TSV05

TSV05 CTRL LT2
CVTSBC0

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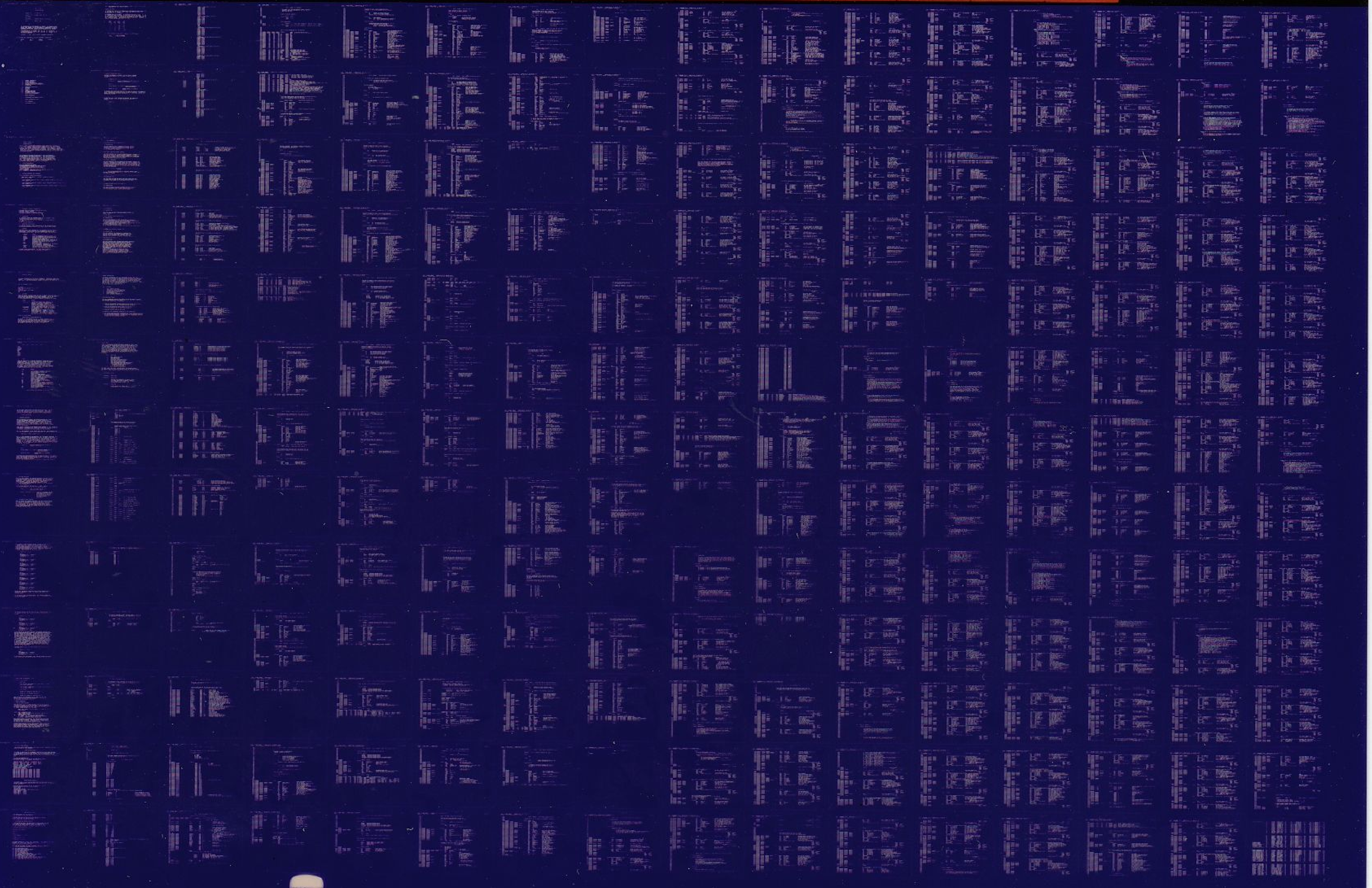

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IDENTIFICATION

PRODUCT ID: AC-T095C-MC

PRODUCT TITLE: CVTSBCO TSV05 CTRL LT2

DECO/DEPO: 1.0

DEPARTMENT: COMPUTER SPECIAL SYSTEMS/PPG

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1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

THIS IS A PDP-11/23 RESIDENT DIAGNOSTIC WHICH CHECKS THE FUNCTIONALITY OF A TSV05 MAGTAPE SUBSYSTEM WHILE CONNECTED TO A PDP-11//23 SYSTEM (Q-BUS). THE PROGRAM PROVIDES ERROR MESSAGES WHICH IDENTIFY FAILING FUNCTIONS THAT AID IN THE REPAIR OF THE DEVICE. THIS DIAGNOSTIC CONSIST OF TWELVE TEST. TEST 1-9 ARE EXECUTED IN SEQUENCE. TEST 10-12 ARE STAND ALONE TEST WHICH ALLOW THE OPERATOR TO PERFORM SPECIFIC FUNCTIONAL TEST ON SCOPE LOOPS ON CERTAIN FUNCTIONS.

THIS DIAGNOSTIC HAS BEEN WRITTEN FOR USE WITH THE DIAGNOSTIC RUNTIME SERVICES SOFTWARE (SUPERVISOR). THESE SERVICES PROVIDE THE INTERFACE TO THE OPERATOR AND TO THE SOFTWARE ENVIRONMENT. THIS PROGRAM CAN BE USED WITH XXDP+, ACT, APT, SLIDE AND PAPER TAPE. FOR A COMPLETE DESCRIPTION OF THE RUNTIME SERVICES, REFER TO THE XXDP+ USER'S MANUAL. THERE IS A BRIEF DESCRIPTION OF THE RUNTIME SERVICES IN SECTION 2 OF THIS DOCUMENT.

1.2 SYSTEM REQUIREMENTS

PDP-11/23 PROCESSOR AND MEMORY
CAUTION:DIAGNOSTIC REQUIRES 32K WORDS OF MEMORY
(28K USEABLE AND 4K RESERVED FOR I/O PAGE)
TSV05 MAGTAPE SUBSYSTEM (DRIVE AND CONTROLLER)
CONSOLE TERMINAL
PDP-11 DIAGNOSTIC SUPERVISOR (HSAAA.SYS VERSION 34 OR LATER)
PDP-11 DIAGNOSTIC LOADER/MONITOR (XXDP+)

1.3 RELATED DOCUMENTS AND STANDARDS

DIGITAL EQUIPMENT CORPORATION DOCUMENTS:

1. CHQUS XXDP+ USERS GUIDE; DOCUMENT NUMBER AC-F348E-MC
   DATE: 14 JULY 1980.

2. TSV05 TRANSPORT SUBSYSTEM USER'S GUIDE; DOCUMENT NUMBER EK-TSV05-UG-001
   DATE: AUGUST 1982

3. TSV05 TRANSPORT SUBSYSTEM TECHNICAL MANUAL; DOCUMENT NUMBER EK-TSV05-TM-001
   DATE: AUGUST 1982

4. TSV05 TRANSPORT SUBSYSTEM INSTALLATION MANUAL; DOCUMENT NUMBER EK-TSV05-IN-001
   DATE: AUGUST 1982

1.4 DIAGNOSTIC HIERARCY PREREQUISITES

FUNCTIONAL PDP-11/23 CENTRAL PROCESSOR AND MEMORY
FUNCTIONAL CONSOLE TERMINAL
FUNCTIONAL STANDALONE DIAGNOSTIC SUPERVISOR
FUNCTIONAL DIAGNOSTIC LOADER/MONITOR (XXDP+)

1.5 ASSUMPTIONS

ALL HARDWARE EXCEPT THE HARDWARE UNDER TEST IS ASSUMED TO WORK PROPERLY OR FALSE ERRORS CAN BE REPORTED.
THE TAPE BEING USED ON THE TS05 TRANSPORT IS A KNOWN GOOD REEL OF TAPE.
CVTSAA HAS RUN SUCESSFULLY.

2.0 OPERATING INSTRUCTIONS

THIS SECTION CONTAINS A BRIEF DESCRIPTION OF THE RUNTIME SERVICES. FOR DETAILED INFORMATION, REFER TO THE XXDP+ USER'S MANUAL (CHQUS).

2.1 COMMANDS

THERE ARE ELEVEN LEGAL COMMANDS FOR THE DIAGNOSTIC RUNTIME SERVICES (SUPERVISOR). THIS SECTION LISTS THE COMMANDS AND GIVES A VERY BRIEF DESCRIPTION OF THEM. THE XXDP+ USER'S MANUAL HAS MORE DETAILS.

COMMAND	EFFECT
START	START THE DIAGNOSTIC FROM AN INITIAL STATE
RESTART	START THE DIAGNOSTIC WITHOUT INITIALIZING
CONTINUE	CONTINUE AT TEST THAT WAS INTERRUPTED (AFTER ↑C)
PROCEED	CONTINUE FROM AN ERROR HALT
EXIT	RETURN TO XXDP+ MONITOR (XXDP+ OPERATION ONLY!)
ADD	ACTIVATE A UNIT FOR TESTING (ALL UNITS ARE CONSIDERED TO BE ACTIVE AT START TIME
DROP	DEACTIVATE A UNIT
PRINT	PRINT STATISTICAL INFORMATION (IF IMPLEMENTED BY THE DIAGNOSTIC - SECTION 4.0)
DISPLAY	TYPE A LIST OF ALL DEVICE INFORMATION
FLAGS	TYPE THE STATE OF ALL FLAGS (SEE SECTION 2.3)
ZFLAGS	CLEAR ALL FLAGS (SEE SECTION 2.3)

A COMMAND CAN BE RECOGNIZED BY THE FIRST THREE CHARACTERS. SO YOU MAY, FOR EXAMPLE, TYPE "STA" INSTEAD OF "START".

2.1.1 OPERATOR COMMANDS

THE TSV05 DIAGNOSTIC IS A PDP-11/23 DIAGNOSTIC SUPERVISOR COMPATIBLE PROGRAM. ALL LOADING AND RUNTIME INSTRUCTIONS CAN BE REFERENCED IN THE CHQUS XXDP+ USERS GUIDE,DOCUMENT NUMBER AC-F348E-MC. THE USER ENTRY IS IN QUOTES.

BOOT THE DIAGNOSTIC MEDIA

```
.R VTSB??
DIAG. RUN-TIME SERVICES REV D. APR 79
CVTSB-A-0
****TSV05 LOGIC DIAGNOSTIC****
UNIT IS TSV05
>DR
```

2.2 SWITCHES

THERE ARE SEVERAL SWITCHES WHICH ARE USED TO MODIFY SUPERVISOR OPERATION. THESE SWITCHES ARE APPENDED TO THE LEGAL COMMANDS. ALL OF THE LEGAL SWITCHES ARE TABULATED BELOW WITH A BRIEF DESCRIPTION OF EACH. IN THE DESCRIPTIONS BELOW, A DECIMAL NUMBER IS DESIGNATED BY "DDDDD".

```
SWITCH          EFFECT
------          ---------------------------------
/TESTS:LIST     EXECUTE ONLY THOSE TESTS SPECIFIED IN
                THE LIST.  LIST IS A STRING OF TEST
                NUMBERS, FOR EXAMPLE - /TESTS:1:5:7-10.
                THIS LIST WILL CAUSE TESTS 1,5,7,8,9,10 TO
                BE RUN.  ALL OTHER TESTS WILL NOT BE RUN.
/PASS:DDDDD     EXECUTE DDDDD PASSES (DDDDD = 1 TO 64000)
/FLAGS:FLGS     SET SPECIFIED FLAGS.  FLAGS ARE DESCRIBED
                IN SECTION 2.3.
/EOP:DDDDD      REPORT END OF PASS MESSAGE AFTER EVERY
                DDDDD PASSES ONLY.  (DDDDD = 1 TO 64000)
/UNITS:LIST     TEST/ADD/DROP ONLY THOSE UNITS SPECIFIED
                IN THE LIST.  LIST EXAMPLE - /UNITS:0:5:10-12
                USE UNITS 0,5,10,11,12 (UNIT NUMBERS = 0-63)
```

EXAMPLE OF SWITCH USAGE:

```
START/TESTS:1-5/PASS:1000/EOP:100
```

THE EFFECT OF THIS COMMAND WILL BE: 1) TESTS 1 THROUGH 5 WILL BE EXECUTED, 2) ALL UNITS WILL TESTED 1000 TIMES AND 3) THE END OF PASS MESSAGES WILL BE PRINTED AFTER EACH 100 PASSES ONLY. A SWITCH CAN BE RECOGNIZED BY THE FIRST THREE CHARACTERS. YOU MAY, FOR EXAMPLE, TYPE "/TES:1-5" INSTEAD OF "/TESTS:1-5".

BELOW IS A TABLE THAT SPECIFIES WHICH SWITCHES CAN BE USED BY EACH COMMAND.

	TESTS	PASS	FLAGS	EOP	UNITS
START	X	X	X	X	X
RESTART	X	X	X	X	X
CONTINUE		X	X	X	
PROCEED			X		
DROP					X
ADD					X
PRINT					
DISPLAY					X
FLAGS					
ZFLAGS					
EXIT					

2.3 FLAGS

FLAGS ARE USED TO SET UP CERTAIN OPERATIONAL PARAMETERS SUCH AS LOOPING ON ERROR. ALL FLAGS ARE CLEARED AT STARTUP AND REMAIN CLEARED UNTIL EXPLICITLY SET USING THE FLAGS SWITCH. FLAGS ARE ALSO CLEARED AFTER A START COMMAND UNLESS SET USING THE FLAG SWITCH. THE ZFLAGS COMMAND MAY ALSO BE USED TO CLEAR ALL FLAGS. WITH THE EXCEPTION OF THE START AND ZFLAGS COMMANDS, NO COMMANDS AFFECT THE STATE OF THE FLAGS; THEY REMAIN SET OR CLEARED AS SPECIFIED BY THE LAST FLAG SWITCH.

FLAG	EFFECT
HOE	HALT ON ERROR - CONTROL IS RETURNED TO RUNTIME SERVICES COMMAND MODE
LOE	LOOP ON ERROR
IER*	INHIBIT ALL ERROR REPORTS
IBR*	INHIBIT ALL ERROR REPORTS EXCEPT FIRST LEVEL (FIRST LEVEL CONTAINS ERROR TYPE, NUMBER, PC, TEST AND UNIT)
IXE*	INHIBIT EXTENDED ERROR REPORTS (THOSE CALLED BY PRINTX MACRO'S)
PRI	DIRECT MESSAGES TO LINE PRINTER
PNT	PRINT TEST NUMBER AS TEST EXECUTES
BOE	"BELL" ON ERROR
UAM	UNATTENDED MODE (NO MANUAL INTERVENTION)
ISR	INHIBIT STATISTICAL REPORTS (DOES NOT APPLY TO DIAGNOSTICS WHICH DO NOT SUPPORT STATISTICAL REPORTING)
IDR	INHIBIT PROGRAM DROPPING OF UNITS
ADR	EXECUTE AUTODROP CODE
LOT	LOOP ON TEST

*ERROR MESSAGES ARE DESCRIBED IN SECTION 3.1

SEE THE XXDP+ USER'S MANUAL FOR MORE DETAILS ON FLAGS. YOU MAY SPECIFY MORE THAN ONE FLAG WITH THE FLAG SWITCH. FOR EXAMPLE, TO CAUSE THE PROGRAM TO LOOP ON ERROR, INHIBIT ERROR REPORTS AND TYPE A "BELL" ON ERROR, YOU MAY USE THE FOLLOWING STRING:

```
        /FLAGS:LOE:IER:BOE
```

2.4 HARDWARE QUESTIONS

WHEN A DIAGNOSTIC IS STARTED, THE RUNTIME SERVICES WILL PROMPT THE USER FOR HARDWARE INFORMATION BY TYPING "CHANGE HW (L) ?" YOU MUST ANSWER "Y" AFTER A START COMMAND UNLESS THE HARDWARE INFORMATION HAS BEEN "PRELOADED" USING THE SETUP UTILITY (SEE CHAPTER 14 OF THE XXDP+ USER'S MANUAL). WHEN YOU ANSWER THIS QUESTION WITH A "Y", THE RUNTIME SERVICES WILL ASK FOR THE NUMBER OF UNITS (IN DECIMAL).

AFTER INITIAL STARTING OF THE PROGRAM (START COMMAND TO THE DIAGNOSTIC SUPERVISOR), THE PROGRAM WILL ISSUE THE "CHANGE HW?" QUESTION TO ASK IF THE HARDWARE PARAMETERS ARE TO BE CHANGED (BY THE OPERATOR).

ON A "N" (NO) RESPONSE TO THE "CHANGE HW?" QUESTION, THE DIAGNOSTIC WILL RUN USING THE DEFAULT VALUES FOR ALL QUESTIONS. THE DEFAULT ADDRESS AND VECTOR ARE:

```
        TSBA/TSDB = 172520, VECTOR = 224
```

ON A "Y" (YES) RESPONSE TO THE QUESTION, THE FOLLOWING QUESTIONS WILL THEN BE ASKED TO ALLOW THE OPERATOR TO SELECT THE UNITS TO BE TESTED. A VALUE, IF PRESENT, LOCATED TO THE LEFT OF THE QUESTION MARK IS THE DEFAULT VALUE THAT WILL BE TAKEN IF ONLY A CARRIAGE RETURN IS TYPED AS A RESPONSE. A "(D)" IN A QUESTION INDICATES THAT A DECIMAL NUMBER IS REQUIRED AS A RESPONSE. AN "(O)" INDICATES AN OCTAL NUMBER IS BEING SOLICITED. AN "(L)" INDICATES THAT A LOGICAL RESPONSE IS TO BE MADE: "Y" FOR YES, "N" FOR NO.

```
        # UNITS (D) ?  <ENTER THE NUMBER OF M7196 CONTROLLERS
                        PRESENT TO BE TESTED>

        UNIT 0

        DEVICE ADDRESS  (O) 172520 ? <ENTER THE ADDRESS OF THE
                                      TSBA/TSDB REGISTER>

        VECTOR (O) 224 ?          <ENTER ADDRESS OF INTERRUPT
                                   VECTOR>
```

THE ADDRESS AND VECTOR QUESTIONS WILL BE ASKED FOR EACH OF THE NUMBER OF UNITS (CONTROLLERS) SPECIFIED IN THE "# UNITS?" QUESTION. LOGICAL UNIT NUMBERS ARE ASSIGNED IN ORDER, BEGINNING AT 0. UP TO FOUR UNITS CAN BE SELECTED FOR TESTING AS FOLLOWS:
UP TO 4 TSV05 CONTROLLERS PER 11/23 AND UP TO 2 DRIVES PER CONTROLLER

2.5 SOFTWARE QUESTIONS

AFTER YOU HAVE ANSWERED THE HARDWARE QUESTIONS OR AFTER A RESTART OR CONTINUE COMMAND, THE RUNTIME SERVICES WILL ASK FOR SOFTWARE PARAMETERS. THESE PARAMETERS WILL GOVERN SOME DIAGNOSTIC SPECIFIC OPERATION MODES. YOU WILL BE PROMPTED BY "CHANGE SW (L) ?" IF YOU WISH TO CHANGE ANY PARAMETERS, ANSWER BY TYPING "Y". THE SOFTWARE QUESTIONS AND THE DEFAULT VALUES ARE DESCRIBED IN THE NEXT PARAGRAPH(S).

THE FOLLOWING QUESTIONS ARE ASKED ON A START, RESTART, OR CONTINUE. THEY ALLOW FLEXIBILITY IN THE WAY THE PROGRAM BEHAVES.

```
        CHANGE SW (L) ? <TYPE Y TO CAUSE THE FOLLOWING
                         QUESTIONS TO BE ASKED>

        INHIBIT ITERATIONS (L) N ?  <TYPE "Y" TO PREVENT MULTIPLE
                                     ITERATIONS OF CERTAIN TESTS.
                                     THIS CAUSES EACH TEST PASS TO
                                     RUN AS QUICKLY AS POSSIBLE.
                                     ONLY QUICK-RUNNING LOGIC
                                     TESTS USE MULTIPLE
                                     ITERATIONS.>
```

2.6 EXTENDED P-TABLE DIALOGUE

WHEN YOU ANSWER THE HARDWARE QUESTIONS, YOU ARE BUILDING ENTRIES IN A TABLE THAT DESCRIBES THE DEVICES UNDER TEST. THE SIMPLEST WAY TO BUILD THIS TABLE IS TO ANSWER ALL QUESTIONS FOR EACH UNIT TO BE TESTED. IF YOU HAVE A MULTIPLEXED DEVICE SUCH AS A MASS STORAGE CONTROLLER WITH SEVERAL DRIVES OR A COMMUNICATION DEVICE WITH SEVERAL LINES, THIS BECOMES TEDIOUS SINCE MOST OF THE ANSWERS ARE REPETITIOUS.

TO ILLUSTRATE A MORE EFFICIENT METHOD, SUPPOSE YOU ARE TESTING A DEVICE, THE XY11. SUPPOSE THIS DEVICE CONSISTS OF A CONTROL MODULE WITH EIGHT UNITS (SUB-DEVICES) ATTACHED TO IT. THESE UNITS ARE DESCRIBED BY THE OCTAL NUMBERS 0 THROUGH 7. THERE IS ONE HARDWARE PARAMETER THAT CAN VARY AMONG UNITS CALLED THE Q-FACTOR. THIS Q-FACTOR MAY BE 0 OR 1. BELOW IS A SIMPLE WAY TO BUILD A TABLE FOR ONE XY11 WITH EIGHT UNITS.

```
# UNITS (D) ?  8<CR>

UNIT 1
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  0<CR>
Q-FACTOR (O) 0 ?  1<CR>

UNIT 2
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  1<CR>
Q-FACTOR (O) 1 ?  0<CR>

UNIT 3
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  2<CR>
Q-FACTOR (O) 0 ?  <CR>

UNIT 4
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  3<CR>
Q-FACTOR (O) 0 ?  <CR>

UNIT 5
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  4<CR>
Q-FACTOR (O) 0 ?  <CR>

UNIT 6
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  5<CR>
Q-FACTOR (O) 0 ?  <CR>

UNIT 7
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  6<CR>
Q-FACTOR (O) 0 ?  1<CR>

UNIT 8
CSR ADDRESS (O)  160000<CR>
SUB-DEVICE # (O) ?  7<CR>
Q-FACTOR (O) 1 ?  <CR>
```

NOTICE THAT THE DEFAULT VALUE FOR THE Q-FACTOR CHANGES WHEN A NON-DEFAULT RESPONSE IS GIVEN. BE CAREFUL WHEN SPECIFYING MULTIPLE UNITS!

AS YOU CAN SEE FROM THE ABOVE EXAMPLE, THE HARDWARE PARAMETERS DO NOT VARY SIGNIFICANTLY FROM UNIT TO UNIT. THE PROCEDURE SHOWN IS NOT VERY EFFICIENT.

THE RUNTIME SERVICES CAN TAKE MULTIPLE UNIT SPECIFICATIONS HOWEVER. LET'S BUILD THE SAME TABLE USING THE MULTIPLE SPECIFICATION FEATURE.

```
        # UNITS (D) ?  8<CR>

        UNIT 1
        CSR ADDRESS (O) ?  160000<CR>
        SUB-DEVICE # (O) ?  0,1<CR>
        Q-FACTOR (O) 0 ?  1,0<CR>

        UNIT 3
        CSR ADDRESS (O) ?  160000<CR>
        SUB-DEVICE # (O) ?  2-5<CR>
        Q-FACTOR (O) 0 ?  0<CR>

        UNIT 7
        CSR ADDRESS (O) ?  160000<CR>
        SUB-DEVICE # (O) ?  6,7<CR>
        Q-FACTOR (O) 0 ?  1<CR>
```

AS YOU CAN SEE IN THE ABOVE DIALOGUE, THE RUNTIME SERVICES WILL BUILD AS MANY ENTRIES AS IT CAN WITH THE INFORMATION GIVEN IN ANY ONE PASS THROUGH THE QUESTIONS. IN THE FIRST PASS, TWO ENTRIES ARE BUILT SINCE TWO SUB-DEVICES AND Q-FACTORS WERE SPECIFIED. THE SERVICES ASSUME THAT THE CSR ADDRESS IS 160000 FOR BOTH SINCE IT WAS SPECIFIED ONLY ONCE. IN THE SECOND PASS, FOUR ENTRIES WERE BUILT. THIS IS BECAUSE FOUR SUB-DEVICES WERE SPECIFIED. THE "-" CONSTRUCT TELLS THE RUNTIME SERVICES TO INCREMENT THE DATA FROM THE FIRST NUMBER TO THE SECOND. IN THIS CASE, SUB-DEVICES 2, 3, 4 AND 5 WERE SPECIFIED. (IF THE SUB-DEVICE WERE SPECIFIED BY ADDRESSES, THE INCREMENT WOULD BE BY 2 SINCE ADDRESSES MUST BE ON AN EVEN BOUNDARY.) THE CSR ADDRESSES AND Q-FACTORS FOR THE FOUR ENTRIES ARE ASSUMED TO BE 160000 AND 0 RESPECTIVELY SINCE THEY WERE ONLY SPECIFIED ONCE. THE LAST TWO UNITS ARE SPECIFIED IN THE THIRD PASS.

THE WHOLE PROCESS COULD HAVE BEEN ACCOMPLISHED IN ONE PASS AS SHOWN BELOW.

```
        # UNITS (D) ?  8<CR>

        UNIT 1
        CSR ADDRESS (O) ?  160000<CR>
        SUB-DEVICE # (O) ?  0-7<CR>
        Q-FACTOR (O) 0 ?  0,1,0,,,,1,1<CR>
```

AS YOU CAN SEE FROM THIS EXAMPLE, NULL REPLIES (COMMAS ENCLOSING A NULL FIELD) TELL THE RUNTIME SERVICES TO REPEAT THE LAST REPLY.

2.7 QUICK START-UP PROCEDURE (XXDP+)

TO START-UP THIS PROGRAM:

1. BOOT XXDP+
2. GIVE THE DATE AND ANSWER THE LSI AND 50HZ (IF THERE IS A CLOCK) QUESTIONS
3. TYPE "R NAME", WHERE NAME IS THE NAME OF THE BIN OR BIC FILE FOR THIS PROGRAM
4. TYPE "START"
5. ANSWER THE "CHANGE HW" QUESTION WITH "Y"
6. ANSWER ALL THE HARDWARE QUESTIONS
7. ANSWER THE "CHANGE SW" QUESTION WITH "N"

WHEN YOU FOLLOW THIS PROCEDURE YOU WILL BE USING ONLY THE DEFAULTS FOR FLAGS AND SOFTWARE PARAMETERS. THESE DEFAULTS ARE DESCRIBED IN SECTIONS 2.3 AND 2.5.

3.0 ERROR INFORMATION

3.1 TYPES OF ERROR MESSAGES

THERE ARE THREE LEVELS OF ERROR MESSAGES THAT MAY BE ISSUED BY A DIAGNOSTIC: GENERAL, BASIC AND EXTENDED. GENERAL ERROR MESSAGES ARE ALWAYS PRINTED UNLESS THE "IER" FLAG IS SET (SECTION 2.3). THE GENERAL ERROR MESSAGE IS OF THE FORM:

```
        NAME  TYPE  NUMBER  ON UNIT NUMBER  TST NUMBER PC:XXXXXX
        ERROR MESSAGE

,WHERE; NAME = DIAGNOSTIC NAME
        TYPE = ERROR TYPE (SYS FATAL, DEV FATAL, HARD OR SOFT)
        NUMBER = ERROR NUMBER
        UNIT NUMBER = 0 - N (N IS LAST UNIT IN PTABLE)
        TST NUMBER = TEST AND SUBTEST WHERE ERROR OCCURRED
        PC:XXXXXX = ADDRESS OF ERROR MESSAGE CALL
```

BASIC EPROR MESSAGES ARE MESSAGES THAT CONTAIN SOME ADDITIONAL INFORMATION ABOUT THE ERROR. THESE ARE ALWAYS PRINTED UNLESS THE "IER" OR "IBR" FLAGS ARE SET (SECTION 2.3). THESE MESSAGES ARE PRINTED AFTER THE ASSOCIATED GENERAL MESSAGE.

EXTENDED ERROR MESSAGES CONTAIN SUPPLEMENTARY ERROR INFORMATION SUCH AS REGISTER CONTENTS OR GOOD/BAD DATA. THESE ARE ALWAYS PRINTED UNLESS THE "IER", "IBR" OR "IXR" FLAGS ARE SET (SECTION 2.3). THESE MESSAGES ARE PRINTED AFTER THE ASSOCIATED GENERAL ERROR MESSAGE AND ANY ASSOCIATED BASIC ERROR MESSAGES.

3.2 SPECIFIC ERROR MESSAGES

BELOW ARE SAMPLE ERROR MESSAGES. EACH ERROR MESSAGE REPRESENTS DIFFERENT TYPES OF ERRORS DETECTED BY THIS DIAGNOSTIC.

ERROR MESSAGE EXAMPLE 1

THIS ERROR IS INDICATIVE OF AN INCORRECT REGISTER OR STATUS WORD RETURNED TO THE DIAGNOSTIC. THE FIRST PART DEFINES THE TEST FUNCTION AND UNIT THAT FAILED. THE SECOND PART PRIOVIDES THE REGISTER BITS AND THEIR MNEMONICS FOR THE INCORRECT REGISTER OR STATUS WORDS. THE THIRD PART IS THE EXPECTED AND RECEIVED DATA.

```
TST: 016 FIFO EXERCISER TEST
CVTSB HRD ERR 01610 ON UNIT 00 TST 016 SUB 002 PC: 040624
FIFO STATUS (IN WORD  9) INCORRECT AFTER WRITE FIFO

 TAPE BUS SIGNALS IN WORD #8: - DESIGNATOR <BIT #>
PARERR<15>  IEOT  <12>  IFMK  <9>  IRDY<6>  IRWD<2>
IRESV2<14>  IIDENT<11>  IMER  <8>  IONL<5>  IFBY<1>
IRESV1<13>  ICER  <10>  ISPEED<7>  ILDP<4>  IFPT<0>
 TAPE BUS SIGINALS IN WORD #9:
DATMIS<7>  ILW<6>  OUTRDY<5>  INRDY<4>
 MESSAGE BUFFER ADDRESS = 047352
 MESSAGE BUFFER CONTENTS:
WORD #0 EXPD: 100020  RECV: 100020  XOR: 000000
WORD #1 EXPD: 000012  RECV: 000012  XOR: 000000
WORD #2 EXPD: 000000  RECV: 000000  XOR: 000000
WORD #3 EXPD: 000010  RECV: 000010  XOR: 000000
WORD #4 EXPD: 000000  RECV: 000000  XOR: 000000
WORD #5 EXPD: 000000  RECV: 000000  XOR: 000000
WORD #6 EXPD: 000000  RECV: 000000  XOR: 000000
WORD #7 EXPD: 000000  RECV: 000000  XOR: 000000
WORD #8 EXPD: 070217  RECV: 070217  XOR: 000000
WORD #9 EXPD: 000074  RECV: 000034  XOR: 000040
```

ERROR MESSAGE EXAMPLE 2

THIS ERROR SHOWS A FATAL FUNCTION ERROR FROM THE TAPE DRIVE.IN THIS INSTANCE A UNRECOVERABLE ERROR OCCURED WHICH INDICATES THAT THE CONTROLLER MAY BE DEFECTIVE.

```
CVTSB HRD ERR 00159 ON UNIT 00 TST 001 SUB 005 PC: 026202
TSSR NOT CORRECT AFTER SPACE RECORDS COMMAND
 TSSR = 100214
 TSSR BITS SET: SC.SSR
 TERMINATION CLASS CODE = UNRECOVERABLE ERROR
 PACKET ADDRESS = 026420
 PACKET WORD #  = 140010
 PACKET WORD #  = 000010
 PACKET WORD #  = 000000
 PACKET WORD #  = 000024
```

ERROR MESSAGE EXAMPLE 3

THIS ERROR SHOWS THAT THE MOTION BIT DID NOT GET SET WHILE DOING A REWING WITH EXTENDED FEATURES MODE ENABLED.

```
CVTSB HRD ERR 00121 ON UNIT 00 TST 001 SUB 002 PC: 023306
MOT BIT (XSTO) NOT SET DURING REWIND (EXTENDED FEATURES MODE)
 EXPD: 000312 RECV: 000112 XOR: 000200
```

4.0 PERFORMANCE AND PROGRESS REPORTS

AT THE END OF EACH PASS, THE PASS COUNT IS GIVEN ALONG WITH THE TOTAL NUMBER OF ERRORS REPORTED SINCE THE DIAGNOSTIC WAS STARTED. THE "EOP" SWITCH CAN BE USED TO CONTROL HOW OFTEN THE END OF PASS MESSAGE IS PRINTED. SECTION 2.2 DESCRIBES SWITCHES.

SUCCESSFUL RUN EXAMPLE (PDP-11/23)

```
 DR>STA/FLA:PNT:HOE:UAM

 UNITS (D) ?  1

 UNIT 0

 DEVICE ADDRESS  (O) 172520 ? <CR>

 VECTOR (O) 224 ? <CR>

 CHANGE SW (L) ? N<CR>
```

THE ABOVE COMMAND WILL START THE DIAGNOSTIC. THE COMMAND HAS THREE SWITCHES ON WHICH ARE "PRINT EACH TEST NBR AS EXECUTED" , "HALT ON ERROR" AND "RUN IN UNATTENDED MODE".

NOTE:THE UAM FLAG SHOULD BE USED TO PREVENT TEST 10-12 FROM BEING
     EXECUTED UNLESS THE OPERATOR WANTS THESE SPECIFIC TEST.

```
TST: 001 INITIALIZE #3 TEST
TST: 002 BASIC WRITE SUBSYSTEM MEMORY TEST
TST: 003 DMA MEMORY ADDRESSING TEST
TST: 004 RAM EXERCISER TEST
TST: 005 FIFO EXERCISER TEST
TST: 006 STATIC TRANSPORT BUS CHECK
TST: 007 TRANSPORT BUS INTERFACE CHECK VIA LOOPBACK TEST
TST: 008 READ/WRITE DATA PARITY CHECK TEST
TST: 009 MISCELLANEOUS LOGIC CHECKS TEST
TST: 010 STAND-ALONE MANUAL INTERVENTION NOT EXECUTED TEST
TST: 011 STAND-ALONE CONFIGURATION TYPEOUT NOT EXECUTED TEST
TST: 012 STAND-ALONE SCOPE LOOPS NOT EXECUTED TEST

0 ERRORS
```

NOTE: THE DIAGNOSTIC WILL RUN CONTINUOUSLY UNLESS A PASS LIMIT HAS BEEN SPECIFIED WITH THE "/PASS:" SWITCH.

PROGRAM RUN TIMES

THE AVERAGE RUN TIMES OF THE PROGRAM ARE LISTED BELOW.THESE FIGURES ARE TO BE USED AS A GUIDE. THE TIMING WAS DONE ON A PDP-11/23 PROCESSOR WITH A LA-34 CONSOLE.

THE PROGRAM RUNS IN TWO MODES; NO ITERATIONS AND DEFAULT MODE. IN THE NO ITERATIONS MODE, EACH TEST IS RUN ONCE, WITH NO ITERATIONS. IN THE DEFAULT MODE EACH TEST IS REPEATED BY THE NUMBER OF TIMES INDICATED BY THE ITERATION COUNT. NO ITERATIONS MODE IS SELECTED BY ANSWERING THE INHIBIT ITERATIONS QUESTION WITH A "Y" (YES).

TEST	N/I	ITER	DEF
NUMBER	SECS.	SECS	SECS.
1	15	50	35
2	1	6	5
3	1	1	0
4	110	540	430
5	1	10	9
6	10	120	110
7	1	3	2
8	15	15	12
9	17	17	13

THE TIMES REQUIRED TO RUN TESTS 1 THROUGH 9 IN ONE COMMAND:

```
Q.V.       2 MINS 19 SECONDS
DEFAULT   11 MINS 35 SECONDS
```

5.0 DEVICE INFORMATION TABLES

WHENEVER THE PROGRAM IS STARTED, VIA THE STA(RT) COMMAND, THE SUPERVISOR REQUESTS THE FOLLOWING P-TABLES PARAMETER CHANGES:

```
        CHANGE HW (L) ?

        # UNITS (D) ?  <ENTER THE NUMBER OF M7196 CONTROLLERS
                        PRESENT TO BE TESTED>

        UNIT 0

        DEVICE ADDRESS  (O) 172520 ? <ENTER THE ADDRESS OF THE
                                      TSBA/TSDB REGISTER>

        VECTOR (O) 224 ?          <ENTER ADDRESS OF INTERRUPT
                                   VECTOR>
```

THE ADDRESS AND VECTOR QUESTIONS WILL BE ASKED FOR EACH OF THE NUMBER OF UNITS (CONTROLLERS) SPECIFIED IN THE "# UNITS?" QUESTION. LOGICAL UNIT NUMBERS ARE ASSIGNED IN ORDER, BEGINNING AT 0. UP TO FOUR UNITS CAN BE SELECTED FOR TESTING.

IN ADDITION, ON A START, RESTART OR CONTINUE THE SUPERVISOR REQUESTS CHANGES TO THE SOFTWARE OPERATING PARAMETERS, AS FOLLOWS:

```
        CHANGE SW (L) ?
```

6.0 TEST SUMMARIES

TEST 1: INITIALIZE AFTER WRITE CHARACTERISTICS

TEST DESCRIPTION:

THIS TEST VERIFIES THAT A HARDWARE INITIALIZE COMMAND INVOKED AFTER A WRITE CHARACTERISTICS COMMAND SETS UP THE COMMAND, MESSAGE AND CHARACTERISTIC IMAGE BLOCKS IN THE CONTROLLER RAM CORRECTLY.

TEST 2: BASIC WRITE SUBSYSTEM MEMORY COMMAND

THIS TEST VERIFIES THAT THE WRITE SUBSYSTEM MEMORY COMMAND WITH A BSELO SELECT CODE OF 0 (NO-OP) EXECUTES CORRECTLY. IT ALSO VERIFIES THAT A WRITE SUBSYSTEM MEMORY COMMAND WITH A NON-ZERO MODE FIELD IS REJECTED. THE TEST FURTHER VERIFIES MICROPROGRAM COMMAND DECODING AND HANDLING SEQUENCES.

TEST 3: DMA MEMORY ADDRESSING

THIS TEST VERIFIES THAT THE CONTROLLER CAN PROPERLY ADDRESS AND ACCESS ALL AVAILABLE CPU MEMORY (OTHER THAN THAT OCCUPIED BY THE DIAGNOSTIC AND DIAGNOSTIC SUPERVISOR CODE) FOR BOTH READING (DATI) AND WRITING (DATO). VERIFIED ARE THE LSI-11 BUS DRIVERS FOR ALL AVAILABLE ADDRESS LINES. UP TO THIS POINT ONLY 16 BITS HAVE BEEN USED FOR DMA TRANSFERS.

****

CAUTION

THE LSI BUS DRIVERS FOR ALL AVAILABLE ADDRESS LINES ARE ONLY CHECKED WHEN RUNNING ON A 11/23B SYSTEM WITH MORE THAN 128K WORDS OF MEMORY!

****

TEST 4: RAM EXERCISER TEST

THIS TEST USES THE READ AND WRITE RAM (BOTH SINGLE AND 256 LOCATIONS) SELECT CODES OF THE WRITE SUBSYSTEM MEMORY COMMAND TO EXERCISE THE CONTROLLER'S RAM MEMORY AND DMA LOGIC

TEST 5: EXTENDED FEATURES SWITCH AND TIMERS A,B

TEST DESCRIPTION:

THIS TEST VERIFIES THE INVERT EXTENDED FEATURES FUNCTION CAN LOGICALLY INVERT THE EXTENDED FEATURES SWITCH AND THAT THE INTERNAL TIMERS A AND B OPERATE CORRECTLY.

```
TEST  6: FIFO EXERCISER

        TEST DESCRIPTION:

        THIS TEST USES THE WRITE SUBSYSTEM MEMORY COMMAND TO
        VERIFY THE CONTROLLER'S FIFO AND ASSOCIATED STATUS AND
        CONTROL LOGIC.

TEST  7: STATIC TRANSPORT BUS INTERFACE TEST

        TEST DESCRIPTION:

        WRITE TO TSSR REGISTER TO SOFT INITIALIZE THE CONTROLLER
        DO WRITE CHARACTERISTICS TO CHECK FOR EXTENDED FEATURES SWITCH
        IF EXTENDED FEATURES HARDWARE SWITCH CLEAR THEN:
          DO WRITE SUBSYSTEM WRITE MISCELLANEOUS TO SET EXTENDED FEATURES.
        DO WRITE CHARACTERISTICS TO SELECT RESERVED UNIT 7
        DO A WRITE SUBSYSTEM READ STATUS
        IF ANY TRANSPORT INTERFACE SIGNALS ARE ASSERTED THEN PRINT ERROR


TEST  8: TRANSPORT BUS INTERFACE LOOPBACK TEST

        TEST DESCRIPTION:

        THIS TEST VERIFIES THE CONTROLLER'S TRANSPORT BUS
        DRIVERS, RECEIVERS, AND SIGNAL LOOPBACK LOGIC. NOTE
        THAT THE STATIC TRANSPORT BUS TEST MUST HAVE RUN
        CORRECTLY FOR THIS TEST TO PROVIDE MEANINGFUL RESULTS.

TEST  9: READ/WRITE DATA PARITY TEST

        TEST DESCRIPTION:

        THIS TEST VERIFIES THAT THE WRITE DATA PARITY GENERATOR
        AND THE READ DATA PARITY CHECKER OPERATE PROPERLY. THE
        TRANSPORT BUS SIGNAL LOOPBACK MODE IS ENABLED AND A
        SET WRONG PARITY FUNCTION IS EXECUTED. THEN VARIOUS
        WRITE SUBSYSTEM MEMORY FUNCTIONS ARE PERFORMED TO
        WRITE DATA TO AND FROM THE FIFO IN LOOPBACK MODE.
        THE PROGRAM THEN CHECKS TO INSURE A READ DATA PARITY
        ERROR OCCURRED.
        A RESET FIFO IS DONE AND THE READ DATA PARITY
        ERROR BIT IS AGAIN TESTED TO INSURE IT CLEARED.
        FINALLY A CLEAR WRONG PARITY FUNCTION IS DONE
        AND IT IS VERIFIED THE DATA WORD CAN PASS IN LOOPBACK
        MODE WITHOUT SETTING READ DATA PARITY ERROR.
```

TEST 10: MANUAL INTERVENTION

THE MANUAL INTERVENTION TEST IS A STANDALONE ROUTINE (NOT REALLY A "TEST") THAT ALLOWS THE OPERATOR TO CHECK OUT VARIOUS ELEMENTS AND FUNCTIONS OF THE SUBSYSTEM THAT CANNOT BE MANIPULATED BY THE PROGRAM ALONE. WHEN THIS ROUTINE IS STARTED, IT FIRST PRINTS OUT A MENU OF SELECTABLE SUBTESTS AND THEN WAITS FOR THE OPERATOR TO TYPE IN A SELECTION CODE. THE ONLY WAYS TO EXIT THIS ROUTINE AND RETURN TO THE DIAGNOSTIC SUPERVISOR ARE BY TYPING <CTRL-C> OR SELECTING CODE 6.
SELECTION CODES AND SUBROUTINES ARE:

CODE	ROUTINE
0	HELP. PRINTS THIS MENU.
1	TURN ON ALL M7196 LED INDICATORS
2	TURN OFF ALL M7196 LED INDICATORS
3	OFFLINE/ONLINE ATTENTION TEST
4	WRITE-PROTECT TEST
5	PRINT EXTENDED TRANSPORT STATUS
6	EXIT (RETURN TO SUPERVISOR)

TEST 11: CONFIGURATION TYPEOUT

THIS IS A STANDALONE ROUTINE THAT PRINTS OUT ON THE CONSOLE TERMINAL THE CONFIGURATION OF THE M7196 MODULE AND TSV05 SUBSYSTEM. SPECIFICALLY, THE FOLLOWING INFORMATION IS PRESENTED:

1.0 STATE OF THE EXTENDED FEATURES SWITCH ON THE M7196: ON (EXTENDED FEATURES ENABLED) OR OFF (EXTENDED FEATURES DISABLED).

2.0 STATE OF THE BUFFERING ENABLE SWITCH ON THE M7196: ON (BUFFERING ENABLED) OR OFF (BUFFERING DISABLED).

3.0 MICROCODE REVSION LEVEL OF THE M7196.

4.0 NUMBER OF TAPE TRANSPORTS CONNECTED TO THE CONTROLLER.

5.0 UNIT SELECT CODE AND STATE (ONLINE/OFFLINE, WRITE ENABLED/PROTECTED) OF EACH CONNECTED TRANSPORT. IN ADDITION, THE PROGRAM WILL INDICATE, FOR EACH ON-LINE TRANSPORT, WHETHER OR NOT IT IS EQUIPPED WITH THE EXTENDED TAPE STATUS READOUT FEATURE.

TEST 12: SCOPE LOOPS

THIS IS A STANDALONE ROUTINE PROVIDING A NUMBER OF TIGHT "SCOPE LOOPS" USEFUL FOR DEBUGGING BASIC REGISTER ACCESS PROBLEMS WITH THE M7196 MODULE. THESE SCOPE LOOPS CAN BE USED WHEN THE NORMAL "LOOP ON ERROR" OR "LOOP ON TEST (SUBTEST)" FACILITIES DON'T SEEM TO ALLOW THE OPERATOR TO ZERO IN A PROBLEM IN THE EARLY TESTS (I.E, THE HARDWARE MAY NOT BE RESPONDING TO A REGISTER ACCESS, CAUSING A BUS ERROR TRAP, EVEN THOUGH THE DEVICE ADDRESS SELECTED BY THE PROGRAM MATCHES THE CONFIGURATION SET UP IN THE HARDWARE DIP SWITCHES). THE FOLLOWING MENU OF SCOPE LOOPS ARE AVAILABLE:

CODE	SCOPE LOOP
0	HELP. PRINT THIS MENU.
1	TSBA READ ACCESS
2	TSSR READ ACCESS
3	INITIALIZE (TSSR WRITE ACCESS)
4	TSDB HIGH BYTE WRITE ACCESS
5	TSDB LOW BYTE WRITE ACCESS
6	TSDB MAINTENANCE-MODE WORD WRITE ACCESS
7	TSDBX (TSSR HIGH BYTE) WRITE ACCESS (EXTENDED FEATURES SWITCH MUST BE ON TO USE SELECTION CODE 7)
8	EXIT (RETURN TO SUPERVISOR)

FOR SCOPE LOOPS THAT WRITE INTO REGISTERS, THE PROGRAM PROMPTS THE OPERATOR FOR THE DATA TO BE WRITTEN,LIMITS ON THE DATA PATTENS ARE 0-377, TYPING <RETURN> CAUSES AN EXIT FROM THE SCOPE LOOP BACK TO MENU LEVEL.

7.0 MAINTENANCE HISTORY

REVISION A - MARCH 1982

REVISION B - APRIL 1983

MODIFIED THE DIAGNOSTIC TO HANDLE 11/23A'S WITH MORE THAN 256KB OF MEMORY. CHANGED TEST 3 SUBTEST 3 SO IT WON'T TRY TO CREATE NON-EXISTANT MEMORY ADDRESS (NXM).

REVISION C - JUNE 1984

MINOR CHANGES FOR "ORION" CPU
ELIMINATED CPU TYPE IDENTIFICATION MESSAGE.

```
                                .TITLE  TSV2 - PROGRAM HEADER
                                .SBTTL  PROGRAM HEADER

                                .MCALL  SVC
000000                          SVC                             ; INITIALIZE SUPERVISOR MACROS
                                .ENABLE LC
                                .NLIST  BEX,CND
000000                          .ENABL  ABS,AMA
        002000                  .=2000
002000                          BGNMOD  TSV2
002000                  TSV2::

                        ;++
                        ; THE PROGRAM HEADER IS THE INTERFACE BETWEEN
                        ; THE DIAGNOSTIC PROGRAM AND THE SUPERVISOR.
                        ;--

002000                          POINTER BGNSW,BGNSFT,BGNAU,BGNDU,BGNRPT
002000                          HEADER  CVTSB,C,0,655.,0
002000                  L$NAME::                ;DIAGNOSTIC NAME
002000     103                  .ASCII /C/
002001     126                  .ASCII /V/
002002     124                  .ASCII /T/
002003     123                  .ASCII /S/
002004     102                  .ASCII /B/
002005     000                  .BYTE   0
002006     000                  .BYTE   0
002007     000                  .BYTE   0
002010                  L$REV::                 ;REVISION LEVEL
002010     103                  .ASCII  /C/
002011                  L$DEPO::                ;0
002011     060                  .ASCII  /0/
002012                  L$UNIT::                ;NUMBER OF UNITS
002012  000000                  .WORD   0
002014                  L$TIML::                ;LONGEST TEST TIME
002014  001217                  .WORD   655.
002016                  L$HPCP::                ;POINTER TO H.W. QUES.
002016  101322                  .WORD   L$HARD
002020                  L$SPCP::                ;POINTER TO S.W. QUES.
002020  101454                  .WORD   L$SOFT
002022                  L$HPTP::                ;PTR. TO DEF. H.W. PTABLE
002022  002156                  .WORD   L$HW
002024                  L$SPTP::                ;PTR. TO S.W. PTABLE
002024  002166                  .WORD   L$SW
002026                  L$LADP::                ;DIAG. END ADDRESS
002026  102004                  .WORD   L$LAST
002030                  L$STA::                 ;RESERVED FOR APT STATS
002030  000000                  .WORD   0
002032                  L$CO::
002032  000000                  .WORD   0
002034                  L$DTYP::                ;DIAGNOSTIC TYPE
002034  000000                  .WORD   0
002036                  L$APT::                 ;APT EXPANSION
002036  000000                  .WORD   0
002040                  L$DTP::                 ;PTR. TO DISPATCH TABLE
002040  002124                  .WORD   L$DISPATCH
002042                  L$PRIO::                ;DIAGNOSTIC RUN PRIORITY
```

```
        002042  000000                          .WORD   0
        002044                          L$ENVI::                        ;FLAGS DESCRIBE HOW IT WAS SETUP
        002044  000000                          .WORD   0
        002046                          L$EXP1::                        ;EXPANSION WORD
        002046  000000                          .WORD   0
        002050                          L$MREV::                        ;SVC REV AND EDIT #
        002050     003                          .BYTE   C$REVISION
        002051     003                          .BYTE   C$EDIT
        002052                          L$EF::                          ;DIAG. EVENT FLAGS
        002052  000000                          .WORD   0
        002054  000000                          .WORD   0
        002056                          L$SPC::
        002056  000000                          .WORD   0
        002060                          L$DEVP::                        ; POINTER TO DEVICE TYPE LIST
        002060  003402                          .WORD   L$DVTYP
        002062                          L$REPP::                        ;PTR. TO REPORT CODE
        002062  022620                          .WORD   L$RPT
        002064                          L$EXP4::
        002064  000000                          .WORD   0
        002066                          L$EXP5::
        002066  000000                          .WORD   0
        002070                          L$AUT::                         ;PTR. TO ADD UNIT CODE
        002070  022306                          .WORD   L$AU
        002072                          L$DUT::                         ;PTR. TO DROP UNIT CODE
        002072  022404                          .WORD   L$DU
        002074                          L$LUN::                         ;LUN FOR EXERCISERS TO FILL
        002074  000000                          .WORD   0
        002076                          L$DESP::                        ;POINTER TO DIAG. DESCRIPTION
        002076  003410                          .WORD   L$DESC
        002100                          L$LOAD::                        ;GENERATE SPECIAL AUTOLOAD EMT
        002100  104035                          EMT     E$LOAD
        002102                          L$ETP::                         ;POINTER TO ERRTBL
        002102  000000                          .WORD   0
        002104                          L$ICP::                         ;PTR. TO INIT CODE
        002104  021512                          .WORD   L$INIT
        002106                          L$CCP::                         ;PTR. TO CLEAN-UP CODE
        002106  022572                          .WORD   L$CLEAN
        002110                          L$ACP::                         ;PTR. TO AUTO CODE
        002110  022512                          .WORD   L$AUTO
        002112                          L$PRT::                         ;PTR. TO PROTECT TABLE
        002112  021502                          .WORD   L$PROT
        002114                          L$TEST::                        ;TEST NUMBER
        002114  000000                          .WORD   0
        002116                          L$DLY::                         ;DELAY COUNT
        002116  000000                          .WORD   0
        002120                          L$HIME::                        ;PTR. TO HIGH MEM
        002120  000000                          .WORD   0
```

```
                                                .SBTTL  DISPATCH TABLE

                                        ;++
                                        ; THE DISPATCH TABLE CONTAINS THE STARTING ADDRESS OF EACH TEST.
                                        ; IT IS USED BY THE SUPERVISOR TO DISPATCH TO EACH TEST.
                                        ;--

   002122                                       DISPATCH 12
   002122  000014                               .WORD   12
   002124                               L$DISPATCH::
   002124  023402                               .WORD   T1
   002126  024366                               .WORD   T2
   002130  026360                               .WORD   T3
   002132  031754                               .WORD   T4
   002134  034544                               .WORD   T5
   002136  040336                               .WORD   T6
   002140  050450                               .WORD   T7
   002142  051730                               .WORD   T8
   002144  062556                               .WORD   T9
   002146  066626                               .WORD   T10
   002150  074470                               .WORD   T11
   002152  077642                               .WORD   T12
```

```
                                        .SBTTL  DEFAULT HARDWARE P-TABLE

                                ;++
                                ; THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
                                ; THE TEST-DEVICE PARAMETERS.  THE STRUCTURE OF THIS TABLE
                                ; IS IDENTICAL TO THE STRUCTURE OF THE RUN-TIME P-TABLE.
                                ;--
002154                                  BGNHW   DFPTBL          ;DEFAULT HARD-P-TABLE
002154    000003                        .WORD   L10000-L$HW/2
002156                          L$HW::
002156                          DFPTBL::

002156    172520                        .WORD   172520          ; 1ST (OF 2) REGISTERS.
002160    000224                        .WORD   224             ; INTERRUPT VECTOR
002162    000200                        .WORD   PRI04           ; INTERRUPT PRIORITY.
002164                                  ENDHW
002164                          L10000:
```

```
                                          .SBTTL  SOFTWARE P-TABLE

                                  ;++
                                  ; THE SOFTWARE P-TABLE CONTAINS THE VALUES OF THE PROGRAM
                                  ; PARAMETERS THAT CAN BE CHANGED BY THE OPERATOR.
                                  ;--
   002164                                 BGNSW   SFPTBL
   002164  000004                         .WORD   L10001-L$SW/2
   002166                         L$SW::
   002166                         SFPTBL::

   002166  000000                 TRANSTST::      .WORD   0       ; ENABLE TEST OF TRANSPORT(S) IF =1
   002170  000000                 NOITS::         .WORD   0       ; INHIBIT ITERATION OPTION.
                                                                  ; ... 0 = ITERATE.
                                                                  ; ...NZ = INHIBIT ITERATE.
   002172  000017                 LERRMAX::       .WORD   15.     ; LOCAL (PER TEST) ERROR LIMIT
   002174  000310                 GERRMAX::       .WORD   200.    ; GLOBAL (PER UNIT) ERROR LIMIT
   002176                                 ENDSW
   002176                         L10001:

   002176                                 ENDMOD
```

M2

```
     7                                          .TITLE  TSV3 - GLOBAL AREAS
     8                                          .SBTTL  GLOBAL EQUATES SECTION
    13
    19
    20 002176                                   BGNMOD  TSV3
       002176                           TSV3::
    21
    22                                          .SBTTL  GLOBAL EQUATES SECTION
    23
    24                                  ;++
    25                                  ; THE GLOBAL EQUATES SECTION CONTAINS PROGRAM EQUATES THAT
    26                                  ; ARE USED IN MORE THAN ONE TEST.
    27                                  ;--
    28
    32 002176                                   EQUALS          ; GET STANDARD EQUATES.
                                        ;
                                        ; BIT DIFINITIONS
                                        ;
              100000                    BIT15== 100000
              040000                    BIT14== 40000
              020000                    BIT13== 20000
              010000                    BIT12== 10000
              004000                    BIT11== 4000
              002000                    BIT10== 2000
              001000                    BIT09== 1000
              000400                    BIT08== 400
              000200                    BIT07== 200
              000100                    BIT06== 100
              000040                    BIT05== 40
              000020                    BIT04== 20
              000010                    BIT03== 10
              000004                    BIT02== 4
              000002                    BIT01== 2
              000001                    BIT00== 1
                                        ;
              001000                    BIT9==  BIT09
              000400                    BIT8==  BIT08
              000200                    BIT7==  BIT07
              000100                    BIT6==  BIT06
              000040                    BIT5==  BIT05
              000020                    BIT4==  BIT04
              000010                    BIT3==  BIT03
              000004                    BIT2==  BIT02
              000002                    BIT1==  BIT01
              000001                    BIT0==  BIT00
                                        ;
                                        ; EVENT FLAG DEFINITIONS
                                        ;   EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
                                        ;
              000040                    EF.START==      32.                     ; START COMMAND WAS ISSUED
              000037                    EF.RESTART==    31.                     ; RESTART COMMAND WAS ISSUED
              000036                    EF.CONTINUE==   30.                     ; CONTINUE COMMAND WAS ISSUED
              000035                    EF.NEW==        29.                     ; A NEW PASS HAS BEEN STARTED
              000034                    EF.PWR==        28.                     ; A POWER-FAIL/POWER-UP OCCURRED
                                        ;
                                        ;
                                        ; PRIORITY LEVEL DEFINITIONS
```

```
                                              ;
              000340                          PRI07== 340
              000300                          PRI06== 300
              000240                          PRI05== 240
              000200                          PRI04== 200
              000140                          PRI03== 140
              000100                          PRI02== 100
              000040                          PRI01== 40
              000000                          PRI00== 0
                                              ;
                                              ;OPERATOR FLAG BITS
                                              ;
              000004                          EVL==         4
              000010                          LOT==        10
              000020                          ADR==        20
              000040                          IDU==        40
              000100                          ISR==       100
              000200                          UAM==       200
              000400                          BOE==       400
              001000                          PNT==      1000
              002000                          PRI==      2000
              004000                          IXE==      4000
              010000                          IBE==     10000
              020000                          IER==     20000
              040000                          LOE==     40000
              100000                          MOE==    100000
     33
     34 002176                                        KT11     ..                        ;DEFINE MEMORY MANAGEMENT REGISTERS
                                              .SBTTL  MEMORY MANAGEMENT DEFINITIONS
                                              ;*KT11 VECTOR ADDRESS
              000250                          MMVEC=  250
                                              ;*KT11 STATUS REGISTER ADDRESSES
              177572                          SR0=     177572
              177574                          SR1=     177574
              177576                          SR2=     177576
              172516                          SR3=     172516
                                              .IF NB
                                              ;*USER "I" PAGE DESCRIPTOR REGISTERS
                                              UIPDR0= 177600
                                              UIPDR1= 177602
                                              UIPDR2= 177604
                                              UIPDR3= 177606
                                              UIPDR4= 177610
                                              UIPDR5= 177612
                                              UIPDR6= 177614
                                              UIPDR7= 177616
                                              .IF NB
                                              ;*USER "D" PAGE DESCRIPTOR REGISTORS
                                              UDPDR0= 177620
                                              UDPDR1= 177622
                                              UDPDR2= 177624
                                              UDPDR3= 177626
                                              UDPDR4= 177630
                                              UDPDR5= 177632
                                              UDPDR6= 177634
                                              UDPDR7= 177636
                                              .ENDC
```

```
;*USER "I" PAGE ADDRESS REGISTERS
UIPAR0= 177640
UIPAR1= 177642
UIPAR2= 177644
UIPAR3= 177646
UIPAR4= 177650
UIPAR5= 177652
UIPAR6= 177654
UIPAR7= 177656
.IF NB
;*USER "D" PAGE ADDRESS REGISTERS
UDPAR0= 177660
UDPAR1= 177662
UDPAR2= 177664
UDPAR3= 177666
UDPAR4= 177670
UDPAR5= 177672
UDPAR6= 177674
UDPAR7= 177676
.ENDC
.ENDC
.IF NB
;*SUPERVISOR "I" PAGE DESCRIPTOR REGISTERS
SIPDR0= 172200
SIPDR1= 172202
SIPDR2= 172204
SIPDR3= 172206
SIPDR4= 172210
SIPDR5= 172212
SIPDR6= 172214
SIPDR7= 172216
.IF NB
;*SUPERVISOR "D" PAGE DESCRIPTOR REGISTERS
SDPDR0= 172220
SDPDR1= 172222
SDPDR2= 172224
SDPDR3= 172226
SDPDR4= 172230
SDPDR5= 172232
SDPDR6= 172234
SDPDR7= 172236
.ENDC
;*SUPERVISOR "I" PAGE ADDRESS REGISTERS
SIPAR0= 172240
SIPAR1= 172242
SIPAR2= 172244
SIPAR3= 172246
SIPAR4= 172250
SIPAR5= 172252
SIPAR6= 172254
SIPAR7= 172256
.IF NB
;*SUPERVISOR "D" PAGE ADDRESS REGISTERS
SDPAR0= 172260
SDPAR1= 172262
SDPAR2= 172264
SDPAR3= 172266
```

```
                                          SDPAR4= 172270
                                          SDPAR5= 172272
                                          SDPAR6= 172274
                                          SDPAR7= 172276
                                          .ENDC
                                          .ENDC
                                          ;*KERNEL "I" PAGE DESCRIPTOR REGISTERS
        172300                            KIPDR0= 172300
        172302                            KIPDR1= 172302
        172304                            KIPDR2= 172304
        172306                            KIPDR3= 172306
        172310                            KIPDR4= 172310
        172312                            KIPDR5= 172312
        172314                            KIPDR6= 172314
        172316                            KIPDR7= 172316
                                          .IF NB
                                          ;*KERNEL "D" PAGE
                                           DESCRIPTOR REGISTERS
                                          KDPDR0= 172320
                                          KDPDR1= 172322
                                          KDPDR2= 172324
                                          KDPDR3= 172326
                                          KDPDR4= 172330
                                          KDPDR5= 172332
                                          KDPDR6= 172334
                                          KDPDR7= 172336
                                          .ENDC
                                          ;*KERNEL "I" PAGE ADDRESS REGISTERS
        172340                            KIPAR0= 172340
        172342                            KIPAR1= 172342
        172344                            KIPAR2= 172344
        172346                            KIPAR3= 172346
        172350                            KIPAR4= 172350
        172352                            KIPAR5= 172352
        172354                            KIPAR6= 172354
        172356                            KIPAR7= 172356
                                          .IF NB
                                          ;*KERNEL "D" PAGE ADDRESS REGISTERS
                                          KDPAR0= 172360
                                          KDPAR1= 172362
                                          KDPAR2= 172364
                                          KDPAR3= 172366
                                          KDPAR4= 172370
                                          KDPAR5= 172372
                                          KDPAR6= 172374
                                          KDPAR7= 172376
                                          .ENDC
```

```
                                        .SBTTL  TSV05 REGISTER AND PACKET DEFINITIONS

                                ;
                                ; SOME GENERAL EQUATES.
                                ;

        000004                  ERRVEC==        4               ; POINTER TO ERROR VECTOR FOR BUS TIME OUT.
        000060                  TTIVEC==        60              ; INTERRUPT VECTOR FOR CONSOLE INPUT
        177560                  TTICSR==        177560          ; BUS ADDRESS OF CONSOLE INPUT
        177562                  TTIBFR==        177562          ; CONSOLE INPUT DATA BUFFER
        177520                  BDVPCR==        177520          ; BDV11 PAGE CONTROL REGISTER

                                ;+
                                ;BIT DEFINITIONS FOR TSSR REGISTER
                                ;-

        100000                  SC=     BIT15                   ;SPECIAL CONDITION
        040000                  BIE=    BIT14                   ;BUS INTERFACE ERROR
        020000                  SCE=    BIT13                   ;SANITY CHECK ERROR
        010000                  RMR=    BIT12                   ;MODIFICATION REFUSED
        004000                  NXM=    BIT11                   ;NONEXISTANT MEMORY ERROR
        002000                  NBA=    BIT10                   ;NEED BUFFER ADDRESS
        001400                  HIADDR= BIT9!BIT8               ;EXTENDED ADDRESS BITS
        000200                  SSR=    BIT7                    ;SUB SYSTEM READY
        000100                  OFL=    BIT6                    ;OFF LINE BIT
        000060                  FATERR= BIT4!BIT5               ;FATAL TERMINATION ERROR CODES
        000016                  TERCLS= BIT3!BIT2!BIT1          ;TERMINATION CODES

                                ;+
                                ;
                                ;BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 0
                                ;(XST0)
                                ;
                                ;-

        100000                  XS0TMK= BIT15                   ;TAPE MARK DETECTED
        040000                  XS0RLS= BIT14                   ;RECORD LENGTH SHORT
        020000                  XS0LET= BIT13                   ;LOGICAL END OF TAPE
        010000                  XS0RLL= BIT12                   ;RECORD LENGTH LONG
        004000                  XS0WLE= BIT11                   ;WRITE LOCK ERROR
        002000                  XS0NEF= BIT10                   ;NON EXECUTABLE FUNCTION
        001000                  XS0ILC= BIT9                    ;ILLEGAL COMMAND
        000400                  XS0ILA= BIT8                    ;ILLEGAL ADDRESS
        000200                  XS0MOT= BIT7                    ;TAPE IN MOTION
        000100                  XS0ONL= BIT6                    ;TRANSPORT ON LINE
        000040                  XS0IE=  BIT5                    ;INTERRUPT ENABLE
        000020                  XS0VCK= BIT4                    ;VOLUME CHECK BIT
        000010                  XS0PED= BIT3                    ;PHASE ENCODED DRIVE
        000004                  XS0WLK= BIT2                    ;WRITE LOCKED
        000002                  XS0BOT= BIT1                    ;BEGINNING OF TAPE
        000001                  XS0EOT= BIT0                    ;END OF TAPE
```

```
                             ;+
                             ;BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 1
                             ;(XST1)
                             ;-
        100000               X1.DLT  = BIT15          ;DATA LATE
        040000               X1.SPARE= BIT14          ;NOT USED
        020000               X1.COR  = BIT13          ;CORRECTABLE DATA ERROR
        017375               X1.MBZ  = BIT12+BIT11+BIT10+BIT9+BIT7+BIT6+BIT5+BIT4+BIT3+BIT2+BIT0 ;ALWAYS 0
        000400               X1.RBP  = BIT8           ;READ BUS PARITY ERROR
        000002               X1.UNC  = BIT1           ;UNCORRECTABLE DATA OR HARD ERROR

                             ;+
                             ;BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 2
                             ;(XST2)
                             ;-
        100000               X2.OPM  = BIT15          ;OPERATION IN PROGRESS (TAPE MOVING)
        040000               X2.RCE  = BIT14          ;RAM CHECKSUM ERROR
        035400               X2.SPARE= BIT13+BIT12+BIT11+BIT9+BIT8   ;NOT USED BY TSV05 (ALWAYS=0)
        002000               X2.WCF  = BIT10          ;WRITE CLOCK FAILURE (FIFO NOT EMPTIED BY TRANSPORT)
        000200               X2.EXTF = BIT7           ;IF WRITE CHAR CMD THEN = EXTENDED FEATURES ENABLED
        000100               X2.BUFE = BIT6           ;IF WRITE CHAR CMD THEN = BUFFERING ENABLED
        000077               X2.REV  = 000077         ;IF WRITE CHAR CMD THEN = MICROCODE REVISION LEVEL
        000007               X2.UNIT = BIT2+BIT1+BIT0 ;IF GET STATUS THEN = CURRENTLY SELECTED UNIT NO.

                             ;+
                             ;BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 3
                             ;(XST3)
                             ;-
        177400               X3.MDE  = 177400         ;MICRO-DIAGNOSTIC ERROR CODE
        000200               X3.SPARE= BIT7           ;NOT USED BY TSV05
        000100               X3.OPI  = BIT6           ;OPERATION INCOMPLETE
        000040               X3.REV  = BIT5           ;REVERSE
        000020               X3.TRF  = BIT4           ;TRANSPORT RESPONSE FAILURE
        000010               X3.DCK  = BIT3           ;DENSITY CHECK
        000006               X3.MBZ  =BIT2+BIT1       ;NOT USED ALWAYS 0
        000001               X3.RIB  = BIT0           ;REVERSE INTO BOT

                             ;+
                             ;BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 4
                             ;(XST4)
                             ;-
        100000               X4.HSP  = BIT15          ;HIGH SPEED
        040000               X4.RCE  = BIT14          ;RETRY COUNT EXCEEDED
        020000               X4.TSM  = BIT13          ;TRANSPORT SPECIAL MODE
        017400               X4.MBZ  = BIT12+BIT11+BIT10+BIT9+BIT8    ;NOT USED ALWAYS 0
        000377               X4.WRC  = 000377         ;WRITE RETRY COUNT FIELD

                             ;+
                             ;
                             ;TSSR TERMINATION CODES (BIT 0-2)
                             ;
                             ;-

        000006                       TSREJ=  3*2              ;COMMAND REJECTED
        000006                       UNREC=  6                ;UNRECOVERABLE ERROR
```

```
                      ;+
                      ;
                      ;DEVICE REGISTER OFFSETS
                      ;
                      ;-

000000                TSBA==  0
000000                TSDB==  0                    ;TSDB/TSBA REGISTER
000001                TSBAH== 1
000001                TSDBH== 1                    ;TSDB/TSBA REGISTER HIGH BYTE
000002                TSSR==  2                    ;TSSR REGISTER
000003                TSSRH== 3                    ;TSSR REGISTER HIGH BYTE

                      ;+
                      ; TSDB ADDRESS BIT DEFINITIONS
                      ;-
000003                A1716    = BIT1+BIT0         ;ADDRESS BITS 17:16 ARE IN 1:0

                      ;+
                      ; COMMAND DEFINITIONS
                      ;-
000017                P.GETSTAT        = 17        ;GET STATUS
000013                P.INIT           = 13        ;INITIALIZE
000012                P.CONTROL        = 12        ;CONTROL COMMANDS
000011                P.FORMAT         = 11        ;FORMAT
000010                P.POSITION       = 10        ;POSITION
000006                P.WRTSUB         = 6         ;SUBSYSTEM WRITE
000005                P.WRITE          = 5         ;WRITE
000004                P.WRTCHAR        = 4         ;WRITE CHARACTERISTICS
000001                P.READ           = 1         ;READ

                      ;+
                      ; COMMAND PACKET HEADER WORD BIT DEFINITIONS
                      ;-
100000                       P.ACK   = BIT15              ;BUFFER AVAIL FOR CONTROLLER
040000                       P.CVC   = BIT14              ;CLEAR VOLUME CHECK
020000                       P.OPP   = BIT13              ;REVERSE SEQUENCE OF DATA BITS
010000                       P.SWB   = BIT12              ;SWAP BYTES IN MEMORY
007400                       P.MODE  = BIT11!BIT10!BIT9!BIT8 ;EXTENDED COMMAND MODE FIELD
000200                       P.IE    = BIT7               ;INTERRUPT ENABLE
000140                       P.FMT= BIT6!BIT5             ;PACKET HEADER TYPE (ALWAYS=0)
000037                       P.CMD   = 37                 ;MAJOR COMMAND FIELD
                      ;+
                      ; CONTROL COMMAND MODE CODES
                      ;-
000000                       PC.RELEASE      = 0*256.       ;RELEASE BUFFER
000400                       PC.REWIND       = 1*256.       ;REWIND
001000                       PC.NOOP         = 2*256.       ;NO-OP
002000                       PC.IEREW        = 4*256.       ;REWIND IMMEDIATE INTERRUPT
002400                       PC.ERASE        = 5*256.       ;SECURITY ERASE
```

```
                              ;+
                              ; CONTROLLER RAM DEFINITIONS
                              ;-
        000167                RMCHBEG = 167              ;CHARACTERISTICS IO DATA BEGIN RAM ADDRESS
        000200                RMCHEND = 200              ;CHARACTERISTICS IO DATA END RAM ADDRESS
        000201                RMPKTBEG= 201              ;COMMAND PACKET BEGIN RAM ADDRESS
        000210                RMPKTEND= 210              ;COMMAND PACKET END RAM ADDRESS
        000215                RMMSGBEG= 215              ;MESSAGE BUFFER BEGIN RAM ADDRESS
        000234                RMMSGEND= 234              ;MESSAGE BUFFER END RAM ADDRESS
                              ;+
                              ;
                              ;REGISTER DEFINITIONS IN THE MESSAGE BUFFER
                              ;
                              ;-

        000006                XST0==  6                  ;EXTENDED STATUS REGISTER 0 (WORD 4)
        000010                XST1==  8.                 ;EXTENDED STATUS REGISTER 1 (WORD 5)
        000012                XST2==  10.                ;EXTENDED STATUS REGISTER 2 (WORD 6)
        000014                XST3==  12.                ;EXTENDED STATUS REGISTER 3 (WORD 7)
        000016                XST4==  14.                ;EXTENDED STATUS REGISTER 4 (WORD 8)

                              ;+
                              ;
                              ;OFFSETS TO WORD LOCATIONS IN PACKET DEFINITIONS
                              ;
                              ;-

        000002                        PKLOW   = 2                ;LOW ORDER CHARACTERISTIC DATA POINTER
        000004                        PKHI    = 4                ;HIGH ORDER CHARACTERISTIC DATA POINTER
        000006                        PKBCNT  = 6                ;NUMBER OF BYTES IN DATA PACKET

        000010                        EXBCNT=10                  ;NUMBER OF BYTES IN EXTENDED DATA PACKET

                              ;+
                              ;DATA PACKET OFFSETS FOR WRITE SUBSYTEM COMMAND
                              ;-
        000000                        BSEL0   = 0                ;BYTE 0
        000001                        BSEL1   = 1                ;BYTE 1
        000002                        SEL2    = 2                ;WORD 2
        000004                        SELDATA = 4                ;WORD 3
```

```
                        ;+
                        ;BSEL0 SELECT CODES FOR WRITE SUBSYSTEM COMMAND
                        ;-
        000000          PW.NOP          = 0             ;NO-OP
        000001          PW.RDRAM        = 1             ;READ RAM
        000002          PW.WTRAM        = 2             ;WRITE RAM
        000003          PW.RFIFO        = 3             ;READ FIFO
        000004          PW.WFIFO        = 4             ;WRITE FIFO
        000005          PW.RDSTAT       = 5             ;READ STATUS
        000006          PW.WCTL         = 6             ;WRITE TAPE CONTROL
        000007          PW.WFMT         = 7             ;WRITE TAPE FORMAT
        000010          PW.WMISC        = 10            ;WRITE MISCELLANEOUS
        000011          PW.WNPR         = 11            ;WRITE NPR CONTROL
        000020          PW.D22          = 20            ;DO MICROTEST 22
        000021          PW.D11          = 21            ;DO MICROTEST 11
        000022          PW.D13          = 22            ;DO MICROTEST 13
        000023          PW.NO1311       = 23            ;DISABLE MICROTEST 11 AND 13
        000024          PW.RDEXT        = 24            ;READ EXT. TAPE STATUS (NOT SUPPORTED BY ALL TRANSPORTS

                        ;+
                        ;BSEL1 CODES FOR WRITE TAPE CONTROL
                        ;-
        000200          WC.IFAD         = BIT7          ;IFAD - FORMATTER ADDRESS
        000100          WC.I0TAD        = BIT6          ;ITAD0  - TRANSPORT ADDRESS BIT 0
        000040          WC.I1TAD        = BIT5          ;ITAD1  - TRANSPORT ADDRESS BIT 1
        000020          WC.I5RESV       = BIT4          ;IRESV5 - RESERVED #5
        000010          WC.IREW         = BIT3          ;IREW   - REWIND
        000004          WC.IRWU         = BIT2          ;IRWU   - REWIND AND UNLOAD
        000002          WC.IFEN         = BIT1          ;IFEN   - FORMATTER ENABLE
        000001          WC.IGO          = BIT0          ;GO

                        ;+
                        ;BSEL1 CODES FOR WRITE FORMAT
                        ;-
        000200          WF.IHISP        = BIT7          ;IHISP  - HIGH SPEED
        000100          WF.IWRT         = BIT6          ;IWRT   - WRITE
        000040          WF.IREV         = BIT5          ;IREV   - REVERSE
        000020          WF.IWFM         = BIT4          ;IWFM   - WRITE FILE MARK
        000010          WF.IEDIT        = BIT3          ;IEDIT  - EDIT
        000004          WF.IERASE       = BIT2          ;IERASE - ERASE
        000002          WF.I3RESV       = BIT1          ;IRESV3 - RESERVED #3
        000001          WF.I4RESV       = BIT0          ;IRESV4 - RESERVED #4

                        ;+
                        ;BSEL1 CODES FOR WRITE MISCELLANEOUS SUBCOMMAND
                        ;-
        000200          MS.EXT          = BIT7          ;INVERT SENSE OF EXTENDED FEATURES SWITCH
        000020          MS.RSFIFO       = BIT4          ;RESET FIFO AND INPUT PARITY ERRORR
        000010          MS.RSTAPE       = BIT3          ;RESET TAPE STATUS IN 2 FLIP-FLOPS
        000006          MS.ATTN         = BIT2!BIT1     ;ATTENTION TRIGGER FIELD
        000001          MS.RSD          = BIT0          ;RESET TIMER A,B THEN DELAY TIMES IN SEL2
```

```
                                 ;+
                                 ; MS.ATTN SUBCODES
                                 ;-
        000000                          MSA.NOP = 0*2          ;NO-OP (NOTHING TRIGGERED)
        000002                          MSA.VOL = 1*2          ;SIMULATE ON-LINE/OFF-LINE TRANSISTION
        000004                          MSA.NRAM= 2*2          ;FORCE NON-FATAL RAM ERROR (FORCES ERRCODE 54)
        000006                          MSA.FRAM= 3*2          ;FORCE FATAL RAM ERROR (CAUSES SCE TO SET)
                                 ;+
                                 ; WRITE SUBSYSTEM WRITE NPR BSEL1 BIT DEFINITIONS
                                 ;-
        000200                   NP.IR        = BIT7           ;INTERRUPT REQUEST (0-1 TRANSITION)
        000100                   NP.OUT       = BIT6           ;TAPE DATA DIRECTION OUT (0= IN)
        000040                   NP.LOOP      = BIT5           ;ENABLE TRANSPORT LOOPBACK
        000020                   NP.WRP       = BIT4           ;WRITE CORRECT PARITY (SET=0 TO WRITE WRONG)
                                 ;+
                                 ; READ STATUS MESSAGE BUFFER BIT DEFINITIONS
                                 ;-

        000200                   S2.DIM       = BIT7           ;WORD #9 BYTE 2 DATA IN MISS
        000100                   S2.ILW       = BIT6           ;               ILW H
        000040                   S2.OUTRDY    = BIT5           ;               OUT RDY H
        000020                   S2.INRDY     = BIT4           ;               IN RDY H
        000010                   S2.ATIMR     = BIT3           ;               TIMER A FLAG H
        000004                   S2.BTIMR     = BIT2           ;               TIMER B FLAG H
        000003                   S2.UNDEF     = BIT1+BIT0      ;(UNDEFINED)
        100000                   S1.PARIN     = BIT15          ;WORD #8 BYTE 1 PARIN H
        040000                   S1.I2RESV    = BIT14          ;               IRESV2
        020000                   S1.I1RESV    = BIT13          ;               IRESV1
        010000                   S1.IEOT      = BIT12          ;               IEOT L
        004000                   S1.IIDENT    = BIT11          ;               IIDENT H
        002000                   S1.ICER      = BIT10          ;               ICER H
        001000                   S1.IFMK      = BIT9           ;               IFMK H
        000400                   S1.IHER      = BIT8           ;               IHER H
        000200                   S0.ISPEED    = BIT7           ;WORD #8 BYTE 0 ISPEED H
        000100                   S0.IRDY      = BIT6           ;               IRDY L
        000040                   SC.IONL      = BIT5           ;               IONL L
        000020                   S0.ILDP      = BIT4           ;               ILDP L
        000010                   S0.IDBY      = BIT3           ;               IDBY L
        000004                   S0.IRWD      = BIT2           ;               IRWD L
        000002                   S0.IFBY      = BIT1           ;               IFBY L
        000001                   S0.IFPT      = BIT0           ;               IFPT L
        .SBTTL  SPECIAL MACROS AND OPDEFS.

;+
;SAVE GENERAL REGS 1 TO 5
;-

        .MACRO  SAVREG
        JSR     R5,REGSAV
        .ENDM

;+
; MACRO TO FORCE AN ERROR
;-
.MACRO  FORCERROR       TAG,NOTSSR
.NLIST
.IIF NDF LISTALL, .NLIST
.LIST
.IF B NOTSSR
        MOV     TSSR(R5),R1     ;READ TSSR
.ENDC
        MOV     FORCER,FORCER   ;IS FORCER SET? (LEAVE C BIT ALONE)
        BNE     TAG             ;BR IF YES
.NLIST
.IIF NDF LISTALL, .LIST
.LIST
.ENDM

;+
; MACRO TO FORCE AN EXIT TO AVOID SECTION ITERATIONS
;       WILL EXIT TO A LABEL IF FORCER IS NEGATIVE
;       SO TO FORCE ERRORS AND EXIT ON 1 ERROR SET
;       FORCER TO 177777
;       TO FORCE ERRORS AND ITERATIONS SET FORCER TO 1.
;-
.MACRO  FORCEXIT        TAG
.NLIST
.IIF NDF LISTALL, .NLIST
.LIST
        MOV     FORCER,FORCER   ;IS FORCER NEGATIVE?
        BMI     TAG             ;BR IF YES
.NLIST
.IIF NDF LISTALL, .LIST
.LIST
.ENDM
;+
; MACRO TO INCREMENT ERROR COUNTS
;-
.MACRO  NEXT.ERRNO
.NLIST
;;;.IIF NDF LISTALL, .NLIST
        ERRNO=ERRNO+1
;;;.IIF NDF LISTALL, .LIST
.LIST
.ENDM
```

```
                        ;+
                        ;MACRO TO PERFORM XOR
                        ;-

                              .MACRO  XOR     A,B
                              MOV     A,-(SP)
                              BIC     B,(SP)
                              BIC     A,B
                              BIS     (SP)+,B
                              .ENDM

       000000                 EN=0                    ; INITIALIZE ERROR NUMBER
                              .SBTTL  FORCER  - FORCE ERROR FLAG

                        ;
                        ; THE FOLLOWING LOCATIONS MAY BE PATCHED BY THE USER
                        ; TO OBTAIN THE RESULTS DESCRIBED FOR EACH.
                        ;

002176 000000           FORCER::      0     ; FORCE TYPE ALL HARD ERRORS (THE ONES CALLED -
                                      ; - BY THE MACRO "IFERROR").  AN ERROR NEED NOT -
                                      ; - EXIST, JUST ASSUME AND TYPE THE MESSAGE.
```

```
                                        .SBTTL  GLOBAL DATA SECTION

                                ;++
                                ;THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
                                ;IN MORE THAN ONE TEST.
                                ;--

                                ;
                                ;THE FOLLOWING DATA ARE SET FOR EACH UNIT AT INIT TIME.
                                ;SINGLE UNIT DEFAULTS (LISTED) ARE IN THE DEFAULT P-TABLE.
                                ;
002200  000000                  EPRTSW::        .WORD   0       ;PRINT SWITCH
002202  000000                  UNITN::         .WORD   0       ;UNIT # UNDER TEST.
002204  000000                  QVP::           .WORD   0       ;QUICK VERIFY FLAG.
002206  000000                  CSRADDR::       .WORD   0       ;ADDRESS OF CSR FOR CURRENT DEVICE
002210  000224                  IVEC::          .WORD   224     ;INTERRUPT VECTOR
002212  000200                  IPRI::          .WORD    PRI04  ;INTERRUPT PRIORITY.
002214  000000                  TSTCNT::        .WORD   0       ;NUMBER OF TESTS RUN IN THIS PASS
002216  000000                  LOOPCNT::       .WORD   0       ;REMAINING ITERATION COUNT FOR TEST
002220  000000                  DEVCNT::        .WORD   0       ;NUMBER OF DEVICE UNDER TEST
002222  000000                  FATFLG::        .WORD   0       ;SET IF FATAL ERROR IS DETECTED IN TEST
002224  000000                  INTRECV::       .WORD   0       ;SET IF TAPE INTERRUPT WAS RECEIVED
002226  000000                  EXTFEA::        .WORD   0       ;EXTENDED FEATURES SOFTWARE SW 0=OFF;1=ON
002230  000000                  BENBSW::        .WORD   0       ;BUFFER ENABLE SWITCH SW 0=OFF;1=ON
002232  000000                  EXPD::          .WORD   0       ;EXPECTED RAM DATA FOR PRAMPKT ROUTINE
002234  000000                  RECV::          .WORD   0       ;RECEIVED RAM DATA FOR PRAMPKT ROUTINE
002236  000000                  ERRHI::         .WORD   0       ;HIGH ADDRESS MEMORY ERROR
002240  000000                  ERRLO::         .WORD   0       ;LOW ADDRESS MEMORY ERROR
002242                          RAMDATA::       .BLKW   16.     ;DATA READ FROM RAM PACKET OR MESSAGE BUF AREA
002302  000000                  RAMSIZ::        .WORD   0       ;RAM DATA SIZE FOR PRAMPKT ROUTINE
002304  000000                  RCVHIADD::      .WORD   0       ;RECEIVED BUFFER HIGH ADDRESS
002306  000000                  RCVLOADD::      .WORD   0       ;RECEIVED BUFFER LOW ADDRESS
002310  000000                  COUNT::         .WORD   0       ;TEST COUNT PATTERN
002312  000000                  DATA::          .WORD   0       ;TEST DATA
002314  000000                  TSTFLAG::       .WORD   0       ;TEST FLAG WORD
002316  000000                  TSTPTR::        .WORD   0       ;TSTBLK POINTER
002320  000000                  PRMNO::         .WORD   0       ;PRINT ROUTINE TEMP
002322                          EXPMSG::        .BLKB   100.    ;EXPECTED MESSAGE BUFFER DATA
002466                          RECMSG::        .BLKB   100.    ;RECEIVED MESSAGE BUFFER DATA
002632                          TMPBFR::        .BLKB   80.     ;TEMPORARY STORAGE FOR PRINT
```

```
                                          .SBTTL  TSTBLK  - TEST DATA TABLE


                                  ;+
                                  ;
                                  ;THIS TABLE CONTAINS TEST DATA USED IN SEVERAL TESTS
                                  ;
                                  ;IN SEQUENCE THE DATA IS:
                                  ;
                                  ;       ALL ZEROS
                                  ;       ALL ONES
                                  ;       WALKING ONES
                                  ;       WALKING ZEROS
                                  ;       ALTERNATING ONES AND ZEROS
                                  ;
                                  ;-

 002752                           TSTBLK::
 002752  000000                           .WORD   0               ;ALL ZEROS
 002754  177777                           .WORD   177777          ;ALL ONES
 002756  000001                           .WORD   BIT0            ;DATA FOR WALKING ONES
 002760  000002                           .WORD   BIT1
 002762  000004                           .WORD   BIT2
 002764  000010                           .WORD   BIT3
 002766  000020                           .WORD   BIT4
 002770  000040                           .WORD   BIT5
 002772  000100                           .WORD   BIT6
 002774  000200                           .WORD   BIT7
 002776  000400                           .WORD   BIT8
 003000  001000                           .WORD   BIT9
 003002  002000                           .WORD   BIT10
 003004  004000                           .WORD   BIT11
 003006  010000                           .WORD   BIT12
 003010  020000                           .WORD   BIT13
 003012  040000                           .WORD   BIT14
 003014  100000                           .WORD   BIT15
 003016  177776                           .WORD   ↑CBIT0          ;DATA FOR WALKING ZEROS
 003020  177775                           .WORD   ↑CBIT1
 003022  177773                           .WORD   ↑CBIT2
 003024  177767                           .WORD   ↑CBIT3
 003026  177757                           .WORD   ↑CBIT4
 003030  177737                           .WORD   ↑CBIT5
 003032  177677                           .WORD   ↑CBIT6
 003034  177577                           .WORD   ↑CBIT7
 003036  177377                           .WORD   ↑CBIT8
 003040  176777                           .WORD   ↑CBIT9
 003042  175777                           .WORD   ↑CBIT10
 003044  173777                           .WORD   ↑CBIT11
 003046  167777                           .WORD   ↑CBIT12
 003050  157777                           .WORD   ↑CBIT13
 003052  137777                           .WORD   ↑CBIT14
 003054  077777                           .WORD   ↑CBIT15
 003056  125252                           .WORD   125252          ;ALTERNATING ONES, ZEROS
 003060  052525                           .WORD   052525          ;ALTERNATING ONES, ZERO OPPOSITE FROM ABOVE
         003062                   TBLEND==.
```

```
                                        .SBTTL  GLOBAL ENVIRONMENT STORAGE
                                ;
                                ;STORAGE FOR DEVICE REGISTERS
                                ;
003062  000000  100000  000000  DUMMY:  0,100000,0,0    ;DUMMY DEVICE REGISTERS...
003072  000000  000000  000000          0,0,0,0,0,0,0,0
                                                        ;...FOR MULTI-UNIT CHECKOUT.

003112  000000                  DUFLG::         .WORD   0               ;"DROPPED UNIT" FLAG.
                                                                        ;INHIBITS CODE IN "CLEAN-UP".
003114  000000                  NODEV::         .WORD   0               ;FLAG TO SAY NO DEVICE.

003116  000000                  TEMP1::         .WORD   0               ;SOME TEMP LOCATIONS.
003120  000000                  TEMP2::         .WORD   0
003122  000000                  XXCOMM::        .WORD   0               ;XXDP+ COMM BLOCK POINTER.
003124  000000                  FREE::          .WORD   0               ;1ST FREE MEMORY ADDRESS...
003126  000000                  FRESIZ::        .WORD   0               ;...AND SIZE (IN WORDS).
003130  000000                  FREEHI: .WORD   0               ;LAST WORD IN FREE SPACE
003132  000000                  KTFLG::         .WORD   0               ;KT11, MEM AVAIL FLAG -
                                                                        ;- .WORD        0 = <24K OR NO KT -
                                                                        ;- NZ = >24K AND KT.
003134  000000                  KTENABLE::      .WORD   0               ;SET BY TEST ROUTINES TO FLAG >28K UNDER TEST
003136  000000                  NXMFLG::        .WORD   0               ;SET IF WE CAN TEST CLEARED OTHERWISE
003140  000000                  NXMLO::         .WORD   0               ;NXM LO ADDRESS BITS
003142  000000                  NXMHI::         .WORD   0               ;NXM HI ADDRESS BITS FOR DAL'S 16-21
003144  000000                  T23A::          .WORD   0               ;11/23A FLAG
003146  000000                  T23B::          .WORD   0               ;11/23B FLAG
003150  000000                  T38FLG::        .WORD   0               ;TEST 38 FLAG ↑0
003152  002000                  PST32W::        .WORD   2000            ;32W BLOCK ADDRESS FOR 32K START
003154  000000                  SIFLAG::        .WORD   0               ;
003156  000000                  BADDAT::        .WORD   0               ;ACTUAL DATA
003160  000000                  GDDAT::         .WORD   0               ;EXPECTED DATA
003162  000000                  LOOPFL::        .WORD   0
003164                          CTAB::                                  ;CONFIGURATION TABLES.
003164  000000                  CTABM::         .WORD   0               ;CONFIG WORK.
003166  000000                                  .WORD   0
003170  000000                                  .WORD   0
003172  000000                                  .WORD   0
003174  177777                                  .WORD   -1              ;END OF MEM TABLE.
003176                          CTABE::
                                ;ERROR STATISTICS TABLE (1 WORD PER UNIT), 64 UNITS MAX:
                                ;
                                ;       0       =       UNIT NOT TESTED
                                ;       100000  =       UNIT ONLINE, NO ERRORS
                                ;       10XXXX  =       UNIT ONLINE, ENCOUNTERED XXXX ERRORS
                                ;       160000  =       UNIT DROPPED, NON-EXISTENT DEVICE REGISTER
                                ;       160001  =       UNIT DROPPED, NOT IDLE AT START
                                ;       14XXXX  =       UNIT DROPPED, ENCOUNTERED XXXX ERRORS
                                ;
003176                          ERTABL:         .BLKW   64.
003376  000000                  ERTABE:         .WORD   0

003400  000000                  SKIPT:  .WORD   0               ;1=SKIP SUBTEST 0=NO SKIP OF SUBTEST
```

```
                                                .SBTTL  GLOBAL TEXT MESSAGES
                                        ;++
                                        ; THE GLOBAL TEXT SECTION CONTAINS FORMAT STATEMENTS,
                                        ; MESSAGES, AND ASCII INFORMATION THAT ARE USED IN
                                        ; MORE THAN ONE TEST.
                                        ;--
                                        ;+
                                        ;NAMES OF DEVICES SUPPORTED
                                        ;-
003402                                          DEVTYP  <TSV05>
003402                                  L$DVTYP::
003402     124     123     126                  .ASCIZ  /TSV05/
                                                .EVEN


                                        ;+
                                        ;TEST DESCRIPTION
                                        ;-
003410                                          DESCRIPT <**** TSV05 LOGIC DIAGNOSTIC - REPLACE M7196 IF ERROR ****>
003410                                  L$DESC::
003410     052     052     052                  .ASCIZ  /**** TSV05 LOGIC DIAGNOSTIC - REPLACE M7196 IF ERROR ****/
                                                .EVEN


                                        ;+
                                        ;BIT TO ASCII CONVERSION FOR TSSR REGISTER
                                        ;-
003502  003542  003545  003551  TSSRBIT::               .WORD   1$,2$,3$,4$,5$,6$,7$,8$
003522  003603  003607  003613                          .WORD   9$,10$,11$,12$,13$,14$,15$,16$
003542     123     103     000  1$:     .ASCIZ  'SC'
003545     102     111     105  2$:     .ASCIZ  'BIE'
003551     123     103     105  3$:     .ASCIZ  'SCE'
003555     122     115     122  4$:     .ASCIZ  'RMR'
003561     116     130     115  5$:     .ASCIZ  'NXM'
003565     116     102     101  6$:     .ASCIZ  'NBA'
003571     102     111     124  7$:     .ASCIZ  'BIT9'
003576     102     111     124  8$:     .ASCIZ  'BIT8'
003603     123     123     122  9$:     .ASCIZ  'SSR'
003607     117     106     114  10$:    .ASCIZ  'OFL'
003613     102     111     124  11$:    .ASCIZ  'BIT5'
003620     102     111     124  12$:    .ASCIZ  'BIT4'
003625     102     111     124  13$:    .ASCIZ  'BIT3'
003632     102     111     124  14$:    .ASCIZ  'BIT2'
003637     102     111     124  15$:    .ASCIZ  'BIT1'
003644     102     111     124  16$:    .ASCIZ  'BIT0'
                                        .EVEN
003652     124     123     123  SFIERR: .ASCIZ  'TSSR ERROR AFTER SOFT INIT'
003705     124     123     123  SFMERR: .ASCIZ  'TSSR ERROR AFTER BUS RESET'
003740     040     040     116  NXR:    .ASCIZ  /  NON-EXISTANT DEVICE REGISTER/
003777     045     101     040  NXRX:   .ASCIZ  /%A  ADDRESS: %06/
004020     045     101     040  TSSX:   .ASCII  /%A  TSBA,TSSR EXP'D: %06%A,%06%N/
004060     045     101     040          .ASCIZ  /%A  TSBA,TSSR REC'D: %06%A,%06/
004117     045     116     045  FUSI:   .ASCII  /%N%A/
004123     040     040     125  USI:    .ASCIZ  /  UNEXPECTED INTERRUPT/
004152     040     040     111  NSI:    .ASCIZ  /  INTERRUPT EXPECTED, NOT RECEIVED/
004215     045     116     045  FNOINTR:                .ASCII  /%N%A/
004221     040     040     116  NOINTR: .ASCIZ  /  NO INTERRUPT WAS GENERATED/
004256     040     040     111  IFAULT: .ASCIZ  /  INTERRUPT FAULT/
```

```
004300      045      101      040  INTX:     .ASCIZ  /%A  CPU PC: %O6%A  TSBA: %O6/
004335      040      040      042  NOINIT:   .ASCIZ  /  "BUS-INIT" DIDN'T INITIALIZE CONTROLLER/
004407      040      040      042  NSINIT:   .ASCIZ  /  "SOFT-INIT" DIDN'T INITIALIZE THE DPU/
004457      040      040      042  BRINIT:   .ASCIZ  /  "BUS-RESET" DIDN'T INITIALIZE THE DPU/
004527      000                    NUL:      .ASCIZ  //
004530      045      116      000  NULCR:    .ASCIZ  /%N/
004533      045      101      040  EXPGOT:   .ASCIZ  /%A EXP'D: %O6%A, REC'D: %O6/
004567      045      116      045  EXPGT2:   .ASCIZ  /%N%A EXP'D: %O6%A, %O6%N%A REC'D: %O%A, %O6/
004643      045      101      040  DUAD12:   .ASCIZ  /%A REG(W) WRITTEN TO: %O6%A REG(R) READ; EXP'D: %O6%A, REC'D: %O6/
004745      122      101      115  PKTRAM::            .ASCIZ  'RAM Contents Do Not Match Packet Sent'
005013      040      040      103  SCME:     .ASCIZ  /  CONFIG DOESN'T MATCH MFG. MASTER/
005056      127      122      111  WRTMSG:   .ASCIZ  'WRITE CHARACTERISTICS Failed'
005113      124      123      123  WRTERR:   .ASCIZ  'TSSR Incorrect After WRITE Command, More Bits Set Than SSR'
005206      124      123      123  RDERR:    .ASCIZ  'TSSR Incorrect After READ Command, More Bits Set Than SSR'
005300      106      101      124  SCHERR:   .ASCIZ  'FATAL ERROR IN SUBTEST - CHECK TAPE,CABLES,TRANSPORT etc.'
005372      105      122      122  RETERR:   .ASCIZ  'ERROR IN SUBTEST - WRITE DATA RETRY FIVE TIMES FAILED'
005460      045      116      045  NOMEM:    .ASCIZ  '%N%A ***** NO NXM ADDRESS--CANNOT TEST NXM TIMEOUT. *****%N'
005554      045      116      045  M8186:    .ASCIZ  '%N%A **********%****** 11/23A SYSTEM *****************%N'
005645      045      116      045  M8189:    .ASCIZ  '%N%A ***************** 11/23B SYSTEM *****************%N'
                                             .EVEN
                                             .SBTTL  GLOBAL ERROR REPORT SECTION

                                   ;++
                                   ; THE GLOBAL ERROR REPORT SECTION CONTAINS THE PRINTB AND PRINTX
                                   ; CALLS THAT ARE USED IN MORE THAN ONE TEST.
                                   ; ASCII TEXT STRINGS ARE FOUND IN THE GLOBAL TEXT SECTION.
                                   ;--
005736                                       BGNMSG  NXRERR              ;NON-EXISTANT DEVICE REGISTER.
005736                             NXRERR::
005736                                       PRINTX  #NXRX,NODEV         ;NODEV = NEXM ADDRESS.
005736  013746  003114                       MOV     NODEV,-(SP)
005742  012746  003777                       MOV     #NXRX,-(SP)
005746  012746  000002                       MOV     #2,-(SP)
005752  010600                               MOV     SP,R0
005754  104415                               TRAP    C$PNTX
005756  062706  000006                       ADD     #6,SP
005762  004737  005770                       JSR     PC,EXTEND           ; PRINT EXTENSION IF REQUIRED.
005766                                       ENDMSG
005766                             L10002:
005766  104423                               TRAP    C$MSG

                                   ;
                                   ; THIS ROUTINE APPENDS A UNIQUE EXTENSION (IF REQUIRED)
                                   ; TO ANY OF THE ABOVE ERROR SIGNATURES.
                                   ;
005770  005727                     EXTEND:   TST     (PC)+
005772  000000                     EXTA:     0                           ; 0 = NO EXTENSION.
005774  001402                               BEQ     1$
005776  004777  177770                       JSR     PC,@EXTA            ; APPEND EXTENSION TEXT.
006002                             1$:       PRINTX  #NULCR              ; PRINT A BLANK LINE
006002  012746  004530                       MOV     #NULCR,-(SP)
006006  012746  000001                       MOV     #1,-(SP)
006012  010600                               MOV     SP,R0
006014  104415                               TRAP    C$PNTX
006016  062706  000004                       ADD     #4,SP
006022  000207                               RTS     PC
```

```
                                        .SBTTL  PRITSSR - PRINT TSSR CONTENTS

                                ;+
                                ;
                                ;ROUTINE TO DISPLAY THE CONTENTS, AND BIT DEFINITIONS, OF
                                ;THE TSSR REGISTER. THIS ROUTINE IS NORMALLY CALLED ONLY
                                ;BY A MESSAGE PRINTING ROUTINE
                                ;
                                ;INPUTS:
                                ;
                                ;       R1      CONTENTS OF TSSR
                                ;
                                ;SUBORDINATE ROUTINES:
                                ;
                                ;       CHKAMB  CHECK FOR AMBIGUOUS CONTENTS
                                ;
                                ;-

 006024                         PRITSSR:
 006024                                 SAVREG                          ;SAVE GENERAL REGISTERS
 006030 010104                          MOV     R1,R4                   ;SAVE THE TSSR CONTENTS
 006032                                 PRINTB  #TSSRFOR,R4             ;PRINT THE CONTENTS OF TSSR
 006032 010446                          MOV     R4,-(SP)
 006034 012746  006415                  MOV     #TSSRFOR,-(SP)
 006040 012746  000002                  MOV     #2,-(SP)
 006044 010600                          MOV     SP,R0
 006046 104414                          TRAP    C$PNTB
 006050 062706  000006                  ADD     #6,SP
 006054 010400                          MOV     R4,R0                   ;GET TSSR BACK FOR CHKAMB
 006056 004737  016044                  JSR     PC,CHKAMB               ;ARE CONTENTS AMBIGUOUS ?
 006062 103410                          BCS     5$                      ;BRANCH IF NOT
 006064                                 PRINTX  #AMBTSSR                ;SHOW CONTENTS ARE AMBIGUOUS
 006064 012746  006635                  MOV     #AMBTSSR,-(SP)
 006070 012746  000001                  MOV     #1,-(SP)
 006074 010600                          MOV     SP,R0
 006076 104415                          TRAP    C$PNTX
 006100 062706  000004                  ADD     #4,SP
 006104 010403                  5$:     MOV     R4,R3                   ;CONTENTS OF TSSR
 006106 042703  001476                  BIC     #HIADDR!FATERR!TERCLS,R3        ;CLEAR ALL MULTIPLE BIT FIELDS
 006112 001434                          BEQ     20$                     ;NO BITS ARE SET
 006114 012702  002632                  MOV     #TMPBFR,R2              ;TEMPORARY ASCII BUFFER
 006120 012701  003502                  MOV     #TSSRBIT,R1             ;ASCII EQUIVALENT OF BITS
 006124 005703                  10$:    TST     R3                      ;REMAINING BITS TO CONVERT
 006126 001413                          BEQ     15$                     ;BRANCH WHEN ALL ARE DONE
 006130 000241                          CLC                             ;CLEAR CARRY FOR SHIFT
 006132 006103                          ROL     R3                      ;SHIFT NEXT BIT TO CARRY
 006134 103006                          BCC     13$                     ;BRANCH IF BIT NOT SET
 006136 011100                          MOV     (R1),R0                 ;POINTER TO BIT DEFINITION
 006140 112022                  11$:    MOVB    (R0)+,(R2)+             ;MOVE ASCIZ TO BUFFER
 006142 001376                          BNE     11$                     ;MOVE ALL BITS
 006144 112762  000054  177777          MOVB    #',,-1(R2)              ;INSERT A COMMA TO TERMINATE
 006152 005721                  13$:    TST     (R1)+                   ;POINT TO NEXT DESCRIPTION
 006154 000763                          BR      10$                     ;GET THE REMAINING BITS
 006156 105042                  15$:    CLRB    -(R2)                   ;TERMINATE THE LINE
 006160                                 PRINTX  #TSSDEF,#TMPBFR         ;PRINT THE BIT DEFINITIONS
 006160 012746  002632                  MOV     #TMPBFR,-(SP)
 006164 012746  006606                  MOV     #TSSDEF,-(SP)
```

```
    006170  012746  000002               MOV     #2,-(SP)
    006174  010600                       MOV     SP,R0
    006176  104415                       TRAP    C$PNTX
    006200  062706  000006               ADD     #6,SP

    006204  010403              20$:     MOV     R4,R3              ;GET THE TSSR CONTENTS
    006206  042703  177761               BIC     #↑CTERCLS,R3       ;CLEAR ALL BUT TERMINATION
    006212  016303  006676               MOV     TCOCOD(R3),R3      ;GET THE TERMINATION CODE MEANING
    006216                               PRINTX  #TCOASC,R3         ;PRINT THE TERMINATION CODE
    006216  010346                       MOV     R3,-(SP)
    006220  012746  006476               MOV     #TCOASC,-(SP)
    006224  012746  000002               MOV     #2,-(SP)
    006230  010600                       MOV     SP,R0
    006232  104415                       TRAP    C$PNTX
    006234  062706  000006               ADD     #6,SP
    006240  010403                       MOV     R4,R3              ;TSSR CONTENTS AGAIN
    006242  042703  177717               BIC     #↑CFATERR,R3       ;CLEAR ALL BUT FATAL TERMINATION
    006246  001416                       BEQ     25$                ;DON'T PRINT IF ZERO
    006250  006203                       ASR     R3
    006252  006203                       ASR     R3
    006254  006203                       ASR     R3                 ;ALINE TERMINATION CODE FOR INDEX
    006256  016303  007236               MOV     TSFCOD(R3),R3      ;GET THE FATAL TERMINATION CODE
    006262                               PRINTX  #TFCASC,R3         ;PRINT THE FATAL TERMINATION CODE
    006262  010346                       MOV     R3,-(SP)
    006264  012746  006537               MOV     #TFCASC,-(SP)
    006270  012746  000002               MOV     #2,-(SP)
    006274  010600                       MOV     SP,R0
    006276  104415                       TRAP    C$PNTX
    006300  062706  000006               ADD     #6,SP
    006304  042704  176377      25$:     BIC     #↑CHIADDR,R4       ;CLEAR ALL BUT EXTENDED ADDRESS
    006310  001411                       BEQ     30$                ;DON'T PRINT IF ZERO
    006312                               PRINTX  #TEXASC,R4         ;PRINT THE EXTENDED ADDRESS BITS
    006312  010446                       MOV     R4,-(SP)
    006314  012746  006435               MOV     #TEXASC,-(SP)
    006320  012746  000002               MOV     #2,-(SP)
    006324  010600                       MOV     SP,R0
    006326  104415                       TRAP    C$PNTX
    006330  062706  000006               ADD     #6,SP
    006334  013703  002200      30$:     MOV     EPRTSW,R3                   ;PRINT MEAASGE BUFFER ADDRESS
    006340                               PRINTX  R3                          ;PRINT PROPER MESSAGE
    006340  010346                       MOV     R3,-(SP)
    006342  012746  000001               MOV     #1,-(SP)
    006346  010600                       MOV     SP,R0
    006350  104415                       TRAP    C$PNTX
    006352  062706  000004               ADD     #4,SP
    006356  000207                       RTS     PC                 ;RETURN TO CALLER
```

F4

```
    743 006360                              EPRT2:
    744 006360     045      116      045    EPRT1:   .ASCIZ  '%N%A *****REPLACE M7196*****'
    745
    755 006415     045      116      045    TSSRFOR:         .ASCIZ  '%N%A TSSR = %06'
    756 006435     045      116      045    TEXASC:          .ASCIZ  '%N%A Extended Address Bits = %06'
    757 006476     045      116      045    TCOASC:          .ASCIZ  '%N%A Termination Class Code = %T'
    758 006537     045      116      045    TFCASC:          .ASCIZ  '%N%A Fatal Termination Class Code = %T'
    759 006606     045      116      045    TSSDEF:          .ASCIZ  '%N%A TSSR Bits Set: %T'
    760 006635     045      116      045    AMBTSSR:         .ASCIZ  '%N%A TSSR Contents Are Ambiguous'
    761                                              .EVEN
    762 006676  006716   006741   006767    TCOCOD:  .WORD   1$,2$,3$,4$,5$,6$,7$,8$
    763 006716     116      157      162    1$:      .ASCIZ  'Normal Termination'
    764 006741     124      145      162    2$:      .ASCIZ  'Termination Condition'
    765 006767     124      141      160    3$:      .ASCIZ  'Tape Status Alert'
    766 007011     106      165      156    4$:      .ASCIZ  'Function Reject'
    767 007031     122      145      143    5$:      .ASCIZ  'Recoverable Error - Tape Position One Record Down'
    768 007113     122      145      143    6$:      .ASCIZ  'Recoverable Error - Tape Was Not Moved'
    769 007162     125      156      162    7$:      .ASCIZ  'Unrecoverable Error'
    770 007206     106      141      164    8$:      .ASCIZ  'Fatal Controller Error'
    771                                              .EVEN
    772
    773 007236  007246   007302   007313    TSFCOD:  .WORD   1$,2$,3$,4$
    774 007246     111      156      164    1$:      .ASCIZ  'Internal Diagnostic Failure'
    775 007302     122      145      163    2$:      .ASCIZ  'Reserved'
    776 007313     102      165      163    3$:      .ASCIZ  'Bus Interface or Sanity Check Error'
    777 007357     122      145      163    4$:      .ASCIZ  'Reserved'
    778                                              .EVEN
```

```
                                            .SBTTL  PRIPKT  - PRINT THE ADDRESS/CONTENTS OF COMMAND PACKET

                                    ;+
                                    ;THIS ROUTINE PRINTS THE ADDRESS AND CONTENTS OF A COMMAND PACKET.
                                    ;THIS ROUTINE IS NORMALLY ONLY CALLED FROM A PRINT ROUTINE.
                                    ;
                                    ;INPUT:
                                    ;
                                    ;       R0      NUMBER OF WORDS IN PACKET
                                    ;       R3      HIGH ORDER COMMAND PACKET ADDRESS
                                    ;       R4      ADDRESS OF COMMAND PACKET
                                    ;
                                    ;       NOTE:   R3 IS IGNORED IF THE KTENABLE FLAG IS CLEAR.
                                    ;-

007370                              PRIPKT::
007370                                      SAVREG                          ;SAVE THE REGISTERS
007374  010005                              MOV     R0,R5                   ;SAVE NO. OF WORDS IN PACKET
007376  005737  003134                      TST     KTENABLE                ;ABOVE 28K UNDER TEST?
007402  001001                              BNE     10$                     ;BR IF YES
007404  005003                              CLR     R3                      ;SET HIGH ORDER ADDRESS TO 0
007406  010301                      10$:    MOV     R3,R1                   ;COPY HIGH ORDER ADDRESS
007410  010400                              MOV     R4,R0                   ;GET LOWER ADDRESS
007412  006100                              ROL     R0                      ;SHIFT BIT 15 INTO C BIT
007414  006101                              ROL     R1                      ;AND INTO HIGH ORDER.
007416                                      PRINTB  #PKTADD,R1,R4           ;PRINT PACKET ADDRESS
007416  010446                              MOV     R4,-(SP)
007420  010146                              MOV     R1,-(SP)
007422  012746  007554                      MOV     #PKTADD,-(SP)
007426  012746  000003                      MOV     #3,-(SP)
007432  010600                              MOV     SP,R0
007434  104414                              TRAP    C$PNTB
007436  062706  000010                      ADD     #10,SP
007442  010300                      15$:    MOV     R3,R0                   ;GET HIGH ORDER ADDRESS
007444  001404                              BEQ     20$                     ;BR IF NOT ABOVE 28K.
007446  010401                              MOV     R4,R1                   ;GET LOW ORDER ADDRESS
007450  004737  017316                      JSR     PC,SETMAP               ;SETUP PAR6 MAPPING FOR 18 BIT ADDRESS
007454  010004                              MOV     R0,R4                   ;GET RETURNED PAR6 ADDRESS BIAS
007456  005001                      20$:    CLR     R1                      ;SAVE WORD NUMBER
007460  012402                      25$:    MOV     (R4)+,R2                ;GET PACKET CONTENTS
007462                                      PRINTB  #PKTFRM,R1,R2           ;PRINT THE DATA
007462  010246                              MOV     R2,-(SP)
007464  010146                              MOV     R1,-(SP)
007466  012746  007516                      MOV     #PKTFRM,-(SP)
007472  012746  000003                      MOV     #3,-(SP)
007476  010600                              MOV     SP,R0
007500  104414                              TRAP    C$PNTB
007502  062706  000010                      ADD     #10,SP
007506  005201                              INC     R1                      ;NEXT WORD NUMBER
007510  020105                              CMP     R1,R5                   ;DONE ALL PACKET WORDS?
007512  002762                              BLT     25$                     ;LOOP TILL ALL DONE
007514  000207                              RTS     PC                      ;RETURN

007516     045     116     045      PKTFRM: .ASCIZ  '%N%A Packet Word #%D1%A = %O6'
007554     045     116     045      PKTADD: .ASCIZ  '%N%A Packet Address = %O1%O5'
                                            .EVEN
```

```
                                                .SBTTL  PRIBXOR - PRINT EXPD, RECV AND XOR BYTE

                                        ;+
                                        ;PRINT EXPECTED DATA, RECEIVED DATA, AND XOR OF THE DATA BYTE
                                        ;THIS ROUTINE IS NORMALLY CALLED ONLY FOR PRINT ROUTINES.
                                        ;
                                        ;INPUTS:
                                        ;
                                        ;       R1      RECEIVED DATA
                                        ;       R2      EXPECTED DATA
                                        ;
                                        ;OUTPUT:
                                        ;
                                        ;       R0      XOR OF EXPECTED/RECEIVED DATA
                                        ;-
007612                                  PRIBXOR::
007612                                          SAVREG                          ;SAVE THE REGISTERS
007616  010203                                  MOV     R2,R3                   ;EXPECTED DATA
007620                                          XOR     R1,R3                   ;FORM THE EXCLUSIVE OR
007630  012700  177400                          MOV     #↑C<377>,R0             ;BYTE MASK
007634  040001                                  BIC     R0,R1                   ;SAVE LOW BYTE RECV
007636  040002                                  BIC     R0,R2                   ;SAVE LOW BYTE EXPD
007640  040003                                  BIC     R0,R3                   ;SAVE LOW BYTE XOR
007642                                          PRINTB  #XORBFOR,R2,R1,R3 ;PRINT THE MESSAGE
007642  010346                                  MOV     R3,-(SP)
007644  010146                                  MOV     R1,-(SP)
007646  010246                                  MOV     R2,-(SP)
007650  012746  007674                          MOV     #XORBFOR,-(SP)
007654  012746  000004                          MOV     #4,-(SP)
007660  010600                                  MOV     SP,R0
007662  104414                                  TRAP    C$PNTB
007664  062706  000012                          ADD     #12,SP
007670  010300                                  MOV     R3,R0                   ;R0 HAS XOR ON RETURN
007672  000207                                  RTS     PC                      ;RETURN TO CALLER

007674     045     116     045  XORBFOR:        .ASCIZ  '%N%A EXPD: %O3%A RECV: %O3%A XOR: %O3'
                                                .EVEN
                                                .SBTTL  PRIXOR  - PRINT EXPD, RECV AND XOR
                                        ;+
                                        ;
                                        ;PRINT EXPECTED DATA, RECEIVED DATA, AND XOR OF THE TWO
                                        ;THIS ROUTINE IS NORMALLY CALLED ONLY FOR PRINT ROUTINES.
                                        ;
                                        ;INPUTS:
                                        ;
                                        ;       R1      RECEIVED DATA
                                        ;       R2      EXPECTED DATA
                                        ;
                                        ;OUTPUT:
                                        ;
                                        ;       R0      XOR OF EXPECTED/RECEIVED DATA
                                        ;-
007742                                  PRIXOR::
007742                                          SAVREG                          ;SAVE THE REGISTERS
007746  010203                                  MOV     R2,R3                   ;EXPECTED DATA
007750                                          XOR     R1,R3                   ;FORM THE EXCLUSIVE OR
007760                                          PRINTB  #XORFOR,R2,R1,R3 ;PRINT THE MESSAGE
```

```
     007760  010346                         MOV     R3,-(SP)
     007762  010146                         MOV     R1,-(SP)
     007764  010246                         MOV     R2,-(SP)
     007766  012746  010012                 MOV     #XORFOR,-(SP)
     007772  012746  000004                 MOV     #4,-(SP)
     007776  010600                         MOV     SP,R0
     010000  104414                         TRAP    C$PNTB
     010002  062706  000012                 ADD     #12,SP
 872 010006  010300                         MOV     R3,R0               ;R0 HAS XOR ON RETURN
 873 010010  000207                         RTS     PC                  ;RETURN TO CALLER
 874
 875 010012     045     116     045 XORFOR: .ASCIZ  '%N%A EXPD: %06%A RECV: %06%A XOR: %06'
 876                                        .EVEN
```

```
                                         .SBTTL  PRIEQU  - PRINT BIT NUMBERS AS ASCII EQUIVALENT

                                 ;+
                                 ;
                                 ;ROUTINE TO CONVERT BIT VALUES TO ASCII AND PRINT THE STRING
                                 ;THIS ROUTINE IS NORMALLY CALLED FROM A PRINT ROUTINE
                                 ;
                                 ;INPUTS:
                                 ;
                                 ;       R0      OCTAL VALUE TO CONVERT
                                 ;       R1      TABLE OF POINTERS TO ASCII EQUIVALENT
                                 ;
                                 ;-

010060                           PRIEQU:
010060                                   SAVREG                           ;SAVE THE REGISTERS
010064  000207                           RTS     PC                       ;RETURN TO CALLER

                                         .SBTTL  PRIRAM  - PRINT RAM ADDRESS
                                 ;+
                                 ;
                                 ;PRINT CONTROLLER RAM ADDRESS.
                                 ;THIS ROUTINE IS NORMALLY CALLED ONLY FROM PRINT ROUTINES.
                                 ;
                                 ;INPUTS:
                                 ;
                                 ;       R4      RAM ADDRESS
                                 ;
                                 ;-
010066                           PRIRAM:
010066                                   SAVREG                   ;SAVE R1-R5 UNTIL NEXT RETURN
010072                                   PRINTB  #RAMFOR,R4       ;PRINT RAM ADDRESS IN ERROR
010072  010446                           MOV     R4,-(SP)
010074  012746  010116                   MOV     #RAMFOR,-(SP)
010100  012746  000002                   MOV     #2,-(SP)
010104  010600                           MOV     SP,R0
010106  104414                           TRAP    C$PNTB
010110  062706  000006                   ADD     #6,SP
010114  000207                           RTS     PC               ;RETURN

010116     045     116     045   RAMFOR: .ASCIZ  '%N%A CONTROLLER RAM ADDRESS = %O6'
                                         .EVEN
```

```
                                                .SBTTL  PRIADD  - PRINT MEMORY ERROR ADDRESS
                                        ;+
                                        ;
                                        ;PRINT MEMORY ADDRESS
                                        ;THIS ROUTINE IS NORMALLY CALLED ONLY FROM PRINT ROUTINES.
                                        ;
                                        ; IMPLICIT INPUTS
                                        ;
                                        ;       ERRHI   - HIGH ORDER ADDRESS
                                        ;       ERRLO   - LOW ORDER ADDRESS
                                        ;
                                        ;-
010160                                  PRIADD:
010160                                          SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
010164  013700  002236                          MOV     ERRHI,R0                ;GET HIGH ADDRESSS
010170  013701  002240                          MOV     ERRLO,R1                ;GET LOW ADDRESS
010174  010102                                  MOV     R1,R2                   ;COPY LOW ADDRESS
010176  006101                                  ROL     R1                      ;SHIFT BIT 15 TO C BIT
010200  006100                                  ROL     R0                      ;SHIFT INTO HIGH ORDER
010202                                          PRINTB  #PRIA0,R0,R2            ;PRINT MEMORY ADDRESS IN ERROR
010202  010246                                  MOV     R2,-(SP)
010204  010046                                  MOV     R0,-(SP)
010206  012746  010230                          MOV     #PRIA0,-(SP)
010212  012746  000003                          MOV     #3,-(SP)
010216  010600                                  MOV     SP,R0
010220  104414                                  TRAP    C$PNTB
010222  062706  000010                          ADD     #10,SP
010226  000207                                  RTS     PC                      ;RETURN

010230     045     116     045          PRIA0:  .ASCIZ  '%N%A MEMORY ERROR ADDRESS = %01%05'
                                                .EVEN

                                                .SBTTL  PRITADD - PPINT MEMORY TEST ADDRESS
                                        ;+
                                        ;
                                        ;PRINT MEMORY ADDRESS
                                        ;THIS ROUTINE IS NORMALLY CALLED ONLY FROM PRINT ROUTINES.
                                        ;
                                        ; IMPLICIT INPUTS
                                        ;
                                        ;       ERRHI   - HIGH ORDER ADDRESS
                                        ;       ERRLO   - LOW ORDER ADDRESS
                                        ;
                                        ;-
010274                                  PRITADD:
010274                                          SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
010300  013702  002236                          MOV     ERRHI,R2                ;GET HIGH ADDRESSS
010304  013701  002240                          MOV     ERRLO,R1                ;GET LOW ADDRESS
                                                ;MOV    R1,R2                   ;COPY LOW ADDRESS
                                                ;ROL    R1                      ;SHIFT BIT 15 TO C BIT
                                                ;ROL    R0                      ;SHIFT INTO HIGH ORDER
010310                                          PRINTB  #PRIT0,R1               ;PRINT MEMORY ADDRESS LOW IN ERROR
010310  010146                                  MOV     R1,-(SP)
010312  012746  010356                          MOV     #PRIT0,-(SP)
010316  012746  000002                          MOV     #2,-(SP)
010322  010600                                  MOV     SP,R0
010324  104414                                  TRAP    C$PNTB
```

```
     010326  062706  000006                     ADD     #6,SP
     010332                                     PRINTB  #PRIT1,R2         ;PRINT MEMORY ADDRESS HIGH IN ERROR
     010332  010246                             MOV     R2,-(SP)
     010334  012746  010421                     MOV     #PRIT1,-(SP)
     010340  012746  000002                     MOV     #2,-(SP)
     010344  010600                             MOV     SP,R0
     010346  104414                             TRAP    C$PNTB
     010350  062706  000006                     ADD     #6,SP
     010354  000207                             RTS     PC                ;RETURN

     010356     045     116     045  PRIT0:    .ASCIZ  '%N%A MEMORY TEST ADDRESS LOW = %O6'
     010421     045     116     045  PRIT1:    .ASCIZ  '%N%A MEMORY TEST ADDRESS HIGH = %O6'
                                                .EVEN
                                                .SBTTL  SPACE   - SPACE RECORDS (FORWARD AND REVERSE) COMMAND

                                        ;+
                                        ;
                                        ;ROUTINE TO ISSUE A SPACE RECORDS
                                        ;COMMAND (FORWARD OR REVERSE)
                                        ;
                                        ;INPUT:
                                        ;
                                        ;       R3      NUMBER OF RECORDS TO BE SPACED OVER
                                        ;               BIT15 CONTROLS DIRECTION
                                        ;               BIT15 = 0 IS FORWARD
                                        ;               BIT15 = 1 IS REVERSE
                                        ;       R5      FIRST DEVICE UNIBUS ADDRESS
                                        ;
                                        ;       REQUIRES A WRITE CHARACTERISTICS DONE PREVIOUSLY
                                        ;
                                        ;OUTPUT:
                                        ;
                                        ;       CARRY   SET - SPACE RECORDS COMMAND OK
                                        ;               CLR - SPACE RECORDS FAILED
                                        ;
                                        ;
                                        ;       RO      THE CONTENTS OF R4 IS MOVED TO RO
                                        ;
                                        ;
                                        ;IMPLICIT OUTPUT:
                                        ;
                                        ;       TAPE HAS BEEN MOVED
                                        ;
                                        ;SIDE EFFECTS:
                                        ;
                                        ;
                                        ;-

010466                                  SPACE::
010466                                          SAVREG                          ;SAVE THE GENERAL REGISTERS
010472  012737  000764  010660                  MOV     #500.,SDELAY            ;SET UP DELAY
010500  012737  140010  010650                  MOV     #140010,80$             ;SET UP COMMAND, SPACE FORWARD
010506  005703                                  TST     R3                      ;CHECK FOR DIRECTION
010510  100403                                  BMI     5$                      ;BR, IF REVERSE INDICATED
010512  010337  010652                          MOV     R3,90$                  ;LOAD UP NUMBER OF RECORDS TO SPACE
010516  000407                                  BR      10$                     ;GO DO COMMAND
010520  042703  100000                  5$:     BIC     #BIT15,R3               ;CLEAR DIRECTION BIT
010524  010337  010652                          MOV     R3,90$                  ;LOAD UP NUMBER OF RECORDS TO SPACE
010530  052737  000400  010650                  BIS     #BIT8,80$               ;SET REVERSE BIT IN COMMAND PACKET
010536  012704  010650                  10$:    MOV     #80$,R4                 ;SET UP R4 WITH PACKET ADDRESS
010542  010465  000000                          MOV     R4,TSDB(R5)             ;SEND OUT COMMAND
010546  004737  016250                  15$:    JSR     PC,WAITF                ;WAIT FOR SSR
010552  103420                                  BCS     20$                     ;BR, IF SSR IS SET AND OK
010554                                          DELAY   250             ;DELAY ABOUT .25 SECONDS
010554  012727  000250                          MOV     #250,(PC)+
010560  000000                                  .WORD   0
010562  013727  002116                          MOV     L$DLY,(PC)+
010566  000000                                  .WORD   0
010570  005367  177772                          DEC     -6(PC)
010574  001375                                  BNE     .-4
```

```
       010576  005367  177756              DEC     -22(PC)
       010602  001367                      BNE     .-20
  1018 010604  005337  010660              DEC     SDELAY                          ;BUMP DELAY COUNTER DOWN
  1019 010610  001356                      BNE     15$                             ;BR, IF MORE DELAY
  1020 010612  000411                      BR      60$                             ;BR IF TROUBLE CARRY = CLEAR
  1021 010614  016501  000002      20$:    MOV     TSSR(R5),R1                     ;READ TSSR
  1022 010620  012702  000200              MOV     #SSR,R2                         ;SET UP EXPECTED
  1023 010624  020201              25$:    CMP     R2,R1                           ;ARE THEY OK
  1024 010626  001401                      BEQ     40$                             ;BR, IF EQUAL = OK
  1025 010630  000402                      BR      60$                             ;TROUBLE EXIT
  1026 010632  000261              40$:    SEC                                     ;SET CARRY NO TROUBLE
  1027 010634  000401                      BR      70$                             ;EXIT
  1028 010636  000241              60$:    CLC                                     ;CARRY CLEAR = ERROR
  1029 010640                      70$:
  1030 010640  010400                      MOV     R4,R0                           ;PASS PACKET ADDRESS
  1031 010642  000207                      RTS     PC                              ;RETURN
  1032                             ;
  1033                             ;
  1034                             ;
  1035                             ;PACKET FOR SPACE COMMAND
  1036                             ;
  1038         010650                      .=<.+10>&177770
  1040                             ;
  1041                             ;COMMAND WORD
  1042 010650  000000              80$:    .WORD
  1043                             ;NUMBER OF RECORDS TO BE SPACED OVER WORD
  1044 010652  000000              90$:    .WORD
  1045 010654  000000                      .WORD
  1046 010656  000000                      .WORD
  1047 010660  000000              SDELAY: .WORD   0                               ;DELAY COUNTER
  1048                                     .EVEN
  1049                                     .SBTTL  WRTCHR  - WRITE CHARACTERISTICS COMMAND
```

```
                                ;+
                                ;ROUTINE TO ISSUE A WRITE CHARACTERISTICS
                                ;COMMAND SO THAT OTHER COMMANDS WILL BE ACCEPTED
                                ;
                                ;INPUT:
                                ;       R4      ADDRESS OF PACKET FROM TEST
                                ;       R5      FIRST DEVICE UNIBUS ADDRESS
                                ;       REQUIRES A CALL TO SOFINIT BE DONE PREVIOUSLY
                                ;
                                ;OUTPUT:
                                ;       R0      TSSR CONTENTS
                                ;       CARRY   SET - WRITE CHARACTERISTICS COMMAND OK
                                ;               CLR - WRITE CHARACTERISTICS FAILED
                                ;
                                ;IMPLICIT OUTPUT:
                                ;
                                ;       MESSAGE BUFFER AND OTHER BUFFERS ALL SET UP
                                ;       SOFTWARE SWITCHES SET AS FOLLOWS:
                                ;               EXTFEA = EXTENDED FEATURES PRESENT
                                ;               BENBSW = BUFFER ENABLE SWITCH ON OR OFF
                                ;
                                ;SIDE EFFECTS:
                                ;-
010662                          WRTCHR::
010662                                  SAVREG                          ;SAVE THE GENERAL REGISTERS
010666  005037  002230                  CLR     BENBSW          ;CLEAR BUFFER ENABLE SWITCH
010672  005037  002226                  CLR     EXTFEA                  ;CLEAR EXTENDED FEATURES SW SWITCH
010676  010465  000000          10$:    MOV     R4,TSDB(R5)             ;SEND OUT COMMAND
010702  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR
010706  103401                          BCS     20$                     ;BR, IF SSR IS SET AND OK
010710  000435                          BR      60$                     ;BR IF TROUBLE CARRY = CLEAR
010712  016501  000002          20$:    MOV     TSSR(R5),R1             ;READ TSSR
010716  012702  000200                  MOV     #SSR,R2                 ;SET UP EXPECTED
010722  032701  000100                  BIT     #OFL,R1                 ;WAS OFF LINE SET IN TSSR
010726  001402                          BEQ     25$                     ;BR, IF NO OFL SET
010730  052702  000100                  BIS     #OFL,R2                 ;MAKE THEM LOOK ALIKE
010734  020201                  25$:    CMP     R2,R1                   ;ARE THEY OK
010736  001401                          BEQ     40$                     ;BR, IF EQUAL = OK
010740  000421                          BR      60$                     ;TROUBLE EXIT
010742  062704  000010          40$:    ADD     #8.,R4                  ;POINT TO WRT CHARA DATA PACKET
010746  011403                          MOV     (R4),R3                 ;GET ADDRESS OF MESSAGE BUFFER
010750  032763  000200  000012          BIT     #X2.EXTF,XST2(R3)       ;EXTENDED FEATURES BIT SET?
010756  001402                          BEQ     45$                     ;BR IF NO
010760  005237  002226                  INC     EXTFEA                  ;SET EXTENDED FEATURES SW SWITCH
010764                          45$:
010764  032763  000100  000012          BIT     #X2.BUFE,XST2(R3)       ;BUFFER ENABLE SWITCH SET
010772  001402                          BEQ     50$                     ;BR, IF SWITCH NOT SET
010774  005237  002230                  INC     BENBSW                  ;SET SOFTWARE SWITCH FOR ENABLED
011000                          50$:
011000  000261                          SEC                             ;SET CARRY NO TROUBLE
011002  000401                          BR      70$                     ;EXIT
011004  000241                  60$:    CLC                             ;CARRY CLEAR = ERROR
011006  016500  000002          70$:    MOV     TSSR(R5),R0             ;RETURN TSSR CONTENTS
011012  000207                          RTS     PC                      ;RETURN
```

```
                                .SBTTL  REWIND  - POSITION TAPE (REWIND) COMMAND
                        ;+
                        ;
                        ;THIS ROUTINE WILL REWIND THE SELECTED TAPE.
                        ;
                        ;       CAUTION: THE ROUTINE DOES NOT WAIT FOR BOT
                        ;                TO ARRIVE. ALSO THE CALLER MUST CHECK FOR
                        ;                SSR TO SET IN THE TSSR
                        ;
                        ;
                        ;CALLING SEQUENCE:
                        ;
                        ;       DO A SOFT INIT
                        ;       DO A WRITE CHARACTERISTICS
                        ;       JSR     PC,REWIND
                        ;
                        ;INPUT:
                        ;
                        ;       R5      FIRST DEVICE UNIBUS ADDRESS
                        ;
                        ;
                        ;OUTPUT
                        ;
                        ;       R0      THE CONTENTS OF R4 IS PASSED TO R0
                        ;
                        ;
                        ;-
011014                  REWIND::
011014                          SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
011020  012704  011110          MOV     #RWPACK,R4              ;GET PACKET ADDRESS
011024  010465  000000          MOV     R4,TSDB(R5)             ;SEND PACKET ADDRESS TO EXECUTE
011030  012703  000550          MOV     #360.,R3                ;ENOUGH TIME FOR 2400' REEL TO REWIND
011034  004737  016250  10$:    JSR     PC,WAITF                ;WAIT FOR SSR TO SET
011040  103417                  BCS     20$                     ;LEAVE WHEN SSR IS SET
011042                          DELAY   250.                    ;WAIT FOR .25 SECONDS
011042  012727  000372          MOV     #250.,(PC)+
011046  000000                  .WORD   0
011050  013727  002116          MOV     L$DLY,(PC)+
011054  000000                  .WORD   0
011056  005367  177772          DEC     -6(PC)
011062  001375                  BNE     .-4
011064  005367  177756          DEC     -22(PC)
011070  001367                  BNE     .-20
011072  005303                  DEC     R3                      ;BUMP COUNTER DOWN
011074  001357                  BNE     10$                     ;KEEP GOING
011076  000241                  CLC                             ;CLEAR CARRY TO SET ERROR
011100  010400          20$:    MOV     R4,R0                   ;PASS THE PACKET ADDRESS
011102  000207                  RTS     PC                      ;RETURN

        011110                  .=<.+10>&177770
011110                  RWPACK:
011110  102010                  .WORD   102010                  ;POSTION COMMAND (REWIND)
011112  000000                  .WORD   0                       ;NOT USED
```

```
                                            .SBTTL  CKRAM    - COMPARE RAM TO I/O PACKET
                                    ;+
                                    ;
                                    ;ROUTINE TO READ THE FIRST 8 BYTES FROM RAM
                                    ;MEMORY AND COMPARE THIS DATA TO A COMMAND PACKET.
                                    ;
                                    ;INPUT:
                                    ;
                                    ;       R4      ADDRESS OF THE COMMAND PACKET
                                    ;       R5      FIRST DEVICE UNIBUS ADDRESS
                                    ;
                                    ;OUTPUT:
                                    ;
                                    ;       CARRY   SET - RAM MATCHES PACKET
                                    ;               CLR - RAM DOES NOT MATCH PACKET
                                    ;
                                    ;IMPLICIT OUTPUT:
                                    ;
                                    ;       THE TABLE RAMDATA IS FILLED WITH THE
                                    ;       DATA HELD IN RAM.
                                    ;       RAMSIZ IS SET TO 8. FOR PRAMPKT ROUTINE
                                    ;
                                    ;SIDE EFFECTS:
                                    ;
                                    ;       THE SUBSYSTEM IS LEFT IN MAINTENANCE MODE
                                    ;
                                    ;-

011114                              CKRAM::
011114                                      SAVREG                          ;SAVE THE GENERAL REGISTERS
011120  012701  002242                      MOV     #RAMDATA,R1             ;ADDRESS TO SAVE THE RAM DATA
011124  012702  000201                      MOV     #RMPKTBEG,R2            ;BYTE ADDRESS OF FIRST RAM DATA
011130  005003                              CLR     R3                      ;CLEAR THE ERROR FLAG
011132  004737  016336                      JSR     PC,CHKTSSR              ;WAIT FOR SSR
011136  112765  000000  000000              MOVB    #0,TSDB(R5)             ;SET MAINTENANCE MODE
011144  004737  016336              10$:    JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
011150  010265  000000                      MOV     R2,TSDB(R5)             ;SELECT NEXT RAM ADDRESS
011154  004737  016336                      JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
011160  116511  000000                      MOVB    TSBA(R5),(R1)           ;READ THE RAM DATA
011164  122124                              CMPB    (R1)+,(R4)+             ;COMPARE TO EXPECTED
011166  001401                              BEQ     20$                     ;BRANCH IF OK
011170  005203                              INC     R3                      ;SET ERROR FLAG
011172  005202                      20$:    INC     R2                      ;ADDRESS OF NEXT RAM LOCATION
011174  020227  000210                      CMP     R2,#RMPKTEND            ;REACHED END YET ?
011200  003761                              BLE     10$                     ;BRANCH TILL ALL READ
011202  005703                              TST     R3                      ;WAS AN ERROR FOUND ?
011204  001402                              BEQ     30$                     ;BRANCH IF NOT
011206  000241                              CLC                             ;CLEAR CARRY TO SHOW ERROR
011210  000401                              BR      50$                     ;AND EXIT
011212  000261                      30$:    SEC                             ;SHOW GOOD COMPARE
011214  012737  000010  002302      50$:    MOV     #8.,RAMSIZ              ;SETUP RAMSIZ FOR PRAMPKT ROUTINE
011222  000207                              RTS     PC                      ;RETURN
```

```
                                                .SBTTL  CKRAM2  - COMPARE RAM TO I/O CHARACTERISTICS DATA
                                        ;+
                                        ;
                                        ;ROUTINE TO READ THE FIRST 8 OR 10 BYTES FROM RAM
                                        ;MEMORY AND COMPARE THIS DATA TO A CHARACTERISTICS DATA BLOCK.
                                        ;
                                        ;INPUT:
                                        ;
                                        ;       P4      ADDRESS OF THE CHARACTERISTICS DATA
                                        ;       R5      FIRST DEVICE UNIBUS ADDRESS
                                        ;
                                        ;OUTPUT:
                                        ;
                                        ;       CARRY   SET - RAM MATCHES PACKET
                                        ;               CLR - RAM DOES NOT MATCH PACKET
                                        ;
                                        ;IMPLICIT OUTPUT:
                                        ;
                                        ;       THE TABLE RAMDATA IS FILLED WITH THE
                                        ;       DATA HELD IN RAM.
                                        ;       RAMSIZ IS SET TO 8. OR 10. FOR PRAMPKT ROUTINE
                                        ;
                                        ;SIDE EFFECTS:
                                        ;
                                        ;       THE SUBSYSTEM IS LEFT IN MAINTENANCE MODE
                                        ;-
011224                                  CKRAM2::
011224                                          SAVREG                          ;SAVE THE GENERAL REGISTERS
011230  012701  002242                          MOV     #RAMDATA,R1             ;ADDRESS TO SAVE THE RAM DATA
011234  012702  000167                          MOV     #RMCHBEG,R2             ;BYTE ADDRESS OF FIRST RAM DATA
011240  005003                                  CLR     R3                      ;CLEAR THE ERROR FLAG
011242  004737  016336                          JSR     PC,CHKTSSR              ;WAIT FOR SSR
011246  112765  000000  000000                  MOVB    #0,TSDB(R5)             ;SET MAINTENANCE MODE
011254  004737  016336                  10$:    JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
011260  010265  000000                          MOV     R2,TSDB(R5)             ;SELECT NEXT RAM ADDRESS
011264  004737  016336                          JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
011270  116511  000000                          MOVB    TSBA(R5),(R1)           ;READ THE RAM DATA
011274  122124                                  CMPB    (R1)+,(R4)+             ;COMPARE TO EXPECTED
011276  001401                                  BEQ     20$                     ;BRANCH IF OK
011300  005203                                  INC     R3                      ;SET ERROR FLAG
011302  005202                          20$:    INC     R2                      ;ADDRESS OF NEXT RAM LOCATION
011304  012737  000010  002302                  MOV     #8.,RAMSIZ              ;ASSUME EXTFEA NOT SET
011312  005737  002226                          TST     EXTFEA                  ;IS THE SOFTWARE EXTENDED FEATURES SET
011316  001407                                  BEQ     25$                     ;BR, IF NOT SET
011320  012737  000012  002302                  MOV     #10.,RAMSIZ             ;SET RAMSIZ FOR EXTEND FEATURES
011326  020227  000200                          CMP     R2,#RMCHEND             ;AT END OF EXTENDED BUFFER
011332  003750                                  BLE     10$                     ;BR, IF NOT AT END YET
011334  000403                                  BR      27$                     ;AT END BRANCH
011336  020227  000176                  25$:    CMP     R2,#RMCHEND-2           ;REACHED END YET ?
011342  003744                                  BLE     10$                     ;BRANCH TILL ALL READ
011344  005703                          27$:    TST     R3                      ;WAS AN ERROR FOUND ?
011346  001402                                  BEQ     30$                     ;BRANCH IF NOT
011350  000241                                  CLC                             ;CLEAR CARRY TO SHOW ERROR
011352  000401                                  BR      50$                     ;AND EXIT
011354  000261                          30$:    SEC                             ;SHOW GOOD COMPARE
011356  000207                          50$:    RTS     PC                      ;RETURN
```

```
                                            .SBTTL  CKMSG   - COMPARE WRITE CHAR. MESSAGE BUFFERS
                                    ;+
                                    ;
                                    ;ROUTINE TO COMPARE A WRITE CHARACTERISTICS EXPD AND RECV
                                    ;BUFFER. THE EXPECTED AND RECEIVED BUFFERS ARE STORED FOR
                                    ;ERROR PRINT POUTINES.
                                    ;
                                    ;INPUT:
                                    ;
                                    ;       R0      RECV MESSAGE BUFFER HIGH ORDER ADDRESS
                                    ;       R1      RECV MESSAGE BUFFER LOW ORDER ADDRESS
                                    ;       R2      EXPD MESSAGE BUFFER ADDRESS
                                    ;OUTPUT:
                                    ;
                                    ;       CARRY   SET - MESSAGE BUFFERS MATCH
                                    ;               CLR -MESSAGE BUFFERS DON'T MATCH
                                    ;
                                    ;IMPLICIT OUTPUT:
                                    ;
                                    ;       EXPMSG          BUFFER IS SET TO EXPD DATA
                                    ;       RECMSG          BUFFER IS SET TO RECV DATA
                                    ;       RCVHIADD        SET TO HIGH ORDER ADDRESS OF RECV
                                    ;       RCVLOADD        SET TO LOW ORDER ADDRESS OF RECV
                                    ;
                                    ;-
011360                              CKMSG::
011360                                      SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
011364  010037  002304                      MOV     R0,RCVHIADD             ;SAVE RECV HIGH ADDRESS
011370  010137  002306                      MOV     R1,RCVLOAD              ;SAVE RECV LOW ADDRESS
011374  005737  003134                      TST     KTENABLE                ;TESTING ABOVE 28K?
011400  001403                              BEQ     10$                     ;BR IF NO
011402  004737  017316                      JSR     PC,SETMAP               ;RETURN ADDRESS BIASED TO PAR6 IN R0
011406  010001                              MOV     R0,R1                   ;GET RETURNED ADDRESS BIASED TO PAR6
011410  005004                      10$:    CLR     R4                      ;WORD IN BUFFER
011412  005003                              CLR     R3                      ;CLEAR ERROR SEEN FLAG
011414  010205                              MOV     R2,R5                   ;GET EXPD BUFFER ADDRESS
011416  011264  002322              15$:    MOV     (R2),EXPMSG(R4)         ;SAVE EXPD FOR ERROR REPORT
011422  011164  002466                      MOV     (R1),RECMSG(R4)         ;SAVE RECV FOR ERROR REPORT
011426  022221                              CMP     (R2)+,(R1)+             ;EXPD EQUAL RECV?
011430  001401                              BEQ     25$                     ;BR IF YES
011432  005203                              INC     R3                      ;SET ERROR SEEN FLAG
011434  062704  000002              25$:    ADD     #2,R4                   ;POINT TO NEXT WORD ADDRESS
011440  020427  000014                      CMP     R4,#14                  ;DONE FIRST 7 WORDS?
011444  003764                              BLE     15$                     ;BR IF NO
011446  032765  000200  000012              BIT     #X2.EXTF,XST2(R5);IS EXTENDED FEATURES SET IN EXPD?
011454  001403                              BEQ     50$                     ;BR IF NO
011456  020427  000016                      CMP     R4,#16                  ;DONE EXTENDED FEATURES WORD?
011462  003755                              BLE     15$                     ;BR IF NO
011464  005703                      50$:    TST     R3                      ;ANY ERRORS SEEN?
011466  001402                              BEQ     55$                     ;BR IF NO
011470  000241                              CLC                             ;SET FAILURE
011472  000401                              BR      60$                     ;
011474  000261                      55$:    SEC                             ;SET SUCCESS
011476  000207                      60$:    RTS     PC                      ;RETURN
```

```
                                        .SBTTL  CKMSG2  - COMPARE EXPD RECV MESSAGE BUFFERS
                                ;+
                                ;ROUTINE TO COMPARE AN EXPECTED AND RECEIVED MESSAGE
                                ;BUFFER. THE EXPECTED AND RECEIVED BUFFERS ARE STORED FOR
                                ;ERROR PRINT ROUTINES.
                                ;
                                ;INPUT:
                                ;       R0      RECV MESSAGE BUFFER HIGH ORDER ADDRESS
                                ;       R1      RECV MESSAGE BUFFER LOW ORDER ADDRESS
                                ;       R2      EXPD MESSAGE BUFFER ADDRESS
                                ;       R3      NUMBER OF BYTES TO COMPARE
                                ;
                                ;OUTPUT:
                                ;       CARRY   SET - MESSAGE BUFFERS MATCH
                                ;               CLR - MESSAGE BUFFERS DON'T MATCH
                                ;
                                ;IMPLICIT OUTPUT:
                                ;       EXPMSG          BUFFER IS SET TO EXPD DATA
                                ;       RECMSG          BUFFER IS SET TO RECV DATA
                                ;       RCVHIADD        SET TO HIGH ORDER ADDRESS OF RECV
                                ;       RCVLOADD        SET TO LOW ORDER ADDRESS OF RECV
                                ;-
011500                          CKMSG2::
011500                                  SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
011504  020327  000144                  CMP     R3,#RECMSG-EXPMSG;88D IS COUNT ABOVE MAX ALLOWED?
011510  003412                          BLE     5$                      ;88D BR IF NO
011512  012703  000144                  MOV     #RECMSG-EXPMSG,R3;88D
011516                                  PRINTF  #DEBUGMSG               ;88D
  011516  012746  011632                MOV     #DEBUGMSG,-(SP)
  011522  012746  000001                MOV     #1,-(SP)
  011526  010600                        MOV     SP,R0
  011530  104417                        TRAP    C$PNTF
  011532  062706  000004                ADD     #4,SP
011536  010037  002304          5$:     MOV     R0,RCVHIADD             ;SAVE RECV HIGH ADDRESS
011542  010137  002306                  MOV     R1,RCVLOAD              ;SAVE RECV LOW ADDRESS
011546  005737  003134                  TST     KTENABLE                ;TESTING ABOVE 28K?
011552  001403                          BEQ     10$                     ;BR IF NO
011554  004737  017316                  JSR     PC,SETMAP               ;RETURN ADDRESS BIASED TO PAR6 IN R0
011560  010001                          MOV     R0,R1                   ;GET RETURNED ADDRESS BIASED TO PAR6
011562  005004                  10$:    CLR     R4                      ;WORD IN BUFFER
011564  005005                          CLR     R5                      ;CLEAR ERROR SEEN FLAG
011566  111264  002322          15$:    MOVB    (R2),EXPMSG(R4) ;SAVE EXPD FOR ERROR REPORT
011572  111164  002466                  MOVB    (R1),RECMSG(R4) ;SAVE RECV FOR ERROR REPORT
011576  122221                          CMPB    (R2)+,(R1)+             ;EXPD EQUAL RECV?
011600  001401                          BEQ     25$                     ;BR IF YES
011602  005205                          INC     R5                      ;SET ERROR SEEN FLAG
011604  062704  000001          25$:    ADD     #1,R4                   ;POINT TO NEXT BYTE
011610  020403                          CMP     R4,R3                   ;DONE ALL BYTES?
011612  002001                          BGE     50$                     ;BR IF YES
011614  000764                          BR      15$                     ;DO NEXT BYTE
011616  005705                  50$:    TST     R5                      ;ANY ERRORS SEEN?
011620  001402                          BEQ     55$                     ;BR IF NO
011622  000241                          CLC                             ;SET FAILURE
011624  000401                          BR      60$                     ;
011626  000261                  55$:    SEC                             ;SET SUCCESS
011630  000207                  60$:    RTS     PC                      ;RETURN
```

```
 011632     120      122      117  DEBUGMSG: .ASCIZ 'PROGRAM INTERNAL ERROR -CKMSG2 MESSAGE BUFFER EXCEEDED-';@@D
 011722     045      116      045  FERCM:  .ASCII  /%N%A  ***/
 011733     040      040      124  ERCM:   .ASCIZ  /  TSSR ERROR CODE REC'D = /
 011766     056      056      056  SIMSG:  .ASCIZ  /.... AFTER DOING SOFT INIT/
 012021     124      105      123  TINERR: .ASCIZ  /TEST: .../
                                           .EVEN
                                   ;+
                                   ;
                                   ;PRINT ROUTINE TO FATAL SOFT INIT ERRORS
                                   ;
                                   ;INPUT:
                                   ;
                                   ;       R1      CONTENTS OF TSSR AT ERROR
                                   ;
                                   ;SIDE EFFECTS:
                                   ;
                                   ;       EXECUTES DROP UNIT TO CEASE TESTING
                                   ;
                                   ;-

 012034                                    BGNMSG  SFIMSG
 012034                            SFIMSG::
 012034  004737   006024                   JSR     PC,PRITSSR       ;PRINT CONTENTS OF TSSR REGISTER
 012040  004737   017202                   JSR     PC,CKDROP        ;DROP UNIT, IF ALLOWED
 012044                                    ENDMSG
 012044                            L10003:
 012044  104423                            TRAP    C$MSG

                                   ;+
                                   ;PRINT ROUTINE TO PRINT THE CONTENTS OF
                                   ;TSSR AND A COMMAND PACKET OTHER THAN GET STATUS COMMAND PACKET.
                                   ;
                                   ;INPUTS:
                                   ;
                                   ;       R1      TSSR CONTENTS
                                   ;       R4      ADDRESS OF COMMAND PACKET
                                   ;
                                   ;-

 012046                                    BGNMSG  PKTSSR
 012046                            PKTSSR::
 012046  004737   006024                   JSR     PC,PRITSSR       ;PRINT THE CONTENTS OF TSSR REGISTER
 012052  012700   000004                   MOV     #4,R0            ;NO. OF WORDS IN PACKET
 012056  004737   007370                   JSR     PC,PRIPKT        ;PRINT THE CONTENTS OF COMMAND PACKET
 012062                                    ENDMSG
 012062                            L10004:
 012062  104423                            TRAP    C$MSG
```

```
                                        ;+
                                        ;PRINT ROUTINE TO PRINT THE CONTENTS OF
                                        ;TSSR AND A GET STATUS COMMAND PACKET.
                                        ;
                                        ;INPUTS:
                                        ;
                                        ;       R1      TSSR CONTENTS
                                        ;       R4      ADDRESS OF COMMAND PACKET
                                        ;-
012064                                          BGNMSG  PKTGETS
012064                                  PKTGETS::
012064  004737  006024                          JSR     PC,PRITSSR      ;PRINT THE CONTENTS OF TSSR REGISTER
012070  012700  000002                          MOV     #2,R0           ;NO. OF WORDS IN GET STATUS PACKET
012074  004737  007370                          JSR     PC,PRIPKT       ;PRINT THE CONTENTS OF COMMAND PACKET
012100                                          ENDMSG
012100                                  L10005:
012100  104423                                  TRAP    C$MSG
                                        ;+
                                        ;PRINT TSSR ERRORS FOR INITIALIZATION TESTS
                                        ;
                                        ;INPUTS:
                                        ;       R1      TSSR CONTENTS
                                        ;       R4      ADDRESS OF COMMAND PACKET
                                        ;-
012102                                          BGNMSG  SFFMSG
012102                                  SFFMSG::
012102  004737  006024                          JSR     PC,PRITSSR      ;PRINT CONTENTS OF TSSR REGISTER
012106                                          ENDMSG
012106                                  L10U06:
012106  104423                                  TRAP    C$MSG
                                                .SBTTL  PKTMES  - PRINT TSSR AND MESSAGE BUFFER
                                        ;+
                                        ;PRINT ROUTINE TO PRINT THE CONTENTS OF TSSR AND MESSAGE
                                        ;BUFFER FOR ERROR REPORTS
                                        ;
                                        ;INPUTS:
                                        ;
                                        ;       R1      CONTENTS OF TSSR
                                        ;       R2      LOW ORDER MESSAGE BUFFER
                                        ;       R3      HIGH ORDER MESSAGE BUFFER ADDRESS
                                        ;       NOTE: R3 IS IGNORED IF KTENABLE FLAG IS CLEAR
                                        ;-
012110                                          BGNMSG  PKTMES
012110                                  PKTMES::
012110  004737  006024                          JSR     PC,PRITSSR              ;PRINT CONTENTS OF TSSR
012114  010200                                  MOV     R2,R0                   ;LOW ORDER ADDRESS
012116  010301                                  MOV     R3,R1                   ;HIGH ORDER ADDRESS
012120  004737  014242                          JSR     PC,PRMESS               ;PRINT THE MESSAGE BUFFER
012124                                          ENDMSG
012124                                  L10007:
012124  104423                                  TRAP    C$MSG
```

```
                                    .SBTTL  ADDSSR  - PRINT TEST ADDRESS AND TSSR
                          ;+
                          ;PRINT ROUTINE TO PRINT THE CONTENTS OF
                          ;TSSR AND A MEMORY TEST ADDRESS
                          ;
                          ;INPUTS:
                          ;
                          ;         R5      FIRST DEVICE UNIBUS ADDRESS
                          ;         ERRHI   HIGH ORDER MEMORY TEST ADDRESS
                          ;         ERRLO   LOW ORDER MEMORY TEST ADDRESS
                          ;-

012126                              BGNMSG  ADDSSR
012126                    ADDSSR::
012126  004737  010274              JSR     PC,PRITADD      ;PRINT MEMORY TEST ADDRESS
012132  016501  000002              MOV     TSSR(R5),R1     ;GET CURRENT TSSR
012136  004737  006024              JSR     PC,PRITSSR      ;PRINT THE CONTENTS OF TSSR REGISTER
012142                              ENDMSG
012142                    L10010:
012142  104423                      TRAP    C$MSG

                                    .SBTTL  MSGEXP - PRINT WRITE CHAR. EXPD-RECV MESSAGE BUFFERS
                          ;+
                          ;
                          ;PRINT ROUTINE TO PRINT WRITE CHARACTERISTIC MESSAGE BUFFER
                          ;
                          ;IMPLICIT INPUTS:
                          ;
                          ;         EXPMSG  - EXPECTED MESSAGE BUFFER
                          ;         RECMSG  - RECEIVED MESSAGE BUFFER
                          ;         RCVHIADD- RECEIVED MESSAGE BUFFER HIGH ORDER ADDRESS
                          ;         RCVLOADD- RECEIVED MESSAGE BUFFER LOW ORDER ADDRESS
                          ;-
012144                              BGNMSG  MSGEXP
012144                    MSGEXP::
012144  012700  000007              MOV     #7,R0           ;ASSUME NO EXT FEATURES
012150  005737  002226              TST     EXTFEA          ;EXT FEATURES SET?
012154  001402                      BEQ     5$              ;BR IF NO
012156  012700  000010              MOV     #8.,R0          ;EXT FEATURE BUFFER IS 8 WORDS
012162  004737  014552    5$:       JSR     PC,PRMSGEXP     ;PRINT EXPD/RECV MESSAGE BUFFERS
012166                              ENDMSG
012166                    L10011:
012166  104423                      TRAP    C$MSG
```

```
                                          .SBTTL  FIFEXP  - PRINT FIFO EXP/RECV DATA
                                  ;+
                                  ;
                                  ;PRINT ROUTINE TO PRINT FIFO EXP/RECV DATA
                                  ;
                                  ;       R1      - BYTE COUNT
                                  ;
                                  ;IMPLICIT INPUTS:
                                  ;
                                  ;       EXPMSG  - EXPECTED MESSAGE BUFFER (CONTAINS FIFO DATA ONLY
                                  ;       RECMSG  - RECEIVED MESSAGE BUFFER (CONTAINS FIFO DATA ONLY)
                                  ;-
012170                                    BGNMSG  FIFEXP
012170                            FIFEXP::
012170                                    PRINTX  #FIF1MSG,R1        ;PRINT BYTES TRANSFERRED
012170  010146                            MOV     R1,-(SP)
012172  012746  012242                    MOV     #FIF1MSG,-(SP)
012176  012746  000002                    MOV     #2,-(SP)
012202  010600                            MOV     SP,R0
012204  104415                            TRAP    C$PNTX
012206  062706  000006                    ADD     #6,SP
012212                                    PRINTX  #FIF2MSG           ;PRINT HEADER MSG
012212  012746  012311                    MOV     #FIF2MSG,-(SP)
012216  012746  000001                    MOV     #1,-(SP)
012222  010600                            MOV     SP,R0
012224  104415                            TRAP    C$PNTX
012226  062706  000004                    ADD     #4,SP
012232  010100                            MOV     R1,R0              ;GET BYTE COUNT
012234  004737  015122                    JSR     PC,PRBYTEXP        ;PRINT FIFO BYTES IN ERROR
012240                                    ENDMSG
012240                            L10012:
012240  104423                            TRAP    C$MSG
012242     045     116     045    FIF1MSG:        .ASCIZ  '%N%A NUMBER OF BYTES TRANSFERRED = %D2'
012311     045     116     045    FIF2MSG:        .ASCIZ  '%N%A FIFO DATA BYTES IN ERROR:'
                                          .EVEN
```

```
  1516                                                 .SBTTL  MSGSTAT - PRINT STATUS HEADER AND MESSAGE BUFFERS
  1517                                         ;+
  1518                                         ;
  1519                                         ;PRINT ROUTINE TO PRINT MESSAGE BUFFER EXPD/RECV
  1520                                         ;
  1521                                         ;
  1522                                         ;IMPLICIT INPUTS:
  1523                                         ;
  1524                                         ;       EXPMSG  - EXPECTED MESSAGE BUFFER
  1525                                         ;       RECMSG  - RECEIVED MESSAGE BUFFER
  1526                                         ;       RCVHIADD- RECEIVED MESSAGE BUFFER HIGH ORDER ADDRESS
  1527                                         ;       RCVLOADD- RECEIVED MESSAGE BUFFER LOW ORDER ADDRESS
  1528                                         ;-
  1529 012350                                          BGNMSG  MSGSTAT
       012350                                  MSGSTAT::
  1530 012350  012701  012412                          MOV     #STATCOD,R1      ;ASCII ADDRESS TABLE
  1531 012354  012100                          10$:    MOV     (R1)+,R0         ;DONE ALL MSG LINES?
  1532 012356  001410                                  BEQ     20$              ;BR IF YES
  1533 012360                                          PRINTX  R0               ;PRINT STATUS BIT NAMES
       012360  010046                                  MOV     R0,-(SP)
       012362  012746  000001                          MOV     #1,-(SP)
       012366  010600                                  MOV     SP,R0
       012370  104415                                  TRAP    C$PNTX
       012372  062706  000004                          ADD     #4,SP
  1534 012376  000766                                  BR      10$              ;DO ANOTHER MSG LINE
  1535 012400  012700  000012                  20$:    MOV     #10.,R0          ;NUMBER OF WORDS IN A READ STATUS BUFFER
  1536 012404  004737  014552                          JSR     PC,PRMSGEXP      ;PRINT EXPD/RECV MESSAGE BUFFERS
  1537 012410                                          ENDMSG
       012410                                  L10013:
       012410  104423                                  TRAP    C$MSG
  1538
  1539 012412  012430  012472  012563  STATCOD:        .WORD   1$,2$,3$,4$,5$,6$,0
  1540 012430     045     116     045  1$:.ASCIZ  '%N%A Tape Bus Signals in Word #8:'
  1541 012472     045     116     045  2$:.ASCIZ  '%N%A        PARERR<15>  IEOT   <12>  IFMK   <9>  IRDY<6>   IRWD<2>'
  1542 012563     045     116     045  3$:.ASCIZ  '%N%A        IRESV2<14>  IIDENT<11>  IHER   <8>  IONL<5>   IFBY<1>'
  1543 012654     045     116     045  4$:.ASCIZ  '%N%A        IRESV1<13>  ICER   <10>  ISPEED<7>  ILDP<4>   IFPT<0>'
  1544 012745     045     116     045  5$:.ASCIZ  '%N%A Tape Bus Signals in Word #9:'
  1545 013007     045     116     045  6$:.ASCIZ  '%N%A        DATMIS<7>  ILW<6>  OUTRDY<5>  INRDY<4>'
  1546                                         .EVEN
  1547
```

```
                                                  .SBTTL  MSGLOOP - PRINT LOOPBACK HEADER AND MESSAGE BUFFERS
                                          ;+
                                          ;
                                          ;PRINT ROUTINE TO PRINT MESSAGE BUFFER EXPD/RECV
                                          ;
                                          ;IMPLICIT INPUTS:
                                          ;
                                          ;       EXPMSG   - EXPECTED MESSAGE BUFFER
                                          ;       RECMSG   - RECEIVED MESSAGE BUFFER
                                          ;       RCVHIADD- RECEIVED MESSAGE BUFFER HIGH ORDER ADDRESS
                                          ;       RCVLOADD- RECEIVED MESSAGE BUFFER LOW ORDER ADDRESS
                                          ;-
     013064                                       BGNMSG  MSGLOOP
     013064                               MSGLOOP::
     013064  012701  013126                       MOV     #LOOPCOD,R1       ;ASCII ADDRESS TABLE
     013070  012100                       10$:    MOV     (R1)+,R0          ;DONE ALL MSG LINES?
     013072  001410                               BEQ     20$               ;BR IF YES
     013074                                       PRINTX  R0                ;PRINT STATUS BIT NAMES
     013074  010046                               MOV     R0,-(SP)
     013076  012746  000001                       MOV     #1,-(SP)
     013102  010600                               MOV     SP,R0
     013104  104415                               TRAP    C$PNTX
     013106  062706  000004                       ADD     #4,SP
     013112  000766                               BR      10$               ;DO ANOTHER MSG LINE
     013114  012700  000012               20$:    MOV     #10.,R0           ;NUMBER OF WORDS IN A READ STATUS BUFFER
     013120  004737  014552                       JSR     PC,PRMSGEXP       ;PRINT EXPD/RECV MESSAGE BUFFERS
     013124                                       ENDMSG
     013124                               L10014:
     013124  104423                               TRAP    C$MSG

     013126  013146  013221  013320       LOOPCOD:        .WORD   1$,2$,3$,4$,5$,6$,7$,0
     013146     045     116     045       1$:.ASCIZ  '%N%A Tape Bus Loopback Signals in Word #8:'
     013221     045     116     045       2$:.ASCIZ  '%N%A       PARERR<15>             IRESV2<14>             IRESV1<13>'
     013320     045     116     045       3$:.ASCIZ  '%N%A IMISP=>IEOT<12>     IWRT=>IIDENT<11>     IREV   =>ICER   <10>'
     013417     045     116     045       4$:.ASCIZ  '%N%A IWFM =>IFMK<09>     IEDIT=>IHER <08>     IFAD   =>ISPEED<07>'
     013516     045     116     045       5$:.ASCIZ  '%N%A ITADO=>IRDY<06>     ITAD1=>IONL <05>     IERASE=>ILDP   <04>'
     013615     045     116     045       6$:.ASCIZ  '%N%A IREW =>IDBY<03>     IRWU =>IRWD <02>     IFEN   =>IFBY   <01>'
     013714     045     116     045       7$:.ASCIZ  '%N%A IGO  =>IFPT<00>'
                                                  .EVEN
```

```
1581                                            .SBTTL  MSGSUB - PRINT WRITE SUBSYSTEM MESSAGE BUFFER
1582                                    ;+
1583                                    ;
1584                                    ;PRINT ROUTINE TO PRINT MESSAGE BUFFER EXPD/RECV
1585                                    ;
1586                                    ;
1587                                    ;IMPLICIT INPUTS:
1588                                    ;
1589                                    ;       EXPMSG  - EXPECTED MESSAGE BUFFER
1590                                    ;       RECMSG  - RECEIVED MESSAGE BUFFER
1591                                    ;       RCVHIADD- RECEIVED MESSAGE BUFFER HIGH ORDER ADDRESS
1592                                    ;       RCVLOADD- RECEIVED MESSAGE BUFFER LOW ORDER ADDRESS
1593                                    ;-
1594 013742                                     BGNMSG  MSGSUB
     013742                             MSGSUB::
1595 013742  012700  000012                     MOV     #10.,R0         ;SIZE OF WRITE SUBSYSTEM BUFFER
1596 013746  004737  014552                     JSR     PC,PRMSGEXP     ;PRINT EXPD/RECV MESSAGE BUFFERS
1597 013752                                     ENDMSG
     013752                             L10015:
     013752  104423                             TRAP    C$MSG
1598
1599                                            .SBTTL  MEMADD - PRINT MEMORY ADDRESS DATA ERROR
1600                                    ;+
1601                                    ;
1602                                    ;PRINT ROUTINE TO PRINT MEMORY ADDRESS DATA COMPARE ERROR
1603                                    ;
1604                                    ;IMPLICIT INPUTS:
1605                                    ;
1606                                    ;       ERRHI   - MEMORY ERROR HIGH ORDER ADDRESS
1607                                    ;       ERRLO   - MEMORY ERROR LOW ORDER ADDRESS
1608                                    ;       EXP     - EXPECTED DATA
1609                                    ;       RECV    - RECEIVED DATA
1610                                    ;-
1611 013754                                     BGNMSG  MEMADD
     013754                             MEMADD::
1612 013754  004737  010160                     JSR     PC,PRIADD       ;PRINT MEMORY ADDRESS IN ERROR
1613 013760  013701  002232                     MOV     EXPD,R1         ;GET EXPD DATA
1614 013764  013702  002234                     MOV     RECV,R2         ;GET RECEIVED DATA
1615 013770  004737  007742                     JSR     PC.PRIXOR       ;PRINT EXPD/RECV
1616 013774                                     ENDMSG
     013774                             L10016:
     013774  104423                             TRAP    C$MSG
```

```
                                             .SBTTL  PRAMPKT - PRINT RAM AND PACKET DATA
                                     ;+
                                     ;PRINT ROUTINE TO DISPLAY RAM/PACKET DATA
                                     ;WHEN THE RAM DATA DOES NOT MATCH.
                                     ;
                                     ;INPUTS:
                                     ;
                                     ;       R4      POINTER TO COMMAND PACKET
                                     ;IMPLICIT INPUTS:
                                     ;       RAMDATA         DATA AS READ FROM THE RAM
                                     ;       RAMSIZ          NUMBER OF BYTES IN PACKET
                                     ;                       IF RAMSIZ=0 THEN DEFAULT TO 8.
                                     ;
                                     ;IMPLICIT OUTPUTS:
                                     ;       RAMSIZ  SET TO 0
                                     ;-
 013776                              PRAMPKT:
 013776                                      SAVREG                                  ;SAVE R1-R5 UNTIL NEXT RETURN
 014002  012701  002242                      MOV     #RAMDATA,R1                     ;DATA FROM THE RAM
 014006  005002                              CLR     R2                              ;INIT BYTE NUMBER
 014010  122124                      5$:     CMPB    (R1)+,(R4)+                     ;COMPARE EXPECTED, RECEIVED
 014012  001005                              BNE     7$                              ;BR IF NO MATCH
 014014                                      FORCERROR       7$,NOTSSR
 014024  000436                              BR      10$                             ;BAD
 014026  116105  177777              7$:     MOVB    -1(R1),R5                       ;GET RECV RAM DATA
 014032  116403  177777                      MOVB    -1(R4),R3                       ;GET EXPD PACKET DATA
 014036                                      XOR     R5,R3                           ;XOR EXPD/RECV
 014046  042703  177400                      BIC     #177400,R3                      ;LOW BYTE ONLY
 014052  116137  177777  002234              MOVB    -1(R1),RECV                     ;GET RECEIVED RAM DATA
 014060  116437  177777  002232              MOVB    -1(R4),EXPD                     ;GET EXPECTED RAM DATA
 014066                                      PRINTB  #RAMASC,R2,RECV,EXPD,R3
 014066  010346                              MOV     R3,-(SP)
 014070  013746  002232                      MOV     EXPD,-(SP)
 014074  013746  002234                      MOV     RECV,-(SP)
 014100  010246                              MOV     R2,-(SP)
 014102  012746  014156                      MOV     #RAMASC,-(SP)
 014106  012746  000005                      MOV     #5,-(SP)
 014112  010600                              MOV     SP,R0
 014114  104414                              TRAP    C$PNTB
 014116  062706  000014                      ADD     #14,SP
 014122  005202                      10$:    INC     R2                              ;UPDATE BYTE COUNT
 014124  005737  002302                      TST     RAMSIZ                          ;DEFAULT TO 8.?
 014130  001404                              BEQ     15$                             ;BR IF YES
 014132  020237  002302                      CMP     R2,RAMSIZ                       ;DONE ALL BYTES?
 014136  003724                              BLE     5$                              ;BR IF NO
 014140  000403                              BR      25$                             ;
 014142  020227  000010              15$:    CMP     R2,#8.                          ;DONE DEFAULT NUMBER OF BYTES?
 014146  002720                      20$:    BLT     5$                              ;BR IF NO
 014150  005037  002302              25$:    CLR     RAMSIZ                          ;SET DEFAULT RAMSIZ
 014154  000207                              RTS     PC                              ;RETURN

 014156     045     116     045  RAMASC: .ASCIZ  '%N%A  BYTE: %D2%A RAM: %O3%A Packet: %O3%A XOR:%O3'
                                             .EVEN
```

```
                                         .SBTTL  PRMESS  - PRINT CONTENTS OF MESSAGE BUFFER
                                 ;+
                                 ;THIS ROUTINE PRINTS THE CONTENTS OF
                                 ;THE 7 OR 8 WORD MESSAGE BUFFER RETURNED BY THE TSV-05.
                                 ;
                                 ;INPUT:
                                 ;       R0      LOW ORDER ADDRESS OF MESSAGE BUFFER
                                 ;       R1      HIGH ORDEP ADDRESS OF MESSAGE BUFFER
                                 ;       NOTE: R1 IS IGNORED IF KTENABLE FLAG IS CLEAR
                                 ;THIS ROUTINE IS NORMALLY CALLED FROM A PRINT ROUTINE
                                 ;-
014242                           PRMESS: SAVREG                          ;SAVE THE REGISTERS
014246  010005                           MOV     R0,R5                   ;SAVE LOW ORDER ADDRESS
014250  005737  003134                   TST     KTENABLE                ;ADDRESS ABOVE 28K?
014254  001001                           BNE     10$                     ;BR IF YES
014256  005001                           CLR     R1                      ;SET HIGH ORDER ADDRESS TO 0
014260  010103                   10$:    MOV     R1,R3                   ;SAVE HIGH ORDER ADDRESS
014262  006100                           ROL     R0                      ;SHIFT BIT15 TO C BIT
014264  006101                           ROL     R1                      ;SHIFT TO HIGH ORDER FOR PRINTOUT
014266                                   PRINTX  #PROASC,R1,R5           ;PRINT MESSAGE BUFFER ADDRESS
014266  010546                           MOV     R5,-(SP)
014270  010146                           MOV     R1,-(SP)
014272  012746  014420                   MOV     #PROASC,-(SP)
014276  012746  000003                   MOV     #3,-(SP)
014302  010600                           MOV     SP,R0
014304  104415                           TRAP    C$PNTX
014306  062706  000010                   ADD     #10,SP
014312                                   PRINTX  #PR1ASC                 ;PRINT HEADER FOR CONTENTS
014312  012746  014465                   MOV     #PR1ASC,-(SP)
014316  012746  000001                   MOV     #1,-(SP)
014322  010600                           MOV     SP,R0
014324  104415                           TRAP    C$PNTX
014326  062706  000004                   ADD     #4,SP
014332  005004                           CLR     R4                      ;NUMBER OF THE NEXT WORD
014334  010501                           MOV     R5,R1                   ;COPY LOW ORDER ADDRESS
014336  010300                           MOV     R3,R0                   ;COPY HIGH ORDER ADDRESS
014340  001403                           BEQ     20$                     ;BR IF NOT ABOVE 28K
014342  004737  017316                   JSR     PC,SETMAP               ;SETUP PAR ADDRESS IN R0
014346  010005                           MOV     R0,R5                   ;GET PAR FORMAT ADDRESS ABOVE 28K
014350                           20$:    PRINTX  #PRASC,R4,(R5)+         ;PRINT THE CONTENTS OF MEMORY BUFFER
014350  012546                           MOV     (R5)+,-(SP)
014352  010446                           MOV     R4,-(SP)
014354  012746  014523                   MOV     #PRASC,-(SP)
014360  012746  000003                   MOV     #3,-(SP)
014364  010600                           MOV     SP,R0
014366  104415                           TRAP    C$PNTX
014370  062706  000010                   ADD     #10,SP
014374  005204                           INC     R4                      ;NUMBER OF THE NEXT
014376  020427  000007                   CMP     R4,#7                   ;DONE ALL YET ?
014402  003005                           BGT     50$                     ;BRANCH IF ALL DONE
014404  002761                           BLT     20$                     ;PRINT FIRST 7 WORDS
014406  032763  000200  000012           BIT     #X2.EXTF,XST2(R3);EXTENDED FEATUTES ON ?
014414  001355                           BNE     20$                     ;PRINT EXTENDED STATUS WORD
014416  000207                   50$:    RTS     PC                      ;RETURN
014420     045     116     045   PROASC: .ASCIZ  '%N%A Message Buffer Address = %O1%O5'
014465     045     116     045   PR1ASC: .ASCIZ  '%N%A Message Buffer Contents:'
014523     045     116     045   PRASC:  .ASCIZ  '%N%A    Word%D1%A: %O'
```

```
                                               .EVEN
                                               .SBTTL  PRMSGEXP - PRINT EXPD/RECV MESSAGE BUFFERS
                                     ;+
                                     ;ROUTINE TO PRINT EXPECTED AND RECEIVED MESSAGE BUFFERS
                                     ;         R0       - NUMBER OF WORDS IN BUFFER
                                     ;IMPLICIT INPUTS:
                                     ;         EXPMSG   - EXPECTED MESSAGE BUFFER
                                     ;         RECMSG   - RECEIVED MESSAGE BUFFER
                                     ;         RCVHIADD- RECEIVED MESSAGE BUFFER HIGH ORDER ADDRESS
                                     ;         RCVLOADD- RECEIVED MESSAGE BUFFER LOW ORDER ADDRESS
                                     ;-
014552                               PRMSGEXP::
014552                                         SAVREG                           ;SAVE R1-R5 UNTIL NEXT RETURN
014556  010005                                 MOV     R0,R5                    ;SAVE NUMBER OF WORDS
014560  013700  002306                         MOV     RCVLOADD,R0              ;GET RECV LOW ADDRESS
014564  010004                                 MOV     R0,R4                    ;COPY LOW ADDRESS
014566  013701  002304                         MOV     RCVHIADD,R1              ;GET RECV HIGH ADDRESS
014572  006100                                 ROL     R0                       ;SHIFT BIT15 TO C BIT
014574  006101                                 ROL     R1                       ;SHIFT TO HIGH ORDER FOR PRINTOUT
014576                                         PRINTX  #PRMSG0,R1,R4            ;PRINT MESSAGE BUFFER ADDRESS
014576  010446                                 MOV     R4,-(SP)
014600  010146                                 MOV     R1,-(SP)
014602  012746  014732                         MOV     #PRMSG0,-(SP)
014606  012746  000003                         MOV     #3,-(SP)
014612  010600                                 MOV     SP,R0
014614  104415                                 TRAP    C$PNTX
014616  062706  000010                         ADD     #10,SP
014622                                         PRINTX  #PRMSG1                  ;PRINT HEADER FOR CONTENTS
014622  012746  014777                         MOV     #PRMSG1,-(SP)
014626  012746  000001                         MOV     #1,-(SP)
014632  010600                                 MOV     SP,R0
014634  104415                                 TRAP    C$PNTX
014636  062706  000004                         ADD     #4,SP
014642  005004                                 CLR     R4                       ;NUMBER OF THE CURRENT WORD
014644  012701  002322                         MOV     #EXPMSG,R1               ;GET EXPD BUFFER ADDRESS
014650  012702  002466                         MOV     #RECMSG,R2               ;GET RECV BUFFER ADDRESS
014654  011100                       20$:      MOV     (R1),R0                  ;GET EXPD
014656  011203                                 MOV     (R2),R3                  ;GET RECV
014660                                         XOR     R0,R3                    ;XOR EXPD/RECV
014670                                         PRINTX  #PRMSG2,R4,(R1)+,(R2)+,R3
014670  010346                                 MOV     R3,-(SP)
014672  012246                                 MOV     (R2)+,-(SP)
014674  012146                                 MOV     (R1)+,-(SP)
014676  010446                                 MOV     R4,-(SP)
014700  012746  015035                         MOV     #PRMSG2,-(SP)
014704  012746  000005                         MOV     #5,-(SP)
014710  010600                                 MOV     SP,R0
014712  104415                                 TRAP    C$PNTX
014714  062706  000014                         ADD     #14,SP
014720  005204                                 INC     R4                       ;NUMBER OF THE NEXT
014722  020405                                 CMP     R4,R5                    ;DONE ALL YET?
014724  002001                                 BGE     50$                      ;BR IF YES
014726  000752                                 BR      20$                      ;DO ANOTHER
014730  000207                       50$:      RTS     PC                       ;RETURN
014732     045     116     045       PRMSG0:   .ASCIZ  '%N%A Message Buffer Address = %01%05'
014777     045     116     045       PRMSG1:   .ASCIZ  '%N%A Message Buffer Contents:'
015035     045     116     045       PRMSG2:   .ASCIZ  '%N%A   WORD #%D2%A  EXPD: %06%A  RECV: %06%A  XOR: %06'
```

```
                                               .EVEN
                                               .SBTTL  PRBYTEXP - PRINT ERROR BYTES IN EXP/REC MESSAGE BUFFER
                                       ;+
                                       ;
                                       ;ROUTINE TO PRINT ERROR BYTES IN MESSAGE BUFFERS
                                       ;       ONLY THE FIRST 8 ERRORS ENCOUNTERED ARE PRINTED DUE TO SCREEN SPACE
                                       ;
                                       ;       RO      - NUMBER OF BYTES IN BUFFER
                                       ;
                                       ;IMPLICIT INPUTS:
                                       ;
                                       ;       EXPMSG  - EXPECTED MESSAGE BUFFER
                                       ;       RECMSG  - RECEIVED MESSAGE BUFFER
                                       ;-
015122                                 PRBYTEXP::
015122                                         SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
015126  010005                                 MOV     RO,R5                   ;SAVE NUMBER OF BYTES
015130  005037  002320                         CLR     PRMNO                   ;INIT ERROR COUNT
015134  005004                                 CLR     R4                      ;NUMBER OF THE CURRENT BYTE
015136  012701  002322                         MOV     #EXPMSG,R1              ;GET EXPD BUFFER ADDRESS
015142  012702  002466                         MOV     #RECMSG,R2              ;GET RECV BUFFER ADDRESS
015146  111100                         20$:    MOVB    (R1),RO                 ;GET EXPD BYTE
015150  042700  177400                         BIC     #↑C<377>,RO             ;CLEAR UPPER BYTE
015154  110037  015470                         MOVB    RO,PRBEXP               ;SAVE FOR ERROR REPORT
015160  111203                                 MOVB    (R2),R3                 ;GET RECV BYTE
015162  042703  177400                         BIC     #↑C<377>,R3             ;CLEAR UPPER BYTE
015166  110337  015472                         MOVB    R3,PRBREC               ;FOR ERROR REPORT
015172                                         XOR     RO,R3                   ;XOR EXPD/RECV
015202  122122                                 CMPB    (R1)+,(R2)+             ;EXPD = RECV?
015204  001431                                 BEQ     30$                     ;BR IF YES
015206  005237  002320                         INC     PRMNO                   ;UPDATE ERROR COUNT
015212  023727  002320  000010                 CMP     PRMNO,#8.               ;PRINTED 8?
015220  101023                                 BHI     30$                     ;BR IF YES
015222                                 27$:    PRINTX  #PRBMSG,R4,PRBEXP,PRBREC,R3
015222  010346                                 MOV     R3,-(SP)
015224  013746  015472                         MOV     PRBREC,-(SP)
015230  013746  015470                         MOV     PRBEXP,-(SP)
015234  010446                                 MOV     R4,-(SP)
015236  012746  015336                         MOV     #PRBMSG,-(SP)
015242  012746  000005                         MOV     #5,-(SP)
015246  010600                                 MOV     SP,RO
015250  104415                                 TRAP    C$PNTX
015252  062706  000014                         ADD     #14,SP
015256                                         FORCEXIT        50$             ;@@D
015266  000404                                 BR      35$                     ;@@D
015270                                 30$:
015270                                         FORCERROR  27$,NOTSSR           ;@@D
015300                                 35$:                                    ;@@D
015300  005204                                 INC     R4                      ;NUMBER OF THE NEXT
015302  020405                                 CMP     R4,R5                   ;DONE ALL YET?
015304  002001                                 BGE     50$                     ;BR IF YES
015306  000717                                 BR      20$                     ;DO ANOTHER
015310                                 50$:    PRINTX  #PRBTOT,PRMNO           ;PRINT TOTAL ERROR COUNT
015310  013746  002320                         MOV     PRMNO,-(SP)
015314  012746  015423                         MOV     #PRBTOT,-(SP)
015320  012746  000002                         MOV     #2,-(SP)
015324  010600                                 MOV     SP,RO
```

```
 015326  104415                          TRAP    C$PNTX
 015330  062706  000006                  ADD     #6,SP
 015334  000207                          RTS     PC                      ;RETURN

 015336     045     116     045  PRBMSG: .ASCIZ  '%N%A   BYTE #%D2%A  EXPD: %03%A  RECV: %03%A  XOR: %03'
 015423     045     116     045  PRBTOT: .ASCIZ  '%N%A NUMBER OF BYTES IN ERROR = %D2'
                                         .EVEN
 015470  000000                  PRBEXP: .WORD   0                       ;EXPD
 015472  000000                  PRBREC: .WORD   0                       ;RECV
                                         .SBTTL  EXPREC  - PRINT EXPD/RECV WORD DATA
                                 ;+
                                 ;
                                 ;PRINT ROUTINE TO DISPLAY EXPD/RECV DATA
                                 ;
                                 ;INPUTS:
                                 ;
                                 ;       R1      RECEIVED DATA
                                 ;       R2      EXPECTED DATA
                                 ;
                                 ;-

 015474                                  BGNMSG  EXPREC
 015474                          EXPREC::
 015474  004737  007742                  JSR     PC,PRIXOR                       ;PRINT THE DATA
 015500                                  ENDMSG
 015500                          L10017:
 015500  104423                          TRAP    C$MSG
                                         .SBTTL  EXPBREC - PRINT EXPD/RECV BYTE DATA
                                 ;+
                                 ;
                                 ;PRINT ROUTINE TO DISPLAY BYTE EXPD/RECV DATA
                                 ;
                                 ;INPUTS:
                                 ;
                                 ;       R1      RECEIVED DATA BYTE
                                 ;       R2      EXPECTED DATA BYTE
                                 ;
                                 ;-

 015502                                  BGNMSG  EXPBREC
 015502                          EXPBREC::
 015502  004737  007612                  JSR     PC,PRIBXOR                      ;PRINT THE DATA
 015506                                  ENDMSG
 015506                          L10020:
 015506  104423                          TRAP    C$MSG


                                         .SBTTL  RAMERR  - PRINT RAM AND PACKET DATA
                                 ;+
                                 ;
                                 ;PRINT ROUTINE TO DISPLAY RAM/PACKET DATA
                                 ;
                                 ;INPUTS:
                                 ;
                                 ;       R4      POINTER TO COMMAND PACKET
                                 ;
```

```
                                ;IMPLICIT INPUTS:
                                ;
                                ;       RAMDATA         DATA AS READ FROM THE RAM
                                ;       RAMSIZ          NUMBER OF BYTES IN PACKET
                                ;                       IF RAMSIZ=0 THEN DEFAULT TO 8.
                                ;
                                ;IMPLICIT OUTPUTS:
                                ;
                                ;       RAMSIZ  SET TO 0
                                ;-

015510                                  BGNMSG  RAMERR
015510                          RAMERR::
015510  004737  013776                  JSR     PC,PRAMPKT      ;PRINT RAM/PACKET DATA
015514                                  ENDMSG
015514                          L10021:
015514  104423                          TRAP    C$MSG

                                        .SBTTL  RAMTADD - PRINT TEST ADDRESS, RAM AND PACKET DATA
                                ;+
                                ;
                                ;PRINT ROUTINE TO DISPLAY RAM/PACKET DATA
                                ;
                                ;INPUTS:
                                ;
                                ;       R4      POINTER TO COMMAND PACKET
                                ;
                                ;IMPLICIT INPUTS:
                                ;
                                ;       RAMDATA         DATA AS READ FROM THE RAM
                                ;       RAMSIZ          NUMBER OF BYTES IN PACKET
                                ;                       IF RAMSIZ=0 THEN DEFAULT TO 8.
                                ;       ERRHI           HIGH ORDER TEST ADDRESS
                                ;       ERRLO           LOW ORDER TEST ADDRESS
                                ;
                                ;IMPLICIT OUTPUTS:
                                ;
                                ;       RAMSIZ  SET TO 0
                                ;-

015516                                  BGNMSG  RAMTADD
015516                          RAMTADD::
015516  004737  010274                  JSR     PC,PRITADD      ;PRINT TEST ADDRESS
015522  004737  013776                  JSR     PC,PRAMPKT      ;PRINT RAM/PACKET DATA
015526                                  ENDMSG
015526                          L10022:
015526  104423                          TRAP    C$MSG

                                        .SBTTL  RAMEXP  - PRINT RAM EXPD/RECV DATA
                                ;+
                                ;
                                ;PRINT ROUTINE TO DISPLAY EXPD/RECV DATA
                                ;
                                ;INPUTS:
                                ;
                                ;       R1      RECEIVED DATA
                                ;       R2      EXPECTED DATA
```

```
                                        ;       R4      CONTROLLER RAM ADDRESS
                                        ;-

015530                                          BGNMSG  RAMEXP
015530                                  RAMEXP::
015530  042701  177400                          BIC     #↑C<377>,R1             ;SAVE EXPD RAM DATA BYTE
015534  042702  177400                          BIC     #↑C<377>,R2             ;SAVE EXPD RAM DATA BYTE
015540  004737  010066                          JSR     PC,PRIRAM               ;PRINT THE RAM ADDRESS
015544  004737  007742                          JSR     PC,PRIXOR               ;PRINT THE DATA
015550                                          ENDMSG
015550                                  L10023:
015550  104423                                  TRAP    C$MSG

                                                .SBTTL  TIMEXP  - PRINT TIMER A,B AND EXP/REC
                                        ;+
                                        ;
                                        ;PRINT ROUTINE TO DISPLAY EXPD/RECV DATA
                                        ;AND TIMER A,B HEADER MESSAGE
                                        ;
                                        ;INPUTS:
                                        ;
                                        ;       R1      RECEIVED DATA
                                        ;       R2      EXPECTED DATA
                                        ;-

015552                                          BGNMSG  TIMEXP
015552                                  TIMEXP::
015552                                          PRINTX  #TIMSG0                 ;PRINT HEADER
015552  012746  015600                          MOV     #TIMSG0,-(SP)
015556  012746  000001                          MOV     #1,-(SP)
015562  010600                                  MOV     SP,R0
015564  104415                                  TRAP    C$PNTX
015566  062706  000004                          ADD     #4,SP
015572  004737  007742                          JSR     PC,PRIXOR               ;PRINT THE DATA
015576                                          ENDMSG
015576                                  L10024:
015576  104423                                  TRAP    C$MSG

015600     045     116     045          TIMSG0: .ASCIZ  '%N%A TIMER A STATUS IS IN BIT 3%N%A TIMER B STATUS IS IN BIT 2'
                                        .EVEN
                                                .SBTTL  BADSSR - PRINT TSSR ERRORS ON DATA TRANSFERS

                                        ;+
                                        ;
                                        ;PRINT ROUTINE FOR TSSR ERRORS ON DATA TRANSFERS
                                        ;
                                        ;INPUTS:
                                        ;
                                        ;       R1      CONTENTS OF TSSR
                                        ;       R2      DATA WRITTEN (8 BITS)
                                        ;
                                        ;-

015700                                          BGNMSG  BADSSR
015700                                  BADSSR::
015700  010246                                  MOV     R2,-(SP)                ;SAVE DATA TRANSFERRED
015702  042702  177400                          BIC     #177400,R2              ;GET JUST ONE BYTE
```

```
   1928 015706                                 PRINTB  #XFERASC,R2
        015706  010246                         MOV     R2,-(SP)
        015710  012746  015740                 MOV     #XFERASC,-(SP)
        015714  012746  000002                 MOV     #2,-(SP)
        015720  010600                         MOV     SP,R0
        015722  104414                         TRAP    C$PNTB
        015724  062706  000006                 ADD     #6,SP
   1929 015730  012602                         MOV     (SP)+,R2                ;RESTORE R2
   1930 015732  004737  006024                 JSR     PC,PRITSSR              ;DECODE TSSR CONTENTS
   1931 015736                                 ENDMSG
        015736                         L10025:
        015736  104423                         TRAP    C$MSG
   1932 015740     045     116     045 XFERASC:        .ASCIZ  '%N%A Data Transferred = %O3'
```

```
                                .SBTTL  GLOBAL SUBROUTINES SECTION

                                ;++
                                ; THE GLOBAL SUBROUTINES SECTION CONTAINS THE SUBROUTINES
                                ; THAT ARE USED IN MORE THAN ONE TEST.
                                ;--
                                        .SBTTL  SOFINIT - SOFT INITIALIZE OF CONTROLLER

                                ;+
                                ;
                                ;ROUTINE TO DO A SOFT INITIALIZE OF THE CONTROLLER
                                ;BY WRITING INTO THE TSSR REGISTER. AFTER THE INIT,
                                ;THE TSSR REGISTER IS TESTED FOR ERRORS. ANY ERRORS
                                ;DETECTED SHOULD BE TREATED AS DEVICE FATAL ERRORS.
                                ;
                                ;INPUTS:
                                ;
                                ;       R5      ADDRESS OF FIRST REGISTER
                                ;
                                ;OUTPUTS:
                                ;
                                ;       R0      CONTENTS OF TSSR, IF ERROR
                                ;       CARRY   SET IF INIT WAS OKAY
                                ;               CLEAR IF FATAL ERROR
                                ;
                                ;CALLING SEQUENCE:
                                ;
                                ;       MOV     #ADDRESS,R5
                                ;       JSR     PC,SOFINIT
                                ;       BCS     CONTINUE
                                ;       ERRDF                   ;REPORT FATAL ERROR
                                ;
                                ;-

015774                          SOFINIT::
015774                                  SAVREG                  ; SAVE THE REGISTERS
016000  012765  000000  000002          MOV     #0,TSSR(R5)     ; DO THE INIT.
016006  004737  016250                  JSR     PC,WAITF        ; WAIT FOR SSR
016012  016500  000002                  MOV     TSSR(R5),R0     ;GET THE TSSR REGISTER
016016  010004                          MOV     R0,R4           ;TSSR CONTENTS
016020  042704  176277                  BIC     #↑C<HIADDR!OFL>,R4
016024  052704  002200                  BIS     #SSR!NBA,R4     ;R4 HAS EXPECTED CONTENTS
016030  020400                          CMP     R4,R0           ;ONLY EXPECTED BITS SET ?
016032  001402                          BEQ     5$              ;BRANCH IF OKAY
016034  000241                          CLC                     ;CLEAR THE CARRY FOR ERROR
016036  000401                          BR      10$             ;GO TO EXIT
016040  000261                  5$:     SEC                     ;SET THE CARRY BIT
016042  000207                  10$:    RTS     PC              ;RETURN TO CALLER
```

```
                                .SBTTL  CHKAMB  - CHECK TSSR FOR AMBIGUITY

                                ;+
                                ;
                                ;THIS ROUTINE TESTS THE CONTENTS OF THE TSSR REGISTER
                                ;FOR AMBIGUITY
                                ;
                                ;INPUT:
                                ;
                                ;       R0      CONTENTS OF TSSR
                                ;
                                ;OUTPUT:
                                ;
                                ;       R0      CONTENTS OF TSSR
                                ;
                                ;       CARRY   SET - NO AMBIGUITY
                                ;               CLR - AMBIGUOUS CONTENTS
                                ;
                                ;-

016044                          CHKAMB:
016044                                  SAVREG                    ;SAVE THE GENERAL REGISTERS
016050  010004                          MOV     R0,R4             ;CONTENTS OF TSSR
016052  032700  100000                  BIT     #SC,R0            ;IS BIT 15 SET ?
016056  001004                          BNE     5$                ;BRANCH IF YES
016060  032700  174077                  BIT     #↑C<NBA!OFL!SSR!HIADDR>,R0      ;ANY OTHER BITS SET ?
016064  001023                          BNE     40$               ;MUST BE AN ERROR
016066  000424                          BR      45$               ;RETURN WITH SUCCESS
016070  032700  000200          5$:     BIT     #SSR,R0           ;IS READY BIT SET ?
016074  001011                          BNE     10$               ;BRANCH IF READY BIT IS SET.
016076  032700  000040                  BIT     #BIT5,R0          ;IS FATAL ERROR BIT SET ?
016102  001414                          BEQ     40$               ;ERROR IF NOT
016104  042704  177761                  BIC     #↑CTERCLS,R4      ;CLEAR ALL BUT TERMINATION CODE
016110  020427  000016                  CMP     R4,#16            ;ALL THREE BITS MUST BE SET
016114  001007                          BNE     40$               ;ERROR IF NOT SET
016116  000410                          BR      45$               ;OK IF ALL ARE SET
016120  032700  000040          10$:    BIT     #BIT5,R0          ;IS FATAL ERROR BIT SET ?
016124  001405                          BEQ     45$               ;ERROR IF BIT IS SET WITH SSR
016126  032700  000006                  BIT     #BIT2!BIT1,R0     ;IS THIS A FUNCTION REJECT
016132  001002                          BNE     45$               ;BR, IF TSSR IS OK
016134  000241                  40$:    CLC                       ;AMBIGUOUS CONTENTS
016136  000401                          BR      50$
016140  000261                  45$:    SEC                       ;SHOW SUCCESS - NO AMBIGUITY
016142  000207                  50$:    RTS     PC                ;RETURN TO CALLER
```

```
                                .SBTTL  ENAINT,DSBINT - ENABLE/DISABLE INTERRUPTS
                                ;
                                ; DEFAULT DISPLAY INTERRUPT HANDLERS.
                                ; IF DISPLAY TIME-OUT, REPORT DEV FATAL, AND ABORT PASS.
                                ; OTHERWISE, SAVE DPU REGISTERS AND DISMISS.
                                ;

                                ; BIT DEFINITIONS FOR "INTMASK" AND "INTFLAG" BYTES:
                                ;
        000200                            IOKCKIN=BIT7    ; DON'T CHECK FOR BAD INTERRUPTS -- TEST WILL.
        000001                            IOKSTP=BIT0     ; EXPECT "STOP" INTERRUPT.
                                ;
                                ;INTERRUPT MASK -- SAYS EXPECTING INTERRUPTS
016144     000                  INTMASK:        .BYTE   0
                                ;INTERRUPT FLAG -- SAYS WE GOT ONE (IF POSITIVE)
016145     000                  INTFLAG:        .BYTE   0

                                ;SAVED INTERRUPT VECTOR:
016146  000000                  INTVEC: .WORD   0
                                ;SAVE CPU PC
016150  000000                  INTCPC: .WORD   0

                                ;SUBROUTINE TO ENABLE INTERRUPTS:
016152  010046                  ENAINT: MOV     R0,-(SP)          ;SAVE R0
016154  013700  002210                  MOV     IVEC,R0           ;GET POINTER TO VECTORS
016160  012720  016216                  MOV     #INTR,(R0)+       ;SET UP INTERRUPT VECTOR
016164  012720  000340                  MOV     #PRIO7,(R0)+
016170  012600                          MOV     (SP)+,R0          ;RESTORE R0
016172  011646                          MOV     (SP),-(SP)
016174  012766  000000  000002          MOV     #0,2(SP)          ;SET CPU TO LEVEL 0
016202  000002                          RTI

                                ;SUBROUTINE TO DISABLE INTERRUPTS (RAISE PRIORITY TO LEVEL 7)
016204  011646                  DSBINT: MOV     (SP),-(SP)
016206  012766  000340  000002          MOV     #PRIO7,2(SP)
016214  000002                          RTI
                                        .SBTTL  INTR    - INTERRUPT HANDLERS

016216                                  BGNSRV  INTR              ;DEFINE INTERRUPT ENTRY
016216                          INTR::
016216  012737  000001  002224          MOV     #1,INTRECV        ;SET FLAG TO SHOW INTERRUPT RECEIVED
016224  105037  016145                  CLRB    INTFLAG           ;CLEAR FLAG TO SAY WE GOT INTERRUPT
016230  132737  000001  016144          BITB    #IOKSTP,INTMASK   ;EXPECTING STOP INTERRUPT?
016236  001003                          BNE     1$                ;BR IF YES
016240  152737  000001  016145          BISB    #IOKSTP,INTFLAG   ;NO. SET THE ERROR FLAG.

                                ;SAVE REGISTERS, MSG BUFFER, ETC.
016246                          1$:
016246                                  ENDSRV
016246                          L10026:
016246  000002                          RTI
```

```
                                        .SBTTL  WAITF    - WAIT FOR SUBSYSTEM READY
                                ;
                                ; SUBROUTINE TO WAIT FOR THE SUBSYSTEM READY FLAG
                                ;
                                ;INPUTS:
                                ;
                                ;       R5      ADDRESS OF FIRST DEVICE REGISTER
                                ;
                                ;OUTPUTS:
                                ;
                                ;       R0      CONTENTS OF LAST TSSR READ
                                ;       CARRY   SET - READY BIT SET
                                ;               CLR - TIMEOUT WAITING FOR READY
                                ;
016250  000401                  WAITF:: BR      1$                      ;NOP WHEN SUPER FIXED
016252                                  BREAK                           ; DO A SUPVSR BREAK FIRST.
016252  104422                          TRAP    C$BRK
016254  012746  011000          1$:     MOV     #11000,-(SP)            ;25-APRIL-83 REV B  - 1100 MSEC TIMER
016260  016500  000002          2$:     MOV     TSSR(R5),R0             ;READ THE TSSR REGISTER
016264  105700                          TSTB    R0                      ;TEST FOR READY BIT SET

016266  100420                          BMI     3$                      ; EXIT ON STOP FLAG.
016270                                  DELAY   1                       ; WAIT 100 USEC
016270  012727  000001                  MOV     #1,(PC)+
016274  000000                          .WORD   0
016276  013727  002116                  MOV     L$DLY,(PC)+
016302  000000                          .WORD   0
016304  005367  177772                  DEC     -6(PC)
016310  001375                          BNE     .-4
016312  005367  177756                  DEC     -22(PC)
016316  001367                          BNE     .-20
016320  005316                          DEC     (SP)                    ;REDUCE DELAY COUNT
016322  001356                          BNE     2$                      ;RETRY UNTIL TIMER EXPIRES
016324  000241                          CLC                             ; C = 0, CONTROLLER STILL RUNNING...
016326  000401                          BR      4$                      ;...OR HUNG-UP AFTER 300 MSEC.
016330  000261                  3$:     SEC                             ; C = 1, CONTROLLER IS STOPPED.
016332  005326                  4$:     DEC     (SP)+                   ;RESTORE STACK WITHOUT CHANGING CARRY BIT
016334  000207                          RTS     PC
```

```
                                .SBTTL  CHKTSSR - CHECK TSSR FOR READY
                                ;+
                                ;THIS ROUTINE WAITS FOR READY IN THE TSSR
                                ;AND TESTS FOR AMBIGUOUS BIT SETTINGS IN TSSR.
                                ;
                                ;INPUT:
                                ;       R5      ADDRESS OF CSR REGISTERS
                                ;
                                ;OUTPUT:
                                ;       RO      CONTENTS OF TSSR
                                ;       CARRY   SET - OKAY
                                ;               CLR - NOT READY AMBIGUOUS, OR SC SET
                                ;-
016336                          CHKTSSR:
016336  004737  016250                  JSR     PC,WAITF                ;WAIT FOR READY
016342  103014                          BCC     20$                     ;BRANCH IF TIME OUT
016344  004737  016044                  JSR     PC,CHKAMB               ;TSSR AMBIGOUS?
016350  103006                          BCC     10$                     ;BR IF YES
016352  032700  100000                  BIT     #SC,RO                  ;SPECIAL CONDITION SET?
016356  001405                          BEQ     15$                     ;BR IF NO
016360  032700  074000                  BIT     #<SCE!BIE!RMR!NXM>,RO   ;ANY ERROR BITS SET?
016364  001402                          BEQ     15$                     ;BR IF NO
016366  000241                  10$:    CLC                             ;SET FAILURE
016370  000401                          BR      20$                     ;
016372  000261                  15$:    SEC                             ;SET SUCCESS
016374  000207                  20$:    RTS     PC                      ;RETURN TO CALLER
                                        .SBTTL  XNXM    - CHECK FOR NONEXISTENT MEMORY
                                ;+
                                ; ROUTINE TO TEST FOR A NEXM IN THE RANGE (R1) THRU (R2).
                                ; ON RETURN, IF "C" = 1, (R1) = NEXM ADDRESS.
                                ;               "C" = 0, ALL ADDRESSES OK.
                                ;
                                ;CALL:  MOV ADR1,R1
                                ;       MOV ADR2,R2
                                ;       JSR PC,NXM
                                ;       RETURN          ;TEST "C" AND PROCEED.
016376  012737  016430  000004  XNXM:   MOV     #2$,@#4         ; SET BUSERR VECTOR.
016404  012737  000200  000006          MOV     #PRI04,@#6
016412  005003                          CLR     R3              ;FLAG.
016414  005711                  1$:     TST     (R1)            ;TEST THE ADDRESS(ES).
                                                                ;IF ANY TRAP, CONTINUE AT 2$.
016416  020102                          CMP     R1,R2           ;OTHERWISE, CONTINUE HERE.
016420  001407                          BEQ     3$              ;BR IF FINISHED (NO NEXM'S).
016422  062701  000002                  ADD     #2,R1           ;SET NEXT ADDRESS...
016426  000772                          BR      1$              ;...AND CONTINUE.
016430  005103                  2$:     COM     R3              ;GOT ONE, SET FLAG...
016432  012716  016440                  MOV     #3$,(SP)
016436  000002                          RTI                     ;...AND DISMISS INTERRUPT...
016440                          3$:     CLRVEC  #4              ;...AND GIVE BACK THE VECTOR.
016440  012700  000004                  MOV     #4,RO
016444  104436                          TRAP    C$CVEC
016446  005703                          TST     R3              ;DID WE CATCH ONE ??
016450  001401                          BEQ     .+4             ;NO, "C" = 0, SKIP NEXT.
016452  000261                          SEC                     ;YES, "C" = 1, (R1) = NEXM ADDR.
016454  000207                          RTS     PC
```

```
                                        .SBTTL  TSTLOOP - CHECK ITERATION COUNT
                                ;*
                                ; SUBROUTINE TO EXECUTE TEST ITERATIONS.
                                ; EXIT WITH "C" SET IF LOOPS ALLOWED AND LOOP COUNT NON-ZERO.
                                ; LOOP COUNTER IS SET BY "BEGIN.TEST" MACRO.
                                ;
                                ; CALL: LOOPTO  ARG
                                ;
016456                          TSTLOOP::
016456  005737  002170                  TST     NOITS                   ; ITERATIONS INHIBITED?
016462  001006                          BNE     1$                      ; YES.
016464  005737  002204                  TST     QVP                     ; NO.
016470  100403                          BMI     1$                      ;LOOPS DISALLOWED IN QUICK PASS.
016472  005337  002216                  DEC     LOOPCNT                 ; BUMP LOOP COUNTER.
016476  001002                          BNE     2$
016500  000241                  1$:     CLC                             ;LOOP DISALLOWED, OR DONE.
016502  000401                          BR      3$
016504  000261                  2$:     SEC                             ;LOOP ENABLED.
016506  000207                  3$:     RTS     PC

                                        .SBTTL  TSTSETUP - PRINT TEST NAME AND INIT ERROR COUNTS
                                ;*
                                ; PRINT THE NUMBER AND NAME OF EACH TEST AS WE GO ALONG.
                                ; INCREMENT "TESTK" TO INDICATE THE NUMBER OF TESTS
                                ; IN THE CURRENT RUN SEQUENCE.
                                ; CLEAR THE ERROR COUNTER AND SIGNATURE EXTENSION FLAGS.
                                ;
                                ;INPUT:
                                ;
                                ;       R0      POINTER TO TEST ID ASCIZ STRING
                                ;
                                ;OUTPUT:
                                ;
                                ;       R5      ADDRESS OF FIRST DEVICE REGISTER
                                ;
                                ;IMPLICIT OUTPUTS:
                                ;
                                ;       TSTCNT  UPDATED TO COUNT TESTS PERFORMED SINCE START OR RESTART
                                ;
                                ;SIDE EFFECTS:
                                ;
                                ;       INTERRUPT LEVEL IS RASIED TO LEVEL OF
                                ;       THE DEVICE UNDER TEST
                                ;
                                ;-

016510                          TSTSETUP::
016510  010046                          MOV     R0,-(SP)                ;SAVE THE TEST ID MESSAGE
016512  005037  003154                  CLR     SIFLAG                  ; CLEAR "SOFT INIT" FLAG
016516  005037  016756                  CLR     ERRK                    ; CLEAR LOCAL ERROR COUNTER.
016522  005037  005772                  CLR     EXTA                    ; CLEAR ERROR EXTENSION FLAG.
016526  105037  016144                  CLRB    INTMASK                 ; CLEAR INTERRUPT MASK (CHECK ERROR)
016532  013700  002202                  MOV     UNITN,R0                ; GET THE UNIT NUMBER,
016536  006300                          ASL     R0                      ; ... AND MAKE IT A WORD OFFSET.
016540  005737  003114                  TST     NODEV                   ; DID STARTUP FIND THE DEVICE?
016544  001430                          BEQ     4$                      ; BR IF YES
016546  100010                          BPL     3$                      ; BR IF NOT IDLE
```

```
016550  052760  160000  003176          BIS     #160000,ERTABL(R0) ; FLAG ERROR IN THE ERROR TABLE
016556                                  ERRDF   1,NXR,NXRERR    ; NO DEVICE HERE -- PRINT IT
016556  104455                          TRAP    C$ERDF
016560  000001                          .WORD   1
016562  003740                          .WORD   NXR
016564  005736                          .WORD   NXRERR
016566  000407                          BR      2$
016570  052760  160001  003176  3$:     BIS     #160001,ERTABL(R0)      ; FLAG ERROR IN THE ERROR TABLE
016576                                  ERRDF   2,NOINIT        ; DEVICE NOT IDLE
016576  104455                          TRAP    C$ERDF
016600  000002                          .WORD   2
016602  004335                          .WORD   NOINIT
016604  000000                          .WORD   0
016606  012737  177777  003112  2$:     MOV     #-1,DUFLG       ; DROP THE UNIT
016614                                  DODU    UNITN
016614  013700  002202                  MOV     UNITN,R0
016620  104451                          TRAP    C$DODU
016622                                  DOCLN                   ; ABORT THE PASS
016622  104444                          TRAP    C$DCLN
016624  000423                          BR      5$

016626                          4$:     RFLAGS  R0              ; GET THE OPERATOR FLAGS.
016626  104421                          TRAP    C$RFLA
016630  032700  001000                  BIT     #PNT,R0         ; PRINT THE TEST NUMBERS?
016634  001412                          BEQ     1$              ; BR IF NO
016636  011600                          MOV     (SP),R0         ;GET THE ID MESSAGE
016640                                  PRINTF  #TNAM,R0                ;DISPLAY THE TEST ID
016640  010046                          MOV     R0,-(SP)
016642  012746  016704                  MOV     #TNAM,-(SP)
016646  012746  000002                  MOV     #2,-(SP)
016652  010600                          MOV     SP,R0
016654  104417                          TRAP    C$PNTF
016656  062706  000006                  ADD     #6,SP
016662  005237  002214          1$:     INC     TSTCNT          ; BUMP TEST COUNTER.
016666                                  SETPRI  IPRI            ;PRIORITY THAT OF DEVICE
016666  013700  002212                  MOV     IPRI,R0
016672  104441                          TRAP    C$SPRI
016674  005726                  5$:     TST     (SP)+           ;FIX UP THE STACK
016676  013705  002206                  MOV     CSRADDR,R5      ; ADDRESS OF TSV REGISTERS ON UNIBUS
016702  000207                          RTS     PC
016704     045     123     045  TNAM:   .ASCIZ  '%S%T%A Test'
                                        .EVEN
                                        .SBTTL  TSTEND  - PRINT ERRORS RECEIVED
                                ;
                                ; AT END OF EACH TEST, PRINT THE NUMBER OF ERRORS RECEIVED
                                ; IF NORMAL ERROR REPORTING IS DISABLED (FLA:IER).
                                ;
016720                          TSTEND: RFLAGS  R0
016720  104421                          TRAP    C$RFLA
016722  030027  020000                  BIT     R0,#IER
016726  001412                          BEQ     1$              ; BR IF "IER" NOT SET.
016730                                  PRINTF  #ESUM,ERRK      ; PRINT ERROR COUNT.
016730  013746  016756                  MOV     ERRK,-(SP)
016734  012746  016760                  MOV     #ESUM,-(SP)
016740  012746  000002                  MOV     #2,-(SP)
016744  010600                          MOV     SP,R0
016746  104417                          TRAP    C$PNTF
```

```
     016750  062706  000006                  ADD      #6,SP
2249 016754  000207                   1$:    RTS      PC
2250
2251 016756  000000                   ERRK:  0                              ; LOCAL ERROR COUNT.
2252 016760     045     101      040  ESUM:  .ASCIZ   /%A %D%A ERRORS/
2253 016777     105     122      122  EMAXDU: .ASCIZ  /ERROR LIMIT REACHED -- DROPPING UNIT/
2254                                         .EVEN
```

```
 2256                                                  .SBTTL  INCERK  - INCREMENT LOCAL ERROR COUNT
 2257                                          ;+
 2258                                          ; ROUTINES TO INCREMENT LOCAL ERROR COUNT AND CHECK FOR LIMIT:
 2259                                          ;-
 2260 017044  005237  016756                   INCERK: INC     ERRK                    ; INCREMENT LOCAL ERROR COUNT
 2261 017050  010046                                   MOV     R0,-(SP)                ; SAVE R0
 2262 017052  013700  002202                           MOV     UNITN,R0                ; GET UNIT NUMBER,
 2263 017056  006300                                   ASL     R0                      ; ... AND MAKE IT A WORD OFFSET.
 2264 017060  062700  003176                           ADD     #ERTABL,R0              ; R0 GETS ADDRESS OF ERROR TABLE ENTRY.
 2265 017064  005210                                   INC     (R0)                    ; INCREMENT THE DEVICE ERROR COUNT
 2266 017066  032710  007777                           BIT     #7777,(R0)              ; DID WE OVERFLOW THE FIELD?
 2267 017072  001001                                   BNE     1$                      ; BR IF NO.
 2268 017074  005310                                   DEC     (R0)                    ; YES -- BACK IT UP TO 7777.
 2269 017076  012600                           1$:     MOV     (SP)+,R0                ; RESTORE R0
 2270 017100  000207                                   RTS     PC                      ; RETURN TO CALLER.
 2271
 2272 017102  010046                           CKEMAX: MOV     R0,-(SP)                ; SAVE R0
 2273 017104  013700  002202                           MOV     UNITN,R0                ; GET UNIT NUMBER
 2274 017110  006300                                   ASL     R0                      ; ... AND MAKE IT A WORD OFFSET
 2275 017112  016000  003176                           MOV     ERTABL(R0),R0           ; GET ERROR TABLE ENTRY
 2276 017116  042700  170000                           BIC     #170000,R0              ; EXTRACT ERROR COUNT FIELD
 2277 017122  020037  002174                           CMP     R0,GERRMAX              ; IS GLOBAL LIMIT EXCEEDED FOR THIS UNIT?
 2278 017126  103004                                   BHIS    1$                      ; BR IF YES
 2279 017130  023737  016756  002172                   CMP     ERRK,LERRMAX            ; IS LOCAL LIMIT EXCEEDED FOR THIS TEST?
 2280 017136  103417                                   BLO     2$                      ; BR IF NO
 2281 017140                                   1$:     RFLAGS  R0                      ; GET OPERATOR FLAGS
      017140  104421                                   TRAP    C$RFLA
 2282 017142  032700  000040                           BIT     #IDU,R0                 ; IS DROPPING INHIBITED?
 2283 017146  001013                                   BNE     2$                      ; BR IF YES.
 2284 017150  012737  177777  003112                   MOV     #-1,DUFLG               ; NO -- DROP THE UNIT
 2285 017156                                           ERRDF   4,EMAXDU
      017156  104455                                   TRAP    C$ERDF
      017160  000004                                   .WORD   4
      017162  016777                                   .WORD   EMAXDU
      017164  000000                                   .WORD   0
 2286 017166                                           DODU    UNITN
      017166  013700  002202                           MOV     UNITN,R0
      017172  104451                                   TRAP    C$DODU
 2287 017174                                           DOCLN
      017174  104444                                   TRAP    C$DCLN
 2288 017176  012600                           2$:     MOV     (SP)+,R0                ; RESTORE R0
 2289 017200  000207                                   RTS     PC                      ; RETURN TO CALLER
```

```
                                                .SBTTL  CKDROP  - CHECK IF UNIT SHOULD BE DROPPED
                                        ;+
                                        ; CHECK IF UNIT SHOULD BE DROPPED
                                        ;-
017202  010046                          CKDROP: MOV     R0,-(SP)
017204                                          FORCERROR       1$,NOTSSR
017214                                          RFLAGS  R0
017214  104421                                  TRAP    C$RFLA
017216  032700  000040                          BIT     #IDU,R0
017222  001010                                  BNE     1$
017224  011600                                  MOV     (SP),R0
017226  012737  177777  003112                  MOV     #-1,DUFLG
017234                                          DODU    UNITN
017234  013700  002202                          MOV     UNITN,R0
017240  104451                                  TRAP    C$DODU
017242                                          DOCLN                   ;ABORT THE PASS
017242  104444                                  TRAP    C$DCLN
017244  012600                          1$:     MOV     (SP)+,R0
017246  000207                                  RTS     PC


                                                .SBTTL  CONFIG  - DETERMINE CONFIGURATION OF SYSTEM
                                        ;
                                        ; SUBROUTINE - DETERMINE CONFIGURATION OF TSV05 SYSTEM.
                                        ;
017250                                  CONFIG:
017250  004737  015774                          JSR     PC,SOFINIT
017254  000207                                  RTS     PC
                                                .SBTTL  KTON,KTOFF      - ENABLE/DISABLE MEMORY MANAGEMENT
                                        ;
                                        ; SUBROUTINE - ENABLE MEM MGT.
                                        ;
017256  005737  003132                  KTON:   TST     KTFLG           ; GOT KT?
017262  001403                                  BEQ     1$              ; NO.
017264  012737  000001  177572                  MOV     #1,SR0          ; YES. ENABLE KT11.
017272  000207                          1$:     RTS     PC

                                        ;
                                        ; SUBROUTINE - DISABLE MEM MGT.
                                        ;
017274  005737  003132                  KTOFF:  TST     KTFLG           ; GOT KT11?
017300  001405                                  BEQ     1$              ; NO.
017302  000240                                  NOP
017304  000240                                  NOP
017306  012737  000000  177572                  MOV     #0,SR0          ; DISABLE KT.
017314  000207                          1$:     RTS     PC
```

```
                                        .SBTTL  SETMAP  - SETUP PAR6 MAPPING

                                ;+
                                ;
                                ;THIS ROUTINE SETS UP KERNEL PAR6 TP HANDLE
                                ;AN 18 BIT ADDRESS. THE OFFSET INTO THE PAGE
                                ;IS RETURNED BIASED TO PAR6.
                                ;
                                ;INPUTS:
                                ;
                                ;       R0      HIGH ORDER ADDRESS BITS
                                ;       R1      LOW ORDER ADDRESS BITS
                                ;
                                ;OUTPUTS:
                                ;
                                ;       R0      OFFSET INTO BLOCK WITH PAR6 BIAS (I.E. THE ADDRESS)
                                ;       CARRY   SET IF SUCCESS
                                ;               CLR IF ERROR
                                ;-
017316                          SETMAP:
017316                                  SAVREG                          ;SAVE R1-R4 UNTIL NEXT RETURN
017322  005737  003132                  TST     KTFLG                   ;SYSTEM HAVE ABOVE 28K?
017326  001433                          BEQ     10$                     ;BR IF NO
017330  010102                          MOV     R1,R2                   ;SAVE LOW ORDER BITS
        000006                          .REPT   6
                                        ASR     R0                      ;CONVERT WORD ADDRESS TO 32W BLOCKS
                                        ROR     R1                      ;MAKE IT DOUBLE PRECISION
                                        .ENDR
017362  042701  000177                  BIC     #177,R1                 ;ALINE FOR LOWER 4K BOUNDARY
017366  020137  003132                  CMP     R1,KTFLG                ;HIGHER THAN EXISTING MEMORY?
017372  103011                          BHIS    10$                     ;BR IF YES
017374  010137  172354                  MOV     R1,@#KIPAR6             ;SETUP MAPPING REGISTER PAR6
017400  042702  160000                  BIC     #160000,R2              ;SETUP DISPLACEMENT IN PAGE
017404  062702  140000                  ADD     #140000,R2              ;ADD IN PAR6 BIAS
017410  010200                          MOV     R2,R0                   ;RETURN IN R0
017412  000261                          SEC                             ;SET SUCCESS
017414  000401                          BR      15$                     ;
017416  000241                  10$:    CLC                             ;SET FAILURE
017420  000207                  15$:    RTS     PC                      ;RETURN
                                        .SBTTL  FILLMEM - FILL MEMORY WITH BACKGROUND PATTERN
                                ;+
                                ;  FILL MEMORY WITH A BACKGROUND PATTERN
                                ;
                                ; INPUTS:
                                ;
                                ;       R0 = BACKGROUND PATTERN
                                ;       FREE    = FIRST LOCATION AVAILABLE TO DIAGNOSTIC
                                ;       KTFLG   = SET TO HIGHEST MEMORY LOCATION IF > 28K.
                                ;
                                ; OUTPUTS:
                                ;
                                ;       NONE
                                ;-
                                ;
017422                          FILLMEM:
017422                                  SAVREG                  ;SAVE R1-R5 UNTIL NEXT RETURN
017426  004737  017274                  JSR     PC,KTOFF        ;DISABLE KT.
```

```
 2391 017432  010003                               MOV     R0,R3              ;COPY TEST PATTERN
 2392 017434  013701  003124                       MOV     FREE,R1            ;GET FIRST FREE LOCATION
 2393 017440  013702  003126                       MOV     FRESIZ,R2          ;SIZE OF FREE SPACE BELOW 28K.
 2394 017444  010321                       10$:    MOV     R3,(R1)+           ;STORE A BACKGROUND WORD
 2395 017446  005302                               DEC     R2                 ;DONE ALL MEMORY IN FREE SPACE?
 2396 017450  003375                               BGT     10$                ;BR IF NO
 2397 017452  005737  003132                       TST     KTFLG              ; GOT KT?
 2398 017456  001477                               BEQ     55$                ; NO. GET OUT.
 2399 017460  004737  017256                       JSR     PC,KTON            ; YES. ENABLE KT.
 2400 017464  005000                               CLR     R0                 ;HIGH ORDER ADDRESS START
 2401 017466  013701  003152                       MOV     PST32W,R1          ;GET >28K START ADDRESS (IN 32W BLOCKS)
 2402         000006                               .REPT   6
 2403                                              CLC                        ;CLEAR C BIT
 2404                                              ROL     R1                 ;CONVERT BLOCKS TO WORDS
 2405                                              ROL     R0                 ;MAKE IT DOUBLE PRECISION
 2406                                              .ENDR
 2407 017536  004737  017316                       JSR     PC,SETMAP          ;SETUP PAR6 MAPPING REGISTER
 2408 017542  010320                       30$:    MOV     R3,(R0)+           ;STORE TEST PATTERN IN >28K ADDRESS
 2409 017544  020027  160000                       CMP     R0,#160000         ;END OF PAR6 MAPPING AREA?
 2410 017550  103774                               BLO     30$                ;BR IF NO
 2411 017552  162700  020000                       SUB     #20000,R0          ;BACKUP INTO PAR6 MAPPING BEGIN
 2412 017556  062737  000200  172354               ADD     #200,@#KIPAR6      ;POINT TO NEXT 4K BLOCK >28K.
 2413 017564  023737  172354  003132               CMP     @#KIPAR6,KTFLG     ;END OF MEMORY?
 2414 017572  001427                               BEQ     50$                ;BR IF YES
 2415 017574  005737  003144                       TST     T23A               ;11/23A?
 2416 017600  001407                               BEQ     35$                ;NO KEEP GOING
 2417 017602  013704  177572                       MOV     SR0,R4             ;GET SR0 CONTENTS
 2418 017606  042704  177761                       BIC     #177761,R4         ;CLEAR ALL BUT PAGE NUMBER
 2419 017612  022704  000016                       CMP     #16,R4             ;SEE IF PAGE 7
 2420 017616  001415                               BEQ     50$                ;EXIT IF THERE
 2421 017620  005737  003146               35$:    TST     T23B               ;11/23B?
 2422 017624  001410                               BEQ     45$                ;NO KEEP GOING
 2423 017626  023727  172354  007600               CMP     @#KIPAR6,#7600     ;REACHED 18 BITS?
 2424 017634  103001                               BHIS    40$                ;YES
 2425 017636  000403                               BR      45$                ;NO KEEP GOING
 2426 017640  012737  000020  172516       40$:    MOV     #20,SR3            ;SET 22 BIT RELOCATION
 2427 017646  000137  017542               45$:    JMP     30$                ;KEEP GOING ON ETC.
 2428 017652  004737  017274               50$:    JSR     PC,KTOFF           ; DISABLE KT.
 2429 017656  000207                       55$:    RTS     PC
```

```
                                        .SBTTL  CMPMEM  - COMPARE MEMORY TO BACKGROUND PATTERN
                                ;+
                                ; COMPARE MEMORY WITH A BACKGROUND PATTERN
                                ;
                                ; INPUTS:
                                ;
                                ;       R0 = BACKGROUND PATTERN
                                ;       FREE    = FIRST LOCATION AVAILABLE TO DIAGNOSTIC
                                ;       KTFLG   = SET TO HIGHEST MEMORY LOCATION IF > 28K.
                                ;
                                ; OUTPUTS:
                                ;
                                ;       CARRY   - SET IF NO ERROR
                                ;       CARRY   - CLR IF ERROR
                                ;
                                ; IMPLICIT OUTPUTS:
                                ;
                                ;       ERRHI   - ERROR HIGH ADDRESS
                                ;       ERRLO   - ERROR LOW ADDRESS
                                ;       EXPD    - EXPECTED DATA
                                ;       RECV    - RECEIVED DATA
                                ;-
017660                          CMPMEM:
017660                                  SAVREG                  ;SAVE R1-R5 UNTIL NEXT RETURN
017664  010003                          MOV     R0,R3           ;COPY TEST PATTERN
017666  004737  017274                  JSR     PC,KTOFF        ;DISABLE KT.
017672  013701  003124                  MOV     FREE,R1         ;GET FIRST FREE LOCATION
017676  013702  003126                  MOV     FRESIZ,R2       ;SIZE OF FREE SPACE BELOW 28K.
017702  020311                  10$:    CMP     R3,(R1)         ;FREE SPACE LOCATION EQUAL TO EXPD?
017704  001411                          BEQ     15$             ;BR IF YES
017706  010137  002240                  MOV     R1,ERRLO        ;SAVE ADDRESS IN ERROR
017712  005037  002236                  CLR     ERRHI           ;NO HIGH ADDRESS
017716  010337  002232                  MOV     R3,EXPD         ;SAVE EXPD FOR ERROR REPORT
017722  011137  002234                  MOV     (R1),RECV       ;SAVE RECV FOR ERROR REPORT
017726  000474                          BR      50$             ;
017730  005721                  15$:    TST     (R1)+           ;POINT TO NEXT ADDRESS
017732  005302                          DEC     R2              ;DONE ALL MEMORY IN FREE SPACE?
017734  003362                          BGT     10$             ;BR IF NO
017736  005737  003132                  TST     KTFLG           ; GOT KT?
017742  001472                          BEQ     55$             ; NO. GET OUT.
017744  004737  017256                  JSR     PC,KTON         ; YES. ENABLE KT.
017750  005000                          CLR     R0              ;HIGH ORDER ADDRESS START
017752  013701  003152                  MOV     PST32W,R1       ;GET >28K START ADDRESS (IN 32W BLOCKS)
        000006                          .REPT   6
                                        ROL     R1              ;CONVERT BLOCKS TO WORDS
                                        ROL     R0              ;MAKE IT DOUBLE PRECISION
                                        .ENDR
020006  042701  000177                  BIC     #177,R1         ;ALINE 4K BOUNDARY
020012  010046                          MOV     R0,-(SP)        ;SAVE HIGH ORDER
020014  010146                          MOV     R1,-(SP)        ;SAVE LOW ORDER
020016  004737  017316                  JSR     PC,SETMAP       ;SETUP PAR6 MAPPING REGISTER
020022  010004                          MOV     R0,R4           ;COPY ADDRESS BIASED TO PAR6
020024  012601                          MOV     (SP)+,R1        ;RESTORE LOW ORDER IN NON PAR6 FORMAT
020026  012600                          MOV     (SP)+,R0        ;RESTORE HIGH ORDER IN NON PAR6 FORMAT
020030  020314                  30$:    CMP     R3,(R4)         ;ABOVE 28K LOCATION EQUAL EXPD?
020032  001411                          BEQ     32$             ;BR IF YES
020034  010037  002236                  MOV     R0,ERRHI        ;SAVE HIGH ORDER IN ERROR
```

```
020040  010137  002240                      MOV     R1,ERRLO          ;SAVE LOW ORDER IN ERROR
020044  010337  002232                      MOV     R3,EXPD           ;SAVE EXPD FOR ERROR REPORT
020050  011437  002234                      MOV     (R4),RECV         ;SAVE RECV FOR ERROR REPORT
020054  000421                              BR      50$               ;
020056  062701  000002              32$:    ADD     #2,R1             ;UPDATE NON PAR6 ADDRESS
020062  005500                              ADC     R0                ;MAKE IT DOUBLE PRECISION ADD
020064  062704  000002                      ADD     #2,R4             ;UPDATE PAR FORMAT ADDRESS
020070  020427  160000                      CMP     R4,#160000        ;END OF PAR6 MAPPING AREA?
020074  103755                              BLO     30$               ;BR IF NO
020076  162704  020000                      SUB     #20000,R4         ;BACKUP INTO PAR6 MAPPING BEGIN
020102  062737  000200  172354              ADD     #200,@#KIPAR6     ;POINT TO NEXT 4K BLOCK >28K.
020110  023737  172354  003132              CMP     @#KIPAR6,KTFLG    ;END OF MEMORY?
020116  101744                              BLOS    30$               ;BR IF NO
020120  004737  017274              50$:    JSR     PC,KTOFF          ;TURN OFF MEMORY MAPPING
020124  000241                              CLC                       ;SET FAILURE
020126  000403                              BR      60$               ;
020130  004737  017274              55$:    JSR     PC,KTOFF          ;TURN OFF MEMORY MAPPING
020134  000261                              SEC                       ;SET SUCCESS
020136  000207                      60$:    RTS     PC
                                            .SBTTL  REGSAV  - SAVE R1-R5 ON STACK
                                    ;+
                                    ;
                                    ;ROUTINE TO
                                    ;SAVE R1 THROUGH R5 ON THE STACK
                                    ;
                                    ;CALLING SEQUENCE:
                                    ;
                                    ;       JSR     R5,REGSAV
                                    ;
                                    ;THIS IS A COOROUTINE WHICH TRANSFER CONTROL BACK TO
                                    ;THE CALLING ROUTINE. AT THE END OF THE CALLING ROUTINE,
                                    ;THE RTS PC RETURNS CONTROL TO THIS ROUTINE TO RESTORE
                                    ;REGISTERS.
                                    ;
                                    ;THIS ROUTINE SHOULD ONLY BE CALLED FROM ROUTINES WHICH ARE
                                    ;CALLED VIA A JSR PC INSTRUCTION
                                    ;
                                    ;-

020140                              REGSAV:
020140  010446                              MOV     R4,-(SP)
020142  010346                              MOV     R3,-(SP)
020144  010246                              MOV     R2,-(SP)
020146  010146                              MOV     R1,-(SP)
020150  010546                              MOV     R5,-(SP)
020152  016605  000012                      MOV     10.(SP),R5
020156  004736                              JSR     PC,@(SP)+
020160  012601                              MOV     (SP)+,R1
020162  012602                              MOV     (SP)+,R2
020164  012603                              MOV     (SP)+,R3
020166  012604                              MOV     (SP)+,R4
020170  012605                              MOV     (SP)+,R5
020172  000207                              RTS     PC
```

K7

```
  2542                                         .SBTTL  GETPAT  - GET 8 BIT PATTERN FROM OPERATOR
  2543                                 ;+
  2544                                 ;ROUTINE TO REQUEST AN 8 BIT DATA PATTERN FROM THE OPERATOR
  2545                                 ;
  2546                                 ;INPUTS:        NONE.
  2547                                 ;
  2548                                 ;OUTPUTS:
  2549                                 ;       RO      OCTAL NUMBER FROM THE OPERATOR
  2550                                 ;
  2551                                 ;CALLING SEQUENCE:
  2552                                 ;       JSR     PC,GETPAT
  2553                                 ;-
  2554 020174                          GETPAT::
  2555 020174                                  SAVREG                  ;SAVE THE GENERAL REGISTERS
  2556 020200                          1$:     GMANID  DATASC,PATDAT,0,377,0,377,NO
       020200  104443                          TRAP    C$GMAN
       020202  000406                          BR      10000$
       020204  020230                          .WORD   PATDAT
       020206  000022                          .WORD   T$CODE
       020210  020232                          .WORD   DATASC
       020212  000377                          .WORD   377
       020214  000000                          .WORD   T$LOLIM
       020216  000377                          .WORD   T$HILIM
       020220                          10000$:
  2557 020220                                  BNCOMPLETE      1$      ;RETRY IF ERROR
       020220  103367                          BCC     1$
  2558 020222  013700  020230                  MOV     PATDAT,RO       ;DATA PATTERN FROM OPERATOR
  2559 020226  000207                          RTS     PC              ;RETURN TO CALLER
  2560
  2561                                 ;+
  2562                                 ;LOCAL DATA AREA
  2563                                 ;-
  2564
  2565 020230  000000                  PATDAT: .WORD   0               ;TEMPORARY STORAGE FOR DATA
  2566 020232     105     116     124  DATASC: .ASCIZ  'ENTER DATA PATTERN'
  2567                                         .EVEN
```

```
                                      .SBTTL  GETSEL  - ISSUE MENU AND GET OPERATOR RESPONSE
                                      ;+
                                      ;ROUTINE TO ISSUE A MENU AND GET THE OPERATOR'S RESPONSE.
                                      ;
                                      ;INPUTS:
                                      ;       R0      ADDRESS OF ASCIZ STRING OF MENU
                                      ;       R1      MAXIMUM ALLOWABLE OPERATOR RESPONSE
                                      ;
                                      ;OUTPUTS:
                                      ;       R0      NUMBER OF THE OPERATOR'S SELECTION
                                      ;-
020256                                GETSEL::
020256                                        SAVREG                          ;SAVE GENERAL REGISTERS
020262  010002                                MOV     R0,R2                   ;SAVE THE MENU ADDRESS
020264  010203                        1$:     MOV     R2,R3                   ;START OF MENU STRING
020266  005713                        2$:     TST     (R3)                    ;END OF ASCII ?
020270  001412                                BEQ     3$                      ;BRANCH IF ALL LINES DISPLAYED
020272                                        PRINTF  #SELASC,(R3)+           ;DISPLAY THE MENU
020272  012346                                MOV     (R3)+,-(SP)
020274  012746  020442                        MOV     #SELASC,-(SP)
020300  012746  000002                        MOV     #2,-(SP)
020304  010600                                MOV     SP,R0
020306  104417                                TRAP    C$PNTF
020310  062706  000006                        ADD     #6,SP
020314  000764                                BR      2$
020316                                3$:     GMANID  MENASC,MENRES,D,-1,0,-1,NO
020316  104443                                TRAP    C$GMAN
020320  000406                                BR      10001$
020322  020476                                .WORD   MENRES
020324  000042                                .WORD   T$CODE
020326  020447                                .WORD   MENASC
020330  177777                                .WORD   -1
020332  000000                                .WORD   T$LOLIM
020334  177777                                .WORD   T$HILIM
020336                                10001$:
020336                                        BNCOMPLETE      1$              ;RETRY IF ERROR
020336  103352                                BCC     1$
020340  013700  020476                        MOV     MENRES,R0               ;GET THE OPERATOR'S REPLY
020344  020001                                CMP     R0,R1                   ;COMPARE TO MAXIMUM ALLOWED
020346  101411                                BLOS    5$                      ;BRANCH IF OK
020350                                        PRINTF  #MENERR                 ;DISPLAY ERROR MESSAGE
020350  012746  020374                        MOV     #MENERR,-(SP)
020354  012746  000001                        MOV     #1,-(SP)
020360  010600                                MOV     SP,R0
020362  104417                                TRAP    C$PNTF
020364  062706  000004                        ADD     #4,SP
020370  000735                                BR      1$                      ;RETRY
020372  000207                        5$:     RTS     PC                      ;RETURN TO CALLER
020374     045     116     045        MENERR: .ASCIZ  '%N%A *** Menu Selection Too Large ***'
020442     045     116     045        SELASC: .ASCIZ  '%N%T'
020447     105     156     164        MENASC: .ASCIZ  'Enter Menu Selection: '
                                              .EVEN
020476  000000                        MENRES:         .WORD   0
```

```
                                        .SBTTL  CHKMAN  - CHECK MANUAL INTERVENTION LEGALITY
                                ;+
                                ;
                                ;ROUTINE TO TEST FOR MANUAL INTERVENTION LEGALITY.
                                ;
                                ;INPUT:
                                ;
                                ;       NONE.
                                ;
                                ;OUTPUT:
                                ;
                                ;       CARRY   0       MANUAL INTERVENTION NOT ALLOWED
                                ;               1       MANUAL INTERVENTION IS OK
                                ;
                                ;SIDE EFFECTS:
                                ;
                                ;       A MESSAGE IS DISPLAYED WARNING THAT TEST IS
                                ;       NOT EXECUTED IF MANUAL INTERVENTION IS NOT
                                ;       ALLOWED.
                                ;
                                ;-

020500                          CHKMAN::
020500                                  SAVREG                          ;SAVE THE REGISTERS
020504                                  MANUAL                          ;SEE IF MANUAL INTERVENTION OK
020504  104450                          TRAP    C$MANI
020506                                  BCOMPLETE 1$                    ;BRANCH IF ALLOWED
020506  103411                          BCS     1$
020510                                  PRINTF  #NOMAN                  ;PRINT THE WARNING MESSAGE
020510  012746  020534                  MOV     #NOMAN,-(SP)
020514  012746  000001                  MOV     #1,-(SP)
020520  010600                          MOV     SP,R0
020522  104417                          TRAP    C$PNTF
020524  062706  000004                  ADD     #4,SP
020530  000241                          CLC                             ;CLEAR CARRY FOR ERROR
020532  000207                  1$:     RTS     PC                      ;RETURN

020534     045     116     045  NOMAN:  .ASCIZ  '%N%A *** Manual Intervention not Allowed - Test Aborted ***'
                                        .even
```

ENVIRN - SETUP FREE DIAGNOSTIC SPACE

```
                                        .SBTTL  ENVIRN  - SETUP FREE DIAGNOSTIC SPACE
                               ;
                               ; SUBROUTINE TO SET-UP VARIOUS ENVIRONMENTAL PARAMETERS.
                               ;
020630                         ENVIRN:  MEMORY  R0
020630 104431                           TRAP    C$MEM
020632 010037  003124                   MOV     R0,FREE         ; GET 1ST FREE ADDRESS...
020636 062737  000002  003124           ADD     #2,FREE
020644 011037  003126                   MOV     (R0),FRESIZ     ;...AND WORD COUNT.
020650 162737  000004  003126           SUB     #4,FRESIZ
020656 013702  002012                   MOV     L$UNIT,R2       ; GET NUMBER OF UNITS
020662 162737  000007  003126  10$:     SUB     #7,FRESIZ       ; TAKE AWAY 7 WORDS PER UNIT
020670 005302                           DEC     R2
020672 001373                           BNE     10$
020674 013700  003124                   MOV     FREE,R0         ;GET FIRST FREE ADDRESS
020700 063700  003126                   ADD     FRESIZ,R0       ;POINT TO LAST FREE ADDRESS
020704 162700  000002                   SUB     #2,R0           ;BACKUP 1 WORD
020710 010037  003130                   MOV     R0,FREEHI       ;STORE LAST FREE ADDRESS
020714 000240                           NOP                     ;*****************************************
020716 012701  177520                   MOV     #BDVPCR,R1      ;GET BDV11 PCR ADDRESS
020722 010102                           MOV     R1,R2           ;COPY TO R2
020724 062702  000002                   ADD     #2,R2           ;SET THE RANGE
020730 004737  016376                   JSR     PC,XNXM         ;SEE IF WE HAVE ONE
020734 103001                           BCC     15$             ;OK TO SET FLAGS
020736 000423                           BR      40$             ;RETURN WITH FLAGS CLEAR
020740 013701  177520          15$:     MOV     BDVPCR,R1       ;SAVE PCR CONTENTS
020744 062701  000001                   ADD     #1,R1           ;ADD ONE TO IT
020750 012702  177520                   MOV     #BDVPCR,R2      ;GET BDV11 PCR ADDRESS
020754 005212                           INC     (R2)            ;TRY TO WRITE TO IT
020756 013703  177520                   MOV     BDVPCR,R3       ;GET RESULTS
020762 020103                           CMP     R1,R3           ;DID IT CHANGE?
020764 001006                           BNE     20$             ;NO, MUST BE 11/23B
020766 005237  003144                   INC     T23A            ;SET THE FLAG
020772 042737  170000  002120           BIC     #170000,L$HIME  ;SUPERVISOR COULD BE WRONG
                               ;        NOP                     ;BR 40$ FOR RELEASE
                               ;        PRINTF  #M8186          ;TELL THE SYSTEM TYPE
021000 000402                           BR      40$             ;RETURN
021002 005237  003146          20$:     INC     T23B            ;SET THE FLAG
                               ;        NOP                     ;BR 40$ FOR RELEASE
                               ;        PRINTF  #M8189          ;TELL THE SYSTEM TYPE
021006                         40$:
021006 000207                           RTS     PC              ;RETURN
```

```
                                                .SBTTL  KTINIT  - SETUP KT11 MEMORY MANAGEMENT REGISTERS
                                        ;+
                                        ;
                                        ;ROUTINE TO INIT KT-11
                                        ;
                                        ;-

021010                                  KTINIT:
021010  005037  003132                          CLR     KTFLG                   ; INIT >28K MEMORY FLAG
021014  005037  003134                          CLR     KTENABLE                ; INIT TEST >28K FLAG
021020  023727  002120  001577                  CMP     L$HIME,#1577            ; GOT ENOUGH MEMORY (>28K)?
021026  101444                                  BLOS    9$                      ; NO.
021030  013700  000004                          MOV     @#ERRVEC,R0             ; SAVE OLD ERR VEC PTR.
021034  012737  021126  000004                  MOV     #2$,@#ERRVEC            ; SET ERR VEC PTR.
021042  005737  177572                          TST     @#SR0                   ; GOT KT11?
021046  000240                                  NOP                             ;  (TRAP IF NO).
021050  013737  002120  003132                  MOV     L$HIME,KTFLG            ; YES. SET KT FLAG.
021056  042737  000177  003132                  BIC     #177,KTFLG              ;
021064  010037  000004                          MOV     R0,@#ERRVEC             ; RESTORE OLD ERR VEC PTR.
021070  005000                                  CLR     R0                      ; R0 = AR DATA.
021072  012701  172340                          MOV     #KIPAR0,R1              ; R1 = KI REGS PTR.
021076  012761  077406  177740  1$:             MOV     #77406,-40(R1)          ; SET DESCRIPTOR REG.
021104  010021                                  MOV     R0,(R1)+                ; SET KIPAR REG.
021106  062700  000200                          ADD     #200,R0                 ; BUMP AR DATA BY "4K".
021112  020027  002000                          CMP     R0,#2000                ; AT "I/O"?
021116  001367                                  BNE     1$                      ; NO.
021120  012741  177600                          MOV     #177600,-(R1)           ; YES. SET KTPAR7 FOR I/O.
021124  000405                                  BR      9$

021126  012716  021134          2$:             MOV     #6$,(SP)                ; SET UP RETURN
021132  000002                                  RTI                             ; RTI TO NEXT LOCATION

021134  010037  000004          6$:             MOV     R0,@#ERRVEC             ; RESTORE OLD ERR VEC PTR.

021140  000207                  9$:             RTS     PC
```

```
                                  ;+
                                  ;       SUBROUTINE TO SET EXTENDED FEATURES SWITCH
                                  ;
                                  ;       Requires that SOFINIT and WRTCHR have been done previous to call.
                                  ;
                                  ;
                                  ;INPUTS:
                                  ;       R5      CURRENT UNIT NUMBER
                                  ;OUTPUTS:
                                  ;       The Extended Features Switch is set.
                                  ;
                                  ;-

021142                            INVERT::

021142  005737  002226                    TST     EXTFEA                  ; IS SWITCH SET?
021146  001020                            BNE     1$                      ; YES,EXIT STAGE RIGHT!(or the next one outa town!)
021150  012737  100206  021214            MOV     #100206,CMDPKT          ; WRT SUB-SYS MEM CMD
021156  012737  021224  021216            MOV     #WSMBK,CMDPKT+2         ; MSG BUF ADDR
021164  012737  000006  021222            MOV     #6,CMDPKT+6             ; BYTE COUNT
021172  012737  100010  021224            MOV     #100010,WSMBK           ; INVERT THE SWITCH
021200  012704  021214                    MOV     @CMDPKT,R4              ; SET CMDPKT INTO R4
021204  004737  010662                    JSR     PC,WRTCHR               ; DO IT
021210  000207                    1$:     RTS     PC                      ; RETURN

                                  ;       COMMAND PACKET.

        021214                    .       =       <.+3>&177774    ;MUST BE ON MOD 4 BOUNDRY.

021214  000000                    CMDPKT:: 0                      ;1ST WORD IS TS05 COMMAND.
021216  000000                            0                       ;2ND WORD IS THE BUFFER LOW ADDRESS.
021220  000000                            0                       ;3RD WORD IS THE BUFFER HIGH ADDRESS.
021222  000000                            0                       ;4TH WORD IS THE BYTE/RECORD/FILE COUNT.

                                  ;       WRITE SUB-SYSTEM MEMORY CHARACTERISTIC BLOCK.

021224  000000                    WSMBK:: 0                       ;1ST WORD:: SEL 0
021226  000000                            0                       ;2ND WORD:: SEL 2
021230  000000                            0                       ;3RD WORD:: SEL 4
                                          .EVEN
                                  ;+
                                  ;       SUBROUTINE TO CHECK WETHER OR NOT WE'LL TEST NXM
                                  ;
                                  ;
                                  ;INPUTS:
                                  ;OUTPUTS:
                                  ;       The NXMFLG is set if we can test.
                                  ;       The NXMLO and NXMHI addresses are setup.
                                  ;-

021232                            MEMCK::

021232                                    SAVREG                          ;SAVE THE REGISTERS
021236  005037  003136                    CLR     NXMFLG                  ;CLEAR THE FLAG
021242  005037  003140                    CLR     NXMLO                   ;CLEAR THE TEST ADDRESS LO
021246  005037  003142                    CLR     NXMHI                   ;CLEAR THE TEST ADDRESS HI
021252  005737  003146                    TST     T238                    ;IS IT A 11/238?
```

```
021256  001407                                  BEQ     1$                              ;NC
021260  023727  002120  007777                  CMP     L$HIME,#7777                    ; GREATER THAN 128K
021266  103406                                  BLO     2$                              ; NO
021270  004737  021406                          JSR     PC,NXMTST                       ;SETUP THE ADDRESS
021274  000427                                  BR      13$                             ;SET THE FLAG AND EXIT
021276  005737  003144                  1$:     TST     T23A                            ;IS IT A 11/23A?
021302  001413                                  BEQ     4$                              ;NO
021304  023727  002120  005777          2$:     CMP     L$HIME,#5777                    ;GREATER THAN 96K
021312  101023                                  BHI     14$                             ;YES,23A/23B WITH 128K MEMORY
021314  023727  002120  003777                  CMP     L$HIME,#3777                    ;GREATER THAN 64K BUT LESS THAN 92K?
021322  103403                                  BLO     4$                              ;NO, CHECK 24K
021324  004737  021406                          JSR     PC,NXMTST                       ;SETUP THE ADDRESS
021330  000411                                  BR      13$                             ;SET THE FLAG AND EXIT
021332  023727  002120  001577          4$:     CMP     L$HIME,#1577                    ;GREATER THAN 24K BUT LESS THAN 64K?
021340  103410                                  BLO     14$                             ;NO, TELL THEM AND EXIT WITH FLAG CLEAR
021342  004737  021406                          JSR     PC,NXMTST                       ;SETUP THE ADDRESS
021346  062737  000077  003142                  ADD     #77,NXMHI                       ;FOOL THE 11/02 & 11/03
021354  005237  003136                  13$:    INC     NXMFLG                          ;SET THE FLAG
021360  000411                                  BR      15$                             ;EXIT
021362  000410                          14$:    BR      15$                             ;NOP FOR PRINTOUT
021364                                          PRINTF  #NOMEM                          ;TELL THEM & EXIT ***NO PRINT*****
021364  012746  005460                          MOV     #NOMEM,-(SP)
021370  012746  000001                          MOV     #1,-(SP)
021374  010600                                  MOV     SP,R0
021376  104417                                  TRAP    C$PNTF
021400  062706  000004                          ADD     #4,SP
021404  000207                          15$:    RTS     PC                              ;RETURN

                                        ;+
                                        ;       SUBROUTINE TO SETUP THE NXM ADDRESS FOR TESTING
                                        ;
                                        ;OUTPUTS:NXMLO,NXMHI                    ;SETUP WITH NXM ADDRESS
                                        ;
                                        ;-

021406  013701  002120                  NXMTST: MOV     L$HIME,R1                       ;GET TOP OF MEMORY
021412  062701  000200                          ADD     #200,R1                         ;MAKE IT I/O BLOCK OR OTHER NXM
021416  042701  000177                          BIC     #177,R1
021422  010102                                  MOV     R1,R2                           ;RESAVE RESULTS
        000006                                  .REPT   6
                                                ASL     R1                              ;PUT IN PLACE FOR XFER
                                                .ENDR
021440  010137  003140                          MOV     R1,NXMLO                        ;SAVE TEST ADDRESS LOW
        000012                                  .REPT   10.
                                                ASR     R2                              ;PUT IN PLACE FOR XFER
                                                .ENDR
021470  042702  177700                          BIC     #177700,R2                      ;DON'T WANT ILA!
021474  010237  003142                          MOV     R2,NXMHI                        ;SAVE TEST ADDRESS HIGH
021500  000207                                  RTS     PC                              ;RETURN

021502                                          ENDMOD
```

```
     7                                                     .TITLE  TSV4 - MISCELLANEOUS SECTIONS
     8
     9 021502                                              BGNMOD  TSV4
       021502                                      TSV4::
    10
    16
    17
    18
    19                                                     .SBTTL  PROTECTION TABLE
    20 021502                                              BGNPROT
       021502                                      L$PROT::
    21 021502   177777   177777   177777                   .WORD   -1, -1, -1, -1          ;NO DEVICE PROTECTION REQUIRED.
    22 021512                                              ENDPROT
```

```
                                                    .SBTTL  INITIALIZE SECTION


                                            ;++
                                            ;THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
                                            ;AT THE BEGINNING OF EACH PASS.
                                            ;
                                            ;IF "START" OR "RESTART", SET QUICK-PASS FLAG AND BUS-INIT.
                                            ;IF "CONTINUE", NOTHING IS REQUIRED.
                                            ;
                                            ;--
                                            ;+
                                            ;INSERT TEMPORARY JUMP TO ODT
                                            ;-
021512                                              BGNINIT
021512                                      L$INIT::
021512  005037  002226                      40$:    CLR     EXTFEA
021516  005037  003136                              CLR     NXMFLG
021522  012737  006360  002200                      MOV     #EPRT1,EPRTSW           ;SET UP PRIMARY MESSAGE FOR REPLACEMENT
021530  005037  003154                              CLR     SIFLAG                  ;CLEAR "SOFT INIT" FLAG
021534  005037  003134                              CLR     KTENABLE                ;CLEAR TEST ABOVE 28K FLAG
021540  005037  002302                              CLR     RAMSIZ                  ;CLEAR RAM SIZE FOR RAMERR ROUTINE
021544                                              READEF  #EF.CONTINUE
021544  012700  000036                              MOV     #EF.CONTINUE,R0
021550  104447                                      TRAP    C$REFG
021552                                              BNCOMPLETE 1$
021552  103023                                      BCC     1$
021554  023737  002202  002012                      CMP     UNITN,L$UNIT            ;UNIT IN RANGE?
021562  103070                                      BHIS    4$                      ;BR IF NO.
021564  005737  003112                              TST     DUFLG                   ;DROPPED UNIT?
021570  100472                                      BMI     NXTU                    ;BR IF YES
021572  013701  002202                              MOV     UNITN,R1
021576  006301                                      ASL     R1
021600  005761  003176                              TST     ERTABL(R1)
021604  001516                                      BEQ     SETU
021606  032761  040000  003176                      BIT     #BIT14,ERTABL(R1)       ;DROPPED?
021614  001060                                      BNE     NXTU
021616                                              EXIT    INIT                    ;DO NOTHING IF "CONTINUE".
021616  104432                                      TRAP    C$EXIT
021620  000416                                      .WORD   L10030-.
021622                                      1$:     READEF  #EF.NEW
021622  012700  000035                              MOV     #EF.NEW,R0
021626  104447                                      TRAP    C$REFG
021630                                              BNCOMPLETE NXTU                 ;TAKE NEXT UNIT IF NOT NEW PASS.
021630  103052                                      BCC     NXTU
021632                                              READEF  #EF.START
021632  012700  000040                              MOV     #EF.START,R0
021636  104447                                      TRAP    C$REFG
021640                                              BCOMPLETE 2$
021640  103404                                      BCS     2$
021642                                              READEF  #EF.RESTART
021642  012700  000037                              MOV     #EF.RESTART,R0
021646  104447                                      TRAP    C$REFG
021650                                              BNCOMPLETE 31$
021650  103031                                      BCC     31$
021652                                      2$:                                     ;1ST PASS, BUS-INIT...
021652                                              BRESET                          ;BUS RESET.
021652  104433                                      TRAP    C$RESET
```

```
   021654  005037  002214                   CLR     TSTCNT                      ;NUMBER OF TESTS RUN IN PASS
   021660  005037  002222                   CLR     FATFLG                      ;CLEAR FATAL ERROR COUNT
   021664  005037  003144                   CLR     T23A                        ;CLEAR 11/23A FLAG
   021670  005037  003146                   CLR     T23B                        ;CLEAR 11/23B FLAG
                                   ;        MOV     #340,-(SP)
                                   ;        MOV     #20$,-(SP)                  ;RETURN TO DEBUGGER
                                   ;        JMP     O.ODT               ;;@@ENTER THE DEBUGGER
   021674  005037  003400                   CLR     SKIPT               ;CLEAR THE SUBTEST "SKIPPER"
   021700                          20$:
   021700  012737  177777  002204           MOV     #-1,QVP                     ;...QUICK VERIFY...
   021706  004737  020630                   JSR     PC,ENVIRN                   ;SET ENVIRONMENT.
   021712  004737  021010                   JSR     PC,KTINIT                   ;INITIALIZE KT MEMORY MANAGEMENT
   021716  012700  003176                   MOV     #ERTABL,R0
   021722  005020                  30$:     CLR     (R0)+                       ;CLEAR THE ERROR TABLE
   021724  020027  003376                   CMP     R0,#ERTABE
   021730  103774                           BLO     30$
   021732  000404                           BR      4$
   021734  005037  002204          31$:     CLR     QVP
   021740  000137  022010                   JMP     PASRPT                      ;GO REPORT THE STATUS

   021744                          4$:
   021744  012737  177777  002202  NEWPAS:  MOV     #-1,UNITN                   ;INIT UNIT NUMBER...
   021752  005037  002220                   CLR     DEVCNT                      ;CLEAR COUNT OF DEVICES RUNNING
   021756                          NXTU:    BREAK
   021756  104422                           TRAP    C$BRK
   021760  005237  002202                   INC     UNITN                       ;...AND SET NEXT UNIT NUMBER.
   021764  023737  002202  002012           CMP     UNITN,L$UNIT
   021772  103423                           BLO     SETU
   021774  012737  177777  003112           MOV     #-1,DUFLG
   022002  000401                           BR      11$
   022004                                   DOCLN                               ;ABORT, NO MORE UNITS.
   022004  104444                           TRAP    C$DCLN
   022006  000240                  11$:     NOP
   022010                          PASRPT:
   022010  023727  002012  000001           CMP     L$UNIT,#1                   ;HOW MANY UNITS SELECTED?
   022016  101752                           BLOS    NEWPAS                      ;BR IF ONLY 1
   022020  005737  002220                   TST     DEVCNT                      ;ARE ANY STILL RUNNING?
   022024  001747                           BEQ     NEWPAS                      ;BR IF NO
   022026                                   RFLAGS  R0
   022026  104421                           TRAP    C$RFLA
   022030  032700  000100                   BIT     #ĪSR,R0                     ;SHOULD WE PRINT STATISTICS
   022034  001343                           BNE     NEWPAS                      ;BR IF NO

   022036                                   DORPT
   022036  104424                           TRAP    C$DRPT
   022040  000741                           BR      NEWPAS
   022042                          10$:

   022042                          SETU:    GPHARD  UNITN,R0                    ;GET UNIT N P-TABLE POINTER.
   022042  013700  002202                   MOV     UNITN,R0
   022046  104442                           TRAP    C$GPHRD
   022050                                   BNCOMPLETE NXTU                     ;BR IF UNIT NOT AVAILABLE.
   022050  103342                           BCC     NXTU
   022052  005037  003112                   CLR     DUFLG                       ;CLEAR "DROPPED" FLAG.
   022056  005237  002220                   INC     DEVCNT
   022062  012001                           MOV     (R0)+,R1                    ;GET 1ST REGISTER ADDRESS.
   022064  010137  002206                   MOV     R1,CSRADDR                  ;ADDRESS OF REGISTERS OF UNIT UNDER TEST
```

```
    022070  012001                              MOV     (R0)+,R1                        ;GET VECTOR ADDRESS.
                                                ;MOV    (R0),R2                         ;GET INTERRUPT PRIORITY
                                                ;MOV    R2,IPRI                         ;SET INTERRUPT PRIORITY.
    022072  010137  002210                      MOV     R1,IVEC                         ;SET INTERRUPT VECTOR POINTER...
    022076  012721  016216                      MOV     #INTR,(R1)+                     ;...VECTOR...
    022102  013721  002212                      MOV     IPRI,(R1)+                      ;...AND PRIORITY.

    022106                              1$:
                                        ;       TST     QVP             ;1ST PASS ??
                                        ;       BEQ     5$              ;NO, SKIP THE PASS 1 STUFF.

                                        ;
                                        ;1ST PASS, CHECK THAT DEVICE ADDRESSES ARE VALID, AND
                                        ;THAT THE DISPLAY STATUS IS PROPERLY INITIALIZED.
                                        ;
    022106  013701  002202                      MOV     UNITN,R1
    022112  006301                              ASL     R1
    022114  052761  100000  003176              BIS     #BIT15,ERTABL(R1)               ;SAY DEVICE RUNNING
    022122  005037  005772                      CLR     EXTA                            ;CLEAR ERROR EXTENSION FLAG.
    022126  023727  002012  000001              CMP     L$UNIT,#1                       ;ARE WE TESTING MULTIPLE UNITS?
    022134  101416                              BLOS    10$                             ;BR IF NO.
    022136                                      RFLAGS  R0                              ;YES -- GET OPERATOR FLAGS.
    022136  104421                              TRAP    C$RFLA
    022140  032700  001000                      BIT     #PNT,R0                         ;SHOULD WE PRINT UNIT #?
    022144  001412                              BEQ     10$                             ;BR IF NOT.
    022146                                      PRINTF  #PUNIT,UNITN                    ;PRINT THE UNIT #
    022146  013746  002202                      MOV     UNITN,-(SP)
    022152  012746  022240                      MOV     #PUNIT,-(SP)
    022156  012746  000002                      MOV     #2,-(SP)
    022162  010600                              MOV     SP,R0
    022164  104417                              TRAP    C$PNTF
    022166  062706  000006                      ADD     #6,SP
    022172                              10$:
    022172  005037  003114                      CLR     NODEV
    022176  013701  002206                      MOV     CSRADDR,R1                      ;ADDRESS OF FIRST REGISTER
    022202  010102                              MOV     R1,R2                           ;START OF REGISTERS
    022204  062702  000002                      ADD     #TSSR,R2                        ;ADDRESS OF TSSR REGISTER
    022210  004737  016376                      JSR     PC,XNXM                         ;TEST BOTH CONTROLLER REGISTERS...
    022214  103005                              BCC     2$                              ;...AND BR IF ALL OK.
    022216  010137  003114                      MOV     R1,NODEV                        ;FLAG DEVICE AS NON-EXISTENT
    022222  012737  177777  003112              MOV     #-1,DUFLG                       ;DROP THIS UNIT.
    022230                              2$:
                                        ;
                                        ;FINALLY, SET CPU PRIORITY AND WE'RE DONE.
                                        ;
    022230                              5$:     SETPRI  #PRI00          ;ENABLE INTERRUPTS.
    022230  012700  000000                      MOV     #PRI00,R0
    022234  104441                              TRAP    C$SPRI
    022236                                      ENDINIT
    022236                              L10030:
    022236  104411                              TRAP    C$INIT

    022240     045     116     045      PUNIT:  .ASCIZ  /%N%N%A***** TESTING UNIT %D2%A *****/
                                                .EVEN
                                        .SBTTL  ADD AND DROP UNITS SECTIONS

                                ;++
                                ; THE ADD-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
                                ; TO BE (A) ADDED TO THE TEST LIST FOR THE FIRST TIME,
                                ;    OR (B) RE-INSERTED IF IT HAD BEEN PREVIOUSLY DROPPED.
                                ;--
022306                                  BGNAU
022306                          L$AU::
022306  010001                          MOV     R0,R1                   ; GET UNIT TO BE ADDED (R0)
022310  006301                          ASL     R1                      ; MAKE IT A WORD INDEX
022312  052761  100000  003176          BIS     #100000,ERTABL(R1)      ; SET THE "ACTIVE" BIT
022320  042761  040000  003176          BIC     #40000,ERTABL(R1)       ; CLEAR THE "DROPPED" BIT
022326                                  PRINTF  #1$,R0
022326  010046                          MOV     R0,-(SP)
022330  012746  022354                  MOV     #1$,-(SP)
022334  012746  000002                  MOV     #2,-(SP)
022340  010600                          MOV     SP,R0
022342  104417                          TRAP    C$PNTF
022344  062706  000006                  ADD     #6,SP
022350                                  EXIT    AU
022350  000167                          .WORD   J$JMP
022352  000026                          .WORD   L10031-2-.
022354     045     116     045  1$:     .ASCIZ  /%N%A  UNIT %D%A ADDED/
                                        .EVEN

022402                                  ENDAU           ; UNUSED.
022402                          L10031:
022402  104452                          TRAP    C$AU
                                ;++
                                ; THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
                                ; TO BE REMOVED FROM THE TEST LIST.
                                ;
                                ; SUPVSR DOES THE "DROPPING".  THIS IS JUST TO TELL THE MAN.
                                ; "DROPPED" UNITS ARE RE-SELECTED ON OPERATOR "STA" OR "ADD"
                                ; COMMAND, OTHERWISE REMAIN INACTIVE.  THE "DISPLAY" COMMAND
                                ; WILL PRINT ALL DROPPED UNITS, AND THE P-TABLES OF THOSE
                                ; WHICH ARE STILL ACTIVE.
                                ; UPON ENTRY, R0 CONTAINS THE UNIT TO BE DROPPED.

022404                                  BGNDU
022404                          L$DU::
022404  012737  177777  003112          MOV     #-1,DUFLG
022412  010001                          MOV     R0,R1
022414  006301                          ASL     R1
022416  052761  140000  003176          BIS     #140000,ERTABL(R1)      ; SAY DROPPED
022424  000240  000240  000240          240,240,240                     ; ?????????
022432                                  PRINTF  #1$,R0
022432  010046                          MOV     R0,-(SP)
022434  012746  022460                  MOV     #1$,-(SP)
022440  012746  000002                  MOV     #2,-(SP)
022444  010600                          MOV     SP,R0
022446  104417                          TRAP    C$PNTF
022450  062706  000006                  ADD     #6,SP
022454                                  EXIT    DU
022454  000167                          .WORD   J$JMP
022456  000030                          .WORD   L10032-2-.
```

```
022460      045     116     045  1$:      .ASCIZ   /#N#A  UNIT #D#A DROPPED/
                                          .EVEN
022510                                    ENDDU
022510                           L10032:
022510  104453                            TRAP     C$DU
                                 ;++
                                 ; AUTO-DROP CODE SECTION.
                                 ;--
022512                                    BGNAUTO
022512                           L$AUTO::
022512  013705  002206                    MOV      CSRADDR,R5                  ;POINT TO DEVICE REGISTER
022516  012703  000550                    MOV      #360.,R3                    ;ENOUGH TIME FOR 2400' REEL TO REWIND
022522  004737  016250           10$:     JSR      PC,WAITF                    ;WAIT FOR SSR TO SET
022526  103420                            BCS      20$                         ;LEAVE WHEN SSR IS SET
022530                                    DELAY    250.                        ;WAIT FOR .25 SECONDS
022530  012727  000372                    MOV      #250.,(PC)+
022534  000000                            .WORD    0
022536  013727  002116                    MOV      L$DLY,(PC)+
022542  000000                            .WORD    0
022544  005367  177772                    DEC      -6(PC)
022550  001375                            BNE      .-4
022552  005367  177756                    DEC      -22(PC)
022556  001367                            BNE      .-20
022560  005303                            DEC      R3                          ;BUMP COUNTER DOWN
022562  001357                            BNE      10$                         ;KEEP GOING
022564  004737  017202                    JSR      PC,CKDROP                   ;TRY AND DROP UNIT
022570                           20$:
022570                                    ENDAUTO                  ; UNUSED.
022570                           L10033:
022570  104461                            TRAP     C$AUTO
```

```
                                        .SBTTL  CLEAN-UP AND REPORT CODING SECTIONS

                                ;++
                                ; THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS
                                ; EXECUTED AT THE END OF EACH PASS (OR SUB-PASS).
                                ; USE TO RETURN DEVICE UNDER TEST TO A NEUTRAL STATE.
                                ;--
022572                                  BGNCLN
022572                          L$CLEAN::
022572  013705  002206                  MOV     CSRADDR,R5              ;POINT TO DEVICE REGISTER
022576  005737  003112                  TST     DUFLG           ;"DROPPED" FLAG IS SET ON...
022602  100405                          BMI     1$              ;...AND GROSS CONTROLLER FAULT...
                                                                ;...DON'T TRY TO XCT CLEANUP CODE.

022604  012765  000000  000002          MOV     #0,TSSR(R5)     ;DO SOFT INIT
022612  004737  016250                  JSR     PC,WAITF
022616                          1$:
022616                          2$:     ENDCLN
022616                          L10034:
022616  104412                          TRAP    C$CLEAN
                                ;++
                                ; THE REPORT CODING SECTION CONTAINS THE
                                ; "PRINTS" CALLS THAT GENERATE STATISTICAL REPORTS.
                                ;--
022620                                  BGNRPT
022620                          L$RPT::
022620                                  PRINTS  #DEVSUM
022620  012746  023062                  MOV     #DEVSUM,-(SP)
022624  012746  000001                  MOV     #1,-(SP)
022630  010600                          MOV     SP,R0
022632  104416                          TRAP    C$PNTS
022634  062706  000004                  ADD     #4,SP
022640  010246                          MOV     R2,-(SP)
022642  010346                          MOV     R3,-(SP)
022644  010446                          MOV     R4,-(SP)
022646  012704  003176                  MOV     #ERTABL,R4      ; GET START OF ERROR TABLE.
022652  005003                          CLR     R3              ; CLEAR UNIT NUMBER
022654  011402                  1$:     MOV     (R4),R2         ; GET ERROR TABLE ENTRY & TEST IT.
022656  001467                          BEQ     4$              ; ZERO IF UNIT NOT RUN
022660  100066                          BPL     4$
022662  032702  040000                  BIT     #BIT14,R2       ; WAS UNIT DROPPED?
022666  001015                          BNE     2$              ; BR IF YES
022670  042702  170000                  BIC     #^C7777,R2      ; GET ERROR COUNT FIELD
022674                                  PRINTS  #DEVONL,R3,R2   ; PRINT
022674  010246                          MOV     R2,-(SP)
022676  010346                          MOV     R3,-(SP)
022700  012746  023117                  MOV     #DEVONL,-(SP)
022704  012746  000003                  MOV     #3,-(SP)
022710  010600                          MOV     SP,R0
022712  104416                          TRAP    C$PNTS
022714  062706  000010                  ADD     #10,SP
022720  000446                          BR      4$
022722  020227  160000          2$:     CMP     R2,#160000      ; WAS UNIT NON-EXISTENT?
022726  001012                          BNE     3$              ; BR IF NO
022730                                  PRINTS  #DEVNXR,R3
022730  010346                          MOV     R3,-(SP)
022732  012746  023167                  MOV     #DEVNXR,-(SP)
```

```
     022736  012746  000002                   MOV     #2,-(SP)
     022742  010600                           MOV     SP,R0
     022744  104416                           TRAP    C$PNTS
     022746  062706  000006                   ADD     #6,SP
 254 022752  000431                           BR      4$
 255 022754  020227  160001          3$:      CMP     R2,#160001         ; WAS UNIT NOT READY AT STARTUP?
 256 022760  001012                           BNE     30$                ; BR IF NO.
 257 022762                                  PRINTS  #DEVNRD,R3
     022762  010346                           MOV     R3,-(SP)
     022764  012746  023251                   MOV     #DEVNRD,-(SP)
     022770  012746  000002                   MOV     #2,-(SP)
     022774  010600                           MOV     SP,R0
     022776  104416                           TRAP    C$PNTS
     023000  062706  000006                   ADD     #6,SP
 258 023004  000414                           BR      4$
 259 023006  042702  170000          30$:     BIC     #↑C7777,R2
 260 023012                                  PRINTS  #DEVDRO,R3,R2
     023012  010246                           MOV     R2,-(SP)
     023014  010346                           MOV     R3,-(SP)
     023016  012746  023332                   MOV     #DEVDRO,-(SP)
     023022  012746  000003                   MOV     #3,-(SP)
     023026  010600                           MOV     SP,R0
     023030  104416                           TRAP    C$PNTS
     023032  062706  000010                   ADD     #10,SP
 261 023036  062704  000002          4$:      ADD     #2,R4
 262 023042  005203                           INC     R3
 263 023044  020427  003376                   CMP     R4,#ERTABE
 264 023050  103701                           BLO     1$
 265 023052  012604                           MOV     (SP)+,R4
 266 023054  012603                           MOV     (SP)+,R3
 267 023056  012602                           MOV     (SP)+,R2
 268 023060                                  ENDRPT            ; UNUSED.
     023060                          L10035:
     023060  104425                           TRAP    C$RPT
 269
 270 023062     045     116     045  DEVSUM: .ASCIZ  /%N%ADEVICE STATUS SUMMARY:%N/
 271 023117     045     101     040  DEVONL: .ASCIZ  /%A  UNIT %D3%A   ONLINE,  ERRORS = %D%N/
 272 023167     045     101     040  DEVNXR: .ASCIZ  /%A  UNIT %D3%A   DROPPED, NON-EXISTENT REGISTER%N/
 273 023251     045     101     040  DEVNRD: .ASCIZ  /%A  UNIT %D3%A   DROPPED, NOT READY AT STARTUP%N/
 274 023332     045     101     040  DEVDRO: .ASCIZ  /%A  UNIT %D3%A   DROPPED, ERRORS = %D%N/
 275                                          .EVEN
 276
 277 023402                                  ENDMOD
 278
```

```
     1                                            .TITLE  TSV5 - HARDWARE TESTS
     2
     9
    10 023402                                      BGNMOD  TSV5
       023402                             TSV5::
    16
    24
```

```
                                        .SBTTL  TEST  1: INITIALIZE AFTER WRITE CHARACTERISTICS
                                ;+
                                ; TEST DESCRIPTION:
                                ;
                                ;       This test verifies that a Hardware Initialize command
                                ;       invoked after a Write Characteristics command sets up
                                ;       the Command, Message and Characteristic image blocks
                                ;       in the controller ram correctly.
                                ;
                                ; TEST STEPS:
                                ;
                                ;       REPEAT FOR LOOPCNT
                                ;         BEGIN
                                ;               Do WRITE CHARACTERISTICS command.
                                ;               If the NBA bit in the TSSR register is NOT=0 then Print Error.
                                ;               Write to TSSR register to soft initialize the controller
                                ;               If controller RAM 310-377 NOT=0 then Print Error
                                ;         END
                                ;--


023402                                  BGNTST
023402                                                                          T1::
023402  012700  024042                  MOV     #TST13ID,R0             ;ASCII MESSAGE TO IDENTIFY TEST
023406  004737  016510                  JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
023412  012737  000012  002216          MOV     #10.,LOOPCNT            ;PERFORM 10 ITERATIONS
023420                          T13LOOP:
023420  004737  024316                  JSR     PC,T13REST              ;SET PACKET TO START-UP VALUES

023424  012703  002764                  MOV     #TSTBLK+10.,R3          ;START OF TEST DATA
023430  012704  024000                  MOV     #T13PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
023434  012764  000010  000006          MOV     #8.,PKBCNT(R4)          ;START WITH MINIMUM ALLOWABLE VALUE
023442                          5$:
023442  004737  015774                  JSR     PC,SOFINIT              ;WRITE TO TSSR TO SOFT INITIALIZE
023446  103405                          BCS     10$                     ;BR IF SOFT INIT OKAY
023450  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
023452                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL DURING INIT
023452  104455                                                                          TRAP    C$ERDF
023454  000144                                                                          .WORD   100
023456  003652                                                                          .WORD   SFIERR
023460  012034                                                                          .WORD   SFIMSG

                                ;Do WRITE CHARACTERISTICS command.
023462  005037  002222          10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
023466  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
023472  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
023476                                  FORCERROR       12$                     ;@@DFORCE ERROR IF FORCER=1
023512  103407                          BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
023514  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
023516                                  NEXT.ERRNO
023516                          12$:    ERRDF   ERRNO,T13SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
023516  104455                                                                          TRAP    C$ERDF
023520  000145                                                                          .WORD   101
023522  024227                                                                          .WORD   T13SSR
023524  012046                                                                          .WORD   PKTSSR
023526  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
023532                          15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
```

```
   023532  104406                                                                         TRAP    C$CLP1
   023534  016501  000002              MOV     TSSR(R5),R1                ;GET THE CONTENTS OF TSSR
   023540  012702  000200              MOV     #SSR,R2                    ;EXPECTED CONTENTS OF TSSR
   023544  032701  000100              BIT     #OFL,R1                    ;IS OFF-LINE BIT SET ?
   023550  001402                      BEQ     25$                        ;BRANCH IF NOT OFF-LINE
   023552  052702  000100              BIS     #OFL,R2                    ;SET OFF-LINE IN EXPECTED DATA


                               ;If the NBA bit in the TSSR register is NOT=0 then Print Error.
   023556                      25$:
   023556                              FORCERROR       27$                    ;BAD
   023572  020201                      CMP     R2,R1                      ;DOES EXPECTED MATCH RECEIVED ?
   023574  001404                      BEQ     30$                        ;OKAY IF MATCH
   023576                              NEXT.ERRNO
   023576                      27$:    ERRHRD  ERRNO,T13NBA,PKTSSR        ;NBA NOT ZERO
   023576  104456                                                                         TRAP    C$ERHRD
   023600  000146                                                                         .WORD   102
   023602  024154                                                                         .WORD   T13NBA
   023604  012046                                                                         .WORD   PKTSSR
   023606                      30$:    CKLOOP                             ;LOOP ON ERROR ?
   023606  104406                                                                         TRAP    C$CLP1


                               ;Write to TSSR register to soft initialize the controller
   023610                      40$:
   023610  004737  015774              JSR     PC,SOFINIT                 ;WRITE TO TSSR TO SOFT INITIALIZE
   023614                              FORCERROR       42$                    ;BAD
   023630  103405                      BCS     50$                        ;BR IF SOFT INIT OKAY
   023632  010001                      MOV     R0,R1                      ;SAVE CONTENTS OF TSSR
   023634                              NEXT.ERRNO
   023634                      42$:    ERRDF   ERRNO,SFIERR,SFIMSG        ;DEVICE FATAL DURING INIT
   023634  104455                                                                         TRAP    C$ERDF
   023636  000147                                                                         .WORD   103
   023640  003652                                                                         .WORD   SFIERR
   023642  012034                                                                         .WORD   SFIMSG


                               ;If controller RAM 310-377 NOT=0 then Print Error
   023644  012704  000310      50$:    MOV     #310,R4                    ;START WITH LOC 310
   023650  005002                      CLR     R2                         ;MEMORY EXPECTED SHOULD BE 000000
   023652  105065  000000              CLRB    TSDB(R5)                   ;SET MAINTENANCE MODE
   023656  004737  016336              JSR     PC,CHKTSSR                 ;WAIT FOR SSR READY
   023662  010465  000000      60$:    MOV     R4,TSDB(R5)                ;SELECT RAM ADDRESS
   023666  004737  016336              JSR     PC,CHKTSSR                 ;WAIT FOR SSR READY
   023672  116501  000000              MOVB    TSBA(R5),R1                ;READ LOC CONTENTS
   023676                              FORCERROR       62$,NOTSSR             ;BAD
   023706  120102                      CMPB    R1,R2                      ;CHECK MEMORY FOR 000000
   023710  001406                      BEQ     70$                        ;BRANCH IF DATA OKAY
   023712                              NEXT.ERRNO
   023712                      62$:    ERRDF   ERRNO,T13MEM,RAMEXP        ;MEMORY NOT ZERO AFTER INIT.
   023712  104455                                                                         TRAP    C$ERDF
   023714  000150                                                                         .WORD   104
   023716  024115                                                                         .WORD   T13MEM
   023720  015530                                                                         .WORD   RAMEXP
   023722  005237  002222              INC     FATFLG                     ;SET THE FATAL ERROR FLAG
   023726                      70$:    CKLOOP
   023726  104406                                                                         TRAP    C$CLP1
   023730                              ESCAPE  TST                        ;EXIT ON FATAL ERROR
   023730  104410                                                                         TRAP    C$ESCAPE
   023732  000432                                                                         .WORD   L10036-.
```

```

023734  005204                  82$:    INC     R4                              ;LOOK AT NEXT RAM LOC.
023736  020427  000400                  CMP     R4,#400                         ;AT TOP OF RAM ADDRESS SPACE
023742  001347                          BNE     60$                             ;BRANCH TILL ALL MEMORY TESTED


023744  005737  002222                  TST     FATFLG                          ;ANY FATAL ERRORS ?
023750  001402                          BEQ     160$                            ;BRANCH IF NOT
023752  004737  017202                  JSR     PC,CKDROP                       ;TRY TO DROP THE UNIT
023756  004737  016456          160$:   JSR     PC,TSTLOOP                      ;DONE ALL ITERATIONS?
023762  103002                          BCC     165$                            ;BR IF YES
023764  000137  023420                  JMP     T13LOOP                         ;LOOP UNTIL ITERATION COUNT DONE
023770                          165$:
023770                                  EXIT    TST
023770  104432                                                                                  TRAP    C$EXIT
023772  000372                                                                                  .WORD   L10036-.



                                ;+
                                ;LOCAL STORAGE FOR THIS TEST
                                ;-

        024000                          .=<.+10>&177770
024000                          T13PACKET:                                      ;COMMAND PACKET FOR TEST
024000  100004                          .WORD   100004                          ;WRITE CHARACTERISTICS COMMAND, WITH ACK
024002  024010                          .WORD   T13DATA                         ;ADDRESS OF CHARACTERISTICS BLOCK
024004  000000                          .WORD   0
024006  000010                          .WORD   8.                              ;STARTING VALUE OF BLOCK SIZE

024010                          T13DATA:                                                 ;CHARACTERISTICS DATA BLOCK
024010  024022                          .WORD   T13BFR                          ;ADDRESS OF MESSAGE BUFFER
024012  000000                          .WORD   0
024014  000016                          .WORD   14.                             ;LENGTH OF MESSAGE BUFFER
024016  000000  000000                  .WORD   0,0

024022                          T13BFR: .BLKW   8.                              ;MESSAGE BUFFER
                                ;LOCAL TEXT MESSAGES FOR TEST
                                ;-

024042     111     156     151  TST13ID:        .ASCIZ  'Initialization After WRITE CHARACTERISTICS'
024115     111     156     143  T13MEM: .ASCIZ  'Incorrect RAM Data After Init'
                                        .EVEN
024154     127     122     111  T13NBA: .ASCIZ  'WRITE CHARACTERISTICS Command Not Accepted'
024227     103     157     156  T13SSR: .ASCIZ  'Contents of TSSR Incorrect After WRITE CHARACTERISTICS'



                                ;+
                                ;
                                ;ROUTINE TO RESTORE COMMAND PACKET TO START-UP (DEFAULT) VALUES
                                ;
                                ;-

                                .EVEN

024316                          T13REST:
024316                                  SAVREG                  ;SAVE THE REGISTERS
024322  012701  024000                  MOV     #T13PACKET,R1   ;START OF THE PACKET
```

```
024326  012721  100004                  MOV     #100004,(R1)+       ;WRITE CHARACTERISTICS WITH ACK
024332  012721  024010                  MOV     #T13DATA,(R1)+      ;ADDRESS OF CHAR DATA BLOCK
024336  005021                          CLR     (R1)+               ;EXTENDED ADDRESS
024340  012721  000010                  MOV     #8.,(R1)+           ;SIZE OF DATA BLOCK IN BYTES
024344  012721  024022                  MOV     #T13BFR,(R1)+       ;ADDRESS OF MESSAGE BUFFER
024350  005021                          CLR     (R1)+
024352  012721  000016                  MOV     #14.,(R1)+          ;LENGTH OF MESSAGE BUFFER
024356  005021                          CLR     (R1)+
024360  005011                          CLR     (R1)
024362  000207                          RTS     PC                  ;RETURN
024364                                  ENDTST
024364                                                                              L10036:
024364  104401                                                                              TRAP    C$ETST

                                        .SBTTL  TEST 2: BASIC WRITE SUBSYSTEM MEMORY COMMAND
                                ;+
                                ;
                                ;THIS TEST VERIFIES THAT THE WRITE SUBSYSTEM MEMORY COMMAND WITH A
                                ;BSELO SELECT CODE OF 0 (NO-OP) EXECUTES CORRECTLY. IT ALSO
                                ;VERIFIES THAT A WRITE SUBSYSTEM MEMORY COMMAND WITH A NON-ZERO
                                ;MODE FIELD IS REJECTED. THE TEST FURTHER VERIFIES MICROPROGRAM
                                ;COMMAND DECODING AND HANDLING SEQUENCES.
                                ;
                                ;-
024366                                  BGNTST
024366                                                                                  T2::
024366  012700  026201                  MOV     #TST14ID,R0                 ;ASCII MESSAGE TO IDENTIFY TEST
024372  004737  016510                  JSR     PC,TSTSETUP                 ;DO INITIAL TEST SETUP
024376  012737  000024  002216          MOV     #20.,LOOPCNT                ;PERFORM 20 ITERATIONS
024404                          T14LOOP:
024404                                  BGNSUB                              ;///////////// BEGIN SUBTEST ////////////
024404                                                                                  T2.1:
024404  104402                                                                              TRAP    C$BSUB
024406  004737  026246                  JSR     PC,T14REST                  ;SET PACKET TO INITIAL VALUES
024412  004737  026304                  JSR     PC,T14RST                   ;SET PACKET TO INITIAL VALUES
024416                                  SETPRI  #PRIO0                      ;LOWER PRIORITY TO ALLOW INTERRUPTS
024416  012700  000000                                                                      MOV     #PRIO0,R0
024422  104441                                                                              TRAP    C$SPRI
024424                          5$:
024424                                  BGNSEG                              ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
024424  104404                                                                              TRAP    C$BSEG
024426  004737  015774                  JSR     PC,SOFINIT                  ;DO SOFT INIT OF CONTROLLER
024432  103405                          BCS     10$                         ;BR IF SOFT INIT = OK
024434  010001                          MOV     R0,R1                       ;SAVE CONTENTS OF TSSR
024436                                  ERRDF   ERRNO,SFIERR,SFIMSG         ;DEVICE FATAL ERROR DURING INIT
024436  104455                                                                              TRAP    C$ERDF
024440  000311                                                                              .WORD   201
024442  003652                                                                              .WORD   SFIERR
024444  012034                                                                              .WORD   SFIMSG
024446                          10$:
024446  012704  025540                  MOV     #T14PK2,R4                  ;SUBROUTINE NEEDS PACKET ADDRESS
024452  004737  010662                  JSR     PC,WRTCHR                   ;ISSUE WRITE CHARACTERISTICS
024456  103405                          BCS     11$                         ;BR, IF COMMAND ISSUED OK
024460  010001                          MOV     R0,R1                       ;SAVE CONTENTS OF TSSR
024462                                  ERRHRD  ERRNO,WRTMSG,SFIMSG         ;WRITE CHARACTERISTISC FAILED
024462  104456                                                                              TRAP    C$ERHRD
024464  000312                                                                              .WORD   202
```

```
        024466  005056                                                                     .WORD    WRTMSG
        024470  012034                                                                     .WORD    SFIMSG
    229 024472                         11$:
    230 024472  005037  002222                 CLR      FATFLG                  ;CLEAR FATAL ERROR FLAG
    231 024476  005037  002224                 CLR      INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
    232 024502  012704  025120                 MOV      #T14PACKET,R4           ;SET UP NEW WRT. SUBSYS MEM. COMMAND
    233 024506  010465  000000                 MOV      R4,TSDB(R5)             ;SET THE PACKET ADDRESS
    234 024512  004737  016336                 JSR      PC,CHKTSSR              ;WAIT FOR SSR TO SET
    235 024516  103407                         BCS      15$                     ;BR IF CARRY SET (GOOD RETURN)
    236 024520  010001                         MOV      R0,R1                   ;SAVE CONTENTS OF TSSR
    240 024522                                 ERRDF    ERRNO,T14SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
        024522  104455                                                                     TRAP     C$ERDF
        024524  000313                                                                     .WORD    203
        024526  025733                                                                     .WORD    T14SSR
        024530  012046                                                                     .WORD    PKTSSR
    241 024532  005237  002222                 INC      FATFLG                  ;SET FATAL ERROR FLAG
    242 024536                         15$:    CKLOOP                           ;LOOP ON ERROR, IF FLAG SET
        024536  104406                                                                     TRAP     C$CLP1
    243 024540                                 ESCAPE   SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
        024540  104410                                                                     TRAP     C$ESCAPE
        024542  000074                                                                     .WORD    10000$-.
    244 024544  005737  002224                 TST      INTRECV                 ;DID AN INTERRUPT OCCUR ?
    245 024550  001004                         BNE      22$                     ;BRANCH IF YES
    249 024552                                 ERRHRD   ERRNO,T14NINT,PKTSSR
        024552  104456                                                                     TRAP     C$ERHRD
        024554  000314                                                                     .WORD    204
        024556  026023                                                                     .WORD    T14NINT
        024560  012046                                                                     .WORD    PKTSSR
    250 024562  016501  000002         22$:    MOV      TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
    251 024566  012702  000200                 MOV      #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
    252 024572  032701  000100                 BIT      #OFL,R1                 ;IS OFF-LINE BIT SET ?
    253 024576  001402                         BEQ      25$                     ;BRANCH IF NOT OFF-LINE
    254 024600  052702  000100                 BIS      #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
    255 024604  020201                 25$:    CMP      R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
    256 024606  001404                         BEQ      30$                     ;OKAY IF MATCH
    260 024610                                 ERRHRD   ERRNO,T14NBA,PKTSSR     ;NBA NOT ZERO
        024610  104456                                                                     TRAP     C$ERHRD
        024612  000315                                                                     .WORD    205
        024614  025562                                                                     .WORD    T14NBA
        024616  012046                                                                     .WORD    PKTSSR
    261 024620                         30$:
    262 024620  004737  011114         35$:    JSR      PC,CKRAM                ;CHECK RAM TO MEMORY
    263 024624  103405                         BCS      59$                     ;RAM OK GO ON
    267 024626                                 ERRHRD   ERRNO,PKTRAM,RAMERR     ;THEY DON'T MATCH
        024626  104456                                                                     TRAP     C$ERHRD
        024630  000316                                                                     .WORD    206
        024632  004745                                                                     .WORD    PKTRAM
        024634  015510                                                                     .WORD    RAMERR
    268 024636                                 ENDSEG                           ;<<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
        024636                                                                        10000$:
        024636  104405                                                                     TRAP     C$ESEG
    269
    270
    271 024640                         59$:    ENDSUB                           ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
        024640                                                                        L10040:
        024640  104403                                                                     TRAP     C$ESUB
    272
```

```
024642  005737  002222                  TST     FATFLG                  ;ANY FATAL ERRORS ?
024646  001402                          BEQ     60$                     ;BRANCH IF NOT
024650  004737  017202                  JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
024654                          60$:
                                ;+
                                ;
                                ;TEST 2, SUBTEST 2
                                ;
                                ;CHECK THAT NON-ZERO MODE BITS BEING SET CAUSES
                                ;WRITE SUBSYSTEM MEMORY COMMAND TO BE REJECTED
                                ;
                                ;-

024654                                  BGNSUB                          ;///////////// BEGIN SUBTEST ////////////
024654                                                                                  T2.2:
024654  104402                                                                                  TRAP    C$BSUB

024656                                  SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
024656  012700  000000                                                                          MOV     #PRI00,R0
024662  104441                                                                                  TRAP    C$SPRI
024664  012704  025540          5$:     MOV     #T14PK2,R4              ;GET THE ADDRESS OF COMMAND PACKET
024670  004737  026246                  JSR     PC,T14REST              ;RESTORE PACKET TO STARTING VALUES
024674  004737  026304                  JSR     PC,T14RST               ;RESTORE PACKET TO STARTING VALUES
024700                                  BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
024700  104404                                                                                  TRAP    C$BSEG

024702  004737  015774                  JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
024706  103405                          BCS     10$                     ;BR IF SOFT INIT = OK
024710  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
024712                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
024712  104455                                                                                  TRAP    C$ERDF
024714  000317                                                                                  .WORD   207
024716  003652                                                                                  .WORD   SFIERR
024720  012034                                                                                  .WORD   SFIMSG
024722                          10$:
024722  004737  010662                  JSR     PC,WRTCHR               ;ISSUE WRITE CHARACTERISTICS
024726  103405                          BCS     11$                     ;BR, IF COMMAND ISSUED OK
024730  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
024732                                  ERRHRD  ERRNO,WRTMSG,SFIMSG     ;WRITE SUBSYSTEM MEMORY FAILED
024732  104456                                                                                  TRAP    C$ERHRD
024734  000320                                                                                  .WORD   208
024736  005056                                                                                  .WORD   WRTMSG
024740  012034                                                                                  .WORD   SFIMSG
024742                          11$:
024742  005037  002224                  CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
024746  012704  025120                  MOV     #T14PACKET,R4           ;SET-UP WITH WRT SUBSYS MEM PACKET
024752  052714  007000                  BIS     #007000,(R4)            ;NON-ZERO COMMAND MODE BITS
024756  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
024762  004737  016250                  JSR     PC,WAITF                ;WAIT FOR SSR TO SET
024766  103405                          BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
024770  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
024772                                  ERRDF   ERRNO,T14SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
024772  104455                                                                                  TRAP    C$ERDF
024774  000321                                                                                  .WORD   209
024776  025733                                                                                  .WORD   T14SSR
025000  012046                                                                                  .WORD   PKTSSR
025002                          15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
```

```
    025002  104406                                                                                  TRAP    C$CLP1
322 025004                                  ESCAPE  SEG                    ;BY-PASS CHECKS IF FATAL ERROR
    025004  104410                                                                                  TRAP    C$ESCAPE
    025006  000074                                                                                  .WORD   10000$-.
323 025010  005737  002224                  TST     INTRECV                ;DID AN INTERRUPT OCCUR ?
324 025014  001004                          BNE     22$                    ;BRANCH IF YES
328 025016                                  ERRHRD  ERRNO,T14NINT,PKTSSR
    025016  104456                                                                                  TRAP    C$ERHRD
    025020  000322                                                                                  .WORD   210
    025022  026023                                                                                  .WORD   T14NINT
    025024  012046                                                                                  .WORD   PKTSSR
329 025026  016501  000002          22$:    MOV     TSSR(R5),R1            ;GET THE CONTENTS OF TSSR
330 025032  012702  100206                  MOV     #SC!SSR!TSREJ,R2       ;EXPECTED CONTENTS OF TSSR
331 025036  032701  000100                  BIT     #OFL,R1                ;IS OFF-LINE BIT SET ?
332 025042  001402                          BEQ     25$                    ;BRANCH IF NOT OFF-LINE
333 025044  052702  000100                  BIS     #OFL,R2                ;SET OFF-LINE IN EXPECTED DATA
334 025050  020201                  25$:    CMP     R2,R1                  ;DOES EXPECTED MATCH RECEIVED ?
335 025052  001404                          BEQ     30$                    ;OKAY IF MATCH
339 025054                                  ERRHRD  ERRNO,T142REJ,PKTSSR   ;COMMAND NOT REJECTED
    025054  104456                                                                                  TRAP    C$ERHRD
    025056  000323                                                                                  .WORD   211
    025060  025636                                                                                  .WORD   T142REJ
    025062  012046                                                                                  .WORD   PKTSSR
340 025064                          30$:
341 025064  004737  011114          35$:    JSR     PC,CKRAM               ;CHECK RAM TO MEMORY
342 025070  103405                          BCS     59$                    ;RAM OK GO ON
346 025072                                  ERRHRD  ERRNO,PKTRAM,RAMERR    ;THEY DON'T MATCH
    025072  104456                                                                                  TRAP    C$ERHRD
    025074  000324                                                                                  .WORD   212
    025076  004745                                                                                  .WORD   PKTRAM
    025100  015510                                                                                  .WORD   RAMERR
347 025102                                  ENDSEG                         ;<<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
    025102                                                                                 10000$:
    025102  104405                                                                                  TRAP    C$ESEG
348
349 025104                          59$:    ENDSUB                         ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
    025104                                                                                 L10041:
    025104  104403                                                                                  TRAP    C$ESUB
350 025106                                  EXIT    TST                    ;ALL DONE THIS TEST
    025106  104432                                                                                  TRAP    C$EXIT
    025110  001246                                                                                  .WORD   L10037-.
351
352                                 ;+
353                                 ;LOCAL STORAGE FOR THIS TEST
354                                 ;-
355
357         025120                          .=<.+10>&177770
359 025120                          T14PACKET:                             ;COMMAND PACKET FOR TEST
360 025120  100206                          .WORD   100206                 ;WRITE SUBSYSTEM MEM. COMMAND, WITH IE, ACK
361 025122  025130                          .WORD   T14DATA                ;ADDRESS OF CHARACTERISTICS BLOCK
362 025124  000000                          .WORD   0
363 025126  000006                          .WORD   6.                     ;STARTING VALUE OF BLOCK SIZE
364 025130                          T14DATA:                               ;CHARACTERISTICS DATA BLOCK
365 025130     000                  T14BS0: .BYTE   0                      ;BSEL0 BYTE
366 025131     000                  T14BS1: .BYTE   0                      ;BSEL1 BYTE
367 025132  000000                  T14BS2: .WORD   0                      ;BSEL1 WORD
368 025134  000000                          .WORD   0                      ;DATA
```

```
025136                                  T14BFR: .BLKW   128.                        ;MESSAGE BUFFER


        025540                                  .=<.+10>&177770
025540                                  T14PK2:                                     ;COMMAND PACKET FOR TEST
025540  100204                                  .WORD   100204                      ;WRITE CHARA. MEM. CMND., WITH IE, ACK
025542  025550                                  .WORD   T14DTA                      ;ADDRESS OF SELECT DATA BLOCK
025544  000000                                  .WORD   0
025546  000010                                  .WORD   8.                          ;STARTING VALUE OF BLOCK SIZE


025550                                  T14DTA:                                     ;SELECT DATA BLOCK
025550  025136                                  .WORD   T14BFR                      ;ADDRESS OF MESSAGE BUFFER
025552  000000                                  .WORD   0
025554  000400                                  .WORD   256.                        ;LENGTH OF MESSAGE BUFFER
025556  000000  000000                          .WORD   0,0


                                        ;+
                                        ;LOCAL TEXT MESSAGES FOR TEST
                                        ;-

025562     127     122     111  T14NBA: .ASCIZ  'WRITE SUBSYSTEM MEMORY Command Not Accepted'
025636     127     122     111  T142REJ:        .ASCIZ  'WRITE SUBSYSTEM MEMORY Not Rejected With Non-Zero Mode Field'
025733     103     157     156  T14SSR: .ASCIZ  'Contents of TSSR Incorrect After WRITE SUBSYSTEM MEMORY'
026023     105     170     160  T14NINT:        .ASCIZ  'Expected Interrupt Not Received On WRITE SUBSYSTEM MEMORY'
026115     111     156     143  T14TSBA:        .ASCIZ  'Incorrect TSBA Address After WRITE SUBSYSTEM MEMORY'
026201     102     141     163  TST14ID:        .ASCIZ  'Basic WRITE SUBSYSTEM MEMORY Command'
                                                .EVEN


                                        ;+
                                        ;
                                        ;ROUTINE TO RESTORE COMMAND PACKET TO START-UP (DEFAULT) VALUES
                                        ;WRITE SUBSYSTEM MEMORY COMMAND
                                        ;
                                        ;-

026246                                  T14REST:
026246                                          SAVREG                              ;SAVE THE REGISTERS
026252  012701  025120                          MOV     #T14PACKET,R1               ;START OF THE PACKET
026256  012721  100206                          MOV     #100206,(R1)+               ;WRITE SUBSYSTEM MEM. WITH ACK, IE
026262  012721  025130                          MOV     #T14DATA,(R1)+              ;ADDRESS OF DATA BLOCK
026266  005021                                  CLR     (R1)+                       ;EXTENDED ADDRESS
026270  012721  000006                          MOV     #6.,(R1)+                   ;SIZE OF DATA BLOCK IN BYTES
026274  005021                                  CLR     (R1)+                       ;CLEAR BSELO AND BSEL1
026276  005021                                  CLR     (R1)+                       ;CLEAR SEL2
026300  005011                                  CLR     (R1)                        ;CLEAR DATA AREA
026302  000207                                  RTS     PC                          ;RETURN


026304                                  T14RST:
026304                                          SAVREG                              ;SAVE THE REGISTERS
026310  012701  025540                          MOV     #T14PK2,R1                  ;START OF THE PACKET
026314  012721  100204                          MOV     #100204,(R1)+               ;WRITE CHARA. WITH ACK, IE
026320  012721  025550                          MOV     #T14DTA,(R1)+               ;ADDRESS OF CHARAISTICS DATA BLOCK
026324  005021                                  CLR     (R1)+                       ;EXTENDED ADDRESS
```

```
    026326  012721  000010          MOV     #8.,(R1)+                       ;SIZE OF DATA BLOCK IN BYTES
    026332  012721  025136          MOV     #T14BFR,(R1)+                   ;MESSAGE BUFFER ADDRESS
    026336  005021                  CLR     (R1)+
    026340  012721  000400          MOV     #256.,(R1)+                     ;LENGTH OF MESSAGE BUFFER
    026344  005021                  CLR     (R1)+
    026346  005011                  CLR     (R1)
    026350  005037  025136          CLR     T14BFR                          ;CLEAR 1ST LOC IN MESSAGE BUFFER
    026354  000207                  RTS     PC                              ;RETURN
    026356                          ENDTST
    026356                                                           L10037:
    026356  104401                                                           TRAP     C$ETST
```

```

                                        .SBTTL  TEST  3: DMA MEMORY ADDRESSING

                                ;++
                                ; TEST 3
                                ;
                                ; TEST DESCRIPTION
                                ;
                                ;       This test verifies that the controller can properly address and
                                ;       access all available CPU memory (other than that occupied by the
                                ;       diagnostic and diagnostic supervisor code) for both reading (DATI)
                                ;       and writing (DATO). Verified are the LSI-11 Bus drivers for all
                                ;       available address lines. Up to this point only 16 bits have been
                                ;       used for DMA transfers.
                                ;
                                ; TEST STEPS
                                ;
                                ;  REPEAT FROM 1 TO LOOPCNT
                                ;    BEGIN
                                ;       Do Subtest 1 - Verify GET STATUS selected locations
                                ;       Do Subtest 2 - Verify message packets selected locations
                                ;       Do Subtest 3 - Verify Characteristic data selected locations
                                ;       Do Subtest 4 - Verify NXM to selected invalid addresses
                                ;    END
                                ;
                                ;--

026360                                  BGNTST
026360                                                                       T3::
026360  012700  030430                  MOV     #TST12ID,R0             ;ASCII MESSAGE TO IDENTIFY TEST
026364  004737  016510                  JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
026370  012737  000012  002216          MOV     #10.,LOOPCNT            ;PERFORM 10 ITERATIONS
026376  005237  003150                  INC     T3BFLG                  ;SET TEST FLAG
026402  004737  021232                  JSR     PC,MEMCK                ;CHECK MEMORY

026406                          T12LOOP:                                ;LOOP ON TEST LABEL

                                        .SBTTL  TEST 3: SUBTEST 1: GET STATUS SELECTED LOCATIONS
                                ;++
                                ; TEST 3: SUBTEST 1:
                                ;
                                ; SUBTEST DESCRIPTION:
                                ;
                                ;       This subtest verifies the controller can fetch a get status
                                ;       command from all available memory locations.
                                ;       Two word blocks are tested one at a time by first setting
                                ;       all available memory to a background pattern of 125252.
                                ;       A Get Status command is then executed to various addresses in
                                ;       each available memory 4k word block. The various addresses
                                ;       are determined by floating a 1 then a 0 through the address bits.
                                ;
                                ; TEST STEPS:
                                ;
                                ;    BEGIN
                                ;       Write to TSSR to soft initialize
                                ;       Do a WRITE CHARACTERISTICS to setup a message buffer
                                ;
                                ;       REPEAT FOR SELECTED VALID ADDRESSES IN DIAGNOSTIC FREE SPACE AND ABOVE 32K
                                ;         BEGIN
                                ;               Get a valid modulo-4 test address
                                ;               Do a GET STATUS command from the test address
                                ;         END
                                ;     END
                                ;--

026406                                  BGNSUB                          ;///////////// BEGIN SUBTEST //////////
026406                                                                                  T3.1:
026406  104402                                                                                  TRAP    C$BSUB


                                ;Write to TSSR to soft initialize
026410  004737  015774                  JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
026414  103405                          BCS     15$                     ;BR IF SOFT INIT = OK
026416                                  NEXT.ERRNO
026416  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
026420                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
026420  104455                                                                                  TRAP    C$ERDF
026422  000455                                                                                  .WORD   301
026424  003652                                                                                  .WORD   SFIERR
026426  012034                                                                                  .WORD   SFIMSG

                                ;Do a WRITE CHARACTERISTICS to setup a message buffer
026430                          15$:
026430  012704  030220                  MOV     #T12PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
026434  004737  031600                  JSR     PC,T12SWRT              ;RESTORE PACKET TO STARTING VALUES
026440  005037  003134                  CLR     KTENABLE                ;TURN OFF KT-11
026444  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
026450  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
026454                                  FORCERROR       17$
026470  103405                          BCS     20$                     ;BR IF SSR SET IN CHKTSSR
026472  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
026474                                  NEXT.ERRNO
026474                          17$:    ERRDF   ERRNO,T12WRTSSR,PKTSSR  ;DEVICE FATAL SSR FAILED TO SET
026474  104455                                                                                  TRAP    C$ERDF
026476  000456                                                                                  .WORD   302
026500  030532                                                                                  .WORD   T12WRTSSR
026502  012046                                                                                  .WORD   PKTSSR

                                ;Verify a Get Status can be fetched from each address
                                ;Get a valid modulo-4 test address
                                ;Do a GET STATUS command from the test address
026504  005037  002222          20$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
026510  005037  030270                  CLR     T12KT                   ;TEST ABOVE 28K SWITCH
026514  012702  030274                  MOV     #T12BLK,R2              ;POINT TO TEST PATTERN TABLE
026520                          T121LOOP:
026520  005037  003134                  CLR     KTENABLE                ;TURN OFF ABOVE 28K TEST FLAG
026524  012201                          MOV     (R2)+,R1                ;GET TEST PATTERN ADDRESS
026526  005000                          CLR     R0                      ;ASSUME NO TEST ABOVE 28K
026530  005737  030270                  TST     T12KT                   ;TEST ABOVE 28K THIS TIME?
026534  001407                          BEQ     25$                     ;BR IF NO
026536  016200  177776                  MOV     -2(R2),R0               ;GET TEST PATTERN AGAIN
026542  042700  177774                  BIC     #↑C<A1716>,R0           ;SAVE 18 BIT ADDRESS ONLY
026546  012737  000001  003134          MOV     #1,KTENABLE             ;TURN ON ABOVE 28K TEST FLAG
026554  004737  031276          25$:    JSR     PC,T12CONVERT           ;CONVERT TEST PATTERN TO TEST ADDRESS
```

```
026560  103034                           BCC     65$                     ;BR IF INVALID PACKET ADDRESS
026562  013704  030264                   MOV     T12LOADD,R4             ;COPY CURRENT PACKET LOW ADDRESS
026566  013703  030262                   MOV     T12HIADD,R3             ;COPY CURRENT PACKET HIGH ADDRESS
026572  004737  031646                   JSR     PC,T12SETGET            ;SETUP CURRENT PACKET TO GET STATUS
026576  042703  177774                   BIC     #↑C<A1716>,R3           ;SAVF ADDRESS BITS 17+16
026602  050304                           BIS     R3,R4                   ;SETUP 18 BIT PACKET ADDRESS
026604  004737  017274                   JSR     PC,KTOFF                ;TURN OFF KT-11
026610  010465  000000                   MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
026614  004737  016336                   JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
026620                                   FORCERROR       32$
026634  103405                           BCS     40$                     ;BR IF SSR SET IN CHKTSSR
026636  010001                           MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
026640                                   NEXT,ERRNO
026640                           32$:    ERRDF   ERRNO,T12GETSSR,PKTGETS ;DEVICE FATAL SSR FAILED TO SET
026640  104455                                                                           TRAP    C$ERDF
026642  000457                                                                           .WORD   303
026644  030456                                                                           .WORD   T12GETSSR
026646  012064                                                                           .WORD   PKTGETS
026650                           40$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
026650  104406                                                                           TRAP    C$CLP1
026652                           65$:
026652                                   FORCEXIT        80$
026662  020227  030426                   CMP     R2,#T12TBE              ;DONE ALL TSTBLK TEST PATTERNS?
026666  103002                           BHIS    70$                     ;BR IF YES
026670  000137  026520                   JMP     T121LOOP                ;DO ANOTHER MODULO- 4 ADDRESS
026674  005737  030270           70$:    TST     T12KT                   ;DONE ABOVE 28K TESTING TOO?
026700  003012                           BGT     80$                     ;BR IF YES
026702  005737  003132                   TST     KTFLG                   ;ANY MEMORY ABOVE 28K ON SYSTEM?
026706  001407                           BEQ     80$                     ;BR IF NO
026710  012737  000001  030270           MOV     #1,T12KT                ;SET SWITCH
026716  012702  030274                   MOV     #T12BLK,R2              ;RESET TEST PATTERN TABLE
026722  000137  026520                   JMP     T121LOOP                ;DO ABOVE 28K TESTING
026726  004737  017274           80$:    JSR     PC,KTOFF                ;TURN OFF KT11
026732                                   ENDSUB                          ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
026732                                                                                L10043:
026732  104403                                                                           TRAP    C$ESUB
026734  005737  002222                   TST     FATFLG                  ;ANY FATAL ERRORS ?
026740  001402                           BEQ     100$                    ;BRANCH IF NOT
026742  004737  017202                   JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
026746                           100$:

                                         .SBTTL  TEST 3: SUBTEST 2: MESSAGE PACKETS TO SELECTED LOCATIONS

                                 ;++
                                 ; TEST 3: SUBTEST 2:
                                 ;
                                 ; SUBTEST DESCRIPTION:
                                 ;
                                 ;       This subtest verifies the controller can deposit message packets
                                 ;       to all available memory locations.
                                 ;       Write Characteristics commands are executed with message
                                 ;       buffer addresses set to various addresses in each available
                                 ;       memory location.
                                 ;       The various addresses are determined by floating a 1 then a 0
                                 ;       through the address bits.
                                 ;
                                 ; TEST STEPS:
                                 ;
```

```
                                ;       BEGIN
                                ;          Write to TSSR to soft initialize
                                ;          Do a WRITE CHARACTERISTICS to setup a message buffer to compare
                                ;
                                ;          REPEAT FOR SELECTED ADDRESSES IN DIAGNOSTIC FREE SPACE AND ABOVE 32K
                                ;            BEGIN
                                ;                   Get a valid modulo-4 test address
                                ;                   Set the packet message buffer to the TEST ADDRESS
                                ;                   Do a WRITE CHARACTERISTICS
                                ;                   Restore the test message buffer to background pattern
                                ;            END
                                ;       END
                                ;--

026746                                  BGNSUB                          ;///////////// BEGIN SUBTEST //////////
026746                                                                               T3.2:
026746  104402                                                                                  TRAP    C$BSUB



                                ;Write to TSSR to soft initialize
026750  004737  015774                  JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
026754  103405                          BCS     15$                     ;BR IF SOFT INIT = OK
026756                                  NEXT.ERRNO
026756  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
026760                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
026760  104455                                                                                  TRAP    C$ERDF
026762  000460                                                                                  .WORD   304
026764  003652                                                                                  .WORD   SFIERR
026766  012034                                                                                  .WORD   SFIMSG

                                ;Do a WRITE CHARACTERISTICS to setup a message buffer to compare
026770                          15$:
026770  012704  030220                  MOV     #T12PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
026774  004737  031600                  JSR     PC,T12SWRT              ;SET PACKET TO WRITE CHARACTERISTICS
027000  004737  017274                  JSR     PC,KTOFF                ;TURN OFF KT-11
027004  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
027010  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
027014                                  FORCERROR       17$
027030  103405                          BCS     20$                     ;BR IF SSR SET IN CHKTSSR
027032  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
027034                                  NEXT.ERRNO
027034                          17$:    ERRDF   ERRNO,T12WRTSSR,PKTSSR  ;DEVICE FATAL SSR FAILED TO SET
027034  104455                                                                                  TRAP    C$ERDF
027036  000461                                                                                  .WORD   305
027040  030532                                                                                  .WORD   T12WRTSSR
027042  012046                                                                                  .WORD   PKTSSR

                                ;Get a valid modulo-4 test address
                                ;Set the packet message buffer to the test address
                                ;Do a WRITE CHARACTERISTICS
027044  005037  002222          20$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
027050  012703  030274                  MOV     #T12BLK,R3              ;POINT TO TEST PATTERN TABLE
027054                          T122LOOP:
027054  012301                          MOV     (R3)+,R1                ;GET TEST PATTERN ADDRESS
027056  010100                          MOV     R1,R0                   ;GET ADDRESS ALL "18 BITS"
027060  042700  177774                  BIC     #177774,R0              ;LEAVE ONLY A17 AND A16
027064  042701  000003                  BIC     #3,R1                   ;GET RID OF A17 AND A16
```

```
027070  004737  031276                  JSR     PC,T12CONVERT           ;CONVERT TEST PATTERN TO TEST ADDRESS
027074  103402                          BCS     25$                     ;BR IF VALID MESSAGE BUFFER ADDRESS
027076  000137  027174                  JMP     150$                    ;GET ANOTHER TEST PATTERN TO TRY
027102  012704  030220          25$:    MOV     #T12PACKET,R4           ;SET THE COMMAND PACKET ADDRESS
027106  004737  031600                  JSR     PC,T12SWRT              ;SETUP T12PACKET TO WRITE CHAR.
027112  013737  030264  030230          MOV     T12LOADD,T12DATA        ;SETUP LOW ORDER MESSAGE BUFFER ADD.
027120  013737  030262  030232          MOV     T12HIADD,T12DATA+2      ;SETUP HIGH ORDER MESSAGE BUFFER ADD.
027126  004737  017274                  JSR     PC,KTOFF                ;TURN OFF KT-11
027132  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
027136  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
027142                                  FORCERROR       32$
027156  103405                          BCS     50$                     ;BR IF SSR SET IN CHKTSSR
027160  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
027162                                  NEXT.ERRNO
027162                          32$:    ERRDF   ERRNO,T12WRTSSR,PKTSSR  ;DEVICE FATAL SSR FAILED TO SET
027162  104455                                                                                  TRAP    C$ERDF
027164  000462                                                                                  .WORD   306
027166  030532                                                                                  .WORD   T12WRTSSR
027170  012046                                                                                  .WORD   PKTSSR
027172                          50$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
027172  104406                                                                                  TRAP    C$CLP1
027174                          150$:
027174
027204  020327  030426                  FORCEXIT        160$
                                        CMP     R3,#T12TBE              ;DONE ALL TST12BLK TEST PATTERNS?
027210  103002                          BHIS    160$                    ;BR IF YES
027212  000137  027054                  JMP     T122LOOP                ;DO ANOTHER MODULO- 4 ADDRESS
027216  004737  017274          160$:   JSR     PC,KTOFF                ;TURN OFF KT11
027222                                  ENDSUB                          ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
027222                                                                                  L10044:
027222  104403                                                                                  TRAP    C$ESUB
027224  005737  002222                  TST     FATFLG                  ;ANY FATAL ERRORS ?
027230  001402                          BEQ     180$                    ;BRANCH IF NOT
027232  004737  017202                  JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
027236                          180$:



                                        .SBTTL  TEST 3: SUBTEST 3: CHARACTERISTIC DATA SELECTED LOCATIONS
                                ;++
                                ; TEST 3: SUBTEST 3:
                                ;
                                ; SUBTEST DESCRIPTION:
                                ;
                                ;       This subtest verifies the controller can fetch a
                                ;       Write Characteristics data block from all available
                                ;       memory locations.
                                ;       Write Characteristics commands are executed with
                                ;       characteristic data blocks at various memory addresses.
                                ;       The various memory addresses are determined by floating
                                ;       a 1 then a 0 through the address bits.
                                ;
                                ; TEST STEPS:
                                ;
                                ;    BEGIN
                                ;       Write to TSSR to soft initialize
                                ;
                                ;       REPEAT FOR SELECTED VALID ADDRESSES IN DIAGNOSTIC FREE SPACE AND ABOVE 32K
                                ;         BEGIN
                                ;               Get a valid test address
                                ;               Set the test packet characteristics data pointer to the
                                ;                 test address.
                                ;               Store expected characteristic data in test address block
                                ;               Do a WRITE CHARACTERISTIC command
                                ;         END
                                ;    END
                                ;--

027236                                  BGNSUB                          ;////////////// BEGIN SUBTEST //////////
027236                                                                                T3.3:
027236  104402                                                                          TRAP    C$BSUB


                                ;Write to TSSR to soft initialize
027240  004737  015774                  JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
027244  103405                          BCS     20$                     ;BR IF SOFT INIT = OK
027246                                  NEXT,ERRNO
027246  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
027250                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
027250  104455                                                                          TRAP    C$ERDF
027252  000463                                                                          .WORD   307
027254  003652                                                                          .WORD   SFIERR
027256  012034                                                                          .WORD   SFIMSG


                                ;Get a valid test address
027260  005037  002222          20$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
027264  005037  030270                  CLR     T12KT                   ;TEST ABOVE 28K SWITCH
027270  012703  030274                  MOV     #T12BLK,R3              ;POINT TO TEST PATTERN TABLE
027274                          T123LOOP:
027274  005037  003134                  CLR     KTENABLE                ;TURN OFF ABOVE 28K TEST FLAG
027300  012301                          MOV     (R3)+,R1                ;GET TEST PATTERN ADDRESS
027302  010100                          MOV     R1,R0                   ;GET ADDRESS ALL "18 BITS"
027304  042700  177774                  BIC     #177774,R0              ;LEAVE ONLY A17 AND A16
027310  042701  000003                  BIC     #3,R1                   ;GET RID OF A17 AND A16
027314  005737  030270                  TST     T12KT                   ;TEST ABOVE 28K THIS TIME?
027320  001407                          BEQ     25$                     ;BR IF NO
027322  016300  177776                  MOV     -2(R3),R0               ;GET TEST PATTERN AGAIN
027326  042700  177774                  BIC     #↑C<A1716>,R0           ;SAVE 18 BIT ADDRESS ONLY
027332  012737  000001  003134          MOV     #1,KTENABLE             ;TURN ON ABOVE 28K TEST FLAG
027340  004737  031276          25$:    JSR     PC,T12CONVERT           ;CONVERT TEST PATTERN TO TEST ADDRESS
027344  103402                          BCS     30$                     ;BR IF VALID TEST ADDRESS
027346  000137  027450                  JMP     60$                     ;GET NEXT TEST PATTERN

                                ;Set the test packet characteristics data pointer to the test address
027352  012704  030220          30$:    MOV     #T12PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
027356  004737  031600                  JSR     PC,T12SWRT              ;RESTORE PACKET TO STARTING VALUES
027362  013764  030264  000002          MOV     T12LOADD,PKLOW(R4)      ;STORE CHAR. DATA PTR LOW ADDRESS
027370  013764  030262  000004          MOV     T12HIADD,PKHI(R4)       ;STORE CHAR. DATA PTR HIGH ADDRESS
027376  004737  031710                  JSR     PC,T12CHAR              ;STORE EXPECTED DATA IN DATA BLOCK

                                ;Do a WRITE CHARACTERISTIC command
027402  004737  017274                  JSR     PC,KTOFF                ;TURN OFF KT-11
027406  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
027412  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
027416                                  FORCERROR       32$
027432  103405                          BCS     40$                     ;BR IF SSR SET IN CHKTSSR
027434  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
```

```
027436                                  NEXT.ERRNO
027436                          32$:    ERRDF   ERRNO,T12WRTSSR,PKTSSR  ;DEVICE FATAL SSR FAILED TO SET
     027436  104455                                                                            TRAP    C$ERDF
     027440  000464                                                                            .WORD   308
     027442  030532                                                                            .WORD   T12WRTSSR
     027444  012046                                                                            .WORD   PKTSSR
027446                          40$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     027446  104406                                                                            TRAP    C$CLP1
027450                          60$:
027450  020327  030426                  CMP     R3,#T12TBE              ;DONE ALL TSTBLK TEST PATTERNS?
027454  103002                          BHIS    65$                     ;BR IF YES
027456  000137  027274                  JMP     T123LOOP                ;DO ANOTHER MODULO- 4 ADDRESS
027462  005737  030270          65$:    TST     T12KT                   ;DONE ABOVE 28K TESTING TOO?
027466  003012                          BGT     70$                     ;BR IF YES
027470  005737  003132                  TST     KTFLG                   ;ANY MEMORY ABOVE 28K ON SYSTEM?
027474  001407                          BEQ     70$                     ;BR IF NO
027476  012737  000001  030270          MOV     #1,T12KT                ;SET SWITCH
027504  012703  030274                  MOV     #T12BLK,R3              ;RESET TEST PATTERN TABLE
027510  000137  027274                  JMP     T123LOOP                ;DO ABOVE 28K TESTING
027514  004737  017274          70$:    JSR     PC,KTOFF                ;TURN OFF KT11
027520                                  ENDSUB                          ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\
     027520                                                                          L10045:
     027520  104403                                                                            TRAP    C$ESUB
027522  005737  002222                  TST     FATFLG                  ;ANY FATAL ERRORS ?
027526  001402                          BEQ     75$                     ;BRANCH IF NOT
027530  004737  017202                  JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
027534                          75$:

                                        .SBTTL  TEST 3: SUBTEST 4: NXM TO SELECTED INVALID ADDRESSES

                                ;++
                                ; TEST 3: SUBTEST 4:
                                ;
                                ; SUBTEST DESCRIPTION:
                                ;
                                ;       This subtest verifies the NXM error bit in the TSSR
                                ;       register is set when attempting to fetch data (a characteristic
                                ;       data block) from selected nonexistent locations.
                                ;       If NXM fails to set it is likely that an LSI-11 Bus driver is
                                ;       failing to assert an address line.
                                ;       Addresses tested include all combinations of high-order address
                                ;       bits (i.e bits 16-21).
                                ;       ***************************************************************
                                ;                               CAUTION
                                ;
                                ;                 The LSI BUS drivers for all available address lines(16-21)
                                ;       are only checked when running on a 11/23B system with more than
                                ;       128K words of memory!
                                ;       ****************************************************************
                                ;
                                ; TEST STEPS:
                                ;
                                ;    BEGIN
                                ;       Write to TSSR to soft initialize
                                ;       Do a write characteristic command
                                ;       Invert the extended features switch
                                ;
                                ;       REPEAT FOR SELECTED NON-EXISTENT MEMORY ADDRESSES
```

```
                                        ;               BEGIN
                                        ;                       Get an invalid test address
                                        ;                       Set the test packet characteristics data pointer to the
                                        ;                          test address.
                                        ;                       Do a WRITE CHARACTERISTIC command
                                        ;                       If TSSR register NXM bit not set then print error message
                                        ;               END
                                        ;       END
                                        ;--

027534                                          BGNSUB                          ;///////////// BEGIN SUBTEST //////////
027534                                                                                          T3.4:
027534  104402                                                                                          TRAP    C$BSUB


027536  005737  003144                          TST     T23A                    ;26-APR-83 REV B - CHK FOR 23A CPU
027542  001406                                  BEQ     5$                      ;26-APR-83 REV B - BR, IF NOT 23A
027544  023727  002120  007777                  CMP     L$HIME,#7777            ;26-APR-83 REV B - CHK FOR > 256KB
027552  103402                                  BLO     5$                      ;26-APR-83 REV B - BR, IF < 256KB
027554  000137  030146                          JMP     NOEXTF                  ;26-APR-83 REV B - JMP OVER 256KB
027560                                  5$:
027560  005737  003136                          TST     NXMFLG                  ;GOT ENOUGH MEMORY?
027564  001002                                  BNE     10$                     ;IF SET STAY
027566  000137  030146                          JMP     NOEXTF                  ;LEAVE IF NOT SET

                                        ;Write to TSSR to soft initialize

027572  004737  015774                  10$:    JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
027576  103405                                  BCS     11$                     ;BR IF SOFT INIT = OK
027600                                          NEXT.ERRNO
027600  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
027602                                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
027602  104455                                                                                          TRAP    C$ERDF
027604  000465                                                                                          .WORD   309
027606  003652                                                                                          .WORD   SFIERR
027610  012034                                                                                          .WORD   SFIMSG

                                        ;Do a WRITE CHARACTERISTIC command so to invert switch

027612                                  11$:    CKLOOP                          ;LOOP IF SELECTED
027612  104406                                                                                          TRAP    C$CLP1
027614  012704  030220                          MOV     #T12PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
027620  004737  031600                          JSR     PC,T12SWRT              ;RESTORE PACKET TO STARTING VALUES
027624  005037  003134                          CLR     KTENABLE                ;TURN OFF KT-11
027630  010465  000000                          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
027634  004737  016336                          JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
027640                                          FORCERROR       15$
027654  103405                                  BCS     17$                     ;BR IF SSR SET IN CHKTSSR
027656  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
027660                                          NEXT.ERRNO
027660                                  15$:    ERRDF   ERRNO,T12WRTSSR,PKTSSR  ;DEVICE FATAL SSR FAILED TO SET
027660  104455                                                                                          TRAP    C$ERDF
027662  000466                                                                                          .WORD   310
027664  030532                                                                                          .WORD   T12WRTSSR
027666  012046                                                                                          .WORD   PKTSSR
027670                                  17$:    CKLOOP                          ;LOOP IF SELECTED
027670  104406                                                                                          TRAP    C$CLP1
```

```
027672  004737  021142                  JSR     PC,INVERT               ;INVERT THE SWITCH

                                ;Get an invalid test address

027676  005037  002222          20$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
027702                          25$:
027702  013737  003142  030262          MOV     NXMHI,T12HIADD          ;SAVE TEST ADDRESS HIGH
027710  013737  003140  030264          MOV     NXMLO,T12LOADD          ;SAVE TEST ADDRESS LOW
027716                          T124LOOP:

                                ;Set the test packet characteristics data pointer to the
                                ;  test address.

027716  012704  030220          30$:    MOV     #T12PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
027722  004737  031600                  JSR     PC,T12SWRT              ;RESTORE PACKET TO STARTING VALUES
027726  013764  030264  000002          MOV     T12LOADD,PKLOW(R4)      ;STORE CHAR. DATA PTR LOW ADDRESS
027734  013764  030262  000004          MOV     T12HIADD,PKHI(R4)       ;STORE CHAR. DATA PTR HIGH ADDRESS

                                ;Do a WRITE CHARACTERISTIC command
027742  004737  017274                  JSR     PC,KTOFF                ;TURN OFF KT-11
027746  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
027752  004737  016250                  JSR     PC,WAITF                ;WAIT FOR SSR TO SET
027756                                  FORCERROR       32$
027772  103407                          BCS     40$                     ;BR IF SSR SET IN CHKTSSR
027774  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
027776                                  NEXT.ERRNO
027776                          32$:    ERRDF   ERRNO,T12WRTSSR,PKTSSR  ;DEVICE FATAL SSR FAILED TO SET
027776  104455                                                                                  TRAP    C$ERDF
030000  000467                                                                                  .WORD   311
030002  030532                                                                                  .WORD   T12WRTSSR
030004  012046                                                                                  .WORD   PKTSSR
030006  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
030012                          40$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
030012  104406                                                                                  TRAP    C$CLP1
030014                                  FORCERROR       45$,NOTSSR
030024                                  ESCAPE  SUB                     ;BY-PASS SUBTEST IF FATAL ERROR
030024  104410                                                                                  TRAP    C$ESCAPE
030026  000124                                                                                  .WORD   L10046-.
                                ;If TSSR register NXM bit not set then print error message
030030                          45$:
030030  016501  000002                  MOV     TSSR(R5),R1             ;GET TSSR CONTENTS
030034                                  FORCERROR       52$
030050  032701  004000                  BIT     #NXM,R1                 ;NXM SET?
030054  001012                          BNE     60$                     ;BR IF YES
030056                                  NEXT.ERRNO
030056  013737  030264  002240  52$:    MOV     T12LOADD,ERRLO          ;MEMORY TEST ADDRESS LOW
030064  013737  030262  002236          MOV     T12HIADD,ERRHI          ;MEMORY TEST ADDRESS HIGH
030072                                  ERRHRD  ERRNO,T12NXM,ADDSSR     ;REPORT ADDRESS AND TSSR ERROR
030072  104456                                                                                  TRAP    C$ERHRD
030074  000470                                                                                  .WORD   312
030076  031167                                                                                  .WORD   T12NXM
030100  012126                                                                                  .WORD   ADDSSR

030102                          60$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
030102  104406                                                                                  TRAP    C$CLP1
030104                                  FORCEXIT        90$
030114  005737  003144                  TST     T23A                    ;IS IT A 11/23A?
```

```
030120  001012                          BNE     90$                             ;YES WERE DONE
030122  013700  030262                  MOV     T12HIADD,R0                     ;GET CURRENT HIGH ADDRESS
030126  005200                  65$:    INC     R0                              ;GET NEXT ADDRESS
030130  020027  000077                  CMP     R0,#77                          ;DONE A21-A16?
030134  101004                          BHI     90$                             ;BR IF YES
030136  010037  030262          75$:    MOV     R0,T12HIADD                     ;SETUP NEW HIGH ORDER ADDRESS
030142  000137  027716                  JMP     T124LOOP                        ;DO ANOTHER NON-EXISTENT ADDRESS
030146                          90$:
030146                          NOEXTF:
030146  004737  017274                  JSR     PC,KTOFF                        ;TURN OFF KT11
030152                                  ENDSUB                                  ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\
030152                                                                                          L10046:
030152  104403                                                                                         TRAP    C$ESUB
030154  005737  002222                  TST     FATFLG                          ;ANY FATAL ERRORS ?
030160  001402                          BEQ     100$                            ;BRANCH IF NOT
030162  004737  017202                  JSR     PC,CKDROP                       ;TRY TO DROP THE UNIT
030166  004737  016456          100$:   JSR     PC,TSTLOOP                      ;SHOULD WE DO ITERATIONS?
030172  103002                          BCC     105$                            ;BR IF NO
030174  000137  026406                  JMP     T12LOOP                         ;LOOP UNTIL ITERATION COUNT DONE
030200                          105$:
030200  004737  017274                  JSR     PC,KTOFF                        ;TURN OFF MEMORY MANAGEMENT
030204  005037  003150                  CLR     T3BFLG                          ;CLEAR TEST FLAG
030210                                  EXIT    TST                             ;ALL DONE THIS TEST
030210  104432                                                                                         TRAP    C$EXIT
030212  001540                                                                                         .WORD   L10042-.



                                ;+
                                ;LOCAL STORAGE FOR THIS TEST
                                ;-


        030220                          .=<.+10>&177770
030220                          T12PACKET:                                      ;COMMAND PACKET FOR TEST
030220  100004                          .WORD   100004                          ;WRITE CHARACTERISTICS COMMAND, WITH ACK
030222  030230                          .WORD   T12DATA                         ;ADDRESS OF CHARACTERISTICS BLOCK
030224  000000                          .WORD   0
030226  000010                          .WORD   8.                              ;STARTING VALUE OF BLOCK SIZE

030230                          T12DATA:                                        ;CHARACTERISTICS DATA BLOCK
030230  030242                          .WORD   T12BFR                          ;LOW ADDRESS OF MESSAGE BUFFER
030232  000000                          .WORD   0                               ;HIGH ORDER OF MESSAGE BUFFER
030234  000016                          .WORD   14.                             ;LENGTH OF MESSAGE BUFFER
030236  000000  000000                  .WORD   0,0

030242                          T12BFR: .BLKW   8.                              ;MESSAGE BUFFER

030262  000000                  T12HIADD:       .WORD   0                       ;HIGH ADDRESS
030264  000000                  T12LOADD:       .WORD   0                       ;LOW ADDRESS
030266  000000                  T12PAR6:        .WORD   0                       ;ADDRESS IN PAR FORMAT
030270  000000                  T12KT:          .WORD   0                       ;TEST ABOVE 28K SWITCH
030272  000000                  T124TST:        .WORD   0                       ;ADDRESS TEST BIT
                                ;+
                                ;
                                ;TABLE OF ADDRESSES
                                ;
                                ;-
030274  000001                  T12BLK: .WORD   000001
```

```
    938 030276  000002                              .WORD    000002
    939 030300  000003                              .WORD    000003
    940 030302  000005                              .WORD    000005
    941 030304  000006                              .WORD    000006
    942 030306  000007                              .WORD    000007
    943 030310  000011                              .WORD    000011
    944 030312  000012                              .WORD    000012
    945 030314  000013                              .WORD    000013
    946 030316  000021                              .WORD    000021
    947 030320  000022                              .WORD    000022
    948 030322  000023                              .WORD    000023
    949 030324  000041                              .WORD    000041
    950 030326  000042                              .WORD    000042
    951 030330  000043                              .WORD    000043
    952 030332  000101                              .WORD    000101
    953 030334  000102                              .WORD    000102
    954 030336  000103                              .WORD    000103
    955 030340  000201                              .WORD    000201
    956 030342  000202                              .WORD    000202
    957 030344  000203                              .WORD    000203
    958 030346  000401                              .WORD    000401
    959 030350  000402                              .WORD    000402
    960 030352  000403                              .WORD    000403
    961 030354  001001                              .WORD    001001
    962 030356  001002                              .WORD    001002
    963 030360  001003                              .WORD    001003
    964 030362  002001                              .WORD    002001
    965 030364  002002                              .WORD    002002
    966 030366  002003                              .WORD    002003
    967 030370  004001                              .WORD    004001
    968 030372  004002                              .WORD    004002
    969 030374  004003                              .WORD    004003
    970 030376  010001                              .WORD    010001
    971 030400  010002                              .WORD    010002
    972 030402  010003                              .WORD    010003
    973 030404  020001                              .WORD    020001
    974 030406  020002                              .WORD    020002
    975 030410  020003                              .WORD    020003
    976 030412  040001                              .WORD    040001
    977 030414  040002                              .WORD    040002
    978 030416  040003                              .WORD    040003
    979 030420  100001                              .WORD    100001
    980 030422  100002                              .WORD    100002
    981 030424  100003                              .WORD    100003
    982 030426  177777                     T12TBE:  .WORD             177777
    983                                    ;+
    984                                    ;LOCAL TEXT MESSAGES FOR TEST
    985                                    ;-
    986
    987 030430     104      115      101   TST12ID:         .ASCIZ  'DMA Memory Addressing'
    988 030456     103      157      156   T12GETSSR:       .ASCIZ  'Contents of TSSR Incorrect After GET STATUS'
    989 030532     103      157      156   T12WRTSSR:       .ASCIZ  'Contents of TSSR Incorrect After WRITE CHARACTERISTICS'
    990 030621     115      145      163   T12MSGBUF:       .ASCIZ  'Message Buffer Contents Incorrect After WRITE CHARACTERISTICS'
    991 030717     102      141      143   T12BKGND:        .ASCIZ  'Background Pattern Disturbed By WRITE CHARACTERISTICS'
    992 031005     105      170      160   T12NINT:         .ASCIZ  'Expected Interrupt Not Received On WRITE CHARACTERISTICS'
    993 031076     127      162      151   T12DPR:          .ASCIZ  'Write Characteristic data in ram does not match expected'
    994 031167     124      123      123   T12NXM:          .ASCIZ  'TSSR NXM bit failed to set when non-existent memory address specifi
ed'
```

```
                                        .EVEN



                        ;+
                        ;ROUTINE TO CONVERT A TEST PATTERN TO A VALID ADDRESS IN DIAGNOSTIC FREE SPACE
                        ;       DIAGNOSTIC FREE SPACE IS BETWEEN THE END OF THE DIAGNOSTIC AND THE
                        ;       BEGINNING OF THE SUPERVISOR. THIS IS ALWAYS BELOW 24K.
                        ;       IF MEMORY ABOVE 28K SPECIFIED (VIA R1) THEN PAR 6 IS SET
                        ;       TO THE RELOCATION BASE.
                        ;
                        ; INPUTS:
                        ;
                        ;       R0      HIGH ORDER ADDRESS BITS
                        ;       R1      LOW ORDER ADDRESS BITS
                        ;
                        ; OUPTUTS:
                        ;       T12PAR6 = ADDRESS BIASED TO PAR6 IF >28K UNDER TEST
                        ;       T12HIADD = HIGH ORDER ADDRESS IN NON PAR6 FORMAT
                        ;       T12LOADD = LOW ORDER ADDRESS IN NON PAR6 FORMAT
                        ;       C BIT = 1 IF GOOD ADDRESS RETURNED
                        ;       C BIT = 0 IF TEST PATTERN DID NOT YIELD A VALID ADDRESS
                        ;-
031276                  T12CONVERT:
031276                          SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
031302  005037  030264          CLR     T12LOADD                ;CLEAR LOW ADDRESS
031306  005037  030262          CLR     T12HIADD                ;CLEAR HIGH ADDRESS
031312  005037  030266          CLR     T12PAR6                 ;CLEAR PAR6 BIASED ADDRESS
031316  042701  170000          BIC     #↑C<7777>,R1            ;FORCE TO LOWER 12 BITS OF ADDRESS
031322  010005                  MOV     R0,R5                   ;SAVE HIGH ORDER ADDRESS BITS
031324  004737  017274          JSR     PC,KTOFF                ;SHUTOFF MEMORY MANAGEMENT
031330  013702  003124          MOV     FREE,R2                 ;GET FIRST FREE ADDRESS
031334  062702  000020          ADD     #16.,R2                 ;IN CASE TEST PATTERN=0
031340  060102                  ADD     R1,R2                   ;ADD IN TEST PATTERN
031342  042702  000003          BIC     #3,R2                   ;MAKE IT MODULO-4
031346  013703  003130  25$:    MOV     FREEHI,R3               ;GET LAST FREE ADDRESS
031352  162703  000020          SUB     #16.,R3                 ;SAVE AT LEAST 8 WORDS (IN CASE MESSAGE BUFFER)
031356  010237  030264          MOV     R2,T12LOADD             ;SAVE POSSIBLE LOW ADDRESS
031362  010237  030266          MOV     R2,T12PAR6              ;SAVE IT IN PAR6 BIASED TOO
031366  020203                  CMP     R2,R3                   ;IS THIS ADDRESS ABOVE FREE SPACE?
031370  101007                  BHI     35$                     ;BR IF YES
031372  020237  003124          CMP     R2,FREE                 ;IS IT IN FREE SPACE?
031376  103007                  BHIS    50$                     ;BR IF YES- ITS GOOD
031400  005737  003134          TST     KTENABLE                ;TESTING ABOVE 28K?
031404  001004                  BNE     50$                     ;BR IF YES
031406  000424                  BR      90$                     ;BR IF NOT IN FREE SPACE
031410  162702  000020  35$:    SUB     #16.,R2                 ;FORCE FIT THE TEST PATTERN
031414  000754                  BR      25$                     ;TRY THIS TEST PATTERN ADDRESS
031416                  50$:
031416  005737  003134          TST     KTENABLE                ;TESTING ABOVE 28K?
031422  001420                  BEQ     100$                    ;BR IF NO
031424  005737  003132          TST     KTFLG                   ;ANY MEMORY ABOVE 28K?
031430  001413                  BEQ     90$                     ;BR IF NO
031432  004737  017256          JSR     PC,KTON                 ;TURN ON MEMORY MANAGEMENT
031436  010500                  MOV     R5,R0                   ;GET HIGH ORDER ADDRESS
031440  010037  030262          MOV     R0,T12HIADD             ;SAVE POSSIBLE HIGH ADDRESS
031444  010201                  MOV     R2,R1                   ;GET COMPUTED LOW ORDER ADDRESS
031446  004737  017316          JSR     PC,SETMAP               ;RETURN PAR6 BIASED ADDRESS IN R0
```

```
031452  010037  030266                  MOV     R0,T12PAR6              ;COPY PAR6 BIASED ADDRESS
031456  103403                          BCS     105$                    ;BR IF VALID ADDRESS
031460  000241                  90$:    CLC                             ;CLR C BIT FOR FAILURE
031462  000401                          BR      105$                    ;
031464  000261                  100$:   SEC                             ;SET SUCCESS
031466  000207                  105$:   RTS     PC                      ;RETURN


                                ;+
                                ;
                                ;ROUTINE TO READ THE FIRST 2 BYTES FROM RAM
                                ;MEMORY AND COMPARE THIS DATA TO A COMMAND PACKET.
                                ;
                                ;INPUT:
                                ;
                                ;       R4      ADDRESS OF THE COMMAND PACKET
                                ;       R5      FIRST DEVICE UNIBUS ADDRESS
                                ;
                                ;OUTPUT:
                                ;
                                ;       CARRY   SET - RAM MATCHES PACKET
                                ;               CLR - RAM DOES NOT MATCH PACKET
                                ;
                                ;IMPLICIT OUTPUT:
                                ;
                                ;       THE TABLE RAMDATA IS FILLED WITH THE
                                ;       DATA HELD IN RAM.
                                ;       RAMSIZ  SET TO 2 FOR PRAMPKT ROUTINE
                                ;
                                ;SIDE EFFECTS:
                                ;
                                ;       THE SUBSYSTEM IS LEFT IN MAINTENANCE MODE
                                ;
                                ;-
031470                          T12CKRAM::
031470                                  SAVREG                                  ;SAVE THE GENERAL REGISTERS
031474  012701  002242                  MOV     #RAMDATA,R1                     ;ADDRESS TO SAVE THE RAM DATA
031500  012702  000201                  MOV     #RMPKTBEG,R2                    ;BYTE ADDRESS OF FIRST RAM DATA
031504  005003                          CLR     R3                              ;CLEAR THE ERROR FLAG
031506  004737  016336                  JSR     PC,CHKTSSR                      ;WAIT FOR SSR
031512  112765  000000  000000          MOVB    #0,TSDB(R5)                     ;SET MAINTENANCE MODE
031520  004737  016336          10$:    JSR     PC,CHKTSSR                      ;WAIT FOR SSR TO SET
031524  010265  000000                  MOV     R2,TSDB(R5)                     ;SELECT NEXT RAM ADDRESS
031530  004737  016336                  JSR     PC,CHKTSSR                      ;WAIT FOR SSR TO SET
031534  116511  000000                  MOVB    TSBA(R5),(R1)                   ;READ THE RAM DATA
031540  122124                          CMPB    (R1)+,(R4)+                     ;COMPARE TO EXPECTED
031542  001401                          BEQ     20$                             ;BRANCH IF OK
031544  005203                          INC     R3                              ;SET ERROR FLAG
031546  005202                  20$:    INC     R2                              ;ADDRESS OF NEXT RAM LOCATION
031550  020227  000203                  CMP     R2,#RMPKTBEG+2                  ;DONE 2 BYTES?
031554  002761                          BLT     10$                             ;BR IF NO
031556  005703                          TST     R3                              ;WAS AN ERROR FOUND ?
031560  001402                          BEQ     30$                             ;BRANCH IF NOT
031562  000241                          CLC                                     ;CLEAR CARRY TO SHOW ERROR
031564  000401                          BR      50$                             ;AND EXIT
031566  000261                  30$:    SEC                                     ;SHOW GOOD COMPARE
031570  012737  000002  002302  50$:    MOV     #2,RAMSIZ                       ;SETUP RAMSIZ
```

```
031576 000207                        RTS     PC                        ;RETURN

                            ;+
                            ;
                            ;ROUTINE TO SETUP PACKET TO WRITE CHARACTERISTICS
                            ;-

031600                      T12SWRT:
031600                               SAVREG                    ;SAVE THE REGISTERS
031604 012701 030220                 MOV     #T12PACKET,R1     ;START OF THE PACKET
031610 012721 100004                 MOV     #100004,(R1)+     ;WRITE CHARACTERISTICS WITH ACK
031614 012721 030230                 MOV     #T12DATA,(R1)+    ;ADDRESS OF CHAR DATA BLOCK
031620 005021                        CLR     (R1)+             ;EXTENDED ADDRESS
031622 012721 000010                 MOV     #8.,(R1)+         ;SIZE OF DATA BLOCK IN BYTES
031626 012721 030242                 MOV     #T12BFR,(R1)+     ;ADDRESS OF MESSAGE BUFFER
031632 005021                        CLR     (R1)+
031634 012721 000016                 MOV     #14.,(R1)+        ;LENGTH OF MESSAGE BUFFER
031640 005021                        CLR     (R1)+
031642 005011                        CLR     (R1)
031644 000207                        RTS     PC                ;RETURN
                            ;+
                            ;
                            ;ROUTINE TO SETUP A GET STATUS COMMAND PACKET AT CURRENT PACKET ADDRESS
                            ;
                            ;        R3      HIGH ORDER PACKET ADDRESS
                            ;        R4      LOW ORDER PACKET ADDRESS
                            ;        NOTE: R3 IS IGNORED IF KTENABLE FLAG CLEAR
                            ;
                            ;-

031646                      T12SETGET:
031646                               SAVREG                    ;SAVE THE REGISTERS
031652 010401                        MOV     R4,R1             ;GET LOW ORDER ADDRESS
031654 005737 003134                 TST     KTENABLE          ;TESTING ABOVE 28K?
031660 001404                        BEQ     10$               ;BR IF NO
031662 010300                        MOV     R3,R0             ;GET HIGH ORDER ADDRESS
031664 004737 017316                 JSR     PC,SETMAP         ;RETURN ADDRESS BIASED TO PAR6 IN R0
031670 010001                        MOV     R0,R1             ;GET ADDRESS
031672 012700 000017        10$:     MOV     #P.GETSTATUS,R0 ;GET STATUS COMMAND CODE NO IE
031676 052700 100000                 BIS     #P.ACK,R0         ;SET ACK
031702 010021                        MOV     R0,(R1)+          ;STORE GET STATUS IN PACKET
031704 005021                        CLR     (R1)+             ;CLEAR UNUSED WORD
031706 000207                        RTS     PC                ;RETURN


                            ;+
                            ;
                            ;ROUTINE TO SETUP A CHARACTERISTIC DATA BLOCK AT A TEST ADDRESS
                            ;
                            ;-
031710                      T12CHAR:
031710                               SAVREG                    ;SAVE R1-R5 UNTIL NEXT RETURN
031714 012700 030230                 MOV     #T12DATA,R0       ;GET T12PACKET DATA POINTER
031720 013701 030264                 MOV     T12LOADD,R1       ;ASSUME NOT ABOVE 28K
031724 005737 003134                 TST     KTENABLE          ;TESTING ABOVE 28K?
031730 001402                        BEQ     10$               ;BR IF NO
031732 013701 030266                 MOV     T12PAR6,R1        ;SET TEST ADDRESS ABOVE 28K
```

```
031736  012021          10$:    MOV     (R0)+,(R1)+             ;STORE DATA WORD 1
031740  012021                  MOV     (R0)+,(R1)+             ;STORE DATA WORD 2
031742  012021                  MOV     (R0)+,(R1)+             ;STORE DATA WORD 3
031744  012021                  MOV     (R0)+,(R1)+             ;STORE DATA WORD 4
031746  012021                  MOV     (R0)+,(R1)+             ;STORE DATA WORD 5
031750  000207                  RTS     PC                      ;RETURN

031752                          ENDTST
031752                                                                          L10042:
031752  104401                                                                          TRAP    C$ETST
```

```


                                            .SBTTL  TEST  4: RAM EXERCISER TEST
                                    ;+
                                    ;
                                    ;THIS TEST USES THE READ AND WRITE RAM (BOTH SINGLE AND 256
                                    ;LOCATIONS) SELECT CODES OF THE WRITE SUBSYSTEM MEMORY COMMAND
                                    ;TO EXERCISE THE CONTROLLER'S RAM MEMORY AND DMA LOGIC
                                    ;
                                    ;-
031754                                      BGNTST
031754                                                                                  T4::


031754  005737  002214                      TST     TSTCNT                  ;CHECK FOR RUN MODE
031760  001402                              BEQ     10$                     ;BR, IF NOT ONLY PROGRAM RUN
031762  005237  003400                      INC     SKIPT                   ;SET SKIP SW
031766  012700  034413              10$:    MOV     #TST15ID,R0             ;ASCII MESSAGE TO IDENTIFY TEST
031772  004737  016510                      JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
031776  012737  000005  002216              MOV     #5,LOOPCNT              ;PERFORM 5 ITERATIONS
032004                              T15LOOP:
                                    ;
                                    ;
                                    ;TEST 4, SUBTEST 1
                                    ;
                                    ;       THIS SUBTEST WRITES THE ADDRESS (8 BITS) INTO THE
                                    ;       RAM MEMORY SINGLE WORD (8 BITS) MODE
                                    ;
                                    ;-
032004                                      BGNSUB                          ;///////////// BEGIN SUBTEST /////////////
032004                                                                                  T4.1:
032004  104402                                                                                  TRAP    C$BSUB
032006                                      SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
032006  012700  000000                                                                          MOV     #PRI00,R0
032012  104441                                                                                  TRAP    C$SPRI
032014  005737  003400                      TST     SKIPT                   ;SHOULD WE SKIP THIS SUBTEST
032020  001402                              BEQ     10$                     ;BR, IF NOW SKIP REQUIRED
032022  000137  032304                      JMP     50$                     ;SKIP SUBTEST
032026  004737  034432              10$:    JSR     PC,T15REST              ;SET COMMAND PACKET
032032  004737  034504                      JSR     PC,T15RT2               ;SET UP OTHER COMMAND PACKET
032036  004737  015774                      JSR     PC,SOFINIT              ;DO INITIALIZE ON CONTROLLER
032042  103405                              BCS     20$                     ;BR IF INIT WAS OK
032044  010001                              MOV     R0,R1                   ;CONTENTS OF TSSR REGISTER
032046                                      ERRDF   ERRNO,SFIERR,SFIMSG     ;FATAL ERROR TSSR WAS NOT OK
032046  104455                                                                                  TRAP    C$ERDF
032050  000621                                                                                  .WORD   401
032052  003652                                                                                  .WORD   SFIERR
032054  012034                                                                                  .WORD   SFIMSG
032056                              20$:
032056  012704  033330                      MOV     #T15PACKET,R4           ;SUBROUTINE NEEDS PACKET ADDRESS
032062  004737  010662                      JSR     PC,WRTCHR               ;ISSUE WRITE CHARACTERISTICS
032066  103405                              BCS     23$                     ;BR, IF COMMAND ISSUED OK
032070  010001                              MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
032072                                      ERRHRD  ERRNO,WRTMSG,SFIMSG     ;WRITE CHARACTERISTISC FAILED
032072  104456                                                                                  TRAP    C$ERHRD
032074  000622                                                                                  .WORD   402
032076  005056                                                                                  .WORD   WRTMSG
032100  012034                                                                                  .WORD   SFIMSG
```

```
 1229 032102  012703  000400          23$:    MOV     #256.,R3                ;STARTING ADDRESS FOR RAM WRITE
 1230 032106  112737  000001  034041          MOVB    #1,T15BS1               ;SIZE OF TRANSFER
 1231 032114  112737  000002  034040          MOVB    #2,T15BS0               ;WRITE RAM "COMMAND"
 1232 032122                          25$:
 1233 032122  010337  034042                  MOV     R3,T15S2                ;ADDRESS FOR RAM
 1234 032126  012704  034030                  MOV     #T15PK2,R4              ;WRITE SUBSYS MEM PACKET
 1235 032132  110337  034044                  MOVB    R3,T15S3                ;DATA FOR WRITE (ADDRESS)
 1236 032136  010465  000000                  MOV     R4,TSDB(R5)             ;ISSUE COMMAND
 1237 032142  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR
 1238 032146  103407                          BCS     30$                     ;BR, IF NO ERROR
 1239 032150  010001                          MOV     R0,R1                   ;ERROR, SAVE TSSR
 1243 032152                                  ERRHRD  ERRNO,T15SSR,PKTSSR     ;TSSR NOT CORRECT AFTER WRITE SUB MEM
      032152  104456                                                                                TRAP    C$ERHRD
      032154  000623                                                                                .WORD   403
      032156  034046                                                                                .WORD   T15SSR
      032160  012046                                                                                .WORD   PKTSSR
 1244 032162                                  ESCAPE  SUB                     ;DON'T CONTINUE IF ERROR ON WRITE
      032162  104410                                                                                TRAP    C$ESCAPE
      032164  000122                                                                                .WORD   L10050-.
 1245 032166                          30$:    CKLOOP                          ;SCOPE LOOP
      032166  104406                                                                                TRAP    C$CLP1
 1246
 1247
 1248 032170  005203                          INC     R3                      ;NEXT ADDRESS
 1249 032172  020327  010000                  CMP     R3,#10000               ;END OF RAM MEMORY CHECK
 1250 032176  001351                          BNE     25$                     ;LOOP TILL ALL RAM WRITTEN
 1251 032200  005002                          CLR     R2                      ;CLEAR OUT R2 HIGH BITS
 1252 032202  005303                          DEC     R3                      ;SET BACK TO 7777
 1253 032204  110337  034044          40$:    MOVB    R3,T15S3                ;GET DATA PATTERN BACK IN SHAPE
 1254 032210  010337  034042                  MOV     R3,T15S2                ;ADDRESS FOR RAM READ
 1255 032214  112737  000001  034040          MOVB    #1,T15BS0               ;READ RAM COMMAND
 1256 032222  010465  000000                  MOV     R4,TSDB(R5)             ;SEND OUT PACKET ADDRESS TO CONTR.
 1257 032226  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
 1258 032232  103405                          BCS     43$                     ;BR, IF NO PROBLEM
 1259 032234  010001                          MOV     R0,R1                   ;SAVE TSSR
 1263 032236                                  ERRDF   ERRNO,T15SSR,PKTSSR     ;TSSR NOT CORRECT
      032236  104455                                                                                TRAP    C$ERDF
      032240  000624                                                                                .WORD   404
      032242  034046                                                                                .WORD   T15SSR
      032244  012046                                                                                .WORD   PKTSSR
 1264 032246                          43$:    CKLOOP                          ;SCOPE LOOP
      032246  104406                                                                                TRAP    C$CLP1
 1265 032250  013701  033372                  MOV     T15BFR+20,R1            ;GET RAM READ DATA
 1266 032254  010302                          MOV     R3,R2                   ;SET UP FOR COMPARE
 1267 032256  120102                          CMPB    R1,R2                   ;CHECK WITH DATA WRITTEN
 1268 032260  001404                          BEQ     45$                     ;BR IF OK, DATA IN = DATA OUT
 1272 032262                                  ERRHRD  ERRNO,T15AM4,EXPBREC    ;WRITTEN DATA NOT = TO READ
      032262  104456                                                                                TRAP    C$ERHRD
      032264  000625                                                                                .WORD   405
      032266  034325                                                                                .WORD   T15AM4
      032270  015502                                                                                .WORD   EXPBREC
 1273 032272                          45$:    CKLOOP                          ;SCOPE LOOP
      032272  104406                                                                                TRAP    C$CLP1
 1274 032274  005303                          DEC     R3                      ;DROP DATA COUNTER (PATTERN)
 1275 032276  020327  000377                  CMP     R3,#255.                ;AT BOTTOM YET
 1276 032302  001340                          BNE     40$                     ;BR, IF MORE TO CHECK
 1277 032304                          50$:    CKLOOP                          ;SCOPE LOOP
```

```
      032304  104406                                                                TRAP    C$CLP1
 1278 032306                                  ENDSUB                  ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
      032306                                                                   L10050:
      032306  104403                                                                TRAP    C$ESUB
 1279
 1280
 1281 032310                                  BGNSUB                  ;///////////// BEGIN SUBTEST ////////////
      032310                                                                   T4.2:
      032310  104402                                                                TRAP    C$BSUB
 1282
 1283                                 ;+
 1284                                 ;
 1285                                 ;TEST 4, SUBTEST 2
 1286                                 ;
 1287                                 ;
 1288                                 ;       THIS SUBTEST WRITES RAM WITH ALL ZEROS
 1289                                 ;       THEN WALKS AN ALL ONES WORD DOWN THROUGH MEMORY
 1290                                 ;
 1291 032312  004737  034432                  JSR     PC,T15REST              ;RESTORE PACKET FOR WRITE CHARA
 1292 032316  004737  034504                  JSR     PC,T15RT2               ;RESTORE PACKET FOR WRT SUB SYS MEM
 1293 032322  004737  015774                  JSR     PC,SOFINIT              ;DO INITIALIZE ON CONTROLLER
 1294 032326  103405                          BCS     20$                     ;BR IF INIT WAS OK
 1298 032330  010001                          MOV     R0,R1                   ;CONTENTS OF TSSR REGISTER
 1299 032332                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;FATAL ERROR TSSR WAS NOT OK
      032332  104455                                                                TRAP    C$ERDF
      032334  000626                                                                .WORD   406
      032336  003652                                                                .WORD   SFIERR
      032340  012034                                                                .WORD   SFIMSG
 1300 032342                          20$:
 1301 032342  012704  033330                  MOV     #T15PACKET,R4           ;SUBROUTINE NEEDS PACKET ADDRESS
 1302 032346  004737  010662                  JSR     PC,WRTCHR               ;ISSUE WRITE CHARACTERISTICS
 1303 032352  103405                          BCS     25$                     ;BR, IF COMMAND ISSUED OK
 1307 032354  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 1308 032356                                  ERRHRD  ERRNO,WRTMSG,SFIMSG     ;WRITE CHARACTERISTISC FAILED
      032356  104456                                                                TRAP    C$ERHRD
      032360  000627                                                                .WORD   407
      032362  005056                                                                .WORD   WRTMSG
      032364  012034                                                                .WORD   SFIMSG
 1309 032366                          25$:
 1310 032366  112737  000001  034041          MOVB    #1,T15BS1               ;SET SIZE OF TRANSFER 1 BYTE
 1311 032374  012704  034030                  MOV     #T15PK2,R4              ;SET NEW PACKET ADDRESS
 1312 032400  012703  000400                  MOV     #256.,R3                ;STARTING ADDRESS IN RAM
 1313 032404  112737  000002  034040          MOVB    #2,T15BS0               ;WRITE RAM COMMAND
 1314 032412  105037  034044                  CLRB    T15S3                   ;SET DATA TO 000
 1315 032416  010337  034042          30$:    MOV     R3,T15S2                ;ADDRESS TO PACKET DATA AREA
 1316 032422  010465  000000                  MOV     R4,TSDB(R5)             ;SEND OUT PACKET ADDRESS
 1317 032426  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR
 1318 032432  103405                          BCS     33$                     ;BR, IF NO PROBLEM
 1319 032434  010001                          MOV     R0,R1                   ;SAVE TSSR
 1323 032436                                  ERRHRD  ERRNO,T15SSR,PKTSSR     ;TSSR NOT CORRECT
      032436  104456                                                                TRAP    C$ERHRD
      032440  000630                                                                .WORD   408
      032442  034046                                                                .WORD   T15SSR
      032444  012046                                                                .WORD   PKTSSR
 1324 032446                          33$:    CKLOOP                          ;SCOPE LOOP
      032446  104406                                                                TRAP    C$CLP1
 1325
```

```

032450  005203                          INC     R3                      ;NEXT ADDRESS
032452  020327  010000                  CMP     R3,#10000               ;END OF RAM MEMORY CHECK
032456  001357                          BNE     30$                     ;BR, MORE RAM TO GO
032460  005303                  35$:    DEC     R3                      ;SET BACK TO 7777
032462  005002                  40$:    CLR     R2                      ;SET TO ALL ZEROS
032464  112737  000001  034040          MOVB    #1,T15BSO               ;READ RAM COMMAND
032472  010337  034042                  MOV     R3,T15S2                ;ADDRESS TO BE READ TO PACKET DATA
032476  010465  000000                  MOV     R4,TSDB(R5)             ;SEND OUT PACKET ADDRESS
032502  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
032506  103405                          BCS     41$                     ;BR, IF ALL IS WELL
032510  010001                          MOV     R0,R1                   ;SAVE TSSR
032512                                  ERRHRD  ERRNO,T15SSR,PKTSSR     ;TSSR NOT CORRECT
032512  104456                                                                                  TRAP    C$ERHRD
032514  000631                                                                                  .WORD   409
032516  034046                                                                                  .WORD   T15SSR
032520  012046                                                                                  .WORD   PKTSSR
032522                          41$:    CKLOOP                          ;SCOPE LOOP
032522  104406                                                                                  TRAP    C$CLP1
032524  013701  033372                  MOV     T15BFR+20,R1            ;PICK UP READ DATA
032530  120102                          CMPB    R1,R2                   ;BOTH SHOULD BE 00000000 BINARY
032532  001404                          BEQ     42$                     ;BR, IF DATA IS GOOD
032534                                  ERRHRD  ERRNO,T15AM3,EXPBREC    ;CHARACTERISTICS DATA NOT CORRECT
032534  104456                                                                                  TRAP    C$ERHRD
032536  000632                                                                                  .WORD   410
032540  034223                                                                                  .WORD   T15AM3
032542  015502                                                                                  .WORD   EXPBREC
032544                          42$:    CKLOOP                          ;SCOPE LOOPER
032544  104406                                                                                  TRAP    C$CLP1
032546  012702  000377                  MOV     #000377,R2              ;SET ALL ONES WORD
032552  112737  000002  034040          MOVB    #2,T15BSO               ;WRITE RAM COMMAND
032560  112737  000377  034044          MOVB    #000377,T15S3           ;ALL ONES PATTERN
032566  010465  000000                  MOV     R4,TSDB(R5)             ;PASS PACKET ADDRESS TO CONTR.
032572  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR
032576  103405                          BCS     43$                     ;BR, IF OK (NO ERROR)
032600  010001                          MOV     R0,R1                   ;SAVE TSSR
032602                                  ERRHRD  ERRNO,T15SSR,PKTSSR     ;TSSR NOT CORRECT
032602  104456                                                                                  TRAP    C$ERHRD
032604  000633                                                                                  .WORD   411
032606  034046                                                                                  .WORD   T15SSR
032610  012046                                                                                  .WORD   PKTSSR
032612                          43$:    CKLOOP                          ;SCOPE LOOP
032612  104406                                                                                  TRAP    C$CLP1
032614  112737  000001  034040          MOVB    #1,T15BSO               ;SET UP FOR RAM READ
032622  010465  000000                  MOV     R4,TSDB(R5)             ;ISSUE RAM READ
032626  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
032632  103405                          BCS     44$                     ;BR, IF OK (NO ERROR)
032634  010001                          MOV     R0,R1                   ;SAVE TSSR
032636                                  ERRDF   ERRNO,T15SSR,PKTSSR     ;TSSR NOT CORRECT
032636  104455                                                                                  TRAP    C$ERDF
032640  000634                                                                                  .WORD   412
032642  034046                                                                                  .WORD   T15SSR
032644  012046                                                                                  .WORD   PKTSSR
032646  013701  033372          44$:    MOV     T15BFR+20,R1            ;PICK UP REC'D DATA
032652  120102                          CMPB    R1,R2                   ;CHECK WITH DATA WRITTEN
032654  001404                          BEQ     45$                     ;BR IF OK, DATA IN = DATA OUT
032656                                  ERRHRD  ERRNO,T15AM2,EXPBREC    ;WRITTEN DATA NOT = TO READ
```

```
 032656  104456                                                  TRAP    C$ERHRD
 032660  000635                                                  .WORD   413
 032662  034122                                                  .WORD   T15AM2
 032664  015502                                                  .WORD   EXPBREC
 032666                          45$:    CKLOOP                  ;SCOPE LOOP
 032666  104406                                                  TRAP    C$CLP1
 032670  005303                          DEC     R3              ;DROP RAM ADDRESS POINTER
 032672  020327  000377                  CMP     R3,#255.        ;AT START YET
 032676  001271                          BNE     40$             ;BR, IF MORE RAM TO CHECK

 032700                                  ENDSUB                  ;\\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\\
 032700                                                            L10051:
 032700  104403                                                  TRAP    C$ESUB

 032702                                  BGNSUB                  ;//////////// BEGIN SUBTEST ////////////
 032702                                                            T4.3:
 032702  104402                                                  TRAP    C$BSUB
                                 ;*
                                 ;
                                 ;TEST 4, SUBTEST 3
                                 ;
                                 ;
                                 ;       THIS SUBTEST WRITES RAM WITH ALL ONES
                                 ;       THEN WALKS AN ALL ZEROS WORD DOWN THROUGH MEMORY
                                 ;
 032704  005737  003400                  TST     SKIPT           ;CHECK RUN MODE
 032710  001402                          BEQ     10$             ;BR, IF NO SKIP
 032712  000137  033306                  JMP     50$             ;SKIP SUBTEST
 032716  004737  034432          10$:    JSR     PC,T15REST      ;RESTORE PACKET FOR WRITE CHARA
 032722  004737  034504                  JSR     PC,T15RT2       ;RESTORE PACKET FOR WRT SUB SYS MEM
 032726  004737  015774                  JSR     PC,SOFINIT      ;DO INITIALIZE ON CONTROLLER
 032732  103405                          BCS     20$             ;BR IF INIT WAS OK
 032734  010001                          MOV     RO,R1           ;CONTENTS OF TSSR REGISTER
 032736                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;FATAL ERROR TSSR WAS NOT OK
 032736  104455                                                  TRAP    C$ERDF
 032740  000636                                                  .WORD   414
 032742  003652                                                  .WORD   SFIERR
 032744  012034                                                  .WORD   SFIMSG
 032746                          20$:
 032746  012704  033330                  MOV     #T15PACKET,R4   ;SUBROUTINE NEEDS PACKET ADDRESS
 032752  004737  010662                  JSR     PC,WRTCHR       ;ISSUE WRITE CHARACTERISTICS
 032756  103405                          BCS     25$             ;BR, IF COMMAND ISSUED OK
 032760  010001                          MOV     R0,R1           ;SAVE CONTENTS OF TSSR
 032762                                  ERRHRD  ERRNO,WRTMSG,SFIMSG     ;WRITE CHARACTERISTISC FAILED
 032762  104456                                                  TRAP    C$ERHRD
 032764  000637                                                  .WORD   415
 032766  005056                                                  .WORD   WRTMSG
 032770  012034                                                  .WORD   SFIMSG
 032772                          25$:
 032772  112737  000001  034041          MOVB    #1,T15BS1       ;SET SIZE TO 1 BYTE
 033000  012704  034030                  MOV     #T15PK2,R4      ;SET NEW PACKET ADDRESS
 033004  012703  000400                  MOV     #256.,R3        ;STARTING ADDRESS IN RAM
 033010  112737  000002  034040          MOVB    #2,T15BS0       ;WRITE RAM COMMAND
 033016  112737  000377  034044          MOVB    #377,T15S3      ;SET DATA TO 377
 033024  010337  034042          30$:    MOV     R3,T15S2        ;ADDRESS TO PACKET DATA AREA
 033030  010465  000000                  MOV     R4,TSDB(R5)     ;SEND OUT PACKET ADDRESS
 033034  004737  016336                  JSR     PC,CHKTSSR      ;WAIT FOR SSR
```

```
033040  103405                          BCS     33$                     ;BR, IF NO PROBLEM
033042  010001                          MOV     R0,R1                   ;SAVE TSSR
033044                                  ERRHRD  ERRNO,T15SSR,PKTSSR     ;TSSR NOT CORRECT
033044  104456                                                                                  TRAP    C$ERHRD
033046  000640                                                                                  .WORD   416
033050  034046                                                                                  .WORD   T15SSR
033052  012046                                                                                  .WORD   PKTSSR
033054                          33$:    CKLOOP                          ;SCOPE LOOP
033054  104406                                                                                  TRAP    C$CLP1


033056  005203                          INC     R3                      ;NEXT ADDRESS
033060  020327  010000                  CMP     R3,#10000               ;END OF RAM MEMORY CHECK
033064  001357                          BNE     30$                     ;BR, MORE RAM TO GO
033066  005303                  35$:    DEC     R3                      ;SET BACK TO 7777
033070  112702  000377          40$:    MOVB    #377,R2                 ;SET TO ALL ONES
033074  112737  000001  034040          MOVB    #1,T15BS0               ;READ RAM COMMAND
033102  010337  034042                  MOV     R3,T15S2                ;ADDRESS TO BE READ TO PACKET DATA
033106  010465  000000                  MOV     R4,TSDB(R5)             ;SEND OUT PACKET ADDRESS
033112  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
033116  103405                          BCS     41$                     ;BR, IF ALL IS WELL
033120  010001                          MOV     R0,R1                   ;SAVE TSSR
033122                                  ERRHRD  ERRNO,T15SSR,PKTSSR     ;TSSR NOT CORRECT
033122  104456                                                                                  TRAP    C$ERHRD
033124  000641                                                                                  .WORD   417
033126  034046                                                                                  .WORD   T15SSR
033130  012046                                                                                  .WORD   PKTSSR
033132                          41$:    CKLOOP                          ;SCOPE LOOP
033132  104406                                                                                  TRAP    C$CLP1
033134  013701  033372                  MOV     T15BFR+20,R1            ;PICK UP READ DATA
033140  120102                          CMPB    R1,R2                   ;BOTH SHOULD BE 11111111 BINARY
033142  001404                          BEQ     42$                     ;BR, IF DATA IS GOOD
033144                                  ERRHRD  ERRNO,T15AM3,EXPBREC    ;CHARACTERISTICS DATA NOT CORRECT
033144  104456                                                                                  TRAP    C$ERHRD
033146  000642                                                                                  .WORD   418
033150  034223                                                                                  .WORD   T15AM3
033152  015502                                                                                  .WORD   EXPBREC
033154  012702  000377          42$:    MOV     #000377,R2              ;SET ALL ONES WORD
033160  012737  000002  034040          MOV     #2,T15BS0               ;WRITE RAM COMMAND
033166  112737  000377  034044          MOVB    #000377,T15S3           ;ALL ONES PATTERN
033174  010465  000000                  MOV     R4,TSDB(R5)             ;PASS PACKET ADDRESS TO CONTR.
033200  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR
033204  103405                          BCS     43$                     ;BR, IF OK (NO ERROR)
033206  010001                          MOV     R0,R1                   ;SAVE TSSR
033210                                  ERRHRD  ERRNO,T15SSR,PKTSSR     ;TSSR NOT CORRECT
033210  104456                                                                                  TRAP    C$ERHRD
033212  000643                                                                                  .WORD   419
033214  034046                                                                                  .WORD   T15SSR
033216  012046                                                                                  .WORD   PKTSSR
033220                          43$:    CKLOOP                          ;SCOPE LOOP
033220  104406                                                                                  TRAP    C$CLP1
033222  112737  000001  034040          MOVB    #1,T15BS0               ;SET UP FOR RAM READ
033230  010465  000000                  MOV     R4,TSDB(R5)             ;ISSUE RAM READ
033234  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
033240  103405                          BCS     44$                     ;BR, IF OK (NO ERROR)
033242  010001                          MOV     R0,R1                   ;SAVE TSSR
033244                                  ERRHRD  ERRNO,T15SSR,PKTSSR     ;TSSR NOT CORRECT
```

```
        033244  104456                                                                       TRAP    C$ERHRD
        033246  000644                                                                       .WORD   420
        033250  034046                                                                       .WORD   T15SSR
        033252  012046                                                                       .WORD   PKTSSR
   1478 033254  013701  033372          44$:    MOV     T15BFR+20,R1            ;PICK UP REC'D DATA
   1479 033260  120102                          CMPB    R1,R2                   ;CHECK WITH DATA WRITTEN
   1480 033262  001404                          BEQ     45$                     ;BR IF OK, DATA IN = DATA OUT
   1484 033264                                  ERRHRD  ERRNO,T15AM2,EXPBREC    ;WRITTEN DATA NOT = TO READ
        033264  104456                                                                       TRAP    C$ERHRD
        033266  000645                                                                       .WORD   421
        033270  034122                                                                       .WORD   T15AM2
        033272  015502                                                                       .WORD   EXPBREC
   1485 033274                          45$:    CKLOOP                          ;SCOPE LOOP
        033274  104406                                                                       TRAP    C$CLP1
   1486 033276  005303                          DEC     R3                      ;DROP RAM ADDRESS POINTER
   1487 033300  020327  000377                  CMP     R3,#255.                ;AT START YET
   1488 033304  001271                          BNE     40$                     ;BR, IF MORE RAM TO CHECK
   1489
   1490 033306                          50$:
   1491 033306                                  ENDSUB                          ;\\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\\
        033306                                                                          L10052:
        033306  104403                                                                       TRAP    C$ESUB
   1492
   1493 033310  004737  016456                  JSR     PC,TSTLOOP              ;DO WE NEED TO ITERATE TEST ?
   1494 033314  103002                          BCC     63$                     ;BRANCH IF NOT
   1495 033316  000137  032004                  JMP     T15LOOP                 ;EXECUTE AGAIN
   1496 033322                          63$:    EXIT    TST                     ;ALL DONE THIS TEST
        033322  104432                                                                       TRAP    C$EXIT
        033324  001216                                                                       .WORD   L10047-.
   1497                                 ;+
   1498                                 ;LOCAL STORAGE FOR THIS TEST
   1499                                 ;-
   1500
   1502         033330                          .=<.+10>&177770
   1504 033330                          T15PACKET:                              ;COMMAND PACKET FOR TEST
   1505 033330  100204                          .WORD   100204                  ;WRITE CHARACTERISTICS COMMAND, WITH IE, ACK
   1506 033332  033340                          .WORD   T15DATA                 ;ADDRESS OF CHARACTERISTICS BLOCK
   1507 033334  000000                          .WORD   0
   1508 033336  000010                          .WORD   8.                      ;STARTING VALUE OF BLOCK SIZE
   1509 033340                          T15DATA:                                ;CHARACTERISTICS DATA BLOCK
   1510 033340  033352                          .WORD   T15BFR                  ;ADDRESS OF MESSAGE BUFFER
   1511 033342  000000                          .WORD   0
   1512 033344  000400                          .WORD   256.                    ;LENGTH OF MESSAGE BUFFER
   1513 033346  000000  000000                  .WORD   0,0
   1514 033352                          T15BFR: .BLKW   150.                    ;MESSAGE BUFFER
   1515                                 ;
   1516                                 ;WRITE SUBSYSTEM MEMORY COMMAND PACKET
   1517                                 ;
   1519         034030                          .=<.+10>&177770
   1521 034030                          T15PK2:
   1522 034030  100206                          .WORD   100206                  ;WRITE SUB SYS MEM COMMAND, IE AND ACK
   1523 034032  034040                          .WORD   T15BF2                  ;ADDRESS OF SELECT BLOCK DATA
   1524 034034  000000                          .WORD   0
   1525 034036  000006                          .WORD   6.                      ;SIZE OF DATA PACKET
   1526
   1527                                         .EVEN
   1528 034040                          T15BF2:
```

```
034040      000                     T15BS0: .BYTE   0                               ;BSELO AREA
034041      000                     T15BS1: .BYTE   0                               ;BSEL1 AREA
034042  000000                      T15S2:  .WORD   0                               ;SEL 2 AREA
034044  000000                      T15S3:  .WORD   0                               ;DATA AREA




                                    ;+
                                    ;LOCAL TEXT MESSAGES FOR TEST
                                    ;-

034046      127     122     111     T15SSR: .ASCIZ  'WRITE SUBSYSTEM MEMORY Command Not Accepted'
034122      127     122     111     T15AM2: .ASCIZ  'WRITE SUBSYSTEM MEMORY COMMAND Failed On All Ones Word Read Back'
034223      127     122     111     T15AM3: .ASCIZ  'WRITE SUBSYSTEM MEMORY COMMAND Failed On All Zeros Word Read Back'
034325      127     122     111     T15AM4: .ASCIZ  'WRITE SUBSYSTEM MEMORY COMMAND Failed On Address Test'
034413      122     101     115     TST15ID:        .ASCIZ  'RAM Exerciser'
                                            .EVEN
                                    ;+
                                    ;
                                    ;ROUTINE TO RESTORE COMMAND PACKET TO START-UP (DEFAULT) VALUES
                                    ;WRITE SUBSYSTEM MEMORY COMMAND
                                    ;
                                    ;-

034432                              T15REST:
034432                                      SAVREG                                  ;SAVE THE REGISTERS
034436  012701  033330                      MOV     #T15PACKET,R1                   ;START OF THE PACKET
034442  012721  100204                      MOV     #100204,(R1)+                   ;WRITE SUBSYSTEM MEM. WITH ACK, IE
034446  012721  033340                      MOV     #T15DATA,(R1)+                  ;ADDRESS OF CHARAISTICS DATA BLOCK
034452  005021                              CLR     (R1)+                           ;EXTENDED ADDRESS
034454  012721  000010                      MOV     #8.,(R1)+                       ;SIZE OF DATA BLOCK IN BYTES
034460  012721  033352                      MOV     #T15BFR,(R1)+                   ;ADDRESS OF MESSAGE BUFFER
034464  005021                              CLR     (R1)+
034466  012721  000400                      MOV     #256.,(R1)+                     ;LENGTH OF MESSAGE BUFFER
034472  005021                              CLR     (R1)+
034474  005011                              CLR     (R1)
034476  005037  033352                      CLR     T15BFR                          ;CLEAR 1ST LOC IN MESSAGE BUFFER
034502  000207                              RTS     PC                              ;RETURN


034504                              T15RT2:
034504                                      SAVREG                                  ;SAVE THE REGISTERS
034510  012701  034030                      MOV     #T15PK2,R1                      ;START OF THE PACKET
034514  012721  100206                      MOV     #100206,(R1)+                   ;WRITE SUBSYSTEM MEM. WITH ACK, IE
034520  012721  034040                      MOV     #T15BF2,(R1)+                   ;ADDRESS OF DATA BLOCK
034524  005021                              CLR     (R1)+                           ;EXTENDED ADDRESS
034526  012721  000006                      MOV     #6.,(R1)+                       ;SIZE OF DATA BLOCK IN BYTES
034532  005021                              CLR     (R1)+
034534  005021                              CLR     (R1)+
034536  005011                              CLR     (R1)
034540  000207                              RTS     PC                              ;RETURN
034542                                      ENDTST
034542                                                                                      L10047:
034542  104401                                                                                      TRAP    C$ETST
```

```
                                                .SBTTL  TEST  5: EXTENDED FEATURES SWITCH AND TIMERS A,B
                                        ;++
                                        ; TEST DESCRIPTION:
                                        ;
                                        ;       This test verifies the Invert Extended Features function
                                        ;       can logically invert the Extended features switch and
                                        ;       that the internal timers A and B operate correctly.
                                        ;
                                        ; TEST STEPS:
                                        ;
                                        ;  REPEAT FOR LOOPCNT
                                        ;    BEGIN
                                        ;       Do Subtest 1    - Verify Extended Features Switch
                                        ;       Do Subtest 2    - Verify Timers A,B
                                        ;    END
                                        ;--


 034544                                         BGNTST
 034544                                                                                 T5::
 034544  012700  036622                         MOV     #TST16ID,R0             ;ASCII MESSAGE TO IDENTIFY TEST
 034550  004737  016510                         JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
 034554  012737  000012  002216                 MOV     #10.,LOOPCNT            ;PERFORM 10 ITERATIONS
 034562                                 T16LOOP:

                                                .SBTTL  TEST  5: SUBTEST 1: VERIFY EXTENDED FEATURES TEST

                                        ;++
                                        ; TEST 5: SUBTEST 1:
                                        ;
                                        ; SUBTEST DESCRIPTION:
                                        ;
                                        ;       This subtest verifies that the Invert Sense of Extended features
                                        ;       Switch function (Write Subsystem Memory,Write Misc command)
                                        ;       operates properly.
                                        ;       First the state of the Extended Features switch is read in the
                                        ;       message packet supplied by the write characteristics command.
                                        ;       Then, the sense of the switch is logically inverted.
                                        ;       A Write characteristics command is executed and it is verified
                                        ;       that the Extended status register (XST4) is returned when
                                        ;       in Extended mode, and not returned if not in extended mode.
                                        ;       The subtest also verifies that specifying a Message Buffer
                                        ;       address with any of bits 21-19 ,set will cause the command to
                                        ;       be rejected.
                                        ;
                                        ; TEST STEPS:
                                        ;
                                        ;
                                        ; BEGIN
                                        ;       Write to TSSR register to soft initialize the controller
                                        ;       Do WRITE CHARACTERISTICS to check for Extended Features Switch
                                        ;       IF Extended Features Hardware Switch CLEAR
                                        ;       THEN
                                        ;         (* Verify Extended Features switch can be Inverted to SET *)
                                        ;         Do Write Subsystem Write Miscellaneous to SET Extended Features.
                                        ;         DO a WRITE CHARACTERISTICS with an extended characteristic word
                                        ;         Compare the controller ram to the extended characteristic word
```

```
                                ;               If Data word in controller ram NOT= to word sent  Then Print Error
                                ;               If Message Buffer Data Length NOT= 12.  Then Print Error
                                ;             ELSE
                                ;               (* Verify Extended Features switch can be Inverted to CLEAR *)
                                ;               Do Write Subsystem Write Miscellaneous to CLEAR Extended Features.
                                ;               Do a WRITE CHARACTERISTICS without an extended characteristic word
                                ;               If Message Buffer Data Length NOT= 10.  Then Print Error
                                ;             END-IF
                                ;             (* Verify Function Reject when Message Buffer 21-19 are non-zero *)
                                ;             Write to TSSR register to soft initialize the controller
                                ;             REPEAT FOR MESSAGE BUFFER ADDRESS bits <21:19> FROM 0 TO 7
                                ;              DO a WRITE CHARACTERISTICS with a message address bit<21:19> non-zero
                                ;              If TSSR termination code NOT= Function Reject  Then Print Error
                                ;             END-REPEAT
                                ; END
                                ;--
034562                                        BGNSUB                            ;///////////// BEGIN SUBTEST //////////
034562                                                                                   T5.1:
034562  104402                                                                                          TRAP    C$BSUB


034564                          5$:
                                ;             Write to TSSR register to soft initialize the controller
034564  004737  015774                        JSR     PC,SOFINIT                ;WRITE TO TSSR TO SOFT INITIALIZE
034570  103405                                BCS     10$                       ;BR IF SOFT INIT OKAY
034572  010001                                MOV     R0,R1                     ;SAVE CONTENTS OF TSSR
034574                                        ERRDF   ERRNO,SFIERR,SFIMSG       ;DEVICE FATAL DURING INIT
034574  104455                                                                                          TRAP    C$ERDF
034576  000764                                                                                          .WORD   500
034600  003652                                                                                          .WORD   SFIERR
034602  012034                                                                                          .WORD   SFIMSG
                                ;             Do WRITE CHARACTERISTICS to check for Extended Features Switch
034604  004737  037770          10$:          JSR     PC,T16REST                ;RESTORE PACKET DEFAULTS
034610  005037  002222                        CLR     FATFLG                    ;CLEAR FATAL ERROR FLAG
034614  012704  040150                        MOV     #T16PACKET,R4             ;GET THE ADDRESS OF COMMAND PACKET
034620  004737  010662                        JSR     PC,WRTCHR                 ;DO WRITE CHARACTERISTICS COMMAND
034624                                        FORCERROR       12$                       ;88DFORCE ERROR IF FORCER=1
034640  103407                                BCS     15$                       ;BR IF CARRY SET (GOOD RETURN)
034642  010001                                MOV     R0,R1                     ;SAVE CONTENTS OF TSSR
034644                                        NEXT.ERRNG
034644                          12$:          ERRDF   ERRNO,T16SSR,PKTSSR       ;DEVICE FATAL SSR FAILED TO SET
034644  104455                                                                                          TRAP    C$ERDF
034646  000765                                                                                          .WORD   501
034650  036672                                                                                          .WORD   T16SSR
034652  012046                                                                                          .WORD   PKTSSR
034654  005237  002222                        INC     FATFLG                    ;SET FATAL ERROR FLAG
034660                          15$:          CKLOOP                            ;LOOP ON ERROR, IF FLAG SET
034660  104406                                                                                          TRAP    C$CLP1

                                ;             If Extended Features Hardware Switch Clear then:
                                ;               (* Verify Extended Features switch can be Inverted to SET *)
                                ;               REPEAT FOR TEST PATTERNS IN TSTBLK TABLE
034662  012701  040172                        MOV     #T16BFR,R1                ;MESSAGE BUFFER ADDRESS
034666  032761  000200  000012                BIT     #X2.EXTF,XST2(R1)         ;EXTENDED FEATURES SWITCH CLEAR?
034674  001402                                BEQ     20$                       ;BR IF YES
034676  000137  035246                        JMP     200$                      ;
034702  012703  002764          20$:          MOV     #TSTBLK+10.,R3            ;START OF TEST DATA
```

```
 1689                                       ;       Do Write Subsystem Write Miscellaneous to SET Extended Features.
 1690
 1691 034706  004737  040130                        JSR     PC,T16SEXT                  ;SETUP PACKET FOR WRITE MISC INVERT
 1692 034712  012704  040220                        MOV     #T16PK2,R4                  ;GET WRITE SUBSYSTEM COMMAND PACKET
 1693 034716  010465  000000                        MOV     R4,TSDB(R5)                 ;SET THE PACKET ADDRESS TO EXECUTE
 1694 034722  004737  016336                        JSR     PC,CHKTSSR                  ;WAIT FOR SSR TO SET
 1695 034726                                        FORCERROR       32$                         ;@@DFORCE ERROR IF FORCER=1
 1696 034742  103407                                BCS     40$                         ;BR IF CARRY SET (GOOD RETURN)
 1697 034744  010001                                MOV     R0,R1                       ;SAVE CONTENTS OF TSSR
 1698 034746                                        NEXT.ERRNO
 1699 034746                                32$:    ERRDF   ERRNO,T162SSR,PKTSSR        ;DEVICE FATAL SSR FAILED TO SET
      034746  104455                                                                                    TRAP    C$ERDF
      034750  000766                                                                                    .WORD   502
      034752  036727                                                                                    .WORD   T162SSR
      034754  012046                                                                                    .WORD   PKTSSR
 1700 034756  005237  002222                        INC     FATFLG                      ;SET FATAL ERROR FLAG
 1701 034762                                40$:    CKLOOP                              ;LOOP ON ERROR, IF FLAG SET
      034762  104406                                                                                    TRAP    C$CLP1
 1702
 1703                                       ;         DO a WRITE CHARACTERISTICS with an extended characteristic word
 1704 034764  012737  125252  002312                MOV     #125252,DATA                ;SETUP TEST DATA FOR EXTENDED WORD
 1705 034772  012704  040150                        MOV     #T16PACKET,R4               ;GET THE ADDRESS OF COMMAND PACKET
 1706 034776  012764  000020  000006                MOV     #16.,PKBCNT(R4)             ;STORE MESSAGE PACKET SIZE
 1707 035004  013737  002312  040170                MOV     DATA,T16DATA+10             ;STORE TEST DATA IN EXTENDED WORD
 1708 035012  004737  010662                        JSR     PC,WRTCHR                   ;DO WRITE CHARACTERISTICS COMMAND
 1709 035016                                        FORCERROR       42$                         ;@@DFORCE ERROR IF FORCER=1
 1710 035032  103407                                BCS     50$                         ;BR IF CARRY SET (GOOD RETURN)
 1711 035034  010001                                MOV     R0,R1                       ;SAVE CONTENTS OF TSSR
 1712 035036                                        NEXT.ERRNO
 1713 035036                                42$:    ERRDF   ERRNO,T16SSR,PKTSSR         ;DEVICE FATAL SSR FAILED TO SET
      035036  104455                                                                                    TRAP    C$ERDF
      035040  000767                                                                                    .WORD   503
      035042  036672                                                                                    .WORD   T16SSR
      035044  012046                                                                                    .WORD   PKTSSR
 1714 035046  005237  002222                        INC     FATFLG                      ;SET FATAL ERROR FLAG
 1715 035052                                50$:    CKLOOP                              ;LOOP ON ERROR, IF FLAG SET
      035052  104406                                                                                    TRAP    C$CLP1
 1716                                       ;         If the TSBA Address Register NOT= Expected  Then Print Error
 1717 035054  016501  000000                        MOV     TSBA(R5),R1                 ;GET TSBA REGISTER CONTENTS
 1718 035060  012702  040172                        MOV     #T16BFR,R2                  ;START OF THE DATA BUFFER
 1719 035064  062702  000020                62$:    ADD     #16.,R2                     ;EXPECTED CONTENTS OF TSBA
 1720 035070                                        FORCERROR       72$,NOTSSR                  ;@@DFORCE ERROR IF FORCER=1
 1721 035100  020102                                CMP     R1,R2                       ;COMPARE EXPECTED TO RECEIVED
 1722 035102  001404                                BEQ     80$                         ;ERROR IF NOT EQUAL
 1723 035104                                        NEXT.ERRNO
 1724 035104                                72$:    ERRHRD  ERRNO,T16TSBA,EXPREC        ;PRINT THE ERROR & EXPD/RECV
      035104  104456                                                                                    TRAP    C$ERHRD
      035106  000770                                                                                    .WORD   504
      035110  037040                                                                                    .WORD   T16TSBA
      035112  015474                                                                                    .WORD   EXPREC
 1725 035114                                80$:    CKLOOP                              ;LOOP ON ERROR, IF FLAG SET
      035114  104406                                                                                    TRAP    C$CLP1
 1726                                       ;         Compare the controller ram to the extended characteristic word
 1727                                       ;         If Data word in controller ram NOT= to word sent  Then Print Error
 1728 035116  012704  040160                        MOV     #T16DATA,R4                 ;GET CHARACTERISTIC DATA ADDRESS
 1729 035122  004737  011224                        JSR     PC,CKRAM2                   ;DOES RAM DATA EQUAL DATA SENT?
 1730 035126                                        FORCERROR       92$                         ;@@DFORCE ERROR IF FORCER=1
```

```
1731 035142  103404                          BCS     100$                     ;BR IF YES
1732 035144                                  NEXT.ERRNO
1733 035144                          92$:    ERRHRD  ERRNO,PKTRAM,RAMERR      ;REPORT THE RAM ERROR(S)
     035144  104456                                                                                   TRAP    C$ERHRD
     035146  000771                                                                                   .WORD   505
     035150  004745                                                                                   .WORD   PKTRAM
     035152  015510                                                                                   .WORD   RAMERR
1734 035154                          100$:   CKLOOP                           ;LOOP ON ERROR, IF FLAG SET
     035154  104406                                                                                   TRAP    C$CLP1
1735                                 ;         If Message Buffer Data Length NOT= 12.  Then Print Error
1736 035156  012702  040172                  MOV     #T16BFR,R2               ;GET MESSAGE BUFFER ADDRESS
1737 035162  016201  000002                  MOV     2(R2),R1                 ;GET RECV DATA FIELD LENGTH
1738 035166  012702  000014                  MOV     #12.,R2                  ;GET EXPD DATA FIELD LENGTH
1739 035172                                  FORCERROR       112$,NOTSSR              ;@@DFORCE ERROR IF FORCER=1
1740 035202  020102                          CMP     R1,R2                    ;COMPARE EXPECTED TO RECEIVED
1741 035204  001404                          BEQ     120$                     ;ERROR IF NOT EQUAL
1742 035206                                  NEXT.ERRNO
1743 035206                          112$:   ERRHRD  ERRNO,T16LEN,EXPREC      ;PRINT THE ERROR & EXPD/RECV
     035206  104456                                                                                   TRAP    C$ERHRD
     035210  000772                                                                                   .WORD   506
     035212  037142                                                                                   .WORD   T16LEN
     035214  015474                                                                                   .WORD   EXPREC
1744 035216                          120$:   CKLOOP                           ;LOOP ON ERROR, IF FLAG SET
     035216  104406                                                                                   TRAP    C$CLP1
1745
1746 035220  004737  015774                  JSR     PC,SOFINIT               ;WRITE TO TSSR TO SOFT INITIALIZE
1747 035224  103405                          BCS     125$                     ;BR IF SOFT INIT OKAY
1748 035226  010001                          MOV     R0,R1                    ;SAVE CONTENTS OF TSSR
1749 035230                                  ERRDF   ERRNO,SFIERR,SFIMSG      ;DEVICE FATAL DURING INIT
     035230  104455                                                                                   TRAP    C$ERDF
     035232  000772                                                                                   .WORD   506
     035234  003652                                                                                   .WORD   SFIERR
     035236  012034                                                                                   .WORD   SFIMSG
1750 035240                          125$:   CKLOOP                           ;LOOP IF SELECTED
     035240  104406                                                                                   TRAP    C$CLP1
1751 035242  000137  035426                  JMP     300$                     ;
1752
1753                                 ;    (* Verify Extended Features switch can be Inverted to CLEAR *)
1754 035246                          200$:
1755                                 ;       Do Write Subsystem Write Miscellaneous to CLEAR Extended Features.
1756 035246  004737  040130                  JSR     PC,T16SEXT               ;SETUP PACKET FOR WRITE MISC INVERT
1757 035252  012704  040220                  MOV     #T16PK2,R4               ;GET WRITE SUBSYSTEM COMMAND PACKET
1758 035256  010465  000000                  MOV     R4,TSDB(R5)              ;SET THE PACKET ADDRESS TO EXECUTE
1759 035262  004737  016336                  JSR     PC,CHKTSSR               ;WAIT FOR SSR TO SET
1760 035266                                  FORCERROR       232$                     ;@@DFORCE ERROR IF FORCER=1
1761 035302  103407                          BCS     240$                     ;BR IF CARRY SET (GOOD RETURN)
1762 035304  010001                          MOV     R0,R1                    ;SAVE CONTENTS OF TSSR
1763 035306                                  NEXT.ERRNO
1764 035306                          232$:   ERRDF   ERRNO,T162SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
     035306  104455                                                                                   TRAP    C$ERDF
     035310  000773                                                                                   .WORD   507
     035312  036727                                                                                   .WORD   T162SSR
     035314  012046                                                                                   .WORD   PKTSSR
1765 035316  005237  002222                  INC     FATFLG                   ;SET FATAL ERROR FLAG
1766 035322                          240$:   CKLOOP                           ;LOOP ON ERROR, IF FLAG SET
     035322  104406                                                                                   TRAP    C$CLP1
1767
```

```
                                      ;          DO a WRITE CHARACTERISTICS without an extended characteristic word
 035324  012704  040150                          MOV     #T16PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
 035330  012764  000016  000006                  MOV     #14.,PKBCNT(R4)         ;STORE MESSAGE PACKET SIZE
 035336  004737  010662                          JSR     PC,WRTCHR               ;DO WRITE CHARACTERISTICS COMMAND
 035342                                          FORCERROR        242$                     ;@@DFORCE ERROR IF FORCER=1
 035356  103407                                  BCS     250$                    ;BR IF CARRY SET (GOOD RETURN)
 035360  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 035362                                          NEXT.ERRNO
 035362                               242$:      ERRDF   ERRNO,T16SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
 035362  104455                                                                                            TRAP    C$ERDF
 035364  000774                                                                                            .WORD   508
 035366  036672                                                                                            .WORD   T16SSR
 035370  012046                                                                                            .WORD   PKTSSR
 035372  005237  002222                          INC     FATFLG                  ;SET FATAL ERROR FLAG
 035376                               250$:      CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
 035376  104406                                                                                            TRAP    C$CLP1
                                      ;          If Message Buffer Data Length NOT= 10.  Then Print Error
 035400  013701  040174                          MOV     T16BFR+2,R1             ;GET RECV DATA FIELD LENGTH
 035404  012702  000012                          MOV     #10.,R2                 ;GET EXPD DATA FIELD LENGTH
 035410  020102                                  CMP     R1,R2                   ;COMPARE EXPECTED TO RECEIVED
 035412  001404                                  BEQ     270$                    ;ERROR IF NOT EQUAL
 035414                                          NEXT.ERRNO
 035414                               262$:      ERRHRD  ERRNO,T16LEN,EXPREC     ;PRINT THE ERROR & EXPD/RECV
 035414  104456                                                                                            TRAP    C$ERHRD
 035416  000775                                                                                            .WORD   509
 035420  037142                                                                                            .WORD   T16LEN
 035422  015474                                                                                            .WORD   EXPREC
 035424                               270$:      CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
 035424  104406                                                                                            TRAP    C$CLP1


                                      ;          (* Verify Function Reject when Message Buffer 21-19 are non-zero *)
                                      ;          Write to TSSR register to soft initialize the controller
 035426                               300$:
                                      ;          REPEAT FOR MESSAGE BUFFER ADDRESS bits <21:19> FROM 0 TO 7
 035426  012737  000001  002312       320$:      MOV     #1,DATA                 ;START AT BITS<21:19>=001
                                      ;          DO a WRITE CHARACTERISTICS with a message address bit<21:19> non-zero
 035434                               325$:
 035434  012704  040150                          MOV     #T16PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
 035440  012764  000016  000006                  MOV     #14.,PKBCNT(R4)         ;STORE MESSAGE PACKET SIZE
 035446  013700  002312                          MOV     DATA,R0                 ;GET TEST DATA
         000003                                  .REPT   3
                                                 ASL     R0                      ;SHIFT INTO BITS 21:19
                                                 .ENDR
 035460  010037  040162                          MOV     R0,T16DATA+2            ;STORE BUFFER ADDRESS BITS 21:19
 035464  010465  000000                          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
 035470  004737  016250                          JSR     PC,WAITF                ;WAIT FOR SSR
 035474                                          FORCERROR        342$                     ;@@DFORCE ERROR IF FORCER=1
 035510  103407                                  BCS     350$                    ;BR IF CARRY SET (GOOD RETURN)
 035512  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 035514                                          NEXT.ERRNO
 035514                               342$:      ERRDF   ERRNO,T16SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
 035514  104455                                                                                            TRAP    C$ERDF
 035516  000776                                                                                            .WORD   510
 035520  036672                                                                                            .WORD   T16SSR
 035522  012046                                                                                            .WORD   PKTSSR
 035524  005237  002222                          INC     FATFLG                  ;SET FATAL ERROR FLAG
```

```
035530                          350$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
035530  104406                                                                  TRAP    C$CLP1

                                ;       If TSSR termination code NOT= Function Reject  Then Print Error
035532  016501  000002                  MOV     TSSR(R5),R1             ;GET RECV TSSR
035536  010102                          MOV     R1,R2                   ;COPY RECV TSSR
035540  042702  000016                  BIC     #TERCLS,R2              ;CLEAR TC<2:0> EXPD
035544  052702  000006                  BIS     #TSREJ,R2               ;SET EXPD TC<2:0>= FUNCTION REJECT
035550                                  FORCERROR       352$,NOTSSR             ;@@FORCE ERROR IF FORCER=1
035560  020102                          CMP     R1,R2                   ;EXPD EQUAL RECV?
035562  001404                          BEQ     360$                    ;BR IF YES
035564                                  NEXT.ERRNO
035564                          352$:   ERRHRD  ERRNO,T16REJ,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
035564  104456                                                                  TRAP    C$ERHRD
035566  000777                                                                  .WORD   511
035570  037254                                                                  .WORD   T16REJ
035572  012046                                                                  .WORD   PKTSSR
035574                          360$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
035574  104406                                                                  TRAP    C$CLP1
035576                                  FORCEXIT        370$
035606  005237  002312                  INC     DATA                    ;GET NEXT TST PATTERN
035612  023727  002312  000007          CMP     DATA,#7                 ;DONE ALL DATA?
035620  101002                          BHI     370$                    ;BR IF YES
035622  000137  035434                  JMP     325$                    ;DO ANOTHER TEST PATTERN
                                ;       END-REPEAT
035626                          370$:
035626                                  ENDSUB                          ;///////////// END SUBTEST //////////
035626                                                                          L10054:
035626  104403                                                                  TRAP    C$ESUB

035630  005737  002222                  TST     FATFLG                  ;ANY FATAL ERRORS ?
035634  001402                          BEQ     460$                    ;BRANCH IF NOT
035636  004737  017202                  JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
035642                          460$:





                                        .SBTTL  TEST  5: SUBTEST 2: VERIFY TIMERS A,B

                                ;++
                                ; TEST 5: SUBTEST 2:
                                ;
                                ; SUBTEST DESCRIPTION:
                                ;
                                ;       This subtest verifies that timers A,B can be reset
                                ;       and that Timer A is twice the frequency of Timer B.
                                ;       Timer A has a period of 25 microseconds and Timer B
                                ;       has a period of 50 microseconds. The timers are
                                ;       checked at 1, 28, 53, and 78 micoseconds.
                                ;
                                ; TEST STEPS:
                                ;
                                ;
                                ;       Write to TSSR register to soft initialize the controller
                                ;       Do WRITE CHARACTERISTICS to setup a Message Buffer
                                ;       (* Verify Timers A,B after RESET TIMER with 0 microsecond delay *)
                                ;       Do a Write Control RESET TIMER with 1 microsecond delay
                                ;       Do a Write Subsystem READ STATUS
                                ;       If Timer A NOT= 0  Then Print Error
                                ;       If Timer B NOT= 0  Then Print Error
                                ;       (* Verify Timers A,B after RESET TIMER with 28 microsecond delay *)
                                ;       Do a Write Control RESET TIMER with 28 microsecond delay
                                ;       If Timer A NOT= 1  Then Print Error
                                ;       If Timer B NOT= 1  Then Print Error
                                ;       Do a Write Control RESET TIMER with 53 microsecond delay
                                ;       If Timer A NOT= 0  Then Print Error
                                ;       If Timer B NOT= 1  Then Print Error
                                ;       Do a Write Control RESET TIMER with 78 microsecond delay
                                ;       If Timer A NOT= 1  Then Print Error
                                ;       If Timer B NOT= 0  Then Print Error
                                ;--
035642                                  BGNSUB                          ;////////////// BEGIN SUBTEST //////////
035642                                                                                          T5.2:
035642  104402                                                                                  TRAP    C$BSUB
                                ;       Write to TSSR register to soft initialize the controller
035644                          5$:
035644  004737  015774                  JSR     PC,SOFINIT              ;WRITE TO TSSR TO SOFT INITIALIZE
035650  103405                          BCS     10$                     ;BR IF SOFT INIT OKAY
035652  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
035654                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL DURING INIT
035654  104455                                                                                  TRAP    C$ERDF
035656  000777                                                                                  .WORD   511
035660  003652                                                                                  .WORD   SFIERR
035662  012034                                                                                  .WORD   SFIMSG
                                ;       Do WRITE CHARACTERISTICS to setup a Message Buffer
035664  004737  037770          10$:    JSR     PC,T16REST              ;RESTORE PACKET DEFAULTS
035670  005037  002222                  CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
035674  012704  040150                  MOV     #T16PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
035700  012764  000010  000006          MOV     #8.,PKBCNT(R4)          ;MESSAGE PACKET SIZE NO EXTEND
035706  004737  010662                  JSR     PC,WRTCHR               ;DO WRITE CHARACTERISTICS COMMAND
035712                                  FORCERROR       12$                         ;@@DFORCE ERROR IF FORCER=1
035726  103407                          BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
035730  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
035732                                  NEXT.ERRNO
035732                          12$:    ERRDF   ERRNO,T16SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
035732  104455                                                                                  TRAP    C$ERDF
035734  001000                                                                                  .WORD   512
035736  036672                                                                                  .WORD   T16SSR
035740  012046                                                                                  .WORD   PKTSSR
035742  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
035746                          15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
035746  104406                                                                                  TRAP    C$CLP1

                                ;       (* Verify Timers A,B after RESET TIMER with 1 microsecond delay *)
                                ;       Do a Write Control RESET TIMER with 1 microsecond delay
035750  012700  000001                  MOV     #MS.RSD,R0              ;RESET TIMER COMMAND
035754  013701  036612                  MOV     T16D01,R1               ;1 MICROSECOND DELAY
035760  004737  040102                  JSR     PC,T16WMISC             ;SETUP T16PK2 COMMAND PACKET
035764  012704  040220                  MOV     #T16PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
035770  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
035774  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
036000                                  FORCERROR       32$                         ;@@DFORCE ERROR IF FORCER=1
```

```
036014  103407                          BCS     40$                     ;BR IF CARRY SET (GOOD RETURN)
036016  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
036020                                  NEXT.ERRNO
036020                          32$:    ERRDF   ERRNO,T162SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
036020  104455                                                                                  TRAP    C$ERDF
036022  001001                                                                                  .WORD   513
036024  036727                                                                                  .WORD   T162SSR
036026  012046                                                                                  .WORD   PKTSSR
036030  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
036034                          40$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
036034  104406                                                                                  TRAP    C$CLP1
                                ;       If Timer A NOT= 0  Then Print Error
                                ;       If Timer B NOT= 0  Then Print Error
036036  005002                          CLR     R2                      ;INIT EXPD
036040  042702  000010                  BIC     #S2.ATIM,R2             ;TIMER A EXPD=0
036044  042702  000004                  BIC     #S2.BTIM,R2             ;TIMER B EXPD=0
036050  012700  040212                  MOV     #T16BFSTA,R0            ;GET RECV READ STATUS
036054  016001  000002                  MOV     2(R0),R1                ;GET RECV BYTE 2
036060  042701  177763                  BIC     #↑C<S2.ATIM!S2.BTIM>,R1 ;SAVE TIMER A:B RECV ONLY
036064                                  FORCERROR       72$,NOTSSR      ;@@D
036074  020201                          CMP     R2,R1                   ;EXPD EQUAL RECV?
036076  001404                          BEQ     80$                     ;BR IF YES
036100                                  NEXT.ERRNO
036100                          72$:    ERRHRD  ERRNO,T16T01,TIMEXP     ;REPORT ERROR
036100  104456                                                                                  TRAP    C$ERHRD
036102  001002                                                                                  .WORD   514
036104  037371                                                                                  .WORD   T16T01
036106  015552                                                                                  .WORD   TIMEXP
036110                          80$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
036110  104406                                                                                  TRAP    C$CLP1

                                ;       Do a Write Control RESET TIMER with 28 microsecond delay
036112  012700  000001                  MOV     #MS.RSD,R0              ;RESET TIMER COMMAND
036116  013701  036614                  MOV     T16D28,R1               ;28 MICROSECOND DELAY
036122  004737  040102                  JSR     PC,T16WMISC             ;SETUP T16PK2 COMMAND PACKET
036126  012704  040220                  MOV     #T16PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
036132  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
036136  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
036142                                  FORCERROR       112$                    ;@@DFORCE ERHOR IF FORCER=1
036156  103407                          BCS     120$                    ;BR IF CARRY SET (GOOD RETURN)
036160  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
036162                                  NEXT.ERRNO
036162                          112$:   ERRDF   ERRNO,T162SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
036162  104455                                                                                  TRAP    C$ERDF
036164  001003                                                                                  .WORD   515
036166  036727                                                                                  .WORD   T162SSR
036170  012046                                                                                  .WORD   PKTSSR
036172  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
036176                          120$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
036176  104406                                                                                  TRAP    C$CLP1
                                ;       If Timer A NOT= 1  Then Print Error
                                ;       If Timer B NOT= 1  Then Print Error
036200  005002                          CLR     R2                      ;INIT EXPD
036202  052702  000010                  BIS     #S2.ATIM,R2             ;TIMER A EXPD=1
036206  052702  000004                  BIS     #S2.BTIM,R2             ;TIMER B EXPD=1
036212  012700  040212                  MOV     #T16BFSTA,R0            ;GET RECV READ STATUS
036216  016001  000002                  MOV     2(R0),R1                ;GET RECV BYTE 2
```

```
     036222  042701  177763                    BIC     #^C<S2.ATIM!S2.BTIM>,R1 ;SAVE TIMER A:B RECV ONLY
     036226                                    FORCERROR        172$,NOTSSR    ;BAD
     036236  020201                            CMP     R2,R1                   ;EXPD EQUAL RECV?
     036240  001404                            BEQ     180$                    ;BR IF YES
     036242                                    NEXT,ERRNO
     036242                            172$:   ERRHRD  ERRNO,T16T28,TIMEXP     ;REPORT ERROR
     036242  104456                                                                                TRAP    C$ERHRD
     036244  001004                                                                                .WORD   516
     036246  037470                                                                                .WORD   T16T28
     036250  015552                                                                                .WORD   TIMEXP
     036252                            180$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     036252  104406                                                                                TRAP    C$CLP1

                                       ;       Do a Write Control RESET TIMER with 53 microsecond delay
     036254  012700  000001                    MOV     #MS.RSD,R0              ;RESET TIMER COMMAND
     036260  013701  036616                    MOV     T16D53,R1               ;53 MICROSECOND DELAY
     036264  004737  040102                    JSR     PC,T16WMISC             ;SETUP T16PK2 COMMAND PACKET
     036270  012704  040220                    MOV     #T16PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
     036274  010465  000000                    MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
     036300  004737  016336                    JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
     036304                                    FORCERROR        212$                 ;BADFORCE ERROR IF FORCER=1
     036320  103407                            BCS     220$                    ;BR IF CARRY SET (GOOD RETURN)
     036322  010001                            MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
     036324                                    NEXT,ERRNO
     036324                            212$:   ERRDF   ERRNO,T162SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
     036324  104455                                                                                TRAP    C$ERDF
     036326  001005                                                                                .WORD   517
     036330  036727                                                                                .WORD   T162SSR
     036332  012046                                                                                .WORD   PKTSSR
     036334  005237  002222                    INC     FATFLG                  ;SET FATAL ERROR FLAG
     036340                            220$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     036340  104406                                                                                TRAP    C$CLP1
                                       ;       If Timer A NOT= 0  Then Print Error
                                       ;       If Timer B NOT= 1  Then Print Error
     036342  005002                            CLR     R2                      ;INIT EXPD
     036344  042702  000010                    BIC     #S2.ATIM,R2             ;TIMER A EXPD=0
     036350  052702  000004                    BIS     #S2.BTIM,R2             ;TIMER B EXPD=1
     036354  012700  040212                    MOV     #T16BFSTA,R0            ;GET RECV READ STATUS
     036360  016001  000002                    MOV     2(R0),R1                ;GET RECV BYTE 2
     036364  042701  177763                    BIC     #^C<S2.ATIM!S2.BTIM>,R1 ;SAVE TIMER A:B RECV ONLY
     036370                                    FORCERROR        272$,NOTSSR    ;BAD
     036400  020201                            CMP     R2,R1                   ;EXPD EQUAL RECV?
     036402  001404                            BEQ     280$                    ;BR IF YES
     036404                                    NEXT,ERRNO
     036404                            272$:   ERRHRD  ERRNO,T16T53,TIMEXP     ;REPORT ERROR
     036404  104456                                                                                TRAP    C$ERHRD
     036406  001006                                                                                .WORD   518
     036410  037570                                                                                .WORD   T16T53
     036412  015552                                                                                .WORD   TIMEXP
     036414                            280$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     036414  104406                                                                                TRAP    C$CLP1
                                       ;       Do a Write Control RESET TIMER with 78 microsecond delay
     036416  012700  000001                    MOV     #MS.RSD,R0              ;RESET TIMER COMMAND
     036422  013701  036620                    MOV     T16D78,R1               ;78 MICROSECOND DELAY
     036426  004737  040102                    JSR     PC,T16WMISC             ;SETUP T16PK2 COMMAND PACKET
     036432  012704  040220                    MOV     #T16PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
     036436  010465  000000                    MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
```

```
036442  004737  016336                    JSR     PC,CHKTSSR                  ;WAIT FOR SSR TO SET
036446                                    FORCERROR       312$                        ;BBDFORCE ERROR IF FORCER=1
036462  103407                            BCS     320$                        ;BR IF CARRY SET (GOOD RETURN)
036464  010001                            MOV     R0,R1                       ;SAVE CONTENTS OF TSSR
036466                                    NEXT.ERRNO
036466                          312$:     ERRDF   ERRNO,T162SSR,PKTSSR        ;DEVICE FATAL SSR FAILED TO SET
036466  104455                                                                                    TRAP    C$ERDF
036470  001007                                                                                    .WORD   519
036472  036727                                                                                    .WORD   T162SSR
036474  012046                                                                                    .WORD   PKTSSR
036476  005237  002222                    INC     FATFLG                      ;SET FATAL ERROR FLAG
036502                          320$:     CKLOOP                              ;LOOP ON ERROR, IF FLAG SET
036502  104406                                                                                    TRAP    C$CLP1
                                ;         If Timer A NOT= 1  Then Print Error
                                ;         If Timer B NOT= 0  Then Print Error
036504  005002                            CLR     R2                          ;INIT EXPD
036506  052702  000010                    BIS     #S2.ATIM,R2                 ;TIMER A EXPD=1
036512  042702  000004                    BIC     #S2.BTIM,R2                 ;TIMER B EXPD=0
036516  012700  040212                    MOV     #T16BFSTA,R0                ;GET RECV READ STATUS
036522  016001  000002                    MOV     2(R0),R1                    ;GET RECV BYTE 2
036526  042701  177763                    BIC     #↑C<S2.ATIM!S2.BTIM>,R1     ;SAVE TIMER A:B RECV ONLY
036532                                    FORCERROR       372$,NOTSSR         ;BBD
036542  020201                            CMP     R2,R1                       ;EXPD EQUAL RECV?
036544  001404                            BEQ     380$                        ;BR IF YES
036546                                    NEXT.ERRNO
036546                          372$:     ERRHRD  ERRNO,T16T78,TIMEXP         ;REPORT ERROR
036546  104456                                                                                    TRAP    C$ERHRD
036550  001010                                                                                    .WORD   520
036552  037670                                                                                    .WORD   T16T78
036554  015552                                                                                    .WORD   TIMEXP
036556                          380$:     CKLOOP                              ;LOOP ON ERROR, IF FLAG SET
036556  104406                                                                                    TRAP    C$CLP1

036560                                    ENDSUB                              ;///////////// END SUBTEST //////////
036560                                                                                    L10055:
036560  104403                                                                                    TRAP    C$ESUB

036562  005737  002222                    TST     FATFLG                      ;ANY FATAL ERRORS ?
036566  001402                            BEQ     460$                        ;BRANCH IF NOT
036570  004737  017202                    JSR     PC,CKDROP                   ;TRY TO DROP THE UNIT
036574  004737  016456          460$:     JSR     PC,TSTLOOP                  ;SHOULD WE DO ITERATIONS?
036600  103002                            BCC     465$                        ;BR IF NO
036602  000137  034562                    JMP     T16LOOP                     ;LOOP UNTIL ITERATIONS DONE
036606                          465$:


036606                                    EXIT    TST                         ;////////// EXIT TEST //////////
036606  104432                                                                                    TRAP    C$EXIT
036610  001524                                                                                    .WORD   L10053-.


                                ;+
                                ;LOCAL STORAGE FOR THIS TEST
                                ;-
036612  000001                  T16D01:           .WORD   1                   ;1 MICROSECOND DELAY (ACTUALLY .8 MIC)
036614  000040                  T16D28:           .WORD   40                  ;28 MICROSECOND DELAY (.8 MICROS PER)
036616  000076                  T16053:           .WORD   76                  ;53 MICROSECOND
```

```
036620  000142                          T16D78:         .WORD   142             ;78 MICROSECOND
                                        ;+
                                        ;LOCAL TEXT MESSAGES FOR TEST
                                        ;-

036622     105       170       164      TST16ID:        .ASCIZ  'Extended Features Switch and Timers A,B'
036672     127       122       111      T16SSR: .ASCIZ  'WRITE CHARACTERISTICS Failed'
036727     127       122       111      T162SSR:.ASCIZ  'WRITE SUBSYSTEM (Write Misc) Failed'
036773     127       122       111      T163SSR:.ASCIZ  'WRITE SUBSYSTEM (Read Status) Failed'
037040     102       165       163      T16TSBA:.ASCIZ  'Bus Address Register (TSBA) Incorrect after Write Characteristics'
037142     104       141       164      T16LEN:.ASCIZ   'Data Field Length in Message Buffer Incorrect after Write Characteristics'
037254     124       123       123      T16REJ:.ASCIZ   'TSSR Function Reject Not Returned When Non-Existent Buffer Address Specifie
d'
037371     124       151       155      T16T01:.ASCIZ   'Timer A,B Incorrect after Reset Timer with 1 microsecond Delay'
037470     124       151       155      T16T28:.ASCIZ   'Timer A,B Incorrect after Reset Timer with 28 microsecond Delay'
037570     124       151       155      T16T53:.ASCIZ   'Timer A,B Incorrect after Reset Timer with 53 microsecond Delay'
037670     124       151       155      T16T78:.ASCIZ   'Timer A,B Incorrect after Reset Timer with 78 microsecond Delay'
                                                .EVEN


                                        ;+
                                        ; SET DEFAULT PACKET
                                        ;-
037770                                  T16REST:
037770  012700  040150                          MOV     #T16PACKET,R0           ;PACKET ADDRESS
037774  012720  100004                          MOV     #100004,(R0)+           ;WRITE CHARACTERISTICS WITH ACK
040000  012720  040160                          MOV     #T16DATA,(R0)+          ;ADDRESS OF CHAR DATA BLOCK
040004  005020                                  CLR     (R0)+                   ;EXTENDED ADDRESS
040006  012720  000012                          MOV     #10.,(R0)+              ;SIZE OF MESSAGE PACKET
040012  012720  040172                          MOV     #T16BFR,(R0)+           ;MESSAGE BUFFER ADDRESS
040016  005020                                  CLR     (R0)+                   ;CLEAR EXTENDED BUFFER ADDRESS
040020  012720  000024                          MOV     #20.,(R0)+              ;LENGTH OF MESSAGE BUFFER
040024  005020                                  CLR     (R0)+                   ;CLEAR ESS,ENB,EAI,ERI
040026  005010                                  CLR     (R0)                    ;CLEAR EXTENDED FEATURES WORD
040030  005037  040172                          CLR     T16BFR                  ;CLEAR 1ST LOCATION IN MESSAGE BUFFER
040034  000207                                  RTS     PC                      ;


                                        ;+
                                        ; CLEAR MESSAGE BUFFER
                                        ;-
040036                                  T16CLRBUF:                              ;
040036                                          SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
040042  012701  040172                          MOV     #T16BFR,R1              ;GET MESSAGE BUFFER ADDRESS
040046  012702  000026                          MOV     #T16BEND-T16BFR,R2      ;SIZE OF MESSAGE BUFFER IN BYTES
040052  105021                          10$:    CLRB    (R1)+                   ;CLEAR A BYTE
040054  005302                                  DEC     R2                      ;DONE?
040056  003375                                  BGT     10$                     ;BR IF NO
040060  000207                                  RTS     PC                      ;RETURN


                                        ;+
                                        ; SETUP T16PK2 PACKET FOR READ STATUS
                                        ;-
040062                                  T16SRD:
040062  004737  040036                          JSR     PC,T16CLRBUF            ;CLEAR MESSAGE BUFFER
040066  012700  040230                          MOV     #T16DT2,R0              ;WRITE SUBSYSTEM DATA BUFFER
040072  112720  000005                          MOVB    #PW.RDSTATUS,(R0)+      ;STORE READ STATUS COMMAND IN BSEL0
040076  105010                                  CLRB    (R0)                    ;CLEAR BSEL1
040100  000207                                  RTS     PC                      ;RETURN

```

```

                        ;+
                        ; SETUP T16PK2 PACKET FOR WRITE MISC.
                        ;
                        ; INPUT:
                        ;           R0      CONTAINS WRITE MISC FUNCTION CODE (BSEL1)
                        ;           R1      CONTAINS DELAY (TIMES 800 NS) FOR BSEL2
                        ;-
040102                  T16WMISC:
040102                              SAVREG                          ;SAVE R1-R5 UNITL NEXT RETURN
040106  004737  040036              JSR     PC,T16CLRBUF            ;CLEAR MESSAGE BUFFER
040112  012702  040230              MOV     #T16DT2,R2              ;WRITE SUBSYSTEM DATA BUFFER
040116  112722  000010              MOVB    #PW.WMISC,(R2)+         ;STORE WRITE MISCELLANEOUS IN BSEL0
040122  110022                      MOVB    R0,(R2)+                ;STORE WRITE MISC CODE IN BSEL1
040124  110112                      MOVB    R1,(R2)                 ;STORE DELAY (RESET TIMER) IN BSEL2
040126  000207                      RTS     PC                      ;RETURN
                        ;+
                        ; SETUP T16PK2 PACKET FOR WRITE MISC. INVERT EXTENDED FEATURES SWITCH
                        ;-
040130                  T16SEXT:
040130  012700  040230              MOV     #T16DT2,R0              ;WRITE SUBSYSTEM DATA BUFFER
040134  112720  000010              MOVB    #PW.WMISC,(R0)+         ;STORE WRITE MISCELLANEOUS IN BSEL0
040140  112710  000200              MOVB    #MS.EXT,(R0)            ;STORE INVERT EXTENDED FEATURES IN BSEL1
040144  000207                      RTS     PC                      ;RETURN




        040150                      .=<.+10>&177770
                        ;
                        ;WRITE CHARACTERISTICS COMMAND PACKET
                        ;
040150                  T16PACKET:                                  ;COMMAND PACKET FOR TEST
040150  100004                      .WORD   100004                  ;WRITE CHARACTERISTICS COMMAND, WITH ACK
040152  040160                      .WORD   T16DATA                 ;ADDRESS OF CHARACTERISTICS BLOCK
040154  000000                      .WORD   0
040156  000012                      .WORD   10.                     ;MESSAGE PACKET SIZE

040160                  T16DATA:                                    ;CHARACTERISTICS DATA BLOCK
040160  040172                      .WORD   T16BFR                  ;ADDRESS OF MESSAGE BUFFER
040162  000000                      .WORD   0
040164  000024                      .WORD   20.                     ;LENGTH OF MESSAGE BUFFER
040166  000000                      .WORD   0                       ;ESS,ENB,EAI,ERI
040170  000000                      .WORD   0                       ;EXTENDED FEATURES WORD


                        ;MESSAGE BUFFER

040172                  T16BFR:                                     ;BEGIN MESSAGE BUFFER
040172  000000                      .WORD   0                       ;MESSAGE TYPE
040174  000000                      .WORD   0                       ;DATA FIELD LENGTH
040176  000000                      .WORD   0                       ;RBPCR
040200  000000                      .WORD   0                       ;XST0
040202  000000                      .WORD   0                       ;XST1
040204  000000                      .WORD   0                       ;XST2
040206  000000                      .WORD   0                       ;XST3
040210  000000                      .WORD   0                       ;XST4 (ALWAYS PRESENT FOR WRITE SUBSYSTEM
040212                         T16BFSTA: .BLKB 6.                             ;READ STATUS AND WRITE FIFO BUFFER
040220                         T16BEND:                                       ;END OF MESSAGE BUFFER
                               ;
                               ;WRITE SUBSYSTEM READ STATUS COMMAND PACKET
                               ;
040220                         T16PK2:
040220   100006                          .WORD   P.WRTSUB!P.ACK               ;WRITE SUBSYSTEM WITH ACK
040222   040230                          .WORD   T16DT2                       ;LOW ADDRESS OF DATA BLOCK
040224   000000                          .WORD   0                            ;HIGH ADDRESS OF DATA BLOCK
040226   000012                          .WORD   10.                          ;MINIMUM MESSAGE PACKET SIZE

040230                         T16DT2:                                        ;DATA BLOCK
040230      000                          .BYTE   0                            ;BSEL0
040231      000                          .BYTE   0                            ;BSEL1
040232   000000                          .WORD   0                            ;SEL2
040234                                   .BLKB   64.                          ;WRITE FIFO DATA OUTPUT BUFFER


040334                                   ENDTST
040334                                                              L10053:
040334   104401                                                             TRAP    C$ETST
```

```
                                        .SBTTL  TEST  6: FIFO EXERCISER
                                ;++
                                ; TEST DESCRIPTION:
                                ;
                                ;       This test uses the Write Subsystem Memory command to
                                ;       verify the controller's FIFO and associated status and
                                ;       control logic.
                                ;
                                ; TEST STEPS:
                                ;
                                ;  REPEAT FOR LOOPCNT
                                ;    BEGIN
                                ;       Do Subtest 1    - FIFO Initialize status test
                                ;       Do Subtest 2    - FIFO Write Single Byte test
                                ;       Do Subtest 3    - FIFO Write Multiple Bytes test
                                ;       Do Subtest 4    - FIFO Verify ILW Status test
                                ;       Do Subtest 5    - FIFO Input Ready test
                                ;       Do Subtest 6    - FIFO Verify Reset FIFO test
                                ;    END
                                ;--


040336                                  BGNTST
040336                                                                  T6::
040336  012700  046566                  MOV     #TST17ID,R0             ;ASCII MESSAGE TO IDENTIFY TEST
040342  004737  016510                  JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
040346  012737  000012  002216          MOV     #10.,LOOPCNT            ;PERFORM 10 ITERATIONS
040354  004737  017274                  JSR     PC,KTOFF                ;SHUT OFF MEMORY MANAGEMENT
040360  005037  003134                  CLR     KTENABLE                ;REALLY SHUT DOWN KT-11
040364                          T17LOOP:



                                        .SBTTL  TEST  6: SUBTEST 1: FIFO INITIALIZE STATUS TEST
                                ;++
                                ; TEST 6: SUBTEST 1:
                                ;
                                ; SUBTEST DESCRIPTION:
                                ;
                                ;       This test verifies, by using the Read Status select code,
                                ;       that the FIFO status is in the correct initial state after
                                ;       the controller is initialized (Input Ready TRUE,
                                ;       Output Ready and Data In Miss FALSE). These status
                                ;       signals are checked by the controller's self-test
                                ;       sequence, so this subtest is actually more of a partial
                                ;       check of the Read Status function than the FIFO status.
                                ;
                                ; TEST STEPS:
                                ;
                                ;    BEGIN
                                ;       Write to TSSR to soft initialize
                                ;       Do a WRITE CHARACTERISTICS to setup a message buffer
                                ;       Do a WRITE SUBSYSTEM Read Status
                                ;       If Input Ready  NOT=1   Then Print Error
                                ;       If Output Ready NOT=0   Then Print Error
                                ;       If Data In Miss NOT=0   Then Print Error
                                ;    END
```

```
2232                                    ;--
2233 040364                                     BGNSUB                                  ;//////////// BEGIN SUBTEST //////////
     040364                                                                                          T6.1:
     040364  104402                                                                                      TRAP     C$BSUB
2234
2235                                    ;       Write to TSSR register to soft initialize the controller
2236 040366                             5$:
2237 040366  004737  015774                     JSR     PC,SOFINIT                      ;WRITE TO TSSR TO SOFT INITIALIZE
2238 040372  103405                             BCS     10$                             ;BR IF SOFT INIT OKAY
2239 040374  010001                             MOV     R0,R1                           ;SAVE CONTENTS OF TSSR
2240 040376                                     ERRDF   ERRNO,SFIERR,SFIMSG             ;DEVICE FATAL DURING INIT
     040376  104455                                                                                      TRAP     C$ERDF
     040400  001130                                                                                      .WORD    600
     040402  003652                                                                                      .WORD    SFIERR
     040404  012034                                                                                      .WORD    SFIMSG
2241                                    ;       Do a WRITE CHARACTERISTICS to setup a message buffer
2242 040406  005037  002222             10$:    CLR     FATFLG                          ;CLEAR FATAL ERROR FLAG
2243 040412  012704  050160                     MOV     #T17PACKET,R4                   ;GET THE ADDRESS OF COMMAND PACKET
2244 040416  004737  010662                     JSR     PC,WRTCHR                       ;DO WRITE CHARACTERISTICS COMMAND
2245 040422                                     FORCERROR       42$                             ;@@DFORCE ERROR IF FORCER=1
2246 040436  103407                             BCS     50$                             ;BR IF CARRY SET (GOOD RETURN)
2247 040440  010001                             MOV     R0,R1                           ;SAVE CONTENTS OF TSSR
2248 040442                                     NEXT.ERRNO
2249 040442                             42$:    ERRDF   ERRNO,T17SSR,PKTSSR             ;DEVICE FATAL SSR FAILED TO SET
     040442  104455                                                                                      TRAP     C$ERDF
     040444  001131                                                                                      .WORD    601
     040446  046605                                                                                      .WORD    T17SSR
     040450  012046                                                                                      .WORD    PKTSSR
2250 040452  005237  002222                     INC     FATFLG                          ;SET FATAL ERROR FLAG
2251 040456                             50$:    CKLOOP                                  ;LOOP ON ERROR, IF FLAG SET
     040456  104406                                                                                      TRAP     C$CLP1
2252
2253                                    ;       Do a Write Subsystem READ STATUS
2254 040460  004737  047744                     JSR     PC,T17SRD                       ;SETUP PACKET FOR READ STATUS
2255 040464  012704  050330                     MOV     #T17PK2,R4                      ;GET WRITE SUBSYSTEM COMMAND PACKET
2256 040470  010465  000000                     MOV     R4,TSDB(R5)                     ;SET THE PACKET ADDRESS TO EXECUTE
2257 040474  004737  016336                     JSR     PC,CHKTSSR                      ;WAIT FOR SSR TO SET
2258 040500                                     FORCERROR       62$                             ;@@DFORCE ERROR IF FORCER=1
2259 040514  103407                             BCS     70$                             ;BR IF CARRY SET (GOOD RETURN)
2260 040516  010001                             MOV     R0,R1                           ;SAVE CONTENTS OF TSSR
2261 040520                                     NEXT.ERRNO
2262 040520                             62$:    ERRDF   ERRNO,T173SSR,PKTSSR            ;DEVICE FATAL SSR FAILED TO SET
     040520  104455                                                                                      TRAP     C$ERDF
     040522  001132                                                                                      .WORD    602
     040524  046706                                                                                      .WORD    T173SSR
     040526  012046                                                                                      .WORD    PKTSSR
2263 040530  005237  002222                     INC     FATFLG                          ;SET FATAL ERROR FLAG
2264 040534                             70$:    CKLOOP                                  ;LOOP ON ERROR, IF FLAG SET
     040534  104406                                                                                      TRAP     C$CLP1
2265                                    ;       Set WORDS 0-7  of expd message buffer = to recv since not testing
2266 040536  004737  050126                     JSR     PC,T17SETEXP                    ;SET WORDS 0-7 EXPD=RECV
2267 040542  012701  046362                     MOV     #T17EXSTA,R1                    ;GET EXPECTED READ STATUS
2268 040546  012702  050222                     MOV     #T17BFSTA,R2                    ;GET RECV READ STATUS
2269 040552  012221                             MOV     (R2)+,(R1)+                     ;SET EXPD WORD #8 = RECV TEMP
2270 040554  011211                             MOV     (R2),(R1)                       ;SET EXPD WORD #9 = RECV TEMP
2271 040556  052711  000020                     BIS     #S2.INRDY,(R1)                  ;SET EXP INPUT READY= TRUE
2272 040562  042711  000040                     BIC     #S2.OUTRDY,(R1)                 ;SET EXP OUTPUT READY= FALSE
```

```
040566  042711  000200                   BIC     #S2.DIM,(R1)            ;SET EXP DATA IN MISS = FALSE
                                 ;       If Input Ready NOT=1 then Print Error
                                 ;       If Output Ready NOT=0 or Data in Miss NOT=0 Then Print Error
040572  005000                           CLR     R0                      ;HIGH RECV ADDRESS FOR CKMSG2
040574  012701  050202                   MOV     #T17BFR,R1              ;LOW RECV ADDRESS FOR CKMSG2
040600  012702  046342                   MOV     #T17EXP,R2              ;EXPD ADDRESS
040604  012703  000024                   MOV     #20.,R3                 ;NUMBER OF BYTES TO COMPARE
040610  004737  011500                   JSR     PC,CKMSG2               ;EXPD EQUAL RECV?
040614                                   FORCERROR       82$,NOTSSR      ;BAD
040624  103404                           BCS     90$                     ;BR IF YES
040626                                   NEXT.ERRNO
040626                           82$:    ERRHRD  ERRNO,T171CMP,MSGSTAT   ;REPORT ERROR
040626  104456                                                                           TRAP    C$ERHRD
040630  001133                                                                           .WORD   603
040632  047125                                                                           .WORD   T171CMP
040634  012350                                                                           .WORD   MSGSTAT
040636                           90$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
040636  104406                                                                           TRAP    C$CLP1

040640                                   ENDSUB                          ;///////////// END SUBTEST //////////
040640                                                                           L10057:
040640  104403                                                                           TRAP    C$ESUB

040642  005737  002222                   TST     FATFLG                  ;ANY FATAL ERRORS ?
040646  001402                           BEQ     160$                    ;BRANCH IF NOT
040650  004737  017202                   JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
040654                           160$:

                                         .SBTTL  TEST  6: SUBTEST 2: FIFO WRITE SINGLE BYTE TEST


                                 ;++
                                 ; TEST 6: SUBTEST 2:
                                 ;
                                 ; SUBTEST DESCRIPTION:
                                 ;
                                 ;       This subtest verifies the ability of the FIFO to correctly
                                 ;       pass a single data byte from input to output. For each
                                 ;       of 256 data values (0-377 octal) the following is done:
                                 ;               1. Initial FIFO status is checked
                                 ;               2. The Write FIFO function, specifying a count of
                                 ;                  one byte to be written is executed.
                                 ;               3. Read Status is executed and FIFO status is checked.
                                 ;               4. Read FIFO is executed and the data and final status
                                 ;                  is checked.
                                 ;
                                 ; TEST STEPS:
                                 ;
                                 ; BEGIN
                                 ;       Write to TSSR to soft initialize
                                 ;       Do a WRITE CHARACTERISTICS to setup a message buffer
                                 ;       Do a Write Subsystem READ STATUS
                                 ;       If Input Ready  NOT=1   Then Print Error
                                 ;       If Output Ready NOT=0   Then Print Error
                                 ;       If Data In Miss NOT=0   Then Print Error
                                 ;
                                 ;  REPEAT FOR DATA FROM 0 TO 377 OCTAL
                                 ;    BEGIN
```

```
                                ;       Do a Write Subsystem WRITE NPR to set tape direction out
                                ;       Do a Write Subsystem WRITE FIFO with byte count equal to 1
                                ;       Do a Write Subsystem READ STATUS
                                ;       If Input Ready  NOT=1   Then Print Error
                                ;       If Output Ready NOT=1   Then Print Error
                                ;       If Data In Miss NOT=0   Then Print Error
                                ;       Do Write Subsystem READ FIFO with byte count equal to 1
                                ;       If Data read from FIFO NOT= to Data sent Then Print Error
                                ;       Do a Write Subsystem READ STATUS
                                ;       If Input Ready  NOT=1   Then Print Error
                                ;       If Output Ready NOT=0   Then Print Error
                                ;       If Data In Miss NOT=0   Then Print Error
                                ;    END
                                ;  END
                                ;--
040654                                  BGNSUB                          ;///////////// BEGIN SUBTEST //////////
040654                                                                              T6.2:
040654  104402                                                                  TRAP    C$BSUB


                                ;
                                        Write to TSSR register to soft initialize the controller
040656                          5$:
040656  004737  015774                  JSR     PC,SOFINIT              ;WRITE TO TSSR TO SOFT INITIALIZE
040662  103405                          BCS     10$                     ;BR IF SOFT INIT OKAY
040664  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
040666                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL DURING INIT
040666  104455                                                                  TRAP    C$ERDF
040670  001133                                                                  .WORD   603
040672  003652                                                                  .WORD   SFIERR
040674  012034                                                                  .WORD   SFIMSG
                                ;
                                        Do a WRITE CHARACTERISTICS to setup a message buffer
040676  005037  002222          10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
040702  012704  050160                  MOV     #T17PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
040706  004737  010662                  JSR     PC,WRTCHR               ;DO WRITE CHARACTERISTICS COMMAND
040712                                  FORCERROR       42$                     ;@@FORCE ERROR IF FORCER=1
040726  103407                          BCS     50$                     ;BR IF CARRY SET (GOOD RETURN)
040730  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
040732                                  NEXT.ERRNO
040732                          42$:    ERRDF   ERRNO,T17SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
040732  104455                                                                  TRAP    C$ERDF
040734  001134                                                                  .WORD   604
040736  046605                                                                  .WORD   T17SSR
040740  012046                                                                  .WORD   PKTSSR
040742  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
040746                          50$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
040746  104406                                                                  TRAP    C$CLP1

                                ;       Do a Write Subsystem READ STATUS
040750  004737  047744                  JSR     PC,T17SRD               ;SETUP PACKET FOR READ STATUS
040754  012704  050330                  MOV     #T17PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
040760  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
040764  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
040770                                  FORCERROR       62$                     ;@@FORCE ERROR IF FORCER=1
041004  103407                          BCS     70$                     ;BR IF CARRY SET (GOOD RETURN)
041006  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
041010                                  NEXT.ERRNO
041010                          62$:    ERRDF   ERRNO,T173SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
041010  104455                                                                  TRAP    C$ERDF
041012  001135                                                                  .WORD   605
```

```
     041014   046706                                                                                   .WORD   T173SSR
     041016   012046                                                                                   .WORD   PKTSSR
2367 041020   005237   002222                    INC     FATFLG                  ;SET FATAL ERROR FLAG
2368 041024                             70$:     CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     041024   104406                                                                                   TRAP    C$CLP1
2369                                    ;        Set WORDS 0-7 of expd message buffer = to recv since not testing
2370 041026   004737   050126                    JSR     PC,T17SETEXP            ;SET WORDS 0-7 EXPD=RECV
2371 041032   012701   046362                    MOV     #T17EXSTA,R1            ;GET EXPECTED READ STATUS
2372 041036   012702   050222                    MOV     #T17BFSTA,R2            ;GET RECV READ STATUS
2373 041042   012221                             MOV     (R2)+,(R1)+             ;SET EXPD WORD #8 = RECV TEMP
2374 041044   011211                             MOV     (R2),(R1)               ;SET EXPD WORD #9 = RECV TEMP
2375 041046   052711   000020                    BIS     #S2.INRDY,(R1)          ;SET EXP INPUT READY= TRUE
2376 041052   042711   000040                    BIC     #S2.OUTRDY,(R1)         ;SET EXP OUTPUT READY= FALSE
2377 041056   042711   000200                    BIC     #S2.DIM,(R1)            ;SET EXP DATA IN MISS = FALSE
2378                                    ;        If Input Ready NOT=1 then Print Error
2379                                    ;        If Output Ready NOT=0 or Data in Miss NOT=0 Then Print Error
2380 041062   005000                             CLR     R0                      ;HIGH RECV ADDRESS FOR CKMSG2
2381 041064   012701   050202                    MOV     #T17BFR,R1              ;LOW RECV ADDRESS FOR CKMSG2
2382 041070   012702   046342                    MOV     #T17EXP,R2              ;EXPD ADDRESS
2383 041074   012703   000024                    MOV     #20.,R3                 ;NUMBER OF BYTES TO COMPARE
2384 041100   004737   011500                    JSR     PC,CKMSG2               ;EXPD EQUAL RECV?
2385 041104                                      FORCERROR       82$,NOTSSR      ;@@D
2386 041114   103404                             BCS     90$                     ;BR IF YES
2387 041116                                      NEXT.ERRNO
2388 041116                             82$:     ERRHRD  ERRNO,T171CMP,MSGSTAT   ;REPORT ERROR
     041116   104456                                                                                   TRAP    C$ERHRD
     041120   001136                                                                                   .WORD   606
     041122   047125                                                                                   .WORD   T171CMP
     041124   012350                                                                                   .WORD   MSGSTAT
2389 041126                             90$:     CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     041126   104406                                                                                   TRAP    C$CLP1
2390
2391                                    ;  Repeat for DATA from 0 to 377
2392 041130   012737   000000   002312           MOV     #0,DATA                 ;GET FIRST DATA
2393 041136                             100$:                                    ;REPEAT LABEL
2394                                    ;        Do a Write Subsystem WRITE NPR to set tape direction out
2395 041136   012700   000100                    MOV     #NP.OUT,R0              ;SET TAPE DIRECTION OUT
2396 041142   004737   050006                    JSR     PC,T17SNPR              ;SETUP T17PK2 FOR WRITE NPR
2397 041146   012704   050330                    MOV     #T17PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
2398 041152   010465   000000                    MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
2399 041156   004737   016336                    JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
2400 041162                                      FORCERROR       102$                    ;@@DFORCE ERROR IF FORCER=1
2401 041176   103407                             BCS     105$                    ;BR IF CARRY SET (GOOD RETURN)
2402 041200   010001                             MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
2403 041202                                      NEXT.ERRNO
2404 041202                             102$:    ERRDF   ERRNO,T174SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
     041202   104455                                                                                   TRAP    C$ERDF
     041204   001137                                                                                   .WORD   607
     041206   046753                                                                                   .WORD   T174SSR
     041210   012046                                                                                   .WORD   PKTSSR
2405 041212   005237   002222                    INC     FATFLG                  ;SET FATAL ERROR FLAG
2406 041216                             105$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     041216   104406                                                                                   TRAP    C$CLP1
2407                                    ;        Do a Write Subsystem WRITE FIFO with byte count equal to 1
2408 041220   012700   000001                    MOV     #1,R0                   ;WRITE 1 BYTE
2409 041224   012701   002312                    MOV     #DATA,R1                ;FIFO WRITE DATA ADDRESS
2410 041230   004737   050032                    JSR     PC,T17WFIF              ;SETUP T17PK2 FOR WRITE FIFO
```

```
041234  012704  050330                   MOV     #T17PK2,R4                    ;GET WRITE SUBSYSTEM COMMAND PACKET
041240  010465  000000                   MOV     R4,TSDB(R5)                   ;SET THE PACKET ADDRESS TO EXECUTE
041244  004737  016336                   JSR     PC,CHKTSSR                    ;WAIT FOR SSR TO SET
041250                                   FORCERROR        107$                        ;@@DFORCE ERROR IF FORCER=1
041264  103407                           BCS     110$                          ;BR IF CARRY SET (GOOD RETURN)
041266  010001                           MOV     R0,R1                         ;SAVE CONTENTS OF TSSR
041270                                   NEXT.ERRNO
041270                          107$:    ERRDF   ERRNO,T175SSR,PKTSSR          ;DEVICE FATAL SSR FAILED TO SET
041270  104455                                                                                       TRAP    C$ERDF
041272  001140                                                                                       .WORD   608
041274  047016                                                                                       .WORD   T175SSR
041276  012046                                                                                       .WORD   PKTSSR
041300  005237  002222                   INC     FATFLG                        ;SET FATAL ERROR FLAG
041304                          110$:    CKLOOP                                ;LOOP ON ERROR, IF FLAG SET
041304  104406                                                                                       TRAP    C$CLP1


                                ;        Do a Write Subsystem READ STATUS
041306  004737  047744                   JSR     PC,T17SRD                     ;SETUP PACKET FOR READ STATUS
041312  012704  050330                   MOV     #T17PK2,R4                    ;GET WRITE SUBSYSTEM COMMAND PACKET
041316  010465  000000                   MOV     R4,TSDB(R5)                   ;SET THE PACKET ADDRESS TO EXECUTE
041322  004737  016336                   JSR     PC,CHKTSSR                    ;WAIT FOR SSR TO SET
041326                                   FORCERROR        112$                        ;@@DFORCE ERROR IF FORCER=1
041342  103407                           BCS     120$                          ;BR IF CARRY SET (GOOD RETURN)
041344  010001                           MOV     R0,R1                         ;SAVE CONTENTS OF TSSR
041346                                   NEXT.ERRNO
041346                          112$:    ERRDF   ERRNO,T173SSR,PKTSSR          ;DEVICE FATAL SSR FAILED TO SET
041346  104455                                                                                       TRAP    C$ERDF
041350  001141                                                                                       .WORD   609
041352  046706                                                                                       .WORD   T173SSR
041354  012046                                                                                       .WORD   PKTSSR
041356  005237  002222                   INC     FATFLG                        ;SET FATAL ERROR FLAG
041362                          120$:    CKLOOP                                ;LOOP ON ERROR, IF FLAG SET
041362  104406                                                                                       TRAP    C$CLP1
                                ;        Set WORDS 0-7 of expd message buffer = to recv since not testing
041364  004737  050126                   JSR     PC,T17SETEXP                  ;SET WORDS 0-7 EXPD=RECV
041370  012701  046362                   MOV     #T17EXSTA,R1                  ;GET EXPECTED READ STATUS
041374  012702  050222                   MOV     #T17BFSTA,R2                  ;GET RECV READ STATUS
041400  012221                           MOV     (R2)+,(R1)+                   ;SET EXPD WORD #8 = RECV TEMP
041402  011211                           MOV     (R2),(R1)                     ;SET EXPD WORD #9 = RECV TEMP
041404  052711  000020                   BIS     #S2.INRDY,(R1)                ;SET EXP INPUT READY= 1
041410  052711  000040                   BIS     #S2.OUTRDY,(R1)               ;SET EXP OUTPUT READY= 1
041414  042711  000200                   BIC     #S2.DIM,(R1)                  ;SET EXP DATA IN MISS = 0
                                ;        If Input Ready NOT=1 then Print Error
                                ;        If Output Ready NOT=1 or Data in Miss NOT=0 Then Print Error
041420  005000                           CLR     R0                            ;HIGH RECV ADDRESS FOR CKMSG2
041422  012701  050202                   MOV     #T17BFR,R1                    ;LOW RECV ADDRESS FOR CKMSG2
041426  012702  046342                   MOV     #T17EXP,R2                    ;EXPD ADDRESS
041432  012703  000024                   MOV     #20.,R3                       ;NUMBER OF BYTES TO COMPARE
041436  004737  011500                   JSR     PC,CKMSG2                     ;EXPD EQUAL RECV?
041442                                   FORCERROR        132$,NOTSSR          ;@@D
041452  103404                           BCS     140$                          ;BR IF YES
041454                                   NEXT.ERRNO
041454                          132$:    ERRHRD  ERRNO,T173CMP,MSGSTAT         ;REPORT ERROR
041454  104456                                                                                       TRAP    C$ERHRD
041456  001142                                                                                       .WORD   610
041460  047303                                                                                       .WORD   T173CMP
041462  012350                                                                                       .WORD   MSGSTAT
```

```
 2454 041464                        140$:   CKLOCP                          ;LOOP ON ERROR, IF FLAG SET
      041464  104406                                                                   TRAP     C$CLP1
 2455
 2456                               ;       Do Write Subsystem READ FIFO with byte count equal to 1
 2457 041466  012700  000001                MOV     #1,R0                   ;SET READ BYTE COUNT
 2458 041472  004737  050066                JSR     PC,T17RFIF              ;SETUP T17PK2 FOR READ FIFO
 2459 041476  012704  050330                MOV     #T17PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
 2460 041502  010465  000000                MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
 2461 041506  004737  016336                JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
 2462 041512                                FORCERROR       142$                    ;@@DFORCE ERROR IF FORCER=1
 2463 041526  103407                        BCS     150$                    ;BR IF CARRY SET (GOOD RETURN)
 2464 041530  010001                        MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 2465 041532                                NEXT.ERRNO
 2466 041532                        142$:   ERRDF   ERRNO,T176SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
      041532  104455                                                                   TRAP     C$ERDF
      041534  001143                                                                   .WORD    611
      041536  047062                                                                   .WORD    T176SSR
      041540  012046                                                                   .WORD    PKTSSR
 2467 041542  005237  002222                INC     FATFLG                  ;SET FATAL ERROR FLAG
 2468 041546                        150$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
      041546  104406                                                                   TRAP     C$CLP1
 2469                               ;       Set WORDS 0-7 of expd message buffer = to recv since not testing
 2470 041550  004737  050126                JSR     PC,T17SETEXP            ;SET WORDS 0-7 EXPD=RECV
 2471 041554  012701  046362                MOV     #T17EXSTA,R1            ;GET EXPECTED READ STATUS
 2472 041560  012702  050222                MOV     #T17BFSTA,R2            ;GET RECV READ STATUS
 2473 041564  013721  002312                MOV     DATA,(R1)+              ;SET EXPD WORD #8 = COUNT DATA
 2474 041570  011211                        MOV     (R2),(R1)               ;SET EXPD WORD #9 = RECV (NOT TESTING)
 2475                               ;       If Data read from FIFO NOT= to Data sent Then Print Error
 2476                               ;       The data is in WORD #8 of the message buffer
 2477 041572  005000                        CLR     R0                      ;HIGH RECV ADDRESS FOR CKMSG2
 2478 041574  012701  050202                MOV     #T17BFR,R1              ;LOW RECV ADDRESS FOR CKMSG2
 2479 041600  012702  046342                MOV     #T17EXP,R2              ;EXPD ADDRESS
 2480 041604  012703  000022                MOV     #18.,R3                 ;NUMBER OF BYTES TO COMPARE
 2481 041610  004737  011500                JSR     PC,CKMSG2               ;EXPD EQUAL RECV?
 2482 041614                                FORCERROR       152$,NOTSSR     ;@@D
 2483 041624  103404                        BCS     160$                    ;BR IF YES
 2484 041626                                NEXT.ERRNO
 2485 041626                        152$:   ERRHRD  ERRNO,T172CMP,MSGSUB    ;REPORT ERROR
      041626  104456                                                                   TRAP     C$ERHRD
      041630  001144                                                                   .WORD    612
      041632  047207                                                                   .WORD    T172CMP
      041634  013742                                                                   .WORD    MSGSUB
 2486 041636                        160$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
      041636  104406                                                                   TRAP     C$CLP1
 2487
 2488                               ;       Do a Write Subsystem READ STATUS
 2489 041640  004737  047744                JSR     PC,T17SRD               ;SETUP PACKET FOR READ STATUS
 2490 041644  012704  050330                MOV     #T17PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
 2491 041650  010465  000000                MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
 2492 041654  004737  016336                JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
 2493 041660                                FORCERROR       162$                    ;@@DFORCE ERROR IF FORCER=1
 2494 041674  103407                        BCS     170$                    ;BR IF CARRY SET (GOOD RETURN)
 2495 041676  010001                        MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 2496 041700                                NEXT.ERRNO
 2497 041700                        162$:   ERRDF   ERRNO,T173SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
      041700  104455                                                                   TRAP     C$ERDF
      041702  001145                                                                   .WORD    613
```

```
     041704  046706                                                                        .WORD    T173SSR
     041706  012046                                                                        .WORD    PKTSSR
     041710  005237  002222                      INC     FATFLG                  ;SET FATAL ERROR FLAG
     041714                             170$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     041714  104406                                                                        TRAP     C$CLP1
                                        ;        Set WORDS 0-7 of expd message buffer = to recv since not testing
     041716  004737  050126                      JSR     PC,T17SETEXP            ;SET WORDS 0-7 EXPD=RECV
     041722  012701  046362                      MOV     #T17EXSTA,R1            ;GET EXPECTED READ STATUS
     041726  012702  050222                      MOV     #T17BFSTA,R2            ;GET RECV READ STATUS
     041732  012221                              MOV     (R2)+,(R1)+             ;SET EXPD WORD #8 = RECV TEMP
     041734  011211                              MOV     (R2),(R1)               ;SET EXPD WORD #9 = RECV TEMP
     041736  052711  000020                      BIS     #S2.INRDY,(R1)          ;SET EXP INPUT READY= 1
     041742  042711  000040                      BIC     #S2.OUTRDY,(R1)         ;SET EXP OUTPUT READY= 0
     041746  042711  000200                      BIC     #S2.DIM,(R1)            ;SET EXP DATA IN MISS = 0
                                        ;        If Input Ready NOT=1 then Print Error
                                        ;        If Output Ready NOT=0 or Data in Miss NOT=0 Then Print Error
     041752  005000                              CLR     R0                      ;HIGH RECV ADDRESS FOR CKMSG2
     041754  012701  050202                      MOV     #T17BFR,R1              ;LOW RECV ADDRESS FOR CKMSG2
     041760  012702  046342                      MOV     #T17EXP,R2              ;EXPD ADDRESS
     041764  012703  000024                      MOV     #20.,R3                 ;NUMBER OF BYTES TO COMPARE
     041770  004737  011500                      JSR     PC,CKMSG2               ;EXPD EQUAL RECV?
     041774                                      FORCERROR       172$,NOTSSR     ;@@D
     042004  103404                              BCS     180$                    ;BR IF YES
     042006                                      NEXT.ERRNO
     042006                             172$:    ERRHRD  ERRNO,T174CMP,MSGSTAT   ;REPORT ERROR
     042006  104456                                                                        TRAP     C$ERHRD
     042010  001146                                                                        .WORD    614
     042012  047367                                                                        .WORD    T174CMP
     042014  012350                                                                        .WORD    MSGSTAT
     042016                             180$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     042016  104406                                                                        TRAP     C$CLP1
     042020                                      FORCEXIT        205$            ;@@D
     042030  005237  002312                      INC     DATA                    ;GET NEXT TEST DATA
     042034  023727  002312  000377              CMP     DATA,#377               ;DONE 0 TO 377?
     042042  101002                              BHI     205$                    ;BR IF YES
     042044  000137  041136                      JMP     100$                    ;DO ANOTHER TEST PATTERN
     042050                             205$:

     042050                                      ENDSUB                          ;///////////// END SUBTEST //////////
     042050                                                                               L10060:
     042050  104403                                                                        TRAP     C$ESUB

     042052  005737  002222                      TST     FATFLG                  ;ANY FATAL ERRORS ?
     042056  001402                              BEQ     260$                    ;BRANCH IF NOT
     042060  004737  017202                      JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
     042064                             260$:

                                                 .SBTTL  TEST  6: SUBTEST 3: FIFO WRITE MULTIPLE BYTES TEST

                                        ;++
                                        ; TEST 6: SUBTEST 3:
                                        ;
                                        ; SUBTEST DESCRIPTION:
                                        ;
                                        ;        This subtest verifies the ability of the FIFO to correctly
                                        ;        pass a multiple data bytes from input to output.
                                        ;        The following sequence is done with various data patterns
```

```
                                ;       and byte counts from 2 to 64.
                                ;               1. Initial FIFO status is checked
                                ;               2. The Write FIFO function.
                                ;               3. Read Status is executed and FIFO status is checked.
                                ;               4. Read FIFO is executed and the data and final status
                                ;                  is checked.
                                ;
                                ; TEST STEPS:
                                ;
                                ; BEGIN
                                ;       Write to TSSR to soft initialize
                                ;       Do a WRITE CHARACTERISTICS to setup a message buffer
                                ;       Do a Write Subsystem READ STATUS
                                ;       If Input Ready  NOT=1   Then Print Error
                                ;       If Output Ready NOT=0   Then Print Error
                                ;       If Data In Miss NOT=0   Then Print Error
                                ;       If Last Word    NOT=0   Then Print Error
                                ;  REPEAT FOR DATA 0 TO 377, 377 TO 0, FLOATING 1'S,0'S AND ALL 1'S/0'S
                                ;  REPEAT FOR BYTE COUNT 2 TO 64 DECIMAL
                                ;    BEGIN
                                ;       Do a Write Subsystem WRITE NPR to set tape direction out
                                ;       Do a Write Subsystem WRITE FIFO
                                ;       Do a Write Subsystem READ STATUS
                                ;       If Input Ready  NOT=1   Then Print Error
                                ;       If Output Ready NOT=1   Then Print Error
                                ;       If Data In Miss NOT=0   Then Print Error
                                ;       If Last Word    NOT=0   Then Print Error
                                ;       Do Write Subsystem READ FIFO
                                ;       If Data read from FIFO NOT= to Data sent Then Print Error
                                ;       Do a Write Subsystem READ STATUS
                                ;       If Input Ready  NOT=1   Then Print Error
                                ;       If Output Ready NOT=0   Then Print Error
                                ;       If Data In Miss NOT=0   Then Print Error
                                ;       If Last Word    NOT=0   Then Print Error
                                ;    END
                                ;  END
                                ;--
 042064                                 BGNSUB                          ;///////////// BEGIN SUBTEST //////////
 042064                                                                          T6.3:
 042064  104402                                                                          TRAP    C$BSUB

                                ;       Write to TSSR register to soft initialize the controller
 042066                         5$:
 042066  004737  015774                 JSR     PC,SOFINIT              ;WRITE TO TSSR TO SOFT INITIALIZE
 042072  103405                         BCS     10$                     ;BR IF SOFT INIT OKAY
 042074  010001                         MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 042076                                 ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL DURING INIT
 042076  104455                                                                          TRAP    C$ERDF
 042100  001146                                                                          .WORD   614
 042102  003652                                                                          .WORD   SFIERR
 042104  012034                                                                          .WORD   SFIMSG
                                ;       Do a WRITE CHARACTERISTICS to setup a message buffer
 042106  005037  002222         10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
 042112  012704  050160                 MOV     #T17PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
 042116  004737  010662                 JSR     PC,WRTCHR               ;DO WRITE CHARACTERISTICS COMMAND
 042122                                 FORCERROR        42$                    ;@@DFORCE ERROR IF FORCER=1
 042136  103407                         BCS     50$                     ;BR IF CARRY SET (GOOD RETURN)
```

```
2596 042140  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
2597 042142                                  NEXT.ERRNO
2598 042142                          42$:    ERRDF   ERRNO,T17SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
     042142  104455                                                                                  TRAP    C$ERDF
     042144  001147                                                                                  .WORD   615
     042146  046605                                                                                  .WORD   T17SSR
     042150  012046                                                                                  .WORD   PKTSSR
2599 042152  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
2600 042156                          50$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     042156  104406                                                                                  TRAP    C$CLP1
2601                                 ;       Do a Write Subsystem READ STATUS
2602 042160  004737  047744                  JSR     PC,T17SRD               ;SETUP PACKET FOR READ STATUS
2603 042164  012704  050330                  MOV     #T17PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
2604 042170  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
2605 042174  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
2606 042200                                  FORCERROR       62$                     ;BADFORCE ERROR IF FORCER=1
2607 042214  103407                          BCS     70$                     ;BR IF CARRY SET (GOOD RETURN)
2608 042216  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
2609 042220                                  NEXT.ERRNO
2610 042220                          62$:    ERRDF   ERRNO,T173SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
     042220  104455                                                                                  TRAP    C$ERDF
     042222  001150                                                                                  .WORD   616
     042224  046706                                                                                  .WORD   T173SSR
     042226  012046                                                                                  .WORD   PKTSSR
2611 042230  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
2612 042234                          70$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     042234  104406                                                                                  TRAP    C$CLP1
2613                                 ;       Set WORDS 0-7 of expd message buffer = to recv since not testing
2614 042236  004737  050126                  JSR     PC,T17SETEXP            ;SET WORDS 0-7 EXPD=RECV
2615 042242  012701  046362                  MOV     #T17EXSTA,R1            ;GET EXPECTED READ STATUS
2616 042246  012702  050222                  MOV     #T17BFSTA,R2            ;GET RECV READ STATUS
2617 042252  012221                          MOV     (R2)+,(R1)+             ;SET EXPD WORD #8 = RECV TEMP
2618 042254  011211                          MOV     (R2),(R1)               ;SET EXPD WORD #9 = RECV TEMP
2619 042256  052711  000020                  BIS     #S2.INRDY,(R1)          ;SET EXP INPUT READY=  1
2620 042262  042711  000040                  BIC     #S2.OUTRDY,(R1)         ;SET EXP OUTPUT READY=  0
2621 042266  042711  000200                  BIC     #S2.DIM,(R1)            ;SET EXP DATA IN MISS = 0
2622 042272  042711  000100                  BIC     #S2.ILW,(R1)            ;SET EXP LAST WORD (ILW)=0
2623                                 ;       If Input Ready NOT=1 then Print Error
2624                                 ;       If Output Ready NOT=0 or Data in Miss NOT=C Then Print Error
2625                                 ;       If Last Word    NOT=0   Then Print Error
2626 042276  005000                          CLR     R0                      ;HIGH RECV ADDRESS FOR CKMSG2
2627 042300  012701  050202                  MOV     #T17BFR,R1              ;LOW RECV ADDRESS FOR CKMSG2
2628 042304  012702  046342                  MOV     #T17EXP,R2              ;EXPD ADDRESS
2629 042310  012703  000024                  MOV     #20.,R3                 ;NUMBER OF BYTES TO COMPARE
2630 042314  004737  011500                  JSR     PC,CKMSG2               ;EXPD EQUAL RECV?
2631 042320                                  FORCERROR       82$,NOTSSR      ;BAD
2632 042330  103404                          BCS     90$                     ;BR IF YES
2633 042332                                  NEXT.ERRNO
2634 042332                          82$:    ERRHRD  ERRNO,T171CMP,MSGSTAT   ;REPORT ERROR
     042332  104456                                                                                  TRAP    C$ERHRD
     042334  001151                                                                                  .WORD   617
     042336  047125                                                                                  .WORD   T171CMP
     042340  012350                                                                                  .WORD   MSGSTAT
2635 042342                          90$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     042342  104406                                                                                  TRAP    C$CLP1
2636
2637
```

```
    2638
    2639                                              ;    REPEAT FOR BYTE COUNT 2 TO 64 DECIMAL
    2640                                              ;    TSTFLAG =1 FOR INCREMENT TEST PATTERN
    2641                                              ;            =2 FOR DECREMENT TEST PATTERN
    2642                                              ;            =3 FOR TSTBLK TABLE PATTERN
    2643 042344  012737  000001  002314                       MOV     #1,TSTFLAG                  ;TEST PATTERN FLAG
    2644 042352                                       95$:
    2645 042352  012737  000002  002310                       MOV     #2,COUNT                    ;GET FIRST BYTE COUNT
    2646 042360                                       100$:
    2647                                              ;       Do a Write Subsystem WRITE NPR to set tape direction out
    2648 042360  012700  000100                               MOV     #NP.OUT,R0                  ;SET TAPE DIRECTION OUT
    2649 042364  004737  050006                               JSR     PC,T17SNPR                  ;SETUP T17PK2 FOR WRITE NPR
    2650 042370  012704  050330                               MOV     #T17PK2,R4                  ;GET WRITE SUBSYSTEM COMMAND PACKET
    2651 042374  010465  000000                               MOV     R4,TSDB(R5)                 ;SET THE PACKET ADDRESS TO EXECUTE
    2652 042400  004737  016336                               JSR     PC,CHKTSSR                  ;WAIT FOR SSR TO SET
    2653 042404                                               FORCERROR       102$
                                                                                                          ;@@DFORCE ERROR IF FORCER=1
    2654 042420  103407                                       BCS     105$                        ;BR IF CARRY SET (GOOD RETURN)
    2655 042422  010001                                       MOV     R0,R1                       ;SAVE CONTENTS OF TSSR
    2656 042424                                               NEXT.ERRNO
    2657 042424                                       102$:   ERRDF   ERRNO,T174SSR,PKTSSR        ;DEVICE FATAL SSR FAILED TO SET
         042424  104455                                                                                           TRAP    C$ERDF
         042426  001152                                                                                           .WORD   618
         042430  046753                                                                                           .WORD   T174SSR
         042432  012046                                                                                           .WORD   PKTSSR
    2658 042434  005237  002222                               INC     FATFLG                      ;SET FATAL ERROR FLAG
    2659 042440                                       105$:   CKLOOP                              ;LOOP ON ERROR, IF FLAG SET
         042440  104406                                                                                           TRAP    C$CLP1
    2660                                              ;       Do a Write Subsystem WRITE FIFO
    2661 042442  004737  050106                               JSR     PC,T17CLEXP                 ;CLEAR EXPD BUFFER
    2662 042446  012701  046464                               MOV     #T17WFDATA,R1               ;EXPD WRITE FIFO DATA BUFFER
    2663 042452  013702  002310                               MOV     COUNT,R2                    ;TEST PATTERN SIZE
    2664 042456  022737  000001  002314                       CMP     #1,TSTFLAG                  ;INCREMENT PATTERN THIS TIME THRU?
    2665 042464  001005                                       BNE     115$                        ;BR IF NO
    2666 042466  005000                                       CLR     R0                          ;INCREMENT TEST PATTERN
    2667 042470  110021                               110$:   MOVB    R0,(R1)+                    ;STORE INCREMENT TEST BYTE
    2668 042472  005200                                       INC     R0                          ;SET NEXT PATTERN
    2669 042474  005302                                       DEC     R2                          ;DONE?
    2670 042476  003374                                       BGT     110$                        ;BR IF NO
    2671 042500  022737  000002  002314               115$:   CMP     #2,TSTFLAG                  ;DECREMENT PATTERN THIS TIME THRU?
    2672 042506  001006                                       BNE     125$                        ;BR IF NO
    2673 042510  012700  000377                               MOV     #377,R0                     ;DECREMENT TEST PATTERN
    2674 042514  110021                               120$:   MOVB    R0,(R1)+                    ;STORE DECREMENT TEST BYTE
    2675 042516  005300                                       DEC     R0                          ;SET NEXT PATTERN
    2676 042520  005302                                       DEC     R2                          ;DONE?
    2677 042522  003374                                       BGT     120$                        ;BR IF NO
    2678 042524  022737  000003  002314               125$:   CMP     #3,TSTFLAG                  ;TSTBLK PATTERNS THIS TIME THRU?
    2679 042532  001005                                       BNE     135$                        ;BR IF NO
    2680 042534  012700  002752                               MOV     #TSTBLK,R0                  ;FLOAT 1'S/0'S ETC. TEST TABLE
    2681 042540  112021                               130$:   MOVB    (R0)+,(R1)+                 ;STORE A TSTBLK BYTE
    2682 042542  005302                                       DEC     R2                          ;DONE?
    2683 042544  003375                                       BGT     130$                        ;BR IF NO
    2684 042546                                       135$:
    2685 042546  013700  002310                               MOV     COUNT,R0                    ;FIFO BYTE COUNT
    2686 042552  012701  046464                               MOV     #T17WFDATA,R1               ;FIFO WRITE DATA ADDRESS
    2687 042556  004737  050032                               JSR     PC,T17WFIF                  ;SETUP T17PK2 FOR WRITE FIFO
    2688 042562  012704  050330                               MOV     #T17PK2,R4                  ;GET WRITE SUBSYSTEM COMMAND PACKET
    2689 042566  010465  000000                               MOV     R4,TSDB(R5)                 ;SET THE PACKET ADDRESS TO EXECUTE
```

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042572  004737  016336                  JSR     PC,CHKTSSR                      ;WAIT FOR SSR TO SET
042576                                  FORCERROR       142$                            ;BBDFORCE ERROR IF FORCER=1
042612  103407                          BCS     150$                            ;BR IF CARRY SET (GOOD RETURN)
042614  010001                          MOV     R0,R1                           ;SAVE CONTENTS OF TSSR
042616                                  NEXT,ERRNO
042616                          142$:   ERRDF   ERRNO,T175SSR,PKTSSR            ;DEVICE FATAL SSR FAILED TO SET
042616  104455                                                                                          TRAP    C$ERDF
042620  001153                                                                                          .WORD   619
042622  047016                                                                                          .WORD   T175SSR
042624  012046                                                                                          .WORD   PKTSSR
042626  005237  002222                  INC     FATFLG                          ;SET FATAL ERROR FLAG
042632                          150$:   CKLOOP                                  ;LOOP ON ERROR, IF FLAG SET
042632  104406                                                                                          TRAP    C$CLP1


                                ;       Do a Write Subsystem READ STATUS
042634  004737  047744                  JSR     PC,T17SRD                       ;SETUP PACKET FOR READ STATUS
042640  012704  050330                  MOV     #T17PK2,R4                      ;GET WRITE SUBSYSTEM COMMAND PACKET
042644  010465  000000                  MOV     R4,TSDB(R5)                     ;SET THE PACKET ADDRESS TO EXECUTE
042650  004737  016336                  JSR     PC,CHKTSSR                      ;WAIT FOR SSR TO SET
042654                                  FORCERROR       157$                            ;BBDFORCE ERROR IF FORCER=1
042670  103407                          BCS     160$                            ;BR IF CARRY SET (GOOD RETURN)
042672  010001                          MOV     R0,R1                           ;SAVE CONTENTS OF TSSR
042674                                  NEXT,ERRNO
042674                          157$:   ERRDF   ERRNO,T173SSR,PKTSSR            ;DEVICE FATAL SSR FAILED TO SET
042674  104455                                                                                          TRAP    C$ERDF
042676  001154                                                                                          .WORD   620
042700  046706                                                                                          .WORD   T173SSR
042702  012046                                                                                          .WORD   PKTSSR
042704  005237  002222                  INC     FATFLG                          ;SET FATAL ERROR FLAG
042710                          160$:   CKLOOP                                  ;LOOP ON ERROR, IF FLAG SET
042710  104406                                                                                          TRAP    C$CLP1


                                ;       Set WORDS 0-7 of expd message buffer = to recv since not testing
042712  004737  050126                  JSR     PC,T17SETEXP                    ;SET WORDS 0-7 EXPD=RECV
042716  012701  046362                  MOV     #T17EXSTA,R1                    ;GET EXPECTED READ STATUS
042722  012702  050222                  MOV     #T17BFSTA,R2                    ;GET RECV READ STATUS
042726  012221                          MOV     (R2)+,(R1)+                     ;SET EXPD WORD #8 = RECV TEMP
042730  011211                          MOV     (R2),(R1)                       ;SET EXPD WORD #9 = RECV TEMP
042732  052711  000020                  BIS     #S2.INRDY,(R1)                  ;SET EXP INPUT READY= 1
042736  052711  000040                  BIS     #S2.OUTRDY,(R1)                 ;SET EXP OUTPUT READY= 1
042742  042711  000200                  BIC     #S2.DIM,(R1)                    ;SET EXP DATA IN MISS = 0
042746  042711  000100                  BIC     #S2.ILW,(R1)                    ;SET EXP LAST WORD (ILW)=0
                                ;       If Input Ready NOT=1 then Print Error
                                ;       If Output Ready NOT=1 or Data in Miss NOT=0 Then Print Error
042752  005000                          CLR     R0                              ;HIGH RECV ADDRESS FOR CKMSG2
042754  012701  050202                  MOV     #T17BFR,R1                      ;LOW RECV ADDRESS FOR CKMSG2
042760  012702  046342                  MOV     #T17EXP,R2                      ;EXPD ADDRESS
042764  012703  000024                  MOV     #20.,R3                         ;NUMBER OF BYTES TO COMPARE
042770  004737  011500                  JSR     PC,CKMSG2                       ;EXPD EQUAL RECV?
042774                                  FORCERROR       162$,NOTSSR             ;BBD
043004  103404                          BCS     170$                            ;BR IF YES
043006                                  NEXT,ERRNO
043006                          162$:   ERRHRD  ERRNO,T173CMP,MSGSTAT           ;REPORT ERROR
043006  104456                                                                                          TRAP    C$ERHRD
043010  001155                                                                                          .WORD   621
043012  047303                                                                                          .WORD   T173CMP
043014  012350                                                                                          .WORD   MSGSTAT
```

```
043016                          170$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
043016  104406                                                                  TRAP    C$CLP1

                                ;       Do Write Subsystem READ FIFO
043020  013700  002310                  MOV     COUNT,R0                ;SET READ BYTE COUNT
043024  004737  050066                  JSR     PC,T17RFIF              ;SETUP T17PK2 FOR READ FIFO
043030  012704  050330                  MOV     #T17PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
043034  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
043040  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
043044                                  FORCERROR       172$                    ;@@DFORCE ERROR IF FORCER=1
043060  103407                          BCS     180$                    ;BR IF CARRY SET (GOOD RETURN)
043062  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
043064                                  NEXT,ERRNO
043064                          172$:   ERRDF   ERRNO,T176SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
043064  104455                                                                  TRAP    C$ERDF
043066  001156                                                                  .WORD   622
043070  047062                                                                  .WORD   T176SSR
043072  012046                                                                  .WORD   PKTSSR
043074  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
043100                          180$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
043100  104406                                                                  TRAP    C$CLP1

                                ;       If Data read from FIFO NOT= to Data sent Then Print Error
043102  005000                          CLR     R0                      ;HIGH RECV ADDRESS FOR CKMSG2
043104  012702  046464                  MOV     #T17WFDATA,R2           ;GET EXPECTED ADDRESS FOR CKMSG2
043110  012701  050222                  MOV     #T17BFSTA,R1            ;GET RECEIVED ADDRESS FOR CKMSG2
043114  013703  002310                  MOV     COUNT,R3                ;NUMBER OF BYTES TO COMPARE
043120  004737  011500                  JSR     PC,CKMSG2               ;EXPD EQUAL RECV?
043124                                  FORCERROR       192$,NOTSSR     ;@@D
043134  103406                          BCS     200$                    ;BR IF YES
043136                                  NEXT,ERRNO
043136  013701  002310          192$:   MOV     COUNT,R1                ;GET BYTE COUNT
043142                                  ERRHRD  ERRNO,T175CMP,FIFEXP    ;REPORT ERROR
043142  104456                                                                  TRAP    C$ERHRD
043144  001157                                                                  .WORD   623
043146  047452                                                                  .WORD   T175CMP
043150  012170                                                                  .WORD   FIFEXP
043152                          200$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
043152  104406                                                                  TRAP    C$CLP1

                                ;       Do a Write Subsystem READ STATUS
043154  004737  047744                  JSR     PC,T17SRD               ;SETUP PACKET FOR READ STATUS
043160  012704  050330                  MOV     #T17PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
043164  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
043170  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
043174                                  FORCERROR       212$                    ;@@DFORCE ERROR IF FORCER=1
043210  103407                          BCS     220$                    ;BR IF CARRY SET (GOOD RETURN)
043212  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
043214                                  NEXT,ERRNO
043214                          212$:   ERRDF   ERRNO,T173SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
043214  104455                                                                  TRAP    C$ERDF
043216  001160                                                                  .WORD   624
043220  046706                                                                  .WORD   T173SSR
043222  012046                                                                  .WORD   PKTSSR
043224  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
043230                          220$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
043230  104406                                                                  TRAP    C$CLP1
```

```
                                        ;       Set WORDS 0-7 of expd message buffer = to recv since not testing
043232  004737  050126                          JSR     PC,T17SETEXP                    ;SET WORDS 0-7 EXPD=RECV
043236  012701  046362                          MOV     #T17EXSTA,R1                    ;GET EXPECTED READ STATUS
043242  012702  050222                          MOV     #T17BFSTA,R2                    ;GET RECV READ STATUS
043246  012221                                  MOV     (R2)+,(R1)+                     ;SET EXPD WORD #8 = RECV TEMP
043250  011211                                  MOV     (R2),(R1)                       ;SET EXPD WORD #9 = RECV TEMP
043252  052711  000020                          BIS     #S2.INRDY,(R1)                  ;SET EXP INPUT READY= 1
043256  042711  000040                          BIC     #S2.OUTRDY,(R1)                 ;SET EXP OUTPUT READY= 0
043262  042711  000200                          BIC     #S2.DIM,(R1)                    ;SET EXP DATA IN MISS = 0
043266  042711  000100                          BIC     #S2.ILW,(R1)                    ;SET EXP LAST WORD (ILW)=0
                                        ;       If Input Ready NOT=1 then Print Error
                                        ;       If Output Ready NOT=0 or Data in Miss NOT=0 Then Print Error
043272  005000                                  CLR     R0                              ;HIGH RECV ADDRESS FOR CKMSG2
043274  012701  050202                          MOV     #T17BFR,R1                      ;LOW RECV ADDRESS FOR CKMSG2
043300  012702  046342                          MOV     #T17EXP,R2                      ;EXPD ADDRESS
043304  012703  000024                          MOV     #20.,R3                         ;NUMBER OF BYTES TO COMPARE
043310  004737  011500                          JSR     PC,CKMSG2                       ;EXPD EQUAL RECV?
043314                                          FORCERROR       232$,NOTSSR             ;BBD
043324  103404                                  BCS     240$                            ;BR IF YES
043326                                          NEXT.ERRNO
043326                                  232$:   ERRHRD  ERRNO,T174CMP,MSGSTAT           ;REPORT ERROR
043326  104456                                                                                          TRAP    C$ERHRD
043330  001161                                                                                          .WORD   625
043332  047367                                                                                          .WORD   T174CMP
043334  012350                                                                                          .WORD   MSGSTAT
043336                                  240$:   CKLOOP                                  ;LOOP ON ERROR, IF FLAG SET
043336  104406                                                                                          TRAP    C$CLP1
043340                                          FORCEXIT        250$                    ;BBD
043350  005237  002310                          INC     COUNT                           ;GET NEXT BYTE COUNT
043354  023727  002310  000077                  CMP     COUNT,#77                       ;DONE 0 TO 77
043362  101002                                  BHI     250$                            ;BR IF YES
043364  000137  042360                          JMP     100$                            ;DO ANOTHER BYTE COUNT
043370  005237  002314                  250$:   INC     TSTFLAG                         ;GET NEXT TEST PATTERN CODE
043374  023727  002314  000003                  CMP     TSTFLAG,#3                      ;DONE INC,DEC,TSTBLK PATTERNS?
043402  101002                                  BHI     255$                            ;BR IF YES
043404  000137  042352                          JMP     95$                             ;DO ANOTHER TEST PATTERN
043410                                  255$:
043410                                          ENDSUB                                  ;///////////// END SUBTEST //////////
043410                                                                                          L10061:
043410  104403                                                                                          TRAP    C$ESUB

043412  005737  002222                          TST     FATFLG                          ;ANY FATAL ERRORS ?
043416  001402                                  BEQ     260$                            ;BRANCH IF NOT
043420  004737  017202                          JSR     PC,CKDROP                       ;TRY TO DROP THE UNIT
043424                                  260$:




                                                .SBTTL  TEST  6: SUBTEST 4: FIFO Verify ILW Status


                                        ;++
                                        ; TEST 6: SUBTEST 4:
                                        ;
                                        ; SUBTEST DESCRIPTION:
                                        ;
                                        ;       This subtest verifies that reading the FIFO when it is
                                        ;       empty causes the Last Word (ILW) status to assert.
```

```
                                ;
                                ; TEST STEPS:
                                ;
                                ; BEGIN
                                ;       Write to TSSR to soft initialize
                                ;       Do Write Subsystem READ FIFO with byte count equal to 1
                                ;       Do a Write Subsystem READ STATUS
                                ;       If Input Ready  NOT=1   Then Print Error
                                ;       If Output Ready NOT=0   Then Print Error
                                ;       If Data In Miss NOT=0   Then Print Error
                                ;       If Last Word (ILW) NOT=1 Then Print Error
                                ;    END
                                ;--
043424                                  BGNSUB                          ;///////////// BEGIN SUBTEST //////////
043424                                                                                   T6.4:
043424  104402                                                                                   TRAP    C$BSUB

                                ;       Write to TSSR register to soft initialize the controller
043426                          5$:
043426  004737  015774                  JSR     PC,SOFINIT              ;WRITE TO TSSR TO SOFT INITIALIZE
043432  103405                          BCS     10$                     ;BR IF SOFT INIT OKAY
043434  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
043436                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL DURING INIT
043436  104455                                                                                   TRAP    C$ERDF
043440  001161                                                                                   .WORD   625
043442  003652                                                                                   .WORD   SFIERR
043444  012034                                                                                   .WORD   SFIMSG
                                ;       Do a WRITE CHARACTERISTICS to setup a message buffer
043446  005037  002222          10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
043452  012704  050160                  MOV     #T17PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
043456  004737  010662                  JSR     PC,WRTCHR               ;DO WRITE CHARACTERISTICS COMMAND
043462                                  FORCERROR       42$                     ;@@DFORCE ERROR IF FORCER=1
043476  103407                          BCS     50$                     ;BR IF CARRY SET (GOOD RETURN)
043500  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
043502                                  NEXT,ERRNO
043502                          42$:    ERRDF   ERRNO,T17SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
043502  104455                                                                                   TRAP    C$ERDF
043504  001162                                                                                   .WORD   626
043506  046605                                                                                   .WORD   T17SSR
043510  012046                                                                                   .WORD   PKTSSR
043512  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
043516                          50$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
043516  104406                                                                                   TRAP    C$CLP1


                                ;       Do Write Subsystem READ FIFO with byte count equal to 1
043520  012700  000001                  MOV     #1,R0                   ;SET READ BYTE COUNT
043524  004737  050066                  JSR     PC,T17RFIF              ;SETUP T17PK2 FOR READ FIFO
043530  012704  050330                  MOV     #T17PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
043534  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
043540  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
043544                                  FORCERROR       142$                    ;@@DFORCE ERROR IF FORCER=1
043560  103407                          BCS     150$                    ;BR IF CARRY SET (GOOD RETURN)
043562  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
043564                                  NEXT,ERRNO
043564                          142$:   ERRDF   ERRNO,T176SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
043564  104455                                                                                   TRAP    C$ERDF
043566  001163                                                                                   .WORD   627
```

```
     043570  047062                                                                      .WORD   T176SSR
     043572  012046                                                                      .WORD   PKTSSR
2868 043574  005237  002222              INC     FATFLG                 ;SET FATAL ERROR FLAG
2869 043600                      150$:   CKLOOP                         ;LOOP ON ERROR, IF FLAG SET
     043600  104406                                                                      TRAP    C$CLP1
2870
2871                             ;       Do a Write Subsystem READ STATUS
2872 043602  004737  047744              JSR     PC,T17SRD              ;SETUP PACKET FOR READ STATUS
2873 043606  012704  050330              MOV     #T17PK2,R4             ;GET WRITE SUBSYSTEM COMMAND PACKET
2874 043612  010465  000000              MOV     R4,TSDB(R5)            ;SET THE PACKET ADDRESS TO EXECUTE
2875 043616  004737  016336              JSR     PC,CHKTSSR             ;WAIT FOR SSR TO SET
2876 043622                              FORCERROR       162$                   ;@@DFORCE ERROR IF FORCER=1
2877 043636  103407                      BCS     170$                   ;BR IF CARRY SET (GOOD RETURN)
2878 043640  010001                      MOV     R0,R1                  ;SAVE CONTENTS OF TSSR
2879 043642                              NEXT.ERRNO
2880 043642                      162$:   ERRDF   ERRNO,T173SSR,PKTSSR   ;DEVICE FATAL SSR FAILED TO SET
     043642  104455                                                                      TRAP    C$ERDF
     043644  001164                                                                      .WORD   628
     043646  046706                                                                      .WORD   T173SSR
     043650  012046                                                                      .WORD   PKTSSR
2881 043652  005237  002222              INC     FATFLG                 ;SET FATAL ERROR FLAG
2882 043656                      170$:   CKLOOP                         ;LOOP ON ERROR, IF FLAG SET
     043656  104406                                                                      TRAP    C$CLP1
2883                             ;       Set WORDS 0-7 of expd message buffer = to recv since not testing
2884 043660  004737  050126              JSR     PC,T17SETEXP           ;SET WORDS 0-7 EXPD=RECV
2885 043664  012701  046362              MOV     #T17EXSTA,R1           ;GET EXPECTED READ STATUS
2886 043670  012702  050222              MOV     #T17BFSTA,R2           ;GET RECV READ STATUS
2887 043674  012221                      MOV     (R2)+,(R1)+            ;SET EXPD WORD #8 = RECV TEMP
2888 043676  011211                      MOV     (R2),(R1)              ;SET EXPD WORD #9 = RECV TEMP
2889 043700  052711  000020              BIS     #S2.INRDY,(R1)         ;SET EXP INPUT READY= 1
2890 043704  042711  000040              BIC     #S2.OUTRDY,(R1)        ;SET EXP OUTPUT READY= 0
2891 043710  042711  000200              BIC     #S2.DIM,(R1)           ;SET EXP DATA IN MISS = 0
2892 043714  052711  000100              BIS     #S2.ILW,(R1)           ;SET EXP LAST WORD (ILW)=1
2893                             ;       If Input Ready NOT=1 then Print Error
2894                             ;       If Output Ready NOT=0 or Data in Miss NOT=0 Then Print Error
2895                             ;       If Last Word (ILW) NOT=1 Then Print Error
2896 043720  005000                      CLR     R0                     ;HIGH RECV ADDRESS FOR CKMSG2
2897 043722  012701  050202              MOV     #T17BFR,R1             ;LOW RECV ADDRESS FOR CKMSG2
2898 043726  012702  046342              MOV     #T17EXP,R2             ;EXPD ADDRESS
2899 043732  012703  000024              MOV     #20.,R3                ;NUMBER OF BYTES TO COMPARE
2900 043736  004737  011500              JSR     PC,CKMSG2              ;EXPD EQUAL RECV?
2901 043742                              FORCERROR       172$,NOTSSR    ;@@D
2902 043752  103404                      BCS     180$                   ;BR IF YES
2903 043754                              NEXT.ERRNO
2904 043754                      172$:   ERRHRD  ERRNO,T176CMP,MSGSTAT  ;REPORT ERROR
     043754  104456                                                                      TRAP    C$ERHRD
     043756  001165                                                                      .WORD   629
     043760  047526                                                                      .WORD   T176CMP
     043762  012350                                                                      .WORD   MSGSTAT
2905 043764                      180$:   CKLOOP                         ;LOOP ON ERROR, IF FLAG SET
     043764  104406                                                                      TRAP    C$CLP1
2906
2907 043766                              ENDSUB                         ;//////////// END SUBTEST //////////
     043766                                                                          L10062:
     043766  104403                                                                      TRAP    C$ESUB
2908
2909 043770  005737  002222              TST     FATFLG                 ;ANY FATAL ERRORS ?
```

```
043774  001402                          BEQ     260$                    ;BRANCH IF NOT
043776  004737  017202                  JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
044002                          260$:



                                        .SBTTL  TEST  6: SUBTEST 5: FIFO Verify Input Ready

                                ;++
                                ; TEST 6: SUBTEST 5:
                                ;
                                ; SUBTEST DESCRIPTION:
                                ;
                                ;       This subtest verifies that writing 64. bytes into the FIFO
                                ;       without reading any out causes the Input Ready status to
                                ;       negate. The Subtest then verfiies that writing a 65th byte
                                ;       into the FIFO causes the Data In Miss status to assert.
                                ;       Next it is verified that the original 64 bytes can be read
                                ;       out correctly and that the data has not been corrupted.
                                ;
                                ; TEST STEPS:
                                ;
                                ; BEGIN
                                ;       Write to TSSR to soft initialize
                                ;       Do a WRITE CHARACTERISTICS to setup a message buffer
                                ;       Do a Write Subsystem WRITE NPR to set tape direction out
                                ;       Do a Write Subsystem WRITE FIFO 64. bytes incrementing pattern
                                ;       Do a Write Subsystem READ STATUS
                                ;       If Input Ready  NOT=0   Then Print Error
                                ;       If Output Ready NOT=1   Then Print Error
                                ;       If Data In Miss NOT=0   Then Print Error
                                ;       Do a Write Subsystem WRITE FIFO 1 byte for a total of 65. written
                                ;       Do a Write Subsystem READ STATUS
                                ;       If Input Ready  NOT=0   Then Print Error
                                ;       If Output Ready NOT=1   Then Print Error
                                ;       If Data In Miss NOT=1   Then Print Error
                                ;       Do Write Subsystem READ FIFO
                                ;       If Data read from FIFO NOT= to Data sent Then Print Error
                                ;       Do a Write Subsystem READ STATUS
                                ;       If Input Ready  NOT=1   Then Print Error
                                ;       If Output Ready NOT=0   Then Print Error
                                ;       If Data In Miss NOT=1   Then Print Error
                                ;  END
                                ;--
044002                                  BGNSUB                          ;///////////// BEGIN SUBTEST //////////
044002                                                                           T6.5:
044002  104402                                                                           TRAP    C$BSUB


                                ;       Write to TSSR register to soft initialize the controller
044004                          5$:
044004  004737  015774                  JSR     PC,SOFINIT              ;WRITE TO TSSR TO SOFT INITIALIZE
044010  103405                          BCS     10$                     ;BR IF SOFT INIT OKAY
044012  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
044014                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL DURING INIT
044014  104455                                                                           TRAP    C$ERDF
044016  001165                                                                           .WORD   629
044020  003652                                                                           .WORD   SFIERR
044022  012034                                                                           .WORD   SFIMSG
```

```
                                          ;       Do a WRITE CHARACTERISTICS to setup a message buffer
044024  005037  002222                    10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
044030  012704  050160                            MOV     #T17PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
044034  004737  010662                            JSR     PC,WRTCHR               ;DO WRITE CHARACTERISTICS COMMAND
044040                                            FORCERROR       42$                     ;@@DFORCE ERROR IF FORCER=1
044054  103407                                    BCS     50$                     ;BR IF CARRY SET (GOOD RETURN)
044056  010001                                    MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
044060                                            NEXT.ERRNO
044060                                    42$:    ERRDF   ERRNO,T17SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
044060  104455                                                                                    TRAP    C$ERDF
044062  001166                                                                                    .WORD   630
044064  046605                                                                                    .WORD   T17SSR
044066  012046                                                                                    .WORD   PKTSSR
044070  005237  002222                            INC     FATFLG                  ;SET FATAL ERROR FLAG
044074                                    50$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
044074  104406                                                                                    TRAP    C$CLP1

                                          ;       Do a Write Subsystem WRITE NPR to set tape direction out
044076  012700  000100                    100$:   MOV     #NP.OUT,R0              ;SET TAPE DIRECTION OUT
044102  004737  050006                            JSR     PC,T17SNPR              ;SETUP T17PK2 FOR WRITE NPR
044106  012704  050330                            MOV     #T17PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
044112  010465  000000                            MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
044116  004737  016336                            JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
044122                                            FORCERROR       102$                    ;@@DFORCE ERROR IF FORCER=1
044136  103407                                    BCS     105$                    ;BR IF CARRY SET (GOOD RETURN)
044140  010001                                    MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
044142                                            NEXT.ERRNO
044142                                    102$:   ERRDF   ERRNO,T174SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
044142  104455                                                                                    TRAP    C$ERDF
044144  001167                                                                                    .WORD   631
044146  046753                                                                                    .WORD   T174SSR
044150  012046                                                                                    .WORD   PKTSSR
044152  005237  002222                            INC     FATFLG                  ;SET FATAL ERROR FLAG
044156                                    105$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
044156  104406                                                                                    TRAP    C$CLP1

                                          ;       Do a Write Subsystem WRITE FIFO 64. bytes incrementing pattern
044160  012737  000100  002310                    MOV     #64.,COUNT              ;WRITE 64 BYTES
044166  012701  046464                            MOV     #T17WFDATA,R1           ;EXPD WRITE FIFO DATA BUFFER
044172  012702  000100                            MOV     #64.,R2                 ;TEST PATTERN SIZE
044176  005000                                    CLR     R0                      ;INCREMENT TEST PATTERN
044200  110021                            110$:   MOVB    R0,(R1)+                ;STORE INCREMENT TEST BYTE
044202  005200                                    INC     R0                      ;SET NEXT PATTERN
044204  005302                                    DEC     R2                      ;DONE?
044206  003374                                    BGT     110$                    ;BR IF NO
044210  013700  002310                            MOV     COUNT,R0                ;FIFO BYTE COUNT
044214  012701  046464                            MOV     #T17WFDATA,R1           ;FIFO WRITE DATA ADDRESS
044220  004737  050032                            JSR     PC,T17WFIF              ;SETUP T17PK2 FOR WRITE FIFO
044224  012704  050330                            MOV     #T17PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
044230  010465  000000                            MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
044234  004737  016336                            JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
044240                                            FORCERROR       142$                    ;@@DFORCE ERROR IF FORCER=1
044254  103407                                    BCS     150$                    ;BR IF CARRY SET (GOOD RETURN)
044256  010001                                    MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
044260                                            NEXT.ERRNO
044260                                    142$:   ERRDF   ERRNO,T175SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
044260  104455                                                                                    TRAP    C$ERDF
```

```
        044262  001170                                                                          .WORD   632
        044264  047016                                                                          .WORD   T175SSR
        044266  012046                                                                          .WORD   PKTSSR
   3007 044270  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
   3008 044274                          150$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
        044274  104406                                                                          TRAP    C$CLP1
   3009
   3010                                 ;       Do a Write Subsystem READ STATUS
   3011                                 ;       If Input Ready  NOT=0   Then Print Error
   3012                                 ;       If Output Ready NOT=1   Then Print Error
   3013                                 ;       If Data In Miss NOT=0   Then Print Error
   3014 044276  004737  047744                  JSR     PC,T17SRD               ;SETUP PACKET FOR READ STATUS
   3015 044302  012704  050330                  MOV     #T17PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
   3016 044306  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
   3017 044312  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
   3018 044316                                  FORCERROR       157$                    ;@@DFORCE ERROR IF FORCER=1
   3019 044332  103407                          BCS     160$                    ;BR IF CARRY SET (GOOD RETURN)
   3020 044334  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
   3021 044336                                  NEXT.ERRNO
   3022 044336                          157$:   ERRDF   ERRNO,T173SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
        044336  104455                                                                          TRAP    C$ERDF
        044340  001171                                                                          .WORD   633
        044342  046706                                                                          .WORD   T173SSR
        044344  012046                                                                          .WORD   PKTSSR
   3023 044346  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
   3024 044352                          160$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
        044352  104406                                                                          TRAP    C$CLP1
   3025                                 ;       Set WORDS 0-7 of expd message buffer = to recv since not testing
   3026 044354  004737  050126                  JSR     PC,T17SETEXP            ;SET WORDS 0-7 EXPD=RECV
   3027 044360  012701  046362                  MOV     #T17EXSTA,R1            ;GET EXPECTED READ STATUS
   3028 044364  012702  050222                  MOV     #T17BFSTA,R2            ;GET RECV READ STATUS
   3029 044370  012221                          MOV     (R2)+,(R1)+             ;SET EXPD WORD #8 = RECV TEMP
   3030 044372  011211                          MOV     (R2),(R1)               ;SET EXPD WORD #9 = RECV TEMP
   3031 044374  042711  000020                  BIC     #S2.INRDY,(R1)          ;SET EXP INPUT READY= 0
   3032 044400  052711  000040                  BIS     #S2.OUTRDY,(R1)         ;SET EXP OUTPUT READY= 1
   3033 044404  042711  000200                  BIC     #S2.DIM,(R1)            ;SET EXP DATA IN MISS = 0
   3034 044410  005000                          CLR     R0                      ;HIGH RECV ADDRESS FOR CKMSG2
   3035 044412  012701  050202                  MOV     #T17BFR,R1              ;LOW RECV ADDRESS FOR CKMSG2
   3036 044416  012702  046342                  MOV     #T17EXP,R2              ;EXPD ADDRESS
   3037 044422  012703  000024                  MOV     #20.,R3                 ;NUMBER OF BYTES TO COMPARE
   3038 044426  004737  011500                  JSR     PC,CKMSG2               ;EXPD EQUAL RECV?
   3039 044432                                  FORCERROR       162$,NOTSSR     ;@@D
   3040 044442  103404                          BCS     170$                    ;BR IF YES
   3041 044444                                  NEXT.ERRNO
   3042 044444                          162$:   ERRHRD  ERRNO,T173CMP,MSGSTAT   ;REPORT ERROR
        044444  104456                                                                          TRAP    C$ERHRD
        044446  001172                                                                          .WORD   634
        044450  047303                                                                          .WORD   T173CMP
        044452  012350                                                                          .WORD   MSGSTAT
   3043 044454                          170$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
        044454  104406                                                                          TRAP    C$CLP1
   3044
   3045
   3046                                 ;       Do a Write Subsystem WRITE FIFO 1 byte for a total of 65. written
   3047 044456  012700  000001                  MOV     #1,R0                   ;FIFO BYTE COUNT
   3048 044462  012701  046464                  MOV     #T17WFDATA,R1           ;FIFO WRITE DATA ADDRESS
   3049 044466  004737  050032                  JSR     PC,T17WFIF              ;SETUP T17PK2 FOR WRITE FIFO
```

```
044472 012704 050330               MOV     #T17PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
044476 010465 000000               MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
044502 004737 016336               JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
044506                             FORCERROR       172$                     ;@@DFORCE ERROR IF FORCER=1
044522 103407                      BCS     180$                    ;BR IF CARRY SET (GOOD RETURN)
044524 010001                      MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
044526                             NEXT.ERRNO
044526                     172$:   ERRDF   ERRNO,T175SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
044526 104455                                                                                  TRAP    C$ERDF
044530 001173                                                                                  .WORD   635
044532 047016                                                                                  .WORD   T175SSR
044534 012046                                                                                  .WORD   PKTSSR
044536 005237 002222               INC     FATFLG                  ;SET FATAL ERROR FLAG
044542                     180$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
044542 104406                                                                                  TRAP    C$CLP1

                           ;       Do a Write Subsystem READ STATUS
                           ;       If Input Ready  NOT=0   Then Print Error
                           ;       If Output Ready NOT=1   Then Print Error
                           ;       If Data In Miss NOT=1   Then Print Error
044544 004737 047744               JSR     PC,T17SRD               ;SETUP PACKET FOR READ STATUS
044550 012704 050330               MOV     #T17PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
044554 010465 000000               MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
044560 004737 016336               JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
044564                             FORCERROR       187$                     ;@@DFORCE ERROR IF FORCER=1
044600 103407                      BCS     190$                    ;BR IF CARRY SET (GOOD RETURN)
044602 010001                      MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
044604                             NEXT.ERRNO
044604                     187$:   ERRDF   ERRNO,T173SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
044604 104455                                                                                  TRAP    C$ERDF
044606 001174                                                                                  .WORD   636
044610 046706                                                                                  .WORD   T173SSR
044612 012046                                                                                  .WORD   PKTSSR
044614 005237 002222               INC     FATFLG                  ;SET FATAL ERROR FLAG
044620                     190$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
044620 104406                                                                                  TRAP    C$CLP1
                           ;       Set WORDS 0-7 of expd message buffer = to recv since not testing
044622 004737 050126               JSR     PC,T17SETEXP            ;SET WORDS 0-7 EXPD=RECV
044626 012701 046362               MOV     #T17EXSTA,R1            ;GET EXPECTED READ STATUS
044632 012702 050222               MOV     #T17BFSTA,R2            ;GET RECV READ STATUS
044636 012221                      MOV     (R2)+,(R1)+             ;SET EXPD WORD #8 = RECV TEMP
044640 011211                      MOV     (R2),(R1)               ;SET EXPD WORD #9 = RECV TEMP
044642 042711 000020               BIC     #S2.INRDY,(R1)          ;SET EXP INPUT READY= 0
044646 052711 000040               BIS     #S2.OUTRDY,(R1)         ;SET EXP OUTPUT READY= 1
044652 052711 000200               BIS     #S2.DIM,(R1)            ;SET EXP DATA IN MISS = 1
044656 005000                      CLR     R0                      ;HIGH RECV ADDRESS FOR CKMSG2
044660 012701 050202               MOV     #T17BFR,R1              ;LOW RECV ADDRESS FOR CKMSG2
044664 012702 046342               MOV     #T17EXP,R2              ;EXPD ADDRESS
044670 012703 000024               MOV     #20.,R3                 ;NUMBER OF BYTES TO COMPARE
044674 004737 011500               JSR     PC,CKMSG2               ;EXPD EQUAL RECV?
044700                             FORCERROR       192$,NOTSSR     ;@@D
044710 103404                      BCS     200$                    ;BR IF YES
044712                             NEXT.ERRNO
044712                     192$:   ERRHRD  ERRNO,T173CMP,MSGSTAT   ;REPORT ERROR
044712 104456                                                                                  TRAP    C$ERHRD
044714 001175                                                                                  .WORD   637
044716 047303                                                                                  .WORD   T173CMP
```

```
044720  012350                                                                          .WORD   MSGSTAT
044722                          200$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
044722  104406                                                                          TRAP    C$CLP1

                                ;       Do Write Subsystem READ FIFO
044724  013700  002310                  MOV     COUNT,R0                ;SET READ BYTE COUNT
044730  004737  050066                  JSR     PC,T17RFIF              ;SETUP T17PK2 FOR READ FIFO
044734  012704  050330                  MOV     #T17PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
044740  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
044744  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
044750                                  FORCERROR       212$                    ;@@DFORCE ERROR IF FORCER=1
044764  103407                          BCS     220$                    ;BR IF CARRY SET (GOOD RETURN)
044766  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
044770                                  NEXT.ERRNO
044770                          212$:   ERRDF   ERRNO,T176SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
044770  104455                                                                          TRAP    C$ERDF
044772  001176                                                                          .WORD   638
044774  047062                                                                          .WORD   T176SSR
044776  012046                                                                          .WORD   PKTSSR
045000  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
045004                          220$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
045004  104406                                                                          TRAP    C$CLP1


                                ;       If Data read from FIFO NOT= to Data sent Then Print Error
045006  005000                          CLR     R0                      ;HIGH RECV ADDRESS FOR CKMSG2
045010  012702  046464                  MOV     #T17WFDATA,R2           ;GET EXPECTED ADDRESS FOR CKMSG2
045014  012701  050222                  MOV     #T17BFSTA,R1            ;GET RECEIVED ADDRESS FOR CKMSG2
045020  013703  002310                  MOV     COUNT,R3                ;NUMBER OF BYTES TO COMPARE
045024  004737  011500                  JSR     PC,CKMSG2               ;EXPD EQUAL RECV?
045030                                  FORCERROR       232$,NOTSSR     ;@@D
045040  103406                          BCS     240$                    ;BR IF YES
045042                                  NEXT.ERRNO
045042  013701  002310          232$:   MOV     COUNT,R1                ;GET BYTE COUNT
045046                                  ERRHRD  ERRNO,T175CMP,FIFEXP    ;REPORT ERROR
045046  104456                                                                          TRAP    C$ERHRD
045050  001177                                                                          .WORD   639
045052  047452                                                                          .WORD   T175CMP
045054  012170                                                                          .WORD   FIFEXP
045056                          240$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
045056  104406                                                                          TRAP    C$CLP1


                                ;       Do a Write Subsystem READ STATUS
                                ;       If Input Ready  NOT=1   Then Print Error
                                ;       If Output Ready NOT=0   Then Print Error
                                ;       If Data In Miss NOT=1   Then Print Error
045060  004737  047744                  JSR     PC,T17SRD               ;SETUP PACKET FOR READ STATUS
045064  012704  050330                  MOV     #T17PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
045070  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
045074  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
045100                                  FORCERROR       252$                    ;@@DFORCE ERROR IF FORCER=1
045114  103407                          BCS     260$                    ;BR IF CARRY SET (GOOD RETURN)
045116  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
045120                                  NEXT.ERRNO
045120                          252$:   ERRDF   ERRNO,T173SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
045120  104455                                                                          TRAP    C$ERDF
045122  001200                                                                          .WORD   640
045124  046706                                                                          .WORD   T173SSR
045126  012046                                                                          .WORD   PKTSSR
```

```
045130  005237  002222          INC     FATFLG                  ;SET FATAL ERROR FLAG
045134                  260$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
045134  104406                                                          TRAP    C$CLP1

                        ;       Set WORDS 0-7 of expd message buffer = to recv since not testing
045136  004737  050126          JSR     PC,T17SETEXP            ;SET WORDS 0-7 EXPD=RECV
045142  012701  046362          MOV     #T17EXSTA,R1            ;GET EXPECTED READ STATUS
045146  012702  050222          MOV     #T17BFSTA,R2            ;GET RECV READ STATUS
045152  012221                  MOV     (R2)+,(R1)+             ;SET EXPD WORD #8 = RECV TEMP
045154  011211                  MOV     (R2),(R1)               ;SET EXPD WORD #9 = RECV TEMP
045156  052711  000020          BIS     #S2.INRDY,(R1)          ;SET EXP INPUT READY= 1
045162  042711  000040          BIC     #S2.OUTRDY,(R1)         ;SET EXP OUTPUT READY= 0
045166  052711  000200          BIS     #S2.DIM,(R1)            ;SET EXP DATA IN MISS = 1
045172  005000                  CLR     R0                      ;HIGH RECV ADDRESS FOR CKMSG2
045174  012701  050202          MOV     #T17BFR,R1              ;LOW RECV ADDRESS FOR CKMSG2
045200  012702  046342          MOV     #T17EXP,R2              ;EXPD ADDRESS
045204  012703  000024          MOV     #20.,R3                 ;NUMBER OF BYTES TO COMPARE
045210  004737  011500          JSR     PC,CKMSG2               ;EXPD EQUAL RECV?
045214                          FORCERROR       272$,NOTSSR     ;BAD
045224  103404                  BCS     280$                    ;BR IF YES
045226                          NEXT.ERRNO
045226                  272$:   ERRHRD  ERRNO,T174CMP,MSGSTAT   ;REPORT ERROR
045226  104456                                                          TRAP    C$ERHRD
045230  001201                                                          .WORD   641
045232  047367                                                          .WORD   T174CMP
045234  012350                                                          .WORD   MSGSTAT
045236                  280$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
045236  104406                                                          TRAP    C$CLP1

045240                          ENDSUB                          ;///////////// END SUBTEST //////////
045240                                                                  L10063:
045240  104403                                                          TRAP    C$ESUB

045242  005737  002222          TST     FATFLG                  ;ANY FATAL ERRORS ?
045246  001402                  BEQ     300$                    ;BRANCH IF NOT
045250  004737  017202          JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
045254                  300$:



                                .SBTTL  TEST  6: SUBTEST 6: FIFO Verify Reset FIFO Test

                        ;++
                        ; TEST 6: SUBTEST 6:
                        ;
                        ; SUBTEST DESCRIPTION:
                        ;
                        ;       This subtest verifies that the Reset FIFO function within
                        ;       the Write Miscellaneous Control 1 function initializes
                        ;       the FIFO to correct intial status. The following steps
                        ;       are performed:
                        ;               1. Reset an already initialized FIFO and check for
                        ;                  proper status.
                        ;               2. Write a varying number of bytes (1-65.) into the
                        ;                  FIFO and verify that after each block of bytes is
                        ;                  written the FIFO can be be reset to it's initial
                        ;                  state.
                        ;
```

```
                                ; TEST STEPS:
                                ;
                                ; BEGIN
                                ;       Write to TSSR to soft initialize
                                ;       Do a WRITE CHARACTERISTICS to setup a message buffer
                                ;       Do a Write Subsystem Write Misc to Reset FIFO
                                ;       Do a Write Subsystem READ STATUS
                                ;       If all Tape Status 2 (ICER,IFMK,IMER) flip-flop
                                ;         signals NOT=0 Then Print Error
                                ;       Do a Write Subsystem WRITE NPR to set tape direction out
                                ;
                                ;  REPEAT FOR BYTE COUNT 1 TO 65.
                                ;    BEGIN
                                ;       Do a Write Subsystem WRITE FIFO with the current byte count
                                ;       Do a Write Subsystem Write Misc to Reset FIFO
                                ;       Do a Write Subsystem READ STATUS
                                ;       If all Tape Status 2 (ICER,IFMK,IMER) flip-flop
                                ;         signals NOT=0 Then Print Error
                                ;    END
                                ;--
045254                                  BGNSUB                                  ;///////////// BEGIN SUBTEST //////////
045254                                                                                  T6.6:
045254  104402                                                                          TRAP    C$BSUB

                                ;
                                        Write to TSSR register to soft initialize the controller
045256                          5$:
045256  004737  015774                  JSR     PC,SOFINIT                      ;WRITE TO TSSR TO SOFT INITIALIZE
045262  103405                          BCS     10$                             ;BR IF SOFT INIT OKAY
045264  010001                          MOV     R0,R1                           ;SAVE CONTENTS OF TSSR
045266                                  ERRDF   ERRNO,SFIERR,SFIMSG             ;DEVICE FATAL DURING INIT
045266  104455                                                                          TRAP    C$ERDF
045270  001201                                                                          .WORD   641
045272  003652                                                                          .WORD   SFIERR
045274  012034                                                                          .WORD   SFIMSG
                                ;       Do a WRITE CHARACTERISTICS to setup a message buffer
045276  005037  002222          10$:    CLR     FATFLG                          ;CLEAR FATAL ERROR FLAG
045302  012704  050160                  MOV     #T17PACKET,R4                   ;GET THE ADDRESS OF COMMAND PACKET
045306  004737  010662                  JSR     PC,WRTCHR                       ;DO WRITE CHARACTERISTICS COMMAND
045312                                  FORCERROR       42$                             ;@@DFORCE ERROR IF FORCER=1
045326  103407                          BCS     50$                             ;BR IF CARRY SET (GOOD RETURN)
045330  010001                          MOV     R0,R1                           ;SAVE CONTENTS OF TSSR
045332                                  NEXT.ERRNO
045332                          42$:    ERRDF   ERRNO,T17SSR,PKTSSR             ;DEVICE FATAL SSR FAILED TO SET
045332  104455                                                                          TRAP    C$ERDF
045334  001202                                                                          .WORD   642
045336  046605                                                                          .WORD   T17SSR
045340  012046                                                                          .WORD   PKTSSR
045342  005237  002222                  INC     FATFLG                          ;SET FATAL ERROR FLAG
045346                          50$:    CKLOOP                                  ;LOOP ON ERROR, IF FLAG SET
045346  104406                                                                          TRAP    C$CLP1
                                ;       Do a Write Subsystem Write Misc to Reset FIFO
045350  004737  047764                  JSR     PC,T17RSFIF                     ;SETUP PKT FOR WRITE MISC RESET FIFO
045354  012704  050330                  MOV     #T17PK2,R4                      ;GET WRITE SUBSYSTEM COMMAND PACKET
045360  010465  000000                  MOV     R4,TSDB(R5)                     ;SET THE PACKET ADDRESS TO EXECUTE
045364  004737  016336                  JSR     PC,CHKTSSR                      ;WAIT FOR SSR TO SET
045370                                  FORCERROR       62$                             ;@@DFORCE ERROR IF FORCER=1
045404  103407                          BCS     70$                             ;BR IF CARRY SET (GOOD RETURN)
```

```
045406  010001                             MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
045410                                     NEXT.ERRNO
045410                             62$:    ERRDF   ERRNO,T172SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
045410  104455                                                                                     TRAP    C$ERDF
045412  001203                                                                                     .WORD   643
045414  046642                                                                                     .WORD   T172SSR
045416  012046                                                                                     .WORD   PKTSSR
045420  005237  002222                     INC     FATFLG                  ;SET FATAL ERROR FLAG
045424                             70$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
045424  104406                                                                                     TRAP    C$CLP1

                                   ;       Do a Write Subsystem READ STATUS
                                   ;       If all Tape Status 2 (ICER,IFMK,IHER) flip-flop
                                   ;         signals NOT=0 Then Print Error
045426  004737  047744                     JSR     PC,T17SRD               ;SETUP PACKET FOR READ STATUS
045432  012704  050330                     MOV     #T17PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
045436  010465  000000                     MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
045442  004737  016336                     JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
045446                                     FORCERROR       77$                     ;BBDFORCE ERROR IF FORCER=1
045462  103407                             BCS     80$                     ;BR IF CARRY SET (GOOD RETURN)
045464  010001                             MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
045466                                     NEXT.ERRNO
045466                             77$:    ERRDF   ERRNO,T173SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
045466  104455                                                                                     TRAP    C$ERDF
045470  001204                                                                                     .WORD   644
045472  046706                                                                                     .WORD   T173SSR
045474  012046                                                                                     .WORD   PKTSSR
045476  005237  002222                     INC     FATFLG                  ;SET FATAL ERROR FLAG
045502                             80$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
045502  104406                                                                                     TRAP    C$CLP1
045504  004737  050126                     JSR     PC,T17SETEXP            ;SET WORDS 0-7 EXPD=RECV (NOT TESTING)
045510  012701  046362                     MOV     #T17EXSTA,R1            ;GET EXPECTED READ STATUS
045514  012702  050222                     MOV     #T17BFSTA,R2            ;GET RECV READ STATUS
045520  011211                             MOV     (R2),(R1)               ;SET EXPD WORD #8 = RECV TEMP
045522  042711  002000                     BIC     #S1.ICER,(R1)           ;SET EXPD ICER  =0
045526  042711  001000                     BIC     #S1.IFMK,(R1)           ;SET EXPD IFMK  =0
045532  042711  000400                     BIC     #S1.IHER,(R1)           ;SET EXPD IHER  =0
045536  016261  000002  000002             MOV     2(R2),2(R1)             ;SET EXPD WORD #9 = RECV (NOT TESTING)
045544  005000                             CLR     R0                      ;HIGH RECV ADDRESS FOR CKMSG2
045546  012701  050202                     MOV     #T17BFR,R1              ;LOW RECV ADDRESS FOR CKMSG2
045552  012702  046342                     MOV     #T17EXP,R2              ;EXPD ADDRESS
045556  012703  000024                     MOV     #20.,R3                 ;NUMBER OF BYTES TO COMPARE
045562  004737  011500                     JSR     PC,CKMSG2               ;EXPD EQUAL RECV?
045566                                     FORCERROR       92$,NOTSSR      ;BBD
045576  103404                             BCS     100$                    ;BR IF YES
045600                                     NEXT.ERRNO
045600                             92$:    ERRHRD  ERRNO,T177CMP,MSGSTAT   ;REPORT ERROR
045600  104456                                                                                     TRAP    C$ERHRD
045602  001205                                                                                     .WORD   645
045604  047634                                                                                     .WORD   T177CMP
045606  012350                                                                                     .WORD   MSGSTAT
045610                             100$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
045610  104406                                                                                     TRAP    C$CLP1

                                   ;       Do a Write Subsystem WRITE NPR to set tape direction out
045612  012700  000100                     MOV     #NP.OUT,R0              ;SET TAPE DIRECTION OUT
045616  004737  050006                     JSR     PC,T17SNPR              ;SETUP T17PK2 FOR WRITE NPR
```

```
3272 045622  012704  050330                    MOV     #T17PK2,R4                ;GET WRITE SUBSYSTEM COMMAND PACKET
3273 045626  010465  000000                    MOV     R4,TSDB(R5)               ;SET THE PACKET ADDRESS TO EXECUTE
3274 045632  004737  016336                    JSR     PC,CHKTSSR                ;WAIT FOR SSR TO SET
3275 045636                                    FORCERROR       112$                      ;@@DFORCE ERROR IF FORCER=1
3276 045652  103407                            BCS     120$                      ;BR IF CARRY SET (GOOD RETURN)
3277 045654  010001                            MOV     R0,R1                     ;SAVE CONTENTS OF TSSR
3278 045656                                    NEXT.ERRNO
3279 045656                           112$:    ERRDF   ERRNO,T174SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
     045656  104455                                                                                        TRAP    C$ERDF
     045660  001206                                                                                        .WORD   646
     045662  046753                                                                                        .WORD   T174SSR
     045664  012046                                                                                        .WORD   PKTSSR
3280 045666  005237  002222                    INC     FATFLG                    ;SET FATAL ERROR FLAG
3281 045672                           120$:    CKLOOP                            ;LOOP ON ERROR, IF FLAG SET
     045672  104406                                                                                        TRAP    C$CLP1
3282
3283                                  ;        Setup incrementing pattern in FIFO data buffer
3284 045674  012701  046362                    MOV     #T17EXSTA,R1              ;EXPD WRITE FIFO DATA BUFFER
3285 045700  012702  000100                    MOV     #64.,R2                   ;TEST PATTERN SIZE
3286 045704  005000                            CLR     R0                        ;INCREMENT TEST PATTERN
3287 045706  110021                   130$:    MOVB    R0,(R1)+                  ;STORE INCREMENT TEST BYTE
3288 045710  005200                            INC     R0                        ;SET NEXT PATTERN
3289 045712  005302                            DEC     R2                        ;DONE?
3290 045714  003374                            BGT     130$                      ;BR IF NO
3291
3292                                  ;  REPEAT FOR BYTE COUNT 1 TO 65.
3293 045716  012737  000001  002310            MOV     #1,COUNT                  ;GET FIRST BYTE COUNT
3294                                  ;        Do a Write Subsystem WRITE FIFO with the current byte count
3295 045724                           150$:                                      ;REPEAT LOOP LABEL
3296 045724  013700  002310                    MOV     COUNT,R0                  ;FIFO BYTE COUNT
3297 045730  012701  046362                    MOV     #T17EXSTA,R1              ;FIFO WRITE DATA ADDRESS
3298 045734  004737  050032                    JSR     PC,T17WFIF                ;SETUP T17PK2 FOR WRITE FIFO
3299 045740  012704  050330                    MOV     #T17PK2,R4                ;GET WRITE SUBSYSTEM COMMAND PACKET
3300 045744  010465  000000                    MOV     R4,TSDB(R5)               ;SET THE PACKET ADDRESS TO EXECUTE
3301 045750  004737  016336                    JSR     PC,CHKTSSR                ;WAIT FOR SSR TO SET
3302 045754                                    FORCERROR       152$                      ;@@DFORCE ERROR IF FORCER=1
3303 045770  103407                            BCS     160$                      ;BR IF CARRY SET (GOOD RETURN)
3304 045772  010001                            MOV     R0,R1                     ;SAVE CONTENTS OF TSSR
3305 045774                                    NEXT.ERRNO
3306 045774                           152$:    ERRDF   ERRNO,T175SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
     045774  104455                                                                                        TRAP    C$ERDF
     045776  001207                                                                                        .WORD   647
     046000  047016                                                                                        .WORD   T175SSR
     046002  012046                                                                                        .WORD   PKTSSR
3307 046004  005237  002222                    INC     FATFLG                    ;SET FATAL ERROR FLAG
3308 046010                           160$:    CKLOOP                            ;LOOP ON ERROR, IF FLAG SET
     046010  104406                                                                                        TRAP    C$CLP1
3309
3310                                  ;        Do a Write Subsystem Write Misc to Reset FIFO
3311 046012  004737  047764                    JSR     PC,T17RSFIF               ;SETUP PKT FOR WRITE MISC RESET FIFO
3312 046016  012704  050330                    MOV     #T17PK2,R4                ;GET WRITE SUBSYSTEM COMMAND PACKET
3313 046022  010465  000000                    MOV     R4,TSDB(R5)               ;SET THE PACKET ADDRESS TO EXECUTE
3314 046026  004737  016336                    JSR     PC,CHKTSSR                ;WAIT FOR SSR TO SET
3315 046032                                    FORCERROR       162$                      ;@@DFORCE ERROR IF FORCER=1
3316 046046  103407                            BCS     170$                      ;BR IF CARRY SET (GOOD RETURN)
3317 046050  010001                            MOV     R0,R1                     ;SAVE CONTENTS OF TSSR
3318 046052                                    NEXT.ERRNO
```

```
   3319 046052                          162$:   ERRDF   ERRNO,T172SSR,PKTSSR        ;DEVICE FATAL SSR FAILED TO SET
        046052  104455                                                                          TRAP    C$ERDF
        046054  001210                                                                          .WORD   648
        046056  046642                                                                          .WORD   T172SSR
        046060  012046                                                                          .WORD   PKTSSR
   3320 046062  005237  002222                  INC     FATFLG                      ;SET FATAL ERROR FLAG
   3321 046066                          170$:   CKLOOP                              ;LOOP ON ERROR, IF FLAG SET
        046066  104406                                                                          TRAP    C$CLP1
   3322
   3323                                 ;       Do a Write Subsystem READ STATUS
   3324                                 ;       If all Tape Status 2 (ICER,IFMK,IHER) flip-flop
   3325                                 ;         signals NOT=0 Then Print Error
   3326 046070  004737  047744                  JSR     PC,T17SRD                   ;SETUP PACKET FOR READ STATUS
   3327 046074  012704  050330                  MOV     #T17PK2,R4                  ;GET WRITE SUBSYSTEM COMMAND PACKET
   3328 046100  010465  000000                  MOV     R4,TSDB(R5)                 ;SET THE PACKET ADDRESS TO EXECUTE
   3329 046104  004737  016336                  JSR     PC,CHKTSSR                  ;WAIT FOR SSR TO SET
   3330 046110                                  FORCERROR       177$                        ;@@DFORCE ERROR IF FORCER=1
   3331 046124  103407                          BCS     180$                        ;BR IF CARRY SET (GOOD RETURN)
   3332 046126  010001                          MOV     R0,R1                       ;SAVE CONTENTS OF TSSR
   3333 046130                                  NEXT.ERRNO
   3334 046130                          177$:   ERRDF   ERRNO,T173SSR,PKTSSR        ;DEVICE FATAL SSR FAILED TO SET
        046130  104455                                                                          TRAP    C$ERDF
        046132  001211                                                                          .WORD   649
        046134  046706                                                                          .WORD   T173SSR
        046136  012046                                                                          .WORD   PKTSSR
   3335 046140  005237  002222                  INC     FATFLG                      ;SET FATAL ERROR FLAG
   3336 046144                          180$:   CKLOOP                              ;LOOP ON ERROR, IF FLAG SET
        046144  104406                                                                          TRAP    C$CLP1
   3337 046146  004737  050126                  JSR     PC,T17SETEXP                ;SET WORDS 0-7 EXPD=RECV (NOT TESTING)
   3338 046152  012701  046362                  MOV     #T17EXSTA,R1                ;GET EXPECTED READ STATUS
   3339 046156  012702  050222                  MOV     #T17BFSTA,R2                ;GET RECV READ STATUS
   3340 046162  011211                          MOV     (R2),(R1)                   ;SET EXPD WORD #8 = RECV TEMP
   3341 046164  042711  002000                  BIC     #S1.ICER,(R1)               ;SET EXPD ICER  =0
   3342 046170  042711  001000                  BIC     #S1.IFMK,(R1)               ;SET EXPD IFMK  =0
   3343 046174  042711  000400                  BIC     #S1.IHER,(R1)               ;SET EXPD IHER  =0
   3344 046200  016261  000002  000002          MOV     2(R2),2(R1)                 ;SET EXPD WORD #9 = RECV (NOT TESTING)
   3345 046206  005000                          CLR     R0                          ;HIGH RECV ADDRESS FOR CKMSG2
   3346 046210  012701  050202                  MOV     #T17BFR,R1                  ;LOW RECV ADDRESS FOR CKMSG2
   3347 046214  012702  046342                  MOV     #T17EXP,R2                  ;EXPD ADDRESS
   3348 046220  012703  000024                  MOV     #20.,R3                     ;NUMBER OF BYTES TO COMPARE
   3349 046224  004737  011500                  JSR     PC,CKMSG2                   ;EXPD EQUAL RECV?
   3350 046230                                  FORCERROR       192$,NOTSSR         ;@@D
   3351 046240  103404                          BCS     200$                        ;BR IF YES
   3352 046242                                  NEXT.ERRNO
   3353 046242                          192$:   ERRHRD  ERRNO,T177CMP,MSGSTAT       ;REPORT ERROR
        046242  104456                                                                          TRAP    C$ERHRD
        046244  001212                                                                          .WORD   650
        046246  047634                                                                          .WORD   T177CMP
        046250  012350                                                                          .WORD   MSGSTAT
   3354 046252                          200$:   CKLOOP                              ;LOOP ON ERROR, IF FLAG SET
        046252  104406                                                                          TRAP    C$CLP1
   3355
   3356
   3357 046254                          250$:
   3358 046254                                  FORCEXIT        260$
   3359 046264  005237  002310                  INC     COUNT                       ;GET NEXT BYTE COUNT
   3360 046270  023727  002310  000101          CMP     COUNT,#65.                  ;DONE ALL BYTES?
```

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046276  101002                                  BHI     260$                    ;BR IF YES
046300  000137  045724                          JMP     150$                    ;DO ANOTHER BYTE COUNT
046304                                  260$:

046304                                          ENDSUB                          ;///////////// END SUBTEST //////////
046304                                                                                  L10064:
046304  104403                                                                                  TRAP    C$ESUB

046306  005737  002222                          TST     FATFLG                  ;ANY FATAL ERRORS ?
046312  001402                                  BEQ     300$                    ;BRANCH IF NOT
046314  004737  017202                          JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
046320  004737  016456                  300$:   JSR     PC,TSTLOOP              ;DO ITERATIONS?
046324  103002                                  BCC     305$                    ;BR IF NO
046326  000137  040364                          JMP     T17LOOP                 ;LOOP UNTIL ITERATIONS DONE
046332                                  305$:

046332                                          EXIT    TST                     ;////////// EXIT TEST //////////
046332  104432                                                                                  TRAP    C$EXIT
046334  002112                                                                                  .WORD   L10056-.



                                        ;+
                                        ;LOCAL STORAGE FOR THIS TEST
                                        ;-


046336                                  T17MSK:                                 ;MASK OF UNTESTED BITS IN READ STATUS BYTES
                                                                                ;UNTESTED BITS ARE SET TO 1
046336     377                                  .BYTE   ↑C<000>                 ;BYTE 0 MASK
046337     037                                  .BYTE   ↑C<340>                 ;BYTE 1 MASK (PARERR,IRESV2,IRESV1)
046340     360                                  .BYTE   ↑C<017>                 ;BYTE 2 (TIMER A,TIMER B,UNDEFINED<1:0>)
046341     000                                  .BYTE   0                       ;MAKE IT EVEN

046342                                  T17EXP:                                 ;BEGIN EXPECTED DATA BUFFER
046342  000000                                  .WORD   0                       ;MESSAGE TYPE
046344  000000                                  .WORD   0                       ;DATA FIELD LENGTH
046346  000000                                  .WORD   0                       ;RBPCR
046350  000000                                  .WORD   0                       ;XST0
046352  000000                                  .WORD   0                       ;XST1
046354  000000                                  .WORD   0                       ;XST2
046356  000000                                  .WORD   0                       ;XST3
046360  000000                                  .WORD   0                       ;XST4 (ALWAYS PRESENT FOR WRITE SUB.)
046362                                  T17EXSTA: .BLKB 66.                     ;EXPECTED READ STATUS AND WRITE FIFO DATA
046464                                  T17EXEND:                                       ;END EXPECTED DATA BUFFER

046464                                  T17WFDATA: .BLKB 66.                    ;WRITE FIFO EXPECTED DATA BUFFER


                                        ;+
                                        ;LOCAL TEXT MESSAGES FOR TEST
                                        ;-

046566     106     111     106          TST17ID:        .ASCIZ  'FIFO Exerciser'
046605     127     122     111          T17SSR: .ASCIZ  'WRITE CHARACTERISTICS Failed'
046642     127     122     111          T172SSR:.ASCIZ  'WRITE SUBSYSTEM (Write Misc) Failed'
046706     127     122     111          T173SSR:.ASCIZ  'WRITE SUBSYSTEM (Read Status) Failed'
046753     127     122     111          T174SSR:.ASCIZ  'WRITE SUBSYSTEM (Write Npr) Failed'
047016     127     122     111          T175SSR:.ASCIZ  'WRITE SUBSYSTEM (Write FIFO) Failed'
```

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047062     127     122     111   T176SSR:.ASCIZ  'WRITE SUBSYSTEM (Read FIFO) Failed'
047125     106     111     106   T171CMP:.ASCIZ  'FIFO Status in WORD #9 Incorrect after Initialize'
047207     122     145     141   T172CMP:.ASCIZ  'Read FIFO Data not equal to Write FIFO , Data is in WORD #8'
047303     105     111     106   T173CMP:.ASCIZ  'FIFO Status (In WORD #9) Incorrect after WRITE FIFO'
047367     106     111     106   T174CMP:.ASCIZ  'FIFO Status (In WORD #9) Incorrect after READ FIFO'
047452     122     145     141   T175CMP:.ASCIZ  'Read FIFO Data not equal to Write FIFO Data'
047526     106     111     106   T176CMP:.ASCIZ  'FIFO Status (In WORD #9) Incorrect after READ FIFO from an Empty FIFO'
047634     106     111     106   T177CMP:.ASCIZ  'FIFO Status (In WORD #9) Incorrect after RESET FIFO'
                                         .EVEN


                                 ;+
                                 ; CLEAR MESSAGE BUFFER
                                 ;-
047720                           T17CLRBUF:                                     ;
047720                                   SAVREG                                 ;SAVE R1-R5 UNTIL NEXT RETURN
047724  012701  050202                   MOV     #T17BFR,R1                     ;GET MESSAGE BUFFER ADDRESS
047730  012702  000120                   MOV     #T17BEND-T17BFR,R2             ;SIZE OF MESSAGE BUFFER IN BYTES
047734  105021                   10$:    CLRB    (R1)+                          ;CLEAR A BYTE
047736  005302                           DEC     R2                             ;DONE?
047740  003375                           BGT     10$                            ;BR IF NO
047742  000207                           RTS     PC                             ;RETURN

                                 ;+
                                 ; SETUP T17PK2 PACKET FOR READ STATUS
                                 ;-
047744                           T17SRD:
047744  004737  047720                   JSR     PC,T17CLRBUF                   ;CLEAR MESSAGE BUFFER
047750  012700  050340                   MOV     #T17DT2,R0                     ;WRITE SUBSYSTEM DATA BUFFER
047754  112720  000005                   MOVB    #PW.RDSTATUS,(R0)+             ;STORE READ STATUS COMMAND IN BSELO
047760  105010                           CLRB    (R0)                           ;CLEAR BSEL1
047762  000207                           RTS     PC                             ;RETURN

                                 ;+
                                 ; SETUP T17PK2 PACKET FOR WRITE MISC RESET FIFO
                                 ;-
047764                           T17RSFIF:
047764  004737  047720                   JSR     PC,T17CLRBUF                   ;CLEAR MESSAGE BUFFER
047770  012700  050340                   MOV     #T17DT2,R0                     ;WRITE SUBSYSTEM DATA BUFFER
047774  112720  000010                   MOVB    #PW.WMISC,(R0)+                ;STORE WRITE MISCELLANEOUS IN BSELO
050000  112710  000030                   MOVB    #MS.RSFIF!MS.RSTAP,(R0)        ;STORE BSEL1 CLEAR FIFO CODES
050004  000207                           RTS     PC                             ;RETURN

                                 ;+
                                 ; SETUP T17PK2 PACKET FOR WRITE NPR
                                 ;
                                 ; INPUT:
                                 ;       R0 CONTAINS BSEL1 NPR DATA
                                 ;
                                 ;       SETS NP.WRP SINCE IF 0 IT WRITES WRONG PARITY.
                                 ;-
050006                           T17SNPR:
050006  004737  047720                   JSR     PC,T17CLRBUF                   ;CLEAR MESSAGE BUFFER
050012  012701  050340                   MOV     #T17DT2,R1                     ;WRITE SUBSYSTEM DATA BUFFER
050016  112721  000011                   MOVB    #PW.WNPR,(R1)+                 ;STORE WRITE NPR IN BSELO
050022  052700  000020                   BIS     #NP.WRP,R0                     ;DON'T WRITE WRONG PARITY
050026  110011                           MOVB    R0,(R1)                        ;STORE NPR DATA IN BSEL1
050030  000207                           RTS     PC                             ;RETURN
```

```

                                            ;+
                                            ; SETUP T17PK2 PACKET FOR WRITE FIFO
                                            ;
                                            ; INPUT:
                                            ;       R0 CONTAINS BYTE COUNT
                                            ;       R1 CONTAINS DATA PATTERN BLOCK ADDRESS
                                            ;-
050032                                      T17WFIF:
050032                                              SAVREG                                  ;SAVE R1-R5 UNTIL NEXT RETURN
050036  004737  047720                              JSR     PC,T17CLRBUF                    ;CLEAR MESSAGE BUFFER
050042  012702  050340                              MOV     #T17DT2,R2                      ;WRITE SUBSYSTEM DATA BUFFER
050046  112722  000004                              MOVB    #PW.WFIFO,(R2)+                 ;STORE WRITE FIFO IN BSEL0
050052  110022                                      MOVB    R0,(R2)+                        ;STORE BYTE COUNT IN BSEL1
050054  005022                                      CLR     (R2)+                           ;CLEAR SEL2 (UNUSED)
050056  112122                              10$:    MOVB    (R1)+,(R2)+                     ;STORE DATA PATTERN BYTE
050060  005300                                      DEC     R0                              ;DONE ALL BYTES?
050062  003375                                      BGT     10$                             ;BR IF NO
050064  000207                                      RTS     PC                              ;RETURN

                                            ;+
                                            ; SETUP T17PK2 PACKET FOR READ FIFO
                                            ;
                                            ; INPUT:
                                            ;       R0 CONTAINS SEL2 BYTE COUNT
                                            ;-
050066                                      T17RFIF:
050066  004737  047720                              JSR     PC,T17CLRBUF                    ;CLEAR MESSAGE BUFFER
050072  012701  050340                              MOV     #T17DT2,R1                      ;WRITE SUBSYSTEM DATA BUFFER
050076  112721  000003                              MOVB    #PW.RFIFO,(R1)+                 ;STORE READ FIFO IN BSEL0
050102  110021                                      MOVB    R0,(R1)+                        ;STORE BYTE COUNT IN BSEL1
050104  000207                                      RTS     PC                              ;RETURN
                                            ;+
                                            ; CLEAR EXPECTED DATA MESSAGE BUFFER
                                            ;-
050106                                      T17CLEXP:
050106  012701  046342                              MOV     #T17EXP,R1                      ;GET EXPD ADDRESS
050112  012700  000122                              MOV     #T17EXEND-T17EXP,R0             ;GET EXPD SIZE
050116  105021                              10$:    CLRB    (R1)+                           ;CLEAR A BYTE
050120  005300                                      DEC     R0                              ;DONE?
050122  003375                                      BGT     10$                             ;BR IF NO
050124  000207                                      RTS     PC                              ;RETURN

                                            ;+
                                            ;Set WORDS 0-7 of expd message buffer = to recv since not testing
                                            ;-
050126                                      T17SETEXP:
050126  012702  046342                              MOV     #T17EXP,R2                      ;GET EXPD
050132  012703  050202                              MOV     #T17BFR,R3                      ;GET READ STATUS RECV BUFFER
050136  012700  000010                              MOV     #8.,R0                          ;SET WORDS 0-7 EXP=RECV
050142  012322                              5$:     MOV     (R3)+,(R2)+                     ;SET EXPD=RECV
050144  005300                                      DEC     R0                              ;DONE WORDS 0-7 WORDS?
050146  003375                                      BGT     5$                              ;BR IF NO
050150  000207                                      RTS     PC                              ;RETURN

        050160                                      .=<.+10>&177770
                                            ;
```

```
                                ;WRITE CHARACTERISTICS COMMAND PACKET
                                ;
050160                          T17PACKET:                                  ;COMMAND PACKET FOR TEST
050160  100004                          .WORD   100004                      ;WRITE CHARACTERISTICS COMMAND, WITH ACK
050162  050170                          .WORD   T17DATA                     ;ADDRESS OF CHARACTERISTICS BLOCK
050164  000000                          .WORD   0
050166  000012                          .WORD   10.                         ;MINIMUM MESSAGE PACKET SIZE

050170                          T17DATA:                                    ;CHARACTERISTICS DATA BLOCK
050170  050202                          .WORD   T17BFR                      ;ADDRESS OF MESSAGE BUFFER
050172  000000                          .WORD   0
050174  000024                          .WORD   20.                         ;LENGTH OF MESSAGE BUFFER
050176  000000                          .WORD   0                           ;ESS,ENB,EAI,ERI
050200  000000                          .WORD   0                           ;EXTENDED FEATURES UNIT NO. ETC.


                                ;MESSAGE BUFFER FOR ALL TEST 6 COMMANDS

050202                          T17BFR:                                     ;BEGIN MESSAGE BUFFER
050202  000000                          .WORD   0                           ;MESSAGE TYPE
050204  000000                          .WORD   0                           ;DATA FIELD LENGTH
050206  000000                          .WORD   0                           ;RBPCR
050210  000000                          .WORD   0                           ;XST0
050212  000000                          .WORD   0                           ;XST1
050214  000000                          .WORD   0                           ;XST2
050216  000000                          .WORD   0                           ;XST3
050220  000000                          .WORD   0                           ;XST4 (ALWAYS PRESENT FOR WRITE SUBSYSTEM
050222                          T17BFSTA: .BLKB 64.                         ;READ STATUS AND WRITE FIFO BUFFER
050322                          T17BEND:                                    ;END OF MESSAGE BUFFER
                                ;
                                ;WRITE SUBSYSTEM READ STATUS COMMAND PACKET
                                ;
        050330                          .=<.+10>&177770
050330                          T17PK2:
050330  100006                          .WORD   P.WRTSUB!P.ACK              ;WRITE SUBSYSTEM WITH ACK
050332  050340                          .WORD   T17DT2                      ;LOW ADDRESS OF DATA BLOCK
050334  000000                          .WORD   0                           ;HIGH ADDRESS OF DATA BLOCK
050336  000012                          .WORD   10.                         ;MINIMUM MESSAGE PACKET SIZE

050340                          T17DT2:                                     ;DATA BLOCK
050340     000                          .BYTE   0                           ;BSEL0
050341     000                          .BYTE   0                           ;BSEL1
050342  000000                          .WORD   0                           ;SEL2
050344                                  .BLKB   66.                         ;WRITE FIFO DATA OUTPUT BUFFER

050446                                  ENDTST
050446                                                                                L10056:
050446  104401                                                                                TRAP    C$ETST


                                        .SBTTL  TEST  7: STATIC TRANSPORT BUS INTERFACE TEST
                                ;+
                                ; TEST DESCRIPTION:
                                ;
                                ;
                                ; TEST STEPS:
                                ;
                                ;    REPEAT FOR LOOPCNT
```

```
                                        ;       BEGIN
                                        ;       Write to TSSR register to soft initialize the controller
                                        ;       Do WRITE CHARACTERISTICS to check for Extended Features Switch
                                        ;       If Extended Features Hardware Switch Clear then:
                                        ;         Do Write Subsystem Write Miscellaneous to Set Extended Features.
                                        ;       Do WRITE CHARACTERISTICS to select reserved unit 7
                                        ;       Do a Write Subsystem READ STATUS
                                        ;       If any transport interface signals are asserted then Print Error
                                        ;       END
                                        ;--


050450                                          BGNTST
050450                                                                          T7::
050450  012700  051156                          MOV     #TST18ID,R0             ;ASCII MESSAGE TO IDENTIFY TEST
050454  004737  016510                          JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
050460  012737  000012  002216                  MOV     #10.,LOOPCNT            ;PERFORM 10 ITERATIONS
050466                                  T18LOOP:
                                        ;       Write to TSSR register to soft initialize the controller
050466                                  5$:
050466  004737  015774                          JSR     PC,SOFINIT              ;WRITE TO TSSR TO SOFT INITIALIZE
050472  103405                                  BCS     10$                     ;BR IF SOFT INIT OKAY
050474  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
050476                                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL DURING INIT
050476  104455                                                                                  TRAP    C$ERDF
050500  001274                                                                                  .WORD   700
050502  003652                                                                                  .WORD   SFIERR
050504  012034                                                                                  .WORD   SFIMSG

                                        ;       Do WRITE CHARACTERISTICS to check for Extended Features Switch
050506  005037  002222                  10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
050512  012704  051640                          MOV     #T18PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
050516  004737  010662                          JSR     PC,WRTCHR               ;DO WRITE CHARACTERISTICS COMMAND
050522                                          FORCERROR       12$                     ;@@DFORCE ERROR IF FORCER=1
050536  103407                                  BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
050540  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
050542                                          NEXT.ERRNO
050542                                  12$:    ERRDF   ERRNO,T18SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
050542  104455                                                                                  TRAP    C$ERDF
050544  001275                                                                                  .WORD   701
050546  051215                                                                                  .WORD   T18SSR
050550  012046                                                                                  .WORD   PKTSSR
050552  005237  002222                          INC     FATFLG                  ;SET FATAL ERROR FLAG
050556                                  15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
050556  104406                                                                                  TRAP    C$CLP1

                                        ;       If Extended Features Hardware Switch Clear then:
                                        ;         Do Write Subsystem Write Miscellaneous to Set Extended Features.
050560  012701  051662                          MOV     #T18BFR,R1              ;MESSAGE BUFFER ADDRESS
050564  032761  000200  000012                  BIT     #X2.EXTF,XST2(R1)       ;EXTENDED FEATURES SWITCH SET?
050572  001026                                  BNE     30$                     ;BR IF YES
050574  004737  051506                          JSR     PC,T18SMISC             ;SETUP PACKET FOR WRITE MISCELLANEOUS
050600  012704  051710                          MOV     #T18PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
050604  010465  000000                          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
050610  004737  016336                          JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
050614                                          FORCERROR       22$                     ;@@DFORCE ERROR IF FORCER=1
050630  103407                                  BCS     30$                     ;BR IF CARRY SET (GOOD RETURN)
```

```
050632  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
050634                                  NEXT.ERRNO
050634                          22$:    ERRDF   ERRNO,T182SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
050634  104455                                                                          TRAP    C$ERDF
050636  001276                                                                          .WORD   702
050640  051252                                                                          .WORD   T182SSR
050642  012046                                                                          .WORD   PKTSSR
050644  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
050650                          30$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
050650  104406                                                                          TRAP    C$CLP1



                                ;       Do WRITE CHARACTERISTICS to select reserved unit 7
050652  005037  002222                  CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
050656  012704  051640                  MOV     #T18PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
050662  004737  010662                  JSR     PC,WRTCHR               ;DO WRITE CHARACTERISTICS COMMAND
050666                                  FORCERROR       42$                     ;@@DFORCE ERROR IF FORCER=1
050702  103407                          BCS     50$                     ;BR IF CARRY SET (GOOD RETURN)
050704  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
050706                                  NEXT.ERRNO
050706                          42$:    ERRDF   ERRNO,T18SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
050706  104455                                                                          TRAP    C$ERDF
050710  001277                                                                          .WORD   703
050712  051215                                                                          .WORD   T18SSR
050714  012046                                                                          .WORD   PKTSSR
050716  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
050722                          50$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
050722  104406                                                                          TRAP    C$CLP1

                                ;       Clear message buffer
050724  012701  051662                  MOV     #T18BFR,R1              ;GET MESSAGE BUFFER ADDRESS
050730  013700  051654                  MOV     T18DATA+4,R0            ;SIZE OF MESSAGE BUFFER IN BYTES
050734  105021                  60$:    CLRB    (R1)+                   ;CLEAR A BYTE
050736  005300                          DEC     R0                      ;DONE?
050740  003375                          BGT     60$                     ;BR IF NO
                                ;       Do a Write Subsystem READ STATUS
050742  004737  051466                  JSR     PC,T18SRD               ;SETUP PACKET FOR READ STATUS
050746  012704  051710                  MOV     #T18PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
050752  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
050756  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
050762                                  FORCERROR       62$                     ;@@DFORCE ERROR IF FORCER=1
050776  103407                          BCS     70$                     ;BR IF CARRY SET (GOOD RETURN)
051000  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
051002                                  NEXT.ERRNO
051002                          62$:    ERRDF   ERRNO,T183SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
051002  104455                                                                          TRAP    C$ERDF
051004  001300                                                                          .WORD   704
051006  051316                                                                          .WORD   T183SSR
051010  012046                                                                          .WORD   PKTSSR
051012  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
051016                          70$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
051016  104406                                                                          TRAP    C$CLP1


                                ;       Set first 8 words of expd message buffer = to recv since not testing
                                ;       Set unused bits in Read Status expd equal rcvd
051020  004737  051530                  JSR     PC,T18SETEXP            ;SET SOME EXPD TO RECV
```

```
                                  ;       If any transport interface signals are asserted then Print Error
051024  005000                            CLR     R0                       ;HIGH RECV ADDRESS FOR CKMSG2
051026  012701  051662                    MOV     #T18BFR,R1               ;LOW RECV ADDRESS FOR CKMSG2
051032  012702  051126                    MOV     #T18EXP,R2               ;EXPD ADDRESS
051036  012703  000012                    MOV     #10.,R3                  ;NUMBER OF WORDS TO COMPARE
051042  004737  011500                    JSR     PC,CKMSG2                ;EXPD EQUAL RECV?
051046                                    FORCERROR        82$,NOTSSR      ;BAD
051056  103404                            BCS     90$                      ;BR IF YES
051060                                    NEXT.ERRNO
051060                            82$:    ERRHRD  ERRNO,T18CMP,MSGSTAT     ;REPORT ERROR
051060  104456                                                                                   TRAP    C$ERHRD
051062  001301                                                                                   .WORD   705
051064  051363                                                                                   .WORD   T18CMP
051066  012350                                                                                   .WORD   MSGSTAT
051070                            90$:    CKLOOP                           ;LOOP ON ERROR, IF FLAG SET
051070  104406                                                                                   TRAP    C$CLP1

051072  005737  002222                    TST     FATFLG                   ;ANY FATAL ERRORS ?
051076  001402                            BEQ     160$                     ;BRANCH IF NOT
051100  004737  017202                    JSR     PC,CKDROP                ;TRY TO DROP THE UNIT
051104  004737  016456            160$:   JSR     PC,TSTLOOP               ;DO ITERATIONS?
051110  103002                            BCC     165$                     ;BR IF NO
051112  000137  050466                    JMP     T18LOOP                  ;LOOP UNTIL ITERATIONS DONE
051116                            165$:
051116                                    EXIT    TST
051116  104432                                                                                   TRAP    C$EXIT
051120  000606                                                                                   .WORD   L10065-.



                                  ;+
                                  ;LOCAL STORAGE FOR THIS TEST
                                  ;-

051122                            T18MSK:                                  ;MASK OF UNUSED BITS IN READ STATUS BYTES
051122     377                            .BYTE   ↑C<000>                  ;BYTE 0 MASK
051123     037                            .BYTE   ↑C<340>                  ;BYTE 1
051124     100                            .BYTE   ↑C<277>                  ;BYTE 2
051125     000                            .BYTE   0                        ;MAKE IT EVEN

051126                            T18EXP:                                  ;EXPECTED DATA BUFFER
051126  000000                            .WORD   0                        ;MESSAGE TYPE
051130  000000                            .WORD   0                        ;DATA FIELD LENGTH
051132  000000                            .WORD   0                        ;RBPCR
051134  000000                            .WORD   0                        ;XST0
051136  000000                            .WORD   0                        ;XST1
051140  000000                            .WORD   0                        ;XST2
051142  000000                            .WORD   0                        ;XST3
051144  000000                            .WORD   0                        ;XST4 (ALWAYS PRESENT FOR WRITE SUB)
051146  000000                            .WORD   0                        ;READ STATUS BYTE 1/0
051150  000000                            .WORD   0                        ;READ STATUS BYTE 2

051152     377     020            T18XS:  .BYTE   377,020                  ;READ STATUS BYTE 0/1 EXPECTED BASE
051154  000000                            .WORD   0                        ;READ STATUS BYTE 2 EXPECTED BASE


                                  ;+
                                  ;LOCAL TEXT MESSAGES FOR TEST
                                  ;-
```

```

051156      123      164      141   TST18ID:          .ASCIZ  'Static Transport Bus Interface'
051215      127      122      111   T18SSR: .ASCIZ  'WRITE CHARACTERISTICS Failed'
051252      127      122      111   T182SSR:.ASCIZ  'WRITE SUBSYSTEM (Write Misc) Failed'
051316      127      122      111   T183SSR:.ASCIZ  'WRITE SUBSYSTEM (Read Status) Failed'
051363      124      162      141   T18CMP: .ASCIZ  'Transport Bus Interface Signals NOT Negated After Unit 7 Selected'
                                            .EVEN


                                    ;+
                                    ; SETUP T18PK2 PACKET FOR READ STATUS
                                    ;-
051466                              T18SRD:
051466                                      SAVREG                                  ;SAVE R1-R5 UNTIL NEXT RETURN
051472  012700  051720                      MOV     #T18DT2,R0                      ;WRITE SUBSYSTEM DATA BUFFER
051476  112720  000005                      MOVB    #PW.RDSTATUS,(R0)+              ;STORE READ STATUS COMMAND IN BSEL0
051502  105010                              CLRB    (R0)                            ;CLEAR BSEL1
051504  000207                              RTS     PC                              ;RETURN

                                    ;+
                                    ; SETUP T18PK2 PACKET FOR WRITE MISC.
                                    ;-
051506                              T18SMISC:
051506                                      SAVREG                                  ;SAVE R1-R5 UNTIL NEXT RETURN
051512  012700  051720                      MOV     #T18DT2,R0                      ;WRITE SUBSYSTEM DATA BUFFER
051516  112720  000010                      MOVB    #PW.WMISC,(R0)+                 ;STORE WRITE MISCELLANEOUS IN BSEL0
051522  112710  000200                      MOVB    #MS.EXT,(R0)                    ;STORE INVERT EXTENDED FEATURES IN BSEL1
051526  000207                              RTS     PC                              ;RETURN

                                    ;+
                                    ;Set first 8 words of expd message buffer = to recv since not testing
                                    ;       Set unused bits in Read Status expd equal rcvd
                                    ;-
051530                              T18SETEXP:
051530  012702  051126                      MOV     #T18EXP,R2                      ;GET EXPD
051534  012703  051662                      MOV     #T18BFR,R3                      ;GET READ STATUS RECV BUFFER
051540  012700  000010                      MOV     #8.,R0                          ;SET FIRST 8 WORDS EXP=RECV
051544  012322                      5$:     MOV     (R3)+,(R2)+                     ;SET EXPD=RECV
051546  005300                              DEC     R0                              ;DONE FIRST 8 WORDS?
051550  003375                              BGT     5$                              ;BR IF NO
051552  012701  051122                      MOV     #T18MSK,R1                      ;GET UNUSED BIT MASK
051556  013712  051152                      MOV     T18XS,(R2)                      ;SETUP BASE EXPECTED BYTE 1/0
051562  013762  051154  000002              MOV     T18XS+2,2(R2)                   ;SETUP BASE EXPECTED BYTE 2
051570  011300                              MOV     (R3),R0                         ;GET RECV BYTE 1 AND BYTE 0
051572  041100                              BIC     (R1),R0                         ;CLEAR ALL BUT UNUSED
051574  040012                              BIC     R0,(R2)                         ;CLEAR UNUSED IN EXP
051576  050012                              BIS     R0,(R2)                         ;SET UNUSED EXPD=RECV FOR COMPARE
051600  016300  000002                      MOV     2(R3),R0                        ;GET RECV BYTE 2
051604  046100  000002                      BIC     2(R1),R0                        ;CLEAR ALL BUT UNUSED
051610  040062  000002                      BIC     R0,2(R2)                        ;CLEAR UNUSED IN EXPD
051614  050062  000002                      BIS     R0,2(R2)                        ;SET UNUSED EXPD=RECV FOR COMPARE
051620  105062  000003                      CLRB    3(R2)                           ;CLEAR EXPD BYTE 3 (UNUSED)
051624  105063  000003                      CLRB    3(R3)                           ;CLEAR RECV BYTE 3 (UNUSED)
051630  000207                              RTS     PC                              ;RETURN

        051640                              .=<.+10>&177770

                                    ;
                                    ;WRITE CHARARTERISTICS COMMAND PACKET
```

```
                                ;
051640                          T18PACKET:                                      ;COMMAND PACKET FOR TEST
051640  100004                          .WORD   100004                          ;WRITE CHARACTERISTICS COMMAND, WITH ACK
051642  051650                          .WORD   T18DATA                         ;ADDRESS OF CHARACTERISTICS BLOCK
051644  000000                          .WORD   0
051646  000012                          .WORD   10.                             ;MESSAGE PACKET MINIMUM SIZE

051650                          T18DATA:                                        ;CHARACTERISTICS DATA BLOCK
051650  051662                          .WORD   T18BFR                          ;ADDRESS OF MESSAGE BUFFER
051652  000000                          .WORD   0
051654  000024                          .WORD   20.                             ;LENGTH OF MESSAGE BUFFER
051656  000000                          .WORD   0                               ;ESS,ENB,EAI,ERI
051660  000007                          .WORD   7                               ;SELECT RESERVED UNIT 7


051662                          T18BFR:                                         ;MESSAGE BUFFER
051662  000000                          .WORD   0                               ;MESSAGE TYPE
051664  000000                          .WORD   0                               ;DATA FIELD LENGTH
051666  000000                          .WORD   0                               ;RBPCR
051670  000000                          .WORD   0                               ;XST0
051672  000000                          .WORD   0                               ;XST1
051674  000000                          .WORD   0                               ;XST2
051676  000000                          .WORD   0                               ;XST3
051700  000000                          .WORD   0                               ;XST4 (ALWAYS PRESENT FOR WRITE SUBSYSTEM
051702  000000                          .WORD   0                               ;READ STATUS BYTE 1/0 RETURNED
051704  000000                          .WORD   0                               ;READ STATUS BYTE 2
                                ;
                                ;WRITE SUBSYSTEM READ STATUS COMMAND PACKET
                                ;
        051710                          .=<.+10>&177770
051710                          T18PK2:
051710  100006                          .WORD   P.WRTSUB!P.ACK                  ;WRITE SUBSYSTEM WITH ACK
051712  051720                          .WORD   T18DT2                          ;LOW ADDRESS OF DATA BLOCK
051714  000000                          .WORD   0                               ;HIGH ADDRESS OF DATA BLOCK
051716  000010                          .WORD   8.                              ;BUFFER EXTENT

051720                          T18DT2:                                         ;DATA BLOCK
051720     000                          .BYTE   0                               ;BSEL0
051721     000                          .BYTE   0                               ;BSEL1
051722  000000                          .WORD   0                               ;SEL2
051724  000000                          .WORD   0                               ;DATA


051726                                  ENDTST
051726                                                                  L10065:
051726  104401                                                                          TRAP    C$ETST
                                        .SBTTL  TEST  8: TRANSPORT BUS INTERFACE LOOPBACK TEST
                                ;**
                                ; TEST DESCRIPTION:
                                ;
                                ;       This test verifies the controller's Transport Bus
                                ;       drivers, receivers, and signal loopback logic. Note
                                ;       that the Static Transport Bus test must have run
                                ;       correctly for this test to provide meaningful results.
                                ;
                                ; TEST STEPS:
                                ;
```

```
                                        ;  REPEAT FOR LOOPCNT
                                        ;    BEGIN
                                        ;       Do Subtest 1     - Loopback Control signals test
                                        ;       Do Subtest 2     - Loopback Read/Write signals test
                                        ;       Do Subtest 3     - Loopback Write Strobe test
                                        ;       Do Subtest 4     - Loopback Read Strobe test
                                        ;    END
                                        ;--



051730                                          BGNTST
051730                                                                                  T8::
051730  012700  060142                          MOV     #TST19ID,R0             ;ASCII MESSAGE TO IDENTIFY TEST
051734  004737  016510                          JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
051740  012737  000012  002216                  MOV     #10.,LOOPCNT            ;PERFORM 10 ITERATIONS
051746                                  T19LOOP:

                                                .SBTTL  TEST  8: SUBTEST 1: LOOPBACK CONTROL SIGNAL TEST

                                        ;++
                                        ; TEST 8: SUBTEST 1:
                                        ;
                                        ; SUBTEST DESCRIPTION:
                                        ;
                                        ;       This subtest verifies the Transport Control loopback
                                        ;       path can transmit and receive correctly. The
                                        ;       control signals are all loopback signals other
                                        ;       than the read/write data (IW<7:0> and IR<7:0>).
                                        ;
                                        ; TEST STEPS:
                                        ;
                                        ;       The loopback signals IFAD,ITAD0,ITAD1 are the tape unit select
                                        ;       lines. Since reserved unit 7 must remain selected these signals
                                        ;       are always set low. This further means the signals they drive
                                        ;       (ISPEED,IRDY,IONL) are only tested in the low state.
                                        ;
                                        ; BEGIN
                                        ;       Write to TSSR register to soft initialize the controller
                                        ;       Do WRITE CHARACTERISTICS to check for Extended Features Switch
                                        ;       If Extended Features Hardware Switch Clear then:
                                        ;         Do Write Subsystem Write Miscellaneous to Set Extended Features.
                                        ;       Do WRITE CHARACTERISTICS to select reserved unit 7 and setup BUFFER
                                        ;       Do a Write Subsystem WRITE NPR to set tape direction out and Loopback
                                        ;       Do Write Subsystem Write Control to CLEAR loopback signals group 1.
                                        ;       Do Write Subsystem Write Format to CLEAR loopback signals group 2.
                                        ;        (the loopback signals have to be cleared here due to the flip-flops
                                        ;         that are set on a 1 to 0 transition (IHER,IFMK,ICER))
                                        ;       Do a Write Subsystem Write Misc to Reset Tape Status F-FLOPS
                                        ;       Do a Write Subsystem READ STATUS
                                        ;       If all Tape Status 2 (ICER,IFMK,IHER) flip-flop
                                        ;         signals NOT=0 Then Print Error
                                        ;
                                        ;  REPEAT FOR ALL TEST PATTERNS IN TSTBLK TABLE
                                        ;    BEGIN
                                        ;       Do Write Subsystem Write Control to Drive loopback signals group 1.
                                        ;       Do Write Subsystem Write Format to Drive loopback signals group 2.
                                        ;       Do a Write Subsystem READ STATUS
```

```
                                   ;        If loopback data NOT= data sent Then Print Error
                                   ;        Do a Write Subsystem Write Misc to Reset Tape Status F-FLOPS
                                   ;        Do a Write Subsystem READ STATUS
                                   ;        If all Tape Status 2 (ICER,IFMK,IHER) flip-flop
                                   ;          signals NOT=0 Then Print Error
                                   ;    END
                                   ;--
051746                                      BGNSUB                          ;///////////// BEGIN SUBTEST //////////
051746                                                                                T8.1:
051746  1044C2                                                                                  TRAP    C$BSUB

                                   ;        Write to TSSR register to soft initialize the controller
051750                             5$:
051750  004737  015774                      JSR     PC,SOFINIT              ;WRITE TO TSSR TO SOFT INITIALIZE
051754  103405                              BCS     10$                     ;BR IF SOFT INIT OKAY
051756  010001                              MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
051760                                      ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL DURING INIT
051760  104455                                                                                  TRAP    C$ERDF
051762  001440                                                                                  .WORD   800
051764  003652                                                                                  .WORD   SFIERR
051766  012034                                                                                  .WORD   SFIMSG
                                   ;        Do WRITE CHARACTERISTICS to check for Extended Features Switch
051770  005037  002222             10$:     CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
051774  012704  062270                      MOV     #T19PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
052000  004737  010662                      JSR     PC,WRTCHR               ;DO WRITE CHARACTERISTICS COMMAND
052004                                      FORCERROR       12$                     ;@@DFORCE ERROR IF FORCER=1
052020  103407                              BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
052022  010001                              MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
052024                                      NEXT,ERRNO
052024                             12$:     ERRDF   ERRNO,T19SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
052024  104455                                                                                  TRAP    C$ERDF
052026  001441                                                                                  .WORD   801
052030  060203                                                                                  .WORD   T19SSR
052032  012046                                                                                  .WORD   PKTSSR
052034  005237  002222                      INC     FATFLG                  ;SET FATAL ERROR FLAG
052040                             15$:     CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
052040  104406                                                                                  TRAP    C$CLP1
                                   ;        If Extended Features Hardware Switch Clear then:
                                   ;          Do Write Subsystem Write Miscellaneous to Set Extended Features.
052042  012701  062312                      MOV     #T19BFR,R1              ;MESSAGE BUFFER ADDRESS
052046  032761  000200  000012              BIT     #X2.EXTF,XST2(R1)       ;EXTENDED FEATURES SWITCH SET?
052054  001026                              BNE     30$                     ;BR IF YES
052056  004737  062142                      JSR     PC,T19SEXT              ;SETUP PACKET FOR WRITE MISC INVERT
052062  012704  062440                      MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
052066  010465  000000                      MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
052072  004737  016336                      JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
052076                                      FORCERROR       22$                     ;@@DFORCE ERROR IF FORCER=1
052112  103407                              BCS     30$                     ;BR IF CARRY SET (GOOD RETURN)
052114  010001                              MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
052116                                      NEXT,ERRNO
052116                             22$:     ERRDF   ERRNO,T192SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
052116  104455                                                                                  TRAP    C$ERDF
052120  001442                                                                                  .WORD   802
052122  060240                                                                                  .WORD   T192SSR
052124  012046                                                                                  .WORD   PKTSSR
052126  005237  002222                      INC     FATFLG                  ;SET FATAL ERROR FLAG
052132                             30$:     CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
```

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      052132  104406                                                                          TRAP    C$CLP1
 3948                                    ;       Do WRITE CHARACTERISTICS to select reserved unit 7
 3949 052134  005037  002222                     CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
 3950 052140  012704  062270                     MOV     #T19PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
 3951 052144  004737  010662                     JSR     PC,WRTCHR               ;DO WRITE CHARACTERISTICS COMMAND
 3952 052150                                     FORCERROR        42$                    ;@@DFORCE ERROR IF FORCER=1
 3953 052164  103407                             BCS     50$                     ;BR IF CARRY SET (GOOD RETURN)
 3954 052166  010001                             MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 3955 052170                                     NEXT,ERRNO
 3956 052170                             42$:    ERRDF   ERRNO,T19SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
      052170  104455                                                                          TRAP    C$ERDF
      052172  001443                                                                          .WORD   803
      052174  060203                                                                          .WORD   T19SSR
      052176  012046                                                                          .WORD   PKTSSR
 3957 052200  005237  002222                     INC     FATFLG                  ;SET FATAL ERROR FLAG
 3958 052204                             50$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
      052204  104406                                                                          TRAP    C$CLP1
 3959                                    ;       Do a Write Subsystem WRITE NPR to set tape direction out and Loopback
 3960 052206  012700  000100                     MOV     #NP.OUT,R0              ;SET TAPE DIRECTION OUT
 3961 052212  052700  000040                     BIS     #NP.LOOP,R0             ;SET LOOPBACK ENABLE
 3962 052216  004737  062002                     JSR     PC,T19SNPR              ;SETUP T19PK2 FOR WRITE NPR
 3963 052222  012704  062440                     MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
 3964 052226  010465  000000                     MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
 3965 052232  004737  016336                     JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
 3966 052236                                     FORCERROR        62$                    ;@@DFORCE ERROR IF FORCER=1
 3967 052252  103407                             BCS     70$                     ;BR IF CARRY SET (GOOD RETURN)
 3968 052254  010001                             MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 3969 052256                                     NEXT,ERRNO
 3970 052256                             62$:    ERRDF   ERRNO,T194SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
      052256  104455                                                                          TRAP    C$ERDF
      052260  001444                                                                          .WORD   804
      052262  060351                                                                          .WORD   T194SSR
      052264  012046                                                                          .WORD   PKTSSR
 3971 052266  005237  002222                     INC     FATFLG                  ;SET FATAL ERROR FLAG
 3972 052272                             70$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
      052272  104406                                                                          TRAP    C$CLP1
 3973                                    ;       Do Write Subsystem Write Control to CLEAR loopback signals group 1.
 3974                                    ;       Do Write Subsystem Write Format to CLEAR loopback signals group 2.
 3975                                    ;        (the loopback signals have to be cleared here due to the flip-flops
 3976                                    ;         that are set on a 1 to 0 transition (IHER,IFMK,ICER))
 3977 052274  005000                             CLR     R0                      ;WRITE 0'S
 3978 052276  042700  000200                     BIC     #WC.IFAD,R0             ;IFAD MUST  ALWAYS =0
 3979 052302  042700  000100                     BIC     #WC.IOTAD,R0            ;ITADO MUST ALWAYS =0
 3980 052306  042700  000040                     BIC     #WC.I1TAD,R0            ;ITAD1 MUST ALWAYS =0
 3981 052312  004737  062102                     JSR     PC,T19WCTL              ;SETUP PACKET FOR WRITE CONTROL
 3982 052316  012704  062440                     MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
 3983 052322  010465  000000                     MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
 3984 052326  004737  016336                     JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
 3985 052332                                     FORCERROR        82$                    ;@@DFORCE ERROR IF FORCER=1
 3986 052346  103407                             BCS     90$                     ;BR IF CARRY SET (GOOD RETURN)
 3987 052350  010001                             MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 3988 052352                                     NEXT,ERRNO
 3989 052352                             82$:    ERRDF   ERRNO,T197SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
      052352  104455                                                                          TRAP    C$ERDF
      052354  001445                                                                          .WORD   805
      052356  060523                                                                          .WORD   T197SSR
      052360  012046                                                                          .WORD   PKTSSR
```

```
052362  005237  002222                 INC     FATFLG                          ;SET FATAL ERROR FLAG
052366                         90$:    CKLOOP                                  ;LOOP ON ERROR, IF FLAG SET
052366  104406                                                                          TRAP    C$CLP1
052370  005000                         CLR     R0                              ;SET FORMAT DRIVE DATA=0
052372  004737  062122                 JSR     PC,T19WFMT                      ;SETUP PACKET FOR WRITE FORMAT
052376  012704  062440                 MOV     #T19PK2,R4                      ;GET WRITE SUBSYSTEM COMMAND PACKET
052402  010465  000000                 MOV     R4,TSDB(R5)                     ;SET THE PACKET ADDRESS TO EXECUTE
052406  004737  016336                 JSR     PC,CHKTSSR                      ;WAIT FOR SSR TO SET
052412                                 FORCERROR       102$                           ;@@DFORCE ERROR IF FORCER=1
052426  103407                         BCS     110$                            ;BR IF CARRY SET (GOOD RETURN)
052430  010001                         MOV     R0,R1                           ;SAVE CONTENTS OF TSSR
052432                                 NEXT.ERRNO
052432                         102$:   ERRDF   ERRNO,T198SSR,PKTSSR            ;DEVICE FATAL SSR FAILED TO SET
052432  104455                                                                          TRAP    C$ERDF
052434  001446                                                                          .WORD   806
052436  060572                                                                          .WORD   T198SSR
052440  012046                                                                          .WORD   PKTSSR
052442  005237  002222                 INC     FATFLG                          ;SET FATAL ERROR FLAG
052446                         110$:   CKLOOP                                  ;LOOP ON ERROR, IF FLAG SET
052446  104406                                                                          TRAP    C$CLP1
                               ;       Do a Write Subsystem Write Misc to Reset Tape Status F-FLOPS
052450  004737  061760                 JSR     PC,T19RSFIF                     ;SETUP PKT FOR WRITE MISC Reset Tape Status F-FLOPS
052454  012704  062440                 MOV     #T19PK2,R4                      ;GET WRITE SUBSYSTEM COMMAND PACKET
052460  010465  000000                 MOV     R4,TSDB(R5)                     ;SET THE PACKET ADDRESS TO EXECUTE
052464  004737  016336                 JSR     PC,CHKTSSR                      ;WAIT FOR SSR TO SET
052470                                 FORCERROR       122$                           ;@@DFORCE ERROR IF FORCER=1
052504  103407                         BCS     130$                            ;BR IF CARRY SET (GOOD RETURN)
052506  010001                         MOV     R0,R1                           ;SAVE CONTENTS OF TSSR
052510                                 NEXT.ERRNO
052510                         122$:   ERRDF   ERRNO,T192SSR,PKTSSR            ;DEVICE FATAL SSR FAILED TO SET
052510  104455                                                                          TRAP    C$ERDF
052512  001447                                                                          .WORD   807
052514  060240                                                                          .WORD   T192SSR
052516  012046                                                                          .WORD   PKTSSR
052520  005237  002222                 INC     FATFLG                          ;SET FATAL ERROR FLAG
052524                         130$:   CKLOOP                                  ;LOOP ON ERROR, IF FLAG SET
052524  104406                                                                          TRAP    C$CLP1
                               ;       Do a Write Subsystem READ STATUS
                               ;       If all Tape Status 2 (ICER,IFMK,IHER) flip-flop
                               ;         signals NOT=0 Then Print Error
052526  004737  061740                 JSR     PC,T19SRD                       ;SETUP PACKET FOR READ STATUS
052532  012704  062440                 MOV     #T19PK2,R4                      ;GET WRITE SUBSYSTEM COMMAND PACKET
052536  010465  000000                 MOV     R4,TSDB(R5)                     ;SET THE PACKET ADDRESS TO EXECUTE
052542  004737  016336                 JSR     PC,CHKTSSR                      ;WAIT FOR SSR TO SET
052546                                 FORCERROR       132$                           ;@@DFORCE ERROR IF FORCER=1
052562  103407                         BCS     140$                            ;BR IF CARRY SET (GOOD RETURN)
052564  010001                         MOV     R0,R1                           ;SAVE CONTENTS OF TSSR
052566                                 NEXT.ERRNO
052566                         132$:   ERRDF   ERRNO,T193SSR,PKTSSR            ;DEVICE FATAL SSR FAILED TO SET
052566  104455                                                                          TRAP    C$ERDF
052570  001450                                                                          .WORD   808
052572  060304                                                                          .WORD   T193SSR
052574  012046                                                                          .WORD   PKTSSR
052576  005237  002222                 INC     FATFLG                          ;SET FATAL ERROR FLAG
052602                         140$:   CKLOOP                                  ;LOOP ON ERROR, IF FLAG SET
052602  104406                                                                          TRAP    C$CLP1
052604  004737  062200                 JSR     PC,T19SETEXP                    ;SET WORDS 0-7 EXPD=RECV (NOT TESTING)
```

```
052610  012701  060042                  MOV     #T19EXSTA,R1            ;GET EXPECTED READ STATUS
052614  012702  062332                  MOV     #T19BFSTA,R2            ;GET RECV READ STATUS
052620  011211                          MOV     (R2),(R1)               ;SET EXPD WORD #8 = RECV TEMP
052622  042711  002000                  BIC     #S1.ICER,(R1)           ;SET EXPD ICER  =0
052626  042711  001000                  BIC     #S1.IFMK,(R1)           ;SET EXPD IFMK  =0
052632  042711  000400                  BIC     #S1.IHER,(R1)           ;SET EXPD IHER  =0
052636  016261  000002  000002          MOV     2(R2),2(R1)             ;SET EXPD WORD #9 = RECV (NOT TESTING)
052644  005000                          CLR     R0                      ;HIGH RECV ADDRESS FOR CKMSG2
052646  012701  062312                  MOV     #T19BFR,R1              ;LOW RECV ADDRESS FOR CKMSG2
052652  012702  060022                  MOV     #T19EXP,R2              ;EXPD ADDRESS
052656  012703  000024                  MOV     #20.,R3                 ;NUMBER OF BYTES TO COMPARE
052662  004737  011500                  JSR     PC,CKMSG2               ;EXPD EQUAL RECV?
052666                                  FORCERROR       152$,NOTSSR     ;@@D
052676  103404                          BCS     160$                    ;BR IF YES
052700                                  NEXT.ERRNO
052700                          152$:   ERRHRD  ERRNO,T197CMP,MSGLOOP   ;REPORT ERROR
052700  104456                                                                                  TRAP    C$ERHRD
052702  001451                                                                                  .WORD   809
052704  061243                                                                                  .WORD   T197CMP
052706  013064                                                                                  .WORD   MSGLOOP
052710                          160$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
052710  104406                                                                                  TRAP    C$CLP1

                                ; REPEAT FOR ALL TEST PATTERNS IN TSTBLK TABLE
052712  005037  057754                  CLR     T19PREV                 ;INIT 1-0 TRANSITION FLAG
052716  012703  002752                  MOV     #TSTBLK,R3              ;GET FIRST PATTERN ADDRESS
052722  012300                  200$:   MOV     (R3)+,R0                ;GET A TEST PATTERN
052724  010337  002316                  MOV     R3,TSTPTR               ;SAVE POINTER INTO TSTBLK
052730  042700  000200                  BIC     #WC.IFAD,R0             ;IFAD MUST  ALWAYS =0
052734  042700  000100                  BIC     #WC.I0TAD,R0            ;ITAD0 MUST ALWAYS =0
052740  042700  000040                  BIC     #WC.I1TAD,R0            ;ITAD1 MUST ALWAYS =0
052744  010037  002312                  MOV     R0,DATA                 ;SET DATA PATTERN
                                ;       Do Write Subsystem Write Control to Drive loopback signals group 1.
                                ;@@D    CALL T19CNVT TO SETUP WRITE CONTROL PATTERN
052750  013700  002312                  MOV     DATA,R0                 ;GET TEST PATTERN
052754  004737  062224                  JSR     PC,T19CNVT              ;CONVERT PATTERN TO CONTROL DRIVE MASK
                                                                        ;R0 CONTAINS WRITE CONTROL DATA HERE
052760  004737  062102                  JSR     PC,T19WCTL              ;SETUP PACKET FOR WRITE CONTROL
052764  012704  062440                  MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
052770  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
052774  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
053000                                  FORCERROR       212$                    ;@@DFORCE ERROR IF FORCER=1
053014  103407                          BCS     220$                    ;BR IF CARRY SET (GOOD RETURN)
053016  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
053020                                  NEXT.ERRNO
053020                          212$:   ERRDF   ERRNO,T197SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
053020  104455                                                                                  TRAP    C$ERDF
053022  001452                                                                                  .WORD   810
053024  060523                                                                                  .WORD   T197SSR
053026  012046                                                                                  .WORD   PKTSSR
053030  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
053034                          220$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
053034  104406                                                                                  TRAP    C$CLP1

                                ;       Do Write Subsystem Write Format to Drive loopback signals group 2.
                                ;@@D    CALL T19CNVT TO SETUP WRITE CONTROL PATTERN
053036  013700  002312                  MOV     DATA,R0                 ;GET TEST PATTERN
053042  004737  062224                  JSR     PC,T19CNVT              ;CONVERT PATTERN TO FORMAT DRIVE MASK
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4078 053046  000300                      SWAB    R0                      ;WRITE FORMAT DATA RETURNED IN HIGH BYTE
4079 053050  004737  062122              JSR     PC,T19WFMT              ;SETUP PACKET FOR WRITE FORMAT
4080 053054  012704  062440              MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
4081 053060  010465  000000              MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
4082 053064  004737  016336              JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
4083 053070                              FORCERROR       232$                    ;BBDFORCE ERROR IF FORCER=1
4084 053104  103407                      BCS     240$                    ;BR IF CARRY SET (GOOD RETURN)
4085 053106  010001                      MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
4086 053110                              NEXT.ERRNO
4087 053110                     232$:    ERRDF   ERRNO,T198SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
     053110  104455                                                                              TRAP    C$ERDF
     053112  001453                                                                              .WORD   811
     053114  060572                                                                              .WORD   T198SSR
     053116  012046                                                                              .WORD   PKTSSR
4088 053120  005237  002222              INC     FATFLG                  ;SET FATAL ERROR FLAG
4089 053124                     240$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     053124  104406                                                                              TRAP    C$CLP1
4090                            ;        Do a Write Subsystem READ STATUS
4091 053126  004737  061740              JSR     PC,T19SRD               ;SETUP PACKET FOR READ STATUS
4092 053132  012704  062440              MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
4093 053136  010465  000000              MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
4094 053142  004737  016336              JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
4095 053146                              FORCERROR       252$                    ;BBDFORCE ERROR IF FORCER=1
4096 053162  103407                      BCS     260$                    ;BR IF CARRY SET (GOOD RETURN)
4097 053164  010001                      MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
4098 053166                              NEXT.ERRNO
4099 053166                     252$:    ERRDF   ERRNO,T193SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
     053166  104455                                                                              TRAP    C$ERDF
     053170  001454                                                                              .WORD   812
     053172  060304                                                                              .WORD   T193SSR
     053174  012046                                                                              .WORD   PKTSSR
4100 053176  005237  002222              INC     FATFLG                  ;SET FATAL ERROR FLAG
4101 053202                     260$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     053202  104406                                                                              TRAP    C$CLP1
4102                            ;        If loopback data NOT= data sent Then Print Error
4103 053204  004737  062200              JSR     PC,T19SETEXP            ;SET WORDS 0-7 EXPD=RECV (NOT TESTING)
4104 053210  012701  060042              MOV     #T19EXSTA,R1            ;GET EXPECTED READ STATUS
4105 053214  012702  062332              MOV     #T19BFSTA,R2            ;GET RECV READ STATUS
4106 053220  013711  002312              MOV     DATA,(R1)               ;SET EXPD WORD #8 TO TEST DATA FIRST
4107 053224  013700  057754              MOV     T19PREV,R0              ;GET PREVIOUS DATA PATTERN
4108 053230  013703  002312              MOV     DATA,R3                 ;GET CURRENT PATTERN
4109 053234  012704  000400              MOV     #S1.IHER,R4             ;SETUP IHER EXPECTED
4110 053240  040411                      BIC     R4,(R1)                 ;SET EXPD IHER  =0
4111 053242  030400                      BIT     R4,R0                   ;PREVIOUS =1?
4112 053244  001403                      BEQ     275$                    ;BR IF NO
4113 053246  030403                      BIT     R4,R3                   ;CURRENT  =0?
4114 053250  001001                      BNE     275$                    ;BR IF NO
4115 053252  050411                      BIS     R4,(R1)                 ;SET EXPD IHER  =1
4116 053254  012704  001000     275$:    MOV     #S1.IFMK,R4             ;SETUP IFMK EXPECTED
4117 053260  040411                      BIC     R4,(R1)                 ;SET EXPD IFMK  =0
4118 053262  030400                      BIT     R4,R0                   ;PREVIOUS =1?
4119 053264  001403                      BEQ     280$                    ;BR IF NO
4120 053266  030403                      BIT     R4,R3                   ;CURRENT  =0?
4121 053270  001001                      BNE     280$                    ;BR IF NO
4122 053272  050411                      BIS     R4,(R1)                 ;SET EXPD IFMK  =1
4123 053274  012704  002000     280$:    MOV     #S1.ICER,R4             ;SETUP ICER EXPECTED
4124 053300  040411                      BIC     R4,(R1)                 ;SET EXPD ICER  =0
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```
 4125 053302  030400                         BIT     R4,R0                   ;PREVIOUS =1?
 4126 053304  001403                         BEQ     285$                    ;BR IF NO
 4127 053306  030403                         BIT     R4,R3                   ;CURRENT  =0?
 4128 053310  001001                         BNE     285$                    ;BR IF NO
 4129 053312  050411                         BIS     R4,(R1)                 ;SET EXPD ICER  =1
 4130 053314  011100                 285$:   MOV     (R1),R0                 ;GET EXPD WORD
 4131                                ;       If previous IIDENT=1 and current is IIDENT=1 then EXPD= 0 else 1
 4132 053316  012704  004000                 MOV     #S1.IIDENT,R4           ;IIDENT
 4133 053322  050400                         BIS     R4,R0                   ;ASSUME EXPD=1
 4134 053324  030437  057754                 BIT     R4,T19PREV              ;PREVIOUS IIDENT=1?
 4135 053330  001403                         BEQ     288$                    ;BR IF NO
 4136 053332  030403                         BIT     R4,R3                   ;IS CURRENT IIDENT=1?
 4137 053334  001401                         BEQ     288$                    ;BR IF NO
 4138 053336  040400                         BIC     R4,R0                   ;SET EXPD=0
 4139 053340  052700  040000         288$:   BIS     #S1.I2RES,R0            ;IRESV2 EXPD ALWAYS=1
 4140 053344  052700  020000                 BIS     #S1.I1RES,R0            ;IRESV1 EXPD ALWAYS=1
 4141 053350  042700  100000                 BIC     #S1.PARERR,R0           ;IGNORE PARERR
 4142 053354  032712  100000                 BIT     #S1.PARERR,(R2)         ;IS PARERR SET IN RECV?
 4143 053360  001402                         BEQ     290$                    ;BR IF NO
 4144 053362  052700  100000                 BIS     #S1.PARERR,R0           ;SET IN EXPD
 4145 053366  010011                 290$:   MOV     R0,(R1)                 ;SETUP FINAL EXPD IN WORD #8
 4146 053370  016261  000002  000002         MOV     2(R2),2(R1)             ;SET EXPD WORD #9 = RECV (NOT TESTING)
 4147 053376  005000                         CLR     R0                      ;HIGH RECV ADDRESS FOR CKMSG2
 4148 053400  012701  062312                 MOV     #T19BFR,R1              ;LOW RECV ADDRESS FOR CKMSG2
 4149 053404  012702  060022                 MOV     #T19EXP,R2              ;EXPD ADDRESS
 4150 053410  012703  000024                 MOV     #20.,R3                 ;NUMBER OF BYTES TO COMPARE
 4151 053414  004737  011500                 JSR     PC,CKMSG2               ;EXPD EQUAL RECV?
 4152 053420                                 FORCERROR       302$,NOTSSR     ;BBD
 4153 053430  103404                         BCS     310$                    ;BR IF YES
 4154 053432                                 NEXT,ERRNO
 4155 053432                         302$:   ERRHRD  ERRNO,T198CMP,MSGLOOP   ;REPORT ERROR
      053432  104456                                                                                 TRAP    C$ERHRD
      053434  001455                                                                                 .WORD   813
      053436  061331                                                                                 .WORD   T198CMP
      053440  013064                                                                                 .WORD   MSGLOOP
 4156 053442                         310$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
      053442  104406                                                                                 TRAP    C$CLP1
 4157                                ;       Do a Write Subsystem Write Misc to Reset Tape Status F-FLOPS
 4158 053444  004737  061760                 JSR     PC,T19RSFIF             ;SETUP PKT FOR WRITE MISC Reset STATUS
 4159 053450  012704  062440                 MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
 4160 053454  010465  000000                 MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
 4161 053460  004737  016336                 JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
 4162 053464                                 FORCERROR       322$                    ;BBDFORCE ERROR IF FORCER=1
 4163 053500  103407                         BCS     330$                    ;BR IF CARRY SET (GOOD RETURN)
 4164 053502  010001                         MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 4165 053504                                 NEXT,ERRNO
 4166 053504                         322$:   ERRDF   ERRNO,T192SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
      053504  104455                                                                                 TRAP    C$ERDF
      053506  001456                                                                                 .WORD   814
      053510  060240                                                                                 .WORD   T192SSR
      053512  012046                                                                                 .WORD   PKTSSR
 4167 053514  005237  002222                 INC     FATFLG                  ;SET FATAL ERROR FLAG
 4168 053520                         330$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
      053520  104406                                                                                 TRAP    C$CLP1
 4169                                ;       Do a Write Subsystem READ STATUS
 4170 053522  004737  061740                 JSR     PC,T19SRD               ;SETUP PACKET FOR READ STATUS
 4171 053526  012704  062440                 MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
```

```
053532  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
053536  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
053542                                  FORCERROR        342$                   ;@@DFORCE ERROR IF FORCER=1
053556  103407                          BCS     350$                    ;BR IF CARRY SET (GOOD RETURN)
053560  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
053562                                  NEXT.ERRNO
053562                          342$:   ERRDF   ERRNO,T193SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
053562  104455                                                                                  TRAP    C$ERDF
053564  001457                                                                                  .WORD   815
053566  060304                                                                                  .WORD   T193SSR
053570  012046                                                                                  .WORD   PKTSSR
053572  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
053576                          350$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
053576  104406                                                                                  TRAP    C$CLP1
053600  004737  062200                  JSR     PC,T19SETEXP            ;SET WORDS 0-7 EXPD=RECV (NOT TESTING)
053604  012701  060042                  MOV     #T19EXSTA,R1            ;GET EXPECTED READ STATUS
053610  012702  062332                  MOV     #T19BFSTA,R2            ;GET RECV READ STATUS
053614  011211                          MOV     (R2),(R1)               ;SET EXPD WORD #8 = RECV TEMP
053616  042711  002000                  BIC     #S1.ICER,(R1)           :SET EXPD ICER  =0
053622  042711  001000                  BIC     #S1.IFMK,(R1)           ;SET EXPD IFMK  =0
053626  042711  000400                  BIC     #S1.IHER,(R1)           ;SET EXPD IHER  =0
053632  016261  000002  000002          MOV     2(R2),2(R1)             ;SET EXPD WORD #9 = RECV (NOT TESTING)
053640  005000                          CLR     R0                      ;HIGH RECV ADDRESS FOR CKMSG2
053642  012701  062312                  MOV     #T19BFR,R1              ;LOW RECV ADDRESS FOR CKMSG2
053646  012702  060022                  MOV     #T19EXP,R2              ;EXPD ADDRESS
053652  012703  000024                  MOV     #20.,R3                 ;NUMBER OF BYTES TO COMPARE
053656  004737  011500                  JSR     PC,CKMSG2               ;EXPD EQUAL RECV?
053662                                  FORCERROR        362$,NOTSSR    ;@@D
053672  103404                          BCS     370$                    ;BR IF YES
053674                                  NEXT.ERRNO
053674                          362$:   ERRHRD  ERRNO,T197CMP,MSGSTAT   ;REPORT ERROR
053674  104456                                                                                  TRAP    C$ERHRD
053676  001460                                                                                  .WORD   816
053700  061243                                                                                  .WORD   T197CMP
053702  012350                                                                                  .WORD   MSGSTAT
053704                          370$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
053704  104406                                                                                  TRAP    C$CLP1

053706  013737  002312  057754          MOV     DATA,T19PREV            ;SETUP PREVIOUS DATA FOR EXPD CALC.
053714  013703  002316                  MOV     TSTPTR,R3               ;RESTORE CURRENT TSTBLK POINTER
053720  020327  003062                  CMP     R3,#TBLEND              ;END OF TSTBLK?
053724  103002                          BHIS    400$                    ;BR IF YES
053726  000137  052722                  JMP     200$                    ;DO NEXT TSTBLK PATTERN
053732                          400$:

053732                                  ENDSUB                          ;///////////// END SUBTEST //////////
053732                                                                                  L10067:
053732  104403                                                                                  TRAP    C$ESUB

053734  005737  002222                  TST     FATFLG                  ;ANY FATAL ERRORS ?
053740  001402                          BEQ     460$                    ;BRANCH IF NOT
053742  004737  017202                  JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
053746                          460$:
```

```

                                        .SBTTL  TEST  8: SUBTEST 2: LOOPBACK READ/WRITE SIGNALS TEST

                                ;++
                                ; TEST 8: SUBTEST 2:
                                ;
                                ; SUBTEST DESCRIPTION:
                                ;
                                ;       This subtest verifies the Read/Write data loopback path.
                                ;       The Read/Write data signals are IR<7:0> and IW<7:0>
                                ;       respectively.
                                ;
                                ; TEST STEPS:
                                ;
                                ;
                                ;  REPEAT FOR ALL TEST PATTERNS IN TSTBLK TABLE
                                ;    BEGIN
                                ;       Write to TSSR register to soft initialize the controller
                                ;       Do WRITE CHARACTERISTICS to check for Extended Features Switch
                                ;       If Extended Features Hardware Switch Clear then:
                                ;         Do Write Subsystem Write Miscellaneous to Set Extended Features.
                                ;       Do WRITE CHARACTERISTICS to select reserved unit 7 and setup BUFFER
                                ;       Do a Write Subsystem WRITE NPR to set tape direction out and Loopback
                                ;       Do a WRITE NPR to set loopback and tape direction OUT
                                ;       Do a WRITE FIFO with byte count equal to 1 and Tape direction OUT
                                ;       Do a READ FIFO with tape direction OUT to load tape out write latch
                                ;       Do a WRITE NPR to set loopback and tape direction IN
                                ;       Do a WRITE FIFO with byte count equal to 1 and Tape direction IN
                                ;         to strobe loopback data into FIFO.
                                ;       Do a READ FIFO with tape direction IN to read data
                                ;       If Data read from FIFO NOT= to Data sent Then Print Error
                                ;       Do a Write Subsystem READ STATUS
                                ;       If Input Ready  NOT=1    Then Print Error
                                ;       If Output Ready NOT=0    Then Print Error
                                ;       If Data In Miss NOT=0    Then Print Error
                                ;    END
                                ;--
053746                                  BGNSUB                          ;///////////// BEGIN SUBTEST //////////
053746                                                                                  T8.2:
053746  104402                                                                                  TRAP    C$BSUB
                                ;       Write to TSSR register to soft initialize the controller
053750                          5$:
053750  004737  015774                  JSR     PC,SOFINIT              ;WRITE TO TSSR TO SOFT INITIALIZE
053754  103405                          BCS     10$                     ;BR IF SOFT INIT OKAY
053756  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
053760                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL DURING INIT
053760  104455                                                                                  TRAP    C$ERDF
053762  001460                                                                                  .WORD   816
053764  003652                                                                                  .WORD   SFIERR
053766  012034                                                                                  .WORD   SFIMSG
                                ;       Do WRITE CHARACTERISTICS to check for Extended Features Switch
053770  005037  002222          10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
053774  012704  062270                  MOV     #T19PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
054000  004737  010662                  JSR     PC,WRTCHR               ;DO WRITE CHARACTERISTICS COMMAND
054004                                  FORCERROR       12$                     ;90DFORCE ERROR IF FORCER=1
054020  103407                          BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
054022  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
```

```
054024                                  NEXT.ERRNO
054024                          12$:    ERRDF   ERRNO,T19SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
054024  104455                                                                  TRAP    C$ERDF
054026  001461                                                                  .WORD   817
054030  060203                                                                  .WORD   T19SSR
054032  012046                                                                  .WORD   PKTSSR
054034  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
054040                          15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
054040  104406                                                                  TRAP    C$CLP1
                                ;       If Extended Features Hardware Switch Clear then:
                                ;         Do Write Subsystem Write Miscellaneous to Set Extended Features.
054042  012701  062312                  MOV     #T19BFR,R1              ;MESSAGE BUFFER ADDRESS
054046  032761  000200  000012          BIT     #X2.EXTF,XST2(R1)       ;EXTENDED FEATURES SWITCH SET?
054054  001026                          BNE     30$                     ;BR IF YES
054056  004737  062142                  JSR     PC,T19SEXT              ;SETUP PACKET FOR WRITE MISC INVERT
054062  012704  062440                  MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
054066  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
054072  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
054076                                  FORCERROR       22$                     ;@@DFORCE ERROR IF FORCER=1
054112  103407                          BCS     30$                     ;BR IF CARRY SET (GOOD RETURN)
054114  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
054116                                  NEXT.ERRNO
054116                          22$:    ERRDF   ERRNO,T192SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
054116  104455                                                                  TRAP    C$ERDF
054120  001462                                                                  .WORD   818
054122  060240                                                                  .WORD   T192SSR
054124  012046                                                                  .WORD   PKTSSR
054126  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
054132                          30$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
054132  104406                                                                  TRAP    C$CLP1
                                ;       Do WRITE CHARACTERISTICS to select reserved unit 7
054134  012704  062270                  MOV     #T19PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
054140  004737  010662                  JSR     PC,WRTCHR               ;DO WRITE CHARACTERISTICS COMMAND
054144                                  FORCERROR       42$                             ;@@DFORCE ERROR IF FORCER=1
054160  103407                          BCS     50$                     ;BR IF CARRY SET (GOOD RETURN)
054162  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
054164                                  NEXT.ERRNO
054164                          42$:    ERRDF   ERRNO,T19SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
054164  104455                                                                  TRAP    C$ERDF
054166  001463                                                                  .WORD   819
054170  060203                                                                  .WORD   T19SSR
054172  012046                                                                  .WORD   PKTSSR
054174  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
054200                          50$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
054200  104406                                                                  TRAP    C$CLP1



                                ;  REPEAT FOR ALL TEST PATTERNS IN TSTBLK TABLE
054202  012703  002752                  MOV     #TSTBLK,R3              ;GET FIRST PATTERN ADDRESS
054206  012337  002312          100$:   MOV     (R3)+,DATA              ;GET A TEST PATTERN
054212  042737  177400  002312          BIC     #^C<377>,DATA           ;DATA IS BYTE
054220  010337  002316                  MOV     R3,TSTPTR               ;SETUP CURRENT TSTBLK POINTER
                                ;       Do a WRITE NPR to set loopback and tape direction OUT
054224  012700  000100                  MOV     #NP.OUT,R0              ;SET TAPE DIRECTION OUT
054230  052700  000040                  BIS     #NP.LOOP,R0             ;SET LOOPBACK
054234  004737  062002                  JSR     PC,T19SNPR              ;SETUP T19PK2 FOR WRITE NPR
054240  012704  062440                  MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
```

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054244  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
054250  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
054254                                  FORCERROR       102$                    ;@@DFORCE ERROR IF FORCER=1
054270  103407                          BCS     105$                    ;BR IF CARRY SET (GOOD RETURN)
054272  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
054274                                  NEXT.ERRNO
054274                          102$:   ERRDF   ERRNO,T194SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
054274  104455                                                                                  TRAP    C$ERDF
054276  001464                                                                                  .WORD   820
054300  060351                                                                                  .WORD   T194SSR
054302  012046                                                                                  .WORD   PKTSSR
054304  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
054310                          105$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
054310  104406                                                                                  TRAP    C$CLP1
                                ;       Do a WRITE FIFO with byte count equal to 1 and Tape direction OUT
054312  012700  000001                  MOV     #1,R0                   ;WRITE 1 BYTE
054316  012701  002312                  MOV     #DATA,R1                ;FIFO WRITE DATA ADDRESS
054322  004737  062046                  JSR     PC,T19WFIF              ;SETUP T19PK2 FOR WRITE FIFO
054326  012704  062440                  MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
054332  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
054336  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
054342                                  FORCERROR       107$                    ;@@DFORCE ERROR IF FORCER=1
054356  103407                          BCS     110$                    ;BR IF CARRY SET (GOOD RETURN)
054360  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
054362                                  NEXT.ERRNO
054362                          107$:   ERRDF   ERRNO,T195SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
054362  104455                                                                                  TRAP    C$ERDF
054364  001465                                                                                  .WORD   821
054366  060414                                                                                  .WORD   T195SSR
054370  012046                                                                                  .WORD   PKTSSR
054372  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
054376                          110$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
054376  104406                                                                                  TRAP    C$CLP1
                                ;       Do a READ FIFO with tape direction OUT to load tape out write latch
054400  012700  000001                  MOV     #1,R0                   ;SET READ BYTE COUNT
054404  004737  062026                  JSR     PC,T19RFIF              ;SETUP T19PK2 FOR READ FIFO
054410  012704  062440                  MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
054414  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
054420  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
054424                                  FORCERROR       122$                    ;@@DFORCE ERROR IF FORCER=1
054440  103407                          BCS     130$                    ;BR IF CARRY SET (GOOD RETURN)
054442  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
054444                                  NEXT.ERRNO
054444                          122$:   ERRDF   ERRNO,T196SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
054444  104455                                                                                  TRAP    C$ERDF
054446  001466                                                                                  .WORD   822
054450  060460                                                                                  .WORD   T196SSR
054452  012046                                                                                  .WORD   PKTSSR
054454  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
054460                          130$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
054460  104406                                                                                  TRAP    C$CLP1
                                ;       Do a WRITE NPR to set loopback and tape direction IN
054462  005000                          CLR     R0                      ;CLR NP.OUT TO SET TAPE DIRECTION IN
054464  052700  000040                  BIS     #NP.LOOP,R0             ;SET LOOPBACK
054470  004737  062002                  JSR     PC,T19SNPR              ;SETUP T19PK2 FOR WRITE NPR
054474  012704  062440                  MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
054500  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
```

```
054504  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
054510                                  FORCERROR       142$                            ;@@DFORCE ERROR IF FORCER=1
054524  103407                          BCS     150$                    ;BR IF CARRY SET (GOOD RETURN)
054526  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
054530                                  NEXT.ERRNO
054530                          142$:   ERRDF   ERRNO,T194SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
054530  104455                                                                                  TRAP    C$ERDF
054532  001467                                                                                  .WORD   823
054534  060351                                                                                  .WORD   T194SSR
054536  012046                                                                                  .WORD   PKTSSR
054540  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
054544                          150$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
054544  104406                                                                                  TRAP    C$CLP1
                                ;       Do a WRITE FIFO with byte count equal to 1 and Tape direction IN
054546  012700  000001                  MOV     #1,R0                   ;WRITE 1 BYTE
054552  012701  002312                  MOV     #DATA,R1                ;FIFO WRITE DATA ADDRESS
054556  004737  062046                  JSR     PC,T19WFIF              ;SETUP T19PK2 FOR WRITE FIFO
054562  012704  062440                  MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
054566  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
054572  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
054576                                  FORCERROR       162$                            ;@@DFORCE ERROR IF FORCER=1
054612  103407                          BCS     170$                    ;BR IF CARRY SET (GOOD RETURN)
054614  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
054616                                  NEXT.ERRNO
054616                          162$:   ERRDF   ERRNO,T195SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
054616  104455                                                                                  TRAP    C$ERDF
054620  001470                                                                                  .WORD   824
054622  060414                                                                                  .WORD   T195SSR
054624  012046                                                                                  .WORD   PKTSSR
054626  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
054632                          170$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
054632  104406                                                                                  TRAP    C$CLP1
                                ;       Do a READ FIFO with tape direction IN to read data
                                ;       If Data read from FIFO NOT= to Data sent Then Print Error
054634  012700  000001                  MOV     #1,R0                   ;SET READ BYTE COUNT
054640  004737  062026                  JSR     PC,T19RFIF              ;SETUP T19PK2 FOR READ FIFO
054644  012704  062440                  MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
054650  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
054654  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
054660                                  FORCERROR       182$                            ;@@DFORCE ERROR IF FORCER=1
054674  103407                          BCS     190$                    ;BR IF CARRY SET (GOOD RETURN)
054676  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
054700                                  NEXT.ERRNO
054700                          182$:   ERRDF   ERRNO,T196SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
054700  104455                                                                                  TRAP    C$ERDF
054702  001471                                                                                  .WORD   825
054704  060460                                                                                  .WORD   T196SSR
054706  012046                                                                                  .WORD   PKTSSR
054710  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
054714                          190$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
054714  104406                                                                                  TRAP    C$CLP1
054716  004737  062200                  JSR     PC,T19SETEXP            ;SET WORDS 0-7 EXPD=RECV (NOT TESTING)
054722  012701  060042                  MOV     #T19EXSTA,R1            ;GET EXPECTED READ STATUS
054726  012702  062332                  MOV     #T19BFSTA,R2            ;GET RECV READ STATUS
054732  013711  002312                  MOV     DATA,(R1)               ;SET EXPD WORD #8 = DATA
054736  016261  000002  000002          MOV     2(R2),2(R1)             ;SET EXPD WORD #9 = RECV (NOT TESTING)
054744  005000                          CLR     R0                      ;HIGH RECV ADDRESS FOR CKMSG2
```

```
4394 054746  012701  062312           MOV     #T19BFR,R1                  ;LOW RECV ADDRESS FOR CKMSG2
4395 054752  012702  060022           MOV     #T19EXP,R2                  ;EXPD ADDRESS
4396 054756  012703  000022           MOV     #18.,R3                     ;NUMBER OF BYTES TO COMPARE
4397 054762  004737  011500           JSR     PC,CKMSG2                   ;EXPD EQUAL RECV?
4398 054766                           FORCERROR       202$,NOTSSR         ;BAD
4399 054776  103404                   BCS     210$                        ;BR IF YES
4400 055000                           NEXT.ERRNO
4401 055000                   202$:   ERRHRD  ERRNO,T199CMP,MSGSUB        ;REPORT ERROR
     055000  104456                                                                 TRAP    C$ERHRD
     055002  001472                                                                 .WORD   826
     055004  061420                                                                 .WORD   T199CMP
     055006  013742                                                                 .WORD   MSGSUB
4402 055010                   210$:   CKLOOP                              ;LOOP ON ERROR, IF FLAG SET
     055010  104406                                                                 TRAP    C$CLP1
4403                          ;       Do a Write Subsystem READ STATUS
4404                          ;       If Input Ready  NOT=1   Then Print Error
4405                          ;       If Output Ready NOT=0   Then Print Error
4406                          ;       If Data In Miss NOT=0   Then Print Error
4407 055012  004737  061740           JSR     PC,T19SRD                   ;SETUP PACKET FOR READ STATUS
4408 055016  012704  062440           MOV     #T19PK2,R4                  ;GET WRITE SUBSYSTEM COMMAND PACKET
4409 055022  010465  000000           MOV     R4,TSDB(R5)                 ;SET THE PACKET ADDRESS TO EXECUTE
4410 055026  004737  016336           JSR     PC,CHKTSSR                  ;WAIT FOR SSR TO SET
4411 055032                           FORCERROR       212$                        ;BADFORCE ERROR IF FORCER=1
4412 055046  103407                   BCS     220$                        ;BR IF CARRY SET (GOOD RETURN)
4413 055050  010001                   MOV     R0,R1                       ;SAVE CONTENTS OF TSSR
4414 055052                           NEXT.ERRNO
4415 055052                   212$:   ERRDF   ERRNO,T193SSR,PKTSSR        ;DEVICE FATAL SSR FAILED TO SET
     055052  104455                                                                 TRAP    C$ERDF
     055054  001473                                                                 .WORD   827
     055056  060304                                                                 .WORD   T193SSR
     055060  012046                                                                 .WORD   PKTSSR
4416 055062  005237  002222           INC     FATFLG                      ;SET FATAL ERROR FLAG
4417 055066                   220$:   CKLOOP                              ;LOOP ON ERROR, IF FLAG SET
     055066  104406                                                                 TRAP    C$CLP1
4418 055070  004737  062200           JSR     PC,T19SETEXP                ;SET WORDS 0-7 EXPD=RECV (NOT TESTING)
4419 055074  012701  060042           MOV     #T19EXSTA,R1                ;GET EXPECTED READ STATUS
4420 055100  012702  062332           MOV     #T19BFSTA,R2                ;GET RECV READ STATUS
4421 055104  012221                   MOV     (R2)+,(R1)+                 ;SET EXPD WORD #8 = RECV TEMP
4422 055106  011211                   MOV     (R2),(R1)                   ;SET EXPD WORD #9 = RECV TEMP
4423 055110  052711  000020           BIS     #S2.INRDY,(R1)              ;SET EXP INPUT READY= 1
4424 055114  042711  000040           BIC     #S2.OUTRDY,(R1)             ;SET EXP OUTPUT READY= 0
4425 055120  042711  000200           BIC     #S2.DIM,(R1)                ;SET EXP DATA IN MISS = 0
4426 055124  005000                   CLR     R0                          ;HIGH RECV ADDRESS FOR CKMSG2
4427 055126  012701  062312           MOV     #T19BFR,R1                  ;LOW RECV ADDRESS FOR CKMSG2
4428 055132  012702  060022           MOV     #T19EXP,R2                  ;EXPD ADDRESS
4429 055136  012703  000024           MOV     #20.,R3                     ;NUMBER OF BYTES TO COMPARE
4430 055142  004737  011500           JSR     PC,CKMSG2                   ;EXPD EQUAL RECV?
4431 055146                           FORCERROR       232$,NOTSSR         ;BAD
4432 055156  103404                   BCS     240$                        ;BR IF YES
4433 055160                           NEXT.ERRNO
4434 055160                   232$:   ERRHRD  ERRNO,T196CMP,MSGSTAT       ;REPORT ERROR
     055160  104456                                                                 TRAP    C$ERHRD
     055162  001474                                                                 .WORD   828
     055164  061160                                                                 .WORD   T196CMP
     055166  012350                                                                 .WORD   MSGSTAT
4435 055170                   240$:   CKLOOP                              ;LOOP ON ERROR, IF FLAG SET
     055170  104406                                                                 TRAP    C$CLP1
```

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055172                          FORCEXIT        255$                    ;BBD
055202  013703  002316          MOV     TSTPTR,R3                       ;RESTORE CURRENT TSTBLK POINTER
055206  020327  003062          CMP     R3,#TBLEND                      ;END OF TSTBLK?
055212  103002                  BHIS    255$                            ;BR IF YES
055214  000137  054206          JMP     100$                            ;DO ANOTHER TSTBLK PATTERN
055220                  255$:

055220                          ENDSUB                                  ;///////////// END SUBTEST //////////
055220                                                                          L10070:
055220  104403                                                                          TRAP    C$ESUB

055222  005737  002222          TST     FATFLG                          ;ANY FATAL ERRORS ?
055226  001402                  BEQ     260$                            ;BRANCH IF NOT
055230  004737  017202          JSR     PC,CKDROP                       ;TRY TO DROP THE UNIT
055234                  260$:



                                .SBTTL  TEST  8: SUBTEST 3: LOOPBACK WRITE STROBE TEST

                        ;**
                        ; TEST 8: SUBTEST 3:
                        ;
                        ; SUBTEST DESCRIPTION:
                        ;
                        ;       This subtest verifies the Write Strobe loopback path
                        ;       can strobe data from the FIFO to the Data lines.
                        ;       The signal IRESV3 drives IWSTR (write strobe) to write
                        ;       data from the FIFO to the tape data out latch.
                        ;
                        ; TEST STEPS:
                        ;
                        ;
                        ;  REPEAT FOR ALL TEST PATTERNS IN TSTBLK TABLE
                        ;    BEGIN
                        ;       Write to TSSR register to soft initialize the controller
                        ;       Do WRITE CHARACTERISTICS to check for Extended Features Switch
                        ;       If Extended Features Hardware Switch Clear then:
                        ;         Do Write Subsystem Write Miscellaneous to Set Extended Features.
                        ;       Do WRITE CHARACTERISTICS to select reserved unit 7 and setup BUFFER
                        ;       Do a Write Subsystem WRITE NPR to set tape direction out and Loopback
                        ;       Do a WRITE NPR to set loopback and tape direction OUT
                        ;       Do a WRITE FORMAT to set IRESV3==>IWSTR = 1
                        ;       Do a WRITE FIFO with byte count equal to 1 and Tape direction OUT
                        ;       Do a WRITE FORMAT to set IRESV3==>IWSTR = 0 to load write data latch
                        ;       Do a WRITE FORMAT to set IRESV3==>IWSTR = 1
                        ;       Do a WRITE NPR to set loopback and tape direction IN
                        ;       Do a WRITE FIFO with byte count equal to 1 and Tape direction IN
                        ;         to strobe loopback data into FIFO.
                        ;       Do a READ FIFO with tape direction IN to read data
                        ;       If Data read from FIFO NOT= to Data sent Then Print Error
                        ;    END
                        ;--
055234                          BGNSUB                                  ;///////////// BEGIN SUBTEST //////////
055234                                                                          T8.3:
     055234  104402                                                                                TRAP    C$BSUB
                                     ;       Write to TSSR register to soft initialize the controller
     055236                          5$:
     055236  004737  015774                  JSR     PC,SOFINIT              ;WRITE TO TSSR TO SOFT INITIALIZE
     055242  103405                          BCS     10$                     ;BR IF SOFT INIT OKAY
     055244  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
     055246                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL DURING INIT
     055246  104455                                                                                TRAP    C$ERDF
     055250  001474                                                                                .WORD   828
     055252  003652                                                                                .WORD   SFIERR
     055254  012034                                                                                .WORD   SFIMSG
                                     ;       Do WRITE CHARACTERISTICS to check for Extended Features Switch
     055256  005037  002222          10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
     055262  012704  062270                  MOV     #T19PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
     055266  004737  010662                  JSR     PC,WRTCHR               ;DO WRITE CHARACTERISTICS COMMAND
     055272                                  FORCERROR       12$                     ;BBDFORCE ERROR IF FORCER=1
     055306  103407                          BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
     055310  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
     055312                                  NEXT.ERRNO
     055312                          12$:    ERRDF   ERRNO,T19SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
     055312  104455                                                                                TRAP    C$ERDF
     055314  001475                                                                                .WORD   829
     055316  060203                                                                                .WORD   T19SSR
     055320  012046                                                                                .WORD   PKTSSR
     055322  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
     055326                          15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     055326  104406                                                                                TRAP    C$CLP1
                                     ;       If Extended Features Hardware Switch Clear then:
                                     ;         Do Write Subsystem Write Miscellaneous to Set Extended Features.
     055330  012701  062312                  MOV     #T19BFR,R1              ;MESSAGE BUFFER ADDRESS
     055334  032761  000200  000012          BIT     #X2.EXTF,XST2(R1)       ;EXTENDED FEATURES SWITCH SET?
     055342  001026                          BNE     30$                     ;BR IF YES
     055344  004737  062142                  JSR     PC,T19SEXT              ;SETUP PACKET FOR WRITE MISC INVERT
     055350  012704  062440                  MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
     055354  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
     055360  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
     055364                                  FORCERROR       22$                     ;BBDFORCE ERROR IF FORCER=1
     055400  103407                          BCS     30$                     ;BR IF CARRY SET (GOOD RETURN)
     055402  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
     055404                                  NEXT.ERRNO
     055404                          22$:    ERRDF   ERRNO,T192SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
     055404  104455                                                                                TRAP    C$ERDF
     055406  001476                                                                                .WORD   830
     055410  060240                                                                                .WORD   T192SSR
     055412  012046                                                                                .WORD   PKTSSR
     055414  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
     055420                          30$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     055420  104406                                                                                TRAP    C$CLP1
                                     ;       Do WRITE CHARACTERISTICS to select reserved unit 7
     055422  012704  062270                  MOV     #T19PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
     055426  004737  010662                  JSR     PC,WRTCHR               ;DO WRITE CHARACTERISTICS COMMAND
     055432                                  FORCERROR       42$                     ;BBDFORCE ERROR IF FORCER=1
     055446  103407                          BCS     50$                     ;BR IF CARRY SET (GOOD RETURN)
     055450  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
     055452                                  NEXT.ERRNO
     055452                          42$:    ERRDF   ERRNO,T19SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
     055452  104455                                                                                TRAP    C$ERDF
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        055454  001477                                                          .WORD   831
        055456  060203                                                          .WORD   T19SSR
        055460  012046                                                          .WORD   PKTSSR
   4531 055462  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
   4532 055466                          50$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
        055466  104406                                                          TRAP    C$CLP1
   4533
   4534                                 ;  REPEAT FOR ALL TEST PATTERNS IN TSTBLK TABLE
   4535 055470  012703  002752                  MOV     #TSTBLK,R3              ;GET FIRST PATTERN ADDRESS
   4536 055474  012337  002312          100$:   MOV     (R3)+,DATA              ;GET A TEST PATTERN
   4537 055500  042737  177400  002312          BIC     #↑C<377>,DATA           ;DATA IS BYTE
   4538 055506  010337  002316                  MOV     R3,TSTPTR               ;SETUP CURRENT TSTBLK POINTER
   4539                                 ;       Do a WRITE NPR to set loopback and tape direction OUT
   4540 055512  012700  000100                  MOV     #NP.OUT,R0              ;SET TAPE DIRECTION OUT
   4541 055516  052700  000040                  BIS     #NP.LOOP,R0             ;SET LOOPBACK
   4542 055522  004737  062002                  JSR     PC,T19SNPR              ;SETUP T19PK2 FOR WRITE NPR
   4543 055526  012704  062440                  MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
   4544 055532  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
   4545 055536  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
   4546 055542                                  FORCERROR       102$                    ;@@DFORCE ERROR IF FORCER=1
   4547 055556  103407                          BCS     105$                    ;BR IF CARRY SET (GOOD RETURN)
   4548 055560  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
   4549 055562                                  NEXT,ERRNO
   4550 055562                          102$:   ERRDF   ERRNO,T194SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
        055562  104455                                                          TRAP    C$ERDF
        055564  001500                                                          .WORD   832
        055566  060351                                                          .WORD   T194SSR
        055570  012046                                                          .WORD   PKTSSR
   4551 055572  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
   4552 055576                          105$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
        055576  104406                                                          TRAP    C$CLP1
   4553                                 ;       Do a WRITE FORMAT to set IRESV3==>IWSTR = 1
   4554 055600  012700  000002                  MOV     #WF.I3RES,R0            ;IRESV3==>IWSTR=1
   4555 055604  004737  062122                  JSR     PC,T19WFMT              ;SETUP T9PK2 FOR WRITE FORMAT
   4556 055610  012704  062440                  MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
   4557 055614  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
   4558 055620  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
   4559 055624                                  FORCERROR       112$                    ;@@DFORCE ERROR IF FORCER=1
   4560 055640  103407                          BCS     120$                    ;BR IF CARRY SET (GOOD RETURN)
   4561 055642  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
   4562 055644                                  NEXT,ERRNO
   4563 055644                          112$:   ERRDF   ERRNO,T198SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
        055644  104455                                                          TRAP    C$ERDF
        055646  001501                                                          .WORD   833
        055650  060572                                                          .WORD   T198SSR
        055652  012046                                                          .WORD   PKTSSR
   4564 055654  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
   4565 055660                          120$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
        055660  104406                                                          TRAP    C$CLP1
   4566                                 ;       Do a WRITE FIFO with byte count equal to 1 and Tape direction OUT
   4567 055662  012700  000001                  MOV     #1,R0                   ;WRITE 1 BYTE
   4568 055666  012701  002312                  MOV     #DATA,R1                ;FIFO WRITE DATA ADDRESS
   4569 055672  004737  062046                  JSR     PC,T19WFIF              ;SETUP T19PK2 FOR WRITE FIFO
   4570 055676  012704  062440                  MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
   4571 055702  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
   4572 055706  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
   4573 055712                                  FORCERROR       132$                    ;@@DFORCE ERROR IF FORCER=1
   4574 055726  103407                          BCS     140$                            ;BR IF CARRY SET (GOOD RETURN)
   4575 055730  010001                          MOV     R0,R1                           ;SAVE CONTENTS OF TSSR
   4576 055732                                  NEXT,ERRNO
   4577 055732                          132$:   ERRDF   ERRNO,T195SSR,PKTSSR            ;DEVICE FATAL SSR FAILED TO SET
        055732  104455                                                                                  TRAP    C$ERDF
        055734  001502                                                                                  .WORD   834
        055736  060414                                                                                  .WORD   T195SSR
        055740  012046                                                                                  .WORD   PKTSSR
   4578 055742  005237  002222                  INC     FATFLG                          ;SET FATAL ERROR FLAG
   4579 055746                          140$:   CKLOOP                                  ;LOOP ON ERROR, IF FLAG SET
        055746  104406                                                                                  TRAP    C$CLP1
   4580                                 ;       Do a WRITE FORMAT to set IRESV3==>IWSTR = 0
   4581 055750  005000                          CLR     R0                              ;SET IRESV3==>IWSTR=0
   4582 055752  004737  062122                  JSR     PC,T19WFMT                      ;SETUP T9PK2 FOR WRITE FORMAT
   4583 055756  012704  062440                  MOV     #T19PK2,R4                      ;GET WRITE SUBSYSTEM COMMAND PACKET
   4584 055762  010465  000000                  MOV     R4,TSDB(R5)                     ;SET THE PACKET ADDRESS TO EXECUTE
   4585 055766  004737  016336                  JSR     PC,CHKTSSR                      ;WAIT FOR SSR TO SET
   4586 055772                                  FORCERROR       152$                            ;@@DFORCE ERROR IF FORCER=1
   4587 056006  103407                          BCS     160$                            ;BR IF CARRY SET (GOOD RETURN)
   4588 056010  010001                          MOV     R0,R1                           ;SAVE CONTENTS OF TSSR
   4589 056012                                  NEXT,ERRNO
   4590 056012                          152$:   ERRDF   ERRNO,T198SSR,PKTSSR            ;DEVICE FATAL SSR FAILED TO SET
        056012  104455                                                                                  TRAP    C$ERDF
        056014  001503                                                                                  .WORD   835
        056016  060572                                                                                  .WORD   T198SSR
        056020  012046                                                                                  .WORD   PKTSSR
   4591 056022  005237  002222                  INC     FATFLG                          ;SET FATAL ERROR FLAG
   4592 056026                          160$:   CKLOOP                                  ;LOOP ON ERROR, IF FLAG SET
        056026  104406                                                                                  TRAP    C$CLP1
   4593                                 ;       Do a WRITE FORMAT to set IRESV3==>IWSTR = 1
   4594 056030  012700  000002                  MOV     #WF.I3RES,R0                    ;IRESV3==>IWSTR=1
   4595 056034  004737  062122                  JSR     PC,T19WFMT                      ;SETUP T9PK2 FOR WRITE FORMAT
   4596 056040  012704  062440                  MOV     #T19PK2,R4                      ;GET WRITE SUBSYSTEM COMMAND PACKET
   4597 056044  010465  000000                  MOV     R4,TSDB(R5)                     ;SET THE PACKET ADDRESS TO EXECUTE
   4598 056050  004737  016336                  JSR     PC,CHKTSSR                      ;WAIT FOR SSR TO SET
   4599 056054                                  FORCERROR       172$                            ;@@DFORCE ERROR IF FORCER=1
   4600 056070  103407                          BCS     180$                            ;BR IF CARRY SET (GOOD RETURN)
   4601 056072  010001                          MOV     R0,R1                           ;SAVE CONTENTS OF TSSR
   4602 056074                                  NEXT,ERRNO
   4603 056074                          172$:   ERRDF   ERRNO,T198SSR,PKTSSR            ;DEVICE FATAL SSR FAILED TO SET
        056074  104455                                                                                  TRAP    C$ERDF
        056076  001504                                                                                  .WORD   836
        056100  060572                                                                                  .WORD   T198SSR
        056102  012046                                                                                  .WORD   PKTSSR
   4604 056104  005237  002222                  INC     FATFLG                          ;SET FATAL ERROR FLAG
   4605 056110                          180$:   CKLOOP                                  ;LOOP ON ERROR, IF FLAG SET
        056110  104406                                                                                  TRAP    C$CLP1
   4606
   4607                                 ;       Do a WRITE NPR to set loopback and tape direction IN
   4608 056112  005000                          CLR     R0                              ;CLR NP.OUT TO SET TAPE DIRECTION IN
   4609 056114  052700  000040                  BIS     #NP.LOOP,R0                     ;SET LOOPBACK
   4610 056120  004737  062002                  JSR     PC,T19SNPR                      ;SETUP T19PK2 FOR WRITE NPR
   4611 056124  012704  062440                  MOV     #T19PK2,R4                      ;GET WRITE SUBSYSTEM COMMAND PACKET
   4612 056130  010465  000000                  MOV     R4,TSDB(R5)                     ;SET THE PACKET ADDRESS TO EXECUTE
   4613 056134  004737  016336                  JSR     PC,CHKTSSR                      ;WAIT FOR SSR TO SET
   4614 056140                                  FORCERROR       182$                            ;@@DFORCE ERROR IF FORCER=1
   4615 056154  103407                          BCS     190$                            ;BR IF CARRY SET (GOOD RETURN)
```

```
4616 056156  010001                            MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
4617 056160                                    NEXT,ERRNO
4618 056160                           182$:    ERRDF   ERRNO,T194SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
     056160  104455                                                                                    TRAP    C$ERDF
     056162  001505                                                                                    .WORD   837
     056164  060351                                                                                    .WORD   T194SSR
     056166  012046                                                                                    .WORD   PKTSSR
4619 056170  005237  002222                    INC     FATFLG                  ;SET FATAL ERROR FLAG
4620 056174                           190$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     056174  104406                                                                                    TRAP    C$CLP1
4621                                  ;        Do a WRITE FIFO with byte count equal to 1 and Tape direction IN
4622 056176  012700  000001                    MOV     #1,R0                   ;WRITE 1 BYTE
4623 056202  012701  002312                    MOV     #DATA,R1                ;FIFO WRITE DATA ADDRESS
4624 056206  004737  062046                    JSR     PC,T19WFIF              ;SETUP T19PK2 FOR WRITE FIFO
4625 056212  012704  062440                    MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
4626 056216  010465  000000                    MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
4627 056222  004737  016336                    JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
4628 056226                                    FORCERROR       202$                    ;BBDFORCE ERROR IF FORCER=1
4629 056242  103407                            BCS     210$                    ;BR IF CARRY SET (GOOD RETURN)
4630 056244  010001                            MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
4631 056246                                    NEXT,ERRNO
4632 056246                           202$:    ERRDF   ERRNO,T195SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
     056246  104455                                                                                    TRAP    C$ERDF
     056250  001506                                                                                    .WORD   838
     056252  060414                                                                                    .WORD   T195SSR
     056254  012046                                                                                    .WORD   PKTSSR
4633 056256  005237  002222                    INC     FATFLG                  ;SET FATAL ERROR FLAG
4634 056262                           210$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     056262  104406                                                                                    TRAP    C$CLP1
4635                                  ;        Do a READ FIFO with tape direction IN to read data
4636 056264  012700  000001                    MOV     #1,R0                   ;SET READ BYTE COUNT
4637 056270  004737  062026                    JSR     PC,T19RFIF              ;SETUP T19PK2 FOR READ FIFO
4638 056274  012704  062440                    MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
4639 056300  010465  000000                    MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
4640 056304  004737  016336                    JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
4641 056310                                    FORCERROR       222$                    ;BBDFORCE ERROR IF FORCER=1
4642 056324  103407                            BCS     230$                    ;BR IF CARRY SET (GOOD RETURN)
4643 056326  010001                            MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
4644 056330                                    NEXT,ERRNO
4645 056330                           222$:    ERRDF   ERRNO,T196SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
     056330  104455                                                                                    TRAP    C$ERDF
     056332  001507                                                                                    .WORD   839
     056334  060460                                                                                    .WORD   T196SSR
     056336  012046                                                                                    .WORD   PKTSSR
4646 056340  005237  002222                    INC     FATFLG                  ;SET FATAL ERROR FLAG
4647 056344                           230$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     056344  104406                                                                                    TRAP    C$CLP1
4648                                  ;        If Data read from FIFO NOT= to Data sent Then Print Error
4649 056346  004737  062200                    JSR     PC,T19SETEXP            ;SET WORDS 0-7 EXPD=RECV (NOT TESTING)
4650 056352  012701  060042                    MOV     #T19EXSTA,R1            ;GET EXPECTED READ STATUS
4651 056356  012702  062332                    MOV     #T19BFSTA,R2            ;GET RECV READ STATUS
4652 056362  013711  002312                    MOV     DATA,(R1)               ;SET EXPD WORD #8 = DATA
4653 056366  016261  000002  000002            MOV     2(R2),2(R1)             ;SET EXPD WORD #9 = RECV (NOT TESTING)
4654 056374  005000                            CLR     R0                      ;HIGH RECV ADDRESS FOR CKMSG2
4655 056376  012701  062312                    MOV     #T19BFR,R1              ;LOW RECV ADDRESS FOR CKMSG2
4656 056402  012702  060022                    MOV     #T19EXP,R2              ;EXPD ADDRESS
4657 056406  012703  000022                    MOV     #18.,R3                 ;NUMBER OF BYTES TO COMPARE
```

```
056412  004737  011500          JSR     PC,CKMSG2               ;EXPD EQUAL RECV?
056416                          FORCERROR       242$,NOTSSR     ;@@D
056426  103404                  BCS     250$                    ;BR IF YES
056430                          NEXT.ERRNO
056430                  242$:   ERRHRD  ERRNO,T19WSTR,MSGSUB    ;REPORT ERROR
056430  104456                                                                  TRAP    C$ERHRD
056432  001510                                                                  .WORD   840
056434  061503                                                                  .WORD   T19WSTR
056436  013742                                                                  .WORD   MSGSUB
056440                  250$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
056440  104406                                                                  TRAP    C$CLP1


056442                          FORCEXIT        255$            ;@@D
056452  013703  002316          MOV     TSTPTR,R3               ;RESTORE CURRENT TSTBLK POINTER
056456  020327  003062          CMP     R3,#TBLEND              ;END OF TSTBLK?
056462  103002                  BHIS    255$                    ;BR IF YES
056464  000137  055474          JMP     100$                    ;DO ANOTHER TSTBLK PATTERN
056470                  255$:

056470                          ENDSUB                          ;///////////// END SUBTEST //////////
056470                                                                  L10071:
056470  104403                                                                  TRAP    C$ESUB

056472  005737  002222          TST     FATFLG                  ;ANY FATAL ERRORS ?
056476  001402                  BEQ     260$                    ;BRANCH IF NOT
056500  004737  017202          JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
056504                  260$:
                                .SBTTL  TEST  8: SUBTEST 4 LOOPBACK READ STROBE TEST

                        ;++
                        ; TEST 8: SUBTEST 4:
                        ;
                        ; SUBTEST DESCRIPTION:
                        ;
                        ;       This subtest verifies the Read Strobe loopback path
                        ;       can strobe the data from the Data lines to the FIFO.
                        ;       The signal IRESV4 drives IRSTR (read strobe) to write
                        ;       from the data lines to the FIFO.
                        ;
                        ; TEST STEPS:
                        ;
                        ;
                        ;  REPEAT FOR ALL TEST PATTERNS IN TSTBLK TABLE
                        ;    BEGIN
                        ;       Write to TSSR register to soft initialize the controller
                        ;       Do WRITE CHARACTERISTICS to check for Extended Features Switch
                        ;       If Extended Features Hardware Switch Clear then:
                        ;         Do Write Subsystem Write Miscellaneous to Set Extended Features.
                        ;       Do WRITE CHARACTERISTICS to select reserved unit 7 and setup BUFFER
                        ;       Do a Write Subsystem WRITE NPR to set tape direction out and Loopback
                        ;       Do a WRITE NPR to set loopback and tape direction OUT
                        ;       Do a WRITE FORMAT to set IRESV4==>IRSTR = 1
                        ;       Do a WRITE FIFO with byte count equal to 1 and Tape direction OUT
                        ;       Do a READ FIFO with tape direction OUT to load tape out write latch
                        ;       Do a WRITE NPR to set loopback and tape direction IN
                        ;       Do a WRITE FORMAT to set IRESV4==>IRSTR = 0 to write loop data to FIFO
```

```
4708                                          ;       Do a WRITE FORMAT to set IRESV4==>IRSTR = 1
4709                                          ;         (to strobe loopback data into FIFO.)
4710                                          ;       Do a READ FIFO with tape direction IN to read data
4711                                          ;       If Data read from FIFO NOT= to Data sent Then Print Error
4712                                          ;    END
4713                                          ;--
4714 056504                                           BGNSUB                                  ;///////////// BEGIN SUBTEST //////////
     056504                                                                                                   T8.4:
     056504  104402                                                                                   TRAP     C$BSUB
4715                                          ;       Write to TSSR register to soft initialize the controller
4716 056506                                   5$:
4717 056506  004737  015774                           JSR     PC,SOFINIT                      ;WRITE TO TSSR TO SOFT INITIALIZE
4718 056512  103405                                   BCS     10$                             ;BR IF SOFT INIT OKAY
4719 056514  010001                                   MOV     R0,R1                           ;SAVE CONTENTS OF TSSR
4720 056516                                           ERRDF   ERRNO,SFIERR,SFIMSG             ;DEVICE FATAL DURING INIT
     056516  104455                                                                                   TRAP     C$ERDF
     056520  001510                                                                                   .WORD    840
     056522  003652                                                                                   .WORD    SFIERR
     056524  012034                                                                                   .WORD    SFIMSG
4721                                          ;       Do WRITE CHARACTERISTICS to check for Extended Features Switch
4722 056526  005037  002222                   10$:    CLR     FATFLG                          ;CLEAR FATAL ERROR FLAG
4723 056532  012704  062270                           MOV     #T19PACKET,R4                   ;GET THE ADDRESS OF COMMAND PACKET
4724 056536  004737  010662                           JSR     PC,WRTCHR                       ;DO WRITE CHARACTERISTICS COMMAND
4725 056542                                           FORCERROR       12$                             ;@@DFORCE ERROR IF FORCER=1
4726 056556  103407                                   BCS     15$                             ;BR IF CARRY SET (GOOD RETURN)
4727 056560  010001                                   MOV     R0,R1                           ;SAVE CONTENTS OF TSSR
4728 056562                                           NEXT.ERRNO
4729 056562                                   12$:    ERRDF   ERRNO,T19SSR,PKTSSR             ;DEVICE FATAL SSR FAILED TO SET
     056562  104455                                                                                   TRAP     C$ERDF
     056564  001511                                                                                   .WORD    841
     056566  060203                                                                                   .WORD    T19SSR
     056570  012046                                                                                   .WORD    PKTSSR
4730 056572  005237  002222                           INC     FATFLG                          ;SET FATAL ERROR FLAG
4731 056576                                   15$:    CKLOOP                                  ;LOOP ON ERROR, IF FLAG SET
     056576  104406                                                                                   TRAP     C$CLP1
4732                                          ;       If Extended Features Hardware Switch Clear then:
4733                                          ;         Do Write Subsystem Write Miscellaneous to Set Extended Features.
4734 056600  012701  062312                           MOV     #T19BFR,R1                      ;MESSAGE BUFFER ADDRESS
4735 056604  032761  000200  000012                   BIT     #X2.EXTF,XST2(R1)               ;EXTENDED FEATURES SWITCH SET?
4736 056612  001026                                   BNE     30$                             ;BR IF YES
4737 056614  004737  062142                           JSR     PC,T19SEXT                      ;SETUP PACKET FOR WRITE MISC INVERT
4738 056620  012704  062440                           MOV     #T19PK2,R4                      ;GET WRITE SUBSYSTEM COMMAND PACKET
4739 056624  010465  000000                           MOV     R4,TSDB(R5)                     ;SET THE PACKET ADDRESS TO EXECUTE
4740 056630  004737  016336                           JSR     PC,CHKTSSR                      ;WAIT FOR SSR TO SET
4741 056634                                           FORCERROR       22$                             ;@@DFORCE ERROR IF FORCER=1
4742 056650  103407                                   BCS     30$                             ;BR IF CARRY SET (GOOD RETURN)
4743 056652  010001                                   MOV     R0,R1                           ;SAVE CONTENTS OF TSSR
4744 056654                                           NEXT.ERRNO
4745 056654                                   22$:    ERRDF   ERRNO,T192SSR,PKTSSR            ;DEVICE FATAL SSR FAILED TO SET
     056654  104455                                                                                   TRAP     C$ERDF
     056656  001512                                                                                   .WORD    842
     056660  060240                                                                                   .WORD    T192SSR
     056662  012046                                                                                   .WORD    PKTSSR
4746 056664  005237  002222                           INC     FATFLG                          ;SET FATAL ERROR FLAG
4747 056670                                   30$:    CKLOOP                                  ;LOOP ON ERROR, IF FLAG SET
     056670  104406                                                                                   TRAP     C$CLP1
4748                                          ;       Do WRITE CHARACTERISTICS to select reserved unit 7
```

```
056672  012704  062270                   MOV     #T19PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
056676  004737  010662                   JSR     PC,WRTCHR               ;DO WRITE CHARACTERISTICS COMMAND
056702                                   FORCERROR       42$                        ;@@DFORCE ERROR IF FORCER=1
056716  103407                           BCS     50$                     ;BR IF CARRY SET (GOOD RETURN)
056720  010001                           MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
056722                                   NEXT.ERRNO
056722                           42$:    ERRDF   ERRNO,T19SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
056722  104455                                                                                   TRAP    C$ERDF
056724  001513                                                                                   .WORD   843
056726  060203                                                                                   .WORD   T19SSR
056730  012046                                                                                   .WORD   PKTSSR
056732  005237  002222                   INC     FATFLG                  ;SET FATAL ERROR FLAG
056736                           50$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
056736  104406                                                                                   TRAP    C$CLP1

                                 ;  REPEAT FOR ALL TEST PATTERNS IN TSTBLK TABLE
056740  012703  002752                   MOV     #TSTBLK,R3              ;GET FIRST PATTERN ADDRESS
056744  012337  002312           100$:   MOV     (R3)+,DATA              ;GET A TEST PATTERN
056750  042737  177400  002312           BIC     #↑C<377>,DATA           ;DATA IS BYTE
056756  010337  002316                   MOV     R3,TSTPTR               ;SETUP CURRENT TSTBLK POINTER
                                 ;       Do a WRITE NPR to set loopback and tape direction OUT
056762  012700  000100                   MOV     #NP.OUT,R0              ;SET TAPE DIRECTION OUT
056766  052700  000040                   BIS     #NP.LOOP,R0             ;SET LOOPBACK
056772  004737  062002                   JSR     PC,T19SNPR              ;SETUP T19PK2 FOR WRITE NPR
056776  012704  062440                   MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
057002  010465  000000                   MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
057006  004737  016336                   JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
057012                                   FORCERROR       102$                       ;@@DFORCE ERROR IF FORCER=1
057026  103407                           BCS     105$                    ;BR IF CARRY SET (GOOD RETURN)
057030  010001                           MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
057032                                   NEXT.ERRNO
057032                           102$:   ERRDF   ERRNO,T194SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
057032  104455                                                                                   TRAP    C$ERDF
057034  001514                                                                                   .WORD   844
057036  060351                                                                                   .WORD   T194SSR
057040  012046                                                                                   .WORD   PKTSSR
057042  005237  002222                   INC     FATFLG                  ;SET FATAL ERROR FLAG
057046                           105$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
057046  104406                                                                                   TRAP    C$CLP1
                                 ;       Do a WRITE FORMAT to set IRESV4==>IRSTR = 1
057050  012700  000001                   MOV     #WF.I4RES,R0            ;IRESV4==>IRSTR=1
057054  004737  062122                   JSR     PC,T19WFMT              ;SETUP T9PK2 FOR WRITE FORMAT
057060  012704  062440                   MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
057064  010465  000000                   MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
057070  004737  016336                   JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
057074                                   FORCERROR       112$                       ;@@DFORCE ERROR IF FORCER=1
057110  103407                           BCS     120$                    ;BR IF CARRY SET (GOOD RETURN)
057112  010001                           MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
057114                                   NEXT.ERRNO
057114                           112$:   ERRDF   ERRNO,T198SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
057114  104455                                                                                   TRAP    C$ERDF
057116  001515                                                                                   .WORD   845
057120  060572                                                                                   .WORD   T198SSR
057122  012046                                                                                   .WORD   PKTSSR
057124  005237  002222                   INC     FATFLG                  ;SET FATAL ERROR FLAG
057130                           120$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
057130  104406                                                                                   TRAP    C$CLP1
```

```
  4791                                   ;      Do a WRITE FIFO with byte count equal to 1 and Tape direction OUT
  4792 057132  012700  000001                   MOV     #1,R0                   ;WRITE 1 BYTE
  4793 057136  012701  002312                   MOV     #DATA,R1                ;FIFO WRITE DATA ADDRESS
  4794 057142  004737  062046                   JSR     PC,T19WFIF              ;SETUP T19PK2 FOR WRITE FIFO
  4795 057146  012704  062440                   MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
  4796 057152  010465  000000                   MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
  4797 057156  004737  016336                   JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
  4798 057162                                   FORCERROR       132$                    ;@@DFORCE ERROR IF FORCER=1
  4799 057176  103407                           BCS     140$                    ;BR IF CARRY SET (GOOD RETURN)
  4800 057200  010001                           MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
  4801 057202                                   NEXT.ERRNO
  4802 057202                           132$:   ERRDF   ERRNO,T195SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
       057202  104455                                                                                   TRAP    C$ERDF
       057204  001516                                                                                   .WORD   846
       057206  060414                                                                                   .WORD   T195SSR
       057210  012046                                                                                   .WORD   PKTSSR
  4803 057212  005237  002222                   INC     FATFLG                  ;SET FATAL ERROR FLAG
  4804 057216                           140$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
       057216  104406                                                                                   TRAP    C$CLP1
  4805                                   ;      Do a READ FIFO with tape direction OUT to load tape out write latch
  4806 057220  012700  000001                   MOV     #1,R0                   ;SET READ BYTE COUNT
  4807 057224  004737  062026                   JSR     PC,T19RFIF              ;SETUP T19PK2 FOR READ FIFO
  4808 057230  012704  062440                   MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
  4809 057234  010465  000000                   MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
  4810 057240  004737  016336                   JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
  4811 057244                                   FORCERROR       152$                    ;@@DFORCE ERROR IF FORCER=1
  4812 057260  103407                           BCS     160$                    ;BR IF CARRY SET (GOOD RETURN)
  4813 057262  010001                           MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
  4814 057264                                   NEXT.ERRNO
  4815 057264                           152$:   ERRDF   ERRNO,T196SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
       057264  104455                                                                                   TRAP    C$ERDF
       057266  001517                                                                                   .WORD   847
       057270  060460                                                                                   .WORD   T196SSR
       057272  012046                                                                                   .WORD   PKTSSR
  4816 057274  005237  002222                   INC     FATFLG                  ;SET FATAL ERROR FLAG
  4817 057300                           160$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
       057300  104406                                                                                   TRAP    C$CLP1
  4818                                   ;      Do a WRITE NPR to set loopback and tape direction IN
  4819 057302  005000                           CLR     R0                      ;CLR NP.OUT TO SET TAPE DIRECTION IN
  4820 057304  052700  000040                   BIS     #NP.LOOP,R0             ;SET LOOPBACK
  4821 057310  004737  062002                   JSR     PC,T19SNPR              ;SETUP T19PK2 FOR WRITE NPR
  4822 057314  012704  062440                   MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
  4823 057320  010465  000000                   MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
  4824 057324  004737  016336                   JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
  4825 057330                                   FORCERROR       182$                    ;@@DFORCE ERROR IF FORCER=1
  4826 057344  103407                           BCS     190$                    ;BR IF CARRY SET (GOOD RETURN)
  4827 057346  010001                           MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
  4828 057350                                   NEXT.ERRNO
  4829 057350                           182$:   ERRDF   ERRNO,T194SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
       057350  104455                                                                                   TRAP    C$ERDF
       057352  001520                                                                                   .WORD   848
       057354  060351                                                                                   .WORD   T194SSR
       057356  012046                                                                                   .WORD   PKTSSR
  4830 057360  005237  002222                   INC     FATFLG                  ;SET FATAL ERROR FLAG
  4831 057364                           190$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
       057364  104406                                                                                   TRAP    C$CLP1
  4832                                   ;      Do a WRITE FORMAT to set IRESV4==>IRSTR = 0
```

```
 4833 057366  005000                          CLR     R0                      ;SET IRESV4==>IRSTR=0
 4834 057370  004737  062122                  JSR     PC,T19WFMT              ;SETUP T9PK2 FOR WRITE FORMAT
 4835 057374  012704  062440                  MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
 4836 057400  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
 4837 057404  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
 4838 057410                                  FORCERROR       202$                    ;@@FORCE ERROR IF FORCER=1
 4839 057424  103407                          BCS     210$                    ;BR IF CARRY SET (GOOD RETURN)
 4840 057426  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 4841 057430                                  NEXT.ERRNO
 4842 057430                          202$:   ERRDF   ERRNO,T198SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
      057430  104455                                                                                  TRAP    C$ERDF
      057432  001521                                                                                  .WORD   849
      057434  060572                                                                                  .WORD   T198SSR
      057436  012046                                                                                  .WORD   PKTSSR
 4843 057440  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
 4844 057444                          210$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
      057444  104406                                                                                  TRAP    C$CLP1
 4845                                 ;       Do a WRITE FORMAT to set IRESV4==>IRSTR = 1
 4846 057446  012700  000001                  MOV     #WF.I4RES,R0            ;IRESV4==>IRSTR=1
 4847 057452  004737  062122                  JSR     PC,T19WFMT              ;SETUP T9PK2 FOR WRITE FORMAT
 4848 057456  012704  062440                  MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
 4849 057462  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
 4850 057466  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
 4851 057472                                  FORCERROR       222$                    ;@@FORCE ERROR IF FORCER=1
 4852 057506  103407                          BCS     230$                    ;BR IF CARRY SET (GOOD RETURN)
 4853 057510  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 4854 057512                                  NEXT.ERRNO
 4855 057512                          222$:   ERRDF   ERRNO,T198SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
      057512  104455                                                                                  TRAP    C$ERDF
      057514  001522                                                                                  .WORD   850
      057516  060572                                                                                  .WORD   T198SSR
      057520  012046                                                                                  .WORD   PKTSSR
 4856 057522  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
 4857 057526                          230$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
      057526  104406                                                                                  TRAP    C$CLP1
 4858                                 ;       Do a READ FIFO with tape direction IN to read data
 4859 057530  012700  000001                  MOV     #1,R0                   ;SET READ BYTE COUNT
 4860 057534  004737  062026                  JSR     PC,T19RFIF              ;SETUP T19PK2 FOR READ FIFO
 4861 057540  012704  062440                  MOV     #T19PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
 4862 057544  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
 4863 057550  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
 4864 057554                                  FORCERROR       282$                    ;@@FORCE ERROR IF FORCER=1
 4865 057570  103407                          BCS     290$                    ;BR IF CARRY SET (GOOD RETURN)
 4866 057572  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 4867 057574                                  NEXT.ERRNO
 4868 057574                          282$:   ERRDF   ERRNO,T196SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
      057574  104455                                                                                  TRAP    C$ERDF
      057576  001523                                                                                  .WORD   851
      057600  060460                                                                                  .WORD   T196SSR
      057602  012046                                                                                  .WORD   PKTSSR
 4869 057604  005237  002222                  INC     FATFLG                  ;SET FATAL ERROR FLAG
 4870 057610                          290$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
      057610  104406                                                                                  TRAP    C$CLP1
 4871                                 ;       If Data read from FIFO NOT= to Data sent Then Print Error
 4872 057612  004737  062200                  JSR     PC,T19SETEXP            ;SET WORDS 0-7 EXPD=RECV (NOT TESTING)
 4873 057616  012701  060042                  MOV     #T19EXSTA,R1            ;GET EXPECTED READ STATUS
 4874 057622  012702  062332                  MOV     #T19BFSTA,R2            ;GET RECV READ STATUS
```

```
057626  013711  002312                  MOV     DATA,(R1)               ;SET EXPD WORD #8 = DATA
057632  016261  000002  000002          MOV     2(R2),2(R1)             ;SET EXPD WORD #9 = RECV (NOT TESTING)
057640  005000                          CLR     R0                      ;HIGH RECV ADDRESS FOR CKMSG2
057642  012701  062312                  MOV     #T19BFR,R1              ;LOW RECV ADDRESS FOR CKMSG2
057646  012702  060022                  MOV     #T19EXP,R2              ;EXPD ADDRESS
057652  012703  000022                  MOV     #18.,R3                 ;NUMBER OF BYTES TO COMPARE
057656  004737  011500                  JSR     PC,CKMSG2               ;EXPD EQUAL RECV?
057662                                  FORCERROR       302$,NOTSSR     ;@@D
057672  103404                          BCS     310$                    ;BR IF YES
057674                                  NEXT.ERRNO
057674                          302$:   ERRHRD  ERRNO,T19RSTR,MSGSUB    ;REPORT ERROR
057674  104456                                                                                  TRAP    C$ERHRD
057676  001524                                                                                  .WORD   852
057700  061610                                                                                  .WORD   T19RSTR
057702  013742                                                                                  .WORD   MSGSUB
057704                          310$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
057704  104406                                                                                  TRAP    C$CLP1


057706                                  FORCEXIT        355$            ;@@D
057716  013703  002316                  MOV     TSTPTR,R3               ;RESTORE CURRENT TSTBLK POINTER
057722  020327  003062                  CMP     R3,#TBLEND              ;END OF TSTBLK?
057726  103002                          BHIS    355$                    ;BR IF YES
057730  000137  056744                  JMP     100$                    ;DO ANOTHER TSTBLK PATTERN
057734                          355$:

057734                                  ENDSUB                          ;///////////// END SUBTEST //////////
057734                                                                                  L10072:
057734  104403                                                                                  TRAP    C$ESUB

057736  005737  002222                  TST     FATFLG                  ;ANY FATAL ERRORS ?
057742  001402                          BEQ     360$                    ;BRANCH IF NOT
057744  004737  017202                  JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
057750                          360$:

057750                                  EXIT    TST                     ;////////// EXIT TEST //////////
057750  104432                                                                                  TRAP    C$EXIT
057752  002602                                                                                  .WORD   L10066-.



                                ;+
                                ;LOCAL STORAGE FOR THIS TEST
                                ;-

057754  000000                  T19PREV:        .WORD   0               ;DRIVE SIGNAL 1-0 TRANSITION FLAG
                                ;+
                                ; LOOPBACK DRIVE SIGNAL TABLE
                                ; THIS TABLE IS USED BY T19CNVT TO SETUP
                                ; A DRIVE PATTERN FROM THE TEST DATA INPUT PATTERN.
                                ;
                                ; WRITE CONTROL SIGNALS ARE OF FORM WC.XXX
                                ; WRITE FORMAT SIGNALS ARE OF FORM WF.XXXX
                                ;-
057756                          T19BFCTL:                               ;WRITE CONTROL DRIVE SIGNALS
057756  000001                                  WC.IGO                  ;IGO==>IFPT     DATA<0>
057760  000002                                  WC.IFEN                 ;IFEN==>IFBY    DATA<1>
057762  000004                                  WC.IRWU                 ;IRWU==>IRWD    DATA<2>
```

```
057764  000010                                      WC.IREW                 ;IREW==>IDBY     DATA<3>
057766  002000                                      WF.IERASE*256.          ;IFAD==>ILDP     DATA<4>
057770  000040                                      WC.I1TAD                ;ITAD1==>IONL    DATA<5>
057772  000100                                      WC.IOTAD                ;ITADO==>IRDY    DATA<6>
057774  000200                                      WC.IFAD                 ;IERASE==>ISPEED DATA<7>
057776  004000                                      WF.IEDIT*256.           ;IEDIT==>IMER    DATA<8>
060000  010000                                      WF.IWFM*256.            ;IWFM==>IFMK     DATA<9>
060002  020000                                      WF.IREV*256.            ;IREV==>ICER     DATA<10>
060004  040000                                      WF.IWRT*256.            ;IWRT==>IIDENT   DATA<11>
060006  100000                                      WF.IMISP*256.           ;IMISP==>IEOT    DATA<12>
060010  000000                                      .WORD   0               ;IRESV2 (UNUSED)DATA<13>
060012  000000                                      .WORD   0               ;IRESV1 (UNUSED)DATA<14>
060014  000000                                      .WORD   0               ;PARERR (UNTESTED)DATA<15>

060016                                T19MSK:                               ;MASK OF UNTESTED BITS IN READ STATUS BYTES
                                                                            ;UNTESTED BITS ARE SET TO 1
060016     377                                .BYTE   ↑C<000>               ;BYTE 0 MASK
060017     037                                .BYTE   ↑C<340>               ;BYTE 1 MASK (PARERR,IRESV2,IRESV1)
060020     360                                .BYTE   ↑C<017>               ;BYTE 2 (TIMER A,TIMER B,UNDEFINED<1:0>)
060021     000                                .BYTE   0                     ;MAKE IT EVEN

060022                                T19EXP:                               ;BEGIN EXPECTED DATA BUFFER
060022  000000                                .WORD   0                     ;MESSAGE TYPE
060024  000000                                .WORD   0                     ;DATA FIELD LENGTH
060026  000000                                .WORD   0                     ;RBPCR
060030  000000                                .WORD   0                     ;XST0
060032  000000                                .WORD   0                     ;XST1
060034  000000                                .WORD   0                     ;XST2
060036  000000                                .WORD   0                     ;XST3
060040  000000                                .WORD   0                     ;XST4 (ALWAYS PRESENT FOR WRITE SUB.)
060042                                T19EXSTA: .BLKB 64.                   ;EXPECTED READ STATUS AND WRITE FIFO DATA
060142                                T19EXEND:                                          ;END EXPECTED DATA BUFFER
                                      ;+
                                      ;LOCAL TEXT MESSAGES FOR TEST
                                      ;-

060142     124     162     141        TST19ID:          .ASCIZ  'Transport Bus Interface Loopback'
060203     127     122     111        T19SSR: .ASCIZ  'WRITE CHARACTERISTICS Failed'
060240     127     122     111        T192SSR:.ASCIZ  'WRITE SUBSYSTEM (Write Misc) Failed'
060304     127     122     111        T193SSR:.ASCIZ  'WRITE SUBSYSTEM (Read Status) Failed'
060351     127     122     111        T194SSR:.ASCIZ  'WRITE SUBSYSTEM (Write Npr) Failed'
060414     127     122     111        T195SSR:.ASCIZ  'WRITE SUBSYSTEM (Write FIFO) Failed'
060460     127     122     111        T196SSR:.ASCIZ  'WRITE SUBSYSTEM (Read FIFO) Failed'
060523     127     122     111        T197SSR:.ASCIZ  'WRITE SUBSYSTEM (Write Control) Failed'
060572     127     122     111        T198SSR:.ASCIZ  'WRITE SUBSYSTEM (Write Format) Failed'
060640     106     111     106        T191CMP:.ASCIZ  'FIFO Status in WORD #9 Incorrect after Initialize'
060722     122     145     141        T192CMP:.ASCIZ  'Read FIFO Data not equal to Write FIFO , Data is in WORD #8'
061016     124     141     160        T193CMP:.ASCIZ  'Tape Status 2 (in WORD #8) Incorrect after RESET TAPE'
061104     122     145     141        T195CMP:.ASCIZ  'Read FIFO Data not equal to Write FIFO Data'
061160     106     111     106        T196CMP:.ASCIZ  'FIFO Status (in WORD #9) Incorrect after READ FIFO'
061243     124     141     160        T197CMP:.ASCIZ  'Tape Status 2 (in WORD #8) Incorrect after RESET TAPE'
061331     103     157     156        T198CMP:.ASCIZ  'Control Signal Loopback Data Error, Data is in WORD #8'
061420     122     145     141        T199CMP:.ASCIZ  'Read/Write Loopback Data Error, Data is in WORD #8'
061503     114     157     157        T19WSTR:.ASCIZ  'Loopback Data Error when strobed by Write strobe, Data is in WORD #8'
061610     114     157     157        T19RSTR:.ASCIZ  'Loopback Data Error when strobed by Read Strobe, Data is in WORD #8'

                                              .EVEN
```

```

                        ;+
                        ; CLEAR MESSAGE BUFFER
                        ;-
061714                  T19CLRBUF:                                      ;
061714                          SAVREG                                  ;SAVE R1-R5 UNTIL NEXT RETURN
061720  012701  062312          MOV     #T19BFR,R1                      ;GET MESSAGE BUFFER ADDRESS
061724  012702  000120          MOV     #T19BEND-T19BFR,R2              ;SIZE OF MESSAGE BUFFER IN BYTES
061730  105021          10$:    CLRB    (R1)+                           ;CLEAR A BYTE
061732  005302                  DEC     R2                              ;DONE?
061734  003375                  BGT     10$                             ;BR IF NO
061736  000207                  RTS     PC                              ;RETURN

                        ;+
                        ; SETUP T19PK2 PACKET FOR READ STATUS
                        ;-
061740                  T19SRD:
061740  004737  061714          JSR     PC,T19CLRBUF                    ;CLEAR MESSAGE BUFFER
061744  012700  062450          MOV     #T19DT2,R0                      ;WRITE SUBSYSTEM DATA BUFFER
061750  112720  000005          MOVB    #PW.RDSTATUS,(R0)+              ;STORE READ STATUS COMMAND IN BSEL0
061754  105010                  CLRB    (R0)                            ;CLEAR BSEL1
061756  000207                  RTS     PC                              ;RETURN

                        ;+
                        ; SETUP T19PK2 PACKET FOR WRITE MISC Reset Tape Status F-FLOPS
                        ;-
061760                  T19RSFIF:
061760  004737  061714          JSR     PC,T19CLRBUF                    ;CLEAR MESSAGE BUFFER
061764  012700  062450          MOV     #T19DT2,R0                      ;WRITE SUBSYSTEM DATA BUFFER
061770  112720  000010          MOVB    #PW.WMISC,(R0)+                 ;STORE WRITE MISCELLANEOUS IN BSEL0
061774  112710  000030          MOVB    #MS.RSFIF!MS.RSTAP,(R0)         ;STORE BSEL1 CLEAR FIFO CODES
062000  000207                  RTS     PC                              ;RETURN

                        ;+
                        ; SETUP T19PK2 PACKET FOR WRITE NPR
                        ;
                        ; INPUT:
                        ;       R0 CONTAINS BSEL1 NPR DATA
                        ;
                        ;       SETS NP.WRP SINCE IF 0 IT WRITES WRONG PARITY.
                        ;-
062002                  T19SNPR:
062002  004737  061714          JSR     PC,T19CLRBUF                    ;CLEAR MESSAGE BUFFER
062006  012701  062450          MOV     #T19DT2,R1                      ;WRITE SUBSYSTEM DATA BUFFER
062012  112721  000011          MOVB    #PW.WNPR,(R1)+                  ;STORE WRITE NPR IN BSEL0
062016  052700  000020          BIS     #NP.WRP,R0                      ;DON'T WRITE WRONG PARITY
062022  110011                  MOVB    R0,(R1)                         ;STORE NPR DATA IN BSEL1
062024  000207                  RTS     PC                              ;RETURN

                        ;+
                        ; SETUP T19PK2 PACKET FOR READ FIFO
                        ;
                        ; INPUT:
                        ;       R0 CONTAINS SEL2 BYTE COUNT
                        ;-
062026                  T19RFIF:
062026  004737  061714          JSR     PC,T19CLRBUF                    ;CLEAR MESSAGE BUFFER
```

```
062032  012701  062450                  MOV     #T19DT2,R1              ;WRITE SUBSYSTEM DATA BUFFER
062036  112721  000003                  MOVB    #PW.RFIFO,(R1)+         ;STORE READ FIFO IN BSEL0
062042  110021                          MOVB    R0,(R1)+                ;STORE BYTE COUNT IN BSEL1
062044  000207                          RTS     PC                      ;RETURN
                                ;+
                                ; SETUP T19PK2 PACKET FOR WRITE FIFO
                                ;
                                ; INPUT:
                                ;       R0 CONTAINS BYTE COUNT
                                ;       R1 CONTAINS DATA PATTERN BLOCK ADDRESS
                                ;-
062046                          T19WFIF:
062046                                  SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
062052  004737  061714                  JSR     PC,T19CLRBUF            ;CLEAR MESSAGE BUFFER
062056  012702  062450                  MOV     #T19DT2,R2              ;WRITE SUBSYSTEM DATA BUFFER
062062  112722  000004                  MOVB    #PW.WFIFO,(R2)+         ;STORE WRITE FIFO IN BSEL0
062066  110022                          MOVB    R0,(R2)+                ;STORE BYTE COUNT IN BSEL1
062070  005022                          CLR     (R2)+                   ;CLEAR SEL2 (UNUSED)
062072  112122                  10$:    MOVB    (R1)+,(R2)+             ;STORE DATA PATTERN BYTE
062074  005300                          DEC     R0                      ;DONE ALL BYTES?
062076  003375                          BGT     10$                     ;BR IF NO
062100  000207                          RTS     PC                      ;RETURN
                                ;+
                                ; SETUP T19PK2 FOR WRITE CONTROL
                                ;
                                ; INPUT:
                                ;       R0 CONTAINS DRIVING DATA PATTERN
                                ;-
062102                          T19WCTL:
062102  004737  061714                  JSR     PC,T19CLRBUF            ;CLEAR MESSAGE BUFFER
062106  012701  062450                  MOV     #T19DT2,R1              ;WRITE SUBSYSTEM DATA BUFFER
062112  112721  000006                  MOVB    #PW.WCTL,(R1)+          ;STORE WRITE CONTROL IN BSEL0
062116  110021                          MOVB    R0,(R1)+                ;STORE DATA WORD IN BSEL1
062120  000207                          RTS     PC                      ;RETURN
                                ;+
                                ; SETUP T19PK2 FOR WRITE FORMAT TRANSPORT REGISTER
                                ;
                                ; INPUT:
                                ;       R0 CONTAINS DRIVING DATA PATTERN
                                ;-
062122                          T19WFMT:
062122  004737  061714                  JSR     PC,T19CLRBUF            ;CLEAR MESSAGE BUFFER
062126  012701  062450                  MOV     #T19DT2,R1              ;WRITE SUBSYSTEM DATA BUFFER
062132  112721  000007                  MOVB    #PW.WFMT,(R1)+          ;STORE WRITE FORMAT IN BSEL0
062136  110021                          MOVB    R0,(R1)+                ;STORE DATA WORD IN BSEL1
062140  000207                          RTS     PC                      ;RETURN
                                ;+
                                ; SETUP T19PK2 PACKET FOR WRITE MISC. INVERT EXTENDED FEATURES SWITCH
                                ;-
062142                          T19SEXT:
062142  012700  062450                  MOV     #T19DT2,R0              ;WRITE SUBSYSTEM DATA BUFFER
062146  112720  000010                  MOVB    #PW.WMISC,(R0)+         ;STORE WRITE MISCELLANEOUS IN BSEL0
062152  112710  000200                  MOVB    #MS.EXT,(R0)            ;STORE INVERT EXTENDED FEATURES IN BSEL1
062156  000207                          RTS     PC                      ;RETURN
                                ;+
                                ; CLEAR EXPECTED DATA MESSAGE BUFFER
                                ;-
```

```
062160                  T19CLEXP:
062160  012701  060022          MOV     #T19EXP,R1              ;GET EXPD ADDRESS
062164  012700  000120          MOV     #T19EXEND-T19EXP,R0     ;GET EXPD SIZE
062170  105021          10$:    CLRB    (R1)+                   ;CLEAR A BYTE
062172  005300                  DEC     R0                      ;DONE?
062174  003375                  BGT     10$                     ;BR IF NO
062176  000207                  RTS     PC                      ;RETURN

                        ;+
                        ;Set WORDS 0-7 of expd message BUFFER = to recv since not testing
                        ;-
062200                  T19SETEXP:
062200  012702  060022          MOV     #T19EXP,R2              ;GET EXPD
062204  012703  062312          MOV     #T19BFR,R3              ;GET READ STATUS RECV BUFFER
062210  012700  000010          MOV     #8.,R0                  ;SET WORDS 0-7 EXP=RECV
062214  012322          5$:     MOV     (R3)+,(R2)+             ;SET EXPD=RECV
062216  005300                  DEC     R0                      ;DONE WORDS 0-7 WORDS?
062220  003375                  BGT     5$                      ;BR IF NO
062222  000207                  RTS     PC                      ;RETURN

                        ;+
                        ; CONVERT A TEST PATTERN DATA WORD TO LOOPBACK DRIVE SIGNALS
                        ;
                        ; INPUTS:
                        ;
                        ;       R0      TEST PATTERN
                        ;
                        ; IMPLICIT INPUTS:
                        ;
                        ;       T19BFCTL  - CONTAINS WRITE CONTROL / WRITE FORMAT CONVERSION BITS
                        ;
                        ; OUTPUTS:
                        ;
                        ;       R0      - LOW BYTE CONTAINS WRITE CONTROL DATA
                        ;               - HIGH BYTE CONTAINS WRITE FORMAT DATA
                        ;-
062224                  T19CNVT:
062224                          SAVREG                  ;SAVE R1-R5 UNTIL NEXT RETURN
062230  012701  057756          MOV     #T19BFCTL,R1    ;CONVERSION TABLE ADDRESS
062234  005002                  CLR     R2              ;INIT RESULT OF CONVERSION
062236  012703  000020          MOV     #16.,R3         ;BIT COUNT
062242  006000          10$:    ROR     R0              ;IS THIS BIT EQUAL TO 1?
062244  103001                  BCC     20$             ;BR IF NO
062246  051102                  BIS     (R1),R2         ;SET CONVERTED BIT
062250  005721          20$:    TST     (R1)+           ;POINT TO NEXT BIT IN CONVERSION TABLE
062252  005303                  DEC     R3              ;DONE?
062254  003372                  BGT     10$             ;BR IF NO
062256  010200                  MOV     R2,R0           ;COPY RESULT
062260  000207                  RTS     PC              ;RETURN



        062270                  .=<.+10>&177770
                        ;
                        ;WRITE CHARACTERISTICS COMMAND PACKET
                        ;
062270                  T19PACKET:                              ;COMMAND PACKET FOR TEST
```

```
062270  100004                  .WORD   100004                  ;WRITE CHARACTERISTICS COMMAND, WITH ACK
062272  062300                  .WORD   T19DATA                 ;ADDRESS OF CHARACTERISTICS BLOCK
062274  000000                  .WORD   0
062276  000012                  .WORD   10.                     ;MINIMUM MESSAGE PACKET SIZE

062300                  T19DATA:                                ;CHARACTERISTICS DATA BLOCK
062300  062312                  .WORD   T19BFR                  ;ADDRESS OF MESSAGE BUFFER
062302  000000                  .WORD   0
062304  000024                  .WORD   20.                     ;LENGTH OF MESSAGE BUFFER
062306  000000                  .WORD   0                       ;ESS,ENB,EAI,ERI
062310  000007                  .WORD   7                       ;EXTENDED FEATURES UNIT NO.


                        ;MESSAGE BUFFER FOR ALL TEST 8 COMMANDS

062312                  T19BFR:                                 ;BEGIN MESSAGE BUFFER
062312  000000                  .WORD   0                       ;MESSAGE TYPE
062314  000000                  .WORD   0                       ;DATA FIELD LENGTH
062316  000000                  .WORD   0                       ;RBPCR
062320  000000                  .WORD   0                       ;XST0
062322  000000                  .WORD   0                       ;XST1
062324  000000                  .WORD   0                       ;XST2
062326  000000                  .WORD   0                       ;XST3
062330  000000                  .WORD   0                       ;XST4 (ALWAYS PRESENT FOR WRITE SUBSYSTEM
062332                  T19BFSTA: .BLKB 64.                     ;READ STATUS AND WRITE FIFO BUFFER
062432                  T19BEND:                                ;END OF MESSAGE BUFFER
                        ;
                        ;WRITE SUBSYSTEM READ STATUS COMMAND PACKET
                        ;
        062440                  .=<.+10>&177770
062440                  T19PK2:
062440  100006                  .WORD   P.WRTSUB!P.ACK          ;WRITE SUBSYSTEM WITH ACK
062442  062450                  .WORD   T19DT2                  ;LOW ADDRESS OF DATA BLOCK
062444  000000                  .WORD   0                       ;HIGH ADDRESS OF DATA BLOCK
062446  000012                  .WORD   10.                     ;MINIMUM MESSAGE PACKET SIZE

062450                  T19DT2:                                 ;DATA BLOCK
062450     000                  .BYTE   0                       ;BSEL0
062451     000                  .BYTE   0                       ;BSEL1
062452  000000                  .WORD   0                       ;SEL2
062454                          .BLKB   64.                     ;WRITE FIFO DATA OUTPUT BUFFER


062554                          ENDTST
062554                                                  L10066:
062554  104401                                                  TRAP    C$ETST
                                .SBTTL  TEST  9: READ/WRITE DATA PARITY TEST
                        ;++
                        ; TEST DESCRIPTION:
                        ;
                        ;       This test verifies that the Write Data Parity generator
                        ;       and the Read Data Parity checker operate properly. The
                        ;       Transport Bus signal loopback mode is enabled and a
                        ;       Set Wrong parity function is executed. Then various
                        ;       Write Subsystem Memory functions are performed to
                        ;       write data to and from the FIFO in loopback mode.
                        ;       The program then checks to insure a Read Data parity
```

```
                                        ;       error occurred.
                                        ;       A Reset FIFO is done and the Read Data parity
                                        ;       error bit is again tested to insure it cleared.
                                        ;       Finally a Clear wrong parity function is done
                                        ;       and it is verified the data word can pass in loopback
                                        ;       mode without setting Read Data parity error.
                                        ;
                                        ; TEST STEPS:
                                        ;
                                        ;  REPEAT FOR LOOPCNT
                                        ;    BEGIN
                                        ;       Write to TSSR register to soft initialize the controller
                                        ;       Do WRITE CHARACTERISTICS to check for Extended Features Switch
                                        ;       If Extended Features Hardware Switch Clear then:
                                        ;         Do Write Subsystem Write Miscellaneous to Set Extended Features.
                                        ;       Do WRITE CHARACTERISTICS to select reserved unit 7 and setup BUFFER
                                        ;  REPEAT FOR ALL TEST PATTERNS IN TSTBLK TABLE
                                        ;    BEGIN
                                        ;       (* Verify Write Wrong Parity Sets Parity Error *)
                                        ;       Do a WRITE NPR to set loopback and tape direction OUT
                                        ;                and SET Write Wrong Parity.
                                        ;       Do a WRITE FORMAT  to set IRESV4==>IRSTR = 1 (sets read strobe high)
                                        ;       Do a WRITE FIFO with byte count equal to 1 and Tape direction OUT
                                        ;       Do a READ FIFO with tape direction OUT to load tape out write latch
                                        ;         (this is when wrong parity (IWP) is set)
                                        ;       Do a WRITE FORMAT  to set IRESV4==>IRSTR = 0 (sets read strobe low)
                                        ;              (Read Strobe sets PAR IN H [Parity Error])
                                        ;       Do a WRITE FORMAT  to set IRESV4==>IRSTR = 1 (sets read strobe high)
                                        ;       Do a Write Subsystem READ STATUS
                                        ;       If Read Data parity error NOT=1  Then Print Error
                                        ;       Do a Write Misc to RESET FIFO
                                        ;       Do a Write Subsystem READ STATUS
                                        ;       If Read Data parity error NOT=0  Then Print Error
                                        ;
                                        ;       (* Verify Data can be transferred without a Parity Error *)
                                        ;       Do a WRITE FORMAT  to set IRESV4==>IRSTR = 1 (sets read strobe high)
                                        ;       Do a WRITE NPR to set loopback and tape direction OUT
                                        ;                and CLEAR Write Wrong Parity.
                                        ;       Do a WRITE FIFO with byte count equal to 1 and Tape direction OUT
                                        ;       Do a READ FIFO with tape direction OUT to load tape out write latch
                                        ;       Do a WRITE FORMAT  to set IRESV4==>IRSTR = 0 (sets read strobe low)
                                        ;              (Read Strobe should NOT set PAR IN H [Parity Error] here)
                                        ;       Do a WRITE FORMAT  to set IRESV4==>IRSTR = 1 (sets read strobe high)
                                        ;       Do a Write Subsystem READ STATUS
                                        ;       If Read Data parity error NOT=0  Then Print Error
                                        ;
                                        ;    END
                                        ;--


062556                                          BGNTST
062556                                                                          T9::
062556  012700  065142                          MOV     #TST20ID,R0             ;ASCII MESSAGE TO IDENTIFY TEST
062562  004737  016510                          JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
062566  012737  000012  002216                  MOV     #10.,LOOPCNT            ;PERFORM 10 ITERATIONS
062574                                  T20LOOP:

```

```
5270 062574                                    BGNSUB                                 ;///////////// BEGIN SUBTEST //////////
     062574                                                                                           T9.1:
     062574  104402                                                                            TRAP     C$BSUB
5271                                   ;       Write to TSSR register to soft initialize the controller
5272 062576                            5$:
5273 062576  004737  015774                    JSR     PC,SOFINIT                     ;WRITE TO TSSR TO SOFT INITIALIZE
5274 062602  103405                            BCS     10$                            ;BR IF SOFT INIT OKAY
5275 062604  010001                            MOV     R0,R1                          ;SAVE CONTENTS OF TSSR
5276 062606                                    ERRDF   ERRNO,SFIERR,SFIMSG            ;DEVICE FATAL DURING INIT
     062606  104455                                                                            TRAP     C$ERDF
     062610  001604                                                                            .WORD    900
     062612  003652                                                                            .WORD    SFIERR
     062614  012034                                                                            .WORD    SFIMSG
5277                                   ;       Do WRITE CHARACTERISTICS to check for Extended Features Switch
5278 062616  005037  002222            10$:    CLR     FATFLG                         ;CLEAR FATAL ERROR FLAG
5279 062622  012704  066340                    MOV     #T20PACKET,R4                  ;GET THE ADDRESS OF COMMAND PACKET
5280 062626  004737  010662                    JSR     PC,WRTCHR                      ;DO WRITE CHARACTERISTICS COMMAND
5281 062632                                    FORCERROR       12$                          ;88DFORCE ERROR IF FORCER=1
5282 062646  103407                            BCS     15$                            ;BR IF CARRY SET (GOOD RETURN)
5283 062650  010001                            MOV     R0,R1                          ;SAVE CONTENTS OF TSSR
5284 062652                                    NEXT.ERRNO
5285 062652                            12$:    ERRDF   ERRNO,T20SSR,PKTSSR            ;DEVICE FATAL SSR FAILED TO SET
     062652  104455                                                                            TRAP     C$ERDF
     062654  001605                                                                            .WORD    901
     062656  065171                                                                            .WORD    T20SSR
     062660  012046                                                                            .WORD    PKTSSR
5286 062662  005237  002222                    INC     FATFLG                         ;SET FATAL ERROR FLAG
5287 062666                            15$:    CKLOOP                                 ;LOOP ON ERROR, IF FLAG SET
     062666  104406                                                                            TRAP     C$CLP1
5288                                   ;       If Extended Features Hardware Switch Clear then:
5289                                   ;         Do Write Subsystem Write Miscellaneous to Set Extended Features.
5290 062670  012701  066362                    MOV     #T20BFR,R1                     ;MESSAGE BUFFER ADDRESS
5291 062674  032761  000200  000012            BIT     #X2.EXTF,XST2(R1)              ;EXTENDED FEATURES SWITCH SET?
5292 062702  001026                            BNE     30$                            ;BR IF YES
5293 062704  004737  066256                    JSR     PC,T20SEXT                     ;SETUP PACKET FOR WRITE MISC INVERT
5294 062710  012704  066510                    MOV     #T20PK2,R4                     ;GET WRITE SUBSYSTEM COMMAND PACKET
5295 062714  010465  000000                    MOV     R4,TSDB(R5)                    ;SET THE PACKET ADDRESS TO EXECUTE
5296 062720  004737  016336                    JSR     PC,CHKTSSR                     ;WAIT FOR SSR TO SET
5297 062724                                    FORCERROR       22$                          ;88DFORCE ERROR IF FORCER=1
5298 062740  103407                            BCS     30$                            ;BR IF CARRY SET (GOOD RETURN)
5299 062742  010001                            MOV     R0,R1                          ;SAVE CONTENTS OF TSSR
5300 062744                                    NEXT.ERRNO
5301 062744                            22$:    ERRDF   ERRNO,T202SSR,PKTSSR           ;DEVICE FATAL SSR FAILED TO SET
     062744  104455                                                                            TRAP     C$ERDF
     062746  001606                                                                            .WORD    902
     062750  065226                                                                            .WORD    T202SSR
     062752  012046                                                                            .WORD    PKTSSR
5302 062754  005237  002222                    INC     FATFLG                         ;SET FATAL ERROR FLAG
5303 062760                            30$:    CKLOOP                                 ;LOOP ON ERROR, IF FLAG SET
     062760  104406                                                                            TRAP     C$CLP1
5304                                   ;       Do WRITE CHARACTERISTICS to select reserved unit 7
5305 062762  012704  066340                    MOV     #T20PACKET,R4                  ;GET THE ADDRESS OF COMMAND PACKET
5306 062766  004737  010662                    JSR     PC,WRTCHR                      ;DO WRITE CHARACTERISTICS COMMAND
5307 062772                                    FORCERROR       42$                          ;88DFORCE ERROR IF FORCER=1
5308 063006  103407                            BCS     50$                            ;BR IF CARRY SET (GOOD RETURN)
5309 063010  010001                            MOV     R0,R1                          ;SAVE CONTENTS OF TSSR
5310 063012                                    NEXT.ERRNO
```

```
5311 063012                                42$:    ERRDF   ERRNO,T20SSR,PKTSSR        ;DEVICE FATAL SSR FAILED TO SET
     063012  104455                                                                                  TRAP     C$ERDF
     063014  001607                                                                                  .WORD    903
     063016  065171                                                                                  .WORD    T20SSR
     063020  012046                                                                                  .WORD    PKTSSR
5312 063022  005237  002222                        INC     FATFLG                     ;SET FATAL ERROR FLAG
5313 063026                                50$:    CKLOOP                             ;LOOP ON ERROR, IF FLAG SET
     063026  104406                                                                                  TRAP     C$CLP1
5314
5315
5316                                       ;  REPEAT FOR ALL TEST PATTERNS IN TSTBLK TABLE
5317 063030  012703  002752                        MOV     #TSTBLK,R3                 ;GET FIRST PATTERN ADDRESS
5318 063034  012337  002312                100$:   MOV     (R3)+,DATA                 ;GET A TEST PATTERN
5319 063040  042737  177400  002312                BIC     #↑C<377>,DATA              ;DATA IS BYTE
5320 063046  010337  002316                        MOV     R3,TSTPTR                  ;SETUP CURRENT TSTBLK POINTER
5321                                       ;       Do a WRITE NPR to set loopback and tape direction OUT and
5322                                       ;                 and SET Write Wrong Parity.
5323 063052  012700  000100                        MOV     #NP.OUT,R0                 ;SET TAPE DIRECTION OUT
5324 063056  052700  000040                        BIS     #NP.LOOP,R0                ;SET LOOPBACK
5325 063062  042700  000020                        BIC     #NP.WRP,R0                 ;SET WRITE WRONG PARITY (INVERTED)
5326 063066  004737  066126                        JSR     PC,T20WNPR                 ;SETUP T20PK2 FOR WRITE NPR
5327 063072  012704  066510                        MOV     #T20PK2,R4                 ;GET WRITE SUBSYSTEM COMMAND PACKET
5328 063076  010465  000000                        MOV     R4,TSDB(R5)                ;SET THE PACKET ADDRESS TO EXECUTE
5329 063102  004737  016336                        JSR     PC,CHKTSSR                 ;WAIT FOR SSR TO SET
5330 063106                                        FORCERROR        102$                        ;@@DFORCE ERROR IF FORCER=1
5331 063122  103407                                BCS     105$                       ;BR IF CARRY SET (GOOD RETURN)
5332 063124  010001                                MOV     R0,R1                      ;SAVE CONTENTS OF TSSR
5333 063126                                        NEXT.ERRNO
5334 063126                                102$:   ERRDF   ERRNO,T204SSR,PKTSSR       ;DEVICE FATAL SSR FAILED TO SET
     063126  104455                                                                                  TRAP     C$ERDF
     063130  001610                                                                                  .WORD    904
     063132  065337                                                                                  .WORD    T204SSR
     063134  012046                                                                                  .WORD    PKTSSR
5335 063136  005237  002222                        INC     FATFLG                     ;SET FATAL ERROR FLAG
5336 063142                                105$:   CKLOOP                             ;LOOP ON ERROR, IF FLAG SET
     063142  104406                                                                                  TRAP     C$CLP1
5337                                       ;       Do a WRITE FORMAT  to set IRESV4==>IRSTR = 1 (sets read strobe high)
5338 063144  012700  000001                        MOV     #WF.I4RES,R0               ;IRESV4==>IRSTR = 1
5339 063150  004737  066222                        JSR     PC,T20WFMT                 ;SETUP T20PK2 FOR WRITE FORMAT
5340 063154  012704  066510                        MOV     #T20PK2,R4                 ;GET WRITE SUBSYSTEM COMMAND PACKET
5341 063160  010465  000000                        MOV     R4,TSDB(R5)                ;SET THE PACKET ADDRESS TO EXECUTE
5342 063164  004737  016336                        JSR     PC,CHKTSSR                 ;WAIT FOR SSR TO SET
5343 063170                                        FORCERROR        112$                        ;@@DFORCE ERROR IF FORCER=1
5344 063204  103407                                BCS     120$                       ;BR IF CARRY SET (GOOD RETURN)
5345 063206  010001                                MOV     R0,R1                      ;SAVE CONTENTS OF TSSR
5346 063210                                        NEXT.ERRNO
5347 063210                                112$:   ERRDF   ERRNO,T208SSR,PKTSSR       ;DEVICE FATAL SSR FAILED TO SET
     063210  104455                                                                                  TRAP     C$ERDF
     063212  001611                                                                                  .WORD    905
     063214  065511                                                                                  .WORD    T208SSR
     063216  012046                                                                                  .WORD    PKTSSR
5348 063220  005237  002222                        INC     FATFLG                     ;SET FATAL ERROR FLAG
5349 063224                                120$:   CKLOOP                             ;LOOP ON ERROR, IF FLAG SET
     063224  104406                                                                                  TRAP     C$CLP1
5350                                       ;       Do a WRITE FIFO with byte count equal to 1 and Tape direction OUT
5351 063226  012700  000001                        MOV     #1,R0                      ;WRITE 1 BYTE
5352 063232  012701  002312                        MOV     #DATA,R1                   ;FIFO WRITE DATA ADDRESS
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 5353 063236  004737  066166                  JSR     PC,T20WFIF               ;SETUP T20PK2 FOR WRITE FIFO
 5354 063242  012704  066510                  MOV     #T20PK2,R4               ;GET WRITE SUBSYSTEM COMMAND PACKET
 5355 063246  010465  000000                  MOV     R4,TSDB(R5)              ;SET THE PACKET ADDRESS TO EXECUTE
 5356 063252  004737  016336                  JSR     PC,CHKTSSR               ;WAIT FOR SSR TO SET
 5357 063256                                  FORCERROR        152$                     ;88DFORCE ERROR IF FORCER=1
 5358 063272  103407                          BCS     160$                     ;BR IF CARRY SET (GOOD RETURN)
 5359 063274  010001                          MOV     R0,R1                    ;SAVE CONTENTS OF TSSR
 5360 063276                                  NEXT.ERRNO
 5361 063276                          152$:   ERRDF   ERRNO,T205SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
      063276  104455                                                                                  TRAP    C$ERDF
      063300  001612                                                                                  .WORD   906
      063302  065402                                                                                  .WORD   T205SSR
      063304  012046                                                                                  .WORD   PKTSSR
 5362 063306  005237  002222                  INC     FATFLG                   ;SET FATAL ERROR FLAG
 5363 063312                          160$:   CKLOOP                           ;LOOP ON ERROR, IF FLAG SET
      063312  104406                                                                                  TRAP    C$CLP1
 5364                                 ;       Do a READ FIFO with tape direction OUT to load tape out write latch
 5365                                 ;         (this is when wrong parity (IWP) is set)
 5366 063314  012700  000001                  MOV     #1,R0                    ;SET READ BYTE COUNT
 5367 063320  004737  066146                  JSR     PC,T20RFIF               ;SETUP T20PK2 FOR READ FIFO
 5368 063324  012704  066510                  MOV     #T20PK2,R4               ;GET WRITE SUBSYSTEM COMMAND PACKET
 5369 063330  010465  000000                  MOV     R4,TSDB(R5)              ;SET THE PACKET ADDRESS TO EXECUTE
 5370 063334  004737  016336                  JSR     PC,CHKTSSR               ;WAIT FOR SSR TO SET
 5371 063340                                  FORCERROR        172$                     ;88DFORCE ERROR IF FORCER=1
 5372 063354  103407                          BCS     180$                     ;BR IF CARRY SET (GOOD RETURN)
 5373 063356  010001                          MOV     R0,R1                    ;SAVE CONTENTS OF TSSR
 5374 063360                                  NEXT.ERRNO
 5375 063360                          172$:   ERRDF   ERRNO,T206SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
      063360  104455                                                                                  TRAP    C$ERDF
      063362  001613                                                                                  .WORD   907
      063364  065446                                                                                  .WORD   T206SSR
      063366  012046                                                                                  .WORD   PKTSSR
 5376 063370  005237  002222                  INC     FATFLG                   ;SET FATAL ERROR FLAG
 5377 063374                          180$:   CKLOOP                           ;LOOP ON ERROR, IF FLAG SET
      063374  104406                                                                                  TRAP    C$CLP1
 5378                                 ;       Do a WRITE FORMAT  to set IRESV4==>IRSTR = 0 (sets read strobe low)
 5379                                 ;               (Read Strobe sets PAR IN H [Parity Error])
 5380 063376  005000                          CLR     R0                       ;IRESV4==>IRSTR = 0
 5381 063400  004737  066222                  JSR     PC,T20WFMT               ;SETUP T20PK2 FOR WRITE FORMAT
 5382 063404  012704  066510                  MOV     #T20PK2,R4               ;GET WRITE SUBSYSTEM COMMAND PACKET
 5383 063410  010465  000000                  MOV     R4,TSDB(R5)              ;SET THE PACKET ADDRESS TO EXECUTE
 5384 063414  004737  016336                  JSR     PC,CHKTSSR               ;WAIT FOR SSR TO SET
 5385 063420                                  FORCERROR        192$                     ;88DFORCE ERROR IF FORCER=1
 5386 063434  103407                          BCS     200$                     ;BR IF CARRY SET (GOOD RETURN)
 5387 063436  010001                          MOV     R0,R1                    ;SAVE CONTENTS OF TSSR
 5388 063440                                  NEXT.ERRNO
 5389 063440                          192$:   ERRDF   ERRNO,T208SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
      063440  104455                                                                                  TRAP    C$ERDF
      063442  001614                                                                                  .WORD   908
      063444  065511                                                                                  .WORD   T208SSR
      063446  012046                                                                                  .WORD   PKTSSR
 5390 063450  005237  002222                  INC     FATFLG                   ;SET FATAL ERROR FLAG
 5391 063454                          200$:   CKLOOP                           ;LOOP ON ERROR, IF FLAG SET
      063454  104406                                                                                  TRAP    C$CLP1
 5392                                 ;       Do a WRITE FORMAT  to set IRESV4==>IRSTR = 1 (sets read strobe high)
 5393 063456  012700  000001                  MOV     #WF.I4RES,R0             ;IRESV4==>IRSTR = 1
 5394 063462  004737  066222                  JSR     PC,T20WFMT               ;SETUP T20PK2 FOR WRITE FORMAT
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K1

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 5395 063466  012704  066510                  MOV     #T20PK2,R4                ;GET WRITE SUBSYSTEM COMMAND PACKET
 5396 063472  010465  000000                  MOV     R4,TSDB(R5)               ;SET THE PACKET ADDRESS TO EXECUTE
 5397 063476  004737  016336                  JSR     PC,CHKTSSR                ;WAIT FOR SSR TO SET
 5398 063502                                  FORCERROR        212$                       ;@@DFORCE ERROR IF FORCER=1
 5399 063516  103407                          BCS     220$                      ;BR IF CARRY SET (GOOD RETURN)
 5400 063520  010001                          MOV     R0,R1                     ;SAVE CONTENTS OF TSSR
 5401 063522                                  NEXT.ERRNO
 5402 063522                          212$:   ERRDF   ERRNO,T208SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
      063522  104455                                                                                    TRAP    C$ERDF
      063524  001615                                                                                    .WORD   909
      063526  065511                                                                                    .WORD   T208SSR
      063530  012046                                                                                    .WORD   PKTSSR
 5403 063532  005237  002222                  INC     FATFLG                    ;SET FATAL ERROR FLAG
 5404 063536                          220$:   CKLOOP                            ;LOOP ON ERROR, IF FLAG SET
      063536  104406                                                                                    TRAP    C$CLP1
 5405                                 ;       Do a Write Subsystem READ STATUS
 5406 063540  004737  066106                  JSR     PC,T20SRD                 ;SETUP PACKET FOR READ STATUS
 5407 063544  012704  066510                  MOV     #T20PK2,R4                ;GET WRITE SUBSYSTEM COMMAND PACKET
 5408 063550  010465  000000                  MOV     R4,TSDB(R5)               ;SET THE PACKET ADDRESS TO EXECUTE
 5409 063554  004737  016336                  JSR     PC,CHKTSSR                ;WAIT FOR SSR TO SET
 5410 063560                                  FORCERROR        232$                       ;@@DFORCE ERROR IF FORCER=1
 5411 063574  103407                          BCS     240$                      ;BR IF CARRY SET (GOOD RETURN)
 5412 063576  010001                          MOV     R0,R1                     ;SAVE CONTENTS OF TSSR
 5413 063600                                  NEXT.ERRNO
 5414 063600                          232$:   ERRDF   ERRNO,T203SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
      063600  104455                                                                                    TRAP    C$ERDF
      063602  001616                                                                                    .WORD   910
      063604  065272                                                                                    .WORD   T203SSR
      063606  012046                                                                                    .WORD   PKTSSR
 5415 063610  005237  002222                  INC     FATFLG                    ;SET FATAL ERROR FLAG
 5416 063614                          240$:   CKLOOP                            ;LOOP ON ERROR, IF FLAG SET
      063614  104406                                                                                    TRAP    C$CLP1
 5417                                 ;       If Read Data parity error NOT=1  Then Print Error
 5418 063616  004737  066314                  JSR     PC,T20SETEXP              ;SET WORDS 0-7 EXPD=RECV (NOT TESTING)
 5419 063622  012701  065042                  MOV     #T20EXSTA,R1              ;GET EXPECTED READ STATUS
 5420 063626  012702  066402                  MOV     #T20BFSTA,R2              ;GET RECV READ STATUS
 5421 063632  011211                          MOV     (R2),(R1)                 ;SET EXPD WORD #8 = RECV TEMP
 5422 063634  016261  000002  000002          MOV     2(R2),2(R1)               ;SET EXPD WORD #9 = RECV (NOT TESTED)
 5423 063642  052711  100000                  BIS     #S1.PARERR,(R1)           ;SET EXP PAR ERR  =1
 5424 063646  005000                          CLR     R0                        ;HIGH RECV ADDRESS FOR CKMSG2
 5425 063650  012701  066362                  MOV     #T20BFR,R1                ;LOW RECV ADDRESS FOR CKMSG2
 5426 063654  012702  065022                  MOV     #T20EXP,R2                ;EXPD ADDRESS
 5427 063660  012703  000024                  MOV     #20.,R3                   ;NUMBER OF BYTES TO COMPARE
 5428 063664  004737  011500                  JSR     PC,CKMSG2                 ;EXPD EQUAL RECV?
 5429 063670                                  FORCERROR        252$,NOTSSR        ;@@D
 5430 063700  103404                          BCS     260$                      ;BR IF YES
 5431 063702                                  NEXT.ERRNO
 5432 063702                          252$:   ERRHRD  ERRNO,T20SWP,MSGSTAT      ;REPORT ERROR
      063702  104456                                                                                    TRAP    C$ERHRD
      063704  001617                                                                                    .WORD   911
      063706  065557                                                                                    .WORD   T20SWP
      063710  012350                                                                                    .WORD   MSGSTAT
 5433 063712                          260$:   CKLOOP                            ;LOOP ON ERROR, IF FLAG SET
      063712  104406                                                                                    TRAP    C$CLP1
 5434                                 ;       Do a Write Misc to RESET FIFO
 5435 063714  012700  000020                  MOV     #MS.RSFIF,R0              ;SET RESET FIFO COMMAND
 5436 063720  004737  066242                  JSR     PC,T20WMISC               ;SETUP T20PK2 FOR WRITE MISC
 5437 063724  012704  066510                        MOV     #T20PK2,R4                    ;GET WRITE SUBSYSTEM COMMAND PACKET
 5438 063730  010465  000000                        MOV     R4,TSDB(R5)                   ;SET THE PACKET ADDRESS TO EXECUTE
 5439 063734  004737  016336                        JSR     PC,CHKTSSR                    ;WAIT FOR SSR TO SET
 5440 063740                                        FORCERROR       282$                           ;@@DFORCE ERROR IF FORCER=1
 5441 063754  103407                                BCS     290$                          ;BR IF CARRY SET (GOOD RETURN)
 5442 063756  010001                                MOV     R0,R1                         ;SAVE CONTENTS OF TSSR
 5443 063760                                        NEXT.ERRNO
 5444 063760                              282$:     ERRDF   ERRNO,T202SSR,PKTSSR          ;DEVICE FATAL SSR FAILED TO SET
      063760  104455                                                                                       TRAP    C$ERDF
      063762  001620                                                                                       .WORD   912
      063764  065226                                                                                       .WORD   T202SSR
      063766  012046                                                                                       .WORD   PKTSSR
 5445 063770  005237  002222                        INC     FATFLG                        ;SET FATAL ERROR FLAG
 5446 063774                              290$:     CKLOOP                                ;LOOP ON ERROR, IF FLAG SET
      063774  104406                                                                                       TRAP    C$CLP1
 5447                                     ;         Do a Write Subsystem READ STATUS
 5448                                     ;         If Read Data parity error NOT=0  Then Print Error
 5449 063776  004737  066314                        JSR     PC,T20SETEXP                  ;SET WORDS 0-7 EXPD=RECV (NOT TESTING)
 5450 064002  012701  065042                        MOV     #T20EXSTA,R1                  ;GET EXPECTED READ STATUS
 5451 064006  012702  066402                        MOV     #T20BFSTA,R2                  ;GET RECV READ STATUS
 5452 064012  011211                                MOV     (R2),(R1)                     ;SET EXPD WORD #8 = RECV TEMP
 5453 064014  016261  000002  000002                MOV     2(R2),2(R1)                   ;SET EXPD WORD #9 = RECV (NOT TESTED)
 5454 064022  042711  100000                        BIC     #S1.PARERR,(R1)               ;SET EXP PAR ERR  =0
 5455 064026  005000                                CLR     R0                            ;HIGH RECV ADDRESS FOR CKMSG2
 5456 064030  012701  066362                        MOV     #T20BFR,R1                    ;LOW RECV ADDRESS FOR CKMSG2
 5457 064034  012702  065022                        MOV     #T20EXP,R2                    ;EXPD ADDRESS
 5458 064040  012703  000024                        MOV     #20.,R3                       ;NUMBER OF BYTES TO COMPARE
 5459 064044  004737  011500                        JSR     PC,CKMSG2                     ;EXPD EQUAL RECV?
 5460 064050                                        FORCERROR       302$,NOTSSR           ;@@D
 5461 064060  103404                                BCS     320$                          ;BR IF YES
 5462 064062                                        NEXT.ERRNO
 5463 064062                              302$:     ERRHRD  ERRNO,T20RSF,MSGSTAT          ;REPORT ERROR
      064062  104456                                                                                       TRAP    C$ERHRD
      064064  001621                                                                                       .WORD   913
      064066  065666                                                                                       .WORD   T20RSF
      064070  012350                                                                                       .WORD   MSGSTAT
 5464 064072                              320$:     CKLOOP                                ;LOOP ON ERROR, IF FLAG SET
      064072  104406                                                                                       TRAP    C$CLP1
 5465                                               (* Verify Data can be transferred without a Parity Error *)
 5466                                     ;         Do a WRITE FORMAT  to set IRESV4==>IRSTR = 1 (sets read strobe high)
 5467 064074  012700  000001                        MOV     #WF.I4RES,R0                  ;IRESV4==>IRSTR = 1
 5468 064100  004737  066222                        JSR     PC,T20WFMT                    ;SETUP T20PK2 FOR WRITE FORMAT
 5469 064104  012704  066510                        MOV     #T20PK2,R4                    ;GET WRITE SUBSYSTEM COMMAND PACKET
 5470 064110  010465  000000                        MOV     R4,TSDB(R5)                   ;SET THE PACKET ADDRESS TO EXECUTE
 5471 064114  004737  016336                        JSR     PC,CHKTSSR                    ;WAIT FOR SSR TO SET
 5472 064120                                        FORCERROR       332$                           ;@@DFORCE ERROR IF FORCER=1
 5473 064134  103407                                BCS     340$                          ;BR IF CARRY SET (GOOD RETURN)
 5474 064136  010001                                MOV     R0,R1                         ;SAVE CONTENTS OF TSSR
 5475 064140                                        NEXT.ERRNO
 5476 064140                              332$:     ERRDF   ERRNO,T208SSR,PKTSSR          ;DEVICE FATAL SSR FAILED TO SET
      064140  104455                                                                                       TRAP    C$ERDF
      064142  001622                                                                                       .WORD   914
      064144  065511                                                                                       .WORD   T208SSR
      064146  012046                                                                                       .WORD   PKTSSR
 5477 064150  005237  002222                        INC     FATFLG                        ;SET FATAL ERROR FLAG
 5478 064154                              340$:     CKLOOP                                ;LOOP ON ERROR, IF FLAG SET
      064154  104406                                                                                       TRAP    C$CLP1
 5479                                       ;       Do a WRITE NPR to set loopback and tape direction OUT and
 5480                                       ;               and CLEAR Write Wrong Parity.
 5481 064156  012700  000100                        MOV     #NP.OUT,R0              ;SET TAPE DIRECTION OUT
 5482 064162  052700  000040                        BIS     #NP.LOOP,R0             ;SET LOOPBACK
 5483 064166  052700  000020                        BIS     #NP.WRP,R0              ;CLEAR WRITE WRONG PARITY (INVERTED)
 5484 064172  004737  066126                        JSR     PC,T20WNPR              ;SETUP T20PK2 FOR WRITE NPR
 5485 064176  012704  066510                        MOV     #T20PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
 5486 064202  010465  000000                        MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
 5487 064206  004737  016336                        JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
 5488 064212                                        FORCERROR       352$                    ;@@DFORCE ERROR IF FORCER=1
 5489 064226  103407                                BCS     360$                    ;BR IF CARRY SET (GOOD RETURN)
 5490 064230  010001                                MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 5491 064232                                        NEXT.ERRNO
 5492 064232                                352$:   ERRDF   ERRNO,T204SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
      064232  104455                                                                                    TRAP    C$ERDF
      064234  001623                                                                                    .WORD   915
      064236  065337                                                                                    .WORD   T204SSR
      064240  012046                                                                                    .WORD   PKTSSR
 5493 064242  005237  002222                        INC     FATFLG                  ;SET FATAL ERROR FLAG
 5494 064246                                360$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
      064246  104406                                                                                    TRAP    C$CLP1
 5495                                       ;       Do a WRITE FIFO with byte count equal to 1 and Tape direction OUT
 5496 064250  012700  000001                        MOV     #1,R0                   ;WRITE 1 BYTE
 5497 064254  012701  002312                        MOV     #DATA,R1                ;FIFO WRITE DATA ADDRESS
 5498 064260  004737  066166                        JSR     PC,T20WFIF              ;SETUP T20PK2 FOR WRITE FIFO
 5499 064264  012704  066510                        MOV     #T20PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
 5500 064270  010465  000000                        MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
 5501 064274  004737  016336                        JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
 5502 064300                                        FORCERROR       372$                    ;@@DFORCE ERROR IF FORCER=1
 5503 064314  103407                                BCS     380$                    ;BR IF CARRY SET (GOOD RETURN)
 5504 064316  010001                                MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 5505 064320                                        NEXT.ERRNO
 5506 064320                                372$:   ERRDF   ERRNO,T205SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
      064320  104455                                                                                    TRAP    C$ERDF
      064322  001624                                                                                    .WORD   916
      064324  065402                                                                                    .WORD   T205SSR
      064326  012046                                                                                    .WORD   PKTSSR
 5507 064330  005237  002222                        INC     FATFLG                  ;SET FATAL ERROR FLAG
 5508 064334                                380$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
      064334  104406                                                                                    TRAP    C$CLP1
 5509                                       ;       Do a READ FIFO with tape direction OUT to load tape out write latch
 5510 064336  012700  000001                        MOV     #1,R0                   ;SET READ BYTE COUNT
 5511 064342  004737  066146                        JSR     PC,T20RFIF              ;SETUP T20PK2 FOR READ FIFO
 5512 064346  012704  066510                        MOV     #T20PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
 5513 064352  010465  000000                        MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
 5514 064356  004737  016336                        JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
 5515 064362                                        FORCERROR       392$                    ;@@DFORCE ERROR IF FORCER=1
 5516 064376  103407                                BCS     400$                    ;BR IF CARRY SET (GOOD RETURN)
 5517 064400  010001                                MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 5518 064402                                        NEXT.ERRNO
 5519 064402                                392$:   ERRDF   ERRNO,T206SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
      064402  104455                                                                                    TRAP    C$ERDF
      064404  001625                                                                                    .WORD   917
      064406  065446                                                                                    .WORD   T206SSR
      064410  012046                                                                                    .WORD   PKTSSR
 5520 064412  005237  002222                        INC     FATFLG                  ;SET FATAL ERROR FLAG
 5521 064416                                400$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
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     064416  104406                                                       TRAP     C$CLP1
5522                                  ;       Do a WRITE FORMAT  to set IRESV4==>IRSTR = 0 (sets read strobe low)
5523                                  ;               (Read Strobe sets PAR IN H [Parity Error])
5524 064420  005000                           CLR     R0                      ;IRESV4==>IRSTR = 0
5525 064422  004737  066222                   JSR     PC,T20WFMT              ;SETUP T20PK2 FOR WRITE FORMAT
5526 064426  012704  066510                   MOV     #T20PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
5527 064432  010465  000000                   MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
5528 064436  004737  016336                   JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
5529 064442                                   FORCERROR       412$                    ;@@DFORCE ERROR IF FORCER=1
5530 064456  103407                           BCS     420$                    ;BR IF CARRY SET (GOOD RETURN)
5531 064460  010001                           MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
5532 064462                                   NEXT.ERRNO
5533 064462                           412$:   ERRDF   ERRNO,T208SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
     064462  104455                                                       TRAP     C$ERDF
     064464  001626                                                       .WORD    918
     064466  065511                                                       .WORD    T208SSR
     064470  012046                                                       .WORD    PKTSSR
5534 064472  005237  002222                   INC     FATFLG                  ;SET FATAL ERROR FLAG
5535 064476                           420$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     064476  104406                                                       TRAP     C$CLP1
5536                                  ;       Do a WRITE FORMAT  to set IRESV4==>IRSTR = 1 (sets read strobe high)
5537 064500  012700  000001                   MOV     #WF.I4RES,R0            ;IRESV4==>IRSTR = 1
5538 064504  004737  066222                   JSR     PC,T20WFMT              ;SETUP T20PK2 FOR WRITE FORMAT
5539 064510  012704  066510                   MOV     #T20PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
5540 064514  010465  000000                   MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
5541 064520  004737  016336                   JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
5542 064524                                   FORCERROR       432$                    ;@@DFORCE ERROR IF FORCER=1
5543 064540  103407                           BCS     440$                    ;BR IF CARRY SET (GOOD RETURN)
5544 064542  010001                           MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
5545 064544                                   NEXT.ERRNO
5546 064544                           432$:   ERRDF   ERRNO,T208SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
     064544  104455                                                       TRAP     C$ERDF
     064546  001627                                                       .WORD    919
     064550  065511                                                       .WORD    T208SSR
     064552  012046                                                       .WORD    PKTSSR
5547 064554  005237  002222                   INC     FATFLG                  ;SET FATAL ERROR FLAG
5548 064560                           440$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     064560  104406                                                       TRAP     C$CLP1
5549
5550                                  ;       Do a Write Subsystem READ STATUS
5551 064562  004737  066106                   JSR     PC,T20SRD               ;SETUP PACKET FOR READ STATUS
5552 064566  012704  066510                   MOV     #T20PK2,R4              ;GET WRITE SUBSYSTEM COMMAND PACKET
5553 064572  010465  000000                   MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
5554 064576  004737  016336                   JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
5555 064602                                   FORCERROR       452$                    ;@@DFORCE ERROR IF FORCER=1
5556 064616  103407                           BCS     460$                    ;BR IF CARRY SET (GOOD RETURN)
5557 064620  010001                           MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
5558 064622                                   NEXT.ERRNO
5559 064622                           452$:   ERRDF   ERRNO,T203SSR,PKTSSR    ;DEVICE FATAL SSR FAILED TO SET
     064622  104455                                                       TRAP     C$ERDF
     064624  001630                                                       .WORD    920
     064626  065272                                                       .WORD    T203SSR
     064630  012046                                                       .WORD    PKTSSR
5560 064632  005237  002222                   INC     FATFLG                  ;SET FATAL ERROR FLAG
5561 064636                           460$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     064636  104406                                                       TRAP     C$CLP1
5562                                  ;       If Read Data parity error NOT=0  Then Print Error
```

```
064640  004737  066314                   JSR     PC,T20SETEXP            ;SET WORDS 0-7 EXPD=RECV (NOT TESTING)
064644  012701  065042                   MOV     #T20EXSTA,R1            ;GET EXPECTED READ STATUS
064650  012702  066402                   MOV     #T20BFSTA,R2            ;GET RECV READ STATUS
064654  011211                           MOV     (R2),(R1)               ;SET EXPD WORD #8 = RECV TEMP
064656  016261  000002  000002           MOV     2(R2),2(R1)             ;SET EXPD WORD #9 = RECV (NOT TESTED)
064664  042711  100000                   BIC     #S1.PARERR,(R1)         ;SET EXP PAR ERR  =0
064670  005000                           CLR     R0                      ;HIGH RECV ADDRESS FOR CKMSG2
064672  012701  066362                   MOV     #T20BFR,R1              ;LOW RECV ADDRESS FOR CKMSG2
064676  012702  065022                   MOV     #T20EXP,R2              ;EXPD ADDRESS
064702  012703  000024                   MOV     #20.,R3                 ;NUMBER OF BYTES TO COMPARE
064706  004737  011500                   JSR     PC,CKMSG2               ;EXPD EQUAL RECV?
064712                                   FORCERROR       472$,NOTSSR     ;BBD
064722  103404                           BCS     480$                    ;BR IF YES
064724                                   NEXT.ERRNO
064724                           472$:   ERRHRD  ERRNO,T20CWP,MSGSTAT    ;REPORT ERROR
064724  104456                                                                                   TRAP    C$ERHRD
064726  001631                                                                                   .WORD   921
064730  065767                                                                                   .WORD   T20CWP
064732  012350                                                                                   .WORD   MSGSTAT
064734                           480$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
064734  104406                                                                                   TRAP    C$CLP1

064736                                   FORCEXIT        555$            ;BBD
064746  013703  002316                   MOV     TSTPTR,R3               ;RESTORE CURRENT TSTBLK POINTER
064752  020327  003062                   CMP     R3,#TBLEND              ;END OF TSTBLK?
064756  103002                           BHIS    555$                    ;BR IF YES
064760  000137  063034                   JMP     100$                    ;DO ANOTHER TSTBLK PATTERN
064764                           555$:

064764                                   ENDSUB                          ;///////////// END SUBTEST //////////
064764                                                                                L10074:
064764  104403                                                                                   TRAP    C$ESUB

064766  005737  002222                   TST     FATFLG                  ;ANY FATAL ERRORS ?
064772  001402                           BEQ     560$                    ;BRANCH IF NOT
064774  004737  017202                   JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
065000                           560$:
065000  004737  016456                   JSR     PC,TSTLOOP              ;DO ITERATIONS?
065004  103002                           BCC     565$                    ;BR IF NO
065006  000137  050466                   JMP     T18LOOP                 ;LOOP UNTIL ITERATIONS DONE
065012                           565$:
065012                                   EXIT    TST                     ;////////// EXIT TEST //////////
065012  104432                                                                                   TRAP    C$EXIT
065014  001610                                                                                   .WORD   L10073-.



                                 ;+
                                 ;LOCAL STORAGE FOR THIS TEST
                                 ;-



065016                           T20MSK:                                 ;MASK OF UNTESTED BITS IN READ STATUS
                                                                         ;UNTESTED BITS ARE SET TO 1
065016     377                           .BYTE   ↑C<000>                 ;BYTE 0 MASK
065017     037                           .BYTE   ↑C<340>                 ;BYTE 1 MASK (PARERR,IRESV2,IRESV1)
065020     360                           .BYTE   ↑C<017>                 ;BYTE 2 (TIMER A,TIMER B,UNDEFINED<1:0>)
065021     000                           .BYTE   0                       ;MAKE IT EVEN
```

```

065022                                  T20EXP:                                 ;BEGIN EXPECTED DATA BUFFER
065022  000000                                  .WORD   0                       ;MESSAGE TYPE
065024  000000                                  .WORD   0                       ;DATA FIELD LENGTH
065026  000000                                  .WORD   0                       ;RBPCR
065030  000000                                  .WORD   0                       ;XST0
065032  000000                                  .WORD   0                       ;XST1
065034  000000                                  .WORD   0                       ;XST2
065036  000000                                  .WORD   0                       ;XST3
065040  000000                                  .WORD   0                       ;XST4 (ALWAYS PRESENT FOR WRITE SUB.)
065042                                  T20EXSTA: .BLKB 64.                     ;EXPECTED READ STATUS AND WRITE FIFO DATA
065142                                  T20EXEND:                                       ;END EXPECTED DATA BUFFER
                                        ;+
                                        ;LOCAL TEXT MESSAGES FOR TEST
                                        ;-

065142     122     145     141  TST20ID:        .ASCIZ  'Read/Write Data Parity'
065171     127     122     111  T20SSR: .ASCIZ  'WRITE CHARACTERISTICS Failed'
065226     127     122     111  T202SSR:.ASCIZ  'WRITE SUBSYSTEM (Write Misc) Failed'
065272     127     122     111  T203SSR:.ASCIZ  'WRITE SUBSYSTEM (Read Status) Failed'
065337     127     122     111  T204SSR:.ASCIZ  'WRITE SUBSYSTEM (Write Npr) Failed'
065402     127     122     111  T205SSR:.ASCIZ  'WRITE SUBSYSTEM (Write FIFO) Failed'
065446     127     122     111  T206SSR:.ASCIZ  'WRITE SUBSYSTEM (Read FIFO) Failed'
065511     127     122     111  T208SSR:.ASCIZ  'WRITE SUBSYSTEM (Write Format) Failed'
065557     122     145     141  T20SWP: .ASCIZ  'Read Data Parity Error (PARERR) Failed to Set after Write Wrong Parity'
065666     122     145     141  T20RSF: .ASCIZ  'Read Data Parity Error (PARERR) Failed to Clear after RESET FIFO'
065767     122     145     141  T20CWP: .ASCIZ  'Read Data Parity Error (PARERR) occurred in Data Loopback'
                                                .EVEN


                                        ;+
                                        ; CLEAR MESSAGE BUFFER
                                        ;-
066062                                  T20CLRBUF:                              ;
066062                                          SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
066066  012701  066362                          MOV     #T20BFR,R1              ;GET MESSAGE BUFFER ADDRESS
066072  012702  000120                          MOV     #T20BEND-T20BFR,R2      ;SIZE OF MESSAGE BUFFER IN BYTES
066076  105021                          10$:    CLRB    (R1)+                   ;CLEAR A BYTE
066100  005302                                  DEC     R2                      ;DONE?
066102  003375                                  BGT     10$                     ;BR IF NO
066104  000207                                  RTS     PC                      ;RETURN

                                        ;+
                                        ; SETUP T20PK2 PACKET FOR READ STATUS
                                        ;-
066106                                  T20SRD:
066106  004737  066062                          JSR     PC,T20CLRBUF            ;CLEAR MESSAGE BUFFER
066112  012700  066520                          MOV     #T20DT2,R0              ;WRITE SUBSYSTEM DATA BUFFER
066116  112720  000005                          MOVB    #PW.RDSTATUS,(R0)+      ;STORE READ STATUS COMMAND IN BSEL0
066122  105010                                  CLRB    (R0)                    ;CLEAR BSEL1
066124  000207                                  RTS     PC                      ;RETURN


                                        ;+
                                        ; SETUP T20PK2 PACKET FOR WRITE NPR
                                        ;
                                        ; INPUT:
                                        ;       R0 CONTAINS BSEL1 NPR DATA
                                        ;
                                        ;-
066126                                  T20WNPR:
066126  004737  066062                          JSR     PC,T20CLRBUF            ;CLEAR MESSAGE BUFFER
066132  012701  066520                          MOV     #T20DT2,R1              ;WRITE SUBSYSTEM DATA BUFFER
066136  112721  000011                          MOVB    #PW.WNPR,(R1)+          ;STORE WRITE NPR IN BSEL0
066142  110011                                  MOVB    R0,(R1)                 ;STORE NPR DATA IN BSEL1
066144  000207                                  RTS     PC                      ;RETURN

                                        ;+
                                        ; SETUP T20PK2 PACKET FOR READ FIFO
                                        ;
                                        ; INPUT:
                                        ;       R0 CONTAINS SEL2 BYTE COUNT
                                        ;-
066146                                  T20RFIF:
066146  004737  066062                          JSR     PC,T20CLRBUF            ;CLEAR MESSAGE BUFFER
066152  012701  066520                          MOV     #T20DT2,R1              ;WRITE SUBSYSTEM DATA BUFFER
066156  112721  000003                          MOVB    #PW.RFIFO,(R1)+         ;STORE READ FIFO IN BSEL0
066162  110021                                  MOVB    R0,(R1)+                ;STORE BYTE COUNT IN BSEL1
066164  000207                                  RTS     PC                      ;RETURN
                                        ;+
                                        ; SETUP T20PK2 PACKET FOR WRITE FIFO
                                        ;
                                        ; INPUT:
                                        ;       R0 CONTAINS BYTE COUNT
                                        ;       R1 CONTAINS DATA PATTERN BLOCK ADDRESS
                                        ;-
066166                                  T20WFIF:
066166                                          SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
066172  004737  066062                          JSR     PC,T20CLRBUF            ;CLEAR MESSAGE BUFFER
066176  012702  066520                          MOV     #T20DT2,R2              ;WRITE SUBSYSTEM DATA BUFFER
066202  112722  000004                          MOVB    #PW.WFIFO,(R2)+         ;STORE WRITE FIFO IN BSEL0
066206  110022                                  MOVB    R0,(R2)+                ;STORE BYTE COUNT IN BSEL1
066210  005022                                  CLR     (R2)+                   ;CLEAR SEL2 (UNUSED)
066212  112122                          10$:    MOVB    (R1)+,(R2)+             ;STORE DATA PATTERN BYTE
066214  005300                                  DEC     R0                      ;DONE ALL BYTES?
066216  003375                                  BGT     10$                     ;BR IF NO
066220  000207                                  RTS     PC                      ;RETURN

                                        ;+
                                        ; SETUP T20PK2 FOR WRITE FORMAT TRANSPORT REGISTER
                                        ;
                                        ; INPUT:
                                        ;       R0 CONTAINS DRIVING DATA PATTERN
                                        ;-
066222                                  T20WFMT:
066222  004737  066062                          JSR     PC,T20CLRBUF            ;CLEAR MESSAGE BUFFER
066226  012701  066520                          MOV     #T20DT2,R1              ;WRITE SUBSYSTEM DATA BUFFER
066232  112721  000007                          MOVB    #PW.WFMT,(R1)+          ;STORE WRITE FORMAT IN BSEL0
066236  110021                                  MOVB    R0,(R1)+                ;STORE DATA WORD IN BSEL1
066240  000207                                  RTS     PC                      ;RETURN
                                        ;+
                                        ; SETUP T20PK2 PACKET FOR WRITE MISC.
                                        ;
                                        ;       R0 CONTAINS WRITE MISC DATA
                                        ;-
```

```
066242                          T20WMISC:
066242  012701  066520                  MOV     #T20DT2,R1                      ;WRITE SUBSYSTEM DATA BUFFER
066246  112721  000010                  MOVB    #PW.WMISC,(R1)+                 ;STORE WRITE MISCELLANEOUS IN BSELO
066252  110011                          MOVB    R0,(R1)                         ;STORE INVERT EXTENDED FEATURES IN BSEL1
066254  000207                          RTS     PC                              ;RETURN
                                ;+
                                ; SETUP T20PK2 PACKET FOR WRITE MISC. INVERT EXTENDED FEATURES SWITCH
                                ;-
066256                          T20SEXT:
066256  012700  066520                  MOV     #T20DT2,R0                      ;WRITE SUBSYSTEM DATA BUFFER
066262  112720  000010                  MOVB    #PW.WMISC,(R0)+                 ;STORE WRITE MISCELLANEOUS IN BSELO
066266  112710  000200                  MOVB    #MS.EXT,(R0)                    ;STORE INVERT EXTENDED FEATURES IN BSEL1
066272  000207                          RTS     PC                              ;RETURN
                                ;+
                                ; CLEAR EXPECTED DATA MESSAGE BUFFER
                                ;-
066274                          T20CLEXP:
066274  012701  065022                  MOV     #T20EXP,R1                      ;GET EXPD ADDRESS
066300  012700  000120                  MOV     #T20EXEND-T20EXP,R0             ;GET EXPD SIZE
066304  105021                  10$:    CLRB    (R1)+                           ;CLEAR A BYTE
066306  005300                          DEC     R0                              ;DONE?
066310  003375                          BGT     10$                             ;BR IF NO
066312  000207                          RTS     PC                              ;RETURN

                                ;+
                                ;Set WORDS 0-7 of expd message BUFFER = to recv since not testing
                                ;-
066314                          T20SETEXP:
066314  012702  065022                  MOV     #T20EXP,R2                      ;GET EXPD
066320  012703  066362                  MOV     #T20BFR,R3                      ;GET READ STATUS RECV BUFFER
066324  012700  000010                  MOV     #8.,R0                          ;SET WORDS 0-7 EXP=RECV
066330  012322                  5$:     MOV     (R3)+,(R2)+                     ;SET EXPD=RECV
066332  005300                          DEC     R0                              ;DONE WORDS 0-7 WORDS?
066334  003375                          BGT     5$                              ;BR IF NO
066336  000207                          RTS     PC                              ;RETURN



                                ;
                                ;WRITE CHARACTERISTICS COMMAND PACKET
                                ;
066340                          T20PACKET:                                      ;COMMAND PACKET FOR TEST
066340  100004                          .WORD   100004                          ;WRITE CHARACTERISTICS COMMAND, WITH ACK
066342  066350                          .WORD   T20DATA                         ;ADDRESS OF CHARACTERISTICS BLOCK
066344  000000                          .WORD   0
066346  000012                          .WORD   10.                             ;MINIMUM MESSAGE PACKET SIZE

066350                          T20DATA:                                        ;CHARACTERISTICS DATA BLOCK
066350  066362                          .WORD   T20BFR                          ;ADDRESS OF MESSAGE BUFFER
066352  000000                          .WORD   0
066354  000024                          .WORD   20.                             ;LENGTH OF MESSAGE BUFFER
066356  000000                          .WORD   0                               ;ESS,ENB,EAI,ERI
066360  000007                          .WORD   7                               ;EXTENDED FEATURES UNIT NO.


                                ;MESSAGE BUFFER FOR ALL TEST 17 COMMANDS

```

```
066362                  T20BFR:                                         ;BEGIN MESSAGE BUFFER
066362  000000                  .WORD   0                               ;MESSAGE TYPE
066364  000000                  .WORD   0                               ;DATA FIELD LENGTH
066366  000000                  .WORD   0                               ;RBPCR
066370  000000                  .WORD   0                               ;XST0
066372  000000                  .WORD   0                               ;XST1
066374  000000                  .WORD   0                               ;XST2
066376  000000                  .WORD   0                               ;XST3
066400  000000                  .WORD   0                               ;XST4 (ALWAYS PRESENT FOR WRITE SUBSYSTEM
066402                  T20BFSTA: .BLKB 64.                             ;READ STATUS AND WRITE FIFO BUFFER
066502                  T20BEND:                                        ;END OF MESSAGE BUFFER
                        ;
                        ;WRITE SUBSYSTEM READ STATUS COMMAND PACKET
                        ;
        066510                  .=<.+10>&177770
066510                  T20PK2:
066510  100006                  .WORD   P.WRTSUB!P.ACK                  ;WRITE SUBSYSTEM WITH ACK
066512  066520                  .WORD   T20DT2                          ;LOW ADDRESS OF DATA BLOCK
066514  000000                  .WORD   0                               ;HIGH ADDRESS OF DATA BLOCK
066516  000012                  .WORD   10.                             ;MINIMUM MESSAGE PACKET SIZE

066520                  T20DT2:                                         ;DATA BLOCK
066520     000                  .BYTE   0                               ;BSEL0
066521     000                  .BYTE   0                               ;BSEL1
066522  000000                  .WORD   0                               ;SEL2
066524                          .BLKB   64.                             ;WRITE FIFO DATA OUTPUT BUFFER


066624                          ENDTST
066624                                                          L10073:
066624  104401                                                                  TRAP    C$ETST
                                .SBTTL  TEST 10: MANUAL INTERVENTION

                        ;THE MANUAL INTERVENTION TEST IS A STANDALONE ROUTINE (NOT REALLY A "TEST")
                        ;THAT ALLOWS THE OPERATOR TO CHECK OUT VARIOUS ELEMENTS AND FUNCTIONS OF
                        ;THE SUBSYSTEM THAT CANNOT BE MANIPULATED BY THE PROGRAM ALONE. WHEN
                        ;THIS ROUTINE IS STARTED, IT FIRST PRINTS OUT A MENU OF SELECTABLE
                        ;SUBTESTS AND THEN WAITS FOR THE OPERATOR TO TYPE IN A SELECTION CODE.
                        ;THE ONLY WAYS TO EXIT THIS ROUTINE AND RETURN TO THE DIAGNOSTIC SUPERVISOR
                        ;ARE BY TYPING <CTRL-C> OR SELECTING CODE 7.
                        ;SELECTION CODES AND SUBROUTINES ARE:
                        ;
                        ;
                        ;       CODE    ROUTINE
                        ;
                        ;         0     HELP. PRINTS THIS MENU.
                        ;         1     TURN ON ALL M7196 LED INDICATORS
                        ;         2     TURN OFF ALL M7196 LED INDICATORS
                        ;         3     OFFLINE/ONLINE ATTENTION TEST
                        ;         4     WRITE-PROTECT TEST
                        ;         5     INITIATE TRANSPORT SERVO EXERCISER
                        ;         6     PRINT EXTENDED TRANSPORT STATUS
                        ;         7     EXIT (RETURN TO SUPERVISOR)
                        ;
                        ;
                        ;EACH MENU ITEM CORRESPONDS TO A SUBTEST, AS FOLLOWS:
                        ;
```

```
;
;
;PRINTS OUT THE MENU ON THE CONSOLE TERMINAL.
;
;
;CAUSES ALL THREE LED INDICATORS ON THE M7196 MODULE
;TO BE ILLUMINATED. AFTER INITIATING THIS ROUTINE, THE OPERATOR
;SHOULD OBSERVE THE LED'S AND VERIFY THAT THEY ARE INDEED ALL LIT.
;THIS ROUTINE FIRST USES THE WRITE SUBSYSTEM MEMORY COMMAND TO
;SET THE FORCE WRONG PARITY FLIP-FLOP, WHICH SERVES TO DRIVE THE
;"PROCESSOR NOT OK" LED. THEN IT ENTERS A LOOP THAT CONTINUALLY
;WRITES THE LOW BYTE OF TSDB AND READS THE TSSR. THESE LATTER TWO
;OPERATIONS WILL CAUSE THE "NOT SSR" AND "DRIVING BUS" LED'S TO
;GLOW -- THEY ARE NOT REALLY LIT AT ALL TIMES BUT SHOULD APPEAR
;REASONABLY VISIBLE.
;
;
;INITIALIZES THE CONTROLLER TO CAUSE ALL LED'S TO
;EXTINGUISH.
;
;
;
;
;THIS ROUTINE INITIALIZES THE CONTROLLER, ISSUES A
;WRITE CHARACTERISTICS COMMAND TO ENABLE ATTENTION INTERRUPTS,
;ISSUES A MESSAGE BUFFER RELEASE COMMAND, PRINTS A MESSAGE ON THE
;CONSOLE TERMINAL INSTRUCTING THE OPERATOR TO TOGGLE THE ON-LINE
;SWITCH ON THE TRANSPORT, THEN WAITS FOR AN ATTENTION INTERRUPT.
;EACH TIME THE TRANSPORT TRANSITIONS FROM ON-LINE TO OFF-LINE OR
;VICE-VERSA, AN ATTENTION INTERRUPT SHOULD BE GENERATED. THE PROGRAM
;WILL REPORT THE INTERRUPT AND THE CURRENT STATE OF THE TRANSPORT.
;THE OPERATOR SHOULD VERIFY THAT THE REPORTED STATE MATCHES THE
;STATE INDICATED BY THE LED ON THE FRONT PANEL OF THE TRANSPORT.
;IN ADDITION, WHEN THE TRANSPORT IS PLACED OFF-LINE, THE PROGRAM
;ISSUES A SEQUENCE OF TAPE-MOTION COMMANDS (READ, WRITE, POSITION, ETC.
;AND VERIFIES THAT, FOR EACH COMMAND, FUNCTION REJECT TERMINATION
;RESULTS, ALONG WITH THE NON-EXECUTABLE FUNCTION (NEF) ERROR BIT BEING
;SET.
;
;THIS ROUTINE INSTRUCTS THE OPERATOR TO MOUNT A SCRATCH
;TAPE REEL THAT DOES NOT HAVE A WRITE-ENABLE RING INSTALLED, THEN
;WAITS FOR THE OPERATOR TO RESPOND THAT THIS HAS BEEN ACCOMPLISHED.
;UPON THE RESPONSE, THE PROGRAM VERIFIES THAT THE TRANSPORT SHOWS
;A WRITE-PROTECTED STATUS, THEN ATTEMPTS TO WRITE DATA ON THE
;TAPE AND EXPECTS THE APPROPRIATE ERROR TERMINATION INDICATING THAT
;THE WRITE FUNCTION COULD NOT BE PERFORMED BECAUSE THE REEL IS
;WRITE-PROTECTED.  IF THE APPROPRIATE TERMINATION IS NOT RECEIVED,
;AN ERROR IS REPORTED.
;
;
;
;INSTRUCTS THE OPERATOR TO PLACE THE TAPE TRANSPORT(S)
;ON-LINE (IF ANY ARE OFF-LINE) THEN ATTEMPTS TO PERFORM AN EXTENDED
;STATUS READOUT.  FOR EACH TRANSPORT EQUIPPED WITH THIS FEATURE,
;THE PROGRAM FORMATS AND PRINTS OUT THE RESULTING STATUS. IF THE
;TRANSPORT IS NOT EQUIPPED WITH THIS FEATURE, A MESSAGE INDICATING
;SUCH IS ISSUED.
```

```
   5899                                      ;
   5900                                      ;
   5901                                      ;
   5902                                      ;
   5903 066626                                       BGNTST
        066626                                                                           T10::
   5908 066626                                       RFLAGS  R0                ;GET OPERATOR FLAGS
        066626  104421                                                                                TRAP    C$RFLA
   5909 066630  001403                               BEQ     21$               ;BR, IF OK TO RUN
   5910 066632  012700  072210                       MOV     #T38NE,R0         ;"TEST NOT EXECUTED"
   5911 066636  000402                               BR      3$                ;JUMP IF NOT FIRST TEST
   5912 066640                               21$:
   5913 066640  012700  073325                       MOV     #T38ID,R0         ;TEST ID MESSAGE
   5914 066644  004737  016510               3$:     JSR     PC,TSTSETUP       ;DO THE COMMON SETUP
   5915 066650  004737  020500                       JSR     PC,CHKMAN         ;IS MANUAL INTERVENTION ALLOWED?
   5916 066654  103402                               BCS     22$               ;BR, IF MANUAL INTER ALLOWED
   5917 066656  000137  071410                       JMP     64$               ;JUMP IF NOT ALLOWED
   5918 066662                               22$:
   5922 066662  005037  002222               2$:     CLR     FATFLG            ;CLEAR THE FATAL ERROR FLAG
   5923 066666  012737  176750  071422               MOV     #65000.,T38DLY    ;SET UP DELAY COUNTER
   5924 066674  004737  015774               5$:     JSR     PC,SOFINIT        ;DO A SOFT INIT
   5925 066700  103427                               BCS     23$               ;BRANCH IF OK
   5926 066702  010001                               MOV     R0,R1             ;CONTENTS OF TSSR REGISTER
   5927 066704  032701  000200                       BIT     #SSR,R1           ;CHECK FOR TSSR SET
   5928 066710  001023                               BNE     23$               ;KEEP GOING IF NOT SET
   5929 066712                                       DELAY   250               ;CALL DELAY ROUTINE
        066712  012727  000250                                                                        MOV     #250,(PC)+
        066716  000000                                                                                .WORD   0
        066720  013727  002116                                                                        MOV     L$DLY,(PC)+
        066724  000000                                                                                .WORD   0
        066726  005367  177772                                                                        DEC     -6(PC)
        066732  001375                                                                                BNE     .-4
        066734  005367  177756                                                                        DEC     -22(PC)
        066740  001367                                                                                BNE     .-20
   5930 066742  005337  071422                       DEC     T38DLY            ;BUMP COUNTER DOWN
   5931 066746  001352                               BNE     5$                ;BR, IF MORE TIME LEFT
   5932 066750                                       ERRDF   ERRNO,SFIERR,SFIMSG  ;REPORT FATAL ERROR
        066750  104455                                                                                TRAP    C$ERDF
        066752  001751                                                                                .WORD   1001
        066754  003652                                                                                .WORD   SFIERR
        066756  012034                                                                                .WORD   SFIMSG
   5933 066760  012700  073352               23$:    MOV     #MIMENU,R0        ;MENU OF MANUAL INTERVENTIONS
   5934 066764  012701  000006                       MOV     #6,R1             ;MAXIMUM ALLOWED SELECTION
   5935 066770  004737  020256                       JSR     PC,GETSEL         ;GO GET THE OPERATORS SELECTION
   5936 066774  010004                               MOV     R0,R4             ;GET NUMBER FROM ROUTINE
   5937 066776  006304                               ASL     R4                ;CONVERT TO WORD OFFSET
   5938 067000  000174  067004                       JMP     @6$(R4)           ;JUMP TO PROPER LOOP
   5939 067004  066662                       6$:     .WORD   2$                ;RETYPE THE MENU
   5940 067006  067022                               .WORD   10$               ; 1 TURN ON LED'S
   5941 067010  067304                               .WORD   15$               ; 2 TURN OFF LED'S
   5942 067012  067536                               .WORD   20$               ; 3 ONLINE ATTENTION
   5943 067014  070172                               .WORD   25$               ; 4 WRITE PROTECT
   5944 067016  071126                               .WORD   35$               ; 5 EXTENDED TRANSPORT STATUS
   5945 067020  071404                               .WORD   63$               ; 6 LEAVE THE TEST
   5946 067022                               10$:    PRINTF  #T38MS2           ;TELL OPERATOR TO CNTRL-C FOR EXIT
        067022  012746  073221                                                                        MOV     #T38MS2,-(SP)
        067026  012746  000001                                                                        MOV     #1,-(SP)
```

```
067032 010600                                                                     MOV    SP,R0
067034 104417                                                                     TRAP   C$PNTF
067036 062706 000004                                                              ADD    #4,SP
067042 004737 073756                  JSR     PC,T38REST              ;SET PACKET TO INITIAL VALUES
067046 004737 015774                  JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
067052 103405                         BCS     100$                    ;BR IF SOFT INIT = OK
067054 010001                         MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
067056                                ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
067056 104455                                                                     TRAP   C$ERDF
067060 001752                                                                     .WORD  1002
067062 003652                                                                     .WORD  SFIERR
067064 012034                                                                     .WORD  SFIMSG
067066 013737 002202 072150   100$:   MOV     UNITN,T38DSW            ;SET UNIT NUMBER

067074 012704 072130                  MOV     #T38PK2,R4              ;SUBROUTINE NEEDS PACKET ADDRESS
067100 004737 010662                  JSR     PC,WRTCHR               ;ISSUE WRITE CHARACTERISTICS
067104 103405                         BCS     110$                    ;BR, IF COMMAND ISSUED OK
067106 010001                         MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
067110                                ERRHRD  ERRNO,WRTMSG,SFIMSG     ;WRITE CHARACTERISTISC FAILED
067110 104456                                                                     TRAP   C$ERHRD
067112 001753                                                                     .WORD  1003
067114 005056                                                                     .WORD  WRTMSG
067116 012034                                                                     .WORD  SFIMSG
067120                        110$:
067120 112737 000000 071441           MOVB    #0,T38BS1               ;CLEAR BIT #4
067126 112737 000011 071440           MOVB    #11,T38BS0              ;WRITE MISC COMMAND
067134 012704 071430                  MOV     #T38PACKET,R4           ;SET UP NEW WRT. SUBSYS MEM. COMMAND
                              ;
                              ;NOTE: THIS COMMAND TURNS ON THE PROCESSOR FAIL LED
                              ;
067140 010465 000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
067144 004737 016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
067150 103405                         BCS     150$                    ;BR IF CARRY SET (GOOD RETURN)
067152 010001                         MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
067154                                ERRDF   ERRNO,T38SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
067154 104455                                                                     TRAP   C$ERDF
067156 001754                                                                     .WORD  1004
067160 072626                                                                     .WORD  T38SSR
067162 012046                                                                     .WORD  PKTSSR
067164                        150$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
067164 104406                                                                     TRAP   C$CLP1
067166                                SETPRI  #PRI07                  ;RAISE THE PRIORITY
067166 012700 000340                                                              MOV    #PRI07,R0
067172 104441                                                                     TRAP   C$SPRI
067174 005037 071414                  CLR     TTION2                  ;ASSUME INTERRUPTS ARE ENABLED
067200 032737 000100 177560           BIT     #100,@#TTICSR           ;ARE TTI INTERRUPTS ON ?
067206 001005                         BNE     701$                    ;BRANCH IF YES
067210 005237 071414                  INC     TTION2                  ;FLAG SET IF INTERRUPTS OFF
067214 052737 000100 177560           BIS     #100,@#TTICSR           ;ENABLE INTERRUPTS
067222 012701 000060          701$:   MOV     #TTIVEC,R1              ;START OF TTI VECTORS
067226 011137 071416                  MOV     (R1),TVSAV2             ;SAVE THE CURRENT TTI VECTOR
067232 012721 070710                  MOV     #590$,(R1)+             ;SET NEW INTERRUPT ROUTINE
067236 011137 071420                  MOV     (R1),TPSAV2             ;SAVE THE VECTOR PRIORITY
067242 012711 000340                  MOV     #PRI07,(R1)             ;USE PRIORITY SEVEN
067246                                SETPRI  #PRI00                  ;LOWER INTERRUPT BR LEVEL
067246 012700 000000                                                              MOV    #PRI00,R0
067252 104441                                                                     TRAP   C$SPRI
```

```
 5993 067254  012701  177777                 MOV     #-1,R1                       ;DATA TO WRITE TO TSDB
 5994 067260  000240                 12$:    NOP                                  ;ALLOW OPERATOR TO TYPE +C
 5995 067262  012702  001750                 MOV     #1000.,R2                    ;SET-UP INNER LOOP
 5996 067266  110165  000000         14$:    MOVB    R1,TSDB(R5)                  ;WRITE DATA TO TSDB
 5997 067272  016500  000002                 MOV     TSSR(R5),R0                  ;READ TSSR
 5998 067276  005302                         DEC     R2                           ;REDUCE INNER COUNT
 5999 067300  001372                         BNE     14$                          ;LOOP TILL EXPIRES
 6000 067302  000766                         BR      12$                          ;LOOP UNTIL HALTED
 6001
 6002 067304                         15$:    PRINTF  #T38MS2                      ;TYPE CNTL C TO EXIT
      067304  012746  073221                                                                              MOV     #T38MS2,-(SP)
      067310  012746  000001                                                                              MOV     #1,-(SP)
      067314  010600                                                                                      MOV     SP,R0
      067316  104417                                                                                      TRAP    C$PNTF
      067320  062706  000004                                                                              ADD     #4,SP
 6003 067324  004737  015774                 JSR     PC,SOFINIT                   ;DO SOFT INIT OF CONTROLLER
 6004 067330  103405                         BCS     200$                         ;BR IF SOFT INIT = OK
 6008 067332  010001                         MOV     R0,R1                        ;SAVE CONTENTS OF TSSR
 6009 067334                                 ERRDF   ERRNO,SFIERR,SFIMSG          ;DEVICE FATAL ERROR DURING INIT
      067334  104455                                                                                      TRAP    C$ERDF
      067336  001755                                                                                      .WORD   1005
      067340  003652                                                                                      .WORD   SFIERR
      067342  012034                                                                                      .WORD   SFIMSG
 6010 067344                         200$:
 6011 067344  013737  002202  072150         MOV     UNITN,T38DSW                 ;SET UNIT NUMBER
 6012 067352  012704  072130                 MOV     #T38PK2,R4                   ;SUBROUTINE NEEDS PACKET ADDRESS
 6013 067356  004737  010662                 JSR     PC,WRTCHR                    ;ISSUE WRITE CHARACTERISTICS
 6014 067362  103405                         BCS     210$                         ;BR, IF COMMAND ISSUED OK
 6018 067364  010001                         MOV     R0,R1                        ;SAVE CONTENTS OF TSSR
 6019 067366                                 ERRHRD  ERRNO,WRTMSG,SFIMSG          ;WRITE CHARACTERISTISC FAILED
      067366  104456                                                                                      TRAP    C$ERHRD
      067370  001756                                                                                      .WORD   1006
      067372  005056                                                                                      .WORD   WRTMSG
      067374  012034                                                                                      .WORD   SFIMSG
 6020                                ;********************************************************************
 6021                                ;
 6022                                ;       THIS WRITE SUB-SYSTEM MEMORY COMMAND JUST HOLDS THE LEDS OFF
 6023                                ;
 6024                                ;**********************************************************************
 6025 067376                         210$:
 6026 067376  112737  000000  071441         MOVB    #0,T38BS1                    ;CLEAR BIT #4
 6027 067404  112737  000025  071440         MOVB    #25,T38BS0                   ;STOP DRIVE TEST 22
 6028 067412  012704  071430                 MOV     #T38PACKET,R4                ;SET UP NEW WRT. SUBSYS MEM. COMMAND
 6029 067416  010465  000000                 MOV     R4,TSDB(R5)                  ;SET THE PACKET ADDRESS
 6030 067422  004737  016336                 JSR     PC,CHKTSSR                   ;WAIT FOR SSR TO SET
 6031 067426  103405                         BCS     250$                         ;BR IF CARRY SET (GOOD RETURN)
 6032 067430  010001                         MOV     R0,R1                        ;SAVE CONTENTS OF TSSR
 6036 067432                                 ERRDF   ERRNO,T38SSR,PKTSSR          ;DEVICE FATAL SSR FAILED TO SET
      067432  104455                                                                                      TRAP    C$ERDF
      067434  001757                                                                                      .WORD   1007
      067436  072626                                                                                      .WORD   T38SSR
      067440  012046                                                                                      .WORD   PKTSSR
 6037 067442                         250$:   CKLOOP                               ;LOOP ON ERROR, IF FLAG SET
      067442  104406                                                                                      TRAP    C$CLP1
 6038 067444                                 SETPRI  #PRI07                       ;RAISE THE PRIORITY
      067444  012700  000340                                                                              MOV     #PRI07,R0
      067450  104441                                                                                      TRAP    C$SPRI
```

K2

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 6039 067452  005037  071414                    CLR     TTION2                  ;ASSUME INTERRUPTS ARE ENABLED
 6040 067456  032737  000100  177560            BIT     #100,@#TTICSR           ;ARE TTI INTERRUPTS ON ?
 6041 067464  001005                            BNE     710$                    ;BRANCH IF YES
 6042 067466  005237  071414                    INC     TTION2                  ;FLAG SET IF INTERRUPTS OFF
 6043 067472  052737  000100  177560            BIS     #100,@#TTICSR           ;ENABLE INTERRUPTS
 6044 067500  012701  000060          710$:     MOV     #TTIVEC,R1              ;START OF TTI VECTORS
 6045 067504  011137  071416                    MOV     (R1),TVSAV2             ;SAVE THE CURRENT TTI VECTOR
 6046 067510  012721  070710                    MOV     #590$,(R1)+             ;SET NEW INTERRUPT ROUTINE
 6047 067514  011137  071420                    MOV     (R1),TPSAV2             ;SAVE THE VECTOR PRIORITY
 6048 067520  012711  000340                    MOV     #PRIO7,(R1)             ;USE PRIORITY SEVEN
 6049 067524                                    SETPRI  #PRIO0                  ;LOWER INTERRUPT BR LEVEL
      067524  012700  000000                                                                          MOV     #PRIO0,R0
      067530  104441                                                                                  TRAP    C$SPRI
 6050 067532  000240                  260$:     NOP                             ;ALLOW CNTL C
 6051 067534  000776                            BR      260$                    ;LOOP UNTIL STOPPED
 6052
 6053
 6054 067536                          20$:      PRINTF  #T38MS2                 ;TELL'EM WHAT TO TYPE
      067536  012746  073221                                                                          MOV     #T38MS2,-(SP)
      067542  012746  000001                                                                          MOV     #1,-(SP)
      067546  010600                                                                                  MOV     SP,R0
      067550  104417                                                                                  TRAP    C$PNTF
      067552  062706  000004                                                                          ADD     #4,SP
 6055 067556                                    SETPRI  #PRIO0                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
      067556  012700  000000                                                                          MOV     #PRIO0,R0
      067562  104441                                                                                  TRAP    C$SPRI
 6056 067564  005037  002224                    CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
 6057 067570  004737  015774                    JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
 6058 067574  103405                            BCS     300$                    ;BR IF SOFT INIT = OK
 6062 067576  010001                            MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 6063 067600                                    ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
      067600  104455                                                                                  TRAP    C$ERDF
      067602  001760                                                                                  .WORD   1008
      067604  003652                                                                                  .WORD   SFIERR
      067606  012034                                                                                  .WORD   SFIMSG
 6064 067610                          300$:
 6065 067610  013737  002202  072150            MOV     UNITN,T38DSW            ;SET UNIT NUMBER IN PACKET
 6066 067616  012737  000040  072146            MOV     #BIT5,T38EAI            ;ENABLE ATTENTION INTERRUPTS
 6067 067624  012704  072130                    MOV     #T38PK2,R4              ;SUBROUTINE NEEDS PACKET ADDRESS
 6068 067630  004737  010662                    JSR     PC,WRTCHR               ;ISSUE WRITE CHARACTERISTICS
 6069 067634  103405                            BCS     310$                    ;BR, IF COMMAND ISSUED OK
 6073 067636  010001                            MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 6074 067640                                    ERRHRD  ERRNO,WRTMSG,SFIMSG     ;WRITE CHARACTERISTISC FAILED
      067640  104456                                                                                  TRAP    C$ERHRD
      067642  001761                                                                                  .WORD   1009
      067644  005056                                                                                  .WORD   WRTMSG
      067646  012034                                                                                  .WORD   SFIMSG
 6075 067650                          310$:
 6076 067650  012704  072160                    MOV     #T38PK3,R4              ;SET UP NEW PACKET FOR MESS BUF REL
 6077 067654  010465  000000                    MOV     R4,TSDB(R5)             ;MESSAGE BUFFER RELEASE,ACK,CVC=1 CMD
 6078 067660  004737  016250                    JSR     PC,WAITF                ;WAIT FOR SSR TO SET
 6079 067664  005002                            CLR     R2                      ;MAKE SURE ALL IS CLEAR
 6080 067666  016501  000002                    MOV     TSSR(R5),R1             ;GET TSSR STATUS
 6081 067672  032701  000100                    BIT     #OFL,R1                 ;IS OFL SET
 6082 067676  001402                            BEQ     320$                    ;BR, IF OFL IS NOT SET
 6083 067700  052702  000100                    BIS     #OFL,R2                 ;SET OFL IN EXPECTED
 6084 067704  052702  000200          320$:     BIS     #SSR,R2                 ;SET UP EXPECTED
```

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6085 067710  020201                            CMP     R2,R1                    ;IS EVERYTHING OK
6086 067712  001404                            BEQ     350$                     ;BR, IF ALL IS WELL
6090 067714                                    ERRHRD  ERRNO,T38SST,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
     067714  104456                                                                                     TRAP     C$ERHRD
     067716  001762                                                                                     .WORD    1010
     067720  073036                                                                                     .WORD    T38SST
     067722  012046                                                                                     .WORD    PKTSSR
6091 067724                           350$:    CKLOOP                           ;LOOP ON ERROR, IF FLAG SET
     067724  104406                                                                                     TRAP     C$CLP1
6092 067726                                    PRINTF  #T38MS1                  ;TELL OPERATOR TO TOGGLE SWITCH
     067726  012746  073126                                                                             MOV      #T38MS1,-(SP)
     067732  012746  000001                                                                             MOV      #1,-(SP)
     067736  010600                                                                                     MOV      SP,R0
     067740  104417                                                                                     TRAP     C$PNTF
     067742  062706  000004                                                                             ADD      #4,SP
6093 067746                                    PRINTF  #T38MS2                  ;TELL OPERATOR TO DO ↑C TO EXIT
     067746  012746  073221                                                                             MOV      #T38MS2,-(SP)
     067752  012746  000001                                                                             MOV      #1,-(SP)
     067756  010600                                                                                     MOV      SP,R0
     067760  104417                                                                                     TRAP     C$PNTF
     067762  062706  000004                                                                             ADD      #4,SP
6094 067766                                    SETPRI  #PRI07                   ;RAISE THE PRIORITY
     067766  012700  000340                                                                             MOV      #PRI07,R0
     067772  104441                                                                                     TRAP     C$SPRI
6095 067774  005037  071414                    CLR     TTION2                   ;ASSUME INTERRUPTS ARE ENABLED
6096 070000  032737  000100  177560           BIT     #100,@#TTICSR            ;ARE TTI INTERRUPTS ON ?
6097 070006  001005                            BNE     720$                     ;BRANCH IF YES
6098 070010  005237  071414                    INC     TTION2                   ;FLAG SET IF INTERRUPTS OFF
6099 070014  052737  000100  177560           BIS     #100,@#TTICSR            ;ENABLE INTERRUPTS
6100 070022  012701  000060           720$:    MOV     #TTIVEC,R1               ;START OF TTI VECTORS
6101 070026  011137  071416                    MOV     (R1),TVSAV2              ;SAVE THE CURRENT TTI VECTOR
6102 070032  012721  070710                    MOV     #590$,(R1)+              ;SET NEW INTERRUPT ROUTINE
6103 070036  011137  071420                    MOV     (R1),TPSAV2              ;SAVE THE VECTOR PRIORITY
6104 070042  012711  000340                    MOV     #PRI07,(R1)              ;USE PRIORITY SEVEN
6105 070046                                    SETPRI  #PRI00                   ;LOWER INTERRUPT BR LEVEL
     070046  012700  000000                                                                             MOV      #PRI00,R0
     070052  104441                                                                                     TRAP     C$SPRI
6106 070054  000240                   360$:    NOP                              ;ALLOW CONTROL C
6107 070056  005737  002224                    TST     INTRECV                  ;DID AN INTERRUPT OCCUR ?
6108 070062  001001                            BNE     370$                     ;BRANCH IF YES
6109 070064  000773                            BR      360$                     ;WAIT SOME MORE FOR INTERRUPT
6110 070066                           370$:    PRINTF  #T38INT                  ;"INTERRUPT RECEIVED"
     070066  012746  072716                                                                             MOV      #T38INT,-(SP)
     070072  012746  000001                                                                             MOV      #1,-(SP)
     070076  010600                                                                                     MOV      SP,R0
     070100  104417                                                                                     TRAP     C$PNTF
     070102  062706  000004                                                                             ADD      #4,SP
6111 070106  016501  000002                    MOV     TSSR(R5),R1              ;READ TSSR STATUS
6112 070112  032701  000100                    BIT     #OFL,R1                  ;CHECK THE OFF-LINE BIT
6113 070116  001011                            BNE     380$                     ;BR, IF DRIVE IS OFF-LINE
6114 070120                                    PRINTF  #T38ONL                  ;"DRIVE IS NOW ON-LINE"
     070120  012746  072746                                                                             MOV      #T38ONL,-(SP)
     070124  012746  000001                                                                             MOV      #1,-(SP)
     070130  010600                                                                                     MOV      SP,R0
     070132  104417                                                                                     TRAP     C$PNTF
     070134  062706  000004                                                                             ADD      #4,SP
6115 070140  000410                            BR      390$                     ;ALMOST DONE
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 6116 070142                          380$:   PRINTF  #T380FL                 ;"DRIVE IS NOW OFF-LINE"
      070142  012746  073002                                                                      MOV     #T380FL,-(SP)
      070146  012746  000001                                                                      MOV     #1,-(SP)
      070152  010600                                                                              MOV     SP,R0
      070154  104417                                                                              TRAP    C$PNTF
      070156  062706  000004                                                                      ADD     #4,SP
 6117 070162  005037  002224          390$:   CLR     INTRECV                 ;CLEAR INTERRUPT FLAG
 6118 070166  000137  067610                  JMP     300$                    ;TRY AGAIN
 6119 070172                          25$:    GMANIL  T38MSG,T38DAT,-1,NO     ;WAIT FOR OPERATOR TO MOUNT TAPE
      070172  104443                                                                              TRAP    C$GMAN
      070174  000404                                                                              BR      10000$
      070176  073754                                                                              .WORD   T38DAT
      070200  000120                                                                              .WORD   T$CODE
      070202  073265                                                                              .WORD   T38MSG
      070204  177777                                                                              .WORD   -1
      070206                                                                               10000$:
 6120 070206                                  BNCOMPLETE 25$                  ;RETRY IF ERROR
      070206  103371                                                                              BCC     25$
 6121 070210  005737  073754                  TST     T38DAT                  ;DID OPERATOR SAY 'YES' ?
 6122 070214  001002                          BNE     27$                     ;BRANCH IF YES
 6123 070216  000137  066662                  JMP     2$                      ;RETURN TO MAIN MENU
 6124 070222                          27$:
 6125 070222  004737  015774                  JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
 6126 070226  103405                          BCS     400$                    ;BR IF SOFT INIT = OK
 6130 070230  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 6131 070232                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
      070232  104455                                                                              TRAP    C$ERDF
      070234  001763                                                                              .WORD   1011
      070236  003652                                                                              .WORD   SFIERR
      070240  012034                                                                              .WORD   SFIMSG
 6132 070242                          400$:   CKLOOP                          ;LOOP IF SELECTED
      070242  104406                                                                              TRAP    C$CLP1
 6133 070244  013737  002202  072150          MOV     UNITN,T38DSW            ;SET UNIT NUMBER
 6134 070252  012704  072130                  MOV     #T38PK2,R4              ;SUBROUTINE NEEDS PACKET ADDRESS
 6135 070256  004737  010662                  JSR     PC,WRTCHR               ;ISSUE WRITE CHARACTERISTICS
 6136 070262  103405                          BCS     410$                    ;BR, IF COMMAND ISSUED OK
 6140 070264  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 6141 070266                                  ERRHRD  ERRNO,WRTMSG,SFIMSG     ;WRITE CHARACTERISTISC FAILED
      070266  104456                                                                              TRAP    C$ERHRD
      070270  001764                                                                              .WORD   1012
      070272  005056                                                                              .WORD   WRTMSG
      070274  012034                                                                              .WORD   SFIMSG
 6142 070276                          410$:   CKLOOP                          ;LOOP IF SELECTED
      070276  104406                                                                              TRAP    C$CLP1
 6143 070300  013701  071454                  MOV     T38BFR+6,R1             ;PICK UP XSTO CONTENTS
 6144 070304  010102                          MOV     R1,R2                   ;SET UP EXPECTED
 6145 070306  052702  000004                  BIS     #BIT2,R2                ;SET UP THE WRITE LOCKED BIT
 6146 070312  020102                          CMP     R1,R2                   ;ARE THEY CORRECT
 6147 070314  001406                          BEQ     430$                    ;BR, IF ALL IS WELL (OK)
 6151 070316                                  ERRHRD  ERRNO,T38WRL,EXPREC     ;"WRITE LOCKED BIT IS NOT SET ETC."
      070316  104456                                                                              TRAP    C$ERHRD
      070320  001765                                                                              .WORD   1013
      070322  072444                                                                              .WORD   T38WRL
      070324  015474                                                                              .WORD   EXPREC
 6152 070326  005237  002222                  INC     FATFLG                  ;SET FATAL FLAG
 6153 070332                          430$:   CKLOOP                          ;LOOP IF SELECTED
      070332  104406                                                                              TRAP    C$CLP1
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  6154 070334  005737  002222                 TST     FATFLG                        ;WAS THE DRIVE NOT WRITE LOCKED
  6155 070340  001402                         BEQ     435$                          ;BR, IF FLAG NOT SET
  6156 070342  000137  066662                 JMP     2$                            ;RE-WRITE MENU
  6157 070346  017737  112552  072202 435$:   MOV     @FREE,T38WR                   ;SET UP WRITE BUFFER ADDRESS
  6158 070354  012704  072200                 MOV     #T38PK4,R4                    ;GET PACKET ADDRESS
  6159 070360  010465  000000                 MOV     R4,TSDB(R5)                   ;SET THE PACKET ADDRESS
  6160 070364  004737  016250                 JSR     PC,WAITF                      ;WAIT FOR SSR TO SET
  6161 070370  016501  000002                 MOV     TSSR(R5),R1                   ;GET TSSR
  6162 070374  012702  100206                 MOV     #SC!SSR!BIT1!BIT2,R2          ;SET UP EXPECTED
  6163 070400  020102                         CMP     R1,R2                         ;ARE THEY EQUAL (CORRECT)
  6164 070402  001404                         BEQ     440$                          ;BR, IF CORRECT STATUS
  6168 070404                                 ERRHRD  ERRNO,T38WRT,PKTSSR           ;"TSSR INCORRECT AFTER WRITE COMMAND
       070404  104456                                                                              TRAP    C$ERHRD
       070406  001766                                                                              .WORD   1014
       070410  072360                                                                              .WORD   T38WRT
       070412  012046                                                                              .WORD   PKTSSR
  6169 070414                          440$:  CKLOOP                                ;LOOP ON ERROR, IF FLAG SET
       070414  104406                                                                              TRAP    C$CLP1
  6170 070416  013701  071454                 MOV     T38BFR+6,R1                   ;READ XSTO CONTENTS
  6171 070422  010102                         MOV     R1,R2                         ;SET UPR EXPECTED
  6172 070424  052702  004000                 BIS     #BIT11,R2                     ;SET THE WRITE LOCK ERROR BIT (XSTO)
  6173 070430  020102                         CMP     R1,R2                         ;WAS THE BIT SET
  6174 070432  001404                         BEQ     450$                          ;BR, IF IT WAS (GOOD)
  6178 070434                                 ERRHRD  ERRNO,T38WLE,EXPREC           ;"WRITE LOCK ERROR BIT NOT SET"
       070434  104456                                                                              TRAP    C$ERHRD
       070436  001767                                                                              .WORD   1015
       070440  072505                                                                              .WORD   T38WLE
       070442  015474                                                                              .WORD   EXPREC
  6179 070444                          450$:  CKLOOP                                ;LOOP IF SELECTED
       070444  104406                                                                              TRAP    C$CLP1
  6180 070446  000137  066662                 JMP     2$                            ;GO BACK TO MENU
  6181
  6182                                 ;*****************************************************************
  6183                                 ;      SERVO EXERCISER NO LONGER USED
  6184                                 ;*****************************************************************
  6185 070452                          30$:
  6186 070452                                 PRINTB  #T38MS3                       ;"EXE ANY OTHER MENU SELECTION TO STOP
       070452  012746  072265                                                                      MOV     #T38MS3,-(SP)
       070456  012746  000001                                                                      MOV     #1,-(SP)
       070462  010600                                                                              MOV     SP,R0
       070464  104414                                                                              TRAP    C$PNTB
       070466  062706  000004                                                                      ADD     #4,SP
  6187 070472  004737  073756                 JSR     PC,T38REST                    ;SET PACKET TO INITIAL VALUES
  6188 070476  004737  015774                 JSR     PC,SOFINIT                    ;DO SOFT INIT OF CONTROLLER
  6189 070502  103405                         BCS     500$                          ;BR IF SOFT INIT = OK
  6193 070504  010001                         MOV     R0,R1                         ;SAVE CONTENTS OF TSSR
  6194 070506                                 ERRDF   ERRNO,SFIERR,SFIMSG           ;DEVICE FATAL ERROR DURING INIT
       070506  104455                                                                              TRAP    C$ERDF
       070510  001770                                                                              .WORD   1016
       070512  003652                                                                              .WORD   SFIERR
       070514  012034                                                                              .WORD   SFIMSG
  6195 070516  013737  002202  072150 500$:   MOV     UNITN,T38DSW                  ;SET UNIT NUMBER
  6196 070524  012704  072130                 MOV     #T38PK2,R4                    ;SUBROUTINE NEEDS PACKET ADDRESS
  6197 070530  004737  010662                 JSR     PC,WRTCHR                     ;ISSUE WRITE CHARACTERISTICS
  6198 070534  103405                         BCS     510$                          ;BR, IF COMMAND ISSUED OK
  6202 070536  010001                         MOV     R0,R1                         ;SAVE CONTENTS OF TSSR
  6203 070540                                 ERRHRD  ERRNO,WRTMSG,SFIMSG           ;WRITE CHARACTERISTISC FAILED
```

```
     070540  104456                                                                      TRAP    C$ERHRD
     070542  001771                                                                      .WORD   1017
     070544  005056                                                                      .WORD   WRTMSG
     070546  012034                                                                      .WORD   SFIMSG
6204 070550                              510$:                                                   
6205 070550  112737  000000  071441          MOVB    #0,T38BS1               ;CLEAR BIT #4
6206 070556  112737  000020  071440          MOVB    #20,T38BS0              ;EXECUTE DRIVE TEST 22
6207 070564  012704  071430                  MOV     #T38PACKET,R4           ;SET UP NEW WRT. SUBSYS MEM. COMMAND
6208 070570  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
6209 070574  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
6210 070600  103405                          BCS     550$                    ;BR IF CARRY SET (GOOD RETURN)
6211 070602  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
6215 070604                                  ERRDF   ERRNO,T38SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
     070604  104455                                                                      TRAP    C$ERDF
     070606  001772                                                                      .WORD   1018
     070610  072626                                                                      .WORD   T38SSR
     070612  012046                                                                      .WORD   PKTSSR
6216 070614                              550$:   CKLOOP                                  ;LOOP ON ERROR, IF FLAG SET
     070614  104406                                                                      TRAP    C$CLP1
6217 070616                                      SETPRI  #PRI07                  ;RAISE THE PRIORITY
     070616  012700  000340                                                              MOV     #PRI07,R0
     070622  104441                                                                      TRAP    C$SPRI
6218 070624  005037  071414                      CLR     TTION2                  ;ASSUME INTERRUPTS ARE ENABLED
6219 070630  032737  000100  177560              BIT     #100,@#TTICSR           ;ARE TTI INTERRUPTS ON ?
6220 070636  001005                              BNE     555$                    ;BRANCH IF YES
6221 070640  005237  071414                      INC     TTION2                  ;FLAG SET IF INTERRUPTS OFF
6222 070644  052737  000100  177560              BIS     #100,@#TTICSR           ;ENABLE INTERRUPTS
6223 070652  012701  000060              555$:   MOV     #TTIVEC,R1              ;START OF TTI VECTORS
6224 070656  011137  071416                      MOV     (R1),TVSAV2             ;SAVE THE CURRENT TTI VECTOR
6225 070662  012721  070710                      MOV     #590$,(R1)+             ;SET NEW INTERRUPT ROUTINE
6226 070666  011137  071420                      MOV     (R1),TPSAV2             ;SAVE THE VECTOR PRIORITY
6227 070672  012711  000340                      MOV     #PRI07,(R1)             ;USE PRIORITY SEVEN
6228 070676                                      SETPRI  #PRI00                  ;LOWER INTERRUPT BR LEVEL
     070676  012700  000000                                                              MOV     #PRI00,R0
     070702  104441                                                                      TRAP    C$SPRI
6229 070704  000240                      560$:   NOP                             ;LOOP AWHILE
6230 070706  000776                              BR      560$                    ;STAY IN "TIGHT" LOOP
6231                                     ;+
6232                                     ;PROCESS CONSOLE INTERRUPTS
6233                                     ;-
6234
6235 070710  010046                      590$:   MOV     R0,-(SP)                ;SAVE WORK REGISTER
6236 070712  113700  177562                      MOVB    @#TTIBFR,R0             ;GET THE OPERATOR INPUT
6237 070716  042700  000200                      BIC     #200,R0                 ;STRIP OFF PARITY BIT
6238 070722  122700  000015                      CMPB    #15,R0                  ;IS IT A CARRIAGE RETURN ?
6239 070726  001075                              BNE     591$                    ;JUST EXIT IF NOT
6240 070730  012766  066662  000002              MOV     #2$,2(SP)               ;RETURN TO MASTER MENU
6241 070736  005066  000004                      CLR     4(SP)                   ;FORCE PRIORTY 0
6242 070742  013737  071416  000060              MOV     TVSAV2,@#TTIVEC ;RESTORE VECTOR
6243 070750  013737  071420  000062              MOV     TPSAV2,@#TTIVEC+2       ;RESTORE SUPER PRIORTY
6244 070756  112737  000025  071440              MOVB    #25,T38BS0              ;STOP DRIVE TEST 22
6245 070764  112737  000000  071441              MOVB    #0,T38BS1               ;CLEAR BS1
6246 070772  012704  071430                      MOV     #T38PACKET,R4           ;SET UP NEW WRT. SUBSYS MEM. COMMAND
6247 070776  010465  000000                      MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
6248 071002  012737  176750  071422              MOV     #65000.,T38DLY          ;SET UP DELAY COUNTER
6249 071010  004737  016250              592$:   JSR     PC,WAITF                ;DO A WAIT FOR SSR
6250 071014  016501  000002                      MOV     TSSR(R5),R1             ;CONTENTS OF TSSR REGISTER
```

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6251 071020  032701  000200                  BIT     #SSR,R1                 ;CHECK FOR TSSR SET
6252 071024  001017                          BNE     595$                    ;KEEP GOING IF NOT SET
6253 071026                                  DELAY   250                     ;CALL DELAY ROUTINE
     071026  012727  000250                                                                                     MOV     #250,(PC)+
     071032  000000                                                                                             .WORD   0
     071034  013727  002116                                                                                     MOV     L$DLY,(PC)+
     071040  000000                                                                                             .WORD   0
     071042  005367  177772                                                                                     DEC     -6(PC)
     071046  001375                                                                                             BNE     .-4
     071050  005367  177756                                                                                     DEC     -22(PC)
     071054  001367                                                                                             BNE     .-20
6254 071056  005337  071422                  DEC     T38DLY                  ;BUMP COUNTER DOWN
6255 071062  001352                          BNE     592$                    ;BR, IF MORE TIME LEFT
6256 071064  004737  016336          595$:   JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
6257 071070  103405                          BCS     580$                    ;BR IF CARRY SET (GOOD RETURN)
6258 071072  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
6262 071074                                  ERRDF   ERRNO,T38SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
     071074  104455                                                                                             TRAP    C$ERDF
     071076  001773                                                                                             .WORD   1019
     071100  072626                                                                                             .WORD   T38SSR
     071102  012046                                                                                             .WORD   PKTSSR
6263 071104                          580$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     071104  104406                                                                                             TRAP    C$CLP1
6264 071106  005737  071414                  TST     TTION2                  ;ARE SUPER INTERRUPTS ENABLED
6265 071112  001403                          BEQ     591$                    ;BR, IF YES
6266 071114  042737  000100  177560          BIC     #100,@#TTICSR           ;RESTORE REGISTER
6267 071122  012600                  591$:   MOV     (SP)+,R0                ;RESTORE REGISTER
6268 071124  000002                          RTI                             ;RETURN
6269 071126                          35$:
6270 071126  004737  073756                  JSR     PC,T38REST              ;SET PACKET TO INITIAL VALUES
6271 071132  004737  015774                  JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
6272 071136  103405                          BCS     600$                    ;BR IF SOFT INIT = OK
6276 071140  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
6277 071142                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
     071142  104455                                                                                             TRAP    C$ERDF
     071144  001774                                                                                             .WORD   1020
     071146  003652                                                                                             .WORD   SFIERR
     071150  012034                                                                                             .WORD   SFIMSG
6278 071152                          600$:   CKLOOP                          ;LOOP IF SELECTED
     071152  104406                                                                                             TRAP    C$CLP1
6279 071154  012701  071446                  MOV     #T38BFR,R1              ;ADDRESS OF MESSAGE BUFFER
6280 071160  012702  125252                  MOV     #125252,R2              ;ALTERNATING 1'S AND 0'S
6281
6282 071164  010221                  601$:   MOV     R2,(R1)+                ;CLEAR OUT THE MESSAGE BUFFER
6283 071166  022701  072122                  CMP     #T38EB,R1               ;END OF BUFFER YET
6284 071172  001401                          BEQ     605$                    ;BR, IF AT END OF BUFFER
6285 071174  000773                          BR      601$                    ;NOT AT END KEEP GOING
6286 071176  013737  002202  072150  605$:   MOV     UNITN,T38DSW            ;SET UNIT NUMBER
6287 071204  012704  072130                  MOV     #T38PK2,R4              ;SUBROUTINE NEEDS PACKET ADDRESS
6288 071210  004737  010662                  JSR     PC,WRTCHR               ;ISSUE WRITE CHARACTERISTICS
6289 071214  103405                          BCS     610$                    ;BR, IF COMMAND ISSUED OK
6293 071216  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
6294 071220                                  ERRHRD  ERRNO,WRTMSG,SFIMSG     ;WRITE CHARACTERISTISC FAILED
     071220  104456                                                                                             TRAP    C$ERHRD
     071222  001775                                                                                             .WORD   1021
     071224  005056                                                                                             .WORD   WRTMSG
     071226  012034                                                                                             .WORD   SFIMSG
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071230                           610$:   CKLOOP                          ;LOOP IF SELECTED
071230  104406                                                                       TRAP    C$CLP1
071232  112737  000000  071441           MOVB    #0,T38BS1               ;CLEAR BIT #4
071240  112737  000024  071440           MOVB    #24,T38BS0              ;READ EXTENDED DRIVE STATUS
071246  012704  071430                   MOV     #T38PACKET,R4           ;SET UP NEW WRT. SUBSYS MEM. COMMAND
071252  010465  000000                   MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
071256  012737  000144  071422           MOV     #100.,T38DLY            ;SET UP DELAY ROUTINE
071264  004737  016250           620$:   JSR     PC,WAITF                ;WAIT AWHILE FOR SSR TO SET
071270  016501  000002                   MOV     TSSR(R5),R1             ;SEE IF IT REALLY DID
071274  032701  000200                   BIT     #SSR,R1                 ;JUST CHECK THAT BIT
071300  001017                           BNE     630$                    ;BR, IF SSR IS SET
071302                                   DELAY   250                     ;DELAY ABOUT .25 SEC
071302  012727  000250                                                               MOV     #250,(PC)+
071306  000000                                                                       .WORD   0
071310  013727  002116                                                               MOV     L$DLY,(PC)+
071314  000000                                                                       .WORD   0
071316  005367  177772                                                               DEC     -6(PC)
071322  001375                                                                       BNE     .-4
071324  005367  177756                                                               DEC     -22(PC)
071330  001367                                                                       BNE     .-20
071332  005337  071422                   DEC     T38DLY                  ;START DELAY COUNT DOWN
071336  001352                           BNE     620$                    ;BR, IF COUNTER IS NOT AT DONE
071340  004737  016336           630$:   JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
071344  103405                           BCS     650$                    ;BR IF CARRY SET (GOOD RETURN)
071346  010001                           MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
071350                                   ERRDF   ERRNO,T38SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
071350  104455                                                                       TRAP    C$ERDF
071352  001776                                                                       .WORD   1022
071354  072626                                                                       .WORD   T38SSR
071356  012046                                                                       .WORD   PKTSSR
071360                           650$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
071360  104406                                                                       TRAP    C$CLP1
071362  012700  071466                   MOV     #T38BFR+20,R0           ;MESSAGE BUFFER ADDRESS
071366  005001                           CLR     R1                      ;NO HIGH ORDER ADDRESS BITS
071370  005037  003134                   CLR     KTENABLE                ;NO KT11 STUFF EITHER
071374  004737  074014                   JSR     PC,T38MBP               ;GO PRINT MESSAGE BUFFER CONTENTS
071400  000137  066662                   JMP     2$                      ;GO BACK TO MENU


071404  000137  000200           63$:    JMP     200                     ;REALLY RETURN TO THE SUPERVISOR
071410                           64$:    EXIT    TST                     ;LEAVE TEST
071410  104432                                                                       TRAP    C$EXIT
071412  003054                                                                       .WORD   L10075-.

                                 ;+
                                 ;LOCAL TEXT MESSAGES FOR TEST
                                 ;-

                                 ;LOCAL STORAGE FOR THIS TEST
                                 ;-
                                 ;+
                                 ;LOCAL STORAGE FOR THIS TEST
                                 ;-

071414  000000                   TTION2:         .WORD   0               ;WORD SET IF SUPERVISOR TTI INTER OFF
071416  000000                   TVSAV2: .WORD   0               ;SAVE TTI VECTOR
071420  000000                   TPSAV2: .WORD   0               ;SAVE TTI PRIORITY
```

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071422  000000           T38DLY: .WORD   0                       ;DELAY COUNTER FOR TEST
        071430                   .=<.+10>&177770
071430                   T38PACKET:                              ;COMMAND PACKET FOR TEST
071430  140006                   .WORD   140006                  ;WRITE SUBSYSTEM MEM. CMD,  ACK,CVC=1
071432  071440                   .WORD   T38TAD                  ;ADDRESS OF CHARACTERISTICS BLOCK
071434  000000                   .WORD   0
071436  000012                   .WORD   10.                     ;STARTING VALUE OF BLOCK SIZE
071440                   T38TAD:                              ;CHARACTERISTICS DATA BLOCK
071440     000           T38BS0: .BYTE   0                       ;BSEL0 BYTE
071441     000           T38BS1: .BYTE   0                       ;BSEL1 BYTE
071442  000000           T38BS2: .WORD   0                       ;BSEL1 WORD
071444  000000                   .WORD   0                       ;DATA
071446                   T38BFR: .BLKW   150.                    ;MESSAGE BUFFER
072122  000000           T38EB:  .WORD                           ;END OF BUFFER ADDRESS


        072130                   .=<.+10>&177770
072130                   T38PK2:                                 ;COMMAND PACKET FOR TEST
072130  140004                   .WORD   140004                  ;WRITE CHARA. MEM. CMND.,  ACK,CVC=1
072132  072140                   .WORD   T38DTA                  ;ADDRESS OF SELECT DATA BLOCK
072134  000000                   .WORD   0
072136  000012                   .WORD   10.                     ;STARTING VALUE OF BLOCK SIZE


072140                   T38DTA:                                 ;SELECT DATA BLOCK
072140  071446                   .WORD   T38BFR                  ;ADDRESS OF MESSAGE BUFFER
072142  000000                   .WORD   0
072144  000400                   .WORD   256.                    ;LENGTH OF MESSAGE BUFFER
072146  000000           T38EAI: .WORD   0                       ;EAI BIT WORD
072150  000000           T38DSW: .WORD   0                       ;DRIVE SELECT WORD ETC
        072160                   .=<.+10>&177770
072160  140212           T38PK3: .WORD   140212                  ;MESSAGE BUFFER RELEASE COMMAND
072162  000000                   .WORD   0                       ;NOT USED
072164  000000                   .WORD   0                       ;NOT USED
072166  000000                   .WORD   0                       ;NOT USED
072170  000000                   .WORD   0                       ;NOT USED

                         ;
                         ;WRITE TAPE PACKET
                         ;
        072200                   .=<.+10>&177770
072200  140005           T38PK4: .WORD   140005                  ;WRITE, ACK, CVC=1 COMMAND
072202  000000           T38WR:  .WORD   0                       ;ADDRESS OF WRITE BUFFER
072204  000000                   .WORD   0                       ;MORE ADDRESS OF WRITE BUFFER
072206  000400           T38SIZ: .WORD   256.                    ;SIZE OF RECORD




                         ;+
                         ;LOCAL TEXT MESSAGES FOR TEST
                         ;-
```

```
6404 072210      123      164      141  T38NE:   .ASCIZ  'Stand-alone Manual Intervention Not Executed'
6405 072265      045      116      045  T38MS3:  .ASCIZ  '%N%A Type <RETURN> To Stop Servo Exerciser, Return To Menu'
6406 072360      124      123      123  T38WRT:  .ASCIZ  'TSSR Not Correct After WRITE, With WRITE PROTECT On'
6407 072444      127      122      111  T38WRL:  .ASCIZ  'WRITE LOCKED Bit Not Set In XSTO'
6408 072505      127      122      111  T38WLE:  .ASCIZ  'WRITE LOCK ERROR Bit Not Set In XSTO'
6409 072552      127      122      111  T38NBA:  .ASCIZ  'WRITE SUBSYSTEM MEMORY Command Not Accepted'
6410 072626      103      157      156  T38SSR:  .ASCIZ  'Contents of TSSR Incorrect After WRITE SUBSYSTEM MEMORY'
6411 072716      045      116      045  T38INT:  .ASCIZ  '%N%A Interrupt Received'
6412 072746      045      116      045  T38ONL:  .ASCIZ  '%N%A Drive Is Now   ON-LINE'
6413 073002      045      116      045  T38OFL:  .ASCIZ  '%N%A Drive Is Now  OFF-LINE'
6414 073036      103      157      156  T38SST:  .ASCIZ  'Contents Of TSSR Incorrect After MESSAGE BUFFER RELEASE'
6415 073126      045      116      045  T38MS1:  .ASCIZ  '%N%AToggle ON-LINE Switch to Generate ATTENTION Interrupts'
6416 073221      045      116      045  T38MS2:  .ASCIZ  '%N%AType RETURN To Return To Menu%N'
6417 073265      111      163      040  T38MSG:  .ASCIZ  'Is Write-Protected Tape Mounted'
6418 073325      115      141      156  T38ID:   .ASCIZ  'Manual Intervention'
6419                                             .EVEN
6420 073352   073376   073450   073476  MIMENU:  .WORD   1$,2$,3$,4$,5$,6$
6421 073366   073645   073710   073753           .WORD   8$,9$,10$,0
6422
6423 073376      012      123      105  1$:      .ASCIZ  <12>'SELECT OPERATION FROM FOLLOWING OPTIONS:'
6424 073450      012      011      060  2$:      .ASCIZ  <12>'   0        Display This Menu'
6425 073476      011      061      011  3$:      .ASCIZ  '       1        Turn On All M7196 LED''s'
6426 073530      011      062      011  4$:      .ASCIZ  '       2        Turn Off All M7196 LED''s'
6427 073563      011      063      011  5$:      .ASCIZ  '       3        Offline/Online Attention'
6428 073617      011      064      011  6$:      .ASCIZ  '       4        Write Protect Test'
6429 073645      011      065      011  8$:      .ASCIZ  '       5        Print Extended Transport Status'
6430 073710      011      066      011  9$:      .ASCIZ  '       6        Return to Diagnostic Supervisor'
6431 073753      000                    10$:     .ASCIZ  ''
6432                                             .EVEN
6433
6434                                    ;+
6435                                    ;LOCAL STORAGE FOR THIS TEST
6436                                    ;-
6437
6438 073754   000000                    T38DAT: .WORD    0               ;LOGICAL RESPONSE TO QUESTION
6439 073756                             T38REST:
6440 073756                                      SAVREG                          ;SAVE THE REGISTERS
6441 073762   012701   071430                    MOV     #T38PACKET,R1           ;START OF THE PACKET
6442 073766   012721   140206                    MOV     #140206,(R1)+           ;WRITE SUBSYSTEM MEM. WITH ACK,CVC=1
6443 073772   012721   071440                    MOV     #T38TAD,(R1)+           ;ADDRESS OF DATA BLOCK
6444 073776   005021                             CLR     (R1)+                   ;EXTENDED ADDRESS
6445 074000   012721   000006                    MOV     #6.,(R1)+               ;SIZE OF DATA BLOCK IN BYTES
6446 074004   005021                             CLR     (R1)+                   ;CLEAR BSELO AND BSEL1
6447 074006   005021                             CLR     (R1)+                   ;CLEAR SEL2
6448 074010   005011                             CLR     (R1)                    ;CLEAR DATA AREA
6449 074012   000207                             RTS     PC                      ;RETURN
6450
6451
6452                                    ;+
6453                                    ;
6454                                    ;THIS ROUTINE PRINTS THE CONTENTS OF
6455                                    ;THE 256 BYTE MESSAGE BUFFER RETURNED BY THE
6456                                    ;TSV-05.
6457                                    ;
6458                                    ;INPUT:
6459                                    ;
6460                                    ;        RO      LOW ORDER ADDRESS OF MESSAGE BUFFER
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  6461                                  ;       R1      HIGH ORDER ADDRESS OF MESSAGE BUFFER
  6462                                  ;       NOTE: R1 IS IGNORED IF KTENABLE FLAG IS CLEAR
  6463                                  ;
  6464                                  ;
  6465                                  ;-
  6466
  6467 074014                           T38MBP:
  6468 074014                                   SAVREG                          ;SAVE THE REGISTERS
  6469 074020  010005                           MOV     R0,R5                   ;SAVE LOW ORDER ADDRESS
  6470 074022  005737  003134                   TST     KTENABLE                ;ADDRESS ABOVE 28K?
  6471 074026  001001                           BNE     910$                    ;BR IF YES
  6472 074030  005001                           CLR     R1                      ;SET HIGH ORDER ADDRESS TO 0
  6473 074032  010103                   910$:   MOV     R1,R3                   ;SAVE HIGH ORDER ADDRESS
  6474 074034  006100                           ROL     R0                      ;SHIFT BIT15 TO C BIT
  6475 074036  006101                           ROL     R1                      ;SHIFT TO HIGH ORDER FOR PRINTOUT
  6476 074040                                   PRINTX  #T38AS0,R1,R5           ;PRINT MESSAGE BUFFER ADDRESS
       074040  010546                                                                                   MOV     R5,-(SP)
       074042  010146                                                                                   MOV     R1,-(SP)
       074044  012746  074316                                                                           MOV     #T38AS0,-(SP)
       074050  012746  000003                                                                           MOV     #3,-(SP)
       074054  010600                                                                                   MOV     SP,R0
       074056  104415                                                                                   TRAP    C$PNTX
       074060  062706  000010                                                                           ADD     #10,SP
  6477 074064                                   PRINTX  #T38AS1                 ;PRINT HEADER FOR CONTENTS
       074064  012746  074363                                                                           MOV     #T38AS1,-(SP)
       074070  012746  000001                                                                           MOV     #1,-(SP)
       074074  010600                                                                                   MOV     SP,R0
       074076  104415                                                                                   TRAP    C$PNTX
       074100  062706  000004                                                                           ADD     #4,SP
  6478 074104  010501                           MOV     R5,R1                   ;COPY LOW ORDER ADDRESS
  6479 074106  010300                           MOV     R3,R0                   ;COPY HIGH ORDER ADDRESS
  6480 074110  001403                           BEQ     913$                    ;BR IF NOT ABOVE 28K
  6481 074112  004737  017316                   JSR     PC,SETMAP               ;SETUP PAR ADDRESS IN R0
  6482 074116  010005                           MOV     R0,R5                   ;GET PAR FORMAT ADDRESS ABOVE 28K
  6483 074120  010537  074464           913$:   MOV     R5,T38CNT               ;HOLD ADDRESS
  6484 074124  011504                   911$:   MOV     (R5),R4                 ;GET BUFFER ENTRY
  6485 074126  022704  125252                   CMP     #125252,R4              ;CHECK FOR NO LOAD CONDITION
  6486 074132  001417                           BEQ     912$                    ;BR, IF BUFFER WASN'T LOADED
  6487 074134  010403                           MOV     R4,R3                   ;MAKE COPY
  6488 074136  042704  170377                   BIC     #170377,R4              ;ONLY BITS 11,10,9 AND 8 ARE SAVED
  6489 074142  000241                           CLC                             ;CLEAR CARRY
  6490 074144  006004                           ROR     R4                      ;11 TO 10 BIT POSITION
  6491 074146  006004                           ROR     R4                      ;10 TO 9 BIT POSITION
  6492 074150  006004                           ROR     R4                      ;9 TO 8 BIT POSITON
  6493 074152  006004                           ROR     R4                      ;8 TO 7 BIT POSITION
  6494 074154  042703  177760                   BIC     #177760,R3              ;ONLY BITS 3,2,1 AND 0 ARE SAVED
  6495 074160  060403                           ADD     R4,R3                   ;"OR'EM TOGETHER
  6496 074162  010325                           MOV     R3,(R5)+                ;PUT BACK IN BUFFER
  6497 074164  020527  072122                   CMP     R5,#T38EB               ;END OF BUFFER YET
  6498 074170  001355                           BNE     911$                    ;BR, IF NOT AT END YET
  6499 074172  013705  074464           912$:   MOV     T38CNT,R5               ;PUT ADDRESS BACK
  6500 074176  012704  000001                   MOV     #1,R4                   ;START BYTE NUMBER AT ONE
  6501 074202                           915$:   PRINTX  #T38ASN,R4,(R5)+                ;PRT MEM BUFFER W/NEWLINE
       074202  012546                                                                                   MOV     (R5)+,-(SP)
       074204  010446                                                                                   MOV     R4,-(SP)
       074206  012746  074440                                                                           MOV     #T38ASN,-(SP)
       074212  012746  000003                                                                           MOV     #3,-(SP)
```

```
     074216  010600                                                                              MOV     SP,R0
     074220  104415                                                                              TRAP    C$PNTX
     074222  062706  000010                                                                      ADD     #10,SP
     074226  005037  074464                  CLR     T38CNT                  ;CLEAR COUNTER
     074232  000412                          BR      921$                    ;SKIP OTHER PRINT
     074234                          920$:   PRINTX  #T38ASC,R4,(R5)+        ;PRINT THE CONTENTS OF MEMORY BUFFER
     074234  012546                                                                              MOV     (R5)+,-(SP)
     074236  010446                                                                              MOV     R4,-(SP)
     074240  012746  074421                                                                      MOV     #T38ASC,-(SP)
     074244  012746  000003                                                                      MOV     #3,-(SP)
     074250  010600                                                                              MOV     SP,R0
     074252  104415                                                                              TRAP    C$PNTX
     074254  062706  000010                                                                      ADD     #10,SP
     074260  005237  074464          921$:   INC     T38CNT                  ;BUMP COUNTER
     074264  005204                          INC     R4              ;NUMBER OF THE NEXT
     074266  020427  000200                  CMP     R4,#128.                ;DONE ALL YET ?
     074272  003010                          BGT     50$             ;BRANCH IF ALL DONE
     074274  023727  074464  000004          CMP     T38CNT,#4               ;DONE FOUR YET
     074302  001401                          BEQ     925$                    ;BR, IF THREE DONE
     074304  000753                          BR      920$            ;KEEP GOING
     074306  005037  074464          925$:   CLR     T38CNT                  ;CLEAR COUNTER
     074312  000733                          BR      915$                    ;PRINT WITH NEW LINE
     074314  000207                  50$:    RTS     PC              ;RETURN

     074316     045     116     045  T38AS0: .ASCIZ  '%N%A Message Buffer Address = %O1%O5'
     074363     045     116     045  T38AS1: .ASCIZ  '%N%A Message Buffer Contents:'
     074421     045     101     040  T38ASC: .ASCIZ  '%A  %D4%A: %O3'
     074440     045     116     045  T38ASN: .ASCIZ  '%N%A Byte%D4%A: %O3'
                                             .EVEN
     074464  000000                  T38CNT: .WORD                   ;COUNTER FOR PRINT
     074466                                  ENDTST
     074466                                                                      L10075:
     074466  104401                                                                              TRAP    C$ETST
                                             .SBTTL  TEST 11: CONFIGURATION TYPEOUT

                                     ;THIS IS A STANDALONE ROUTINE THAT PRINTS OUT ON THE CONSOLE TERMINAL
                                     ;THE CONFIGURATION OF THE M7196 MODULE AND TSV05 SUBSYSTEM. SPECIFICALLY,
                                     ;THE FOLLOWING INFORMATION IS PRESENTED:
                                     ;
                                     ;
                                     ; 1.0 STATE OF THE EXTENDED FEATURES SWITCH ON THE M7196: ON (EXTENDED
                                     ;     FEATURES ENABLED) OR OFF (EXTENDED FEATURES DISABLED).
                                     ;
                                     ; 2.0 STATE OF THE BUFFERING ENABLE SWITCH ON THE M7196: ON
                                     ;     (BUFFERING ENABLED) OR OFF (BUFFERING DISABLED).
                                     ;
                                     ; 3.0 MICROCODE REVSION LEVEL OF THE M7196.
                                     ;
                                     ; 4.0 NUMBER OF TAPE TRANSPORTS CONNECTED TO THE CONTROLLER.
                                     ;
                                     ; 5.0 UNIT SELECT CODE AND STATE (ONLINE/OFFLINE, WRITE ENABLED/PROTECTED)
                                     ;     OF EACH CONNECTED TRANSPORT. IN ADDITION, THE PROGRAM WILL INDICATE,
                                     ;     FOR EACH ON-LINE TRANSPORT, WHETHER OR NOT IT IS EQUIPPED WITH THE
                                     ;     EXTENDED TAPE STATUS READOUT FEATURE.
                                     ;
                                     ;
                                     ;THE OPERATOR IS EXPECTED TO READ THE PRINTOUT AND VERIFY THAT IT MATCHES
```

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                                        ;THE ACTUAL CONFIGURATION AT HAND.  IF, FOR EXAMPLE, THE PROGRAM INDICATES
                                        ;THAT IT "SEES" TWO TRANSPORTS CONNECTED WHEN IN FACT ONLY ONE IS PRESENT,
                                        ;THE OPERATOR MUST INTERPRET THIS AS AN ERROR AND ATTEMPT TO FIND THE
                                        ;CAUSE (BAD CABLE, FAULTY UNIT-SELECT DECODING IN THE TRANSPORT, ETC.).
                                        ;[SINCE THE CONTROLLER CAN ONLY ACCESS UNIT 0 IF IT IS IN "STANDARD"
                                        ;MODE, THE PROGRAM WILL FORCE THE MODULE INTO EXTENDED MODE VIA THE
                                        ;WRITE SUBSYSTEM MEMORY COMMAND IN ORDER TO SCAN FOR CONNECTED TRANSPORTS.]
                                        ;
                                        ;
                                        ;THIS ROUTINE, WHEN ITS ACTIONS ARE COMPLETED, WILL EXIT BACK TO THE
                                        ;DIAGNOSTIC SUPERVISOR SO THAT IF ADDITIONAL UNITS (CONTROLLERS) ARE
                                        ;SELECTED (E.G., FROM THE INITIAL STARTUP DIALOG), THE ROUTINE WILL BE
                                        ;REENTERED SO THAT THEIR CONFIGURATIONS CAN BE PRINTED.
                                        ;
074470                                          BGNTST
074470                                                                          T11::
074470                                          RFLAGS  R0                      ;GET OPERATOR FLAGS
074470  104421                                                                                  TRAP    C$RFLA
074472  001403                                  BEQ     10$                     ;BR, IF OK TO RUN
074474  012700  076463                          MOV     #T39NE,R0               ;"TEST NOT EXECUTED"
074500  000402                                  BR      11$                     ;JUMP OUT OF TEST IF NOT
074502  012700  077612                  10$:    MOV     #TST39ID,R0             ;TEST ID MESSAGE
074506  004737  016510                  11$:    JSR     PC,TSTSETUP             ;DO THE COMMON SETUP
074512  004737  020500                          JSR     PC,CHKMAN               ;IS MANUAL INTERVENTION ALLOWED?
074516  103402                                  BCS     20$                     ;BR, IF MANUAL INTERVENTION ALLOWED
074520  000137  075700                          JMP     64$                     ;JUMP TO OUT IF NOT
074524                                  20$:
074524  004737  015774                          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
074530  103405                                  BCS     25$                     ;BR IF SOFT INIT = OK
074532  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
074534                                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
074534  104455                                                                                  TRAP    C$ERDF
074536  002115                                                                                  .WORD   1101
074540  003652                                                                                  .WORD   SFIERR
074542  012034                                                                                  .WORD   SFIMSG
074544                                  25$:    CKLOOP                                  ;LOOP IF SELECTED
074544  104406                                                                                  TRAP    C$CLP1
074546  013737  002202  076430                  MOV     UNITN,T39DSW            ;SET UNIT NUMBER
074554  012704  076410                          MOV     #T39PK2,R4              ;SUBROUTINE NEEDS PACKET ADDRESS
074560  004737  010662                          JSR     PC,WRTCHR               ;ISSUE WRITE CHARACTERISTICS
074564  103405                                  BCS     50$                     ;BR, IF COMMAND ISSUED OK
074566  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
074570                                          ERRHRD  ERRNO,WRTMSG,SFIMSG     ;WRITE CHARACTERISTISC FAILED
074570  104456                                                                                  TRAP    C$ERHRD
074572  002116                                                                                  .WORD   1102
074574  005056                                                                                  .WORD   WRTMSG
074576  012034                                                                                  .WORD   SFIMSG
074600                                  50$:    CKLOOP                          ;LOOP IF SELECTED
074600  104406                                                                                  TRAP    C$CLP1
074602  013701  075740                          MOV     T39BFR+12,R1            ;GET XST2 STATUS FROM MESSAGE BUFFER
074606                                          PRINTX  #T39SFS                 ;"STATE OF EXTENDED FEATURES SW ="
074606  012746  077331                                                                          MOV     #T39SFS,-(SP)
074612  012746  000001                                                                          MOV     #1,-(SP)
074616  010600                                                                                  MOV     SP,R0
074620  104415                                                                                  TRAP    C$PNTX
074622  062706  000004                                                                          ADD     #4,SP
074626  032701  000200                          BIT     #BIT7,R1                ;CHECK STATE OF E.F.S.
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074632  001011                          BNE     100$                    ;BR, IF EXT. FEA. SW. IS ON
074634                                  PRINTX  #T39OFF                 ;" OFF"
074634  012746  077455                                                                                  MOV     #T39OFF,-(SP)
074640  012746  000001                                                                                  MOV     #1,-(SP)
074644  010600                                                                                          MOV     SP,R0
074646  104415                                                                                          TRAP    C$PNTX
074650  062706  000004                                                                                  ADD     #4,SP
074654  000410                          BR      110$                    ;SKIP OTHER PRINT STATEMENT
074656                          100$:   PRINTX  #T39ON                  ;" ON "
074656  012746  077464                                                                                  MOV     #T39ON,-(SP)
074662  012746  000001                                                                                  MOV     #1,-(SP)
074666  010600                                                                                          MOV     SP,R0
074670  104415                                                                                          TRAP    C$PNTX
074672  062706  000004                                                                                  ADD     #4,SP
074676                          110$:   PRINTX  #T39SBS                 ;"STATE OF BUFFERING SWITCH ="
074676  012746  077403                                                                                  MOV     #T39SBS,-(SP)
074702  012746  000001                                                                                  MOV     #1,-(SP)
074706  010600                                                                                          MOV     SP,R0
074710  104415                                                                                          TRAP    C$PNTX
074712  062706  000004                                                                                  ADD     #4,SP
074716  032701  000100                  BIT     #BIT6,R1                ;CHECK STATE OF BUFFERING SW
074722  001011                          BNE     120$                    ;BR, IF BUFFERING IS ON
074724                                  PRINTX  #T39OFF                 ;" OFF"
074724  012746  077455                                                                                  MOV     #T39OFF,-(SP)
074730  012746  000001                                                                                  MOV     #1,-(SP)
074734  010600                                                                                          MOV     SP,R0
074736  104415                                                                                          TRAP    C$PNTX
074740  062706  000004                                                                                  ADD     #4,SP
074744  000410                          BR      130$                    ;SKIP OTHER PRINT STATEMENT
074746                          120$:   PRINTX  #T39ON                  ;" ON "
074746  012746  077464                                                                                  MOV     #T39ON,-(SP)
074752  012746  000001                                                                                  MOV     #1,-(SP)
074756  010600                                                                                          MOV     SP,R0
074760  104415                                                                                          TRAP    C$PNTX
074762  062706  000004                                                                                  ADD     #4,SP
074766  042701  177700          130$:   BIC     #177700,R1              ;ONLY LEAVE MICROCODE REV LEVEL
074772  010137  077550                  MOV     R1,T39RL                ;LOAD UP REV LEVEL
074776                                  PRINTX  #T39MCL,T39RL           ;"MICROCODE REVISION LEVEL =000XXX"
074776  013746  077550                                                                                  MOV     T39RL,-(SP)
075002  012746  077473                                                                                  MOV     #T39MCL,-(SP)
075006  012746  000002                                                                                  MOV     #2,-(SP)
075012  010600                                                                                          MOV     SP,R0
075014  104415                                                                                          TRAP    C$PNTX
075016  062706  000006                                                                                  ADD     #6,SP
075022  004737  015774                  JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
075026  103405                          BCS     140$                    ;BR IF SOFT INIT = OK
075030  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
075032                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
075032  104455                                                                                          TRAP    C$ERDF
075034  002117                                                                                          .WORD   1103
075036  003652                                                                                          .WORD   SFIERR
075040  012034                                                                                          .WORD   SFIMSG
075042                          140$:   CKLOOP                                          ;LOOP IF SELECTED
075042  104406                                                                                          TRAP    C$CLP1
075044  013737  002202  076430          MOV     UNITN,T39DSW            ;SET UNIT NUMBER
075052  012704  076410                  MOV     #T39PK2,R4              ;SUBROUTINE NEEDS PACKET ADDRESS
075056  004737  010662                  JSR     PC,WRTCHR               ;ISSUE WRITE CHARACTERISTICS
```

K3

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6621 075062  103405                            BCS     150$                      ;BR, IF COMMAND ISSUED OK
6625 075064  010001                            MOV     R0,R1                     ;SAVE CONTENTS OF TSSR
6626 075066                                    ERRHRD  ERRNO,WRTMSG,SFIMSG       ;WRITE CHARACTERISTISC FAILED
     075066  104456                                                                                TRAP    C$ERHRD
     075070  002120                                                                                .WORD   1104
     075072  005056                                                                                .WORD   WRTMSG
     075074  012034                                                                                .WORD   SFIMSG
6627 075076                            150$:   CKLOOP                            ;LOOP IF SELECTED
     075076  104406                                                                                TRAP    C$CLP1
6628 075100  005737  002226                    TST     EXTFEA                    ;CHECK FOR EXTENDED FEATURES SW SWITCH
6629 075104  001036                            BNE     174$                      ;BR IF SWITCH IS ON
6630 075106  112737  000200  075721            MOVB    #200,T39BS1               ;WRITE MISCELLANEOUS CONT/READ STATUS
6631 075114  112737  000010  075720            MOVB    #10,T39BS0                ;FUNCTION SELECTION BIT (TURN ON EXTFEA HW SWITCH)
6632 075122  012704  075710                    MOV     #T39PACKET,R4             ;WRITE SUBSYS MEM PACKET
6633 075126  010465  000000                    MOV     R4,TSDB(R5)               ;ISSUE COMMAND
6634 075132  004737  016336                    JSR     PC,CHKTSSR                ;WAIT FOR SSR
6635 075136  103405                            BCS     160$                      ;BR, IF NO ERROR
6636 075140  010001                            MOV     R0,R1                     ;ERROR, SAVE TSSR
6640 075142                                    ERRHRD  ERRNO,T39NBA,PKTSSR       ;TSSR NOT CORRECT AFTER WRT. MISCELLANEOUS
     075142  104456                                                                                TRAP    C$ERHRD
     075144  002121                                                                                .WORD   1105
     075146  077165                                                                                .WORD   T39NBA
     075150  012046                                                                                .WORD   PKTSSR
6641 075152                            160$:   CKLOOP                            ;LOOP IF SELECTED
     075152  104406                                                                                TRAP    C$CLP1
6642 075154  012704  076410                    MOV     #T39PK2,R4                ;SUBROUTINE NEEDS PACKET ADDRESS
6643                                   ;*****************************************************************
6644                                   ;
6645                                   ;WRITE CHARACTERISTICS COMMAND (CALL TO WRTCHR)
6646                                   ;
6647                                   ;*****************************************************************
6648
6649 075160  004737  010662                    JSR     PC,WRTCHR                 ;ISSUE WRITE CHARACTERISTICS
6650 075164  103405                            BCS     170$                      ;BR, IF COMMAND ISSUED OK
6654 075166  010001                            MOV     R0,R1                     ;SAVE CONTENTS OF TSSR
6655 075170                                    ERRHRD  ERRNO,WRTMSG,SFIMSG       ;WRITE CHARACTERISTISC FAILED
     075170  104456                                                                                TRAP    C$ERHRD
     075172  002122                                                                                .WORD   1106
     075174  005056                                                                                .WORD   WRTMSG
     075176  012034                                                                                .WORD   SFIMSG
6656 075200                            170$:   CKLOOP                            ;SCOPE LOOP
     075200  104406                                                                                TRAP    C$CLP1
6657 075202  005037  002202            174$:   CLR     UNITN                     ;SET TO DRIVE 0
6658 075206  013737  002202  076430    175$:   MOV     UNITN,T39DSW              ;SET UNIT NUMBER
6659 075214  012704  076410                    MOV     #T39PK2,R4                ;SUBROUTINE NEEDS PACKET ADDRESS
6660 075220  004737  010662                    JSR     PC,WRTCHR                 ;ISSUE WRITE CHARACTERISTICS
6661 075224  103405                            BCS     180$                      ;BR, IF COMMAND ISSUED OK
6665 075226  010001                            MOV     R0,R1                     ;SAVE CONTENTS OF TSSR
6666 075230                                    ERRHRD  ERRNO,WRTMSG,SFIMSG       ;WRITE CHARACTERISTISC FAILED
     075230  104456                                                                                TRAP    C$ERHRD
     075232  002123                                                                                .WORD   1107
     075234  005056                                                                                .WORD   WRTMSG
     075236  012034                                                                                .WORD   SFIMSG
6667 075240                            180$:   CKLOOP                            ;LOOP IF SELECTED
     075240  104406                                                                                TRAP    C$CLP1
6668
6669 075242  016501  000002            190$:   MOV     TSSR(R5),R1               ;GET TSSR STATUS
```

L3

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6670 075246  032701  000100                  BIT     #OFL,R1               ;CHECK FOR OFF-LINE
6671 075252  001414                          BEQ     200$                  ;BR, IF DRIVE IS ON-LINE
6672 075254                                  PRINTX  #T39OF2,UNITN         ;"DRIVE NUMBER XX IS OFF-LINE"
     075254  013746  002202                                                                                   MOV     UNITN,-(SP)
     075260  012746  076724                                                                                   MOV     #T39OF2,-(SP)
     075264  012746  000002                                                                                   MOV     #2,-(SP)
     075270  010600                                                                                           MOV     SP,R0
     075272  104415                                                                                           TRAP    C$PNTX
     075274  062706  000006                                                                                   ADD     #6,SP
6673 075300  000137  075634                  JMP     250$                  ;DO NOT TRY TO GET ANYMORE INFO.
6674 075304                          200$:   PRINTX  #T39ON2,UNITN         ;"DRIVE NUMBER XX IS ON-LINE"
     075304  013746  002202                                                                                   MOV     UNITN,-(SP)
     075310  012746  076770                                                                                   MOV     #T39ON2,-(SP)
     075314  012746  000002                                                                                   MOV     #2,-(SP)
     075320  010600                                                                                           MOV     SP,R0
     075322  104415                                                                                           TRAP    C$PNTX
     075324  062706  000006                                                                                   ADD     #6,SP
6675 075330  013701  075734                  MOV     T39BFR+6,R1           ;READ EXTENDED STATUS (XST0)
6676 075334  032701  000004                  BIT     #BIT2,R1              ;IS DRIVE WTITE PROTECTED
6677 075340  001013                          BNE     210$                  ;BR, IF WRITE PROTECTED
6678 075342                                  PRINTX  #T39WPN,UNITN         ;"DRIVE NUMBER IS NOT WRT PRO"
     075342  013746  002202                                                                                   MOV     UNITN,-(SP)
     075346  012746  077106                                                                                   MOV     #T39WPN,-(SP)
     075352  012746  000002                                                                                   MOV     #2,-(SP)
     075356  010600                                                                                           MOV     SP,R0
     075360  104415                                                                                           TRAP    C$PNTX
     075362  062706  000006                                                                                   ADD     #6,SP
6679 075366  000412                          BR      220$                  ;SKIP OVER
6680 075370                          210$:   PRINTX  #T39WRT,UNITN         ;"DRIVE NUMBER XX IS WRT PRO"
     075370  013746  002202                                                                                   MOV     UNITN,-(SP)
     075374  012746  077033                                                                                   MOV     #T39WRT,-(SP)
     075400  012746  000002                                                                                   MOV     #2,-(SP)
     075404  010600                                                                                           MOV     SP,R0
     075406  104415                                                                                           TRAP    C$PNTX
     075410  062706  000006                                                                                   ADD     #6,SP
6681 075414  012737  125252  076026  220$:   MOV     #125252,T39BFR+100    ;SET 1 LOC TO KNOWN VALUE
6682 075422  112737  000000  075721          MOVB    #0,T39BS1             ;EXTENDED TAPE STATUS
6683 075430  112737  000024  075720          MOVB    #24,T39BS0            ;EXTENDED TAPE STATUS
6684 075436  012704  075710                  MOV     #T39PACKET,R4         ;WRITE SUBSYS MEM PACKET
6685 075442  010465  000000                  MOV     R4,TSDB(R5)           ;ISSUE COMMAND
6686 075446  012737  000144  075704          MOV     #100.,T39DLY          ;SET UP DELAY ROUTINE
6687 075454  004737  016250          222$:   JSR     PC,WAITF              ;WAIT AWHILE FOR SSR TO SET
6688 075460  016501  000002                  MOV     TSSR(R5),R1           ;SEE IF IT REALLY DID
6689 075464  032701  000200                  BIT     #SSR,R1               ;JUST CHECK THAT BIT
6690 075470  001017                          BNE     225$                  ;BR, IF SSR IS SET
6691 075472                                  DELAY   250                   ;DELAY ABOUT .25 SEC
     075472  012727  000250                                                                                   MOV     #250,(PC)+
     075476  000000                                                                                           .WORD   0
     075500  013727  002116                                                                                   MOV     L$DLY,(PC)+
     075504  000000                                                                                           .WORD   0
     075506  005367  177772                                                                                   DEC     -6(PC)
     075512  001375                                                                                           BNE     .-4
     075514  005367  177756                                                                                   DEC     -22(PC)
     075520  001367                                                                                           BNE     .-20
6692 075522  005337  075704                  DEC     T39DLY                ;START DELAY COUNT DOWN
6693 075526  001352                          BNE     222$                  ;BR, IF COUNTER IS NOT AT DONE
6694 075530  004737  016336          225$:   JSR     PC,CHKTSSR            ;WAIT FOR SSR
```

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 6695 075534  103405                                   BCS     230$                    ;BR, IF NO ERROR
 6696 075536  010001                                   MOV     R0,R1                   ;ERROR, SAVE TSSR
 6700 075540                                           ERRHRD  ERRNO,T39NBA,PKTSSR     ;TSSR NOT CORRECT AFTER WRT. MISCELLANEOUS
      075540  104456                                                                                           TRAP    C$ERHRD
      075542  002124                                                                                           .WORD   1108
      075544  077165                                                                                           .WORD   T39NBA
      075546  012046                                                                                           .WORD   PKTSSR
 6701 075550                                   230$:   CKLOOP                          ;LOOP IF SELECTED
      075550  104406                                                                                           TRAP    C$CLP1
 6702 075552  023727  076026  125252                   CMP     T39BFR+100,#125252      ;DID LOC GET OVER WRITTEN
 6703 075560  001013                                   BNE     240$                    ;BR, IF IT DIDN'T GET ETC.
 6704 075562                                           PRINTX  #T39ETN,UNITN           ;"DRIVE DOESN'T HAVE EXT TAPE STATUS
      075562  013746  002202                                                                                   MOV     UNITN,-(SP)
      075566  012746  076631                                                                                   MOV     #T39ETN,-(SP)
      075572  012746  000002                                                                                   MOV     #2,-(SP)
      075576  010600                                                                                           MOV     SP,R0
      075600  104415                                                                                           TRAP    C$PNTX
      075602  062706  000006                                                                                   ADD     #6,SP
 6705 075606  000412                                   BR      250$                    ;SKIP OVER
 6706 075610                                   240$:   PRINTX  #T39ETS,UNITN           ;"DRIVE HAS EXT TAPE STATUS"
      075610  013746  002202                                                                                   MOV     UNITN,-(SP)
      075614  012746  076542                                                                                   MOV     #T39ETS,-(SP)
      075620  012746  000002                                                                                   MOV     #2,-(SP)
      075624  010600                                                                                           MOV     SP,R0
      075626  104415                                                                                           TRAP    C$PNTX
      075630  062706  000006                                                                                   ADD     #6,SP
 6707 075634  005237  002202                   250$:   INC     UNITN                   ;BUMP DRIVE NUMBER
 6708 075640  023727  002202  000003                   CMP     UNITN,#3                ;AT END OF DRIVES YET
 6709 075646  001402                                   BEQ     63$                     ;BR, IF NO MORE DRIVES
 6710 075650  000137  075206                           JMP     175$                    ;DO NEXT DRIVE
 6711 075654                                   63$:    PRINTX  #T39NFL                         ;NEW LINE
      075654  012746  076460                                                                                   MOV     #T39NFL,-(SP)
      075660  012746  000001                                                                                   MOV     #1,-(SP)
      075664  010600                                                                                           MOV     SP,R0
      075666  104415                                                                                           TRAP    C$PNTX
      075670  062706  000004                                                                                   ADD     #4,SP
 6712 075674  000137  000200                           JMP     200                     ;RETURN TO SUPERVISOR
 6713 075700                                   64$:    EXIT    TST                     ;EXIT THIS SECTION
      075700  104432                                                                                           TRAP    C$EXIT
      075702  001736                                                                                           .WORD   L10076-.
 6714                                          ;+
 6715                                          ;LOCAL TEXT MESSAGES FOR TEST
 6716                                          ;-
 6717
 6718                                          ;LOCAL STORAGE FOR THIS TEST
 6719                                          ;-
 6720
 6721 075704  000000                           T39DLY: .WORD   0                               ;DELAY COUNTER FOR TEST
 6723         075710                                   .=<.+10>&177770
 6725 075710                                   T39PACKET:                              ;COMMAND PACKET FOR TEST
 6726 075710  140006                                   .WORD   140006                  ;WRITE SUBSYSTEM MEM. CMD.  ACK,CVC=1
 6727 075712  075720                                   .WORD   T39TAD                  ;ADDRESS OF CHARACTERISTICS BLOCK
 6728 075714  000000                                   .WORD   0
 6729 075716  000012                                   .WORD   10.                     ;STARTING VALUE OF BLOCK SIZE
 6730 075720                                   T39TAD:                         ;CHARACTERISTICS DATA BLOCK
 6731 075720     000                           T39BS0: .BYTE   0                       ;BSEL0 BYTE
 6732 075721     000                           T39BS1: .BYTE   0                       ;BSEL1 BYTE
```

```
075722  000000                   T39BS2: .WORD   0                               ;BSEL1 WORD
075724  000000                           .WORD   0                               ;DATA
075726                           T39BFR: .BLKW   150.                            ;MESSAGE BUFFER


        076410                           .=<.+10>&177770
076410                           T39PK2:                                         ;COMMAND PACKET FOR TEST
076410  140004                           .WORD   140004                          ;WRITE CHARA. MEM. CMND.,  ACK,CVC=1
076412  076420                           .WORD   T39DTA                          ;ADDRESS OF SELECT DATA BLOCK
076414  000000                           .WORD   0
076416  000012                           .WORD   10.                             ;STARTING VALUE OF BLOCK SIZE


076420                           T39DTA:                                         ;SELECT DATA BLOCK
076420  075726                           .WORD   T39BFR                          ;ADDRESS OF MESSAGE BUFFER
076422  000000                           .WORD   0
076424  000400                           .WORD   256.                            ;LENGTH OF MESSAGE BUFFER
076426  000000                   T39EAI: .WORD   0                               ;EAI BIT WORD
076430  000000                   T39DSW: .WORD   0                               ;DRIVE SELECT WORD ETC
        076440                           .=<.+10>&177770
076440  140012                   T39PK3: .WORD   140012                          ;MESSAGE BUFFER RELEASE COMMAND
076442  000000                           .WORD   0                               ;NOT USED
                                 ;
                                 ;WRITE TAPE PACKET
                                 ;
        076450                           .=<.+10>&177770
076450  140005                   T39PK4: .WORD   140005                          ;WRITE, ACK, CVC=1 COMMAND
076452  000000                   T39WR:  .WORD   0                               ;ADDRESS OF WRITE BUFFER
076454  000000                           .WORD   0                               ;MORE ADDRESS OF WRITE BUFFER
076456  000400                   T39SIZ: .WORD   256.                            ;SIZE OF RECORD




                                 ;+
                                 ;LOCAL TEXT MESSAGES FOR TEST
                                 ;-




076460     045     116     000   T39NFL: .ASCIZ  '%N'
076463     123     164     141   T39NE:  .ASCIZ  'Stand-alone Configuration Typeout Not Executed'
076542     045     116     045   T39ETS: .ASCIZ  '%N%A Extended Tape Status Availiable, Drive Number %D2'
076631     045     116     045   T39ETN: .ASCIZ  '%N%A Extended Tape Status NOT Availiable, Drive Number %D2'
076724     045     116     045   T39OF2: .ASCIZ  '%N%A Drive Number %D2%A Is Off-Line'
076770     045     116     045   T39ON2: .ASCIZ  '%N%A Drive Number %D2%A Is On-Line'
077033     045     116     045   T39WRT: .ASCIZ  '%N%A Drive Number %D2%A Is Write Protected'
077106     045     116     045   T39WPN: .ASCIZ  '%N%A Drive Number %D2%A Is NOT Write Protected'
077165     127     122     111   T39NBA: .ASCIZ  'WRITE SUBSYSTEM MEMORY Command Not Accepted'
077241     103     157     156   T39SSR: .ASCIZ  'Contents of TSSR Incorrect After WRITE SUBSYSTEM MEMORY'

077331     045     116     045   T39SFS: .ASCIZ  '%N%A State Of Extended Features Switch  ='
077403     045     116     045   T39SBS: .ASCIZ  '%N%A State Of Buffering Switch          ='
077455     045     101     040   T39OFF: .ASCIZ  '%A OFF'
077464     045     101     040   T39ON:  .ASCIZ  '%A ON '
077473     045     116     045   T39MCL: .ASCIZ  '%N%A M7196 Microcode Revision Level      =%O2'
```

```
                                                .EVEN
077550  000000                          T39RL:  .WORD   0
                                                .EVEN
                                                .EVEN


                                        ;+
                                        ;LOCAL STORAGE FOR THIS TEST
                                        ;-

077552  000000                          T39DAT: .WORD   0                       ;LOGICAL RESPONSE TO QUESTION
077554                                  T39REST:
077554                                          SAVREG                          ;SAVE THE REGISTERS
077560  012701  075710                          MOV     #T39PACKET,R1           ;START OF THE PACKET
077564  012721  140006                          MOV     #140006,(R1)+           ;WRITE SUBSYSTEM MEM. WITH ACK,CVC=1
077570  012721  075720                          MOV     #T39TAD,(R1)+           ;ADDRESS OF DATA BLOCK
077574  005021                                  CLR     (R1)+                   ;EXTENDED ADDRESS
077576  012721  000006                          MOV     #6.,(R1)+               ;SIZE OF DATA BLOCK IN BYTES
077602  005021                                  CLR     (R1)+                   ;CLEAR BSEL0 AND BSEL1
077604  005021                                  CLR     (R1)+                   ;CLEAR SEL2
077606  005011                                  CLR     (R1)                    ;CLEAR DATA AREA
077610  000207                                  RTS     PC                      ;RETURN

                                        ;+
                                        ;LOCAL TEXT MESSAGES FOR TEST
                                        ;-

077612     103     157     156          TST39ID:        .ASCIZ  'Configuration Typeout'
                                                .EVEN
077640                                          ENDTST
077640                                                                                  L10076:
077640  104401                                                                                  TRAP    C$ETST

                                                .SBTTL  TEST 12: SCOPE LOOPS



                                        ;+


                                        ;
                                        ;
                                        ;       THIS IS A STANDALONE ROUTINE PROVIDING A NUMBER OF TIGHT "SCOPE
                                        ;       LOOPS" USEFUL FOR DEBUGGING BASIC REGISTER ACCESS PROBLEMS WITH
                                        ;       THE M7196 MODULE.  THESE SCOPE LOOPS CAN BE USED WHEN THE NORMAL
                                        ;       "LOOP ON ERROR" OR "LOOP ON TEST (SUBTEST)" FACILITIES DON'T
                                        ;       SEEM TO ALLOW THE OPERATOR TO ZERO IN A PROBLEM IN THE EARLY
                                        ;       TESTS (I.E. THE HARDWARE MAY NOT BE RESPONDING TO A REGISTER
                                        ;       ACCESS, CAUSING A BUS ERROR TRAP, EVEN THOUGH THE DEVICE ADDRESS
                                        ;       SELECTED BY THE PROGRAM MATCHES THE CONFIGURATION SET UP IN THE
                                        ;       HARDWARE DIP SWITCHES).  THE FOLLOWING MENU OF SCOPE LOOPS ARE
                                        ;       AVAILABLE:
                                        ;
                                        ;               CODE    SCOPE LOOP
                                        ;
                                        ;                 0     HELP. PRINT THIS MENU.
                                        ;                 1     TSBA READ ACCESS
                                        ;                 2     TSSR READ ACCESS
                                        ;                 3     INITIALIZE (TSSR WRITE ACCESS)
                                        ;                 4     TSDB HIGH BYTE WRITE ACCESS
```

```
6851                                         ;                  5     TSDB LOW BYTE WRITE ACCESS
6852                                         ;                  6     TSDB MAINTENANCE-MODE WORD WRITE ACCESS
6853                                         ;                  7     TSDBX (TSSR HIGH BYTE) WRITE ACCESS
6854                                         ;                          (EXTENDED FEATURES SWITCH MUST BE ON
6855                                         ;                            TO USE SELECTION CODE 7)
6856                                         ;                  8     EXIT (RETURN TO SUPERVISOR)
6857                                         ;
6858                                         ;          FOR SCOPE LOOPS THAT WRITE INTO REGISTERS, THE PROGRAM PROMPTS
6859                                         ;          THE OPERATOR FOR THE DATA TO BE WRITTEN.  TYPING <RETURN> CAUSES
6860                                         ;          AN EXIT FROM THE SCOPE LOOP BACK TO MENU LEVEL.
6861                                         ;
6862                                         ;-
6863
6864
6865 077642                                          BGNTST
     077642                                                                              T12::
6870 077642                                          RFLAGS  R0                      ;GET OPERATOR FLAGS
     077642  104421                                                                              TRAP    C$RFLA
6871 077644  001403                                  BEQ     1$                      ;BR, IF OK TO RUN
6872 077646  012700  101235                          MOV     #T4ONE,R0               ;"TEST NOT EXECUTED"
6873 077652  000402                                  BR      100$                    ;JUST EXIT IF NOT
6874 077654  012700  101302                 1$:      MOV     #TST40ID,R0             ;TEST ID MESSAGE
6875 077660  004737  016510                 100$:    JSR     PC,TSTSETUP             ;DO THE COMMON SETUP
6876 077664  004737  020500                          JSR     PC,CHKMAN               ;SEE IF MANUAL INTERVENTION ALLOWED
6877 077670  103402                                  BCS     2$                      ;CARRY SET IF INTERVENTION ALLOWED
6878 077672  000137  100356                          JMP     64$                     ;EXIT IF NO MANUAL INTERVENTION
6879 077676  004737  015774                 2$:      JSR     PC,SOFINIT              ;DO A SOFT INIT
6880 077702  103405                                  BCS     5$                      ;BRANCH IF OK
6881 077704  010001                                  MOV     R0,R1                   ;CONTENTS OF TSSR REGISTER
6885 077706                                          ERRDF   ERRNO,SFIERR,SFIMSG     ;REPORT FATAL ERROR
     077706  104455                                                                              TRAP    C$ERDF
     077710  002261                                                                              .WORD   1201
     077712  003652                                                                              .WORD   SFIERR
     077714  012034                                                                              .WORD   SFIMSG
6886 077716  012700  100374                 5$:      MOV     #SCMENU,R0              ;MENU OF SCOPE LOOP SELECTIONS
6887 077722  012701  000010                          MOV     #8.,R1                  ;MAXIMUM ALLOWED SELECTION
6888 077726  004737  020256                          JSR     PC,GETSEL               ;GO GET THE OPERATORS SELECTION
6889 077732  005700                                  TST     R0                      ;WAS ZERO SPECIFIED ?
6890 077734  001760                                  BEQ     2$                      ;REPEAT MENU IF YES.
6891 077736  020027  000007                          CMP     R0,#7                   ;EXTENDED TSSR ?
6892 077742  001015                                  BNE     3$                      ;BRANCH IF NOT
6893 077744  005737  002226                          TST     EXTFEA                          ;CHECK FOR EXTENDED FEATURES SET
6894 077750  001012                                  BNE     3$                      ;BR, IF IT IS ON
6895 077752                                          PRINTF  #EXFMSG                 ;WARN OPERATOR EXTENDED FEATURES CLEAR
     077752  012746  101157                                                                      MOV     #EXFMSG,-(SP)
     077756  012746  000001                                                                      MOV     #1,-(SP)
     077762  010600                                                                              MOV     SP,R0
     077764  104417                                                                              TRAP    C$PNTF
     077766  062706  000004                                                                      ADD     #4,SP
6896 077772  000137  077676                          JMP     2$                      ;GO BACK TO BASIC MENU
6897 077776  010004                         3$:      MOV     R0,R4                   ;SAVE THE MENU SELECTION
6898 100000                                          SETPRI  #PRI07                  ;RAISE THE PRIORITY
     100000  012700  000340                                                                      MOV     #PRI07,R0
     100004  104441                                                                              TRAP    C$SPRI
6899 100006  005037  100366                          CLR     TTION                   ;ASSUME INTERRUPTS ARE ENABLED
6900 100012  032737  000100  177560                  BIT     #100,@#TTICSR           ;ARE TTI INTERRUPTS ON ?
6901 100020  001005                                  BNE     4$                      ;BRANCH IF YES
```

```
 6902 100022  005237  100366                   INC     TTION                 ;FLAG SET IF INTERRUPTS OFF
 6903 100026  052737  000100  177560           BIS     #100,@#TTICSR         ;ENABLE INTERRUPTS
 6904 100034  012701  000060           4$:     MOV     #TTIVEC,R1            ;START OF TTI VECTORS
 6905 100040  011137  100370                   MOV     (R1),TVECSAV          ;SAVE THE CURRENT TTI VECTOR
 6906 100044  012721  100270                   MOV     #60$,(R1)+            ;SET NEW INTERRUPT ROUTINE
 6907 100050  011137  100372                   MOV     (R1),TPRISAV          ;SAVE THE VECTOR PRIORITY
 6908 100054  012711  000340                   MOV     #PRIO7,(R1)           ;USE PRIORITY SEVEN
 6909 100060                                   SETPRI  #PRIO0                ;LOWER INTERRUPT BR LEVEL
      100060  012700  000000                                                                   MOV     #PRIO0,R0
      100064  104441                                                                           TRAP    C$SPRI
 6910 100066  006304                           ASL     R4                    ;CONVERT TO WORD OFFSET
 6911 100070  000174  100074                   JMP     @6$(R4)               ;JUMP TO PROPER LOOP
 6912 100074  077676                   6$:     .WORD   2$                    ;RETYPE THE MENU
 6913 100076  100116                           .WORD   10$                   ;TSBA READ ACCESS
 6914 100100  100126                           .WORD   15$                   ;TSSR READ ACCESS
 6915 100102  100140                           .WORD   20$                   ;TSSR WRITE ACCESS
 6916 100104  100160                           .WORD   25$                   ;TSDB HIGH BYTE WRITE ACCESS
 6917 100106  100204                           .WORD   30$                   ;TSDB LOW BYTE WRITE ACCESS
 6918 100110  100230                           .WORD   35$                   ;TSDB MAINTENANCE MODE
 6919 100112  100250                           .WORD   40$                   ;TSDBX WRITE ACCESS
 6920 100114  100362                           .WORD   65$                   ;LEAVE THE TEST
 6921
 6922
 6923 100116  105065  000000           10$:    CLRB    TSDB(R5)              ;ENTER MAINTENANCE MODE
 6924 100122  011500                   12$:    MOV     (R5),R0               ;READ TSBA REGISTER
 6925 100124  000776                           BR      12$                   ;LOOP UNTIL HALTED
 6926
 6927
 6928 100126  012703  000002           15$:    MOV     #TSSR,R3              ;ADDRESS OF TSSR REGISTER
 6929 100132  060503                           ADD     R5,R3                 ;POINT TO TSV05'S REGISTERS
 6930 100134  011300                   18$:    MOV     (R3),R0               ;READ TSSR REGISTER
 6931 100136  000776                           BR      18$                   ;LOOP UNTIL STOPPED
 6932
 6933 100140  004737  020174           20$:    JSR     PC,GETPAT             ;READ THE DATA PATTERN
 6934 100144  010001                           MOV     R0,R1                 ;DATA PATTERN FOR LOOP
 6935 100146  012703  000002                   MOV     #TSSR,R3              ;ADDRESS OF TSSR
 6936 100152  060503                           ADD     R5,R3                 ;POINT TO TSV05'S REGISTERS
 6937 100154  010113                   22$:    MOV     R1,(R3)               ;WRITE DATA TO TSSR
 6938 100156  000776                           BR      22$                   ;LOOP
 6939
 6940
 6941 100160  105065  000000           25$:    CLRB    TSDB(R5)              ;ENTER MAINTENANCE MODE
 6942 100164  004737  020174                   JSR     PC,GETPAT             ;READ THE DATA PATTERN
 6943 100170  010001                           MOV     R0,R1                 ;DATA PATTERN FOR LOOP
 6944 100172  012703  000001                   MOV     #TSDBH,R3             ;ADDRESS OF HIGH BYTE OF TSDB
 6945 100176  060503                           ADD     R5,R3                 ;POINT TO TSV05'S REGISTERS
 6946 100200  110113                   27$:    MOVB    R1,(R3)               ;WRITE THE DATA TO TSDB, HIGH BYTE
 6947 100202  000776                           BR      27$                   ;LOOP UNTIL STOPPED
 6948
 6949
 6950 100204  105065  000000           30$:    CLRB    TSDB(R5)              ;ENTER MAINTENANCE MODE
 6951 100210  004737  020174                   JSR     PC,GETPAT             ;READ THE DATA PATTERN
 6952 100214  010001                           MOV     R0,R1                 ;DATA PATTERN FOR LOOP
 6953 100216  012703  000000                   MOV     #TSDB,R3              ;ADDRESS OF TSSR
 6954 100222  060503                           ADD     R5,R3                 ;POINT TO TSV05'S REGISTERS
 6955 100224  110113                   32$:    MOVB    R1,(R3)               ;WRITE DATA TO TSSR, LOW BYTE
 6956 100226  000776                           BR      32$                   ;LOOP UNTIL HALTED BY OPERATOR
```

```

100230  004737  020174          35$:    JSR     PC,GETPAT               ;READ THE DATA PATTERN
100234  010001                          MOV     R0,R1                   ;DATA PATTERN FOR LOOP
100236  012703  000000                  MOV     #TSDB,R3                ;SELECT TSDB
100242  060503                          ADD     R5,R3                   ;POINT TO TSV05'S REGISTERS
100244  010113                  37$:    MOV     R1,(R3)                 ;WRITE THE DATA PATTERN

100246  000776                          BR      37$                     ;LOOP UNTIL HALTED

100250  004737  020174          40$:    JSR     PC,GETPAT               ;READ THE DATA PATTERN
100254  010001                          MOV     R0,R1                   ;SAVE THE DATA PATTERN
100256  012703  000003                  MOV     #TSSRH,R3               ;BYTE ADDRESS OF TSSR, HIGH BYTE
100262  060503                          ADD     R5,R3                   ;POINT TO TSV05'S REGISTERS
100264  110113                  42$:    MOVB    R1,(R3)                 ;WRITE THE DATA TO REGISTER
100266  000776                          BR      42$                     ;LOOP UNTIL HALTED



                                ;+
                                ;PROCESS CONSOLE INTERRUPTS
                                ;-

100270  010046                  60$:    MOV     R0,-(SP)                ;SAVE WORK REGISTER
100272  113700  177562                  MOVB    @#TTIBFR,R0             ;GET THE OPERATOR INPUT
100276  042700  000200                  BIC     #200,R0                 ;STRIP OFF PARITY BIT
100302  122700  000015                  CMPB    #15,R0                  ;IS IT A CARRIAGE RETURN ?
100306  001021                          BNE     61$                     ;JUST EXIT IF NOT
100310  012766  077676  000002          MOV     #2$,2(SP)               ;RETURN TO MASTER MENU
100316  005066  000004                  CLR     4(SP)                   ;FORCE PRIORITY ZERO
100322  013737  100370  000060          MOV     TVECSAV,@#TTIVEC        ;RESTORE SUPERVISOR VECTOR
100330  013737  100372  000062          MOV     TPRISAV,@#TTIVEC+2      ;RESTORE SUPERVISOR PRIORITY
100336  005737  100366                  TST     TTION                   ;ARE SUPERVISOR INTERRUPTS ENABLED ?
100342  001403                          BEQ     61$                     ;BRANCH IF YES
100344  042737  000100  177560          BIC     #100,@#TTICSR           ;TURN OFF TTI INTERRUPTS
100352  012600                  61$:    MOV     (SP)+,R0                ;RESTORE REGISTER
100354  000002                          RTI                             ;RETURN FROM INTERUPT

100356                          64$:
100356                          63$:    EXIT    TST                     ;EXIT THE TEST
100356  104432                                                                          TRAP    C$EXIT
100360  000736                                                                          .WORD   L10077-.
100362  000137  000200          65$:    JMP     200                     ;RETURN TO SUPERVISOR

                                ;+
                                ;LOCAL STORAGE FOR THIS TEST
                                ;-

100366  000000                  TTION:          .WORD   0               ;WORD SET IF SUPERVISOR TTI INTER OFF
100370  000000                  TVECSAV:        .WORD   0               ;SAVE TTI VECTOR
100372  000000                  TPRISAV:        .WORD   0               ;SAVE TTI PRIORITY


                                ;+
                                ;MENU FOR OPERATOR INPUT FOR SCOPE LOOPS
                                ;-


                                        .EVEN
100374  100426  100501  100527  SCMENU: .WORD   1$,2$,3$,4$,5$,6$
```

```
100410  100700  100736  101004            .WORD    7$,8$,9$,10$,11$,12$,0


100426     012     123     105  1$:       .ASCIZ   <12>'SELECT SCOPE LOOP FROM FOLLOWING OPTIONS:'
100501     012     011     060  2$:       .ASCIZ   <12>'    0        Display This Menu'
100527     011     061     011  3$:       .ASCIZ   '        1        TSBA Read Access'
100553     011     062     011  4$:       .ASCIZ   '        2        TSSR Read Access'
100577     011     063     011  5$:       .ASCIZ   '        3        Initialize (TSSR Write Access)'
100641     011     064     011  6$:       .ASCIZ   '        4        TSDB High Byte Write Access'
100700     011     065     011  7$:       .ASCIZ   '        5        TSDB Low Byte Write Access'
100736     011     066     011  8$:       .ASCIZ   '        6        TSDB Maintenance Mode Write Access'
101004     011     067     011  9$:       .ASCIZ   '        7        TSDBX (TSSR High Byte) Write Access'
101053     011     070     011  10$:      .ASCIZ   '        8        Return to Diagnostic Supervisor'
101116     000                  11$:      .ASCIZ   ''
101117     124     171     160  12$:      .ASCIZ   'Type RETURN To Stop Scope Loops'
101157     045     116     045  EXFMSG:   .ASCIZ   '%N%A *** Extended Features Switch Not On *** '
101235     123     164     141  T4ONE:    .ASCIZ   'Stand-alone Scope Loops Not Executed'
101302     123     143     157  TST40ID:           .ASCIZ  'Scope Loops'
                                          .EVEN
101316                                    ENDTST
101316                                                                                   L10077:
101316  104401                                                                                     TRAP     C$ETST
101320                                    ENDMOD
```

```
                                                .TITLE  TSV6 - PARAMETER CODING



  101320                                        BGNMOD  TSV6
  101320                                TSV6::

                                                .SBTTL  HARDWARE PARAMETER CODING SECTION

                                        ;++
                                        ; THE HARDWARE PARAMETER CODING SECTION CONTAINS MACROS
                                        ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
                                        ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
                                        ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
                                        ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
                                        ; WITH THE OPERATOR.
                                        ;--
  101320                                        BGNHRD
  101320  000010                                .WORD L10100-L$HARD/2
  101322                                L$HARD::

  101322                                        GPRMA   HPM1,0,0,160010,177776,YES      ;GET TSBA/TSDB REGISTER ADDRESS.
  101322  000031                                .WORD   T$CODE
  101324  101342                                .WORD   HPM1
  101326  160010                                .WORD   T$LOLIM
  101330  177776                                .WORD   T$HILIM
  101332                                        GPRMA   HPM2,2,0,0,776,YES              ;GET VECTOR ADDRESS.
  101332  001031                                .WORD   T$CODE
  101334  101376                                .WORD   HPM2
  101336  000000                                .WORD   T$LOLIM
  101340  000776                                .WORD   T$HILIM
                                                ;GPRMD  HPM3,4,0,340,0,7,YES            ;GET INTERRUPT PRIORITY.
  101342                                        ENDHRD
                                                .EVEN
  101342                                L10100:
  101342     104       105       126    HPM1:   .ASCIZ  'DEVICE ADDRESS (TSBA/TSDB) '
  101376     111       116       124    HPM2:   .ASCIZ  'INTERRUPT VECTOR    '
  101422     111       116       124    HPM3:   .ASCIZ  'INTERRUPT PRIORITY      '
                                                .EVEN
```

```
                                           .SBTTL  SOFTWARE PARAMETER CODING SECTION

                                ;++
                                ; THE SOFTWARE PARAMETER CODING SECTION CONTAINS MACROS
                                ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
                                ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
                                ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
                                ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
                                ; WITH THE OPERATOR.
                                ;--
101452                                     BGNSFT
101452   000003                            .WORD L10101-L$SOFT/2
101454                          L$SOFT::
                                ;          GPRML   SPM1,0,-1,YES                        ; GET TRANSPORT TEST FLAG.
101454                                     GPRML   SPM4,2,-1,YES                        ; GET ITERATION CONTROL.
101454   001130                            .WORD   T$CODE
101456   101512                            .WORD   SPM4
101460   177777                            .WORD   -1
                                ;          GPRMD   SPM6,4,D,7777,0,7777,YES             ; GET LOCAL ERROR LIMIT
                                ;          GPRMD   SPM7,6,D,7777,0,7777,YES             ; GET GLOBAL ERROR LIMIT
101462                                     ENDSFT
                                           .EVEN
101462                          L10101:

101462      105     116     101 SPM1:      .ASCIZ  'ENABLE TRANSPORT TESTS '
101512      111     116     110 SPM4:      .ASCIZ  'INHIBIT ITERATIONS     '
101542      120     105     122 SPM6:      .ASCIZ  'PER TEST ERROR LIMIT   '
101572      120     105     122 SPM7:      .ASCIZ  'PER UNIT ERROR LIMIT   '
                                           .SBTTL  PATCH AREA

                                ;
                                ; FINALLY A GENEROUS PATCH AREA.
                                ;
                                ; AND AN ADJUSTMENT TO ACCOUNT FOR THE "LASTAD BIT7" HACK
                                ; DESCRIBED IN "SUPPRG.MEM" (FOR REV C).
                                ;

101622                          PATCH::

101622                                     .BLKW   32.

         102000                            .=.!377+1
102000                                     LASTAD              ;SET LAST USED ADDRESS.
                                           .EVEN
102000   000000                            .WORD   0
102002   000000                            .WORD   0
102004                          L$LAST::
102004                                     ENDMOD
         000001                            .END
```

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SYMBOL TABLE

ADDSSR  012126 G            C$AU  = 000052              DEVDRO  023332              FREEHI  003130              INTCPC  016150
ADR   = 000020 G            C$AUTO= 000061              DEVNRD  023251              FRESIZ  003126 G            INTFLA  016145
AMBTSS  006635              C$BRK = 000022              DEVNXR  023167              FUSI    004117              INTMAS  016144
ASSEMB= 000010              C$BSEG= 000004              DEVONL  023117              F$AU  = 000015              INTR    016216 G
A1716 = 000003              C$BSUB= 000002              DEVSUM  023062              F$AUTO= 000020              INTREC  002224 G
BADDAT  003156 G            C$CEFG= 000045              DFPTBL  002156 G            F$BGN = 000040              INTVEC  016146
BADSSR  015700 G            C$CLCK= 000062              DIAGMC= 000000              F$CLEA= 000007              INTX    004300
BDVPCR= 177520 G            C$CLEA= 000012              DICEB = 000001              F$DU  = 000016              INVERT  021142 G
BENBSW  002230 G            C$CLOS= 000035              DSBINT  016204              F$END = 000041              IOKCKI= 000200
BIE   = 040000              C$CLP1= 000006              DUAD12  004643              F$HARD= 000004              IOKSTP= 000001
BIT0  = 000001 G            C$CVEC= 000036              DUFLG   003112 G            F$HW  = 000013              IPRI    002212 G
BIT00 = 000001 G            C$DCLN= 000044              DUMMY   003062              F$INIT= 000006              ISR   = 000100 G
BIT01 = 000002 G            C$DODU= 000051              EF.CON= 000036 G            F$JMP = 000050              IVEC    002210 G
BIT02 = 000004 G            C$DRPT= 000024              EF.NEW= 000035 G            F$MOD = 000000              IXE   = 004000 G
BIT03 = 000010 G            C$DU  = 000053              EF.PWR= 000034 G            F$MSG = 000011              I$AU  = 000041
BIT04 = 000020 G            C$EDIT= 000003              EF.RES= 000037 G            F$PROT= 000021              I$AUTO= 000041
BIT05 = 000040 G            C$ERDF= 000055              EF.STA= 000040 G            F$PWR = 000017              I$CLN = 000041
BIT06 = 000100 G            C$ERHR= 000056              EMAXDU  016777              F$RPT = 000012              I$DU  = 000041
BIT07 = 000200 G            C$ERRO= 000060              EN    = 000000              F$SEG = 000003              I$HRD = 000041
BIT08 = 000400 G            C$ERSF= 000054              ENAINT  016152              F$SOFT= 000005              I$INIT= 000041
BIT09 = 001000 G            C$ERSO= 000057              ENVIRN  020630              F$SRV = 000010              I$MOD = 000041
BIT1  = 000002 G            C$ESCA= 000010              EPRTSW  002200 G            F$SUB = 000002              I$MSG = 000041
BIT10 = 002000 G            C$ESEG= 000005              EPRT1   006360              F$SW  = 000014              I$PROT= 000040
BIT11 = 004000 G            C$ESUB= 000003              EPRT2   006360              F$TEST= 000001              I$PTAB= 000041
BIT12 = 010000 G            C$ETST= 000001              ERCM    011733              GDDAT   003160 G            I$PWR = 000041
BIT13 = 020000 G            C$EXIT= 000032              ERRHI   002236 G            GERRMA  002174 G            I$RPT = 000041
BIT14 = 040000 G            C$GETB= 000026              ERRK    016756              GETPAT  020174 G            I$SEG = 000041
BIT15 = 100000 G            C$GETW= 000027              ERRLO   002240 G            GETSEL  020256 G            I$SETU= 000041
BIT2  = 000004 G            C$GMAN= 000043              ERRNO = 002261              G$CNTO= 000200              I$SFT = 000041
BIT3  = 000010 G            C$GPHR= 000042              ERRVEC= 000004 G            G$DELM= 000372              I$SRV = 000041
BIT4  = 000020 G            C$GPLO= 000030              ERTABE  003376              G$DISP= 000003              I$SUB = 000041
BIT5  = 000040 G            C$GPRI= 000040              ERTABL  003176              G$EXCP= 000400              I$TST = 000041
BIT6  = 000100 G            C$INIT= 000011              ESUM    016760              G$HILI= 000002              J$JMP = 000167
BIT7  = 000200 G            C$INLP= 000020              EVL   = 000004 G            G$LOLI= 000001              KIPAR0= 172340
BIT8  = 000400 G            C$MANI= 000050              EXBCNT= 000010              G$NO  = 000000              KIPAR1= 172342
BIT9  = 001000 G            C$MEM = 000031              EXFMSG  101157              G$OFFS= 000400              KIPAR2= 172344
BOE   = 000400 G            C$MSG = 000023              EXPBRE  015502 G            G$OFSI= 000376              KIPAR3= 172346
BRINIT  004457              C$OPEN= 000034              EXPD    002232 G            G$PRMA= 000001              KIPAR4= 172350
BSEL0 = 000000              C$PNTB= 000014              EXPGOT  004533              G$PRMD= 000002              KIPAR5= 172352
BSEL1 = 000001              C$PNTF= 000017              EXPGT2  004567              G$PRML= 000000              KIPAR6= 172354
CHKAMB  016044              C$PNTS= 000016              EXPMSG  002322 G            G$RADA= 000140              KIPAR7= 172356
CHKMAN  020500 G            C$PNTX= 000015              EXPREC  015474 G            G$RADB= 000000              KIPDR0= 172300
CHKTSS  016336              C$QIO = 000377              EXTA    005772              G$RADD= 000040              KIPDR1= 172302
CKDROP  017202              C$RDBU= 000007              EXTEND  005770              G$RADL= 000120              KIPDR2= 172304
CKEMAX  017102              C$REFG= 000047              EXTFEA  002226 G            G$RADO= 000020              KIPDR3= 172306
CKMSG   011360 G            C$RESE= 000033              E$END = 002100              G$XFER= 000004              KIPDR4= 172310
CKMSG2  011500 G            C$REVI= 000003              E$LOAD= 000035              G$YES = 000010              KIPDR5= 172312
CKRAM   011114 G            C$RFLA= 000021              FATERR= 000060              HIADDR= 001400              KIPDR6= 172314
CKRAM2  011224 G            C$RPT = 000025              FATFLG  002222 G            HOE   = 100000 G            KIPDR7= 172316
CMDPKT  021214 G            C$SEFG= 000046              FERCM   011722              HPM1    101342              KTENAB  003134 G
CMPMEM  017660              C$SPRI= 000041              FIFEXP  012170 G            HPM2    101376              KTFLG   003132 G
CONFIG  017250              C$SVEC= 000037              FIF1MS  012242              HPM3    101422              KTINIT  021010
COUNT   002310 G            C$TPRI= 000013              FIF2MS  012311              IBE   = 010000 G            KTOFF   017274
CSRADD  002206 G            DATA    002312 G            FILLME  017422              IDU   = 000040 G            KTON    017256
CTAB    003164 G            DATASC  020232              FNOINT  004215              IER   = 020000 G            LERRMA  002172 G
CTABE   003176 G            DEBUGM  011632              FORCER  002176 G            IFAULT  004256              LERRNO= 000000
CTABM   003164 G            DEVCNT  002220 G            FREE    003124 G            INCERK  017044              LISTAL= 000001
```

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SYMBOL TABLE

LOE   = 040000 G      L$UNIT  002012 G      L10071  056470        OFL   = 000100        PRMNO   002320 G
LOOPCN  002216 G      L10000  002164        L10072  057734        ONEFIL= 000000        PRMSGE  014552 G
LOOPCO  013126        L10001  002176        L10073  066624        O$APTS= 000000        PRMSG0  014732
LOOPFL  003162 G      L10002  005766        L10074  064764        O$AU  = 000001        PRMSG1  014777
LOT   = 000010 G      L10003  012044        L10075  074466        O$BGNR= 000001        PRMSG2  015035
L$ACP   002110 G      L10004  012062        L10076  077640        O$BGNS= 000001        PR0ASC  014420
L$APT   002036 G      L10005  012100        L10077  101316        O$DU  = 000001        PR1ASC  014465
L$AU    022306 G      L10006  012106        L10100  101342        O$ERRT= 000000        PST32W  003152 G
L$AUT   002070 G      L10007  012124        L10101  101462        O$GNSW= 000001        PUNIT   022240
L$AUTO  022512 G      L10010  012142        MEMADD  013754 G      O$POIN= 000001        PW.D11= 000021
L$CCP   002106 G      L10011  012166        MEMCK   021232 G      O$SETU= 000000        PW.D13= 000022
L$CLEA  022572 G      L10012  012240        MENASC  020447        PASRPT  022010        PW.D22= 000020
L$CO    002032 G      L10013  012410        MENERR  020374        PATCH   101622 G      PW.NOP= 000000
L$DEPO  002011 G      L10014  013124        MENRES  020476        PATDAT  020230        PW.NO1= 000023
L$DESC  003410 G      L10015  013752        MIMENU  073352        PC.ERA= 002400        PW.RDE= 000024
L$DESP  002076 G      L10016  013774        MMVEC = 000250        PC.IER= 002000        PW.RDR= 000001
L$DEVP  002060 G      L10017  015500        MSA.FR= 000006        PC.NOO= 001000        PW.RDS= 000005
L$DISP  002124 G      L10020  015506        MSA.NO= 000000        PC.REL= 000000        PW.RFI= 000003
L$DLY   002116 G      L10021  015514        MSA.NR= 000004        PC.REW= 000400        PW.WCT= 000006
L$DTP   002040 G      L10022  015526        MSA.VO= 000002        PKBCNT= 000006        PW.WFI= 000004
L$DTYP  002034 G      L10023  015550        MSGEXP  012144 G      PKHI  = 000004        PW.WFM= 000007
L$DU    022404 G      L10024  015576        MSGLOO  013064 G      PKLOW = 000002        PW.WMI= 000010
L$DUT   002072 G      L10025  015736        MSGSTA  012350 G      PKTADD  007554        PW.WNP= 000011
L$DVTY  003402 G      L10026  016246        MSGSUB  013742 G      PKTFRM  007516        PW.WTR= 000002
L$EF    002052 G      L10030  022236        MS.ATT= 000006        PKTGET  012064 G      P.ACK = 100000
L$ENVI  002044 G      L10031  022402        MS.EXT= 000200        PKTMES  012110 G      P.CMD = 000037
L$ETP   002102 G      L10032  022510        MS.RSD= 000001        PKTRAM  004745 G      P.CONT= 000012
L$EXP1  002046 G      L10033  022570        MS.RSF= 000020        PKTSSR  012046 G      P.CVC = 040000
L$EXP4  002064 G      L10034  022616        MS.RST= 000010        PNT   = 001000 G      P.FMT = 000140
L$EXP5  002066 G      L10035  023060        M8186   005554        PRAMPK  013776        P.FORM= 000011
L$HARD  101322 G      L10036  024364        M8189   005645        PRASC   014523        P.GETS= 000017
L$HIME  002120 G      L10037  026356        NBA   = 002000        PRBEXP  015470        P.IE  = 000200
L$HPCP  002016 G      L10040  024640        NEWPAS  021744        PRBMSG  015336        P.INIT= 000013
L$HPTP  002022 G      L10041  025104        NODEV   003114 G      PRBREC  015472        P.MODE= 007400
L$HW    002156 G      L10042  031752        NOEXTF  030146        PRBTOT  015423        P.OPP = 020000
L$ICP   002104 G      L10043  026732        NOINIT  004335        PRBYTE  015122 G      P.POSI= 000010
L$INIT  021512 G      L10044  027222        NOINTR  004221        PRI   = 002000 G      P.READ= 000001
L$LADP  002026 G      L10045  027520        NOITS   002170 G      PRIADD  010160        P.SWB = 010000
L$LAST  102004 G      L10046  030152        NOMAN   020534        PRIA0   010230        P.WRIT= 000005
L$LOAD  002100 G      L10047  034542        NOMEM   005460        PRIBX0  007612 G      P.WRTC= 000004
L$LUN   002074 G      L10050  032306        NP.IR = 000200        PRIEQU  010060        P.WRTS= 000006
L$MREV  002050 G      L10051  032700        NP.LOO= 000040        PRIPKT  007370 G      QVP     002204 G
L$NAME  002000 G      L10052  033306        NP.OUT= 000100        PRIRAM  010066        RAMASC  014156
L$PRIO  002042 G      L10053  040334        NP.WRP= 000020        PRITAD  010274        RAMDAT  002242 G
L$PROT  021502 G      L10054  035626        NSI     004152        PRITSS  006024        RAMERR  015510 G
L$PRT   002112 G      L10055  036560        NSINIT  004407        PRIT0   010356        RAMEXP  015530 G
L$REPP  002062 G      L10056  050446        NUL     004527        PRIT1   010421        RAMFOR  010116
L$REV   002010 G      L10057  040640        NULCR   004530        PRIXOR  007742 G      RAMSIZ  002302 G
L$RPT   022620 G      L10060  042050        NXM   = 004000        PRI00 = 000000 G      RAMTAD  015516 G
L$SOFT  101454 G      L10061  043410        NXMFLG  003136 G      PRI01 = 000040 G      RCVHIA  002304 G
L$SPC   002056 G      L10062  043766        NXMHI   003142 G      PRI02 = 000100 G      RCVLOA  002306 G
L$SPCP  002020 G      L10063  045240        NXMLO   003140 G      PRI03 = 000140 G      RDERR   005206
L$SPTP  002024 G      L10064  046304        NXMTST  021406        PRI04 = 000200 G      RECMSG  002466 G
L$STA   002030 G      L10065  051726        NXR     003740        PRI05 = 000240 G      RECV    002234 G
L$SW    002166 G      L10066  062554        NXRERR  005736 G      PRI06 = 000300 G      REGSAV  020140
L$TEST  002114 G      L10067  053732        NXRX    003777        PRI07 = 000340 G      RETERR  005372
L$TIML  002014 G      L10070  055220        NXTU    021756        PRMESS  014242        REWIND  011014 G
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K4

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SYMBOL TABLE

RMCHBE= 000167          S1.IID= 004000          TST40I  101302          T10     066626 G        T15BFR  033352
RMCHEN= 000200          S1.I1R= 020000          TSV2    002000 G        T11     074470 G        T15BF2  034040
RMMSGB= 000215          S1.I2R= 040000          TSV3    002176 G        T12     077642 G        T15BS0  034040
RMMSGE= 000234          S1.PAR= 100000          TSV4    021502 G        T12BFR  030242          T15BS1  034041
RMPKTB= 000201          S2.ATI= 000010          TSV5    023402 G        T12BKG  030717          T15DAT  033340
RMPKTE= 000210          S2.BTI= 000004          TSV6    101320 G        T12BLK  030274          T15L00  032004
RMR   = 010000          S2.DIM= 000200          TTIBFR= 177562 G        T12CHA  031710          T15PAC  033330
RWPACK  011110          S2.ILW= 000100          TTICSR= 177560 G        T12CKR  031470 G        T15PK2  034030
SC    = 100000          S2.INR= 000020          TTION   100366          T12CON  031276          T15RES  034432
SCE   = 020000          S2.OUT= 000040          TTION2  071414          T12DAT  030230          T15RT2  034504
SCHERR  005300          S2.UND= 000003          TTIVEC= 000060 G        T12DPR  031076          T15SSR  034046
SCME    005013          TBLEND= 003062 G        TVECSA  100370          T12GET  030456          T15S2   034042
SCMENU  100374          TCOASC  006476          TVSAV2  071416          T12HIA  030262          T15S3   034044
SDELAY  010660          TCOCOD  006676          T$ARGC= 000001          T12KT   030270          T16BEN  040220
SELASC  020442          TEMP1   003116 G        T$CODE= 001130          T12LOA  030264          T16BFR  040172
SELDAT= 000004          TEMP2   003120 G        T$ERRN= 002261          T12L00  026406          T16BFS  040212
SEL2  = 000002          TERCLS= 000016          T$EXCP= 000000          T12MSG  030621          T16CLR  040036
SETMAP  017316          TESTNO= 000014          T$FLAG= 000040          T12NIN  031005          T16DAT  040160
SETU    022042          TEXASC  006435          T$GMAN= 000000          T12NXM  031167          T16DT2  040230
SFFMSG  012102 G        TFCASC  006537          T$HILI= 000776          T12PAC  030220          T16D01  036612
SFHERR  003705          TIMEXP  015552 G        T$LAST= 000001          T12PAR  030266          T16D28  036614
SFIERR  003652          TIMSG0  015600          T$LOLI= 000000          T12SET  031646          T16D53  036616
SFIMSG  012034 G        TINERR  012021          T$LSYM= 010000          T12SWR  031600          T16D78  036620
SFPTBL  002166 G        TMPBFR  002632 G        T$LTNO= 000014          T12TBE  030426          T16LEN  037142
SIFLAG  003154 G        TNAM    016704          T$NEST= 177777          T12WRT  030532          T16L00  034562
SIMSG   011766          TPRISA  100372          T$NS0 = 000000          T121L0  026520          T16PAC  040150
SKIPT   003400          TPSAV2  071420          T$NS1 = 000005          T122L0  027054          T16PK2  040220
SOFINI  015774 G        TRANST  002166 G        T$NS2 = 000002          T123L0  027274          T16REJ  037254
SPACE   010466 G        TSBA  = 000000 G        T$NS3 = 000003          T124L0  027716          T16RES  037770
SPM1    101462          TSBAH = 000001 G        T$PTNU= 000000          T124TS  030272          T16SEX  040130
SPM4    101512          TSDB  = 000000 G        T$SAVL= 177777          T13BFR  024022          T16SRD  040062
SPM6    101542          TSDBH = 000001 G        T$SEGL= 177777          T13DAT  024010          T16SSR  036672
SPM7    101572          TSFCOD  007236          T$SEKO= 010000          T13L00  023420          T16TSB  037040
SR0   = 177572          TSREJ = 000006          T$SUBN= 000000          T13MEM  024115          T16T01  037371
SR1   = 177574          TSSDEF  006606          T$TAGL= 177777          T13NBA  024154          T16T28  037470
SR2   = 177576          TSSR  = 000002 G        T$TAGN= 010102          T13PAC  024000          T16T53  037570
SR3   = 172516          TSSRBI  003502 G        T$TEMP= 000000          T13RES  024316          T16T78  037670
SSR   = 000200          TSSRF0  006415          T$TEST= 000014          T13SSR  024227          T16WMI  040102
STATC0  012412          TSSRH = 000003 G        T$TSTM= 177777          T14BFR  025136          T162SS  036727
SVCGBL= 000000          TSSX    004020          T$TSTS= 000001          T14BS0  025130          T163SS  036773
SVCINS= 000000          TSTBLK  002752 G        T$$AU = 010031          T14BS1  025131          T17BEN  050322
SVCSUB= 000001          TSTCNT  002214 G        T$$AUT= 010033          T14BS2  025132          T17BFR  050202
SVCTAG= 000000          TSTEND  016720          T$$CLE= 010034          T14DAT  025130          T17BFS  050222
SVCTST= 000001          TSTFLA  002314 G        T$$DU = 010032          T14DTA  025550          T17CLE  050106
S$LSYM= 010000          TSTL00  016456 G        T$$HAR= 010100          T14L00  024404          T17CLR  047720
S0.IDB= 000010          TSTPTR  002316 G        T$$HW = 010000          T14NBA  025562          T17DAT  050170
S0.IFB= 000002          TSTSET  016510 G        T$$INI= 010030          T14NIN  026023          T17DT2  050340
S0.IFP= 000001          TST12I  030430          T$$MSG= 010025          T14PAC  025120          T17EXE  046464
S0.ILD= 000020          TST13I  024042          T$$PRO= 010027          T14PK2  025540          T17EXP  046342
S0.ION= 000040          TST14I  026201          T$$RPT= 010035          T14RES  026246          T17EXS  046362
S0.IRD= 000100          TST15I  034413          T$$SEG= 010000          T14RST  026304          T17L00  040364
S0.IRW= 000004          TST16I  036622          T$$SOF= 010101          T14SSR  025733          T17MSK  046336
S0.ISP= 000200          TST17I  046566          T$$SRV= 010026          T14TSB  026115          T17PAC  050160
S1.ICE= 002000          TST18I  051156          T$$SUB= 010074          T142RE  025636          T17PK2  050330
S1.IE0= 010000          TST19I  060142          T$$SW = 010001          T15AM2  034122          T17RFI  050066
S1.IFM= 001000          TST20I  065142          T$$TES= 010077          T15AM3  034223          T17RSF  047764
S1.IHE= 000400          TST39I  077612          T1      023402 G        T15AM4  034325          T17SET  050126
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SYMBOL TABLE

T17SNP  050006          T19SSR  060203          T3      026360 G        T39NBA  077165          WF.IED= 000010
T17SRD  047744          T19WCT  062102          T3BFLG  003150 G        T39NE   076463          WF.IER= 000004
T17SSR  046605          T19WFI  062046          T3.1    026406          T39NFL  076460          WF.IHI= 000200
T17WFD  046464          T19WFM  062122          T3.2    026746          T39OFF  077455          WF.IRE= 000040
T17WFI  050032          T19WST  061503          T3.3    027236          T39OF2  076724          WF.IWF= 000020
T171CM  047125          T191CM  060640          T3.4    027534          T39ON   077464          WF.IWR= 000100
T172CM  047207          T192CM  060722          T38ASC  074421          T39ON2  076770          WF.I3R= 000002
T172SS  046642          T192SS  060240          T38ASN  074440          T39PAC  075710          WF.I4R= 000001
T173CM  047303          T193CM  061016          T38AS0  074316          T39PK2  076410          WRTCHR  010662 G
T173SS  046706          T193SS  060304          T38AS1  074363          T39PK3  076440          WRTERR  005113
T174CM  047367          T194SS  060351          T38BFR  071446          T39PK4  076450          WRTMSG  005056
T174SS  046753          T195CM  061104          T38BS0  071440          T39RES  077554          WSMBK   021224 G
T175CM  047452          T195SS  060414          T38BS1  071441          T39RL   077550          XFERAS  015740
T175SS  047016          T196CM  061160          T38BS2  071442          T39SBS  077403          XNXM    016376
T176CM  047526          T196SS  060460          T38CNT  074464          T39SFS  077331          XORBFO  007674
T176SS  047062          T197CM  061243          T38DAT  073754          T39SIZ  076456          XORFOR  010012
T177CM  047634          T197SS  060523          T38DLY  071422          T39SSR  077241          XST0   = 000006 G
T18BFR  051662          T198CM  061331          T38DSW  072150          T39TAD  075720          XST1   = 000010 G
T18CMP  051363          T198SS  060572          T38DTA  072140          T39WPN  077106          XST2   = 000012 G
T18DAT  051650          T199CM  061420          T38EAI  072146          T39WR   076452          XST3   = 000014 G
T18DT2  051720          T2      024366 G        T38EB   072122          T39WRT  077033          XST4   = 000016 G
T18EXP  051126          T2.1    024404          T38ID   073325          T4      031754 G        XSOBOT= 000002
T18LOO  050466          T2.2    024654          T38INT  072716          T4.1    032004          XSOEOT= 000001
T18MSK  051122          T20BEN  066502          T38MBP  074014          T4.2    032310          XSOIE = 000040
T18PAC  051640          T20BFR  066362          T38MSG  073265          T4.3    032702          XSOILA= 000400
T18PK2  051710          T20BFS  066402          T38MS1  073126          T4ONE   101235          XSOILC= 001000
T18SET  051530          T20CLE  066274          T38MS2  073221          T5      034544 G        XSOLET= 020000
T18SMI  051506          T20CLR  066062          T38MS3  072265          T5.1    034562          XSOMOT= 000200
T18SRD  051466          T20CWP  065767          T38NBA  072552          T5.2    035642          XSONEF= 002000
T18SSR  051215          T20DAT  066350          T38NE   072210          T6      040336 G        XSOONL= 000100
T18XS   051152          T20DT2  066520          T38OFL  073002          T6.1    040364          XSOPED= 000010
T182SS  051252          T20EXE  065142          T38ONL  072746          T6.2    040654          XSORLL= 010000
T183SS  051316          T20EXP  065022          T38PAC  071430          T6.3    042064          XSORLS= 040000
T19BEN  062432          T20EXS  065042          T38PK2  072130          T6.4    043424          XSOTMK= 100000
T19BFC  057756          T20LOO  062574          T38PK3  072160          T6.5    044002          XSOVCK= 000020
T19BFR  062312          T20MSK  065016          T38PK4  072200          T6.6    045254          XSOWLE= 004000
T19BFS  062332          T20PAC  066340          T38RES  073756          T7      050450 G        XSOWLK= 000004
T19CLE  062160          T20PK2  066510          T38SIZ  072206          T8      051730 G        XXCOMM  003122 G
T19CLR  061714          T20RFI  066146          T38SSR  072626          T8.1    051746          X$ALWA= 000000
T19CNV  062224          T20RSF  065666          T38SST  073036          T8.2    053746          X$FALS= 000040
T19DAT  062300          T20SET  066314          T38TAD  071440          T8.3    055234          X$OFFS= 000400
T19DT2  062450          T20SEX  066256          T38WLE  072505          T8.4    056504          X$TRUE= 000020
T19EXE  060142          T20SRD  066106          T38WR   072202          T9      062556 G        X1.COR= 020000
T19EXP  060022          T20SSR  065171          T38WRL  072444          T9.1    062574          X1.DLT= 100000
T19EXS  060042          T20SWP  065557          T38WRT  072360          UAM    = 000200 G       X1.MBZ= 017375
T19LOO  051746          T20WFI  066166          T39BFR  075726          UNITN   002202 G        X1.RBP= 000400
T19MSK  060016          T20WFM  066222          T39BS0  075720          UNREC  = 000006         X1.SPA= 040000
T19PAC  062270          T20WMI  066242          T39BS1  075721          USI     004123          X1.UNC= 000002
T19PK2  062440          T20WNP  066126          T39BS2  075722          WAITF   016250 G        X2.BUF= 000100
T19PRE  057754          T202SS  065226          T39DAT  077552          WC.IFA= 000200          X2.EXT= 000200
T19RFI  062026          T203SS  065272          T39DLY  075704          WC.IFE= 000002          X2.OPM= 100000
T19RSF  061760          T204SS  065337          T39DSW  076430          WC.IGO= 000001          X2.RCE= 040000
T19RST  061610          T205SS  065402          T39DTA  076420          WC.IRE= 000010          X2.REV= 000077
T19SET  062200          T206SS  065446          T39EAI  076426          WC.IRW= 000004          X2.SPA= 035400
T19SEX  062142          T208SS  065511          T39ETN  076631          WC.IOT= 000100          X2.UNI= 000007
T19SNP  062002          T23A    003144 G        T39ETS  076542          WC.I1T= 000040          X2.WCF= 002000
T19SRD  061740          T23B    003146 G        T39MCL  077473          WC.I5R= 000020          X3.DCK= 000010
```

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X3.MBZ= 000006          X3.REV= 000040          X3.TRF= 000020          X4.MBZ= 017400          X4.TSM= 020000
X3.MDE= 177400          X3.RIB= 000001          X4.HSP= 100000          X4.RCE= 040000          X4.WRC= 000377
X3.OPI= 000100          X3.SPA= 000200

. ABS.  102004      000
        000000      001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  31032 WORDS  ( 122 PAGES)
DYNAMIC MEMORY:  20614 WORDS  ( 79 PAGES)
ELAPSED TIME:  00:46:12
CVTSBC,CVTSBC.LST/-SP=SVC/ML,TSV1B,TSV22B,TSV3B,TSV4,TSV55B,TSV6
.
```