006360  004737  013442          FT14R0: JSR     PC,TTOUT        ;PRINT TAG
1444  006364  032737  000002  000710          BIT     #2,FUN          ;SEE IF READ REVERSE
1445  006372  001003                          BNE     FT14R1          ;IF SO: BR
1446  006374  012704  015116                  MOV     #MSG17,R4
1447  006400  000402                          BR      FT14R2          ;GO PRINT
1448  006402  012704  015076          FT14R1: MOV     #MSG16,R4
1449  006406  004737  013442          FT14R2: JSR     PC,TTOUT        ;PRINT FRWD/REV
1450  006412  012704  015151                  MOV     #MSG22,R4
1451  006416  004737  013442                  JSR     PC,TTOUT        ;PRINT EXPT TAG
1452  006422  010503                          MOV     R5,R3
1453  006424  042703  177700                  BIC     #177700,R3      ;MASK RECORD NUMBER
1454  006430  004737  013572                  JSR     PC,OCTP         ;PRINT EXPT RECORD NUMBER
1455  006434  012704  015161                  MOV     #MSG23,R4
1456  006440  004737  013442                  JSR     PC,TTOUT        ;PRINT RCVD TAG
1457  006444  017703  172046                  MOV     @FC,R3
1458  006450  042703  177700                  BIC     #177700,R3      ;MASK RECORD NUMBER
1459  006454  004737  013572                  JSR     PC,OCTP         ;PRINT ACTUAL RECORD NUMBER
1460  006460  005777  172064          FT14R3: TST     @SWR            ;SEE IF HALT ON ERROR
1461  006464  100001                          BPL     FT14X           ;IF NOT: BR
1462  006466  000000                          HALT
1463  006470  032737  002000  000716  FT14X:  BIT     #2000,UDES      ;SEE IF DONE PE
1464  006476  001005                          BNE     FT14XX          ;IF SO: BR
1465  006500  012737  002300  000716          MOV     #2300,UDES      ;SET TO PE
1466  006506  000137  005662                  JMP     FT14A1          ;DO IN PE
1467  006512  000137  003022          FT14XX: JMP     TSCD2           ;RETURN TO SCHEDULAR
```

```
                                                ;ERASE TEST*****
                                        FT15:   NOP
006516  000240                                    CLR     STMSK
006520  005037  000660                           MOV     #100,RDYDX
006524  012737  000100  000636                    MOV     #10,OPDYX
006532  012737  000010  000640                    MOV     #MSFT15,EMADDR  ;SET TEST HEADER
006540  012737  017412  000610                    JSR     PC,RWND         ;REWIND
006546  004737  011700                           MOV     #RDATA,BADDR    ;SET BA
006552  012737  021624  000616                    MOV     #1700,UDES      ;SET NRZ, NORMAL
006560  012737  001700  000716                    MOV     #25,FUN         ;SET ERASE OP-CODE
006566  012737  000025  000710  FT15A:   MOV     #400,RCNT       ;SET TO ERASE 256 TIMES
006574  012737  000400  000624                    JSR     PC,EXEC         ;GO EXECUTE COMMAND
006602  004737  011546          FT15B:   JSR     #MSG46,ERRP     ;SET ERROR CODE
006606  012737  016043  000626                    JSR     PC,ERCHK        ;GO CHECK ERRORS
006614  004737  011776                           TST     SERFL           ;SEE IF ANY ERRORS
006620  005737  000712                           BNE     FT15X           ;IF SO EXIT
006624  001032                                   DEC     RCNT            ;SEE IF DONE ERASING
006626  005337  000624                           BNE     FT15B           ;IF NOT: BR
006632  001363                                   NOP
006634  000240                                   JSR     PC,RWND         ;REWIND
006636  004737  011700                           MOV     #-200,WCNT      ;SET WC
006642  012737  177600  000622                    MOV     #71,FUN         ;SET READ FORWARD OP-CODE
006650  012737  000071  000710                    MOV     #40,RDYDX       ;SET DELAY
006656  012737  000040  000636                    JSR     PC,EXEC         ;GO EXECUTE COMMAND
006664  004737  011546                           NOP
006670  000240                                   MOV     #MSG60,ERRP     ;SET ERROR CODE
006672  012737  016503  000626                    MOV     #20000,STMSK
006700  012737  020000  000660                    JSR     PC,ERCHK        ;GO CHECK ERRORS
006706  004737  011776                           JMP     TSCD2           ;RETURN TO SCHEDULAR
006712  000137  003022          FT15X:   JMP     TSCD2
```

```
1498                                            ;TAPE MARK WRITE/READ TEST*****
1499
1500  006716  000240                    FT16:   NOP
1501  006720  012737  000001  000636            MOV     #1,RDYDX
1502  006726  012737  001000  000640            MOV     #1000,OPDYX
1503  006734  012737  017434  000610            MOV     #MSFT16,EMADDR  ;SET HEADER
1504  006742  012737  001700  000716            MOV     #1700,UDES      ;SET TO NRZ,NORMAL,ODD
1505  006750  004737  011700            FT16A:  JSR     PC,RWND         ;INIT AND REWIND SLAVE
1506  006754  012737  177760  000620    FT16B:  MOV     #-20,FCNT       ;FC=20
1507  006762  012737  177770  000622            MOV     #-10,WCNT       ;WC=10
1508  006770  012737  000027  000710            MOV     #27,FUN         ;SET WRITE TAPE MARK OP-CODE
1509  006776  004737  011546                    JSR     PC,EXEC         ;GO EXECUTE COMMAND
1510  007002  012737  001000  000660            MOV     #1000,STMSK     ;SET FOR FCE MASK
1511  007010  012737  014765  000626            MOV     #MSG12,ERRP     ;SET ERROR CODE
1512  007016  004737  011776                    JSR     PC,ERCHK        ;GO CHECK ERROR
1513  007022  004737  012340                    JSR     PC,TMCHK        ;GO SEE IF TM SET
1514  007026  012737  000077  000710            MOV     #77,FUN         ;SET USED REVERSE OP-CODE
1515  007034  004737  011546                    JSR     PC,EXEC         ;GO EXECUTE COMMAND
1516  007040  012737  001000  000660            MOV     #1000,STMSK     ;SET FCE ERROR MASK
1517  007046  012737  015003  000626            MOV     #MSG13,ERRP     ;SET ERROR CODE
1518  007054  004737  011776                    JSR     PC,ERCHK        ;GO CHECK ERRORS
1519  007060  004737  012340                    JSR     PC,TMCHK        ;GO SEE IF TM SET
1520  007064  012737  000071  000710            MOV     #71,FUN         ;SET READ  FORWARD OP-CODE
1521  007072  004737  011546                    JSR     PC,EXEC         ;GO EXECUTE COMMAND
1522  007076  012737  015030  000626            MOV     #MSG14,ERRP     ;SET ERROR CODE
1523  007104  004737  011776                    JSR     PC,ERCHK        ;TO CHECK ERRORS
1524  007110  004737  012340                    JSR     PC,TMCHK        ;GO SEE IF TM SET
1525  007114  032737  002000  000716            BIT     #2000,UDES      ;SEE IF DONE PE
1526  007122  001004                            BNE     FT16X           ;IF SO: BR
1527  007124  012737  002300  000716            MOV     #2300,UDES      ;SET PE, NORMAL
1528  007132  000706                            BR      FT16A           ;DO IN PE
1529  007134  004737  012546            FT16X:  JSR     PC,ITER         ;DO ITERATIONS
1530  007140  000137  003022                    JMP     TSCD2           ;RETURN TO SCHEDULAR
1531
```

```
 1532
 1533                                        ;TAPE MARK SPACE TEST**********
 1534
 1535  007144  005037  000624          FT17:   CLR     RCNT
 1536  007150  012737  017475  000610          MOV     #MSFT17,EMADDR  ;SET HEADER
 1537  007156  012737  001700  000716          MOV     #1700,UDES      ;SET TO NRZ
 1538  007164  004737  011700          FT17A:  JSR     PC,RWND         ;REWIND TAPE
 1539  007170  012737  000027  000710  FT17B:  MOV     #27,FUN
 1540  007176  012737  040000  000636          MOV     #40000,RDYDX    ;SET DRY DELAY
 1541  007204  012737  040000  000640          MOV     #40000,OPDYX    ;SET OP DELAY
 1542  007212  004737  011546                  JSR     PC,EXEC         ;GO WRITE TM
 1543  007216  012737  102300  000660          MOV     #102300,STMSK   ;MASK DATA RELATED ERRORS
 1544  007224  012737  015055  000626          MOV     #MSG15,ERRP     ;SET ERROR TYPE
 1545  007232  004737  011776                  JSR     PC,ERCHK        ;GO CHECK ERROR
 1546  007236  005737  000712                  TST     SERFL           ;SEE IF ERROR
 1547  007242  001137                          BNE     FT17X           ;IF SO: BR
 1548  007244  004737  012340                  JSR     PC,TMCHK        ;GO SEE IF TM SET
 1549  007250  000240                          NOP
 1550  007252  000240                          NOP
 1551  007254  032737  000100  000624          BIT     #100,RCNT       ;SEE IF DONE PATTERN
 1552  007262  001045                          BNE     FT17D           ;IF SO: BR
 1553  007264  062737  000020  000624          ADD     #20,RCNT        ;ADD 20 TO RECORD COUNT
 1554  007272  013737  000624  000652          MOV     RCNT,TEMP1      ;SAVE RECORD COUNT
 1555  007300  012737  177600  000622          MOV     #-200,WCNT      ;WC=128
 1556  007306  012737  177400  000620          MOV     #-400,FCNT      ;FC=256
 1557  007314  012737  020112  000616          MOV     #WDATA,BADDR    ;BA=WRITE BUFFER
 1558  007322  012737  000061  000710          MOV     #61,FUN         ;SET WRITE OP CODE
 1559  007330  000240                  FT17C:  NOP
 1560  007332  000240                          NOP
 1561  007334  004737  011546                  JSR     PC,EXEC         ;GO WRITE
 1562  007340  012737  014765  000626          MOV     #MSG12,ERRP     ;SET ERROR CODE
 1563  007346  012737  102300  000660          MOV     #102300,STMSK   ;MASK DATA RELATED ERRORS
 1564  007354  004737  011776                  JSR     PC,ERCHK        ;GO CHECK ERROR
 1565  007360  005737  000712                  TST     SERFL           ;SEE IF ERROR
 1566  007364  001066                          BNE     FT17X           ;IF SO: BR
 1567  007366  005337  000652                  DEC     TEMP1           ;SEE IF DONE ALL
 1568  007372  001356                          BNE     FT17C           ;IF NOT: BR
 1569  007374  000675                          BR      FT17B           ;ELSE GO DO TM
 1570  007376  000240                  FT17D:  NOP
 1571  007400  012737  000033  000710          MOV     #33,FUN         ;SET SPACE REVERSE
 1572  007406  012737  015076  000626          MOV     #MSG16,ERRP     ;SET ERROR CODE
 1573  007414  012737  177600  000642  FT17D1: MOV     #-200,SCNT      ;SET TO 200 RECORDS
 1574  007422  012737  000005  000624          MOV     #5,RCNT         ;SET NUMBER OF OPS TO DO
 1575  007430  004737  012620          FT17E:  JSR     PC,INIT1        ;GO INIT
 1576  007434  004737  011546                  JSR     PC,EXEC         ;GO SPACE
 1577  007440  012737  001000  000660          MOV     #1000,STMSK     ;SET ERROR MASK
 1578  007446  004737  011776                  JSR     PC,ERCHK        ;GO CHECK ERROR
 1579  007452  005737  000712                  TST     SERFL           ;SEE IF ERROR
 1580  007456  001031                          BNE     FT17X           ;IF SO: BR
 1581  007460  004737  012340                  JSR     PC,TMCHK        ;GO SEE IF TM SET
 1582  007464  005337  000624                  DEC     RCNT            ;SEE IF DONE SPACES
 1583  007470  001357                          BNE     FT17E           ;IF NOT: BR
 1584  007472  022737  000031  000710          CMP     #31,FUN         ;SEE IF DONE FORWARD
 1585  007500  001407                          BEQ     FT17F           ;IF SO: BR
 1586  007502  012737  015116  000626          MOV     #MSG17,ERRP     ;SET ERROR CODE
 1587  007510  012737  000031  000710          MOV     #31,FUN         ;SET TO SPACE FORWARD
```

```
 1588  007516  000736                          BR      FT17D1          ;DO FORWARD
 1589  007520  032737  002000  000716  FT17F:  BIT     #2000,UDES      ;SEE IF DONE PE
 1590  007526  001005                          BNE     FT17X           ;IF SO: BR
 1591  007530  012737  002300  000716          MOV     #2300,UDES      ;SET TO PE
 1592  007536  000137  007164                  JMP     FT17A           ;GO PE
 1593  007542  000137  003022          FT17X:  JMP     TSCD2           ;RETURN  TO SCHEDULAR
```

```
1594
1595                                            ;WRITE CHECK TEST**********
1596
1597  007546  000240                    FT20:   NOP
1598  007550  012737  017523  000610            MOV     #MSFT20,EMADDR  ;SET HEADER
1599  007556  012737  001700  000716            MOV     #1700,UDES      ;SET UNIT DESCRIPTION
1600  007564  004737  011700            FT20A:  JSR     PC,RWND         ;INIT AND REWIND SLAVE
1601  007570  012737  000003  000720            MOV     #3,PATRN
1602  007576  004737  012400                    JSR     PC,DSUP         ;GO SET PATTERN 3
1603  007602  012737  020112  000616            MOV     #WDATA,BADDR    ;SET BA
1604  007610  012737  177400  000620            MOV     #-400,FCNT      ;SET FC
1605  007616  012737  177600  000622            MOV     #-200,WCNT      ;SET WC
1606  007624  012737  000061  000710            MOV     #61,FUN         ;SET WRITE OP CODE
1607  007632  004737  011546                    JSR     PC,EXEC         ;GO WRITE RECORD
1608  007636  012737  016043  000626            MOV     #MSG46,ERRP     ;SET ERROR CODE
1609  007644  004737  011776                    JSR     PC,ERCHK        ;GO CHECK ERROR
1610  007650  005737  000712                    TST     SERFL           ;SEE IF ERORR
1611  007654  001042                            BNE     FT20X           ;IF SO: BR
1612  007656  012737  015076  000626            MOV     #MSG16,ERRP     ;SET REVERSE ERROR TAG
1613  007664  012737  000057  000710            MOV     #57,FUN         ;SET REVERSE WRITE CHECK OP-CODE
1614  007672  062737  000376  000616            ADD     #376,BADDR      ;SET BA FOR REVERSE CHECK
1615  007700  004737  011546                    JSR     PC,EXEC         ;GO DO REVERSE CHECK
1616  007704  004737  011776                    JSR     PC,ERCHK        ;GO CHECK ERROR
1617  007710  012737  015116  000626  FT20B:   MOV     #MSG17,ERRP     ;SET FORWARD TAG
1618  007716  012737  000051  000710            MOV     #51,FUN         ;SET FORWARD CHECK OP CODE
1619  007724  162737  000376  000616            SUB     #376,BADDR      ;SET BA FOR FORWARD CHECK
1620  007732  004737  011546                    JSR     PC,EXEC         ;GO DO FORWARD CHECK
1621  007736  004737  011776                    JSR     PC,ERCHK        ;GO CHECK ERROR
1622  007742  032737  002000  000716  FT20C:   BIT     #2000,UDES      ;SEE IF DONE PE
1623  007750  001004                            BNE     FT20X           ;IF SO: BR
1624  007752  012737  002300  000716            MOV     #2300,UDES      ;ELSE SET PE
1625  007760  000701                            BR      FT20A           ;DO IN PE
1626  007762  004737  012546          FT20X:    JSR     PC,ITER         ;DO ITERATIONS
1627  007766  000137  003022                    JMP     TSCD2           ;RETURN TO SCHEDULAR
```

```
1628
1629                                            ;ERASE HEAD TEST*****
1630
1631  007772  012737  017554  000610  FT21:   MOV     #MSFT21,EMADDR  ;SET TEST HEADER
1632  010000  004737  011700          FT21A:  JSR     PC,RWND         ;GO REWIND
1633  010004  012737  000003  000720          MOV     #3,PATRN
1634  010012  004737  012400                  JSR     PC,DSUP         ;GO SET PATTERN 3
1635  010016  012737  020112  000616          MOV     #WDATA,BADDR    ;SET BA=WRITE BUFFER
1636  010024  012737  176340  000620          MOV     #-800.,FCNT     ;SET FC=800(10)
1637  010032  012737  177160  000622          MOV     #-400.,WCNT     ;SET WC=400(10)
1638  010040  012737  001700  000716          MOV     #1700,UDES      ;SET NRZ, NORMAL
1639  010046  012737  000061  000710          MOV     #61,FUN         ;SET WRITE OP-CODE
1640  010054  004737  011546                  JSR     PC,EXEC         ;GO DO WRITE 1
1641  010060  012737  014765  000626          MOV     #MSG12,ERRP     ;SET ERROR CODE
1642  010066  004737  011776                  JSR     PC,ERCHK        ;GO CHECK FOR ERROR
1643  010072  004737  011546                  JSR     PC,EXEC         ;YES DO WRITE 2
1644  010076  004737  011776                  JSR     PC,ERCHK        ;YES CHECK FOR ERROR
1645  010102  000240                          NOP
1646  010104  004737  011700                  JSR     PC,RWND         ;GO REWIND
1647  010110  012737  177160  000620          MOV     #-400.,FCNT     ;SET FC=400(10)
1648  010116  012737  177470  000622          MOV     #-200.,WCNT     ;SET WC=200(10)
1649  010124  004737  011546                  JSR     PC,EXEC         ;GO REWRITE RECORD 1-WH TO EH
1650  010130  000240          FT21SCP:NOP
1651  010132  004737  011700                  JSR     PC,RWND         ;REWIND
1652  010136  012737  021624  000616          MOV     #RDATA,BADDR    ;SET BA=READ BUFFER
1653  010144  012737  177160  000620          MOV     #-400.,FCNT     ;SET FC=400
1654  010152  012737  177470  000622          MOV     #-200.,WCNT     ;SET WC=200
1655  010160  012737  000071  000710          MOV     #71,FUN         ;SET READ OP-CODE
1656  010166  004737  011546                  JSR     PC,EXEC         ;GO READ RECORD 1
1657  010172  012737  015030  000626          MOV     #MSG14,ERRP     ;SET ERROR CODE
1658  010200  004737  011776                  JSR     PC,ERCHK        ;GO CHECK FOR ERROR
1659  010204  000240                          NOP
1660  010206  052777  000010  170304          BIS     #10,@CS         ;INHIBIT BA INCREMENT
1661  010214  012737  176340  000620          MOV     #-800.,FCNT     ;SET FC=800(10)
1662  010222  012737  177160  000622          MOV     #-400.,WCNT     ;SET WC=400(10)
1663  010230  004737  011546                  JSR     PC,EXEC         ;GO READ RECORD 2
1664  010234  022777  001440  170254          CMP     #800.,@FC       ;SEE IF READ RECORD 2 OK
1665  010242  001424                          BEQ     FT21X           ;IF SO: BR
1666  010244  022777  001441  170244          CMP     #801.,@FC       ;BRANCH IF IN GREY AREA
1667  010252  001420                          BEQ     FT21X
1668  010254  022777  001440  170234  1$:     CMP     #800.,@FC       ;BRANCH IF ERASE HEAD REVERSED
1669  010262  101404                          BLOS    FT21B           ;IF SO: BR
1670  010264  012737  015736  000650          MOV     #MSG44,ERADD    ;SET ERASE HEAD INOPERATIVE ERROR CODE
1671  010272  000403                          BR      FT21C
1672  010274  012737  015766  000650  FT21B:  MOV     #MSG45,ERADD    ;SET ERASE HEAD REVERSED ERROR CODE
1673  010302  012737  010130  000674  FT21C:  MOV     #FT21SCP,SCOLP  ;SET SCOPE ADDRESS
1674  010310  004737  003774                  JSR     PC,FT3ER        ;GO PRINT ERROR
1675  010314  004737  012546          FT21X:  JSR     PC,ITER         ;GO SEE IF ITERATION
1676  010320  000137  003022                  JMP     TSCD2           ;RETURN TO SCHEDULAR
1677
1678
```

```
                                                ;BUFFERED COMMAND TEST*****

010324  012737  017603  000610  FT22:   MOV     #MSFT22,EMADDR  ;SET TEST HEADER
010332  004737  011700          JSR     PC,RWND         ;GO REWIND
010336  012700  000003          MOV     #3,R0           ;SET NUMBER OF WRITES
010342  012737  001700  000716  MOV     #1700,UDES      ;SET TO NRZ NORMAL
010350  012737  020112  000616  MOV     #WDATA,BADDR    ;SET BA=WRITE BUFFER
010356  012737  177000  000620  MOV     #-1000,FCNT     ;SET FC=1000
010364  012737  177400  000622  MOV     #-400,WCNT      ;SET WC=400
010372  012737  000061  000710  MOV     #61,FUN         ;SET WRITE OP-CODE
010400  004737  011546  FT22A:   JSR     PC,EXEC         ;GO DO WRITE
010404  005300          DEC     R0              ;SEE IF DONE ALL
010406  001374          BNE     FT22A           ;IF NOT: BR
010410  000240          NOP
010412  012777  000007  170070  MOV     #7,@C1          ;START REWIND
010420  032777  000200  170074  FT22B:  BIT     #200,@DS
010426  001774          BEQ     FT22B
010430  004737  012620          JSR     PC,INIT1        ;INITIALIZE
010434  012737  000010  000636  MOV     #10,RDYDX       ;SET LONG READY DELAY
010442  004737  011546          JSR     PC,EXEC         ;ISSUE BUFFERED WRITE
010446  000240          NOP
010450  012737  016141  000626  MOV     #MSG49,ERRP     ;SET ERROR CODE
010456  012737  102300  000660  MOV     #102300,STMSK   ;MARK DATA ERROR
010464  004737  011776          JSR     PC,ERCHK        ;GO CHECK ERROR
010470  032777  000002  170024  BIT     #2,@DS          ;SEE IF BOT IS SET
010476  001410          BEQ     FT22X           ;IF NOT: BR
010500  012737  016167  000650  MOV     #MSG50,ERADD    ;SET ERROR CODE
010506  012737  010324  000674  MOV     #FT22,SCOLP
010514  004737  003774          JSR     PC,FT3ER        ;GO DO ERROR
010520  004737  012546  FT22X:   JSR     PC,ITER         ;GO SEE IF ITERATION
010524  000137  003022          JMP     TSCD2           ;RETURN TO SCHEDULAR
```

```
1712                                            ;READ-IN PRESET TEST*****
1713
1714  010530  005737  000614          FT23:     TST     SLVN            ;SEE IF SLAVE SELECT=0
1715  010534  001103                            BNE     FT23X           ;IF NOT:BR
1716  010536  012737  017640  000610            MOV     #MSFT23,EMADDR  ;SET TEST HEADER
1717  010544  004737  012620                    JSR     PC,INIT1        ;GO INIT
1718  010550  012737  001700  000716            MOV     #1700,UDES      ;SET TO NRZ NORMAL
1719  010556  012737  020112  000616            MOV     #WDATA,BADDR    ;SET BA=WRITE BUFFER
1720  010564  012737  177400  000620            MOV     #-400,FCNT      ;SET FC=400
1721  010572  012737  177600  000622            MOV     #-200,WCNT      ;SET WC=200
1722  010600  012737  000061  000710            MOV     #61,FUN         ;SET WRITE OP-CODE
1723  010606  004737  011546                    JSR     PC,EXEC         ;GO DO WRITE
1724  010612  000240                            NOP
1725  010614  004737  012620                    JSR     PC,INIT1        ;INITIALIZE
1726  010620  012737  000021  000710            MOV     #21,FUN         ;SET READ-IN PRESET OP CODE
1727  010626  004737  011546                    JSR     PC,EXEC         ;GO DO COMMAND
1728  010632  005000                            CLR     R0
1729  010634  012703  000004                    MOV     #4,R3           ;SET MULT
1730  010640  032777  020000  167654  FT23A:    BIT     #20000,@DS      ;SEE IF PIP RESET
1731  010646  001404                            BEQ     FT23B           ;IF SO: BR
1732  010650  005300                            DEC     R0
1733  010652  001372                            BNE     FT23A           ;AWAIT PIP RESET
1734  010654  005303                            DEC     R3
1735  010656  001370                            BNE     FT23A           ;DELAY
1736  010660  032777  000002  167634  FT23B:    BIT     #2,@DS          ;SEE IF BOT
1737  010666  001010                            BNE     FT23C           ;IF SO: BR
1738  010670  012737  016225  000650            MOV     #MSG51,ERADD    ;SET ERROR CODE
1739  010676  012737  010530  000674            MOV     #FT23,SCOLP
1740  010704  004737  003774                    JSR     PC,FT3ER        ;GO DO ERROR
1741  010710  012701  141000          FT23C:    MOV     #141000,R1      ;SET EXPT TC
1742  010714  013700  000542                    MOV     TC,R0           ;SET TC ADDRESS
1743  010720  020110                            CMP     R1,(R0)         ;SEE IF EXPT=RCVD
1744  010722  001410                            BEQ     FT23X           ;IF SO: BR
1745  010724  012737  016261  000650            MOV     #MSG52,ERADD    ;SET ERROR CODE
1746  010732  012737  010530  000674            MOV     #FT23,SCOLP     ;CLEAR SCOPE ADDRESS
1747  010740  004737  003504                    JSR     PC,FT2ER        ;GO DO ERROR
1748  010744  000137  003022          FT23X:    JMP     TSCD2           ;RETURN TO SCHEDULAR
1749
1750
```

```
1751
1752                                    ;AUTO-DENSITY SELECT TEST: WRITE-NRZ,READ-PE
1753
1754  010750  012737  017727  000610  FT24:   MOV     #MSFT24,EMADDR  ;SET ERROR MSG HEADER
1755  010756  004737  011700                  JSR     PC,RWND         ;REWIND SLAVE
1756  010762  012737  000001  000720          MOV     #1,PATRN        ;SELECT PATTERN
1757  010770  004737  012400                  JSR     PC,DSUP         ;GO DO DATA SETUP
1758  010774  012737  020112  000616          MOV     #WDATA,BADDR    ;SET BUS ADDRESS,
1759  011002  012737  177400  000620          MOV     #-400,FCNT      ;FRAME COUNT,
1760  011010  012737  177600  000622          MOV     #-200,WCNT      ;WORD COUNT,
1761  011016  012737  001700  000716          MOV     #1700,UDES      ;& SLAVE DESC = NRZ NORMAL
1762  011024  012737  000061  000710          MOV     #61,FUN         ;LOAD OP CODE WRITE FWD
1763  011032  004737  011546                  JSR     PC,EXEC         ;GO EXECUTE COMMAND
1764  011036  012737  016043  000626          MOV     #MSG46,ERRP     ;SET ERROR MSG ADDRESS
1765  011044  004737  011776                  JSR     PC,ERCHK        ;GO CHECK ERRORS
1766  011050  005737  000712                  TST     SERFL           ;BRANCH IF AN ERROR OCCURRED
1767  011054  001026                          BNE     FT24X
1768  011056  004737  011700                  JSR     PC,RWND         ;REWIND SLAVE
1769  011062  012737  021624  000616          MOV     #RDATA,BADDR    ;SET BUS ADDRESS FOR READ
1770  011070  012737  002300  000716          MOV     #2300,UDES      ;SET SLAVE DESC = PE,NORMAL
1771  011076  012737  000071  000710          MOV     #71,FUN         ;SET OP CODE = READ FWD
1772  011104  004737  011546                  JSR     PC,EXEC         ;GO READ RECORD
1773  011110  032777  000040  167404          BIT     #40,@DS         ;BRANCH ID PES BIT CLEARED
1774  011116  001405                          BEQ     FT24X
1775  011120  012737  016602  000650          MOV     #MSG63,ERADD
1776  011126  004737  003774                  JSR     PC,FT3ER        ;GO PROCESS ERROR
1777  011132  004737  012546          FT24X:  JSR     PC,ITER
1778  011136  000137  003022                  JMP     TSCD2           ;RETURN TO SCHEDULER
1779
```

```
1780
1781                                        ;AUTO-DENSITY SELECT TEST: WRITE-PE,READ-NRZ
1782  011142  012737  020005  000610  FT25:   MOV     #MSFT25,EMADDR  ;SET ERROR MESSAGE ADDRESS
1783  011150  004737  011700                  JSR     PC,RWND         ;REWIND SLAVE
1784  011154  012737  000001  000720          MOV     #1,PATRN        ;SELECT PATTERN
1785  011162  004737  012400                  JSR     PC,DSUP         ;GO DO DATA SETUP
1786  011166  012737  020112  000616          MOV     #WDATA,BADDR    ;SET BUS ADDRESS
1787  011174  012737  177400  000620          MOV     #-400,FCNT      ;FRAME COUNT,
1788  011202  012737  177600  000622          MOV     #-200,WCNT      ;WORD COUNT,
1789  011210  012737  002300  000716          MOV     #2300,UDES      ;& SLAVE DESC = PE,NORMAL
1790  011216  012737  000061  000710          MOV     #61,FUN         ;LOAD WRITE OP CODE
1791  011224  004737  011546                  JSR     PC,EXEC         ;GO EXECUTE WRITE
1792  011230  012737  016043  000626          MOV     #MSG46,ERRP     ;SET ERROR MSG HDR
1793  011236  004737  011776                  JSR     PC,ERCHK        ;GO CHECK FOR ERRORS
1794  011242  005737  000712                  TST     SERFL           ;BRANCH IF ERROR OCURRED
1795  011246  001026                          BNE     FT25X
1796  011250  004737  011700                  JSR     PC,RWND         ;REWIND SLAVE
1797  011254  012737  021624  000616          MOV     #RDATA,BADDR    ;SET BUS ADDRESS FOR READ
1798  011262  012737  001700  000716          MOV     #1700,UDES      ;SET SLAVE DESC = NRZ,NORMAL
1799  011270  012737  000071  000710          MOV     #71,FUN         ;SET READ FWD OP CODE
1800  011276  004737  011546                  JSR     PC,EXEC         ;GO EXECUTE
1801  011302  032777  000040  167212          BIT     #40,@DS         ;BRANCH ID PES BIT GOT SET
1802  011310  001005                          BNE     FT25X
1803  011312  012737  016633  000650          MOV     #MSG64,ERADD
1804  011320  004737  003774                  JSR     PC,FT3ER        ;GO PROCESS ERROR
1805  011324  004737  012546          FT25X:  JSR     PC,ITER         ;ITERATION LOOP
1806  011330  000137  003022                  JMP     TSCD2           ;RETURN TO SCHEDULER
1807
1808                                        ;REWIND: OFF LINE TEST*****
1809
1810  011334  032777  010000  167206  FT26:   BIT     #10000,@SWR     ;SEE IF IN CONTINUOUS MODE
1811  011342  001077                          BNE     FT26XX          ;IF SO: BR
1812  011344  005737  001662                  TST     CHNFLG          ;BRANCH IF CHAIN MODE
1813  011350  001074                          BNE     FT26XX
1814  011352  012737  017673  000610          MOV     #MSFT26,EMADDR  ;SET TEST HEADER
1815  011360  004737  011700                  JSR     PC,RWND         ;REWIND & SELECT SLAVE
1816  011364  012737  000001  000720          MOV     #1,PATRN        ;SELECT PATTERN (ALL 1'S)
1817  011372  004737  012400                  JSR     PC,DSUP         ;FILL WRITE BUFFER
1818  011376  012737  020112  000616          MOV     #WDATA,BADDR    ;SET WRITE BUFFER BUS ADDRESS
1819  011404  012737  177400  000620          MOV     #-400,FCNT      ;SET FRAME COUNT
1820  011412  012737  177600  000622          MOV     #-200,WCNT      ;SET WORD COUNT
1821  011420  012737  001700  000716          MOV     #1700,UDES      ;SET UNIT DESCRIPTION = NRZ
1822  011426  012737  000061  000710          MOV     #61,FUN         ;SET WRITE COMMAND
1823  011434  004737  011546                  JSR     PC,EXEC         ;GO WRITE A RECORD
1824  011440  012777  000003  167042          MOV     #3,@C1          ;ISSUE REWIND: OFF LINE COMMAND
1825  011446  005037  000674                  CLR     SCOLP           ;CLEAR SCOPE LOOP
1826  011452  012700  004000                  MOV     #4000,R0
1827  011456  005300                  1$:     DEC     R0              ;DELAY
1828  011460  001376                          BNE     1$
1829  011462  032777  010000  167032          BIT     #10000,@DS      ;SEE IF MOL IS RESET
1830  011470  001406                          BEQ     2$              ;IF SO: BR
1831  011472  012737  016300  000650          MOV     #MSG53,ERADD    ;SET ERROR CODE
1832  011500  004737  003774                  JSR     PC,FT3ER        ;GO DO ERROR
1833  011504  000412                          BR      FT26X
1834  011506  013700  000524          2$:     MOV     ER,R0           ;GET ADDRESS OF ERROR REG
1835  011512  005001                          CLR     R1              ;RESULT SHOULD BE 0
```

```
 1836  011514  020110                        CMP     R1,(R0)          ;BRANCH IF ERROR REG = 0
 1837  011516  001405                        BEQ     FT26X
 1838  011520  012737  016667  000650        MOV     #MSG67,ERADD     ;SET ERROR MSG HEADER
 1839  011526  004737  003504                JSR     PC,FT2ER         ;GO TYPE ERROR
 1840  011532  012704  016325        FT26X:  MOV     #MSG54,R4
 1841  011536  004737  013442                JSR     PC,TTOUT         ;PRINT ON LINE REQUEST
 1842  011542  000137  003022        FT26XX: JMP     TSCD2            ;RETURN TO SCHEDULER
 1843
```

```
1844                                        ;COMMAND EXECUTE SUBROUTINE*****
1845
1846  011546  000240                EXEC:   NOP
1847  011550  053777  000716  166764        BIS     UDES,@TC        ;LOAD TAPE CONT
1848  011556  013777  000622  166726        MOV     WCNT,@WC        ;LOAD WC
1849  011564  013777  000620  166724        MOV     FCNT,@FC        ;LOAD FC
1850  011572  013777  000616  166714        MOV     BADDR,@BA       ;LOAD BA
1851  011600  022737  000031  000710        CMP     #31,FUN         ;SEE IF SPACE FORWARD
1852  011606  001404                        BEQ     EXECA           ;IF SO: BR
1853  011610  022737  000033  000710        CMP     #33,FUN         ;SEE IF SPACE REVERSE
1854  011616  001003                        BNE     EXECB           ;IF NOT: BR
1855  011620  013777  000642  166670  EXECA: MOV     SCNT,@FC        ;SET SPACE COUNT
1856  011626  000240                EXECB:  NOP
1857  011630  013777  000710  166652        MOV     FUN,@C1         ;LOAD OP-CODE + GO
1858  011636  000240                        NOP
1859  011640  013703  000636                MOV     RDYDX,R3        ;SET DELAY
1860  011644  005004                        CLR     R4
1861  011646  032777  000200  166646  EXECC: BIT     #200,@DS        ;SEE IF DRY
1862  011654  001004                        BNE     EXECX           ;IF SO: BR
1863  011656  005304                        DEC     R4
1864  011660  001372                        BNE     EXECC
1865  011662  005303                        DEC     R3              ;DELAY FOR DRY
1866  011664  001370                        BNE     EXECC
1867  011666  013703  000640        EXECX:  MOV     OPDYX,R3
1868  011672  005303                EXECXA: DEC     R3              ;DELAY
1869  011674  001376                        BNE     EXECXA
1870  011676  000207                EXECXX: RTS     PC              ;RETURN TO CALLER
1871
```

```
1872                                            ;REWIND SUBROUTINE*****
1873
1874  011700  000240                   RWND:    NOP
1875  011702  004737  012620                    JSR     PC,INIT1        ;INIT
1876  011706  012777  000007  166574            MOV     #7,@C1          ;START REWIND
1877  011714  012700  040000                    MOV     #40000,R0
1878  011720  005300                   RWNDA:   DEC     R0
1879  011722  001376                            BNE     RWNDA           ;DELAY
1880  011724  032777  020000  166570   RWNDB:   BIT     #20000,@DS
1881  011732  001374                            BNE     RWNDB           ;AWAIT PIP
1882  011734  032777  000002  166560            BIT     #2,@DS          ;SEE IF BOT
1883  011742  001012                            BNE     RWNDX           ;IF SO: BR
1884  011744  013704  000610                    MOV     EMADDR,R4
1885  011750  004737  013442                    JSR     PC,TTOUT        ;PRINT HEADER
1886  011754  012704  014452                    MOV     #MSG2,R4
1887  011760  004737  013442                    JSR     PC,TTOUT        ;PRINT REWIND ERROR
1888  011764  000137  003022                    JMP     TSCD2           ;RETURN TO SECHEDULAR
1889  011770  004737  012620           RWNDX:   JSR     PC,INIT1        ;INIT
1890  011774  000207                            RTS     PC              ;RETURN TO CALLER
1891
```

```
1892                                            ;ERROR CHECK SUBROUTINE*****
1893
1894  011776  005037  000712          ERCHK:  CLR     SERFL           ;CLEAR FLAG
1895  012002  017737  166514  000664          MOV     @DS,DSAV        ;SAVE DRIVE STATUS REGISTER
1896  012010  032777  040000  166504          BIT     #40000,@DS      ;SEE IF ERROR
1897  012016  001001                          BNE     ERPT            ;IF SO: BR
1898  012020  000207                          RTS     PC              ;RETURN
1899  012022  017704  166476          ERPT:   MOV     @ER,R4          ;GET ERROR REGISTER
1900  012026  032737  002000  000716          BIT     #2000,UDES      ;SEE IF PE
1901  012034  001403                          BEQ     ERPTA1          ;IF SO: BR
1902  012036  042737  000200  000660          BIC     #200,STMSK      ;RESET PEF MASK
1903  012044  043704  000660          ERPTA1: BIC     STMSK,R4        ;MASK DONT CARE BITS
1904  012050  001530                          BEQ     ERPTX           ;IF NO UNEXPECTED ERRORS: BR
1905  012052  012737  000001  000712  ERPTG:  MOV     #1,SERFL        ;SET FLAG
1906  012060  032777  020000  166462          BIT     #20000,@SWR     ;SEE IF SHOULD PRINT ERRORS
1907  012066  001115                          BNE     ERPTD           ;IF NOT: BR
1908  012070  005737  000606                  TST     HDRFL           ;SEE IF DONE HEADER
1909  012074  001006                          BNE     ERPTA           ;IF SO: BR
1910  012076  005237  000606                  INC     HDRFL           ;SET HEADER FLAG
1911  012102  013704  000610                  MOV     EMADDR,R4
1912  012106  004737  013442                  JSR     PC,TTOUT        ;PRINT HEADER
1913  012112  013704  000626          ERPTA:  MOV     ERRP,R4         ;GET ERROR CODE
1914  012116  001414                          BEQ     ERPTB           ;IF NONE: BR
1915  012120  004737  013442                  JSR     PC,TTOUT        ;PRINT ERROR CODE
1916  012124  012704  015136                  MOV     #MSG20,R4       ;SET NRZ TAG
1917  012130  032777  002000  166404          BIT     #2000,@TC       ;SEE IF PE
1918  012136  001402                          BEQ     ERPT1A          ;IF NOT: BR
1919  012140  012704  015144                  MOV     #MSG21,R4       ;ELSE SET PE TAG
1920  012144  004737  013442          ERPT1A: JSR     PC,TTOUT        ;PRINT TAG
1921  012150  013704  000630          ERPTB:  MOV     ERRP1,R4        ;SEE IF CODE 2
1922  012154  001402                          BEQ     ERPTB1          ;IF NOT: BR
1923  012156  004737  013442                  JSR     PC,TTOUT        ;PRINT CODE 2
1924  012162  032777  004000  166360  ERPTB1: BIT     #4000,@SWR      ;SEE IF ITERATION
1925  012170  001010                          BNE     ERPTC           ;IF NOT: BR
1926  012172  012704  016457                  MOV     #MSG56,R4
1927  012176  004737  013442                  JSR     PC,TTOUT        ;PRINT ITER TAG
1928  012202  013703  000662                  MOV     ITCNT,R3
1929  012206  004737  013572                  JSR     PC,OCTP         ;PRINT ITERATION
1930  012212  012704  014364          ERPTC:  MOV     #MSG1,R4
1931  012216  004737  013442                  JSR     PC,TTOUT        ;PRINT REGISTER TAG
1932  012222  017703  166262                  MOV     @C1,R3
1933  012226  004737  013560                  JSR     PC,OCTPE        ;PRINT CS1
1934  012232  017703  166254                  MOV     @WC,R3
1935  012236  004737  013560                  JSR     PC,OCTPE        ;PRINT WC
1936  012242  017703  166246                  MOV     @BA,R3
1937  012246  004737  013560                  JSR     PC,OCTPE        ;PRINT BA
1938  012252  017703  166240                  MOV     @FC,R3
1939  012256  004737  013560                  JSR     PC,OCTPE        ;PRINT FC
1940  012262  017703  166232                  MOV     @CS,R3
1941  012266  004737  013560                  JSR     PC,OCTPE        ;PRINT CS2
1942  012272  017703  166224                  MOV     @DS,R3
1943  012276  004737  013560                  JSR     PC,OCTPE        ;PRINT DS
1944  012302  017703  166216                  MOV     @ER,R3
1945  012306  004737  013560                  JSR     PC,OCTPE        ;PRINT ER
1946  012312  017703  166224                  MOV     @TC,R3
1947  012316  004737  013560                  JSR     PC,OCTPE        ;PRINT TC
```

```
 1948  012322  005777  166222          ERPTD:  TST     @SWR            ;SEE IF HALT ON ERROR
 1949  012326  100001                          BPL     ERPTX           ;IF NOT: BR
 1950  012330  000000                          HALT
 1951  012332  004737  012620          ERPTX:  JSR     PC,INIT1        ;INIT
 1952  012336  000207                  ERPTXX: RTS     PC              ;RETURN
 1953
 1954
```

```
                                        ;TAPE MARK STATUS CHECK**********
                                        
012340  032737  000004  000664  T*CHK:  BIT     #4,DSAV         ;SEE IF TM SET
012346  001401                          BEQ     TMCHK1          ;IF NOT: BR
012350  000207                  TMCHK0: RTS     PC              ;ELSE RETURN
012352  005737  000712          TMCHK1: TST     SERFL           ;SEE IF HAD ERROR
012356  001374                          BNE     TMCHK0          ;IF SO: BR
012360  012737  016467  000630          MOV     #MSG57,ERRP1    ;SET ERROR CODE 2
012366  004737  012052                  JSR     PC,ERPTG        ;GO PRINT TM ERROR
012372  005037  000630                  CLR     ERRP1           ;CLEAR CODE 2 FLAG
012376  000207                          RTS     PC              ;RETURN
                                        
                                        ;DATA SETUP ROUTINE**********
                                        
012400  000240                  DSUP:   NOP
012402  012703  020112          DS0:    MOV     #WDATA,R3       ;R3 = ADDRS OF WRITE BUFFER
012406  013701  000720                  MOV     PATRN,R1        ;R1 = PATTERN SELECTOR
012412  006301                          ASL     R1              ;MAKE PATTERN SELECTOR EVEN
012414  004771  000740                  JSR     PC,@DATBL(R1)   ;GO GENERATE PATTERN
012420  012702  000640                  MOV     #640,R2         ;R2=BUFFER SIZE +2
012424  012701  021624                  MOV     #RDATA,R1       ;R1=READ DATA START
012430  005021                  1$:     CLR     (R1)+           ;CLEAR BUFFER
012432  005302                          DEC     R2              ;SEE IF DONE ALL
012434  001375                          BNE     1$              ;IF NOT: BR
012436  000207                          RTS     PC              ;EXIT
                                        
                                        ;ALL ONES**********
                                        
012440  012701  177777          DAT1:   MOV     #-1,R1          ;R1=DATA
012444  012702  000640          DAT1A:  MOV     #640,R2         ;R2=WORD COUNT +2
012450  010123                  1$:     MOV     R1,(R3)+        ;LOAD BUFFER
012452  005302                          DEC     R2              ;SEE IF DONE
012454  001375                          BNE     1$              ;IF NOT: BR
012456  000207                          RTS     PC
                                        
                                        ;ALL ZEROS**********
                                        
012460  005001                  DAT2:   CLR     R1              ;R1=DATA
012462  000770                          BR      DAT1A           ;LOAD BUFFER
                                        
                                        ;ONE/ZERO IN ALTERNATING CHARACTERS**********
                                        
012464  012701  125125          DAT3:   MOV     #125125,R1      ;R1=DATA
012470  000765                          BR      DAT1A           ;LOAD BUFFER
                                        
                                        ;ALL BITS 0-377**********
                                        
012472  005001                  DAT4:   CLR     R1              ;R1=STARTING DATA
012474  012702  001500                  MOV     #1500,R2        ;R2=CHARACTER COUNT
012500  110123                  1$:     MOVB    R1,(R3)+        ;LOAD BUFFER
012502  105201                          INCB    R1              ;BUMP DATA
012504  005302                          DEC     R2              ;SEE IF DONE
012506  001374                          BNE     1$              ;IF NOT: BR
012510  000207                          RTS     PC
```

```
2010
2011
2012
2013                                        ;SCOPE LOOP ON ERROR SUBROUTINE**********
2014
2015  012512  000240                SCOPE:  NOP
2016  012514  032777  040000  166026        BIT     #40000,@SWR     ;SEE IF LOOP ON ERROR
2017  012522  001001                        BNE     1$              ;IF SO: BR
2018  012524  000207                        RTS     PC              ;ELSE EXIT
2019  012526  000240                1$:     NOP
2020  012530  005737  000674                TST     SCOLP           ;SEE IF SCOPE ADDRESS
2021  012534  001001                        BNE     2$              ;IF NOT: BR
2022  012536  000207                        RTS     PC              ;ELSE EXIT
2023  012540  022626                2$:     CMP     (SP)+,(SP)+     ;RESET STACK
2024  012542  000177  166126                JMP     @SCOLP          ;LOOP ON ERROR
2025
2026                                        ;TEST ITERATION SUBROUTINE**********
2027
2028  012546  000240                ITER:   NOP
2029  012550  032777  004000  165772        BIT     #4000,@SWR      ;SEE IF ITERATIONS
2030  012556  001403                        BEQ     2$              ;IF SO: BR
2031  012560  005037  000662        1$:     CLR     ITCNT           ;CLEAR ITERATION COUNTER
2032  012564  000207                        RTS     PC              ;ELSE EXIT
2033  012566  005737  000730        2$:     TST     PCNTR           ;DO SINGLE SUBTEST ITERATION
2034  012572  001772                        BEQ     1$              ;ON FIRST PASS
2035  012574  005237  000662                INC     ITCNT           ;BUMP COUNTER
2036  012600  023737  000662  000566        CMP     ITCNT,ITAMT     ;SEE IF DONE ALL
2037  012606  001764                        BEQ     1$              ;IF SO: BR
2038  012610  005726                        TST     (SP)+           ;RESET STACK
2039  012612  017700  166060                MOV     @ITRLP,R0       ;SET ITERATION POINTER
2040  012616  000110                        JMP     (R0)            ;GO ITERATE
2041
2042                                        ;INITIALIZE SUBROUTINE**********
2043
2044  012620  000240                INIT1:  NOP
2045  012622  012777  000040  165670        MOV     #40,@CS         ;INIT
2046  012630  013777  000612  165662  INIT2: MOV     DRVN,@CS        ;SELECT DRIVE
2047  012636  013777  000614  165676        MOV     SLVN,@TC        ;SELECT SLAVE
2048  012644  000207                        RTS     PC              ;RETURN
2049
```

```
2050                                        ;MAG TAPE INTERRUPT HANDLER**********
2051
2052  012646  000240              MTINT:    NOP
2053  012650  013716  000646              MOV     RTRN,(SP)       ;RETURN TO (RTRN)
2054  012654  000002                       RTI                     ;RETURN
2055
2056                                        ;TTY INTERRUPT HANDLER**********
2057
2058  012656  017746  165672      TTINT:    MOV     @TKB,-(SP)      ;GET CHARACTER
2059  012662  042716  000200              BIC     #200,(SP)       ;CLEAR PARITY BIT
2060  012666  122716  000003              CMPB    #3,(SP)         ;BRANCH IF NOT CONTROL C
2061  012672  001010                       BNE     1$
2062  012674  005737  001662              TST     CHNFLG          ;INHIBIT  C IF CHAIN MODE
2063  012700  001005                       BNE     1$
2064  012702  005077  165640              CLR     @PSW
2065  012706  000005                       RESET
2066  012710  000137  000200              JMP     @#200           ;RESTART PROGRAM
2067  012714  122716  000001      1$:     CMPB    #1,(SP)         ;BRANCH IF NOT  A
2068  012720  001017                       BNE     2$
2069  012722  022737  000176  000550      CMP     #SWREG,SWR      ;BRANCH IF HARDWARE SWR IS INVOKED
2070  012730  001016                       BNE     3$
2071  012732  012737  177570  000550      MOV     #177570,SWR     ;INVOKE HARDWARE SWR
2072  012740  004737  014320              JSR     PC,.SAVE        ;SAVE REGISTERS ON THE STACK
2073  012744  012704  016743              MOV     #MSG70,R4       ;TYPE 'HARDWARE SWR IN USE'
2074  012750  004737  013442              JSR     PC,TTOUT
2075  012754  004737  014342              JSR     PC,.RESTORE
2076  012760  122716  000007      2$:     CMPB    #7,(SP)         ;BRANCH IF NOT  G
2077  012764  001005                       BNE     4$
2078  012766  012737  000176  000550  3$: MOV     #SWREG,SWR      ;INVOKE SOFTWARE SWR
2079  012774  004737  014222              JSR     PC,GTSWR        ;GET SOFTWARE SWITCHES
2080  013000  005726              4$:     TST     (SP)+           ;POP CHARACTER OFF THE STACK
2081  013002  000002                       RTI
2082
2083                                        ;BUS ADDRESS TRAP HANDLER**********
2084
2085  013004  000240              TRAP:     NOP
2086  013006  032777  020000  165534      BIT     #20000,@SWR     ;SEE IF SHOULD PRINT ERRORS
2087  013014  001020                       BNE     TRAP2           ;IF NOT: BR
2088  013016  005737  000606              TST     HDRFL           ;SEE IF DONE HEADER
2089  013022  001006                       BNE     TRAP1           ;IF SO: BR
2090  013024  005237  000606              INC     HDRFL           ;ELSE SET HEADER FLAG
2091  013030  013704  000610              MOV     EMADDR,R4
2092  013034  004737  013442              JSR     PC,TTOUT        ;PRINT HEADER
2093  013040  012704  015171      TRAP1:  MOV     #MSG24,R4
2094  013044  004737  013442              JSR     PC,TTOUT        ;PRINT ERROR
2095  013050  010103                       MOV     R1,R3           ;GET ADDRESS THAT CAUSED THE TRAP
2096  013052  004737  013572              JSR     PC,OCTP         ;PRINT ADDRESS OF TRAP
2097  013056  005777  165466      TRAP2:  TST     @SWR            ;SEE IF HALT ON ERROR
2098  013062  100001                       BPL     TRAPX           ;IF NOT: BR
2099  013064  000000                       HALT
2100  013066  022626              TRAPX:    CMP     (SP)+,(SP)+     ;RESET STACK
2101  013070  012737  003250  000674      MOV     #FT1A,SCOLP     ;SET SCOPE ADDRESS
2102  013076  004737  012512              JSR     PC,SCOPE        ;GO SEE IF SCOPE LOOP
2103  013102  005737  000722              TST     RHTF            ;SEE IF INITIAL ADDRESS TEST
2104  013106  001402                       BEQ     TRAPXX          ;IF NOT: BR
2105  013110  000137  001766              JMP     STOB            ;ELSE REDO ADDRESS REQUEST
```

```
 2106  013114  000137  003254          TRAPXX: JMP     FT1B            ;RETURN TO TEST 1
 2107
```

```
                                        ;*********************************************************
                                        ;TTY ENTRY SUBROUTINE:
                                        ;
                                        ;THIS SUBROUTINE IS USED BY THE TEST CONDITION
                                        ;ENTRY ROUTINE TO READ THE RESPONSE ENTERED
                                        ;AT THE TTY AND CHECK THEM FOR LEGALITY AND
                                        ;LIMITS.  ALL RESPONSE MUST BE TYPED IN OCTAL
                                        ;(0-7) AND MUST FALL WITHIN THE LIMITS SET BY
                                        ;THE CALLING ROUTINE.
                                        ;IF AN ENTRY IS ILLEGAL OR OUTSIDE THE LIMITS,
                                        ;A QUESTION MARK IS TYPED (?) AND THE RESPONSE
                                        ;MAY BE REENTERED.
                                        ;ENTRIES MAY NOT EXCEED SIX (6) CHARACTERS AND
                                        ;MAY BE TERMINATED AT LESS THAN SIX BY TYPING A
                                        ;CARRIAGE RETURN
                                        ;*********************************************************

013120  010146          TTR:    MOV     R1,-(SP)        ;SAVE CHAR COUNT ON STACK
013122  011601          10$:    MOV     (SP),R1         ;RESTORE CHAR COUNT (FOR  U)
013124  005037  000652          CLR     TEMP1           ;CLEAR FIRST CHARACTER FLAG
013130  005000                  CLR     R0
013132  004737  013400    1$:   JSR     PC,TTIN         ;GO READ CHARACTER
013136  122737  000003  000602  CMPB    #3,TIB          ;BRANCH IF NOT  C
013144  001003                  BNE     11$
013146  000005                  RESET                   ;RESET
013150  000137  000200          JMP     @#200           ;RESTART
013154  122737  000015  000602  11$:   CMPB    #15,TIB         ;SEE IF CR
013162  001004                  BNE     2$              ;IF NOT: BR
013164  005737  000652          TST     TEMP1           ;SEE IF FIRST CHARACTER
013170  001471                  BEQ     9$              ;IF SO: BR
013172  000457                  BR      6$              ;ELSE GO LOAD VALUE
013174  122737  000025  000602  2$:   CMPB    #25,TIB         ;BRANCH IF NOT CONTROL U
013202  001005                  BNE     21$
013204  012704  016663          MOV     #MSG65,R4       ;TYPE <CR><LF>
013210  004737  013442          JSR     PC,TTOUT
013214  000742                  BR      10$             ;RESTART
013216  122737  000177  000602  21$:   CMPB    #177,TIB        ;BRANCH IF NOT 'RUBOUT'
013224  001012                  BNE     3$
013226  000241                  CLC                     ;REMOVE LAST CHARACTER
013230  006000                  ROR     R0
013232  006200                  ASR     R0
013234  006200                  ASR     R0
013236  012704  016665          MOV     #MSG66,R4       ;TYPE ' '
013242  004737  013442          JSR     PC,TTOUT
013246  005201                  INC     R1              ;DECRENENT CHAR RECEIVED COUNT
013250  000730                  BR      1$              ;GET NEXT CHARACTER
013252  122737  000060  000602  3$:   CMPB    #60,TIB         ;SEE IF CHAR IS LESS THAN 0
013260  101402                  BLOS    4$              ;IF NOT: BR
013262  000137  013360          JMP     TINER           ;ELSE GO TO ERROR
013266  122737  000070  000602  4$:   CMPB    #70,TIB         ;SEE IF CHAR IS GREATER THAN 7
013274  101002                  BHI     5$              ;IF NOT: BR
013276  000137  013360          JMP     TINER           ;ELSE GO TO ERROR
013302  005237  000652          5$:   INC     TEMP1           ;SET FIRST CHARACTER FLAG
013306  006300                  ASL     R0
013310  006300                  ASL     R0              ;SHIFT 3 LEFT
013312  006300                  ASL     R0
```

```
 2164  013314  042737  177770  000602          BIC     #177770,TIB     ;STRIP ASCII
 2165  013322  053700  000602                  BIS     TIB,R0          ;LOAD CHARACTER
 2166  013326  005301                          DEC     R1              ;SEE IF DONE
 2167  013330  001300                          BNE     1$              ;IF NOT: BR
 2168  013332  020002                  6$:     CMP     R0,R2           ;SEE IF EXCEEDED MAXIMUM LIMIT
 2169  013334  101402                          BLOS    7$              ;IF NOT: BR
 2170  013336  000137  013360                  JMP     TINER           ;ELSE GO TO ERROR
 2171  013342  020300                  7$:     CMP     R3,R0           ;SEE IF BELOW MINIMUM LIMIT
 2172  013344  101402                          BLOS    8$              ;IF NOT: BR
 2173  013346  000137  013360                  JMP     TINER           ;ELSE GO TO ERROR
 2174  013352  010015                  8$:     MOV     R0,(R5)         ;LOAD VALUE
 2175  013354  005726                  9$:     TST     (SP)+           ;POP CHAR COUNT OFF STACK
 2176  013356  000207                          RTS     PC              ;EXIT
 2177
 2178                                          ;TTY ENTRY ERROR SUBROUTINE**********
 2179
 2180  013360  012704  014677          TINER:  MOV     #MSG7,R4
 2181  013364  004737  013442                  JSR     PC,TTOUT        ;PRINT?
 2182  013370  005726                          TST     (SP)+           ;POP CHAR COUNT OFF STACK
 2183  013372  162716  000020                  SUB     #20,(SP)        ;RESET SP TO START OF VALUE ROUTINE
 2184  013376  000207                          RTS     PC              ;REDO VALUE ENTRY
 2185
 2186                                          ;TTY READ SUBROUTINE**********
 2187
 2188  013400  005277  165146          TTIN:   INC     @TKS
 2189  013404  105777  165142          1$:     TSTB    @TKS
 2190  013410  100375                          BPL     1$
 2191  013412  117737  165136  000602          MOVB    @TKB,TIB
 2192  013420  042737  000200  000602          BIC     #200,TIB        ;STRIP PARITY BIT
 2193  013426  013737  000602  000600          MOV     TIB,TOB         ;MOVE CHAR TO OUTPUT BFR
 2194  013434  004737  013542                  JSR     PC,TOG          ;AND TYPE IT
 2195  013440  000207                          RTS     PC
 2196
 2197                                          ;TTY OUTPUT SUBROUTINE***********
 2198
 2199  013442  112437  000600          TTOUT:  MOVB    (R4)+,TOB
 2200  013446  122737  000043  000600          CMPB    #43,TOB
 2201  013454  001440                          BEQ     TEX
 2202  013456  122737  000045  000600          CMPB    #45,TOB
 2203  013464  001403                          BEQ     1$
 2204  013466  004737  013542                  JSR     PC,TOG
 2205  013472  000763                          BR      TTOUT
 2206  013474  112737  000015  000600  1$:     MOVB    #15,TOB
 2207  013502  004737  013542                  JSR     PC,TOG
 2208  013506  012703  000004                  MOV     #4,R3
 2209  013512  005037  000600          2$:     CLR     TOB
 2210  013516  004737  013542                  JSR     PC,TOG
 2211  013522  005303                          DEC     R3
 2212  013524  001372                          BNE     2$              ;DO FILLERS
 2213  013526  112737  000012  000600          MOVB    #12,TOB
 2214  013534  004737  013542                  JSR     PC,TOG
 2215  013540  000740                          BR      TTOUT
 2216  013542  105777  165010          TOG:    TSTB    @TPS
 2217  013546  100375                          BPL     TOG
 2218  013550  113777  000600  165002          MOVB    TOB,@TPB
 2219  013556  000207                  TEX:    RTS     PC
```

```
2220
2221
```

```
                                        ;OCTAL OUTPUT SUBROUTINE***********
                                        
013560  012737  000001  014010  OCTPE:  MOV     #1,OFL
013566  010304                  OCTPE1: MOV     R3,R4
013570  000410                          BR      OCTP0
013572  005037  014010          OCTP:   CLR     OFL             ;CLEAR FLAG FOR LEADING ZERO
013576  010304                          MOV     R3,R4           ;SEE IF NUMBER IS ZERO
013600  001004                          BNE     OCTP0           ;IF NOT ZERO: BR
013602  004737  013770                  JSR     PC,OCTPG1       ;ELSE PRINT ZERO
013606  000137  013732                  JMP     OCTP3           ;SPACE AND EXIT
013612  032704  100000          OCTP0:  BIT     #100000,R4      ;SEE IF MSD = 1
013616  001406                          BEQ     OCTP1           ;IF NOT: BR
013620  012704  000001                  MOV     #1,R4
013624  004737  013746                  JSR     PC,OCTPG        ;PRINT 1
013630  000137  013642                  JMP     OCTP2
013634  005004                  OCTP1:  CLR     R4
013636  004737  013746                  JSR     PC,OCTPG        ;PRINT 0
013642  010304                  OCTP2:  MOV     R3,R4
013644  006004                          ROR     R4
013646  006004                          ROR     R4
013650  006004                          ROR     R4              ;POSITION DIGIT
013652  006004                          ROR     R4
013654  000304                          SWAB    R4
013656  004737  013746                  JSR     PC,OCTPG        ;PRINT DIGIT 2
013662  010304                          MOV     R3,R4
013664  006004                          ROR     R4
013666  000304                          SWAB    R4
013670  004737  013746                  JSR     PC,OCTPG        ;PRINT DIGIT 3
013674  010304                          MOV     R3,R4
013676  006104                          ROL     R4
013700  006104                          ROL     R4
013702  000304                          SWAB    R4
013704  004737  013746                  JSR     PC,OCTPG        ;PRINT DIGIT 4
013710  010304                          MOV     R3,R4
013712  006004                          ROR     R4
013714  006004                          ROR     R4
013716  006004                          ROR     R4
013720  004737  013746                  JSR     PC,OCTPG
013724  010304                          MOV     R3,R4
013726  004737  013746                  JSR     PC,OCTPG        ;PRINT DIGIT 5
013732  012737  000240  000600  OCTP3:  MOV     #240,TOB
013740  004737  013542                  JSR     PC,TOG          ;PRINT SPACE
013744  000207                          RTS     PC              ;EXIT
013746  042704  177770          OCTPG:  BIC     #177770,R4
013752  001004                          BNE     OCTPG0
013754  005737  014010                  TST     OFL
013760  001001                          BNE     OCTPG0
013762  000207                          RTS     PC
                                        
013764  005237  014010          OCTPG0: INC     OFL
013770  052704  000260          OCTPG1: BIS     #260,R4
013774  010437  000600                  MOV     R4,TOB
014000  004737  013542                  JSR     PC,TOG
014004  010304                          MOV     R3,R4
014006  000207                          RTS     PC
014010  000000                  OFL:    0                       ;FIRST CHAR FLAG
```

```
                                        ;DATA CHARACTER OUTPUT SUBROUTINE***********
                                
014012  005037  000600          DOUT:   CLR     TOB
014016  012704  000010                  MOV     #10,R4          ;SET NUMBER TO PRINT
014022  110337  000600                  MOVB    R3,TOB
014026  105777  164524          1$:     TSTB    @TPS
014032  100375                          BPL     1$
014034  132737  000200  000600        BITB    #200,TOB
014042  001404                          BEQ     2$
014044  012777  000061  164506        MOV     #061,@TPB
014052  000403                          BR      3$
014054  012777  000060  164476  2$:     MOV     #060,@TPB
014062  006137  000600          3$:     ROL     TOB
014066  005304                          DEC     R4
014070  001356                          BNE     1$
014072  000207                          RTS     PC
                                
014074  013703  000656          DOUTD:  MOV     TEMP3,R3
014100  000303                          SWAB    R3
014102  004737  014012                  JSR     PC,DOUT
014106  013703  000656                  MOV     TEMP3,R3
014112  004737  014012                  JSR     PC,DOUT
014116  000207                          RTS     PC
                                
                                        ;TU45 SERIAL NUMBER PRINT SUBROUTINE**********
                                
014120  010304          SNPT:   MOV     R3,R4
014122  000304                  SWAB    R4
014124  006004                  ROR     R4
014126  006004                  ROR     R4
014130  006004                  ROR     R4
014132  006004                  ROR     R4              ;GET FIRST DIGIT
014134  004737  014176          JSR     PC,SNPG         ;GO PRINT
014140  010304                  MOV     R3,R4
014142  000304                  SWAB    R4              ;GET SECOND DIGIT
014144  004737  014176          JSR     PC,SNPG         ;GO PRINT
014150  010304                  MOV     R3,R4
014152  006004                  ROR     R4
014154  006004                  ROR     R4
014156  006004                  ROR     R4
014160  006004                  ROR     R4              ;GET THIRD DIGIT
014162  004737  014176          JSR     PC,SNPG         ;GO PRINT
014166  010304                  MOV     R3,R4           ;GET FOURTH DIGIT
014170  004737  014176          JSR     PC,SNPG         ;GO PRINT
014174  000207                  RTS     PC              ;EXIT
014176  012737  000260  000600  SNPG:   MOV     #260,TOB        ;SET BASE = 0
014204  042704  177760                  BIC     #177760,R4      ;MASK DIGIT
014210  050437  000600                  BIS     R4,TOB          ;SET ASCII
014214  004737  013542                  JSR     PC,TOG          ;TYPE DIGIT
014220  000207                          RTS     PC              ;RETURN
```

```
2330
2331                                    ;ROUTINE TO LOAD NEW VALUE INTO SWITCHES
2332  014222  022737  000176  000550  GTSWR:  CMP     #SWREG,SWR      ;BRANCH IF SOFTWARE SWR
2333  014230  001032                          BNE     1$              ;NOT INVOKED
2334  014232  004737  014320                  JSR     PC,.SAVE        ;SAVE REGISTERS ON THE STACK
2335  014236  012704  020067                  MOV     #$MSWR,R4
2336  014242  004737  013442                  JSR     PC,TTOUT
2337  014246  017703  164276                  MOV     @SWR,R3
2338  014252  004737  013560                  JSR     PC,OCTPE
2339  014256  012704  020076                  MOV     #$MNEW,R4
2340  014262  004737  013442                  JSR     PC,TTOUT
2341  014266  013705  000550                  MOV     SWR,R5          ;TTR ROUTINE RETURNS NEW VALUE TO (R5)
2342  014272  012701  000007                  MOV     #7,R1           ;LIMIT RESPONSE TO 7 CHARS
2343  014276  012702  177777                  MOV     #177777,R2      ;BETWEEN 0 AND 177777
2344  014302  012703  000000                  MOV     #0,R3
2345  014306  004737  013120                  JSR     PC,TTR
2346  014312  004737  014342                  JSR     PC,.RESTORE     ;RESTORE REGISTERS
2347  014316  000207                  1$:     RTS     PC
2348
2349                                    ;;ROUTINE TO SAVE REGISTERS ON THE STACK
2350  014320  010546                  .SAVE:  MOV     %5,-(SP)        ;;R5 IS SAVED AT 12(SP)
2351  014322  010446                          MOV     %4,-(SP)        ;;R4 IS SAVED AT 10(SP)
2352  014324  010346                          MOV     %3,-(SP)        ;;R3 IS SAVED AT 6(SP)
2353  014326  010246                          MOV     %2,-(SP)        ;;R2 IS SAVED AT 4(SP)
2354  014330  010146                          MOV     %1,-(SP)        ;;R1 IS SAVED AT 2(SP)
2355  014332  010046                          MOV     %0,-(SP)        ;;R0 IS SAVED AT (SP)
2356  014334  016646  000014                  MOV     14(SP),-(SP)    ;;PUSH RETURN PC ON THE STACK
2357  014340  000207                          RTS     PC              ;;RETURN TO CALLER
2358
2359                                    ;;ROUTINE TO RESTORE REGISTERS SAVED ON THE STACK
2360  014342  012666  000014          .RESTORE:MOV    (SP)+,14(SP)    ;;STORE RETURN PC ON STACK
2361  014346  012600                          MOV     (SP)+,%0
2362  014350  012601                          MOV     (SP)+,%1
2363  014352  012602                          MOV     (SP)+,%2
2364  014354  012603                          MOV     (SP)+,%3
2365  014356  012604                          MOV     (SP)+,%4
2366  014360  012605                          MOV     (SP)+,%5
2367  014362  000207                          RTS     PC              ;;RETURN
2368
2369
```

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 2370                                           ;MESSAGE TABLE*****
 2371
 2372  014364  041445  030523  020040  MSG1:    .ASCII  /%CS1    WC     BA     FC     CS2    /
 2373  014372  020040  041527  020040
 2374  014400  020040  041040  020101
 2375  014406  020040  020040  041506
 2376  014414  020040  020040  041440
 2377  014422  031123  020040  020040
 2378  014430  051504  020040  020040          .ASCII  /DS     ER     TC%#/
 2379  014436  042440  020122  020040
 2380  014444  020040  041524  021445
 2381  014452  051045  053505  047111  MSG2:    .ASCII  /%REWIND ERROR#/
 2382  014460  020104  051105  047522
 2383  014466  021522
 2384  014470  022445  046524  031460  MSG3:    .ASCII  /%%TM03-TU45 BASIC FUNCTION TEST (CZTUQA0)%/
 2385  014476  052055  032125  020065
 2386  014504  040502  044523  020103
 2387  014512  052506  041516  044524
 2388  014520  047117  052040  051505
 2389  014526  020124  041450  052132
 2390  014534  050525  030101  022451
 2391  014542  054524  042520  036040          .ASCII  /TYPE <CR> TO TERMINATE RESPONSE &  C TO RESTART%#/
 2392  014550  051103  020076  047524
 2393  014556  052040  051105  044515
 2394  014564  040516  042524  051040
 2395  014572  051505  047520  051516
 2396  014600  020105  020046  041536
 2397  014606  052040  020117  042522
 2398  014614  052123  051101  022524
 2399  014622     043
 2400  014623     045  042522  044507  MSG4:    .ASCII  /%REGISTER START = #/
 2401  014630  052123  051105  051440
 2402  014636  040524  052122  036440
 2403  014644  021440
 2404  014646  053045  041505  047524  MSG5:    .ASCII  /%VECTOR = #/
 2405  014654  020122  020075     043
 2406  014661     045  047105  020104  MSG6:    .ASCII  /%END OF PASS #/
 2407  014666  043117  050040  051501
 2408  014674  020123     043
 2409  014677     040  020077     043  MSG7:    .ASCII  / ? #/
 2410  014703     045  047520  044523  MSG9:    .ASCII  /%POSITION ERROR: #/
 2411  014710  044524  047117  042440
 2412  014716  051122  051117  020072
 2413  014724     043
 2414  014725     045  051104  053111  MSG10:   .ASCII  /%DRIVE NUMBER: #/
 2415  014732  020105  052516  041115
 2416  014740  051105  020072     043
 2417  014745     045  046123  053101  MSG11:   .ASCII  /%SLAVE NUMBER: #/
 2418  014752  020105  052516  041115
 2419  014760  051105  020072     043
 2420  014765     045  051127  052111  MSG12:   .ASCII  /%WRITE ERROR #/
 2421  014772  020105  051105  047522
 2422  015000  020122     043
 2423  015003     045  042522  042101  MSG13:   .ASCII  /%READ REVERSE ERROR #/
 2424  015010  051040  053105  051105
 2425  015016  042523  042440  051122
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 2426  015024  051117  021440
 2427  015030  051045  040505  020104  MSG14:  .ASCII  /%READ FORWARD ERROR #/
 2428  015036  047506  053522  051101
 2429  015044  020104  051105  047522
 2430  015052  020122     043
 2431  015055     045  051127  052111  MSG15:  .ASCII  /%WRITE TM ERROR #/
 2432  015062  020105  046524  042440
 2433  015070  051122  051117  021440
 2434  015076  051045  053105  051105  MSG16:  .ASCII  /%REVERSE ERROR #/
 2435  015104  042523  042440  051122
 2436  015112  051117  021440
 2437  015116  043045  051117  040527  MSG17:  .ASCII  /%FORWARD ERROR #/
 2438  015124  042122  042440  051122
 2439  015132  051117  021440
 2440  015136  047040  055122  021440  MSG20:  .ASCII  / NRZ #/
 2441  015144  050040  020105     043  MSG21:  .ASCII  / PE #/
 2442  015151     040  054105  052120  MSG22:  .ASCII  / EXPT: #/
 2443  015156  020072     043
 2444  015161     040  041522  042126  MSG23:  .ASCII  / RCVD: #/
 2445  015166  020072     043
 2446  015171     045  052502  020123  MSG24:  .ASCII  /%BUS TRAP: #/
 2447  015176  051124  050101  020072
 2448  015204     043
 2449  015205     045  041527  020072  MSG25:  .ASCII  /%WC: #/
 2450  015212     043
 2451  015213     045  040502  020072  MSG26:  .ASCII  /%BA: #/
 2452  015220     043
 2453  015221     045  041104  020072  MSG27:  .ASCII  /%DB: #/
 2454  015226     043
 2455  015227     045  047111  052111  MSG28:  .ASCII  /%INIT DID NOT CLEAR RH #/
 2456  015234  042040  042111  047040
 2457  015242  052117  041440  042514
 2458  015250  051101  051040  020110
 2459  015256     043
 2460  015257     045  041523  047040  MSG29:  .ASCII  /%SC NOT RESET BY INIT #/
 2461  015264  052117  051040  051505
 2462  015272  052105  041040  020131
 2463  015300  047111  052111  021440
 2464  015306  052045  042522  047040  MSG30:  .ASCII  /%TRE NOT RESET BY INIT #/
 2465  015314  052117  051040  051505
 2466  015322  052105  041040  020131
 2467  015330  047111  052111  021440
 2468  015336  041445  031123  047040  MSG31:  .ASCII  /%CS2 NOT RESET BY INIT #/
 2469  015344  052117  051040  051505
 2470  015352  052105  041040  020131
 2471  015360  047111  052111  021440
 2472  015366  042045  052114  047040  MSG32:  .ASCII  /%DLT NOT SET #/
 2473  015374  052117  051440  052105
 2474  015402  021440
 2475  015404  051445  020103  047516  MSG33:  .ASCII  /%SC NOT SET #/
 2476  015412  020124  042523  020124
 2477  015420     043
 2478  015421     045  051124  020105  MSG34:  .ASCII  /%TRE NOT SET #/
 2479  015426  047516  020124  042523
 2480  015434  020124     043
 2481  015437     045  051111  047040  MSG35:  .ASCII  /%IR NOT SET BY INIT #/
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 2482  015444  052117  051440  052105
 2483  015452  041040  020131  047111
 2484  015460  052111  021440
 2485  015464  047445  020122  047516  MSG36:  .ASCII  /%OR NOT RESET BY INIT #/
 2486  015472  020124  042522  042523
 2487  015500  020124  054502  044440
 2488  015506  044516  020124     043
 2489  015513     045  051117  047040  MSG37:  .ASCII  /%OR NOT RESET BY 1 SILO ENTRY #/
 2490  015520  052117  051040  051505
 2491  015526  052105  041040  020131
 2492  015534  020061  044523  047514
 2493  015542  042440  052116  054522
 2494  015550  021440
 2495  015552  047445  020122  047516  MSG38:  .ASCII  /%OR NOT SET BY SILO FULL #/
 2496  015560  020124  042523  020124
 2497  015566  054502  051440  046111
 2498  015574  020117  052506  046114
 2499  015602  021440
 2500  015604  041045  042101  051440  MSG39:  .ASCII  /%BAD SILO READ #/
 2501  015612  046111  020117  042522
 2502  015620  042101  021440
 2503  015624  044445  020122  047516  MSG40:  .ASCII  /%IR NOT RESET BY SILO FULL#/
 2504  015632  020124  042522  042523
 2505  015640  020124  054502  051440
 2506  015646  046111  020117  052506
 2507  015654  046114     043
 2508  015657     045  047516  026516  MSG41:  .ASCII  /%NON-EXIST DRIVE#/
 2509  015664  054105  051511  020124
 2510  015672  051104  053111  021505
 2511  015700  047045  047117  042455  MSG42:  .ASCII  /%NON-EXIST SLAVE#/
 2512  015706  044530  052123  051440
 2513  015714  040514  042526     043
 2514  015721     045  042523  044522  MSG43:  .ASCII  /%SERIAL NO: #/
 2515  015726  046101  047040  035117
 2516  015734  021440
 2517  015736  042445  040522  042523  MSG44:  .ASCII  /%ERASE HEAD INOPERATIVE#/
 2518  015744  044040  040505  020104
 2519  015752  047111  050117  051105
 2520  015760  052101  053111  021505
 2521  015766  050045  051517  044523  MSG45:  .ASCII  /%POSSIBLE ERASE HEAD PROBLEM: /
 2522  015774  046102  020105  051105
 2523  016002  051501  020105  042510
 2524  016010  042101  050040  047522
 2525  016016  046102  046505  020072
 2526  016024  044103  041505  020113          .ASCII  /CHECK POLARITY#/
 2527  016032  047520  040514  044522
 2528  016040  054524     043
 2529  016043     045  042523  026524  MSG46:  .ASCII  /%SET-UP WRITE ERROR#/
 2530  016050  050125  053440  044522
 2531  016056  042524  042440  051122
 2532  016064  051117     043
 2533  016067     045  050123  041501  MSG47:  .ASCII  /%SPACE FORWARD ERROR#/
 2534  016074  020105  047506  053522
 2535  016102  051101  020104  051105
 2536  016110  047522  021522
 2537  016114  051445  040520  042503  MSG48:  .ASCII  /%SPACE REVERSE ERROR#/
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 2538  016122  051040  053105  051105
 2539  016130  042523  042440  051122
 2540  016136  051117     043
 2541  016141     045  052502  043106  MSG49:  .ASCII  /%BUFFERED WRITE ERROR#/
 2542  016146  051105  042105  053440
 2543  016154  044522  042524  042440
 2544  016162  051122  051117     043
 2545  016167     045  047502  020124  MSG50:  .ASCII  /%BOT SET AFTER BUFFERED WRITE#/
 2546  016174  042523  020124  043101
 2547  016202  042524  020122  052502
 2548  016210  043106  051105  042105
 2549  016216  053440  044522  042524
 2550  016224     043
 2551  016225     045  047516  041040  MSG51:  .ASCII  /%NO BOT FROM READ IN PRESET#/
 2552  016232  052117  043040  047522
 2553  016240  020115  042522  042101
 2554  016246  044440  020116  051120
 2555  016254  051505  052105     043
 2556  016261     045  041524  044440  MSG52:  .ASCII  /%TC INCORRECT #/
 2557  016266  041516  051117  042522
 2558  016274  052103  021440
 2559  016300  046445  046117  043040  MSG53:  .ASCII  /%MOL FAILED TO CLEAR#/
 2560  016306  044501  042514  020104
 2561  016314  047524  041440  042514
 2562  016322  051101     043
 2563  016325     045  051045  051505  MSG54:  .ASCII  /%%RESET SLAVE TO ON LINE BEFORE CONTINUING/
 2564  016332  052105  051440  040514
 2565  016340  042526  052040  020117
 2566  016346  047117  046040  047111
 2567  016354  020105  042502  047506
 2568  016362  042522  041440  047117
 2569  016370  044524  052516  047111
 2570  016376     107
 2571  016377     045  042523  020124          .ASCII  /%SET SW12=1 IF YOU DOT WISH TO REPEAT THIS TEST#/
 2572  016404  053523  031061  030475
 2573  016412  044440  020106  047531
 2574  016420  020125  047504  020124
 2575  016426  044527  044123  052040
 2576  016434  020117  042522  042520
 2577  016442  052101  052040  044510
 2578  016450  020123  042524  052123
 2579  016456     043
 2580  016457     040  052111  051105  MSG56:  .ASCII  / ITER: #/
 2581  016464  020072     043
 2582  016467     045  046524  047040  MSG57:  .ASCII  /%TM NOT SET#/
 2583  016474  052117  051440  052105
 2584  016502     043
 2585  016503     045  044505  044124  MSG60:  .ASCII  /%EITHER TAPE NOT ERASED OR OPI PROBLEM#/
 2586  016510  051105  052040  050101
 2587  016516  020105  047516  020124
 2588  016524  051105  051501  042105
 2589  016532  047440  020122  050117
 2590  016540  020111  051120  041117
 2591  016546  042514  021515
 2592  016552  051045  020110  047117  MSG62:  .ASCII  /%RH ONLY (NO=0,YES=1): #/
 2593  016560  054514  024040  047516
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 2594  016566  030075  054454  051505
 2595  016574  030475  035051  021440
 2596  016602  042045  042111  047040  MSG63:  .ASCII  /%DID NOT AUTO SELECT NRZ#/
 2597  016610  052117  040440  052125
 2598  016616  020117  042523  042514
 2599  016624  052103  047040  055122
 2600  016632     043
 2601  016633     045  044504  020104  MSG64:  .ASCII  /%DID NOT AUTO SELECT PE#/
 2602  016640  047516  020124  052501
 2603  016646  047524  051440  046105
 2604  016654  041505  020124  042520
 2605  016662     043
 2606  016663     045     043          MSG65:  .ASCII  /%#/
 2607  016665     134     043          MSG66:  .ASCII  / #/
 2608  016667     045  051105  020072  MSG67:  .ASCII  /%ER: #/
 2609  016674     043
 2610  016675     045  042522  047515  MSG69:  .ASCII  /%REMOVE TMDP FROM SLAVE TO BE TESTED%#/
 2611  016702  042526  052040  042115
 2612  016710  020120  051106  046517
 2613  016716  051440  040514  042526
 2614  016724  052040  020117  042502
 2615  016732  052040  051505  042524
 2616  016740  022504     043
 2617  016743     045  040510  042122  MSG70:  .ASCII  /%HARDWARE SWR IN USE%#/
 2618  016750  040527  042522  051440
 2619  016756  051127  044440  020116
 2620  016764  051525  022505     043
 2621
```

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 2622                                           ;TEST HEADERS*****
 2623
 2624  016771     045  043045  030524  MSFT1:  .ASCII  /%%FT1:RH ADDRESSING #/
 2625  016776  051072  020110  042101
 2626  017004  051104  051505  044523
 2627  017012  043516  021440
 2628  017016  022445  052106  035062  MSFT2:  .ASCII  /%%FT2:RH REGISTER BITS TEST #/
 2629  017024  044122  051040  043505
 2630  017032  051511  042524  020122
 2631  017040  044502  051524  052040
 2632  017046  051505  020124     043
 2633  017053     045  043045  031524  MSFT3:  .ASCII  /%%FT3:RH INITIALIZE TEST #/
 2634  017060  051072  020110  047111
 2635  017066  052111  040511  044514
 2636  017074  042532  052040  051505
 2637  017102  020124     043
 2638  017105     045  043045  032124  MSFT4:  .ASCII  /%%FT4:RH11 SILO TEST 1 #/
 2639  017112  051072  030510  020061
 2640  017120  044523  047514  052040
 2641  017126  051505  020124  020061
 2642  017134     043
 2643  017135     045  043045  032524  MSFT5:  .ASCII  /%%FT5:RH11 SILO TEST 2 #/
 2644  017142  051072  030510  020061
 2645  017150  044523  047514  052040
 2646  017156  051505  020124  020062
 2647  017164     043
 2648  017165     045  043045  033124  MSFT6:  .ASCII  /%%FT6:RH11 SILO TEST 3 #/
 2649  017172  051072  030510  020061
 2650  017200  044523  047514  052040
 2651  017206  051505  020124  020063
 2652  017214     043
 2653  017215     045  043045  033524  MSFT7:  .ASCII  /%%FT7:RH11 SILO TEST 4 #/
 2654  017222  051072  030510  020061
 2655  017230  044523  047514  052040
 2656  017236  051505  020124  020064
 2657  017244     043
 2658  017245     045  043045  030524  MSFT10: .ASCII  /%%FT10:RH11 SILO TEST 5 #/
 2659  017252  035060  044122  030461
 2660  017260  051440  046111  020117
 2661  017266  042524  052123  032440
 2662  017274  021440
 2663  017276  022445  052106  030461  MSFT11: .ASCII  /%%FT11:NOP TEST#/
 2664  017304  047072  050117  052040
 2665  017312  051505  021524
 2666  017316  022445  052106  031061  MSFT12: .ASCII  /%%FT12:REWIND TEST#/
 2667  017324  051072  053505  047111
 2668  017332  020104  042524  052123
 2669  017340     043
 2670  017341     045  043045  030524  MSFT13: .ASCII  /%%FT13:WRITE-READ TEST#/
 2671  017346  035063  051127  052111
 2672  017354  026505  042522  042101
 2673  017362  052040  051505  021524
 2674  017370  022445  052106  032061  MSFT14: .ASCII  /%%FT14:SPACE TEST#/
 2675  017376  051472  040520  042503
 2676  017404  052040  051505  021524
 2677  017412  022445  052106  032461  MSFT15: .ASCII  /%%FT15:ERASE TEST#/
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 2678  017420  042472  040522  042523
 2679  017426  052040  051505  021524
 2680  017434  022445  052106  033061  MSFT16: .ASCII  /%%FT16:TAPE MARK WRITE-READ TEST#/
 2681  017442  052072  050101  020105
 2682  017450  040515  045522  053440
 2683  017456  044522  042524  051055
 2684  017464  040505  020104  042524
 2685  017472  052123     043
 2686  017475     045  043045  030524  MSFT17: .ASCII  /%%FT17:TM SPACE TEST #/
 2687  017502  035067  046524  051440
 2688  017510  040520  042503  052040
 2689  017516  051505  020124     043
 2690  017523     045  043045  031124  MSFT20: .ASCII  /%%FT20:WRITE CHECK TEST #/
 2691  017530  035060  051127  052111
 2692  017536  020105  044103  041505
 2693  017544  020113  042524  052123
 2694  017552  021440
 2695  017554  022445  052106  030462  MSFT21: .ASCII  /%%FT21:ERASE HEAD TEST#/
 2696  017562  042472  040522  042523
 2697  017570  044040  040505  020104
 2698  017576  042524  052123     043
 2699  017603     045  043045  031124  MSFT22: .ASCII  /%%FT22:BUFFERED COMMAND TEST#/
 2700  017610  035062  052502  043106
 2701  017616  051105  042105  041440
 2702  017624  046517  040515  042116
 2703  017632  052040  051505  021524
 2704  017640  022445  052106  031462  MSFT23: .ASCII  /%%FT23:READ IN PRESET TEST#/
 2705  017646  051072  040505  020104
 2706  017654  047111  050040  042522
 2707  017662  042523  020124  042524
 2708  017670  052123     043
 2709  017673     045  043045  031124  MSFT26: .ASCII  /%%FT26:REWIND-OFF LINE TEST#/
 2710  017700  035066  042522  044527
 2711  017706  042116  047455  043106
 2712  017714  046040  047111  020105
 2713  017722  042524  052123     043
 2714  017727     045  043045  031124  MSFT24: .ASCII  /%%FT24:AUTO DENSITY SELECT: WRITE-NRZ,READ-PE#/
 2715  017734  035064  052501  047524
 2716  017742  042040  047105  044523
 2717  017750  054524  051440  046105
 2718  017756  041505  035124  053440
 2719  017764  044522  042524  047055
 2720  017772  055122  051054  040505
 2721  020000  026504  042520     043
 2722  020005     045  043045  031124  MSFT25: .ASCII  /%%FT25:AUTO DENSITY SELECT: WRITE-PE,READ-NRZ#/
 2723  020012  035065  052501  047524
 2724  020020  042040  047105  044523
 2725  020026  054524  051440  046105
 2726  020034  041505  035124  053440
 2727  020042  044522  042524  050055
 2728  020050  026105  042522  042101
 2729  020056  047055  055122     043
 2730  020063     045  043536     043  $CNTG:  .ASCII  /% G#/
 2731  020067     045  053523  036522  $MSWR:  .ASCII  /%SWR= #/
 2732  020074  021440
 2733  020076  020040  042516  036527  $MNEW:  .ASCII  /  NEW= #/
```

```
 2734  020104  021440
 2735  020106  022477     043          $QUEST: .ASCII  /?%#/
 2736
 2737
 2738          020112                          .EVEN
 2739  020112  000000                  WDATA:  0
 2740          021624                          .=.+1510
 2741  021624  000000                  RDATA:  0
 2742
 2743          000001                          .END
```

AS	000526	EXECX	011666	FT17D	007376	FT4X	004132	MSFT4	017105
BA	000514	EXECXA	011672	FT17D1	007414	FT5	004206	MSFT5	017135
BADDR	000616	EXECXX	011676	FT17E	007430	FT5A	004230	MSFT6	017165
BAE	000544	EXFL	000700	FT17F	007520	FT5B	004256	MSFT7	017215
BTRP	000574	FC	000516	FT17X	007542	FT5C	004300	MSG1	014364
BTRP2	000576	FCNT	000620	FT2	003316	FT5D	004330	MSG10	014725
CC	000530	FT1	003216	FT2A	003330	FT5E	004342	MSG11	014745
CHNFLG	001662	FT1A	003250	FT2B	003370	FT5X	004370	MSG12	014765
COUNT	000734	FT1B	003254	FT2C	003430	FT6	004400	MSG13	015003
CRCNT	000714	FT1X	003266	FT2D	003444	FT6A	004422	MSG14	015030
CS	000520	FT1XX	003312	FT2E	003474	FT6B	004430	MSG15	015055
C1	000510	FT10	004746	FT2ER	003504	FT6C	004466	MSG16	015076
DATA0	000742	FT10A	005002	FT2ERA	003534	FT6D	004510	MSG17	015116
DATA1	000744	FT10ER	005066	FT2ERB	003606	FT6DE	004542	MSG2	014452
DATA2	000746	FT10X	005044	FT2ERC	003616	FT6DEA	004574	MSG20	015136
DATA3	000750	FT10XX	005062	FT2X	003626	FT6DEB	004640	MSG21	015144
DATBL	000740	FT11	005102	FT20	007546	FT6DEX	004650	MSG22	015151
DAT1	012440	FT12	005220	FT20A	007564	FT6E	004512	MSG23	015161
DAT1A	012444	FT12A	005300	FT20B	007710	FT6X	004532	MSG24	015171
DAT2	012460	FT13	005332	FT20C	007742	FT7	004652	MSG25	015205
DAT3	012464	FT13A	005404	FT20X	007762	FT7A	004704	MSG26	015213
DAT4	012472	FT13B	005446	FT21	007772	FT7ER	004732	MSG27	015221
DB	000532	FT13C	005526	FT21A	010000	FT7X	004722	MSG28	015227
DOUT	014012	FT13D	005574	FT21B	010274	FUN	000710	MSG29	015257
DOUTD	014074	FT13X	005640	FT21C	010302	GTSWR	014222	MSG3	014470
DRVN	000612	FT14	005644	FT21SC	010130	HDRFL	000606	MSG30	015306
DRVTP	000564	FT14A	005716	FT21X	010314	HERE	003164	MSG31	015336
DS	000522	FT14A1	005662	FT22	010324	INIT1	012620	MSG32	015366
DSAV	000664	FT14A2	006010	FT22A	010400	INIT2	012630	MSG33	015404
DSUP	012400	FT14A3	006032	FT22B	010420	ITAMT	000566	MSG34	015421
DSO	012402	FT14B	006062	FT22X	010520	ITCNT	000662	MSG35	015437
DT	000536	FT14EC	006300	FT23	010530	ITER	012546	MSG36	015464
EMADDR	000610	FT14RE	006306	FT23A	010640	ITRLP	000676	MSG37	015513
ER	000524	FT14RF	006252	FT23B	010660	LTADD	000706	MSG38	015552
ERADD	000650	FT14RR	006210	FT23C	010710	MR	000534	MSG39	015604
ERCHK	011776	FT14R0	006360	FT23X	010744	MSFT1	016771	MSG4	014623
ERPT	012022	FT14R1	006402	FT24	010750	MSFT10	017245	MSG40	015624
ERPTA	012112	FT14R2	006406	FT24X	011132	MSFT11	017276	MSG41	015657
ERPTA1	012044	FT14R3	006460	FT25	011142	MSFT12	017316	MSG42	015700
ERPTB	012150	FT14X	006470	FT25X	011324	MSFT13	017341	MSG43	015721
ERPTB1	012162	FT14XX	006512	FT26	011334	MSFT14	017370	MSG44	015736
ERPTC	012212	FT15	006516	FT26X	011532	MSFT15	017412	MSG45	015766
ERPTD	012322	FT15A	006566	FT26XX	011542	MSFT16	017434	MSG46	016043
ERPTG	012052	FT15B	006602	FT3	003640	MSFT17	017475	MSG47	016067
ERPTX	012332	FT15X	006712	FT3A	003714	MSFT2	017016	MSG48	016114
ERPTXX	012336	FT16	006716	FT3B	003736	MSFT20	017523	MSG49	016141
ERPT1A	012144	FT16A	006750	FT3ER	003774	MSFT21	017554	MSG5	014646
ERRP	000626	FT16B	006754	FT3X	003764	MSFT22	017603	MSG50	016167
ERRP1	000630	FT16X	007134	FT4	004060	MSFT23	017640	MSG51	016225
EXEC	011546	FT17	007144	FT4ER	004142	MSFT24	017727	MSG52	016261
EXECA	011620	FT17A	007164	FT4ERA	004152	MSFT25	020005	MSG53	016300
EXECB	011626	FT17B	007170	FT4ERB	004162	MSFT26	017673	MSG54	016325
EXECC	011646	FT17C	007330	FT4ERC	004170	MSFT3	017053	MSG56	016457

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MSG57   016467          OCTP3   013732          SCNT    000642          TEMP3   000656          TSCD3   003034
MSG6    014661          OFL     014010          SCOLP   000674          TEND    003110          TSRH    002750
MSG60   016503          OPDYX   000640          SCOPE   012512          TENDX   003206          TSTTBL  000752
MSG62   016552          PATRN   000720          SERFL   000712          TEX     013556          TTIN    013400
MSG63   016602          PCNTR   000730          SERNUM  000562          TIB     000602          TTINT   012656
MSG64   016633          PEXFL   000702          SLVN    000614          TINER   013360          TTOUT   013442
MSG65   016663          PFLG    000644          SN      000540          TKB     000554          TTR     013120
MSG66   016665          PSW     000546          SNPG    014176          TKS     000552          UDES    000716
MSG67   016667          RCNT    000624          SNPT    014120          TLAST   001110          VECT    000570
MSG69   016675          RDATA   021624          START   001600          TMCHK   012340          WC      000512
MSG7    014677          RDSW    000736          STFLG   000704          TMCHK0  012350          WCNT    000622
MSG70   016743          RDYDX   000636          STMSK   000660          TMCHK1  012352          WDATA   020112
MSG9    014703          REGS    000572          STSCD   003054          TOB     000600          $CNTG   020063
MTINT   012646          RFD     000634          ST0     002126          TOG     013542          $DONE   003116
NRZOF   000724          RHOF    000726          ST0B    001766          TPB     000560          $ENDAD  003154
NXTDRV  002616          RHTF    000722          ST1     002150          TPS     000556          $MNEW   020076
NXTSLV  002670          RH17F   000604          ST1A    002170          TRAP    013004          $MSWR   020067
OCTP    013572          RRD     000632          ST2     002276          TRAPX   013066          $QUEST  020106
OCTPE   013560          RTRN    000646          ST3     002406          TRAPXX  013114          $SVPC = 000764
OCTPE1  013576          RWND    011700          ST4     002542          TRAP1   013040          .       = 021626
OCTPG   013746          RWNDA   011720          SWR     000550          TRAP2   013056          .RESTO  014342
OCTPG0  013764          RWNDB   011724          SWREG   000176          TSCD    002556          .SAVE   014320
OCTPG1  013770          RWNDX   011770          TC      000542          TSCDA   002746
OCTP0   013612          SAV1    000666          TEMPST  000732          TSCD0   002756
OCTP1   013634          SAV2    000670          TEMP1   000652          TSCD1   002764
OCTP2   013642          SAV3    000672          TEMP2   000654          TSCD2   003022

. ABS.  021626      000


ERRORS DETECTED:  0

,CZTUQA.SEQ/SOL_CZTUQA.P11
RUN-TIME: 24 40 2 SECONDS
RUN-TIME RATIO: 112/67=1.6
CORE USED:  14K  (28 PAGES)
```