TM03 TM03/TE16, TU77 BFT
TE16 TU77 CZTECFO

AH-A798F-MC
FICHE 01 OF 01

JUL 1984
digital
Made In USA™

.REM ^

IDENTIFICATION

PRODUCT CODE: AC-A797F-MC

PRODUCT NAME: CZTECFO TM03-TE16/TU77 BASIC FUNCTION TEST

DATE CREATED: 15 MARCH 1984

MAINTAINER: TAPE DIAGNOSTIC ENGINEERING

AUTHOR: J. HITT

TABLE OF CONTENTS

1. ABSTRACT

THIS PROGRAM IS INTENDED TO TEST ALL OF THE BASIC FUNCTIONAL LEVEL OPERATIONS OF THE TM03/TE16 MAG TAPE SYSTEM. ALL FUNCTIONS; WRITE, READ, SPACE, ERASE, REWIND, ETC; WILL BE TESTED. IN ADDITION TO THE TM03/TE16 TESTS, THE RH WILL BE TESTED SEPARATELY IN SO FAR AS IT IS POSSIBLE TO SEPARATE THE RH FROM THE TM03/TE16 ITSELF.

2. REQUIREMENTS (HARDWARE)

A. ANY PDP11 PROCESSOR
B. 8K OF CORE
C. CONSOLE TTY
D. TM03 MAGTAPE CONTROLLER
E. MASS BUS CONTROLLER
F. TE16 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/TE16 COMBINATIONS ARE TESTED. ADDITIONALLY THE SOFTWARE
SWR IS INVOKED WITH A SWITCH SETTING OF 000000
IF LOADED VIA ACT11 CHAIN MODE.

**EXCEPTION: IF THIS PROGRAM IS LOADED VIA TMDP CHAIN MODE THE
PROGRAM WILL NOT TEST TM03 DRIVE #0, TE16 SLAVE #0.

**NOTE: IN ORDER TO CHANGE THE SETTING OF THE SOFTWARE SWR,
SET LOC: 176(SWREG:) TO THE DESIRED SETTING.

** 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).NON_STANDARD
MODE FOR JUMPERS IS M8931 (W2-IN) ,M8937(W2-IN,W1-OUT).

```
PARAMETER REQUEST: <DEFAULT> (RESPONSE)          [LOCATION:]

TM03-TE16/TU77 BASIC FUNCTIONS TEST (DZTEC-B)
TYPE ^C TO RESTART

REGISTER START: <172440> (CR)                    [REGS:]
VECTOR ADDRESS: <224> (CR)                       [VECT:]
IS CONTROLLER JUMPERED IN NON-STANDARD MODE
TYPE 2 FOR NON STANDARD OR CR FOR STANDARD: <3> [JUMPER:]
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 TE ..

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 TE16/TU77 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. *****
```

8. TM03 TE16/TU77 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.

  FT27: 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)
```

```
                        .LIST   BIN,LOC,SEQ
                        .TITLE CZTECFO TM03-TE16/TU77 BFT
                        ;BASIC FUNCTION TEST
                        ;AC-A797F-MC
                        ;FEB 77
                        ;J.G. ADAMS

                        ;REVISED JUN 1977 BY J.G. ADAMS ;;B ADDED TU77 CAPABILITY

                        ;REVISED NOV 1978 BY MIKE PAGE  ;* DESIGNATES CODE ADDED FOR
                                                        ;NON-STANDARD JUMPER CONFIG.
                        ;REVISED MAY 1983 BY B. LEBLANC ;BL FIXED CC0000810,CC0001688

                        ;REVISED SEP 1983 BY B. LEBLANC ;; FIXED CC0001619,CC0001743

                        ;REVISED MARCH 1984 BY J. HITT  ;ADDED XON/XOFF FUNCTIONALITY

                        .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=HALT AT END OF PASS
                        ;               0=CONTINUOUS CYCLE
                        ;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.
```

```
                        ;TE16/TU77 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
.MM:                    ;DB ;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
000042                          .=42
000042  000000                  .WORD   0
000046                          .=46
000046  003226                  .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  013576                  .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  002540          JMP     ST4

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

000224                          .=224
000224  013566                  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
```

E2


```
708                                     ;FLAGS AND COUNTERS**********
709
710  000600  000000          TOB:    0
711  000602  000000          TIB:    0
712  000604  000000          RH17F:  0
713  000606  000000          HDRFL:  0
714  000610  000000          EMADDR: 0
715  000612  000000          DRVN:   0
716  000614  000000          SLVN:   0
717  000616  000000          BADDR:  0
718  000620  000000          FCNT:   0
719  000622  000000          WCNT:   0
720  000624  000000          RCNT:   0
721  000626  000000          ERRP:   0
722  000630  000000          ERRP1:  0
723  000632  000000          RRD:    0
724  000634  000000          RFD:    0
725  000636  000000          RDYDX:  0
726  000640  000000          OPDYX:  0
727  000642  000000          SCNT:   0
728  000644  000000          PFLG:   0
729  000646  000000          RTRN:   0
730  000650  000000          ERADD:  0
731  000652  000000          TEMP1:  0
732  000654  000000          TEMP2:  0
733  000656  000000          TEMP3:  0
734  000660  000000          STMSK:  0
735  000662  000000          ITCNT:  0
736  000664  000000          DSAV:   0
737  000666  000000          SAV1:   0
738  000670  000000          SAV2:   0
739  000672  000000          SAV3:   0
740  000674  000000          SCOLP:  0
741  000676  000000          ITRLP:  0
742  000700  000000          EXFL:   0
743  000702  000000          PEXFL:  0
744  000704  000000          STFLG:  0
745  000706  000000          LTADD:  0
746  000710  000000          FUN:    0
747  000712  000000          SERFL:  0
748  000714  000000          CRCNT:  0
749  000716  000000          UDES:   0
750  000720  000000          PATRN:  0
751  000722  000000          RHTF:   0
752  000724  000000          NRZOF:  0
753  000726  000000          RHOF:   0
754  000730  000000          PCNTR:  0
755  000732  000000          TEMPST: 0
756  000734  000000          COUNT:  0
757  000736  000000          RDSW:   0
758  000740  000000          NONSTD: 0
759  000742  000000          JUMPER: 0
760
```

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

000744  000000          DATBL:  0
000746  013262          DATA0:  DAT1    ;ALL ONE BITS
000750  013302          DATA1:  DAT2    ;ALL ZERO BITS
000752  013306          DATA2:  DAT3    ;ALTERNATING ONE/ZERO BITS
000754  013314          DATA3:  DAT4    ;ALL BITS 0-377
```

```
771
772                                     ;LOGIC TEST ENTRY TABLE**********
773
774  000756  000000                TSTTBL: 0
775  000760  000000                        0
776  000762  003270                        FT1
777  000764  003270                        FT1
778  000766  003376                        FT2
779  000770  003376                        FT2
780  000772  003720                        FT3
781  000774  003720                        FT3
782  000776  004140                        FT4
783  001000  004140                        FT4
784  001002  004266                        FT5
785  001004  004266                        FT5
786  001006  004460                        FT6
787  001010  004460                        FT6
788  001012  004732                        FT7
789  001014  004732                        FT7
790  001016  005026                        FT10
791  001020  005026                        FT10
792  001022  005162                        FT11
793  001024  005162                        FT11
794  001026  005300                        FT12
795  001030  005300                        FT12
796  001032  005412                        FT13
797  001034  005412                        FT13
798  001036  005724                        FT14
799  001040  005724                        FT14
800  001042  006576                        FT15
801  001044  006576                        FT15
802  001046  007210                        FT16
803  001050  007210                        FT16
804  001052  007436                        FT17
805  001054  007436                        FT17
806  001056  010040                        FT20
807  001060  010040                        FT20
808  001062  010264                        FT21
809  001064  010264                        FT21
810  001066  010616                        FT22
811  001070  010616                        FT22
812  001072  011022                        FT23
813  001074  011022                        FT23
814  001076  011242                        FT24
815  001100  011242                        FT24
816  001102  011434                        FT25
817  001104  011434                        FT25
818  001106  011626                        FT26
819  001110  011626                        FT26
820  001112  012064                        FT27
821  001114  012064                        FT27
822  001116  003162                         .WORD   TEND
823  001120  000027             TLAST:      .WORD   27          ;CONTAINS # OF TESTS
824  001122  000000             $CNTRLS:    .WORD   0           ;XON/XOFF FLAG
```

```
        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$:     MOV     (SP)+,@#4               ;RESTORE VECTORS
001654  012637  000006                  MOV     (SP)+,@#6
001660  005027                          CLR     (PC)+           ;;CLEAR CHAIN INDICATOR
001662  000000                  CHNFLG: .WORD   0               ;;CHAIN MODE INDICATOR
                                                                ;;1/0 = CHAIN/NOT CHAIN MODE
001664  005737  000042                  TST     @#42            ;;BRANCH IF IN DUMP MODE
001670  001407                          BEQ     50$
001672  012737  000176  000550          MOV     #SWREG,SWR      ;;INVOKE SOFTWARE SWR
001700  005237  001662                  INC     CHNFLG          ;;SET CHNFLG = CHAIN MODE
001704  000137  001710                  JMP     SCHN            ;;GO TO CHAIN ADDRESS
001710                          50$:
001710  000240                  SCHN:   NOP
001712  122737  000006  000041  4$:     CMPB    #6,@#41         ;BRANCH IF LOADED VIA TMDP (DUMP MODE)
001720  001005                          BNE     5$
001722  012704  020214                  MOV     #MSG69,R4       ;ADVISE USER TO REMOVE TMDP FROM UUT
001726  004737  014414                  JSR     PC,TTOUT
001732  000000                          HALT
001734  012704  015563          5$:     MOV     #MSG3,R4
001740  004737  014414                  JSR     PC,TTOUT        ;PRINT TITLE
001744  005737  001662                  TST     CHNFLG          ;SEE IF IN CHAIN MODE
001750  001402                          BEQ     6$              ;IF NOT: BR
001752  000137  002554                  JMP     TSCD            ;ELSE GO START TEST
001756  112737  000043  015563  6$:     MOVB    #'#,MSG3        ;DO NOT PRINT TITLE ON RESTART
001764  012704  015723          STOB:   MOV     #MSG4,R4
001770  004737  014414                  JSR     PC,TTOUT        ;REQUEST REGISTER ADDRESS
001774  013703  000572                  MOV     REGS,R3
002000  004737  014630                  JSR     PC,OCTP         ;PRINT CURRENT ADDRESS
002004  012705  000572                  MOV     #REGS,R5        ;SET ADDRESS SAVE LOC
002010  012701  000007                  MOV     #7,R1           ;SET SIZE OF RESPONSE
002014  012702  176400                  MOV     #176400,R2      ;SET UPPER LIMIT
002020  012703  172300                  MOV     #172300,R3      ;SET LOWER LIMIT
002024  004737  014072                  JSR     PC,TTR          ;GO GET RESPONSE
002030  012704  015746                  MOV     #MSG5,R4
002034  004737  014414                  JSR     PC,TTOUT        ;REQUEST VECTOR
002040  013703  000570                  MOV     VECT,R3
002044  004737  014630                  JSR     PC,OCTP         ;PRINT CURRENT VECTOR
002050  012705  000570                  MOV     #VECT,R5        ;SET ADDRESS SAVE LOC
002054  012701  000004                  MOV     #4,R1           ;SET SIZE OF RESPONSE
002060  012702  000224                  MOV     #224,R2         ;SET UPPER LIMIT
002064  012703  000150                  MOV     #150,R3         ;SET LOWER LIMIT
002070  004737  014072                  JSR     PC,TTR          ;GO GET RESPONSE
002074  013700  000570                  MOV     VECT,R0         ;GET VECTOR
002100  012720  013566                  MOV     #MTINT,(R0)+    ;LOAD INTERRUPT ADDRESS IN VECTOR
```

```
874  002104  012710  000340                  MOV     #340,(R0)       ;LOAD PRIORITY
875  002110  013700  000572                  MOV     REGS,R0         ;GET START OF REGS
876  002114  012701  000017                  MOV     #17,R1          ;SET NUMBER OF REGS
877  002120  012702  000510                  MOV     #C1,R2          ;GET START OF TABLE
878  002124  010022                  STO:    MOV     R0,(R2)+        ;BUILD TABLE
879  002126  062700  000002                  ADD     #2,R0           ;BUMP ADDRESS
880  002132  005301                          DEC     R1              ;SEE IF DONE
881  002134  001373                          BNE     STO             ;IF NOT: BR
882  002136  012702  000600                  MOV     #TOB,R2
883  002142  012700  000054                  MOV     #54,R0
884  002146  005022                  ST1:    CLR     (R2)+           ;CLEAR FLAGS + COUNTERS
885  002150  005300                          DEC     R0
886  002152  001375                          BNE     ST1
887  002154  012737  000001  00072_          MOV     #1,RHTF         ;SET ADDRESS TEST FLAG
888  002162  000137  003022                  JMP     TSRH            ;GO DO INITIAL ADDRESS TEST PASS
889  002166  012704  016025          ST1A:   MOV     #MSG10A,R4      ;
890  002172  004737  014414                  JSR     PC,TTOUT        ;REQUEST JUMPER CONFIGURATION
891  002176  012705  (:0742                  MOV     #JUMPER,R5      ;GET ADDRESS OF RESPONSE
892  002202  012701  000002                  MOV     #2,R1           ;SET SIZE OF RESPONSE
893  002206  012702  000004                  MOV     #4,R2           ;SET RANGE
894  002212  012703  000000                  MOV     #0,R3           ;LOWER LIMIT
895  002216  004737  014072                  JSR     PC,TTR          ;GET RESPONSE
896  002222  022737  000002  000742          CMP     #2,JUMPER       ;TEST FOR NON-STANDARD MODE
897  002230  001002                          BNE     1$
898  002232  004737  013442                  JSR     PC,NOST         ;MODIFY TEST SCHEDULE
899  002236  012704  016165          1$:     MOV     #MSG10,R4
900  002242  004737  014414                  JSR     PC,TTOUT        ;REQUEST DRIVE NUMBER
901  002246  013703  000612                  MOV     DRVN,R3         ;GET CURRENT DRIVE #
902  002252  004737  014630                  JSR     PC,OCTP         ;AND TYPE IT
903  002256  012705  000612                  MOV     #DRVN,R5        ;SET ADDRESS OF DRIVE NUMBER SAVE
904  002262  012701  000002                  MOV     #2,R1           ;SET SIZE OF RESPONSE
905  002266  012702  000007                  MOV     #7,R2           ;SET UPPER LIMIT
906  002272  012703  000000                  MOV     #0,R3           ;SET LOWER LIMIT
907  002276  004737  014072                  JSR     PC,TTR          ;GO GET RESPONSE
908  002302  012777  000040  176210          MOV     #40,@CS         ;SET INIT
909  002310  053777  000612  176202          BIS     DRVN,@CS        ;SET DRIVE NUMBER
910  002316  005777  176166                  TST     @C1             ;ACCESS DRIVE
911  002322  032777  010000  176170          BIT     #10000,@CS      ;SEE IF NED
912  002330  001405                          BEQ     ST2             ;IF NOT: BR
913  002332  012704  017164                  MOV     #MSG41,R4
914  002336  004737  014414                  JSR     PC,TTOUT        ;PRINT NOT AVAIL
915  002342  000711                          BR      ST1A            ;REDO DRIVE REQUEST
916  002344  012704  016205          ST2:    MOV     #MSG11,R4
917  002350  004737  014414                  JSR     PC,TTOUT        ;REQUEST SLAVE NUMBER
918  002354  013703  000614                  MOV     SLVN,R3         ;GET CURRENT SLAVE #
919  002360  004737  014630                  JSR     PC,OCTP         ;AND TYPE IT
920  002364  012705  000614                  MOV     #SLVN,R5        ;SET ADDRESS OF SLAVE SAVE
921  002370  012701  000002                  MOV     #2,R1           ;SET SIZE OF RESPONSE
922  002374  012702  000007                  MOV     #7,R2           ;SET UPPER LIMIT
923  002400  012703  000000                  MOV     #0,R3           ;SET LOWER LIMIT
924  002404  004737  014072                  JSR     PC,TTR          ;GO GET RESPONSE
925  002410  012777  000040  176102          MOV     #40,@CS         ;INIT
926  002416  053777  000612  176074          BIS     DRVN,@CS        ;SET DRIVE NUMBER
927  002424  013777  000614  176110          MOV     SLVN,@TC        ;LOAD SLAVE NUMBER
928  002432  032777  002000  176076          BIT     #2000,@DT       ;SEE IF SLAVE PRESENT
929  002440  001005                          BNE     ST3             ;IF SO: BR
```

```
 930  002442  012704  017205                MOV     #MSG42,R4
 931  002446  004737  014414                JSR     PC,TTOUT        ;PRINT NON EXIST SLAVE
 932  002452  000734                        BR      ST2             ;REDO SLAVE REQUEST
 933  002454  012704  017226        ST3:    MOV     #MSG43,R4
 934  002460  004737  014414                JSR     PC,TTOUT        ;PRINT SERIAL NUMBER TAG
 935  002464  017703  176050                MOV     @SN,R3
 936  002470  004737  015156                JSR     PC,SNPT         ;PRINT SERIAL NUMBER
 937  002474  012704  020071                MOV     #MSG62,R4       ;GET REQUEST
 938  002500  004737  014414                JSR     PC,TTOUT        ;REQUEST RH11 ONLY RESPONSE
 939  002504  013703  000726                MOV     RHOF,R3         ;GET CURRENT FLAG SETTING
 940  002510  004737  014630                JSR     PC,OCTP         ;AND TYPE IT
 941  002514  012705  000726                MOV     #RHOF,R5        ;SET FLAG ADDRESS
 942  002520  012701  000002                MOV     #2,R1           ;SET SIZE OF RESPONSE
 943  002524  012702  000001                MOV     #1,R2           ;SET UPPER LIMIT
 944  002530  012703  000000                MOV     #0,R3           ;SET LOWER LIMIT
 945  002534  004737  014072                JSR     PC,TTR          ;GO GET RESPONSE
 946
 947                          ;START 210
 948  002540  012706  000500        ST4:    MOV     #500,SP         ;SET STACK PTR
 949  002544  005037  000730                CLR     PCNTR           ;CLEAR PASS COUNTER
 950  002550  004737  015260                JSR     PC,GTSWR        ;GET SWITCHES
```

```
952                                             ;TEST SCHEDULAR**********
953
954  002554  C52777  000100  175770  TSCD:   BIS     #100,@TKS       ;SET KEYBOARD IE BIT
955  002562  005037  000704                  CLR     STFLG           ;CLEAR SINGLE TEST FLAG
956  002566  005037  000604                  CLR     RH17F           ;SET RH INDICATOR = RH11
957  002572  013746  000004                  MOV     @#4,-(SP)       ;SAVE ERROR TRAP VECTORS
958  002576  013746  000006                  MOV     @#6,-(SP)       ;AND PRIORITY
959  002602  012737  002630  000004          MOV     #1$,@#4         ;SET TIME OUT TRAP TO 1$ BELOW
960  002610  005037  000006                  CLR     @#6
961  002614  005777  175724                  TST     @#BAE           ;REFERENCE BAE REGISTER
962  002620  012737  000001  000604          MOV     #1,RH17F        ;SET FLAG = RH70
963  002626  000401                          BR      2$
964  002630  022626                  1$:     CMP     (SP)+,(SP)+     ;RESET STACK
965  002632  012637  000006          2$:     MOV     (SP)+,@#6       ;RESTORE ERROR TRAP
966  002636  012637  000004                  MOV     (SP)+,@#4
967  002642  017700  175702                  MOV     @#SWR,R0
968  002646  042700  177740                  BIC     #177740,R0
969  002652  001125                          BNE     STSCD           ;GO SELECT SINGLE TEST
970  002654  005737  001662                  TST     CHNFLG          ;;BRANCH IF NOT IN CHAIN MODE
(1)  002660  001457                          BEQ     TSCDA
(1)  002662  012737  177777  000612          MOV     #-1,DRVN        ;;INITIALIZE DRIVE #
(1)  002670  012737  177777  000614  NXTDRV: MOV     #-1,SLVN        ;;INITIALIZE SLAVE #
(1)  002676  012777  000040  175614  1$:     MOV     #40,@CS         ;;INIT CONTROLLER
(1)  002704  005237  000612                  INC     DRVN            ;;STEP DRIVE #
(1)  002710  022737  000010  000612          CMP     #10,DRVN        ;;EXIT IF ALL DRIVES TESTED
(1)  002716  001524                          BEQ     $DONE           ;;FOR AVAILABILITY
(1)  002720  013777  000612  175572          MOV     DRVN,@CS        ;;LOAD DRIVE #
(1)  002726  005777  175556                  TST     @#C1            ;;ACCESS DRIVE
(1)  002732  032777  010000  175560          BIT     #10000,@CS      ;;BRANCH IF DRIVE NON EXISTANT
(1)  002740  001356                          BNE     1$              ;;(NED = 1)
(1)  002742  005237  000614          NXTSLV: INC     SLVN            ;;STEP SLAVE # AND BRANCH
(1)  002746  001011                          BNE     1$              ;;IF NOT SLAVE 0
(1)  002750  005737  000612                  TST     DRVN            ;;BRANCH IF NOT DRIVE # 0
(1)  002754  001006                          BNE     1$
(1)  002756  122737  000006  000041          CMPB    #6,@#41         ;;BRANCH IF NOT TMDP
(1)  002764  001002                          BNE     1$
(1)  002766  005237  000614                  INC     SLVN            ;;STEP TO SLAVE # 1
(1)  002772  022737  000010  000614  1$:     CMP     #10,SLVN        ;;BRANCH IF ALL SLAVES TESTED
(1)  003000  001733                          BEQ     NXTDRV          ;;FOR AVAILABILITY
(1)  003002  013777  000614  175532          MOV     SLVN,@TC        ;;LOAD SLAVE UNIT #
(1)  003010  032777  002000  175520          BIT     #2000,@DT       ;;BRANCH IF SLAVE NOT
(1)  003016  001751                          BEQ     NXTSLV          ;;PRESENT (SPR = 0)
971  003020  000240                  TSCDA:  NOP
972  003022  012737  000756  000706  TSRH:   MOV     #TSTTBL,LTADD
973  003030  062737  000004  000706  TSCD0:  ADD     #4,LTADD
974  003036  013737  000706  000676  TSCD1:  MOV     LTADD,ITRLP
975  003044  062737  000002  000676          ADD     #2,ITRLP        ;SET ITERATION ADDRESS
976  003052  005037  000660                  CLR     STMSK
977  003056  005037  000626                  CLR     ERRP
978  003062  005037  000606                  CLR     HDRFL           ;CLEAR PRINT HEADER FLAG
979  003066  017700  175614                  MOV     @LTADD,R0       ;SET POINTER TO TEST
980  003072  000110                          JMP     (R0)            ;GO TO TEST
981  003074  032777  002000  175446  TSCD2:  BIT     #2000,@SWR      ;SEE IF HALT ON TEST
982  003102  001401                          BEQ     TSCD3           ;IF NOT: BR
983  003104  000000                          HALT
984  003106  005737  000704          TSCD3:  TST     STFLG           ;SE IF SINGLE TEST
```

L2


```
   985  003112  001746                          BEQ     TSCDO           ;IF NOT: BR
   986  003114  017700  175430                  MOV     @SWR,R0
   987  003120  042700  177740                  BIC     #177740,R0      ;BRANCH IF ALL TESTS SELECTED
   988  003124  001613                          BEQ     TSCD
   989  003126  012737  000001  000704  STSCD:  MOV     #1,STFLG        ;SET SINGLE TEST FLAG
   990  003134  023700  C01120                  CMP     TLAST,R0        ;SEE IF EXCEEDED TESTS
   991  003140  002410                          BLT     TEND            ;IF SO: BR
   992  003142  006300                          ASL     R0
   993  003144  006100                          ROL     R0              ;SET TABLE MODIFIER
   994  003146  012737  000756  000706          MOV     #TSTTBL,LTADD
   995  003154  060037  000706                  ADD     R0,LTADD        ;SET TEST POINTER
   996  003160  000726                          BR      TSCD1
   997  003162  005737  001662          TEND:   TST     CHNFLG          ;BRANCH IF IN CHAIN MODE
   998  003166  001265                          BNE     NXTSLV
   999  003170  012704  015761          $DONE:  MOV     #MSG6,R4
  1000  003174  004737  014414                  JSR     PC,TTOUT        ;PRINT END OF PASS
  1001  003200  013703  000730                  MOV     PCNTR,R3
  1002  003204  004737  014630                  JSR     PC,OCTP         ;PRINT PASS NUMBER
  1003  003210  005000                          CLR     R0
  1004  003212  005300                  1$:     DEC     R0
  1005  003214  001376                          BNE     1$
  1006  003216  013700  000042                  MOV     @#42,R0         ;GET ACT11 RETURN ADDRESS
   (1)  003222  001405                          BEQ     HERE            ;BRANCH IF NOT ACT11
   (1)  003224  000005                          RESET
   (1)  003226  004710                  $ENDAD: JSR     PC,(R0)
   (1)  003230  000240                          NOP
   (1)  003232  000240                          NOP
   (1)  003234  000240                          NOP
   (1)  003236  000240                  HERE:   NOP
  1007  003240  005737  001662                  TST     CHNFLG          ;BRANCH IF IN CHAIN MODE
  1008  003244  001005                          BNE     TENDX
  1009  003246  032777  010000  175274          BIT     #10000,@SWR     ;SEE IF HALT ON PASS
  1010  003254  001401                          BEQ     TENDX           ;IF NOT: BR
  1011  003256  000000                          HALT
  1012  003260  005237  000730          TENDX:  INC     PCNTR           ;BUMP PASS COUNTER
  1013  003264  000137  002554                  JMP     TSCD            ;RESTART
```

```
1015
1016                                        ;RH ADDRESSING TEST**********
1017
1018  003270  012737  020362  000610  FT1:  MOV   #MSFT1,EMADDR   ;SET HEADER
1019  003276  012737  013756  000004        MOV   #TRAP,@#4       ;SET TRAP HANDLER ADDRESS
1020  003304  012737  000340  000006        MOV   #340,@#6
1021  003312  012700  000016              MOV   #16,R0            ;SET NUMBER OF REGISTERS
1022  003316  013701  000510              MOV   C1,R1             ;GET FIRST ADDRESS (CS1)
1023  003322  005711              FT1A:    TST   (R1)              ;REFERENCE REGISTER
1024  003324  000240                       NOP                   ;IF ADDRESS IS BAD, BUS TRAP WILL OCCUR
1025  003326  005300              FT1B:    DEC   R0                ;SEE IF DONE ALL
1026  003330  001403                       BEQ   FT1X              ;IF SO: BR
1027  003332  062701  000002              ADD   #2,R1             ;BUMP ADDRESS POINTER
1028  003336  000771                       BR    FT1A              ;CONTINUE
1029  003340  012737  000006  000004  FT1X: MOV   #6,@#4   ;RESET TRAP CATCHER
1030  003346  012737  000000  000006        MOV   #HA'T,@#6
1031  003354  005737  000722              TST   RHTF              ;SEE IF INITIAL ADDRESS TEST PASS
1032  003360  001404                       BEQ   FT1XX             ;IF NOT: BR
1033  003362  005037  000722              CLR   RHTF              ;CLEAR FLAG
1034  003366  000137  002166              JMP   ST1A              ;RETURN
1035  003372  000137  003074        FT1XX: JMP   TSCD2             ;RETURN TO SCHEDULAR
```

```
1037
1038                                        ;RH REGISTER BITS READ/WRITE**********
1039
1040  003376  012737  020407  000610  FT2:    MOV     #MSFT2,EMADDR   ;SET TEST HEADER
1041  003404  012701  177777          FT2A:   MOV     #-1,R1          ;SET ALL ONES PATTERN
1042  003410  004737  013540                  JSR     PC,INIT1        ;GO INIT
1043  003414  013700  000512                  MOV     WC,R0           ;GET ADDRESS OF WORD COUNT
1044  003420  010102                          MOV     R1,R2           ;SET EXPT REGISTER BIT PATTERN
1045  003422  010110                          MOV     R1,(R0)         ;LOAD PATTERN
1046  003424  021002                          CMP     (R0),R2         ;SEE IF EXPT=RCVD
1047  003426  001410                          BEQ     FT2B            ;IF SO: BR
1048  003430  012737  016512  000650          MOV     #MSG25,ERADD    ;SET CODE
1049  003436  012737  003410  000674          MOV     #FT2A,SCOLP     ;SET SCOPE
1050  003444  004737  003564                  JSR     PC,FT2ER        ;GO DO ERROR
1051  003450  013700  000514          FT2B:   MOV     BA,R0           ;GET ADDRESS OF BUS ADDRESS
1052  003454  010102                          MOV     R1,R2
1053  003456  042702  000001                  BIC     #1,R2           ;SET EXPT PATTERN
1054  003462  010110                          MOV     R1,(R0)         ;LOAD PATTERN
1055  003464  020210                          CMP     R2,(R0)         ;SEE IF EXPT=RCVD
1056  003466  001410                          BEQ     FT2C            ;IF SO:BR
1057  003470  012737  016520  000650          MOV     #MSG26,ERADD    ;SET ERROR CODE
1058  003476  012737  003450  000674          MOV     #FT2B,SCOLP     ;SET SCOPE ADDRESS
1059  003504  004737  003564                  JSR     PC,FT2ER        ;GO DO ERROR
1060  003510  013700  000532          FT2C:   MOV     DB,R0           ;GET ADDRESS OF DATA BUFFER
1061  003514  010102                          MOV     R1,R2
1062  003516  010110                          MOV     R1,(R0)         ;LOAD PATTERN
1063  003520  012703  004000                  MOV     #4000,R3
1064  003524  005303                  FT2D:   DEC     R3              ;DELAY
1065  003526  001376                          BNE     FT2D
1066  003530  020210                          CMP     R2,(R0)         ;SEE IF EXPT=RCVD
1067  003532  001410                          BEQ     FT2E            ;IF SO: BR
1068  003534  012737  016526  000650          MOV     #MSG27,ERADD    ;SET ERROR CODE
1069  003542  012737  003510  000674          MOV     #FT2C,SCOLP     ;SET SCOPE ADDRESS
1070  003550  004737  003564                  JSR     PC,FT2ER        ;GO DO ERROR
1071  003554  005701                  FT2E:   TST     R1              ;SEE IF DONE RESET
1072  003556  001453                          BEQ     FT2X            ;IF SO: BR
1073  003560  005001                          CLR     R1              ;SET ZERO PATTERN
1074  003562  000712                          BR      FT2A            ;DO ZERO BITS
1075  003564  000240                  FT2ER:  NOP
1076  003566  032777  020000  174754          BIT     #20000,@SWR     ;SEE IF PRINT ERROR
1077  003574  001034                          BNE     FT2ERB          ;IF NOT: BR
1078  003576  005737  000606                  TST     HDRFL           ;SEE ID DONE HEADER
1079  003602  001004                          BNE     FT2ERA          ;IF SO: BR
1080  003604  013704  000610                  MOV     EMADDR,R4
1081  003610  004737  014414                  JSR     PC,TTOUT        ;DO HEADER
1082  003614  012737  000001  000606  FT2ERA: MOV     #1,HDRFL        ;SET FLAG
1083  003622  013704  000650                  MOV     ERADD,R4
1084  003626  004737  014414                  JSR     PC,TTOUT        ;PRINT ERROR CODE
1085  003632  012704  016456                  MOV     #MSG22,R4
1086  003636  004737  014414                  JSR     PC,TTOUT        ;PRINT EXPT TAG
1087  003642  010103                          MOV     R1,R3
1088  003644  004737  014616                  JSR     PC,OCTPE        ;PRINT EXPT
1089  003650  012704  016466                  MOV     #MSG23,R4
1090  003654  004737  014414                  JSR     PC,TTOUT        ;PRINT RCVD TAG
1091  003660  011003                          MOV     (R0),R3
1092  003662  004737  014616                  JSR     PC,OCTPE        ;PRINT RCVD
```

```
1093  003666  005777  174656          FT2ERB: TST     @SWR            ;SEE IF HALT ON ERROR
1094  003672  100001                          BPL     FT2ERC          ;IF NOT: BR
1095  003674  000000                          HALT
1096  003676  004737  013334          FT2ERC: JSR     PC,SCOPE        ;GO SEE IF SCOPE ON ERROR
1097  003702  000240                          NOP
1098  003704  000207                          RTS     PC              ;IF NO SCOPE: CONTINUE TEST
1099  003706  000240                  FT2X:   NOP
1100  003710  004737  013370                  JSR     PC,ITER         ;GO SEE IF ITERATIONS
1101  003714  000137  003074                  JMP     TSCD2           ;RETURN TO SCHEDULAR
```

```
                                                ;RH INITIALIZE TEST**********

003720  012737  020444  000610  FT3:    MOV     #MSFT3,EMADDR   ;SET TEST HEADER
003726  012737  003720  000674          MOV     #FT3,SCOLP
003734  004737  013540                  JSR     PC,INIT1        ;GO INIT
003740  052777  020000  174552          BIS     #20000,@CS      ;FORCE UPE =1
003746  000240                          NOP
003750  004737  013540                  JSR     PC,INIT1        ;GO INIT
003754  005777  174530                  TST     @C1             ;SEE IF SC IS RESET
003760  100005                          BPL     FT3A            ;IF SO: BR
003762  012737  016564  000650          MOV     #MSG29,ERADD    ;SET ERROR CODE
003770  004737  004054                  JSR     PC,FT3ER        ;GO DO ERROR
003774  032777  040000  174506  FT3A:   BIT     #40000,@C1      ;SEE IF TRE IS RESET
004002  001405                          BEQ     FT3B            ;IF SO: BR
004004  012737  016613  000650          MOV     #MSG30,ERADD    ;SET ERROR CODE.
004012  004737  004054                  JSR     PC,FT3ER        ;GO DO ERROR
004016  017701  174476          FT3B:   MOV     @CS,R1          ;GET CS2
004022  042701  000307                  BIC     #307,R1         ;MARK IR/OR
004026  005701                          TST     R1              ;SEE IF RESET
004030  001405                          BEQ     FT3X            ;IF SO: BR
004032  012737  016643  000650          MOV     #MSG31,ERADD    ;SET ERROR CODE
004040  004737  004054                  JSR     PC,FT3ER        ;GO DO ERROR
004044  004737  013370          FT3X:   JSR     PC,ITER         ;GO SEE IF ITERATION
004050  000137  003074                  JMP     TSCD2           ;RETURN TO SCHEDULAR

                                ;ERROR REPORT SUBROUTINE
004054  000240                  FT3ER:  NOP
004056  032777  020000  174464          BIT     #20000,@SWR     ;SEE IF PRINT ERROR
004064  001015                          BNE     2$              ;IF NOT: BR
004066  005737  000606                  TST     HDRFL           ;SEE IF DONE HEADER
004072  001006                          BNE     1$              ;IF SO: BR
004074  013704  000610                  MOV     EMADDR,R4
004100  004737  014414                  JSR     PC,TTOUT        ;PRINT HEADER
004104  005237  000606                  INC     HDRFL
004110  013704  000650          1$:     MOV     ERADD,R4
004114  004737  014414                  JSR     PC,TTOUT        ;PRINT ERROR CODE
004120  005777  174424          2$:     TST     @SWR            ;SEE IF HALT ON ERROR
004124  100001                          BPL     3$              ;IF NOT: BR
004126  000000                          HALT
004130  000240                  3$:     NOP
004132  004737  013334                  JSR     PC,SCOPE        ;GO SEE IF SCOPE
004136  000207                          RTS     PC              ;IF NOT: BR
```

```
1147
1148                                        ;RH11 SILO TEST 1: EPMTY SILO READ**********
1149
1150  004140  005737  000604        FT4:    TST     RH17F
1151  004144  001141                BNE     FT5X            ;IF RH70: BR
1152  004146  012737  020476  000610      MOV     #MSFT4,EMADDR   ;SET TEST TEST HEADER
1153  004154  012777  000040  174336      MOV     #40,@CS         ;INIT
1154  004162  017700  174344              MOV     @DB,R0          ;READ DB
1155  004166  005777  174326              TST     @CS             ;SEE IF DLT IS SET
1156  004172  100013                BPL     FT4ER           ;IF NOT: BR
1157  004174  005777  174310              TST     @C1             ;SEE IF SC IS SET
1158  004200  100014                BPL     FT4ERA          ;IF NOT: BR
1159  004202  032777  040000  174300      BIT     #40000,@C1      ;SEE IF TRE IS SET
1160  004210  001414                BEQ     FT4ERB          ;IF NOT: BR
1161  004212  004737  013370        FT4X:   JSR     PC,ITER         ;GO SEE IF ITERATION
1162  004216  000137  003074              JMP     TSCD2           ;RETURN TO SCHEDULAR
1163  004222  012737  016673  000650  FT4ER:  MOV     #MSG32,ERADD    ;SET ERROR CODE
1164  004230  000407                BR      FT4ERC
1165  004232  012737  016711  000650  FT4ERA: MOV     #MSG33,ERADD    ;SET ERROR CODE
1166  004240  000403                BR      FT4ERC
1167  004242  012737  016726  000650  FT4ERB: MOV     #MSG34,ERADD    ;SET ERROR CODE.
1168  004250  000240                FT4ERC: NOP
1169  004252  012737  004140  000674      MOV     #FT4,SCOLP      ;SET SCOPE ADDRESS
1170  004260  004737  004054              JSR     PC,FT3ER        ;GO PRINT ERROR
1171  004264  000752                BR      FT4X
```

```
1173
1174                                        ;RH11 SILO TEST 2: IR/OR CHECK**********
1175
1176  004266  005737  000604        FT5:    TST     RH17F           ;SEE IF RH70
1177  004272  001066                        BNE     FT5X            ;IF SO: BR
1178  004274  012737  020526  000610        MOV     #MSFT5,EMADDR   ;SET TEST HEADER
1179  004302  012737  004310  000674        MOV     #FT5A,SCOLP     ;SET SCOPE ADDRESS
1180  004310  004737  013540        FT5A:   JSR     PC,INIT1        ;GO INIT
1181  004314  032777  000100  174176        BIT     #100,@CS        ;SEE IF IR IS SET
1182  004322  001005                        BNE     FT5B            ;IF SO: BR
1183  004324  012737  016744  000650        MOV     #MSG35,ERADD    ;SET ERROR CODE
1184  004332  004737  004054                JSR     PC,FT3ER        ;GO DO ERROR
1185  004336  032777  000200  174154  FT5B: BIT     #200,@CS        ;SEE IF OR IS RESET
1186  004344  001405                        BEQ     FT5C            ;IF SO: BR
1187  004346  012737  016771  000650        MOV     #MSG36,ERADD    ;SET ERROR CODE
1188  004354  004737  004054                JSR     PC,FT3ER        ;GO DO ERROR
1189  004360  012777  000000  174144  FT5C: MOV     #0,@DB          ;LOAD ZERO INTO SILO
1190  004366  032777  000200  174124        BIT     #200,@CS        ;SEE THAT OR RESET
1191  004374  001405                        BEQ     FT5D            ;IF IT DOES: BR
1192  004376  012737  017020  000650        MOV     #MSG37,ERADD    ;SET ERROR CODE
1193  004404  004737  004054                JSR     PC,FT3ER        ;GO DO ERROR
1194  004410  012777  177777  174114  FT5D: MOV     #-1,@DB         ;LOAD SILO WITH -1
1195  004416  012700  004000                MOV     #4000,R0
1196  004422  032777  000200  174070  FT5E: BIT     #200,@CS        ;SEE IF OR IS SET
1197  004430  001007                        BNE     FT5X            ;IF SO: BR
1198  004432  005300                        DEC     R0
1199  004434  001372                        BNE     FT5E            ;AWAIT OR
1200  004436  012737  017020  000650        MOV     #MSG37,ERADD    ;SET ERROR CODE
1201  004444  004737  004054                JSR     PC,FT3ER        ;GO DO ERROR
1202  004450  004737  013370        FT5X:   JSR     PC,ITER         ;GO SEE IF ITERATION
1203  004454  000137  003074                JMP     TSCD2           ;RETURN TO SCHEDULAR
```

```
1205
1206                                        ;RH11 SILO TEST 3: SILO DATA TEST**********
1207
1208  004460  005737  000604        FT6:    TST     RH17F
1209  004464  001052                        BNE     FT6X            ;IF RH70: BR
1210  004466  012737  020556  000610        MOV     #MSFT6,EMADDR   ;SET TEST HEADER
1211  004474  012737  004502  000674        MOV     #FT6A,SCOLP     ;SET SCOPE ADDRESS
1212  004502  004737  013540        FT6A:   JSR     PC,INIT1        ;GO INIT
1213  004506  005000                        CLR     R0              ;PRESET DATA
1214  004510  010077  174016        FT6B:   MOV     R0,@DB          ;LOAD SILO
1215  004514  005200                        INC     R0              ;BUMP DATA
1216  004516  022700  000102                CMP     #102,R0         ;SEE IF FILLED ALL
1217  004522  001372                        BNE     FT6B            ;IF NOT: BR
1218  004524  032777  000100  173766        BIT     #100,@CS        ;SEE IF IR IS RESET.
1219  004532  001405                        BEQ     FT6C            ;IF SO: BR
1220  004534  012737  017131  000650        MOV     #MSG40,ERADD    ;SET ERROR CODE
1221  004542  004737  004054                JSR     PC,FT3ER        ;GO DO ERROR
1222  004546  032777  000200  173744  FT6C:  BIT     #200,@CS        ;SEE IF OR IS SET
1223  004554  001005                        BNE     FT6D            ;IF SO: BR
1224  004556  012737  017057  000650        MOV     #MSG38,ERADD    ;SET ERROR CODE
1225  004564  004737  004054                JSR     PC,FT3ER        ;GO DO ERROR
1226  004570  005000        FT6D:   CLR     R0              ;PRESET DATA
1227  004572  017701  173734        FT6E:   MOV     @DB,R1          ;READ SILO
1228  004576  020001                        CMP     R0,R1           ;SEE IF EXPT=RCVD
1229  004600  001010                        BNE     FT6DE           ;IF NOT: BR
1230  004602  005200                        INC     R0              ;BUMP DATA
1231  004604  022700  000102                CMP     #102,R0         ;SEE IF DONE ALL
1232  004610  001370                        BNE     FT6E            ;IF NOT: BR
1233  004612  004737  013370        FT6X:   JSR     PC,ITER         ;GO SEE IF ITERATION
1234  004616  000137  003074                JMP     TSCD2           ;RETURN TO SCHEDULAR
1235
1236  004622  000240        FT6DE:  NOP
1237  004624  032777  020000  173716        BIT     #20000,@SWR     ;SEE IF PRINT ERROR
1238  004632  001032                        BNE     FT6DEB          ;IF NOT: BR
1239  004634  005737  000606                TST     HDRFL           ;SEE IF DONE HEADER
1240  004640  013701  000610                MOV     EMADDR,R1
1241  004644  004737  014414                JSR     PC,TTOUT        ;PRINT HEADER
1242  004650  005237  000606                INC     HDRFL           ;SET FLAG
1243  004654  012704  017111  FT6DEA: MOV     #MSG39,R4
1244  004660  004737  014414                JSR     PC,TTOUT        ;PRINT SILO READ ERROR
1245  004664  012704  016456                MOV     #MSG22,R4
1246  004670  004737  014414                JSR     PC,TTOUT        ;PRINT EXPT TAG
1247  004674  010003                        MOV     R0,R3
1248  004676  004737  014630                JSR     PC,OCTP         ;PRINT EXPT
1249  004702  012704  016466                MOV     #MSG23,R4
1250  004706  004737  014414                JSR     PC,TTOUT        ;PRINT RCVD TAG
1251  004712  010103                        MOV     R1,R3
1252  004714  004737  014630                JSR     PC,OCTP         ;PRINT RCVD
1253  004720  005777  173624  FT6DEB: TST     @SWR            ;SEE IF HALT ON ERROR
1254  004724  100001                        BPL     FT6DEX          ;IF NOT: BR
1255  004726  000000                        HALT
1256  004730  000207        FT6DEX: RTS     PC              ;RETURN TO TEST
```

```
1258
1259                                        ;RH11 SILO TEST 4: SILO OVERFLOW**********
1260
1261  004732  005737  000604          FT7:  TST     RH17F
1262  004736  001021                      BNE     FT7X            ;IF RH70: BR
1263  004740  012737  020606  000610      MOV     #MSFT7,EMADDR   ;SET TEST HEADER
1264  004746  012737  004732  000674      MOV     #FT7,SCOLP      ;SET SCOPE ADDRESS
1265  004754  004737  013540              JSR     PC,INIT1        ;GO INIT
1266  004760  012700  000103              MOV     #103,R0         ;SET SIZE OF SILO +1
1267  004764  010077  173542          FT7A: MOV     R0,@DB          ;LOAD SILO
1268  004770  005300                      DEC     R0              ;SEE IF DONE
1269  004772  001374                      BNE     FT7A            ;IF NOT: BR
1270  004774  005777  173520              TST     @CS             ;SEE IF DLT IS SET
1271  005000  100004                      BPL     FT7ER           ;IF NOT: BR
1272  005002  004737  013370          FT7X: JSR     PC,ITER         ;GO SEE IF ITERATION
1273  005006  000137  003074              JMP     TSCD2           ;RETURN TO SCHEDULAR
1274  005012  012737  016673  000650  FT7ER: MOV     #MSG32,ERADD    ;SET ERROR CODE
1275  005020  004737  004054              JSR     PC,FT3ER        ;GO DO ERROR
1276  005024  000766                      BR      FT7X
```

H3


```
                                                      ;RH11 SILO TEST 5: SILO RESET**********
005026  005737  000604           FT10:    TST     RH17F
005032  001034                            BNE     FT10X             ;IF RH70: BR
005034  012737  020636  000610            MOV     #MSFT10,EMADDR    ;SET TEST HEADER
005042  012737  005026  000674            MOV     #FT10,SCOLP       ;SET SCOPE ADDRESS
005050  012777  000040  173442            MOV     #40,@CS           ;INITIALIZE
005056  012700  000004                    MOV     #4,R0             ;SET NUMBER OF SILO WRITER
005062  010077  173444           FT10A:   MOV     R0,@DB            ;WRITE SILO
005066  005300                            DEC     R0                ;SEE IF DONE
005070  001374                            BNE     FT10A             ;IF NOT: BR
005072  052777  000040  173420            BIS     #40,@CS           ;INITIALIZE
005100  012777  177777  173424            MOV     # 1,@DB           ;WRITE SILO
005106  017701  173420                    MOV     @DB,R1            ;READ SILO 1
005112  017701  173414                    MOV     @DB,R1            ;READ SILO 2
005116  005777  173376                    TST     @CS               ;SEE IF DLT IS SET
005122  100011                            BPL     FT10ER            ;IF NOT: BR
005124  004737  013370           FT10X:   JSR     PC,ITER           ;GO SEE IF ITERATION
005130  005737  000726                    TST     RHOF              ;SEE IF RH11 ONLY
005134  001402                            BEQ     FT10XX            ;IF NOT: BR
005136  000137  003162                    JMP     TEND              ;ELSE GO TO END
005142  000137  003074           FT10XX:  JMP     TSCD2             ;RETURN TO SCHEDULAR
005146  012737  016673  000550   FT10ER:  MOV     #MSG32,ERADD      ;SET ERROR CODE
005154  004737  004054                    JSR     PC,FT3ER          ;GO DO ERROR
005160  000761                            BR      FT10X
```

```
1305                                            ;NOP TEST*****
1306
1307  005162  000240                      FT11:   NOP
1308  005164  012737  005162  000674              MOV     @FT11,SCOLP     ;SET SCOPE ADDRESS
1309  005172  004737  013540                      JSR     PC,INIT1
1310  005176  012737  000300  000716              MOV     @300,UDES       ;SET TC= ALL NRZ,NORM,ODD
1311  005204  012737  177777  000620              MOV     @ 1,FCNT        ;SET FC= ALL OVER
1312  005212  012737  177777  000622              MOV     @-1,WCNT        ;SET WC= ALL OVER
1313  005220  012737  177777  000616              MOV     @ 1,BADDR       ;SET BA= ALL OVER
1314  005226  012737  000001  000636              MOV     @1,RDYDX        ;SET DELAY
1315  005234  012737  000001  000640              MOV     @1,OPDYX        ;SET OP DELAY
1316  005242  012737  000001  000710              MOV     @1,FUN          ;SET NOP FUNCTIONS CODE
1317  005250  004737  012310                      JSR     PC,EXEC         ;GO EXECUTE COMMAND
1318  005254  000240                              NOP
1319  005256  012737  020667  000610              MOV     @MSFT11,EMADDR
1320  005264  004737  012510                      JSR     PC,ERCHK        ;GO CHECK REGISTER
1321  005270  004737  013370                      JSR     PC,ITER         ;GO SEE IF ITERATIONS
1322  005274  000137  003074                      JMP     TSCD2           ;RETURN TO SCHEDULAR
```

```
1324                                            ;REWIND TEST*****
1325
1326  005300  000240                    FT12:   NOP
1327  005302  012737  005300  000674            MOV     #FT12,@COLP
1328  005310  004737  013540                    JSR     PC,INIT1        ;GO INITIALIZE
1329  005314  052777  001700  173220            BIS     #1700,@TC       ;SET TO NRZ,NORMAL
1330  005322  012737  177760  000620            MOV     #-20,FCNT       ;SET FC=20
1331  005330  012737  177770  000622            MOV     #-10,WCNT       ;SET WC=10
1332  005336  012737  021544  000616            MOV     #WDATA,BADDR    ;SET BA=WRITE BUFFER
1333  005344  012737  000007  000710            MOV     #7,FUN          ;SET REWIND OP CODE
1334  005352  004737  012310                    JSR     PC,EXEC         ;GO EXECUTE COMMAND
1335  005356  000240                            NOP
1336  005360  032777  020000  173134  FT12A:   BIT     #20000,@DS
1337  005366  001374                            BNE     FT12A           ;AWAIT PIP
1338  005370  012737  020707  000610            MOV     #MSFT12,EMADDR
1339  005376  004737  012510                    JSR     PC,ERCHK        ;GO CHECK FOR ERROR
1340  005402  004737  013370                    JSR     PC,ITER         ;GO SEE IF ITERATION
1341  005406  000137  003074                    JMP     TSCD2           ;RETURN TO SCHEDULAR
1342
```

```
1344                                        ;WRITE/READ TEST*****
1345
1346  005412  000240                FT13:   NOP
1347  005414  012737  000001  000636        MOV     #1,RDYDX
1348  005422  012737  000001  000640        MOV     #1,OPDYX
1349  005430  012737  000100  000624        MOV     #100,RCNT       ;SET RECORD COUNT
1350  005436  012737  020732  000610        MOV     #MSFT13,EMADDR  ;SET TEST HEADER
1351  005444  012737  000001  000720        MOV     #1,PATRN
1352  005452  004737  013222                JSR     PC,DSUP         ;SET UP ALL ONES DATA PATTERN
1353  005456  012737  001700  000716        MOV     #1700,UDES      ;SET TO 800 BPI NORMAL
1354  005464  004737  012442        FT13A:  JSR     PC,RWND         ;GO REWIND
1355  005470  012737  177600  000620        MOV     #-200,FCNT      ;SET FC
1356  005476  012737  177700  000622        MOV     #-100,WCNT      ;SET WC
1357  005504  012737  021544  000616        MOV     #WDATA,BADDR    ;SET BA
1358  005512  012737  000061  000710        MOV     #61,FUN         ;SET WRITE OP-CODE
1359  005520  012737  016225  000626        MOV     #MSG12,ERRP
1360  005526  004737  012310        FT13B:  JSR     PC,EXEC         ;GO EXECUTE COMMAND
1361  005532  005037  000674                CLR     SCOLP           ;NO SCOPE LOOP
1362  005536  004737  012510                JSR     PC,ERCHK        ;GO CHECK ERROR
1363  005542  005337  000624                DEC     RCNT            ;SEE IF DONE ALL
1364  005546  001367                        BNE     FT13B           ;IF NOT: BR
1365  005550  012737  000100  000624        MOV     #100,RCNT       ;SET RECORD COUNT
1366  005556  012737  023256  000616        MOV     #RDATA,BADDR
1367  005564  062737  000200  000616        ADD     #200,BADDR      ;SET BA
1368  005572  012737  000077  000710        MOV     #77,FUN         ;SET READ REVERSE OP CPDE
1369  005600  012737  016243  0006.         MOV     #MSG13,ERRP
1370  005606  004737  012310        T13C:   JSR     PC,EXEC         ;GO EXECUTE COMMAND
1371  005612  004737  012510                JSR     PC,ERCHK        ;GO CHECK ERROR
1372  005616  005337  000624                DEC     RCNT            ;SEE IF READ ALL
1373  005622  001371                        BNE     FT13C           ;IF NOT:BR
1374  005624  162737  000200  000616        SUB     #200,BADDR      ;SET BA
1375  005632  012737  000071  000710        MOV     #71,FUN         ;SET READ FORWARD OP CODE
1376  005640  012737  016270  000626        MOV     #MSG14,ERRP
1377  005646  012737  000100  000624        MOV     #100,RCNT       ;SET RECORD COUNT
1378  005654  004737  012310        FT13D:  JSR     PC,EXEC         ;GO EXECUTE COMMAND
1379  005660  004737  012510                JSR     PC,ERCHK        ;GO CHECK ERRORS
1380  005664  005337  000624                DEC     RCNT            ;SEE IF DONE ALL
1381  005670  001371                        BNE     FT13D           ;IF NOT:BR
1382  005672  032737  002000  000716        BIT     #2000,UDES      ;SEE IF DONE PE
1383  005700  001007                        BNE     FT13X           ;IF SO: BR
1384  005702  012737  002300  000716        MOV     #2300,UDES      ;SET PE MODE
1385  005710  012737  000100  000624        MOV     #100,RCNT       ;RESET RECORD COUNT
1386  005716  000662                        BR      FT13A           ;GO DO NEXT DENSITY
1387  005720  000137  003074        FT13X:  JMP     TSCD2           ;RETURN TO SCHEDULAR
```

```
1389                                        ;SPACE TEST*****
1390
1391  005724  000240                FT14:   NOP
1392  005726  012737  020761  000610        MOV     #MSFT14,EMADDR  ;SET TEST HEADER
1393  005734  012737  001700  000716        MOV     #1700,UDES      ;SET NRZ,NORMAL
1394  005742  004737  012442        FT14A1: JSR     PC,RWND         ;GO INITIALIZE
1395  005746  012737  000100  000624        MOV     #100,RCNT       ;SET NUMBER OF RECORDER
1396  005754  012737  177777  021544        MOV     #-1,WDATA       ;SET DATA PATTERN
1397  005762  012737  177700  000620        MOV     #-100,FCNT      ;PRESET FRAME CNT
1398  005770  012737  177740  000622        MOV     #-40,WCNT       ;PRESET WORD CNT
1399  005776  004737  013540        FT14A:  JSR     PC,INIT1        ;GO REWIND
1400  006002  012737  001000  000640        MOV     #1000,OPDYX
1401  006010  012737  040000  000636        MOV     #40000,RDYDX
1402  006016  012737  000061  000710        MOV     #61,FUN         ;SET WRITE OP-CODE
1403  006024  012737  102300  000660        MOV     #102300,STMSK   ;MASK DATA RELATED ERRORS
1404  006032  052777  000010  172460        BIS     #10,SCS         ;INHIBIT BUS ADDRESS INCREMENT
1405  006040  004737  012310                JSR     PC,EXEC         ;GO EXECUTE COMMAND
1406  006044  012737  017350  000626        MOV     #MSG46,ERRP     ;SET ERROR CODE
1407  006052  004737  012510                JSR     PC,ERCHK        ;GO CHECK ERRORS
1408  006056  005737  000712                TST     SERFL           ;SEE IF ERROR
1409  006062  001402                        BEQ     FT14A2          ;IF NOT: BR
1410  006064  000137  006550                JMP     FT14X           ;ELSE EXIT
1411  006070  005337  000620        FT14A2: DEC     FCNT            ;BUMP FC
1412  006074  032737  000001  000620        BIT     #1,FCNT         ;SEE IF SHOULD BUMP WC
1413  006102  001403                        BEQ     FT14A3          ;IF NOT: BR
1414  006104  162737  000001  000622        SUB     #1,WCNT         ;BUMP WC
1415  006112  005337  000624        FT14A3: DEC     RCNT            ;SEE IF DONE ALL
1416  006116  001327                        BNE     FT14A           ;WRITE ALL RECORDS
1417  006120  012737  000100  000632        MOV     #100,RRD        ;PRESET RECORD POSITION
1418  006126  012737  000176  000634        MOV     #176,RFD
1419  006134  012737  177701  000642        MOV     #-77,SCNT       ;SET SPACE AMOUNT
1420  006142  012737  000033  000710  FT14B: MOV     #33,FUN         ;SET OP-CODE SPACE REVERSE
1421  006150  004737  012310                JSR     PC,EXEC         ;GO EXECUTE COMMAND
1422  006154  012737  017421  000626        MOV     #MSG48,ERRP     ;SET ERROR CODE
1423  006162  004737  012510                JSR     PC,ERCHK        ;GO CHECK ERRORS
1424  006166  005737  000712                TST     SERFL           ;SEE IF ERROR
1425  006172  001166                        BNE     FT14X           ;IF SO: BR
1426  006174  004737  006270                JSR     PC,FT14RR       ;GO READ REVERSE + CHECK DATA
1427  006200  000240                        NOP
1428  006202  012737  000031  000710        MOV     #31,FUN         ;SET SPACE FORWARD OP-CODE
1429  006210  005237  000642                INC     SCNT            ;SET SPACE AMOUNT
1430  006214  001555                        BEQ     FT14X           ;IF DONE: BR
1431  006216  004737  012310                JSR     PC,EXEC         ;GO EXECUTE COMMAND
1432  006222  012737  017374  000626        MOV     #MSG47,ERRP     ;SET ERROR CODE
1433  006230  004737  012510                JSR     PC,ERCHK        ;GO CHECK ERROR
1434  006234  005737  000712                TST     SERFL           ;SEE IF ERROR FLAG
1435  006240  001143                        BNE     FT14X           ;IF NO: BR
1436  006242  004737  006332                JSR     PC,FT14RF       ;GO READ FORWARD FOR POSITION CHECK
1437  006246  000240                        NOP
1438  006250  005237  000642                INC     SCNT            ;DECREMENT SPACE AMOUNT
1439  006254  001535                        BEQ     FT14X           ;IF DONE: BR
1440  006256  005237  000632                INC     RRD             ;BUMP DATA EXPT
1441  006262  005337  000634                DEC     RFD             ;BUMP DATA EXPT
1442  006266  000725                        BR      FT14B
1443  006270  000240        FT14RR: NOP
1444  006272  012737  023256  000616        MOV     #RDATA,BADDR    ;SET BA
```

```
1445  006300  012737  000077  000710          MOV     #77,FUN         ;SET READ REVERSE OP CODE
1446  006306  004737  012310                  JSR     PC,EXEC         ;GO EXECUTE COMMAND
1447  006312  000240                          NOP
1448  006314  013705  000632                  MOV     RRD,R5
1449  006320  020577  172172                  CMP     R5,@FC          ;SEE IF CORRECT RECORD
1450  006324  001020                          BNE     FT14RER         ;IF NOT: BR
1451  006326  000137  006360                  JMP     FT14EC          ;GO CLEAR RH11 ERROR BIT
1452  006332  000240          FT14RF: NOP
1453  006334  012737  000071  000710          MOV     #71,FUN         ;SET READ FORWARD OP CODE
1454  006342  004737  012310                  JSR     PC,EXEC         ;GO EXECUTE COMMAND
1455  006346  013705  000634                  MOV     RFD,R5
1456  006352  020577  172140                  CMP     R5,@FC          ;SEE IF CORRECT RECORD
1457  006356  001003                          BNE     FT14RER         ;IF NOT: BR
1458  006360  004737  013540          FT14EC: JSR     PC,INIT1        ;CLEAR RH
1459  006364  000207                          RTS     PC              ;RETURN
1460  006366  000240          FT14RER: NOP
1461  006370  032777  020000  172152          BIT     #20000,@SWR     ;SEE IF PRINT INHIBITED
1462  006376  001060                          BNE     FT14R3          ;IF SO: BR
1463  006400  012704  020761                  MOV     #MSFT14,R4
1464  006404  004737  014414                  JSR     PC,TTOUT        ;PRINT HEADER
1465  006410  012704  016003                  MOV     #MSG9,R4
1466  006414  004737  014414                  JSR     PC,TTOUT        ;PRINT ERROR TYPE
1467  006420  012704  016443                  MOV     #MSG20,R4       ;SET NRZ TAG POINTER
1468  006424  032737  002000  000716          BIT     #2000,UDES      ;SEE IF PE
1469  006432  001402                          BEQ     FT14R0          ;IF NOT: BR
1470  006434  012704  016451                  MOV     #MSG21,R4       ;ELSE SET PE TAG POINTER
1471  006440  004737  014414          FT14R0: JSR     PC,TTOUT        ;PRINT TAG
1472  006444  032737  000002  000710          BIT     #2,FUN          ;SEE IF READ REVERSE
1473  006452  001003                          BNE     FT14R1          ;IF SO: BR
1474  006454  012704  016423                  MOV     #MSG17,R4
1475  006460  000402                          BR      FT14R2          ;GO PRINT
1476  006462  012704  016403          FT14R1: MOV     #MSG16,R4
1477  006466  004737  014414          FT14R2: JSR     PC,TTOUT        ;PRINT FRWD/REV
1478  006472  012704  016456                  MOV     #MSG22,R4
1479  006476  004737  014414                  JSR     PC,TTOUT        ;PRINT EXPT TAG
1480  006502  010503                          MOV     R5,R3
1481  006504  042703  177700                  BIC     #177700,R3      ;MASK RECORD NUMBER
1482  006510  004737  01463C                  JSR     PC,OCTP         ;PRINT EXPT RECORD NUMBER
1483  006514  012704  016466                  MOV     #MSG23,R4
1484  006520  004737  014414                  JSR     PC,TTOUT        ;PRINT RCVD TAG
1485  006524  017703  171766                  MOV     @FC,R3
1486  006530  042703  177700                  BIC     #177700,R3      ;MASK RECORD NUMBER
1487  006534  004737  014630                  JSR     PC,OCTP         ;PRINT ACTUAL RECORD NUMBER
1488  006540  005777  172004          FT14R3: TST     @SWR            ;SEE IF HALT ON ERROR
1489  006544  100001                          BPL     FT14X           ;IF NOT: BR
1490  006546  000000                          HALT
1491  006550  032737  002000  000716  FT14X:  BIT     #2000,UDES      ;SEE IF DONE PE
1492  006556  001005                          BNE     FT14XX          ;IF SO: BR
1493  006560  012737  002300  000716          MOV     #2300,UDES      ;SET TO PE
1494  006566  000137  005742                  JMP     FT14A1          ;DO IN PE
1495  006572  000137  003074          FT14XX: JMP     TSCD2           ;RETURN TO SCHEDULAR
```

```
1497                                            ;ERASE TEST*****
1498
1499  006576  000240                    FT15:   NOP
1500  006600  005037  000660                    CLR     STMSK
1501  006604  012737  000100  000636            MOV     #100,RDYDX
1502  006612  012737  000010  000640            MOV     #10,OPDYX
1503  006620  012737  021003  000610            MOV     #MSFT15,EMADDR  ;SET TEST HEADER
1504  006626  004737  012442                    JSR     PC,RWND         ;REWIND
1505  006632  012737  023256  000616            MOV     #RDATA,BADDR    ;SET BA
1506  006640  012737  001700  000716            MOV     #1700,UDES      ;SET NRZ, NORMAL
1507  006646  012737  000025  000710  FT15A:    MOV     #25,FUN         ;SE  ERASE OP CODE
1508  006654  012737  000454  000624            MOV     #300.,RCNT      ;**B SET TO ERASE 300 TIMES
1509  006662  004737  012310          FT15B:    JSR     PC,EXEC         ;GO EXECUTE COMMAND
1510  006666  012737  017350  000626            MOV     #MSG46,ERRP     ;SET ERROR CODE
1511  006674  004737  012510                    JSR     PC,ERCHK        ;GO CHECK ERRORS
1512  006700  005737  000712                    TST     SERFL           ;SEE IF ANY ERRORS
1513  006704  001032                            BNE     FT15X           ;IF SO EXIT
1514  006706  005337  000624                    DEC     RCNT            ;SEE IF DONE ERASING
1515  006712  001363                            BNE     FT15B           ;IF NOT: BR
1516  006714  000240                            NOP
1517  006716  004737  012442                    JSR     PC,RWND         ;REWIND
1518  006722  012737  177600  000622            MOV     #-200,WCNT      ;SET WC
1519  006730  012737  000071  000710            MOV     #71,FUN         ;SET READ FORWARD OP-CODE
1520  006736  012737  000040  000636            MOV     #40,RDYDX       ;SET DELAY
1521  006744  004737  012310                    JSR     PC,EXEC         ;GO EXECUTE COMMAND
1522  006750  000240                            NOP
1523  006752  012737  020022  000626            MOV     #MSG60,ERRP     ;SET ERROR CODE
1524  006760  012737  020000  000660            MOV     #20000,STMSK
1525  006766  004737  012510                    JSR     PC,ERCHK        ;GO CHECK ERRORS
1526                                            ;***********************************************
1527
1528                                            ;THIS CODE ADDED TO FORM REV C
1529
1530                                            ;THE SSC BIT AND THE PIP BIT IN THE DRIVE STATUS REG
1531                                            ;SHOULD NOT BE SET CONCURRENTLY
1532
1533                                            ;***********************************************
1534
1535  006772  012737  000100  000636  FT15X:    MOV     #100,RDYDX      ;SET DELAY
1536  007000  012737  000010  000640            MOV     #10,OPDYX
1537  007006  012737  000020  000624            MOV     #20,RCNT        ;SET UP FOR 20 ERASES
1538  007014  012737  023256  000616  1$:       MOV     #RDATA,BADDR    ;SET UP BUSS ADDRS
1539  007022  012737  001700  000716            MOV     #1700,UDES      ;SET UP TAPE CONTROL
1540  007030  012737  000025  000710            MOV     #25,FUN         ;SET FUN FOR ERASE
1541  007036  004737  012310                    JSR     PC,EXEC         ;GO EXECUTE CMD
1542  007042  005337  000624                    DEC     RCNT            ;DECREMENT THE NUMBER OF EXECUTES
1543  007046  001362                            BNE     1$              ;BRANCH IF MORE LEFT
1544  007050  052777  001700  171464            BIS     #1700,@TC
1545  007056  012777  177760  171432            MOV     #-20,@FC
1546  007064  012777  177770  171420            MOV     #-10,@WC
1547  007072  012777  021544  171414            MOV     #WDATA,@BA
1548  007100  012777  000007  171402            MOV     #7,@C1          ;DO REWIND
1549  007106  000240                            NOP
1550  007110  032777  000100  171404  2$:       BIT     #100,@DS        ;WAIT FOR SSC
1551  007116  001774                            BEQ     2$
1552  007120  017737  171376  000652            MOV     @DS,TEMP1       ;READ DRIVE STATUS REG IMMEDIATELY
```

```
1553  007126  032737  020000  000652          BIT     #20000,TEMP1    ;CHECK FOR PIP
1554  007134  001420                          BEQ     FT15XX          ;BRANCH IF NOT SET
1555  007136  052737  000001  007206          BIS     #1,TAG          ;SET FLAG FOR ERROR
1556  007144  012704  016375                  MOV     #MSG15B,R4
1557  007150  004737  014414                  JSR     PC,TTOUT
1558  007154  010703                          MOV     PC,R3
1559  007156  062703  000010                  ADD     #10,R3
1560  007162  004737  014616                  JSR     PC,OCTPE
1561
1562  007166  004737  012772                  JSR     PC,ERPTB1       ;GO PRINT ERROR
1563                                                                   ;DS REG REPORTED IS ITS CONTENTS
1564                                                                   ;AT THE TIME OF THE ERROR  (5 LINES OF CODE BE
1565  007172  005037  007206                  CLR     TAG             ;CLEAR FLAG
1566  007176  004737  013370          FT15XX: JSR     PC,ITER         ;CHECK FOR ITERATIONS
1567  007202  000137  003074                  JMP     TSCD2           ;GO TO  SCHEDULAR
1568
1569  007206  000000          TAG:    .WORD   0               ;••C  FLAG FOR ERROR ROUTINE
```

```
1571                                        ;TAPE MARK WRITE/READ TEST*****
1572
1573  007210  000240                FT16:   NOP
1574  007212  012737  000001  000636        MOV     #1,RDYDX
1575  007220  012737  001000  000640        MOV     #1000,OPDYX
1576  007226  012737  021025  000610        MOV     #MSFT16,EMADDR  ;SET HEADER
1577  007234  012737  001700  000716        MOV     #1700,UDES      ;SET TO NRZ,NORMAL,ODD
1578  007242  004737  012442        FT16A:  JSR     PC,RWND         ;INIT AND REWIND SLAVE
1579  007246  012737  177760  000620  FT16B: MOV     #-20,FCNT       ;FC=20
1580  007254  012737  177770  000622        MOV     #-10,WCNT       ;WC=10
1581  007262  012737  000027  000710        MOV     #27,FUN         ;SET WRITE TAPE MARK OP CODE
1582  007270  004737  012310              JSR     PC,EXEC         ;GO EXECUTE COMMAND
1583  007274  012737  001000  000660        MOV     #1000,STMSK     ;SET FOR FCE MASK
1584  007302  012737  016315  000626        MOV     #MSG15,ERRP     ;SET ERROR CODE
1585  007310  004737  012510              JSR     PC,ERCHK        ;GO CHECK ERROR
1586  007314  004737  013164              JSR     PC,TMCHK        ;GO SEE IF TM SET
1587  007320  012737  000077  000710        MOV     #77,FUN         ;SET READ REVERSE OP CODE
1588  007326  004737  012310              JSR     PC,EXEC         ;GO EXECUTE COMMAND
1589  007332  012737  001000  000660        MOV     #1000,STMSK     ;SET FCE ERROR MASK
1590  007340  012737  016243  000626        MOV     #MSG13,ERRP     ;SET ERROR CODE
1591  007346  004737  012510              JSR     PC,ERCHK        ;GO CHECK ERRORS
1592  007352  004737  013164              JSR     PC,TMCHK        ;GO SEE IF TM SET
1593  007356  012737  000071  000710        MOV     #71,FUN         ;SET READ  FORWARD OP CODE
1594  007364  004737  012310              JSR     PC,EXEC         ;GO EXECUTE COMMAND
1595  007370  012737  016270  000626        MOV     #MSG14,ERRP     ;SET ERROR CODE
1596  007376  004737  012510              JSR     PC,ERCHK        ;TO CHECK ERRORS
1597  007402  004737  013164              JSR     PC,TMCHK        ;GO SEE IF TM SET
1598  007406  032737  002000  000716        BIT     #2000,UDES      ;SEE IF DONE PE
1599  007414  001004                      BNE     FT16X           ;IF SO: BR
1600  007416  012737  002300  000716        MOV     #2300,UDES      ;SET PE, NORMAL
1601  007424  000706                      BR      FT16A           ;DO IN PE
1602  007426  004737  013370        FT16X:  JSR     PC,ITER         ;DO ITERATIONS
1603  007432  000137  003074              JMP     TSCD2           ;RETURN TO SCHEDULAR
1604
```

```
                                                ;TAPE MARK SPACE TEST**********

007436  005037  000624          FT17:   CLR     RCNT
007442  012737  021066  000610          MOV     #MSFT17,EMADDR  ;SET HEADER
007450  012737  001700  000716          MOV     #1700,UDES      ;SET TO NRZ
007456  004737  012442          FT17A:  JSR     PC,RWND         ;REWIND TAPE
007462  012737  000027  000710  FT17B:  MOV     #27,FUN
007470  012737  040000  000636          MOV     #40000,RDYDX    ;SET DRY DELAY
007476  012737  040000  000640          MOV     #40000,OPDYX    ;SET OP DELAY
007504  004737  012310                  JSR     PC,EXEC         ;GO WRITE TM
007510  012737  102300  000660          MOV     #102300,STMSK   ;MASK DATA RELATED ERRORS
007516  012737  016315  000626          MOV     #MSG15,ERRP     ;SET ERROR TYPE
007524  004737  012510                  JSR     PC,ERCHK        ;GO CHECK ERROR
007530  005737  000712                  TST     SERFL           ;SEE IF ERROR
007534  001137                          BNE     FT17X           ;IF SO: BR
007536  004737  013164                  JSR     PC,TMCHK        ;GO SEE IF TM SET
007542  000240                          NOP
007544  000240                          NOP
007546  032737  000100  000624          BIT     #100,RCNT       ;SEE IF DONE PATTERN
007554  001045                          BNE     FT17D           ;IF SO: BR
007556  062737  000020  000624          ADD     #20,RCNT        ;ADD 20 TO RECORD COUNT
007564  013737  000624  000652          MOV     RCNT,TEMP1      ;SAVE RECORD COUNT
007572  012737  177600  000622          MOV     #-200,WCNT      ;WC=128
007600  012737  177400  000620          MOV     #-400,FCNT      ;FC=256
007606  012737  021544  000616          MOV     #WDATA,BADDR    ;BA=WRITE BUFFER
007614  012737  000061  000710          MOV     #61,FUN         ;SET WRITE OP CODE
007622  000240                  FT17C:  NOP
007624  000240                          NOP
007626  004737  012310                  JSR     PC,EXEC         ;GO WRITE
007632  012737  016225  000626          MOV     #MSG12,ERRP     ;SET ERROR CODE
007640  012737  102300  000660          MOV     #102300,STMSK   ;MASK DATA RELATED ERRORS
007646  004737  012510                  JSR     PC,ERCHK        ;GO CHECK ERROR
007652  005737  000712                  TST     SERFL           ;SEE IF ERROR
007656  001066                          BNE     FT17X           ;IF SO: BR
007660  005337  000652                  DEC     TEMP1           ;SEE IF DONE ALL
007664  001356                          BNE     FT17C           ;IF NOT: BR
007666  000675                          BR      FT17B           ;ELSE GO DO TM
007670  000240                  FT17D:  NOP
007672  012737  000033  000710          MOV     #33,FUN         ;SET SPACE REVERSE
007700  012737  016403  000626          MOV     #MSG16,ERRP     ;SET ERROR CODE
007706  012737  177600  000642  FT17D1: MOV     #-200,SCNT      ;SET TO 200 RECORDS
007714  012737  000005  000624          MOV     #5,RCNT         ;SET NUMBER OF OPS TO DO
007722  004737  013540          FT17E:  JSR     PC,INIT1        ;GO INIT
007726  004737  012310                  JSR     PC,EXEC         ;GO SPACE
007732  012737  001000  000660          MOV     #1000,STMSK     ;SET ERROR MASK
007740  004737  012510                  JSR     PC,ERCHK        ;GO CHECK ERROR
007744  005737  000712                  TST     SERFL           ;SEE IF ERROR
007750  001031                          BNE     FT17X           ;IF SO: BR
007752  004737  013164                  JSR     PC,TMCHK        ;GO SEE IF TM SET
007756  005337  000624                  DEC     RCNT            ;SEE IF DONE SPACES
007762  001357                          BNE     FT17E           ;IF NOT: BR
007764  022737  000031  000710          CMP     #31,FUN         ;SEE IF DONE FORWARD
007772  001407                          BEQ     FT17F           ;IF SO: BR
007774  012737  016423  000626          MOV     #MSG17,ERRP     ;SET ERROR CODE
010002  012737  000031  000710          MOV     #31,FUN         ;SET TO SPACE FORWARD
```

```
1662  010010  000736                        BR      FT17D1          ;DO FORWARD
1663  010012  032737  002000  000716  FT17F: BIT     #2000,UDES      ;SEE IF DONE PE
1664  010020  001005                        BNE     FT17X           ;IF SO: BR
1665  010022  012737  002300  000716        MOV     #2300,UDES      ;SET TO PE
1666  010030  000137  007456                JMP     FT17A           ;GO PE
1667  010034  000137  003074        FT17X:  JMP     TSCD2           ;RETURN  TO SCHEDULAR
```

```

                                        ;WRITE CHECK TEST**********

010040  000240                    FT20:   NOP
010042  012737  021114  000610            MOV     #MSFT20,EMADDR   ;SET HEADER
010050  012737  001700  000716            MOV     #1700,UDES       ;SET UNIT DESCRIPTION
010056  004737  012442            FT20A:  JSR     PC,RWND          ;INIT AND REWIND SLAVE
010062  012737  000003  000720            MOV     #3,PATRN
010070  004737  013222                    JSR     PC,DSUP          ;GO SET PATTERN 3
010074  012737  021544  000616            MOV     #WDATA,BADDR     ;SET BA
010102  012737  177400  000620            MOV     #-400,FCNT       ;SET FC
010110  012737  177600  000622            MOV     #-200,WCNT       ;SET WC
010116  012737  000061  000710            MOV     #61,FUN          ;SET WRITE OP CODE
010124  004737  012310                    JSR     PC,EXEC          ;GO WRITE RECORD
010130  012737  017350  000626            MOV     #MSG46,ERRP      ;SET ERROR CODE
010136  004737  012510                    JSR     PC,ERCHK         ;GO CHECK ERROR
010142  005737  000712                    TST     SERFL            ;SEE IF ERORR
010146  001042                            BNE     FT20X            ;IF SO: BR
010150  012737  016403  000626            MOV     #MSG16,ERRP      ;SET REVERSE ERROR TAG
010156  012737  000057  000710            MOV     #57,FUN          ;SET REVERSE WRITE CHECK OP CODE
010164  062737  000376  000616            ADD     #376,BADDR       ;SET BA FOR REVERSE CHECK
010172  004737  012310                    JSR     PC,EXEC          ;GO DO REVERSE CHECK
010176  004737  012510                    JSR     PC,ERCHK         ;GO CHECK ERROR
010202  012737  016423  000626    FT20B:  MOV     #MSG17,ERRP      ;SET FORWARD TAG
010210  012737  000051  000710            MOV     #51,FUN          ;SET FORWARD CHECK OP CODE
010216  162737  000376  000616            SUB     #376,BADDR       ;SET BA FOR FORWARD CHECK
010224  004737  012310                    JSR     PC,EXEC          ;GO DO FORWARD CHECK
010230  004737  012510                    JSR     PC,ERCHK         ;GO CHECK ERROR
010234  032737  002000  000716    FT20C:  BIT     #2000,UDES       ;SEE IF DONE PE
010242  001004                            BNE     FT20X            ;IF SO: BR
010244  012737  002300  000716            MOV     #2300,UDES       ;ELSE SET PE
010252  000701                            BR      FT20A            ;DO IN PE
010254  004737  013370            FT20X:  JSR     PC,ITER          ;DO ITERATIONS
010260  000137  003074                    JMP     TSCD2            ;RETURN TO SCHEDULAR
```

```
1704
1705                                        ;ERASE HEAD TEST*****
1706
1707  010264  012737  021145  000610  FT21:   MOV     #MSFT21,EMADDR  ;SET TEST HEADER
1708  010272  004737  012442          FT21A:  JSR     PC,RWND         ;GO REWIND
1709  010276  012737  000003  000720          MOV     #3,PATRN
1710  010304  004737  013222                  JSR     PC,DSUP         ;GO SET PATTERN 3
1711  010310  012737  021544  000616          MOV     #WDATA,BADDP    ;SET BA=WRITE BUFFER
1712  010316  012737  176340  000620          MOV     #-800.,FCNT     ;SET FC=800(10)
1713  010324  012737  177160  000622          MOV     #-400.,WCNT     ;SET WC=400(10)
1714  010332  012737  001700  000716          MOV     #1700,UDES      ;SET NRZ, NORMAL
1715  010340  012737  000061  000710          MOV     #61,FUN         ;SET WRITE OP-CODE
1716  010346  004737  012310                  JSR     PC,EXEC         ;GO DO WRITE 1
1717  010352  012737  016225  000626          MOV     #MSG12,ERRP     ;SET ERROR CODE
1718  010360  004737  012510                  JSR     PC,ERCHK        ;GO CHECK FOR ERROR
1719  010364  004737  012310                  JSR     PC,EXEC         ;YES DO WRITE 2
1720  010370  004737  012510                  JSR     PC,ERCHK        ;YES CHECK FOR ERROR
1721  010374  000240                          NOP
1722  010376  004737  012442                  JSR     PC,RWND         ;GO REWIND
1723  010402  012737  177160  000620          MOV     #-400.,FCNT     ;SET FC=400(10)
1724  010410  012737  177470  000622          MOV     #-200.,WCNT     ;SET WC=200(10)
1725  010416  004737  012310                  JSR     PC,EXEC         ;GO REWRITE RECORD 1-WH TO EH
1726  010422  000240          FT21SCP:NOP
1727  010424  004737  012442                  JSR     PC,RWND         ;REWIND
1728  010430  012737  023256  000616          MOV     #RDATA,BADDR    ;SET BA=READ BUFFER
1729  010436  012737  177160  000620          MOV     #-400.,FCNT     ;SET FC=400
1730  010444  012737  177470  000622          MOV     #-200.,WCNT     ;SET WC=200
1731  010452  012737  000071  000710          MOV     #71,FUN         ;SET READ OP-CODE
1732  010460  004737  012310                  JSR     PC,EXEC         ;GO READ RECORD 1
1733  010464  012737  016270  000626          MOV     #MSG14,ERRP     ;SET ERROR CODE
1734  010472  004737  012510                  JSR     PC,ERCHK        ;GO CHECK FOR ERROR
1735  010476  000240                          NOP
1736  010500  052737  000010  170012          BIS     #10,@CS         ;INHIBIT BA INCREMENT
1737  010506  012737  176340  000620          MOV     #-800.,FCNT     ;SET FC=800(10)
1738  010514  012737  177160  000622          MOV     #-400.,WCNT     ;SET WC=400(10)
1739  010522  004737  012310                  JSR     PC,EXEC         ;GO READ RECORD 2
1740  010526  022737  001440  167762          CMP     #800.,@FC       ;SEE IF READ RECORD 2 OK
1741  010534  001424                          BEQ     FT21X           ;IF SO: BR
1742  010536  022737  001441  167752          CMP     #801.,@FC       ;BRANCH IF IN GREY AREA
1743  010544  001420                          BEQ     FT21X
1744  010546  022737  001440  167742  18:     CMP     #800.,@FC       ;BRANCH IF ERASE HEAD REVERSED
1745  010554  101404                          BLOS    FT218           ;IF SO: BR
1746  010556  012737  017243  000650          MOV     #MSG44,ERADD    ;SET ERASE HEAD INOPERATIVE ERROR CODE
1747  010564  000403                          BR      FT21C
1748  010566  012737  017273  000650  FT218:  MOV     #MSG45,ERADD    ;SET ERASE HEAD REVERSED ERROR CODE
1749  010574  012737  010422  000674  FT21C:  MOV     #FT21SCP,SCOLP  ;SET SCOPE ADDRESS
1750  010602  004737  004054                  JSR     PC,FTSER        ;GO PRINT ERROR
1751  010606  004737  013370          FT21X:  JSR     PC,ITER         ;GO SEE IF ITERATION
1752  010612  000137  003074                  JMP     @SCD2           ;RETURN TO SCHEDULAR
1753
1754
```

```
1756                                                ;BUFFERED COMMAND TEST*****
1757
1758  010616  012737  021174  000610  FT22:   MOV     #MSFT22,EMADDR  ;SET TEST HEADER
1759  010624  004737  012442                  JSR     PC,RWND         ;GO REWIND
1760  010630  012700  000003                  MOV     #3,R0           ;SET NUMBER OF WRITES
1761  010634  012737  001700  000716          MOV     #1700,UDES      ;SET TO NRZ NORMAL
1762  010642  012737  021544  000616          MOV     #WDATA,BADDR    ;SET BA=WRITE BUFFER
1763  010650  012737  177000  000620          MOV     #-1000,FCNT     ;SET FC=1000
1764  010656  012737  177400  000622          MOV     #-400,WCNT      ;SET WC=400
1765  010664  012737  000061  000710          MOV     #61,FUN         ;SET WRITE OP-CODE
1766  010672  004737  012310          FT22A:  JSR     PC,EXEC         ;GO DO WRITE
1767  010676  005300                          DEC     R0              ;SEE IF DONE ALL
1768  010700  001374                          BNE     FT22A           ;IF NOT: BR
1769  010702  000240                          NOP
1770  010704  012777  000007  167576          MOV     #7,@C1          ;START REWIND
1771  010712  032777  000200  167602  FT22B:  BIT     #200,@DS
1772  010720  001774                          BEQ     FT22B
1773  010722  004737  013540                  JSR     PC,INIT1        ;INITIALIZE
1774  010726  012737  000010  000636          MOV     #10,RDYDX       ;SET LONG READY DELAY
1775  010734  004737  012310                  JSR     PC,EXEC         ;ISSUE BUFFERED WRITE
1776  010740  000240                          NOP
1777  010742  012737  017446  000626          MOV     #MSG49,ERRP     ;SET ERROR CODE
1778  010750  012737  102300  000660          MOV     #102300,STMSK   ;MARK DATA ERROR
1779  010756  004737  012510                  JSR     PC,ERCHK        ;GO CHECK ERROR
1780  010762  032777  000002  167532          BIT     #2,@DS          ;SEE IF BOT IS SET
1781  010770  001410                          BEQ     FT22X           ;IF NOT: BR
1782  010772  012737  017474  000650          MOV     #MSG50,ERADD    ;SET ERROR CODE
1783  011000  012737  010616  000674          MOV     #FT22,SCOLP
1784  011006  004737  004054                  JSR     PC,FTSER        ;GO DO ERROR
1785  011012  004737  013370          FT22X:  JSR     PC,ITER         ;GO SEE IF ITERATION
1786  011016  000137  003074                  JMP     TSCD2           ;RETURN TO SCHEDULAR
1787
1788
```

```
1790                                                ;READ IN PRESET TEST*****
1791
1792  011022  005737  000614          FT23:   TST     SLVN            ;SEE IF SLAVE SELECT=0
1793  011026  001103                   BNE     FT23X           ;IF NOT:BR
1794  011030  012737  021231  000610          MOV     #MSFT23,EMADDR  ;SET TEST HEADER
1795  011036  004737  013540                  JSR     PC,INIT1        ;GO INIT
1796  011042  012737  001700  000716          MOV     #1700,UDES      ;SET TO NRZ NORMAL
1797  011050  012737  021544  000616          MOV     #WDATA,BADDR    ;SET BA=WRITE BUFFER
1798  011056  012737  177400  000620          MOV     #-400,FCNT      ;SET FC=400
1799  011064  012737  177600  000622          MOV     #-200,WCNT      ;SET WC=200
1800  011072  012737  000061  000710          MOV     #61,FUN         ;SET WRITE OP CODE
1801  011100  004737  012310                  JSR     PC,EXEC         ;GO DO WRITE
1802  011104  000240                   NOP
1803  011106  004737  013540                  JSR     PC,INIT1        ;INITIALIZE
1804  011112  012737  000021  000710          MOV     #21,FUN         ;SET READ-IN PRESET OP CODE
1805  011120  004737  012310                  JSR     PC,EXEC         ;GO DO COMMAND
1806  011124  005000                   CLR     R0
1807  011126  012703  000004                  MOV     #4,R3           ;SET MULT
1808  011132  032777  020000  167362  FT23A:  BIT     #20000,@DS      ;SEE IF PIP RESET
1809  011140  001404                   BEQ     FT23B           ;IF SO: BR
1810  011142  005300                   DEC     R0
1811  011144  001372                   BNE     FT23A           ;AWAIT PIP RESET
1812  011146  005303                   DEC     R3
1813  011150  001370                   BNE     FT23A           ;DELAY
1814  011152  032777  000002  167342  FT23B:  BIT     #2,@DS          ;SEE IF BOT
1815  011160  001010                   BNE     FT23C           ;IF SO: BR
1816  011162  012737  017532  000650          MOV     #MSG51,ERADD    ;SET ERROR CODE
1817  011170  012737  011022  000674          MOV     #FT23,SCOLP
1818  011176  004737  004054                  JSR     PC,FT3ER        ;GO DO ERROR
1819  011202  012701  141000          FT23C:  MOV     #141000,R1      ;SET EXPT TC
1820  011206  013700  000542                  MOV     TC,R0           ;SET TC ADDRESS
1821  011212  020110                   CMP     R1,(R0)         ;SEE IF EXPT=RCVD
1822  011214  001410                   BEQ     FT23X           ;IF SO: BR
1823  011216  012737  017566  000650          MOV     #MSG52,ERADD    ;SET ERROR CODE
1824  011224  012737  011022  000674          MOV     #FT23,SCOLP     ;CLEAR SCOPE ADDRESS
1825  011232  004737  003564                  JSR     PC,FT2ER        ;GO DO ERROR
1826  011236  000137  003074          FT23X:  JMP     TSCD2           ;RETURN TO SCHEDULAR
1827
1828
```

```
1830
1831                                    ;AUTO DENSITY SELECT TEST: WRITE NRZ,READ PE
1832
1833  011242  012737  021264  000610  FT24:   MOV     #MSFT24,EMADDR  ;SET ERROR MSG HEADER
1834  011250  004737  012442                  JSR     PC,RWND         ;REWIND SLAVE
1835  011254  012737  000001  000720          MOV     #1 PATRN        ;SELECT PATTERN
1836  011262  004737  013222                  JSR     PC,DSUP         ;GO DO DATA SETUP
1837  011266  012737  021544  000616          MOV     #WDATA,BADDR    ;SET BUS ADDRESS.
1838  011274  012737  177400  000620          MOV     #-400,FCNT      ;FRAME COUNT.
1839  011302  012737  177600  000622          MOV     #-200,WCNT      ;WORD COUNT.
1840  011310  012737  001700  000716          MOV     #1700,UDES      ;& SLAVE DESC = NRZ NORMAL
1841  011316  012737  000061  000710          MOV     #61,FUN         ;LOAD OP CODE WRITE FWD
1842  011324  004737  012310                  JSR     PC,EXEC         ;GO EXECUTE COMMAND
1843  011330  012737  017350  000626          MOV     #MSG46,ERRP     ;SET ERROR MSG ADDRESS
1844  011336  004737  012510                  JSR     PC,ERCHK        ;GO CHECK ERRORS
1845  011342  005737  000712                  TST     SERFL           ;BRANCH IF AN ERROR OCCURRED
1846  011346  001026                          BNE     FT24X
1847  011350  004737  012442                  JSR     PC,RWND         ;REWIND SLAVE
1848  011354  012737  023256  000616          MOV     #RDATA,BADDR    ;SET BUS ADDRESS FOR READ
1849  011362  012737  002300  000716          MOV     #2300,UDES      ;SET SLAVE DESC = PE,NORMAL
1850  011370  012737  000071  000710          MOV     #71,FUN         ;SET OP CODE = READ FWD
1851  011376  004737  012310                  JSR     PC,EXEC         ;GO READ RECORD
1852  011402  032777  000040  167112          BIT     #40,@DS         ;BRANCH ID PES BIT CLEARED
1853  011410  001405                          BEQ     FT24X
1854  011412  012737  020121  000650          MOV     #MSG63,ERADD
1855  011420  004737  004054                  JSR     PC,FT3ER        ;GO PROCESS ERROR
1856  011424  004737  013370          FT24X:  JSR     PC,ITER
1857  011430  000137  003074                  JMP     TSCD2           ;RETURN TO SCHEDULER
1858
```

```
1860
1861                                        ;AUTO DENSITY SELECT TEST- WRITE-PE,READ NRZ
1862  011434  012737  021342  000610  FT25:   MOV     #MSFT25,EMADDR  ;SET ERROR MESSAGE ADDRESS
1863  011442  004737  012442                 JSR     PC,RWND         ;REWIND SLAVE
1864  011446  012737  000001  000720         MOV     #1,PATRN        ;SELECT PATTERN
1865  011454  004737  013222                 JSR     PC,DSUP         ;GO DO DATA SETUP
1866  011460  012737  021544  000616         MOV     #WDATA,BADDR    ;SET BUS ADDRESS
1867  011466  012737  177400  000620         MOV     #-400,FCNT      ;FRAME COUNT,
1868  011474  012737  177600  000622         MOV     #-200,WCNT      ;WORD COUNT,
1869  011502  012737  002300  000716         MOV     #2300,UDES      ;& SLAVE DESC = PE,NORMAL
1870  011510  012737  000061  000710         MOV     #61,FUN         ;LOAD WRITE OP CODE
1871  011516  004737  012310                 JSR     PC,EXEC         ;GO EXECUTE WRITE
1872  011522  012737  017350  000626         MOV     #MSG46,ERRP     ;SET ERROR MSG HDR
1873  011530  004737  012510                 JSR     PC,ERCHK        ;GO CHECK FOR ERRORS
1874  011534  005737  000712                 TST     SERFL           ;BRANCH IF ERROR OCURRED
1875  011540  001026                         BNE     FT25X
1876  011542  004737  012442                 JSR     PC,RWND         ;REWIND SLAVE
1877  011546  012737  023256  000616         MOV     #RDATA,BADDR    ;SET BUS ADDRESS FOR READ
1878  011554  012737  001700  000716         MOV     #1700,UDES      ;SET SLAVE DESC = NRZ,NORMAL
1879  011562  012737  000071  000710         MOV     #71,FUN         ;SET READ FWD OP CODE
1880  011570  004737  012310                 JSR     PC,EXEC         ;GO EXECUTE
1881  011574  032777  C00040  166720         BIT     #40,@DS         ;BRANCH ID PES BIT GOT SET
1882  011602  001005                         BNE     FT25X
1883  011604  012737  020152  000650         MOV     #MSG64,ERADD
1884  011612  004737  004054                 JSR     PC,FTSER        ;GO PROCESS ERROR
1885  011616  004737  013370         FT25X:  JSR     PC,ITER         ;ITERATION LOOP
1886  011622  000137  003074                 JMP     TSCD2           ;RETURN TO SCHEDULER
1887
```

```
1890                                        ;++B SEQUENTIAL TAPE MARK TEST
1891
1892  011626  000240                FT26:   NOP
1893  011630  012737  021420  000610        MOV     #MSFT26,EMADDR  ;SET TEST ERROR MSG HEADER
1894  011636  012737  001700  000716        MOV     #1700,UDES      ;SET NRZ
1895  011644  004737  012442          1$:   JSR     PC,RWND         ;REWIND SLAVE
1896  011650  012737  000027  000710        MOV     #27,FUN         ;SET WRITE TAPE MARK FUNCTION CODE
1897  011656  004737  012310                JSR     PC,EXEC         ;GO DO TAPE MARK
1898  011662  005037  000660                CLR     STMSK           ;CLEAR EXPECTED ERROR MASK
1899  011666  012737  016315  000626        MOV     #MSG15,ERRP     ;SET ERROR MESSAGE
1900  011674  004737  012510                JSR     PC,ERCHK        ;GO CHECK FOR ERRORS
1901  011700  004737  013164                JSR     PC,TMCHK        ;GO CHECK FOR TAPE MARK
1902  011704  005737  000712                TST     SERFL           ;EXIT TEST IF ERROR DETECTED
1903  011710  001061                        BNE     FT26X
1904  011712  004737  012310                JSR     PC,EXEC         ;WRITE SECOND TAPE MARK
1905  011716  012737  016336  000626        MOV     #MSG15A,ERRP    ;SET ERROR MESSAGE
1906  011724  004737  012510                JSR     PC,ERCHK        ;GO CHECK ERROR
1907  011730  004737  013164                JSR     PC,TMCHK
1908  011734  005737  000712                TST     SERFL           ;EXIT TEST IF ERROR DETECTED
1909  011740  001045                        BNE     FT26X
1910  011742  004737  012442                JSR     PC,RWND         ;REWIND
1911  011746  012737  000031  000710        MOV     #31,FUN         ;SET SPACE FORWARD OP CODE
1912  011754  012737  177777  000642        MOV     #-1,SCNT        ;SET # OF RECORDS TO SPACE
1913  011762  004737  012310                JSR     PC,EXEC         ;GO SPACE FORWARD
1914  011766  012737  017374  000626        MOV     #MSG47,ERRP     ;SET SPACE FORWARD ERROR
1915  011774  004737  012510                JSR     PC,ERCHK        ;GO CHECK ERROR BITS
1916  012000  004737  013164                JSR     PC,TMCHK        ;GO CHECK IF TAPE MARK DETECTED
1917  012004  005737  000712                TST     SERFL           ;EXIT TEST IF ERROR DETECTED
1918  012010  001021                        BNE     FT26X
1919  012012  004737  012310                JSR     PC,EXEC         ;SPACE TO SECOND TAPE MARK
1920  012016  004737  012510                JSR     PC,ERCHK        ;GO CHECK ERROR BITS
1921  012022  004737  013164                JSR     PC,TMCHK        ;CHECK IF TAPE MARK DETECTED
1922  012026  005737  000712                TST     SERFL           ;EXIT TEST IF ERROR DETECTED
1923  012032  001010                        BNE     FT26X
1924  012034  032737  002000  000716        BIT     #2000,UDES      ;EXIT TEST IF PE COMPLETED
1925  012042  001004                        BNE     FT26X
1926  012044  012737  002300  000716        MOV     #2300,UDES      ;SET PE MODE
1927  012052  000674                        BR      1$
1928  012054  004737  013370          FT26X: JSR    PC,ITER
1929  012060  000137  003074                JMP     TSCD2
```

```
                                        ;REWIND: OFF LINE TEST*****
                                        
012064  032777  010000  166456  FT27:   BIT     #10000,@SWR     ;SEE IF IN CONTINUOUS MODE
012072  001104                          BNE     FT27XX          ;IF SO: BR
012074  005737  001662                  TST     CHNFLG          ;BRANCH IF CHAIN MODE
012100  001101                          BNE     FT27XX
012102  012737  021461  000610          MOV     #MSFT27,EMADDR  ;SET TEST HEADER
012110  004737  012442                  JSR     PC,RWND         ;REWIND & SELECT SLAVE
012114  012737  000001  000720          MOV     #1,PATRN        ;SELECT PATTERN (ALL 1'S)
012122  004737  013222                  JSR     PC,DSUP         ;FILL WRITE BUFFER
012126  012737  021544  000616          MOV     #WDATA,BADDR    ;SET WRITE BUFFER BUS ADDRESS
012134  012737  177400  000620          MOV     #-400,FCNT      ;SET FRAME COUNT
012142  012737  177600  000622          MOV     #-200,WCNT      ;SET WORD COUNT
012150  012737  001700  000716          MOV     #1700,UDES      ;SET UNIT DESCRIPTION = NRZ
012156  012737  000061  000710          MOV     #61,FUN         ;SET WRITE COMMAND
012164  004737  012310                  JSR     PC,EXEC         ;GO WRITE A RECORD
012170  004737  013540                  JSR     PC,INIT1        ;**B CLEAR ANY ERROR BITS
012174  012777  000003  166306          MOV     #3,@C1          ;ISSUE REWIND: OFF LINE COMMAND
012202  005037  000674                  CLR     SCOLP           ;CLEAR SCOPE LOOP
012206  012700  000042                  MOV     #42,R0
012212  005001                  1$:     CLR     R1              ;CLEAR TIMER
012214  005301                  2$:     DEC     R1
012216  001376                          BNE     2$              ;IF NOT TIMED OUT: BR
012220  005300                          DEC     R0
012222  001373                          BNE     1$              ;IF NOT ALL TIMED OUT: BR
012224  032777  010000  166270          BIT     #10000,@DS      ;SEE IF MOL IS RESET
012232  001406                          BEQ     3$              ;IF SO: BR
012234  012737  017605  000650          MOV     #MSG53,ERADD    ;SET ERROR CODE
012242  004737  004054                  JSR     PC,FT3ER        ;GO DO ERROR
012246  000412                          BR      FT27X
012250  013700  000524          3$:     MOV     ER,R0           ;GET ADDRESS OF ERROR REG
012254  005001                          CLR     R1              ;RESULT SHOULD BE 0
012256  020110                          CMP     R1,(R0)         ;BRANCH IF ERROR REG = 0
012260  001405                          BEQ     FT27X
012262  012737  020206  000650          MOV     #MSG67,ERADD    ;SET ERROR MSG HEADER
012270  004737  003564                  JSR     PC,FT2ER        ;GO TYPE ERROR
012274  012704  017632          FT27X:  MOV     #MSG54,R4
012300  004737  014414                  JSR     PC,TTOUT        ;PRINT ON LINE REQUEST
012304  000137  003074          FT27XX: JMP     TSCD2           ;RETURN TO SCHEDULER
```

```
1971
1972                                        ;COMMAND EXECUTE SUBROUTINE*****
1973
1974  012310  000240                EXEC:   NOP
1975  012312  053777  000716  166222        BIS     UDES,@TC        ;LOAD TAPE CONT
1976  012320  013777  000622  166164        MOV     WCNT,@WC        ;LOAD WC
1977  012326  013777  000620  166162        MOV     FCNT,@FC        ;LOAD FC
1978  012334  013777  000616  166152        MOV     BADDR,@BA       ;LOAD BA
1979  012342  022737  000031  000710        CMP     #31,FUN         ;SEE IF SPACE FORWARD
1980  012350  001404                        BEQ     EXECA           ;IF SO: BR
1981  012352  022737  000033  000710        CMP     #33,FUN         ;SEE IF SPACE REVERSE
1982  012360  001003                        BNE     EXECB           ;IF NOT: BR
1983  012362  013777  000642  166126  EXECA: MOV     SCNT,@FC        ;SET SPACE COUNT
1984  012370  000240                EXECB:  NOP
1985  012372  013777  000710  166110        MOV     FUN,@C1         ;LOAD OP CODE + GO
1986  012400  000240                        NOP
1987  012402  013703  000636                MOV     RDYDX,R3        ;SET DELAY
1988  012406  005004                        CLR     R4
1989  012410  032777  000200  166104  EXECC: BIT     #200,@DS        ;SEE IF DRY
1990  012416  001004                        BNE     EXECX           ;IF SO: BR
1991  012420  005304                        DEC     R4
1992  012422  001372                        BNE     EXECC
1993  012424  005303                        DEC     R3              ;DELAY FOR DRY
1994  012426  001370                        BNE     EXECC
1995  012430  013703  00064C        EXECX:  MOV     OPDYX,R3
1996  012434  005303                EXECXA: DEC     R3              ;DELAY
1997  012436  001376                        BNE     EXECXA
1998  012440  000207                EXECXX: RTS     PC              ;RETURN TO CALLER
1999
```

```
2001                                            ;REWIND SUBROUTINE*****
2002
2003   012442  004737  013540          RWND:   JSR     PC,INIT1        ;INIT SLAVE
2004   012446  012777  000007  166034          MOV     #7,@C1          ;START REWIND
2005   012454  032777  000002  166040  1$:     BIT     #2,@DS          ;WAIT FOR BOT TO SET
2006   012462  001774                          BEQ     1$
2007   012464  032777  020000  166030  2$:     BIT     #20000,@DS      ;WAIT FOR PIP TO CLEAR
2008   012472  001374                          BNE     2$
2009   012474  105777  166022          3$:     TSTB    @DS             ;..B WAIT FOR DRY
2010   012500  100375                          BPL     3$              ;..B
2011   012502  004737  013540                  JSR     PC,INIT1        ;INIT
2012   012506  000207                          RTS     PC              ;RETURN TO CALLER
2013
```

```
                                                      ;ERROR CHECK SUBROUTINE*****

012510  005037  000712          ERCHK:   CLR     SERFL              ;CLEAR FLAG
012514  017737  166002  000664           MOV     @DS,DSAV           ;SAVE DRIVE STATUS REGISTER
012522  032777  040000  165772           BIT     #40000,@DS         ;SEE IF ERROR
012530  001021                           BNE     ERPT               ;IF SO: BR
012532  022777  006576  166146           CMP     #FT15,@LTADD       ;;CHECK FOR TEST 15
012540  001404                           BEQ     1$                 ;;BRANCH IF TEST 15
012542  022777  007210  166136           CMP     #FT16,@LTADD       ;;CHECK FOR TEST 16
012550  001010                           BNE     2$                 ;;BRANCH IF NOT TEST 16
012552  032777  100000  165742  1$:      BIT     #100000,@DS        ;;TEST FOR ATA
012560  001004                           BNE     2$                 ;;EXIT IF ATA IS SET
012562  012737  020310  000626           MOV     #MSG71,ERRP        ;;SET UP ERROR CODE
012570  000434                           BR      ERPTG              ;;GO REPORT ERROR
012572  000207                  2$:      RTS     PC                 ;RETURN
012574  017704  165724          ERPT:    MOV     @ER,R4             ;GET ERROR REGISTER
012600  032737  002000  000716           BIT     #2000,UDES         ;SEE IF PE
012606  001403                           BEQ     1$                 ;IF SO: BR
012610  042737  000200  000660           BIC     #200,STMSK         ;RESET PEF MASK
012616  022737  000003  000742  1$:      CMP     #3,JUMPER          ;;TEST FOR NON-STANDARD JUMPER
012624  001413                           BEQ     ERPTA1             ;;BRANCH IF STANDARD
012626  022777  011242  166052           CMP     #FT24,@LTADD       ;;CHECK FOR TEST 24
012634  001404                           BEQ     2$                 ;;BRANCH IF TST24
012636  022777  011434  166042           CMP     #FT25,@LTADD       ;;CHECK FOR TEST 25
012644  001003                           BNE     ERPTA1
012646  052737  020000  000660  2$:      BIS     #20000,STMSK       ;;SET OPI BIT IN ERROR MASK
012654  043704  000660          ERPTA1:  BIC     STMSK,R4           ;MASK DONT CARE BITS
012660  001536                           BEQ     ERPTX              ;IF NO UNEXPECTED ERRORS: BR
012662  012737  000001  000712  ERPTG:   MOV     #1,SERFL           ;SET FLAG
012670  032777  020000  165652           BIT     #20000,@SWR        ;SEE IF SHOULD PRINT ERRORS
012676  001123                           BNE     ERPTD              ;IF NOT: BR
012700  005737  000606                   TST     HDRFL              ;SEE IF DONE HEADER
012704  001006                           BNE     ERPTA              ;IF SO: BR
012706  005237  000606                   INC     HDRFL              ;SET HEADER FLAG
012712  013704  000610                   MOV     EMADDR,R4
012716  004737  014414                   JSR     PC,TTOUT           ;PRINT HEADER
012722  013704  000626          ERPTA:   MOV     ERRP,R4            ;GET ERROR CODE
012726  001414                           BEQ     ERPTB              ;IF NONE: BR
012730  004737  014414                   JSR     PC,TTOUT           ;PRINT ERROR CODE
012734  012704  016443                   MOV     #MSG20,R4          ;SET NRZ TAG
012740  032777  002000  165574           BIT     #2000,@TC          ;SEE IF PE
012746  001402                           BEQ     ERPT1A             ;IF NOT: BR
012750  012704  016451                   MOV     #MSG21,R4          ;ELSE SET PE TAG
012754  004737  014414          ERPT1A:  JSR     PC,TTOUT           ;PRINT TAG
012760  013704  000630          ERPTB:   MOV     ERRP1,R4           ;SEE IF CODE 2
012764  001402                           BEQ     ERPTB1             ;IF NOT: BR
012766  004737  014414                   JSR     PC,TTOUT           ;PRINT CODE 2
012772  032777  004000  165550  ERPTB1:  BIT     #4000,@SWR         ;SEE IF ITERATION
013000  001010                           BNE     ERPTC              ;IF NOT: BR
013002  012704  017776                   MOV     #MSG56,R4
013006  004737  014414                   JSR     PC,TTOUT           ;PRINT ITER TAG
013012  013703  000662                   MOV     ITCNT,R3
013016  004737  014630                   JSR     PC,OCTP            ;PRINT ITERATION
013022  012704  015422          ERPTC:   MOV     #MSG1,R4
013026  004737  014414                   JSR     PC,TTOUT           ;PRINT REGISTER TAG
013032  017703  165452                   MOV     @C1,R3
```

```
013036  004737  014616                  JSR     PC,OCTPE        ;PRINT CS1
013042  017703  165444                  MOV     @WC,R3
013046  004737  014616                  JSR     PC,OCTPE        ;PRINT WC
013052  017703  165436                  MOV     @BA,R3
013056  004737  014616                  JSR     PC,OCTPE        ;PRINT BA
013062  017703  165430                  MOV     @FC,R3
013066  004737  014616                  JSR     PC,OCTPE        ;PRINT FC
013072  017703  165422                  MOV     @CS,R3
013076  004737  014616                  JSR     PC,OCTPE        ;PRINT CS2
013102  005737  007206                  TST     TAG             ;..C  CHECK FOR SPECIAL DS
013106  001403                          BEQ     1$
013110  013703  000652                  MOV     TEMP1,R3        ;..C PRINT DS READ INTO TEMP1 AT CRITICAL TIME
013114  000402                          BR      2$
013116  017703  165400          1$:     MOV     @DS,R3
013122  004737  014616          2$:     JSR     PC,OCTPE        ;PRINT DS
013126  017703  165372                  MOV     @ER,R3
013132  004737  014616                  JSR     PC,OCTPE        ;PRINT ER
013136  017703  165400                  MOV     @TC,R3
013142  004737  014616                  JSR     PC,OCTPE        ;PRINT TC
013146  005777  165376          ERPTD:  TST     @SWR            ;SEE IF HALT ON ERROR
013152  100001                          BPL     ERPTX           ;IF NOT: BR
013154  000000                          HALT
013156  004737  013540          ERPTX:  JSR     PC,INIT1        ;INIT
013162  000207                  ERPTXX: RTS     PC              ;RETURN
```

```
2098                                        ;TAPE MARK STATUS CHECK**********
2099
2100  013164  032737  000004  000664  TMCHK:  BIT     #4,DSAV         ;BRANCH IF TM SET
2101  013172  001012                          BNE     1$
2102  013174  005737  000712                  TST     SERFL           ;SEE IF HAD ERROR
2103  013200  001007                          BNE     1$              ;IF SO: BR
2104  013202  012737  020006  000630          MOV     #MSG57,ERRP1    ;SET ERROR CODE 2
2105  013210  004737  012662                  JSR     PC,ERPTG        ;GO PRINT TM ERROR
2106  013214  005037  000630                  CLR     ERRP1           ;CLEAR CODE 2 FLAG
2107  013220  000207                  1$:     RTS     PC              ;RETURN
2108
2109                                        ;DATA SETUP ROUTINE**********
2110
2111  013222  000240                  DSUP:   NOP
2112  013224  012703  021544          DS0:    MOV     #WDATA,R3       ;R3 = ADDRS OF WRITE BUFFER
2113  013230  013701  000720                  MOV     PATRN,R1        ;R1 = PATTERN SELECTOR
2114  013234  006301                          ASL     R1              ;MAKE PATTERN SELECTOR EVEN
2115  013236  004771  000744                  JSR     PC,@DATBL(R1)   ;GO GENERATE PATTERN
2116  013242  012702  000640                  MOV     #640,R2         ;R2=BUFFER SIZE *2
2117  013246  012701  023256                  MOV     #RDATA,R1       ;R1=READ DATA START
2118  013252  005021                  1$:     CLR     (R1)+           ;CLEAR BUFFER
2119  013254  005302                          DEC     R2              ;SEE IF DONE ALL
2120  013256  001375                          BNE     1$              ;IF NOT: BR
2121  013260  000207                          RTS     PC              ;EXIT
2122
2123                                        ;ALL ONES**********
2124
2125  013262  012701  177777          DAT1:   MOV     #-1,R1          ;R1=DATA
2126  013266  012702  000640          DAT1A:  MOV     #640,R2         ;R2=WORD COUNT *2
2127  013272  010123                  1$:     MOV     R1,(R3)+        ;LOAD BUFFER
2128  013274  005302                          DEC     R2              ;SEE IF DONE
2129  013276  001375                          BNE     1$              ;IF NOT: BR
2130  013300  000207                          RTS     PC
2131
2132                                        ;ALL ZEROS**********
2133
2134  013302  005001                  DAT2:   CLR     R1              ;R1=DATA
2135  013304  000770                          BR      DAT1A           ;LOAD BUFFER
2136
2137                                        ;ONE/ZERO IN ALTERNATING CHARACTERS**********
2138
2139  013306  012701  125125          DAT3:   MOV     #125125,R1      ;R1=DATA
2140  013312  000765                          BR      DAT1A           ;LOAD BUFFER
2141
2142                                        ;ALL BITS 0-377**********
2143
2144  013314  005001                  DAT4:   CLR     R1              ;R1=STARTING DATA
2145  013316  012702  001500                  MOV     #1500,R2        ;R2=CHARACTER COUNT
2146  013322  110123                  1$:     MOVB    R1,(R3)+        ;LOAD BUFFER
2147  013324  105201                          INCB    R1              ;BUMP DATA
2148  013326  005302                          DEC     R2              ;SEE IF DONE
2149  013330  001374                          BNE     1$              ;IF NOT: BR
2150  013332  000207                          RTS     PC
2151
```

```
2153
2154
2155
2156                                        ;SCOPE LOOP ON ERROR SUBROUTINE**********
2157
2158  013334  000240                SCOPE:  NOP
2159  013336  032777  040000  165204        BIT     #40000,@SWR     ;SEE IF LOOP ON ERROR
2160  013344  001001                        BNE     1$              ;IF SO: BR
2161  013346  000207                        RTS     PC              ;ELSE EXIT
2162  013350  000240                1$:     NOP
2163  013352  005737  000674                TST     SCOLP           ;SEE IF SCOPE ADDRESS
2164  013356  001001                        BNE     2$              ;IF NOT: BR
2165  013360  000207                        RTS     PC              ;ELSE EXIT
2166  013362  022626                2$:     CMP     (SP)+,(SP)+     ;RESET STACK
2167  013364  000177  165304                JMP     @SCOLP          ;LOOP ON ERROR
2168
2169                                        ;TEST ITERATION SUBROUTINE**********
2170
2171  013370  000240                ITER:   NOP
2172  013372  032777  004000  165150        BIT     #4000,@SWR      ;SEE IF ITERATIONS
2173  013400  001403                        BEQ     2$              ;IF SO: BR
2174  013402  005037  000662        1$:     CLR     ITCNT           ;CLEAR ITERATION COUNTER
2175  013406  000207                        RTS     PC              ;ELSE EXIT
2176  013410  005737  000730        2$:     TST     PCNTR           ;DO SINGLE SUBTEST ITERATION
2177  013414  001772                        BEQ     1$              ;ON FIRST PASS
2178  013416  005237  000662                INC     ITCNT           ;BUMP COUNTER
2179  013422  023737  000662  000566        CMP     ITCNT,ITAMT     ;SEE IF DONE ALL
2180  013430  001764                        BEQ     1$              ;IF SO: BR
2181  013432  005726                        TST     (SP)+           ;RESET STACK
2182  013434  017700  165236                MOV     @ITRLP,R0       ;SET ITERATION POINTER
2183  013440  000110                        JMP     (R0)            ;GO ITERATE
2184
2185
2186
2187                                        ;NON-STANDARD JUMPER HANDLER SUBROUTINE**********
2188
2189  013442  010046                NOST:   MOV     R0,-(SP)        ;*SAVE R0
2190  013444  012700  000120                MOV     #120,R0         ;*SET UP INDEX
2191  013450  012760  011626  000756        MOV     #FT26,TSTTBL(R0);*ADJUST SCHEDULAR TEST TABLE
2192  013456  005720                        TST     (R0)+
2193  013460  012760  011626  000756        MOV     #FT26,TSTTBL(R0)        ;*OVERLAY TEST LIST
2194
2195  013466  005720                        TST     (R0)+
2196  013470  012760  012064  000756        MOV     #FT27,TSTTBL(R0)
2197  013476  005720                        TST     (R0)+
2198  013500  012760  012064  000756        MOV     #FT27,TSTTBL(R0)
2199  013506  005720                        TST     (R0)+
2200  013510  012760  003162  000756        MOV     #TEND,TSTTBL(R0)
2201  013516  005720                        TST     (R0)+
2202  013520  012760  000027  000756        MOV     #27,TSTTBL(R0)
2203  013526  012737  000027  001120        MOV     #27,TLAST
2204  013534  012600                        MOV     (SP)+,R0        ;RESTO R0
2205  013536  000207                        RTS      PC
2206
2207                                        ;INITIALIZE SUBROUTINE**********
2208
```

```
2209  013540  000240                    INIT1:  NOP
2210  013542  012777  000040  164750            MOV     #40,@CS         ;INIT
2211  013550  013777  000612  164742  INIT2:    MOV     DRVN,@CS        ;SELECT DRIVE
2212  013556  013777  000614  164756            MOV     SLVN,@TC        ;SELECT SLAVE
2213  013564  000207                            RTS     PC              ;RETURN
2214
2215                                            ;MAG TAPE INTERRUPT HANDLER**********
2216
2217  013566  000240                    MTINT:  NOP
2218  013570  013716  000646                    MOV     RTRN,(SP)       ;RETURN TO (RTRN)
2219  013574  000002                            RTI                     ;RETURN
2220
```

```
2222
2223                                    ;TTY INTERRUPT HANDLER**********
2224
2225  013576  017746  164752    TTINT:  MOV     @TKB,(SP)       ;GET CHARACTER
2226  013602  042716  000200            BIC     #200,(SP)       ;CLEAR PARITY BIT
2227  013606  122716  000003            CMPB    #3,(SP)         ;BRANCH IF NOT CONTROL C
2228  013612  001010                    BNE     1$
2229  013614  005737  001662            TST     CHNFLG          ;INHIBIT ^C IF CHAIN MODE
2230  013620  001005                    BNE     1$
2231  013622  005077  164720            CLR     @PSW
2232  013626  000005                    RESET
2233  013630  000137  000200            JMP     @#200           ;RESTART PROGRAM
2234  013634  122716  000001    1$:     CMPB    #1,(SP)         ;BRANCH IF NOT ^A
2235  013640  001017                    BNE     2$
2236  013642  022737  000176  000550    CMP     #SWREG,SWR      ;BRANCH IF HARDWARE SWR IS INVOKED
2237  013650  001016                    BNE     3$
2238  013652  012737  177570  000550    MOV     #177570,SWR     ;INVOKE HARDWARE SWR
2239  013660  004737  015356            JSR     PC,.SAVE        ;SAVE REGISTERS ON THE STACK
2240  013664  012704  020262            MOV     #MSG70,R4       ;TYPE 'HARDWARE SWR IN USE'
2241  013670  004737  014414            JSR     PC,TTOUT
2242  013674  004737  015400            JSR     PC,.RESTORE
2243  013700  122716  000007    2$:     CMPB    #7,(SP)         ;BRANCH IF NOT ^G
2244  013704  001006                    BNE     4$
```

```
2246
2247  013706  012737  000176  000550  3$:   MOV     #SWREG,SWR      ;INVOKE SOFTWARE SWR
2248  013714  004737  015260          4$:   JSR     PC,GTSWR        ;GET SWITCHES
2249  013720  000414                  5$:   BR      6$
2250  013722  122716  000023          4$:   CMPB    #23,(SP)        ;SEE IF ^S
2251  013726  001004                  5$:   BNE     5$              ;BRANCH IF NOT
2252  013730  112737  000377  001122  5$:   MOVB    #377,$CNTRLS    ;SET XOFF FLAG
2253  013736  000405                  5$:   BR      6$
2254  013740  122716  000021          5$:   CMPB    #21,(SP)        ;SEE IF ^Q
2255  013744  001002                  5$:   BNE     6$              ;BRANCH IF NOT
2256  013746  105037  001122          5$:   CLRB    $CNTRLS
2257  013752  005726                  6$:   TST     (SP)+           ;POP CHARACTER OFF STACK
2258  013754  000002                  5$:   RTI                     ;RETURN
```

```
2260                                            ;BUS ADDRESS TRAP HANDLER**********
2261
2262  013756  000240                    TRAP:   NOP
2263  013760  032777  020000  164562            BIT     #20000,@SWR     ;SEE IF SHOULD PRINT ERRORS
2264  013766  001020                            BNE     TRAP2           ;IF NOT: BR
2265  013770  005737  000606                    TST     HDRFL           ;SEE IF DONE HEADER
2266  013774  001006                            BNE     TRAP1           ;IF SO: BR
2267  013776  005237  000606                    INC     HDRFL           ;ELSE SET HEADER FLAG
2268  014002  013704  000610                    MOV     EMADDR,R4
2269  014006  004737  014414                    JSR     PC,TTOUT        ;PRINT HEADER
2270  014012  012704  016476            TRAP1:  MOV     #MSG24,R4
2271  014016  004737  014414                    JSR     PC,TTOUT        ;PRINT ERROR
2272  014022  010103                            MOV     R1,R3           ;GET ADDRESS THAT CAUSED THE TRAP
2273  014024  004737  014630                    JSR     PC,OCTP         ;PRINT ADDRESS OF TRAP
2274  014030  005777  164514            TRAP2:  TST     @SWR            ;SEE IF HALT ON ERROR
2275  014034  100001                            BPL     TRAPX           ;IF NOT: BR
2276  014036  000000                            HALT
2277  014040  022626                    TRAPX:  CMP     (SP)+,(SP)+     ;RESET STACK
2278  014042  012737  003322  000674            MOV     #T1A,SCOLP      ;SET SCOPE ADDRESS
2279  014050  004737  013334                    JSR     PC,SCOPE        ;GO SEE IF SCOPE LOOP
2280  014054  005737  000722                    TST     RHTF            ;SEE IF INITIAL ADDRESS TEST
2281  014060  001402                            BEQ     TRAPXX          ;IF NOT: BR
2282  014062  000137  001764                    JMP     STOB            ;ELSE REDO ADDRESS REQUEST
2283  014066  000137  003326            TRAPXX: JMP     T1B             ;RETURN TO TEST 1
2284
```

```
2286                                    ;*************************************************
2287                                    ;TTY ENTRY SUBROUTINE:
2288                                    ;
2289                                    ;THIS SUBROUTINE IS USED BY THE TEST CONDITION
2290                                    ;ENTRY ROUTINE TO READ THE RESPONSE ENTERED
2291                                    ;AT THE TTY AND CHECK THEM FOR LEGALITY AND
2292                                    ;LIMITS.  ALL RESPONSE MUST BE TYPED IN OCTAL
2293                                    ;(0-7) AND MUST FALL WITHIN THE LIMITS SET BY
2294                                    ;THE CALLING ROUTINE.
2295                                    ;IF AN ENTRY IS ILLEGAL OR OUTSIDE THE LIMITS,
2296                                    ;A QUESTION MARK IS TYPED (?) AND THE RESPONSE
2297                                    ;MAY BE REENTERED.
2298                                    ;ENTRIES MAY NOT EXCEED SIX (6) CHARACTERS AND
2299                                    ;MAY BE TERMINATED AT LESS THAN SIX BY TYPING A
2300                                    ;CARRIAGE RETURN
2301                                    ;*************************************************
2302
2303  014072  010146          TTR:    MOV     R1,-(SP)        ;SAVE CHAR COUNT ON STACK
2304  014074  011601          10$:    MOV     (SP),R1         ;RESTORE CHAR COUNT (FOR ^U)
2305  014076  005037  000652          CLR     TEMP1           ;CLEAR FIRST CHARACTER FLAG
2306  014102  005000                  CLR     R0
2307  014104  004737  014352  1$:     JSR     PC,TTIN         ;GO READ CHARACTER
2308  014110  122737  000003  000602  CMPB    #3,TIB          ;BRANCH IF NOT ^C
2309  014116  001003                  BNE     11$
2310  014120  000005                  RESET                   ;RESET
2311  014122  000137  000200          JMP     @#200           ;RESTART
2312  014126  122737  000015  000602  11$:    CMPB    #15,TIB         ;SEE IF CR
2313  014134  001004                  BNE     2$              ;IF NOT: BR
2314  014136  005737  000652          TST     TEMP1           ;SEE IF FIRST CHARACTER
2315  014142  001471                  BEQ     9$              ;IF SO: BR
2316  014144  000457                  BR      6$              ;ELSE GO LOAD VALUE
2317  014146  122737  000025  000602  2$:     CMPB    #25,TIB         ;BRANCH IF NOT CONTROL U
2318  014154  001005                  BNE     21$
2319  014156  012704  020202          MOV     #MSG65,R4       ;TYPE <CR><LF>
2320  014162  004737  014414          JSR     PC,TTOUT
2321  014166  000742                  BR      10$             ;RESTART
2322  014170  122737  000177  000602  21$:    CMPB    #177,TIB        ;BRANCH IF NOT 'RUBOUT'
2323  014176  001012                  BNE     3$
2324  014200  000241                  CLC                     ;REMOVE LAST CHARACTER
2325  014202  006000                  ROR     R0
2326  014204  006200                  ASR     R0
2327  014206  006200                  ASR     R0
2328  014210  012704  020204          MOV     #MSG66,R4       ;TYPE '\'
2329  014214  004737  014414          JSR     PC,TTOUT
2330  014220  005201                  INC     R1              ;DECRENENT CHAR RECEIVED COUNT
2331  014222  000730                  BR      1$              ;GET NEXT CHARACTER
2332  014224  122737  000060  000602  3$:     CMPB    #60,TIB         ;SEE IF CHAR IS LESS THAN 0
2333  014232  101402                  BLOS    4$              ;IF NOT: BR
2334  014234  000137  014332          JMP     TINER           ;ELSE GO TO ERROR
2335  014240  122737  000070  000602  4$:     CMPB    #70,TIB         ;SEE IF CHAR IS GREATER THAN 7
2336  014246  101002                  BHI     5$              ;IF NOT: BR
2337  014250  000137  014332          JMP     TINER           ;ELSE GO TO ERROR
2338  014254  005237  000652          5$:     INC     TEMP1           ;SET FIRST CHARACTER FLAG
2339  014260  006300                  ASL     R0
2340  014262  006300                  ASL     R0              ;SHIFT 3 LEFT
2341  014264  006300                  ASL     R0
```

```
2342  014266  042737  177770  000602          BIC     #177770,TIB     ;STRIP ASCII
2343  014274  053700  000602                  BIS     TIB,R0          ;LOAD CHARACTER
2344  014300  005301                          DEC     R1              ;SEE IF DONE
2345  014302  001300                          BNE     1$              ;IF NOT: BR
2346  014304  020002                  6$:     CMP     R0,R2           ;SEE IF EXCEEDED MAXIMUM LIMIT
2347  014306  101402                          BLOS    7$              ;IF NOT: BR
2348  014310  000137  014332                  JMP     TINER           ;ELSE GO TO ERROR
2349  014314  020300                  7$:     CMP     R3,R0           ;SEE IF BELOW MINIMUM LIMIT
2350  014316  101402                          BLOS    8$              ;IF NOT: BR
2351  014320  000137  014332                  JMP     TINER           ;ELSE GO TO ERROR
2352  014324  010015                  8$:     MOV     R0,(R5)         ;LOAD VALUE
2353  014326  005726                  9$:     TST     (SP)+           ;POP CHAR COUNT OFF STACK
2354  014330  000207                          RTS     PC              ;EXIT
2355
2356                                          ;TTY ENTRY ERROR SUBROUTINE**********
2357
2358  014332  012704  015777          TINER:  MOV     #MSG7,R4
2359  014336  004737  014414                  JSR     PC,TTOUT        ;PRINT?
2360  014342  005726                          TST     (SP)+           ;POP CHAR COUNT OFF STACK
2361  014344  162716  000020                  SUB     #20,(SP)        ;RESET SP TO START OF VALUE ROUTINE
2362  014350  000207                          RTS     PC              ;REDO VALUE ENTRY
2363
2364                                          ;TTY READ SUBROUTINE**********
2365
2366  014352  005277  164174          TTIN:   INC     @TKS
2367  014356  105777  164170          1$:     TSTB    @TKS
2368  014362  100375                          BPL     1$
2369  014364  117737  164164  000602          MOVB    @TKB,TIB
2370  014372  042737  000200  000602          BIC     #200,TIB        ;STRIP PARITY BIT
2371  014400  013737  000602  000600          MOV     TIB,TOB         ;MOVE CHAR TO OUTPUT BFR
2372  014406  004737  014514                  JSR     PC,TOG          ;AND TYPE IT
2373  014412  000207                          RTS     PC
2374
2375                                          ;TTY OUTPUT SUBROUTINE**********
2376
2377  014414  112437  000600          TTOUT:  MOVB    (R4)+,TOB
2378  014420  122737  000043  000600          CMPB    #43,TOB
2379  014426  001472                          BEQ     TEX
2380  014430  122737  000045  000600          CMPB    #45,TOB
2381  014436  001403                          BEQ     1$
2382  014440  004737  014514                  JSR     PC,TOG
2383  014444  000763                          BR      TTOUT
2384  014446  112737  000015  000600  1$:     MOVB    #15,TOB
2385  014454  004737  014514                  JSR     PC,TOG
2386  014460  012703  000004                  MOV     #4,R3
2387  014464  005037  000600          2$:     CLR     TOB
2388  014470  004737  014514                  JSR     PC,TOG
2389  014474  005303                          DEC     R3
2390  014476  001372                          BNE     2$              ;DO FILLERS
2391  014500  112737  000012  000600          MOVB    #12,TOB
2392  014506  004737  014514                  JSR     PC,TOG
2393  014512  000740                          BR      TTOUT
```

```
2395  014514  105777  164032          TOG:    TSTB    @TKS            ;SEE IF INPUT AT KEYBOARD
2396  014520  100024                  BPL     3$              ;IF SO, THEN
2397  014522  117737  164026  001123          MOVB    @TKB,$CNTRLS+1  ;MOVE CHARACTER AND
2398  014530  142737  000200  001123          BICB    #200,$CNTRLS+1  ;MASK OFF PARITY BIT.
2399  014536  122737  000023  001123          CMPB    #23,$CNTRLS+1   ;SEE IF CHARACTER IS XOFF
2400  014544  001004                  BNE     2$              ;IF XOFF, THEN
2401  014546  112737  000377  001122          MOVB    #377,$CNTRLS    ;SET XOFF FLAG
2402  014554  000757                  BR      TOG
2403  014556  122737  000021  001123  2$:     CMPB    #21,$CNTRLS+1   ;SEE IF CHARACTER IS XON
2404  014564  001002                  BNE     3$              ;IF SO THEN
2405  014566  105037  001122                  CLRB    $CNTRLS         ;CLEAR XOFF FLAG
2406  014572  105737  001122          3$:     TSTB    $CNTRLS         ;SEE IF IN XOFF MODE
2407  014576  100746                  BMI     TOG             ;IF NOT THEN
2408  014600  105777  163752                  TSTB    @TPS            ;CHECK IF PRINTER READY
2409  014604  100343                  BPL     TOG             ;
2410  014606  113777  000600  163744          MOVB    TOB,@TPB
2411  014614  000207                  TEX:    RTS     PC              ;RETURN
```

```
2413                                    ;OCTAL OUTPUT SUBROUTINE**********
2414
2415  014616  012737  000001  015046  OCTPE:  MOV     #1,OFL
2416  014624  010304                    MOV     R3,R4
2417  014626  000410                    BR      OCTPO
2418  014630  005037  015046          OCTP:   CLR     OFL             ;CLEAR FLAG FOR LEADING ZERO
2419  014634  010304                  OCTPE1: MOV     R3,R4           ;SEE IF NUMBER IS ZERO
2420  014636  001004                    BNE     OCTPO           ;IF NOT ZERO: BR
2421  014640  004737  015026                  JSR     PC,OCTPG1       ;ELSE PRINT ZERO
2422  014644  000137  014770                  JMP     OCTP3           ;SPACE AND EXIT
2423  014650  032704  100000          OCTPO:  BIT     #100000,R4      ;SEE IF MSD = 1
2424  014654  001406                    BEQ     OCTP1           ;IF NOT: BR
2425  014656  012704  000001                  MOV     #1,R4
2426  014662  004737  015004                  JSR     PC,OCTPG        ;PRINT 1
2427  014666  000137  014700                  JMP     OCTP2
2428  014672  005004                  OCTP1:  CLR     R4
2429  014674  004737  015004                  JSR     PC,OCTPG        ;PRINT 0
2430  014700  010304                  OCTP2:  MOV     R3,R4
2431  014702  006004                    ROR     R4
2432  014704  006004                    ROR     R4
2433  014706  006004                    ROR     R4              ;POSITION DIGIT
2434  014710  006004                    ROR     R4
2435  014712  000304                    SWAB    R4
2436  014714  004737  015004                  JSR     PC,OCTPG        ;PRINT DIGIT 2
2437  014720  010304                    MOV     R3,R4
2438  014722  006004                    ROR     R4
2439  014724  000304                    SWAB    R4
2440  014726  004737  015004                  JSR     PC,OCTPG        ;PRINT DIGIT 3
2441  014732  010304                    MOV     R3,R4
2442  014734  006104                    ROL     R4
2443  014736  006104                    ROL     R4
2444  014740  000304                    SWAB    R4
2445  014742  004737  015004                  JSR     PC,OCTPG        ;PRINT DIGIT 4
2446  014746  010304                    MOV     R3,R4
2447  014750  006004                    ROR     R4
2448  014752  006004                    ROR     R4
2449  014754  006004                    ROR     R4
2450  014756  004737  015004                  JSR     PC,OCTPG
2451  014762  010304                    MOV     R3,R4
2452  014764  004737  015004                  JSR     PC,OCTPG        ;PRINT DIGIT 5
2453  014770  012737  000240  000600  OCTP3:  MOV     #240,TOB
2454  014776  004737  014514                  JSR     PC,TOG          ;PRINT SPACE
2455  015002  000207                    RTS     PC              ;EXIT
2456  015004  042704  177770          OCTPG:  BIC     #177770,R4
2457  015010  001004                    BNE     OCTPGO
2458  015012  005737  015046                  TST     OFL
2459  015016  001001                    BNE     OCTPGO
2460  015020  000207                    RTS     PC
2461
2462  015022  005237  015046          OCTPGO: INC     OFL
2463  015026  052704  000260          OCTPG1: BIS     #260,R4
2464  015032  010437  000600                  MOV     R4,TOB
2465  015036  004737  014514                  JSR     PC,TOG
2466  015042  010304                    MOV     R3,R4
2467  015044  000207                    RTS     PC
2468  015046  000000                  OFL:    0                       ;FIRST CHAR FLAG
```

```
2469
2470                                        ;DATA CHARACTER OUTPUT SUBROUTINE**********
2471
2472  015050  005037  000600        DOUT:   CLR     TOB
2473  015054  012704  000010                MOV     #10,R4          ;SET NUMBER TO PRINT
2474  015060  110337  000600                MOVB    R3,TOB
2475  015064  105777  163466        1$:     TSTB    @TPS
2476  015070  100375                        BPL     1$
2477  015072  132737  000200  000600      BITB    #200,TOB
2478  015100  001404                        BEQ     2$
2479  015102  012777  000061  163450      MOV     #061,@TPB
2480  015110  000403                        BR      3$
2481  015112  012777  000060  163440  2$:   MOV     #060,@TPB
2482  015120  006137  000600        3$:     ROL     TOB
2483  015124  005304                        DEC     R4
2484  015126  001356                        BNE     1$
2485  015130  000207                        RTS     PC
2486
2487  015132  013703  000656        DOUTD:  MOV     TEMP3,R3
2488  015136  000303                        SWAB    R3
2489  015140  004737  015050                JSR     PC,DOUT
2490  015144  013703  000656                MOV     TEMP3,R3
2491  015150  004737  015050                JSR     PC,DOUT
2492  015154  000207                        RTS     PC
2493
2494                                        ;SERIAL NUMBER PRINT SUBROUTINE**********
2495
2496  015156  010304        SNPT:   MOV     R3,R4
2497  015160  000304                SWAB    R4
2498  015162  006004                ROR     R4
2499  015164  006004                ROR     R4
2500  015166  006004                ROR     R4
2501  015170  006004                ROR     R4              ;GET FIRST DIGIT
2502  015172  004737  015234        JSR     PC,SNPG         ;GO PRINT
2503  015176  010304                MOV     R3,R4
2504  015200  000304                SWAB    R4              ;GET SECOND DIGIT
2505  015202  004737  015234        JSR     PC,SNPG         ;GO PRINT
2506  015206  010304                MOV     R3,R4
2507  015210  006004                ROR     R4
2508  015212  006004                ROR     R4
2509  015214  006004                ROR     R4
2510  015216  006004                ROR     R4              ;GET THIRD DIGIT
2511  015220  004737  015234        JSR     PC,SNPG         ;GO PRINT
2512  015224  010304                MOV     R3,R4           ;GET FOURTH DIGIT
2513  015226  004737  015234        JSR     PC,SNPG         ;GO PRINT
2514  015232  000207                RTS     PC              ;EXIT
2515  015234  012737  000260  000600  SNPG:  MOV     #260,TOB        ;SET BASE = 0
2516  015242  042704  177760                BIC     #177760,R4      ;MASK DIGIT
2517  015246  050437  000600                BIS     R4,TOB          ;SET ASCII
2518  015252  004737  014514                JSR     PC,TOG          ;TYPE DIGIT
2519  015256  000207                        RTS     PC              ;RETURN
2520
```

```
                                                ;ROUTINE TO LOAD NEW VALUE INTO SWITCHES
     015260 022737 000176 000550 GTSWR:   CMP     #SWREG,SWR          ;BRANCH IF SOFTWARE SWR
     015266 001032                        BNE     1$                  ;NOT INVOKED
     015270 004737 015356                 JSR     PC,.SAVE            ;SAVE REGISTERS ON THE STACK
     015274 012704 021521                 MOV     #$MSWR,R4
     015300 004737 014414                 JSR     PC,TTOUT
     015304 017703 163240                 MOV     @SWR,R3
     015310 004737 014616                 JSR     PC,OCTPE
     015314 012704 021530                 MOV     #$MNEW,R4
     015320 004737 014414                 JSR     PC,TTOUT
     015324 013705 000550                 MOV     SWR,R5              ;TTR ROUTINE RETURNS NEW VALUE TO (R5)
     015330 012701 000007                 MOV     #7,R1               ;LIMIT RESPONSE TO 7 CHARS
     015334 012702 177777                 MOV     #177777,R2          ;BETWEEN 0 AND 177777
     015340 012703 000000                 MOV     #0,R3
     015344 004737 014072                 JSR     PC,TTR
     015350 004737 015400                 JSR     PC,.RESTORE         ;RESTORE REGISTERS
     015354 000207               1$:      RTS     PC

                                 ;;ROUTINE TO SAVE REGISTERS ON THE STACK
 (1) 015356 010546               .SAVE:   MOV     %5,-(SP)            ;;R5 IS SAVED AT 12(SP)
 (1) 015360 010446                        MOV     %4,-(SP)            ;;R4 IS SAVED AT 10(SP)
 (1) 015362 010346                        MOV     %3,-(SP)            ;;R3 IS SAVED AT 6(SP)
 (1) 015364 010246                        MOV     %2,-(SP)            ;;R2 IS SAVED AT 4(SP)
 (1) 015366 010146                        MOV     %1,-(SP)            ;;R1 IS SAVED AT 2(SP)
 (1) 015370 010046                        MOV     %0,-(SP)            ;;R0 IS SAVED AT (SP)
 (1) 015372 016646 000014                 MOV     14(SP),-(SP)        ;;PUSH RETURN PC ON THE STACK
 (1) 015376 000207                        RTS     PC                  ;;RETURN TO CALLER
 (1)
                                 ;;ROUTINE TO RESTORE REGISTERS SAVED ON THE STACK
 (1) 015400 012666 000014        .RESTORE:MOV     (SP)+,14(SP)        ;;STORE RETURN PC ON STACK
 (1) 015404 012600                        MOV     (SP)+,%0
 (1) 015406 012601                        MOV     (SP)+,%1
 (1) 015410 012602                        MOV     (SP)+,%2
 (1) 015412 012603                        MOV     (SP)+,%3
 (1) 015414 012604                        MOV     (SP)+,%4
 (1) 015416 012605                        MOV     (SP)+,%5
 (1) 015420 000207                        RTS     PC                  ;;RETURN
 (1)
```

```
                                        ;MESSAGE TABLE*****
                                
2545    015422  041445  030523  020040  MSG1:   .ASCII  /*CS1    WC     BA     FC     CS2    /
        015430  020040  041527  020040
        015436  020040  041040  020101
        015444  020040  020040  041506
        015452  020040  020040  041440
        015460  031123  020040  020040
2548    015466  051504  020040  020040          .ASCII  /DS     ER     TC*0/
        015474  042440  020122  020040
        015502  02004C  041524  021445
2549    015510  051045  053505  047111  MSG2:   .ASCII  /*REWIND ERROR BOT NOT SET WHEN PIP CLEARED0/
        015516  020104  051105  047522
        015524  026522  047502  020124
        015532  047516  020124  042523
        015540  020124  044127  047105
        015546  050040  050111  041440
        015554  042514  051101  042105
        015562     043
2550    015563     045  052045  030115  MSG3:   .ASCII  '**TM03-TE16/TU77 BASIC FUNCTION TEST (CZTECF0)*';--B
        015570  026463  042524  033061
        015576  052057  033525  020067
        015604  040502  044523  020103
        015612  052506  041516  044524
        015620  047117  052040  051505
        015626  020124  041450  052132
        015634  041505  030106  022451
2551    015642  054524  042520  036040          .ASCII  /TYPE <CR> TO TERMINATE RESPONSE & ^C TO RESTART*0/
        015650  051103  020076  047524
        015656  052040  051105  044515
        015664  040516  042524  051040
        015672  051505  047520  051516
        015700  020105  020046  041536
        015706  052040  020117  042522
        015714  052123  051101  022524
        015722     043
2552    015723     045  042522  044507  MSG4:   .ASCII  /*REGISTER START - 0/
        015730  052123  051105  051440
        015736  040524  052122  036440
        015744  021440
2553    015746  053045  041505  047524  MSG5:   .ASCII  /*VECTOR - 0/
        015754  020122  020075     043
2554    015761     045  047105  020104  MSG6:   .ASCII  /*END OF PASS 0/
        015766  043117  050040  051501
        015774  020123     043
2555    015777     040  020077     043  MSG7:   .ASCII  / ? 0/
2556    016003     045  047520  044523  MSG9:   .ASCII  /*POSITION ERROR: 0/
        016010  044524  047117  042440
        016016  051122  051117  020072
        016024     043
2557    016025     045  051511  041440  MSG10A: .ASCII  /*IS CONTROLLER JUMPERED IN NON STANDARD MODE/<15><12>
        016032  047117  051124  046117
        016040  042514  020122  052512
        016046  050115  051105  042105
        016054  044440  020116  047516
        016062  026516  052123  047101
```

```
                016070  040504  042122  046440
                016076  042117  006505     012
2558            016103     124  050131  020105          .ASCII  /TYPE 2 FOR NON STANDARD OR CR FOR STANDARD:      0/
                016110  020062  047506  020122
                016116  047516  026516  052123
                016124  047101  040504  042122
                016132  047440  020122  051103
                016140  043040  051117  051440
                016146  040524  042116  051101
                016154  035104  020040  020040
                016162  020040     043
2559            016165     045  051104  053111  MSG10:  .ASCII  /#DRIVE NUMBER: 0/
                016172  020105  052516  041115
                016200  051105  020072     043
2560            016205     045  046123  053101  MSG11:  .ASCII  /#SLAVE NUMBER: 0/
                016212  020105  052516  041115
                016220  051105  020072     043
2561            016225     045  051127  052111  MSG12:  .ASCII  /#WRITE ERROR 0/
                016232  020105  051105  047522
                016240  020122     043
2562            016243     045  042522  042101  MSG13:  .ASCII  /#READ REVERSE ERROR 0/
                016250  051040  053105  051105
                016256  042523  042440  051122
                016264  051117  021440
2563            016270  051045  040505  020104  MSG14:  .ASCII  /#READ FORWARD ERROR 0/
                016276  047506  053522  051101
                016304  020104  051105  047522
                016312  020122     043
2564            016315     045  051127  052111  MSG15:  .ASCII  /#WRITE TM ERROR 0/
                016322  020105  046524  042440
                016330  051122  051117  021440
2565            016336  020045  051127  052111  MSG15A: .ASCII  /# WRITE TM ERROR ON SECOND TM 0/
                016344  020105  046524  042440
                016352  051122  051117  047440
                016360  020116  042523  047503
                016366  042116  052040  020115
                016374     043
2566            016375     045  041520  020040  MSG15B: .ASCII  /#PC  0/
                016402     043
2567            016403     045  042522  042526  MSG16:  .ASCII  /#REVERSE ERROR 0/
                016410  051522  020105  051105
                016416  047522  020122     043
2568            016423     045  047506  053522  MSG17:  .ASCII  /#FORWARD ERROR 0/
                016430  051101  020104  051105
                016436  047522  020122     043
2569            016443     040  051116  020132  MSG20:  .ASCII  / NRZ 0/
                016450     043
2570            016451     040  042520  021440  MSG21:  .ASCII  / PE 0/
2571            016456  042440  050130  035124  MSG22:  .ASCII  / EXPT: 0/
                016464  021440
2572            016466  051040  053103  035104  MSG23:  .ASCII  / RCVD: 0/
                016474  021440
2573            016476  041045  051525  052040  MSG24:  .ASCII  /#BUS TRAP: 0/
                016504  040522  035120  021440
2574            016512  053445  035103  021440  MSG25:  .ASCII  /#WC: 0/
2575            016520  041045  035101  021440  MSG26:  .ASCII  /#BA: 0/
```

```
2576  016526 042045 035102 021440 MSG27:  .ASCII  /*DB: */
2577  016534 044445 044516 020124 MSG28:  .ASCII  /*INIT DID NOT CLEAR RH */
      016542 044504 020104 047516
      016550 020124 046103 040505
      016556 020122 044122 021440
2578  016564 051445 020103 047516 MSG29:  .ASCII  /*SC NOT RESET BY INIT */
      016572 020124 042522 042523
      016600 020124 054502 044440
      016606 044516 020124    043
2579  016613    045 051124 020105 MSG30:  .ASCII  /*TRE NOT RESET BY INIT */
      016620 047516 020124 042522
      016626 042523 020124 054502
      016634 044440 044516 020124
      016642    043
2580  016643    045 051503 020062 MSG31:  .ASCII  /*CS2 NOT RESET BY INIT */
      016650 047516 020124 042522
      016656 042523 020124 054502
      016664 044440 044516 020124
      016672    043
2581  016673    045 046104 020124 MSG32:  .ASCII  /*DLT NOT SET */
      016700 047516 020124 042523
      016706 020124    043
2582  016711    045 041523 047040 MSG33:  .ASCII  /*SC NOT SET */
      016716 052117 051440 052105
      016724 021440
2583  016726 052045 042522 047040 MSG34:  .ASCII  /*TRE NOT SET */
      016734 052117 051440 052105
      016742 021440
2584  016744 044445 020122 047516 MSG35:  .ASCII  /*IR NOT SET BY INIT */
      016752 020124 042523 020124
      016760 054502 044440 044516
      016766 020124    043
2585  016771    045 051117 047040 MSG36:  .ASCII  /*OR NOT RESET BY INIT */
      016776 052117 051040 051505
      017004 052105 041040 020131
      017012 047111 052111 021440
2586  017020 047445 020122 047516 MSG37:  .ASCII  /*OR NOT RESET BY 1 SILO ENTRY */
      017026 020124 042522 042523
      017034 020124 054502 030440
      017042 051440 046111 020117
      017050 047105 051124 020131
      017056    043
2587  017057    045 051117 047040 MSG38:  .ASCII  /*OR NOT SET BY SILO FULL */
      017064 052117 051440 052105
      017072 041040 020131 044523
      017100 047514 043040 046125
      017106 020114    043
2588  017111    045 040502 020104 MSG39:  .ASCII  /*BAD SILO READ */
      017116 044523 047514 051040
      017124 040505 020104    043
2589  017131    045 051111 047040 MSG40:  .ASCII  /*IR NOT RESET BY SILO FULL*/
      017136 052117 051040 051505
      017144 052105 041040 020131
      017152 044523 047514 043040
      017160 046125 021514
2590  017164 047045 047117 042455 MSG41:  .ASCII  /*NON-EXIST DRIVE*/
```

```
                017172  044530  052123  042040
                017200  044522  042526     043
2591            017205     045  047516  025516  MSG42:   ASCII  /*NON EXIST SLAVE@/
                017212  054105  051511  020124
                017220  046123  053101  021505
2592            017226  051445  051105  040511  MSG43:  .ASCII  /*SERIAL NO: @/
                017234  020114  047516  020072
                017242     043
2593            017243     045  051105  051501  MSG44:  .ASCII  /*ERASE HEAD INOPERATIVE@/
                017250  020105  042510  042101
                017256  044440  047516  042520
                017264  040522  044524  042526
                017272     043
2594            017273     045  047520  051523  MSG45:  .ASCII  /*POSSIBLE ERASE HEAD PROBLEM: /
                017300  041111  042514  042440
                017306  040522  042523  044040
                017314  040505  020104  051120
                017322  041117  042514  035115
                017330     040
2595            017331     103  042510  045503          .ASCII  /CHECK POLARITY@/
                017336  000040  046117  051101
                017344  052111  021531
2596            017350  051445  052105  052455  MSG46:  .ASCII  /*SET-UP WRITE ERROR@/
                017356  020120  051127  052111
                017364  020105  051105  047522
                017372  021522
2597            017374  051445  040520  042503  MSG47:  .ASCII  /*SPACE FORWARD ERROR@/
                017402  043040  051117  040527
                017410  042122  042440  051122
                017416  051117     043
2598            017421     045  050123  041501  MSG48:  .ASCII  /*SPACE REVERSE ERROR@/
                017426  020105  042522  042526
                017434  051522  020105  051105
                017442  047522  021522
2599            017446  041045  043125  042506  MSG49:  .ASCII  /*BUFFERED WRITE ERROR@/
                017454  042522  020104  051127
                017462  052111  020105  051105
                017470  047522  021522
2600            017474  041045  052117  051440  MSG50:  .ASCII  /*BOT SET AFTER BUFFERED WRITE@/
                017502  052105  040440  052106
                017510  051105  041040  043125
                017516  042506  042522  020104
                017524  051127  052111  021505
2601            017532  047045  020117  047502  MSG51:  .ASCII  /*NO BOT FROM READ IN PRESET@/
                017540  020124  051106  046517
                017546  051040  040505  020104
                017554  047111  050040  042522
                017562  042523  021524
2602            017566  052045  020103  047111  MSG52:  .ASCII  /*TC INCORRECT @/
                017574  047503  051122  041505
                017602  020124     043
2603            017605     045  047515  020114  MSG53:  .ASCII  /*MOL FAILED TO CLEAR@/
                017612  040506  046111  042105
                017620  052040  020117  046103
                017626  040505  021522
2604            017632  022445  042522  042523  MSG54:  .ASCII  /**RESET SLAVE TO ON LINE BEFORE CONTINUING/
```

```
                017640  020124  046123  053101
                017646  020105  047524  047440
                017654  020116  044514  042516
                017662  041040  043105  051117
                017670  020105  047503  052116
                017676  047111  044525  043516
2605            017704  051445  052105  051440          .ASCII  /%SET SW12=1 IF YOU DOT WISH TO REPEAT REWIND OFFLINE TEST@/
                017712  030527  036462  020061
                017720  043111  054440  052517
                017726  042040  052117  053440
                017734  051511  020110  047524
                017742  051040  050105  040505
                017750  020124  042522  044527
                017756  042116  047440  043106
                017764  044514  042516  052040
                017772  051505  021524
2606            017776  044440  042524  035122  MSG56:  .ASCII  / ITER: @/
                020004  021440
2607            020006  052045  020115  047516  MSG57:  .ASCII  /%TM NOT SET@/
                020014  020124  042523  021524
2608            020022  042445  052111  042510  MSG60:  .ASCII  /%EITHER TAPE NOT ERASED OR OPI PROBLEM@/
                020030  020122  040524  042520
                020036  047040  052117  042440
                020044  040522  042523  020104
                020052  051117  047440  044520
                020060  050040  047522  046102
                020066  046505     043
2609            020071     045  044122  047440  MSG62:  .ASCII  /%RH ONLY (NO=0,YES=1): @/
                020076  046116  020131  047050
                020104  036517  026060  042531
                020112  036523  024461  020072
                020120     043
2610            020121     045  044504  020104  MSG63:  .ASCII  /%DID NOT AUTO SELECT NRZ@/
                020126  047516  020124  052501
                020134  047524  051440  046105
                020142  041505  020124  051116
                020150  021532
2611            020152  042045  042111  047040  MSG64:  .ASCII  /%DID NOT AUTO SELECT PE@/
                020160  052117  040440  052125
                020166  020117  042523  042514
                020174  052103  050040  021505
2612            020202  021445                  MSG65:  .ASCII  /%@/
2613            020204  021534                  MSG66:  .ASCII  /\@/
2614            020206  042445  035122  021440  MSG67:  .ASCII  /%ER: @/
2615            020214  051045  046505  053117  MSG69:  .ASCII  /%REMOVE TMDP FROM SLAVE TO BE TESTED%@/
                020222  020105  046524  050104
                020230  043040  047522  020115
                020236  046123  053101  020105
                020244  047524  041040  020105
                020252  042524  052123  042105
                020260  021445
2616            020262  044045  051101  053504  MSG70:  .ASCII  /%HARDWARE SWR IN USE%@/
                020270  051101  020105  053523
                020276  020122  047111  052440
                020304  042523  021445
2617            020310  040445  040524  047040  MSG71:  .ASCII  /%ATA NOT SET AFTER NON TRANSFER OPERATION@/
```

```
        020316  052117  051440  052105
        020324  040440  052106  051105
        020332  047040  047117  052055
        020340  040522  051516  042506
        020346  020122  050117  051105
        020354  052101  047511  021516
  2618
```

```
2620                                                    ;TEST HEADERS*****
2621
2622  020362  022445  052106  035061  MSFT1:  .ASCII  /%%FT1:RH ADDRESSING @/
      020370  044122  040440  042104
      020376  042522  051523  047111
      020404  020107     043
2623  020407     045  043045  031124  MSFT2:  .ASCII  /%%FT2:RH REGISTER BITS TEST @/
      020414  051072  020110  042522
      020422  044507  052123  051105
      020430  041040  052111  020123
      020436  042524  052123  021440
2624  020444  022445  052106  035063  MSFT3:  .ASCII  /%%FT3:RH INITIALIZE TEST @/
      020452  044122  044440  044516
      020460  044524  046101  055111
      020466  020105  042524  052123
      020474  02144C
2625  020476  022445  052106  035064  MSFT4:  .ASCII  /%%FT4:RH11 SILO TEST 1 @/
      020504  044122  030461  051440
      020512  046111  020117  042524
      020520  052123  030440  021440
2626  020526  022445  052106  035065  MSFT5:  .ASCII  /%%FT5:RH11 SILO TEST 2 @/
      020534  044122  030461  051440
      020542  046111  020117  042524
      020550  052123  031040  021440
2627  020556  022445  052106  035066  MSFT6:  .ASCII  /%%FT6:RH11 SILO TEST 3 @/
      020564  044122  030461  051440
      020572  046111  020117  042524
      020600  052123  031440  021440
2628  020606  022445  052106  035067  MSFT7:  .ASCII  /%%FT7:RH11 SILO TEST 4 @/
      020614  044122  030461  051440
      020622  046111  020117  042524
      020630  052123  032040  021440
2629  020636  022445  052106  030061  MSFT10: .ASCII  /%%FT10:RH11 SILO TEST 5 @/
      020644  051072  030510  020061
      020652  044523  047514  052040
      020660  051505  020124  020065
      020666     043
2630  020667     045  043045  030524  MSFT11: .ASCII  /%%FT11:NOP TEST@/
      020674  035061  047516  020120
      020702  042524  052123     043
2631  020707     045  043045  030524  MSFT12: .ASCII  /%%FT12:REWIND TEST@/
      020714  035062  042522  044527
      020722  042116  052040  051505
      020730  021524
2632  020732  022445  052106  031461  MSFT13: .ASCII  /%%FT13:WRITE READ TEST@/
      020740  053472  044522  042524
      020746  051055  040505  020104
      020754  042524  052123     043
2633  020761     045  043045  030524  MSFT14: .ASCII  /%%FT14:SPACE TEST@/
      020766  035064  050123  041501
      020774  020105  042524  052123
      021002     043
2634  021003     045  043045  030524  MSFT15: .ASCII  /%%FT15:ERASE TEST@/
      021010  035065  051105  051501
      021016  020105  042524  052123
      021024     043
```

```
2635  021025    045  043045  030524  MSFT16: .ASCII  /##FT16:TAPE MARK WRITE READ TEST0/
      021032 035066  040524  042520
      021040 046440  051101  020113
      021046 051127  052111  026505
      021054 042522  042101  052040
      021062 051505  021524
2636  021066 022445  052106  033461  MSFT17: .ASCII  /##FT17:TM SPACE TEST 0/
      021074 052072  020115  050123
      021102 041501  020105  042524
      021110 052123  021440
2637  021114 022445  052106  030062  MSFT20: .ASCII  /##FT20:WRITE CHECK TEST 0/
      021122 053472  044522  042524
      021130 041440  042510  045503
      021136 052040  051505  020124
      021144    043
2638  021145    045  043045  031124  MSFT21: .ASCII  /##FT21:ERASE HEAD TEST0/
      021152 035061  051105  051501
      021160 020105  042510  042101
      021166 052040  051505  021524
2639  021174 022445  052106  031062  MSFT22: .ASCII  /##FT22:BUFFERED COMMAND TEST0/
      021202 041072  043125  042506
      021210 042522  020104  047503
      021216 046515  047101  020104
      021224 042524  052123    043
2640  021231    045  043045  031124  MSFT23: .ASCII  /##FT23:READ IN PRESET TEST0/
      021236 035063  042522  042101
      021244 044440  020116  051120
      021252 051505  052105  052040
      021260 051505  021524
2641  021264 022445  052106  032062  MSFT24: .ASCII  /##FT24:AUTO DENSITY SELECT: WRITE NRZ,READ PE0/
      021272 040472  052125  020117
      021300 042504  051516  052111
      021306 020131  042523  042514
      021314 052103  020072  051127
      021322 052111  026505  051116
      021330 026132  042522  042101
      021336 050055  021505
2642  021342 022445  052106  032462  MSFT25: .ASCII  /##FT25:AUTO DENSITY SELECT: WRITE PE,READ NRZ0/
      021350 040472  052125  020117
      021356 042504  051516  052111
      021364 020131  042523  042514
      021372 052103  020072  051127
      021400 052111  026505  042520
      021406 051054  040505  026504
      021414 051116  021532
2643  021420 022445  052106  033062  MSFT26: .ASCII  /##FT26:SEQUENTIAL TAPE MARK TEST0/
      021426 051472  050505  042525
      021434 052116  040511  020114
      021442 040524  042520  046440
      021450 051101  020113  042524
      021456 052123    043
2644  021461    045  043045  031124  MSFT27: .ASCII  /##FT27:REWIND OFF LINE TEST0/
      021466 035067  042522  044527
      021474 042116  047455  043106
      021502 046040  047111  020105
      021510 042524  052123    043
```

```
2645  021515     045  043536     043  $CNTG:  .ASCII  /*↑G@/
2646  021521     043  053523  036522  $MSWR:  .ASCII  /*SWR= @/
      021526  021440
2647  021530  020040  042516  036527  $MNEW:  .ASCII  /  NEW= @/
      021536  021440
2648  021540  022477     043          $QUEST: .ASCII  /?*@/
2649
2650
2651          021544                          .EVEN
2652  021544  000000                  WDATA:  0
2653          023256                          .=.+1510
2654  023256  000000                  RDATA:  0
2655
2656          000001                          .END
```

```
AS      000526    683#
BA      000514    678#   1051   1547*  1978*  2074
BADDR   000616    717#   1313*  1332*  1357*  1366*  1367*  1374*  1444*  1505*  1538*  1631*  1678*  1689*
                 1694*   1711*  1728*  1762*  1797*  1837*  1848*  1866*  1877*  1941*  1978
BAE     000544    690#    961
BTRP    000574    705#
BTRP2   000576    706#
CC      000530    684#
CHNFLG  001662    841#*   850    970    997   1007   1935   2229
COUNT   000734    756#
CRCNT   000714    748#
CS      000520    680#    908*   909*   911    925*   926*   970*  1109*  1120   1153*  1155   1181   1185
                 1190    1196   1218   1222   1270   1285*  1290*  1294   1404*  1736*  2078   2210*  2211*
C1      000510    676#    877    910    970   1022   1112   1116   1157   1159   1548*  1770*  1948*  1985*
                 2004*   2070
DATA0   000746    766#
DATA1   000750    767#
DATA2   000752    768#
DATA3   000754    769#
DATBL   000744    765#   2115
DAT1    013262    766    2125#
DAT1A   013266   2126#   2135   2140
DAT2    013302    767    2134#
DAT3    013306    768    2139#
DAT4    013314    769    2144#
DB      000532    685#   1060   1154   1189*  1194*  1214*  1227   1267*  1287*  1291*  1292   1293
DOUT    015050   2472#   2489   2491
DOUTD   015132   2487#
DRVN    000612    715#    901    903    909    926    970*  2211
DRVTP   000564    701#
DS      000522    681#   1336   1550   1552   1771   1780   1808   1814   1852   1881   1956   1989   2005
                 2007    2009   2018   2019   2025   2084
DSAV    000664    736#   2018*  2100
DSUP    013222   1352    1677   1710   1836   1865   1940   2111#
DSO     013224   2112#
DT      000536    687#    928    970
EMADDR  000610    714#   1018*  1040*  1080   1106*  1135   1152*  1178*  1210*  1240   1263*  1283*  1319
                 1338*   1350*  1392*  1503*  1576*  1610*  1673*  1707*  1758*  1794*  1833*  1862*  1893*
                 1937*   2049   2268
ER      000524    682#   1961   2030   2086
ERADD   000650    730#   1048*  1057*  1068*  1083   1114*  1118*  1124*  1138   1163*  1165*  1167*  1183*
                 1187*   1192*  1200*  1220*  1224*  1274*  1301*  1746*  1748*  1782*  1816*  1823*  1854*
                 1883*   1958*  1965*
ERCHK   012510   1320    1339   1362   1371   1379   1407   1423   1433   1511   1525   1585   1591   1596
                 1619    1638   1652   1684   1691   1696   1718   1720   1734   1779   1844   1873   1900
                 1906    1915   1920   2017#
ERPT    012574   2020    2030#
ERPTA   012722   2047    2051#
ERPTA1  012654   2035    2039   2041#
ERPTB   012760   2052    2059#
ERPTB1  012772   1562    2060   2062#
ERPTC   013022   2063    2068#
ERPTD   013146   2045    2090#
ERPTG   012662   2028    2043#  2105
ERPTX   013156   2042    2091   2093#
ERPTXX  013162   2094#
```

```
ERPT1A  012754         2056     2058#
ERRP    000626          721#     977*    1359*    1369*    1376*    1406*    1422*    1432*    1510*    1523*    1584*    1590*    1595*
                       1618*    1636*    1646*    1660*    1683*    1687*    1692*    1717*    1733*    1777*    1843*    1872*    1899*
                       1905*    1914*    2027*    2051
ERRP1   000630          722#    2059     2104*    2106*
EXEC    012310         1317     1334     1360     1370     1378     1405     1421     1431     1446     1454     1509     1521     1541
                       1582     1588     1594     1616     1635     1650     1682     1690     1695     1716     1719     1725     1732
                       1739     1766     1775     1801     1805     1842     1851     1871     1880     1897     1904     1913     1919
                       1946     1974#
EXECA   012362         1980     1983#
EXECB   012370         1982     1984#
EXECC   012410         1989#    1992     1994
EXECX   012430         1990     1995#
EXECXA  012434         1996#    1997
EXECXX  012440         1998#
EXFL    000700          742#
FC      000516          679#    1449     1456     1485     1545*    1740     1742     1744     1977*    1983*    2076
FCNT    000620          718#    1311*    1330*    1355*    1397*    1411*    1412     1579*    1630*    1679*    1712*    1723*    1729*
                       1737*    1763*    1798*    1838*    1867*    1942*    1977
FT1     003270          776      777     1018#
FT1A    003322         1023#    1028     2278
FT1B    003326         1025#    2283
FT1X    003340         1026     1029#
FT1XX   003372         1032     1035#
FT10    005026          790      791     1281#    1284
FT10A   005062         1287#    1289
FT10ER  005146         1295     1301#
FT10X   005124         1282     1296#    1303
FT10XX  005142         1298     1300#
FT11    005162          792      793     1307#    1308
FT12    005300          794      795     1326#    1327
FT12A   005360         1336#    1337
FT13    005412          796      797     1346#
FT13A   005464         1354#    1386
FT13B   005526         1360#    1364
FT13C   005606         1370#    1373
FT13D   005654         1378#    1381
FT13X   005720         1383     1387#
FT14    005724          798      799     1391#
FT14A   005776         1399#    1416
FT14A1  005742         1394#    1494
FT14A2  006070         1409     1411#
FT14A3  006112         1413     1415#
FT14B   006142         1420#    1442
FT14EC  006360         1451     1458#
FT14RE  006366         1450     1457     1460#
FT14RF  006332         1436     1452#
FT14RR  006270         1426     1443#
FT14R0  006440         1469     1471#
FT14R1  006462         1473     1476#
FT14R2  006466         1475     1477#
FT14R3  006540         1462     1488#
FT14X   006550         1410     1425     1430     1435     1439     1489     1491#
FT14XX  006572         1492     1495#
FT15    006576          800      801     1499#    2021
FT15A   006646         1507#
```

FT15B	006662	1509#	1515				
FT15X	006772	1513	1535#				
FT15XX	007176	1554	1566#				
FT16	007210	802	803	1573#	2023		
FT16A	007242	1578#	1601				
FT16B	007246	1579#					
FT16X	007426	1599	1602#				
FT17	007436	804	805	1609#			
FT17A	007456	1612#	1666				
FT17B	007462	1613#	1643				
FT17C	007622	1633#	1642				
FT17D	007670	1626	1644#				
FT17D1	007706	1647#	1662				
FT17E	007722	1649#	1657				
FT17F	010012	1659	1663#				
FT17X	010034	1621	1640	1654	1664	1667#	
FT2	003376	778	779	1040#			
FT2A	003410	1042#	1049	1074			
FT2B	003450	1047	1051#	1058			
FT2C	003510	1056	1060#	1069			
FT2D	003524	1064#	1065				
FT2E	003554	1067	1071#				
FT2ER	003564	1050	1059	1070	1075#	1825	1966
FT2ERA	003614	1079	1082#				
FT2ERB	003666	1077	1093#				
FT2ERC	003676	1094	1096#				
FT2X	003706	1072	1099#				
FT20	010040	806	807	1672#			
FT20A	010056	1675#	1700				
FT20B	010202	1692#					
FT20C	010234	1697#					
FT20X	010254	1686	1698	1701#			
FT21	010264	808	809	1707#			
FT21A	010272	1708#					
FT21B	010566	1745	1748#				
FT21C	010574	1747	1749#				
FT21SC	010422	1726#	1749				
FT21X	010606	1741	1743	1751#			
FT22	010616	810	811	1758#	1783		
FT22A	010672	1766#	1768				
FT22B	010712	1771#	1772				
FT22X	011012	1781	1785#				
FT23	011022	812	813	1792#	1817	1824	
FT23A	011132	1808#	1811	1813			
FT23B	011152	1809	1814#				
FT23C	011202	1815	1819#				
FT23X	011236	1793	1822	1826#			
FT24	011242	814	815	1833#	2036		
FT24X	011424	1846	1853	1856#			
FT25	011434	816	817	1862#	2038		
FT25X	011616	1875	1882	1885#			
FT26	011626	818	819	1892#	2191	2193	
FT26X	012054	1903	1909	1918	1923	1925	1928#
FT27	012064	820	821	1933#	2196	2198	
FT27X	012274	1960	1964	1967#			
FT27XX	012304	1934	1936	1969#			

```
FT3       003720    780    781   1106#  1107
FT3A      003774   1113   1116#
FT3B      004016   1117   1120#
FT3ER     004054   1115   1119   1125   1130#  1170   1184   1188   1193   1201   1221   1225   1275   1302
                   1750   1784   1818   1855   1884   1959
FT3X      004044   1123   1126#
FT4       004140    782    783   1150#  1169
FT4ER     004222   1156   1163#
FT4ERA    004232   1158   1165#
FT4FRB    004242   1160   1167#
FT4ERC    004250   1164   1166   1168#
FT4X      004212   1161#  1171
FT5       004266    784    785   1176#
FT5A      004310   1179   1180#
FT5B      004336   1182   1185#
FT5C      004360   1186   1189#
FT5D      004410   1191   1194#
FT5E      004422   1196#  1199
FT5X      004450   1151   1177   1197   1202#
FT6       004460    786    787   1208#
FT6A      004502   1211   1212#
FT6B      004510   1214#  1217
FT6C      004546   1219   1222#
FT6D      004570   1223   1226#
FT6DE     004622   1229   1236#
FT6DEA    004654   1243#
FT6DEB    004720   1238   1253#
FT6DEX    004730   1254   1256#
FT6E      004572   1227#  1232
FT6X      004612   1209   1233#
FT7       004732    788    789   1261#  1264
FT7A      004764   1267#  1269
FT7ER     005012   1271   1274#
FT7X      005002   1262   1272#  1276
FUN       000710    746#  1316*  1333*  1358*  1368*  1375*  1402*  1420*  1428*  1445*  1453*  1472   1507*
                   1519*  1540*  1581*  1587*  1593*  1613*  1632*  1645*  1658   1661*  1681*  1688*  1693*
                   1715*  1731*  1765*  1800*  1804*  1841*  1850*  1870*  1879*  1896*  1911*  1945*  1979
                   1981   1985
GTSWR     015260    950   2248   2524#
HORFL     000606    713#   978*  1078   1082*  1133   1137*  1239   1242*  2046   2048*  2265   2267*
HERE      003236   1006#
INIT1     013540   1042   1108   1111   1180   1212   1265   1309   1328   1399   1458   1649   1773   1795
                   1803   1947   2003   2011   2093   2209#
INIT2     013550   2211#
ITAMT     000566    702#  2179
ITCNT     000662    735#  2066   2174*  2178*  2179
ITER      013370   1100   1126   1161   1202   1233   1272   1296   1321   1340   1566   1602   1701   1751
                   1785   1856   1885   1928   2171#
ITRLP     000676    741#   974*   975*  2182
JUMPER    000742    759#   891    896   2034
LTADD     000706    745#   972*   973*   974    979    994*   995*  2021   2023   2036   2038
MR        000534    686#
MSFT1     020362   1018   2622#
MSFT10    020636   1283   2629#
MSFT11    020667   1319   2630#
MSFT12    020707   1338   2631#
```

```
MSFT13  020732  1350  2632#
MSFT14  020761  1392  1463  2633#
MSFT15  021003  1503  2634#
MSFT16  021025  1576  2635#
MSFT17  021066  1610  2636#
MSFT2   020407  1040  2623#
MSFT20  021114  1673  2637#
MSFT21  021145  1707  2638#
MSFT22  021174  1758  2639#
MSFT23  021231  1794  2640#
MSFT24  021264  1833  2641#
MSFT25  021342  1862  2642#
MSFT26  021420  1893  2643#
MSFT27  021461  1937  2644#
MSFT3   020444  1106  2624#
MSFT4   020476  1152  2625#
MSFT5   020526  1178  2626#
MSFT6   020556  1210  2627#
MSFT7   020606  1263  2628#
MSG1    015422  2068  2547#
MSG10   016165   899  2559#
MSG10A  016025   889  2557#
MSG11   016205   916  2560#
MSG12   016225  1359  1636  1717  2561#
MSG13   016243  1369  1590  2562#
MSG14   016270  1376  1595  1733  2563#
MSG15   016315  1584  1618  1899  2564#
MSG15A  016336  1905  2565#
MSG15B  016375  1556  2566#
MSG16   016403  1476  1646  1687  2567#
MSG17   016423  1474  1660  1692  2568#
MSG2    015510  2549#
MSG20   016443  1467  2054  2569#
MSG21   016451  1470  2057  2570#
MSG22   016456  1085  1245  1478  2571#
MSG23   016466  1089  1249  1483  2572#
MSG24   016476  2270  2573#
MSG25   016512  1048  2574#
MSG26   016520  1057  2575#
MSG27   016526  1068  2576#
MSG28   016534  2577#
MSG29   016564  1114  2578#
MSG3    015563   848   853#  2550#
MSG30   016613  1118  2579#
MSG31   016643  1124  2580#
MSG32   016673  1163  1274  1301  2581#
MSG33   016711  1165  2582#
MSG34   016726  1167  2583#
MSG35   016744  1183  2584#
MSG36   016771  1187  2585#
MSG37   017020  1192  1200  2586#
MSG38   017057  1224  2587#
MSG39   017111  1243  2588#
MSG4    015723   854  2552#
MSG40   017131  1220  2589#
MSG41   017164   913  2590#
```

MSG42	017205	930	2591#											
MSG43	017226	933	2592#											
MSG44	017243	1746	2593#											
MSG45	017273	1748	2594#											
MSG46	017350	1406	1510	1683	1843	1872	2596#							
MSG47	017374	1432	1914	2597#										
MSG48	017421	1422	2598#											
MSG49	017446	1777	2599#											
MSG5	015746	863	2553#											
MSG50	017474	1782	2600#											
MSG51	017532	1816	2601#											
MSG52	017566	1823	2602#											
MSG53	017605	1958	2603#											
MSG54	017632	1967	2604#											
MSG56	017776	2064	2606#											
MSG57	020006	2104	2607#											
MSG6	015761	999	2554#											
MSG60	020022	1523	2608#											
MSG62	020071	937	2609#											
MSG63	020121	1854	2610#											
MSG64	020152	1883	2611#											
MSG65	020202	2319	2612#											
MSG66	020204	2328	2613#											
MSG67	020206	1965	2614#											
MSG69	020214	845	2615#											
MSG7	015777	2358	2555#											
MSG70	020262	2240	2616#											
MSG71	020310	2027	2617#											
MSG9	016003	1465	2556#											
MTINT	013566	668	873	2217#										
NONSTD	000740	758#												
NOST	013442	898	2189#											
NRZOF	000724	752#												
NXTDRV	002670	970#												
NXTSLV	002742	970#	998											
OCTP	014630	857	866	902	919	940	1002	1248	1252	1482	1487	2067	2273	2418#
OCTPE	014616	1088	1092	1560	2071	2073	2075	2077	2079	2085	2087	2089	2415#	2530
OCTPE1	014634	2419#												
OCTPG	015004	2426	2429	2436	2440	2445	2450	2452	2456#					
OCTPG0	015022	2457	2459	2462#										
OCTPG1	015026	2421	2463#											
OCTP0	014650	2417	2420	2423#										
OCTP1	014672	2424	2428#											
OCTP2	014700	2427	2430#											
OCTP3	014770	2422	2453#											
OFL	015046	2415*	2418*	2458	2462*	2468#								
OPDYX	000640	726#	1315*	1348*	1400*	1502*	1536*	1575*	1615*	1995				
PATRN	000720	750#	1351*	1676*	1709*	1835*	1864*	1939*	2113					
PCNTR	000730	754#	949*	1001	1012*	2176								
PEXFL	000702	743#												
PFLG	000644	728#												
PSW	000546	694#	2231*											
RCNT	000624	720#	1349*	1363*	1365*	1372*	1377*	1380*	1385*	1395*	1415*	1508*	1514*	1537*
		1542*	1609*	1625	1627*	1628	1648*	1656*						
RDATA	023256	1366	1444	1505	1538	1728	1848	1877	2117	2654#				
RDSW	000736	757#												

```
RDYDX   000636   725#  1314*  1347*  1401*  1501*  1520*  1535*  1574*  1614*  1774*  1987
REGS    000572   704#   856    858    875
RFD     000634   724#  1418*  1441*  1455
RHDF    000726   753#   939    941   1297
RHDR    000722   751#   887*  1031   1033*  2280
RHLDF   000604   712#   956*   962*  1150   1176   1208   1261   1281
RRD     000632   723#  1417*  1440*  1448
RTRN    000646   729#  2218
RWND    012442  1354   1394   1504   1517   1578   1612   1675   1708   1722   1727   1759   1834   1847
                1863   1876   1895   1910   1938   2003#
SAV1    000666   737#
SAV2    000670   738#
SAV3    000672   739#
SCHN    001710   841    842#
SCNT    000642   727#  1419*  1429*  1438*  1647*  1912*  1983
SCOLP   000674   740#  1049*  1058*  1069*  1107*  1169*  1179*  1211*  1264*  1284*  1308*  1327*  1361*
                1749*  1783*  1817*  1824*  1949*  2163   2167   2278*
SCOPE   013334  1096   1144   2158#  2279
SERFL   000712   747#  1408   1424   1434   1512   1620   1639   1653   1685   1845   1874   1902   1908
                1917   1922   2017*  2043*  2102
SERNUM  000562   700#
SLVN    000614   716#   918    920    927    970*  1792   2212
SN      000540   688#   935
SNPG    015234  2502   2505   2511   2513   2515#
SNPT    015156   936   2496#
START   001600   659    829#
STFLG   000704   744#   955*   984    989*
STMSK   000660   734#   976*  1403*  1500*  1524*  1583*  1589*  1617*  1637*  1651*  1778*  1898*  2033*
                2040*  2041
STSCD   003126   969    989#
STO     002124   878#   881
STOB    001764   854#  2282
ST1     002146   884#   886
ST1A    002166   889#   915   1034
ST2     002344   912    916#   932
ST3     002454   929    933#
ST4     002540   663    948#
SWR     000550   695#   834    838*   841*   967    981    986   1009   1076   1093   1131   1140   1237
                1253   1461   1488   1933   2044   2062   2090   2159   2172   2236   2238*  2247*  2263
                2274   2524   2529   2533
SWREG   000176   653#   838    841   2236   2247   2524
TAG     007206  1555*  1565*  1569#  2080
TC      000542   689#   927*   970*  1329*  1544*  1820   1975*  2055   2088   2212*
TEMPST  000732   755#
TEMP1   000652   731#  1552*  1553   1628*  1641*  2082   2305*  2314   2338*
TEMP2   000654   732#
TEMP3   000656   733#  2487   2490
TEND    003162   822    991    997#  1299   2200
TENDX   003260  1008   1010   1012#
TEX     014614  2379   2411#
TIB     000602   711#  2308   2312   2317   2322   2332   2335   2342*  2343   2369*  2370*  2371
TINER   014332  2334   2337   2348   2351   2358#
TKB     000554   697#  2225   2369   2397
TKS     000552   696#   954*  2366*  2367   2395
TLAST   001120   823#   990   2203*
TMCHK   013164  1586   1592   1597   1622   1655   1901   1907   1916   1921   2100#
```

```
TOB     000600  7100#  882   2371*  2377*  2378   2380   2384*  2397*  2391*  2410   2453*  2464*  2472*
                2474*  2477  2482*  2515*  2517#
TOG     014514  2372   2382  2385   2388   2392   2395#  2402   2407   2409   2454   2465   2518
TPB     000560   699#  2410* 2479*  2481*
TPS     000556   698#  2408  2475
TRAP    013756  1019   2262#
TRAPX   014040  2275   2277#
TRAPXX  014066  2281   2283#
TRAP1   014012  2266   2270#
TRAP2   014030  2264   2274#
TSCD    002554   852    954#  988    1013
TSCDA   003020   970    971#
TSCDO   003030   973#   985
TSCD1   003036   974#   996
TSCD2   003074   981#  1035  1101   1127   1162   1203   1234   1273   1300   1322   1341   1387   1495
                1567  1603  1667   1702   1752   1786   1826   1857   1886   1929   1969
TSCD3   003106   982    984#
TSRH    003022   888    972#
TSTTBL  000756   774#   972   994    2191*  2193*  2196*  2198*  2200*  2202*
TTIN    014352  2307   2366#
TTINT   013576   646   2225#
TTOUT   014414   846    849   855    864    890    900    914    917    931    934    938   1000   1081
                1084  1086  1090   1136   1139   1241   1244   1246   1250   1464   1466   1471   1477
                1479  1484  1557   1968   2050   2053   2058   2061   2065   2069   2241   2269   2271
                2320  2329  2359   2377#  2383   2393   2528   2532
TTR     014072   862    871   895    907    924    945   2303#  2537
UDES    001716   749#  1310* 1353*  1382   1384*  1393*  1468   1491   1493*  1506*  1539*  1577*  1598
                1600* 1611* 1663   1665*  1674*  1697   1699*  1714*  1761*  1796*  1840*  1849*  1869*
                1878* 1894* 1924   1926*  1944*  1975   2031
VECT    000570   703#   865   867    872
WC      000512   677#  1043  1546*  1976*  2072
WCNT    000622   719#  1312* 1331*  1356*  1398*  1414*  1518*  1580*  1629*  1680*  1713*  1724*  1730*
                1738* 1764* 1799*  1839*  1868*  1943*  1976
WDATA   021544  1332   1357  1396*  1547   1631   1678   1711   1762   1797   1837   1866   1941   2112
                2652#
$CNTG   021515  2645#
$CNTRL  001122   824#  2252* 2256*  2397*  2398*  2399   2401*  2403   2405*  2406
$DONE   003170   970    999#
$ENDAD  003226   642   1006#
$MNEW   021530  2531   2647#
$MSWR   021521  2527   2646#
$QUEST  021540  2648#
$SVPC   000764   642#
.       023260   640#   642#  645#   652#   659#   662#   667#   673#   826#   2651#  2653#
.RESTO  015400  2242   2538  2542#
.SAVE   015356  2239   2526  2541#
```

```
$CATCH     5590     640
$CHAIN     5590     841
$CHNMO     5590     970
$RESTO     5590    2542
$SAVE      5590    2541
.$ACT1     5590     642
.$EOP      5590    1006


. ABS.  023260      000

 ERRORS DETECTED:  0

 CZTECF,CZTECF/CRF=CZTEAE.SML/ML,CZTECF.P11
 RUN TIME: 3 5 .9 SECONDS
 RUN-TIME RATIO: 19/10=1.8
 CORE USED:  11K  (22 PAGES)
```