TSV05 TSV05 CTRL LT1
CVTSABO

AH-T094B-MC
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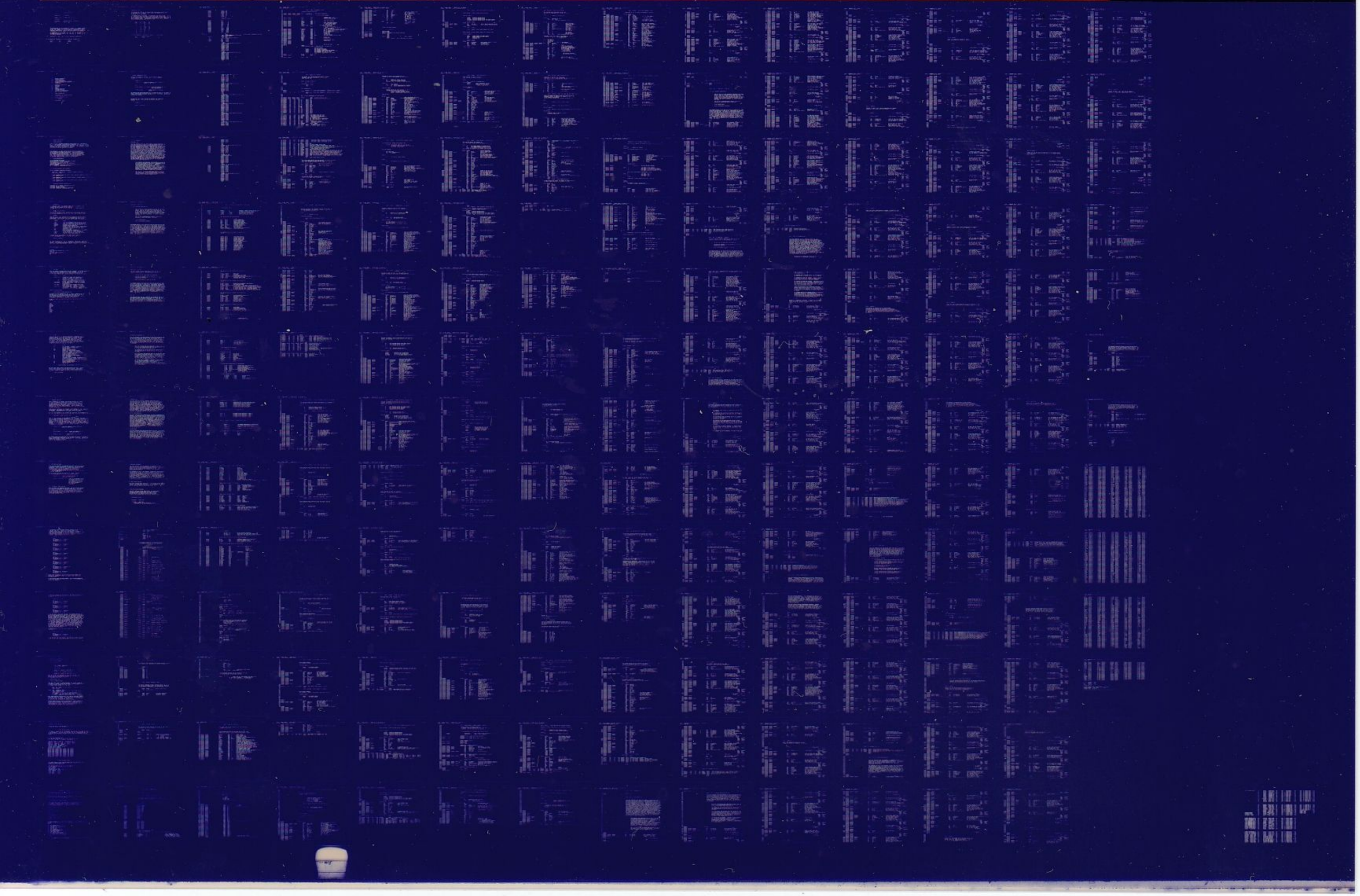

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IDENTIFICATION

PRODUCT ID: AC-T093B-MC

PRODUCT TITLE: CVTSABO TSV05 CTRL LT1

DECO/DEPO: 1.0

DEPARTMENT: COMPUTER SPECIAL SYSTEMS/PPG

DATE: JUNE 4, 1984

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1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

THIS IS A LSI-11 RESIDENT DIAGNOSTIC WHICH CHECKS THE FUNCTIONALITY OF A TSV05 MAGTAPE SUBSYSTEM WHILE CONNECTED TO A LSI-11/23 SYSTEM (QBUS). THE PROGRAM PROVIDES ERROR MESSAGES WHICH IDENTIFY FAILING FUNCTIONS THAT AID IN THE REPAIR OF THE DEVICE. THIS DIAGNOSTIC CONSIST OF ELEVEN TEST WHICH ARE EXECUTED IN SEQUENCE.

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

LSI-11 PROCESSOR AND MEMORY
CAUTION:DIAGNOSTIC REQUIRES 32K WORDS OF MEMORY
(28K USEABLE I.E. 4K FOR I/O PAGE)
TSV05 MAGTAPE SUBSYSTEM (DRIVE AND CONTROLLER)
CONSOLE TERMINAL
PDP-11 DIAGNOSTIC SUPERVISOR (MSAAA.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 1983

3. TSV05 TRANSPORT SUBSYSTEM TECHNICAL MANUAL; DOCUMENT NUMBER EK-TSV05-TM-001
   DATE: AUGUST 1983

4. TSV05 TRANSPORT SUBSYSTEM INSTALLATION MANUAL; DOCUMENT NUMBER EK-TSV05-IN 001
   DATE: AUGUST 1983

1.4 DIAGNOSTIC HIERARCY PREREQUISITES

FUNCTIONAL LSI-11 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 WOPK
PROPERLY OR FALSE ERRORS CAN BE REPORTED.
THE TAPE BEING USED ON THE TSO5 TRANSPORT IS A KNOWN GOOD REEL
OF TAPE.

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 LSI-11 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 VTSA??
DIAG. RUN-TIME SERVICES REV D. APR 79
CVTSA-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 LSI-11 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 (0) ?  8<CR>

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

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

UNIT 7
CSR ADDRESS (0) ?  160000<CR>
SUB-DEVICE # (0) ?  6,7<CR>
Q-FACTOR (0) 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 (0) ?  8<CR>

UNIT 1
CSR ADDRESS (0) ?  160000<CR>
SUB-DEVICE # (0) ?  0-7<CR>
Q-FACTOR (0) 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. TYPE "R NAME", WHERE NAME IS THE NAME OF THE BIN OR BIC FILE FOR THIS PROGRAM

3. TYPE "START"

4. ANSWER THE "CHANGE HW" QUESTION WITH "Y"

5. ANSWER ALL THE HARDWARE QUESTIONS

6. 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 ERROR 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 "IXE" 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
CVTSA 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 08: - DESIGNATOR <BIT #>
PARERR<15>  IEOT  <12>  IFMK  <9>  IRDY<6>  IRWD<2>
IRESV2<14>  IIDENT<11>  IHER  <8>  IONL<5>  IFBY<1>
IRESV1<13>  ICER  <10>  ISPEED<7>  ILDP<4>  IFPT<0>
 TAPE BUS SIGINALS IN WORD 09:
DATMIS<7>  ILW<6>  OUTRDY<5>  INRDY<4>
 MESSAGE BUFFER ADDRESS = 047352
 MESSAGE BUFFER CONTENTS:
WORD 00 EXPD: 100020  RECV: 100020  XOR: 000000
WORD 01 EXPD: 000012  RECV: 000012  XOR: 000000
WORD 02 EXPD: 000000  RECV: 000000  XOR: 000000
WORD 03 EXPD: 000010  RECV: 000010  XOR: 000000
WORD 04 EXPD: 000000  RECV: 000000  XOR: 000000
WORD 05 EXPD: 000000  RECV: 000000  XOR: 000000
WORD 06 EXPD: 000000  RECV: 000000  XOR: 000000
WORD 07 EXPD: 000000  RECV: 000000  XOR: 000000
WORD 08 EXPD: 070217  RECV: 070217  XOR: 000000
WORD 09 EXPD: 000074  RECV: 000034  XOR: 000040
```

ERROR MESSAGE EXAMPLE 2

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

```
CVTSA 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 0  = 140010
 PACKET WORD 0  = 000010
 PACKET WORD 0  = 00000C
 PACKET WORD 0  = 000024
```

ERROR MESSAGE EXAMPLE 3

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

```
CVTS M70 ERR 00121 ON UNIT 00 TST 001 SUB 002 PC: 023306
MOT BIT (XSTO) NOT SET DURING REWIND (EXTENDED FEATURES MODE)
 EXPD  OL0312 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 (LSI 11)

```
 DR>STA/FLA:PNT MOE

 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 TWO SWITCHES ON WHICH ARE "PRINT EACH TEST NBR AS EXECUTED AND "HALT ON ERROR".

```
TST: 001 INITIALIZE #1
TST: 002 WRAP DATA HIGH BYTE TEST
TST: 003 WRAP DATA LOW BYTE TEST
TST: 004 RAM TEST
TST: 005 INITIALIZE  2 TEST
TST: 006 COMMAND REJECT TEST
TST: 007 WRITE CHARACTREISTICS TEST
TST: 008 VOLUME CHECK
TST: 009 COMPLETION INTERRUPT TEST
TST: 010 BASIC PACKET PROTOCOL TEST
TST: 011 NON-TAPE-MOTION COMMANDS TEST

0 ERRORS
```

NOTE: THE DIAGNOSTIC WILL RUN CONTINUOSLY UNLESS A PASS NUMBER 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 LSI-11 PROCESSOR WITH A LA34 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 NUMBER	N/I SECS.	ITER SECS	DEF SECS.
1	1	30	29
2	1	10	9
3	1	8	7
4	25	120	95
5	5	140	135
6	25	475	450
7	20	20	0
8	1	10	9
9	20	20	0
10	1	2	1
11	8	11	3

THE TIMES REQUIRED TO RUN TESTS 1 THROUGH 12 IN ONE COMMAND:

Q.V.	1 MIN 57 SECONDS
DEFAULT	12 MINS

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  (0) 172520 ? <ENTER THE ADDRESS OF THE
                              TSBA/TSDB REGISTER>

VECTOR (0) 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) ?

INHIBIT ITERATIONS (L) N ?
```

6.0 TEST SUMMARIES

TEST 1: BUS RESET TEST

THIS TEST VERIFIES THAT THE M7196 MODULE'S DEVICE REGISTERS ARE ACCESSIBLE ON THE BUS (SUBTEST 1) AND THEN CHECKS THAT THE BUILT-IN INITIALIZATION SELF-TEST MICRODIAGNOSTIC DID NOT FIND ANY BASIC PROBLEMS IN THE MODULE. AREAS OF LOGIC TESTED BY THE SELF-TEST SEQUENCE ARE AS FOLLOWS: ROM AND PIPELINE REGISTER, SEQUENCER, INTERNAL BUSES, 2901 MICROPROCESSOR, AND, RAM. THIS TEST INITIALIZES THE CONTROLLER BY ISSUING THE BUS INIT SIGNAL VIA A RESET INSTRUCTION, OR BY WRITING INTO THE TSSR REGISTER, WAITS A PERIOD OF TIME (TO ALLOW THE CONTROLLER'S INITIALIZATION MICRODIAGNOSTIC SEQUENCE TO BE COMPLETED), AND THEN CHECKS THE CONTENTS OF THE TSSR REGISTER. SUCCESSFUL INITIALIZATION IS INDICATED BY SUBSYSTEM READY (SSR) AND NEED BUFFER ADDRESS (NBA) BITS BEING SET (1) AND ALL OTHER BITS (EXCEPT A17 AND A16 AND OFL, WHICH ARE IGNORED FOR THIS TEST) BEING CLEAR (0). IF THE CONTENTS OF TSSR ARE NOT AS EXPECTED, AN ERROR REPORT IS ISSUED LISTING THE EXPECTED DATA, ACTUAL DATA, AND THE DISCREPANCIES. THE ERROR REPORT ANALYZES THE TSSR CONTENTS AND DISCERNS AND REPORTS ONE OF THREE POSSIBILITIES:

1. TSSR CONTENTS ARE AMBIGUOUS (ANY OF BITS 11-14 ARE SET, OR STATES OF SSR AND SC BITS DO NOT CORRESPOND TO THE APPARENT ERROR CODE IN BITS 0-5): INDICATES THAT THE TSSR CONTENT CANNOT BE TRUSTED. INDICATES A CATASTROPHIC CONTROLLER MALFUNCTION. THIS IS A FATAL ERROR (EXECUTION IS ABORTED). FIELD ACTION WOULD BE TO REPLACE THE M7196. IF THE M7196 ITSELF IS BEING DEBUGGED, THE PROGRAM SHOULD BE RESTARTED WITH LOOP ON ERROR ENABLED IN ORDER TO PROBE FOR THE PROBLEM.

2. SSR = 0, SC = 0 AND THE ERROR CODE IN BITS 0-5 IS IN THE RANGE 17-13: THIS IS A FATAL ERROR. THE ERROR CODE IS DECODED AND THE APPROPRIATE DESCRIPTION GIVEN. INDICATES THAT A SERIOUS PROBLEM EXISTS.

TEST 2: WRAP DATA - HIGH BYTE

THIS TEST VERIFIES OPERATION OF:

1. PART OF THE LSI-11 BUS INTERFACE SECTION OF THE M7196 MODULE: PART OF THE INPUT FILE (TSDB HIGH BYTE), PART OF THE OUTPUT FILE (TSSR HIGH BYTE AND TSBA, BOTH BYTES), PART OF THE DC005 TRANSCEIVER CIRCUITS (ADDRESS DECODER, BDAL DRIVERS, HIGH BYTE OF INTERNAL DAL BUS DRIVERS), AND BASIC PROGRAMMED I/O CONTROL SEQUENCES AND LOGIC;
2. PART OF 2901 MICROPROCESSOR ELEMENTS (Q-REGISTER, REGISTER 0, ROTATE AND NEGATE FUNCTIONS
3. Y AND SOURCE BUSES;
4. BASIC MICROPROGRAM SEQUENCES.

THE PROGRAM WRITES A TEST DATA BYTE INTO THE HIGH BYTE OF TSDB, WAITS FOR THE SSR BIT IN TSSR TO SET, THEN CHECKS THE CONTENTS OF BOTH TSBA AND TSSR. THE MODULE IS FUNCTIONING CORRECTLY IF DATA WRITTEN APPEARS IN BOTH BYTES OF TSBA AND THE FINAL CONTENT OF TSSR IS CORRECT (SAME AS AFTER INITIALIZATION EXCEPT FOR BITS 8 AND 9, WHICH SHOULD CONTAIN BITS 8 AND 9 OF THE DATA PATTERN WRITTEN. AN ERROR IS REPORTED AND A DESCRIPTIVE ANALYSIS GIVEN IF A DISCREPANCY IN TSBA OR TSSR IS DETECTED. THE ANALYSIS LISTS LIKELY FAULTY CANDIDATES FROM THE LOGIC ELEMENTS LISTED ABOVE. THE TEST IS REPEATED FOR ALL COMBINATIONS OF TEST DATA BYTES (0-377 OCTAL).

TEST 3: WRAP DATA - LOW BYTE

THIS TEST FURTHER VERIFIES OPERATION OF MANY OF THE SAME ELEMENTS TESTED IN TEST 2, AND ADDITIONALLY VERIFIES:

1. LOW BYTE OF THE TSDB INPUT FILE REGISTER,
2. LOW BYTE OF INTERNAL DAL BUS DRIVERS ON THE DC005 TRANSCEIVER CIRCUITS,
3. BASIC FUNCTIONING OF PARTS OF THE RAM.

THE PROGRAM WRITES A TEST DATA BYTE INTO THE LOW BYTE OF TSDB, WAITS FOR THE SSR BIT IN TSSR TO SET, THEN CHECKS THE CONTENTS OF BOTH TSBA AND TSSR. THE MODULE IS FUNCTIONING CORRECTLY IF DATA WRITTEN APPEARS IN BOTH BYTES OF TSBA AND THE FINAL CONTENT OF TSSR IS CORRECT (SAME AS AFTER INITIALIZATION EXCEPT FOR BITS 8 AND 9, WHICH SHOULD CONTAIN BITS 8 AND 9 OF THE DATA PATTERN WRITTEN. AN ERROR IS REPORTED AND A DESCRIPTIVE ANALYSIS GIVEN IF A DISCREPANCY IN TSBA OR TSSR IS DETECTED. THE ANALYSIS LISTS LIKELY FAULTY CANDIDATES FROM THE LOGIC ELEMENTS LISTED ABOVE. THE TEST IS REPEATED FOR ALL COMBINATIONS OF TEST DATA BYTES (0-377 OCTAL).

TEST 4: RAM TEST

THIS TEST VERIFIES THAT ALL LOCATIONS OF THE RAM ON THE M7196 CAN PROPERLY STORE AND READ BACK ALL DATA PATTERNS, AND THAT EACH RAM LOCATION IS UNIQUELY ADDRESSED (I.E., THAT ONE AND ONLY ONE LOCATION IS ACCESSED BY ANY PARTICULAR ADDRESS). THE BYPRODUCT OF THESE TESTS IS A VERIFICATION OF TWO REGISTERS IN THE 2901 AND THE CAPABLITY OF THE 2901 TO CORRECTLY PERFORM AN ADD.

TEST 5: SECOND INITIALIZATION TEST

THIS TEST VERIFIES THE SAME ELEMENTS AS DID INITIALIZATION TEST #1 AND ALSO CHECKS THAT CERTAIN PARTS OF RAM IS CLEARED TO ZERO AND THAT 2901 REGISTERS 10 AND 11 ARE ALSO CLEARED TO ZERO. THIS IS A CONFIDENCE CHECK OF A PART OF THE SELF-TEST SEQUENCE (I.E., THAT IT IS REALLY BEING EXECUTED). FOR EACH OF TWO SUBTESTS (ONE FOR INITIALIZING VIA A BUS INIT, THE OTHER FOR INITIALIZING BY WRITING INTO THE TSSR), THE FOLLOWING SEQUENCE IS PERFORMED:

1. EACH RAM LOCATION AND 2901 REGISTERS 10 AND 11 ARE SET TO ALL 1'S BY USING WRITES INTO THE TSDB REGISTER (LOW BYTE AND MAINTENANCE MODE WORD WRITES).

2. THE CONTROLLER IS INITIALIZED AND THE VARIOUS CHECKS ON THE TSSR DESCRIBED IN INITIALIZATION TEST #1 ARE PERFORMED.

3. #1'S (377 OCTAL) ARE WRITTEN INTO THE LOW BYTE OF TSDB, WHICH SHOULD CAUSE RAM LOCATION 0 TO BE WRITTEN TO ALL 1'S SINCE 2901 REGISTERS 10 AND 11, SPECIFYING THE RAM ADDRESS, SHOULD BE 0. RAM LOCATION 0 IS VERIFIED BY WRITING A WORD OF ZEROS INTO THE TSDB. THE RESULTING LOW BYTE OF TSBA SHOULD CONTAIN ALL 1'S.

4. THE ENTIRE RAM IS SCANNED. LOCATION 0 SHOULD CONTAIN ALL 1'S AND THE REMAINING LOCATIONS, EXCEPT FOR THE MESSAGE BUFFER IMAGE AREA, SHOULD CONTAIN 0. DISCREPANCIES ARE REPORTED. AN ERROR AT THIS POINT IS MOST LIKELY DUE TO A ROM, PIPELINE OR SEQUENCER PROBLEM OR A TIMING PROBLEM.

TEST 6: COMMAND REJECT

THIS TEST VERIFIES THAT ALL COMMANDS OTHER THAN WRITE CHARACTERISTICS ARE REJECTED DUE TO THE NEED BUFFER ADDRESS (NBA) BIT BEING SET IN TSSR, AND THAT THE TSBA AND TSSR REGISTERS ARE LEFT IN THE PROPER STATE AFTER EACH COMMAND IS REJECTED. THIS TEST CHECKS MICROPROCESSOR SEQUENCING, BASIC COMMAND DECODING AND DATI DMA HANDLING. THIS TEST CONTAINS TWO SUBTESTS: SUBTEST 1 SEQUENCES THROUGH ALL COMMAND WORDS (OTHER THAN WRITE CHARACTERISTICS) WITH THE INTERRUPT ENABLE (IE) BIT CLEAR AND VERIFIES THAT AN INTERRUPT IS NOT GENERATED BY THE REJECTED COMMAND; SUBTEST 2 PERFORMS SIMILARLY TO SUBTEST 1 BUT SETS THE IE BIT IN EACH COMMAND WORD AND VERIFIES THAT AN INTERRUPT IS GENERATED WHEN THE COMMAND IS REJECTED.

TEST 7: WRITE CHARACTERISTICS

THIS TEST VERIFIES BASIC OPERATION OF THE WRITE CHARACTERISTICS COMMAND. IT VERIFIES THAT THE COMMAND BLOCK AND CHARACTERISTICS DATA BLOCK ARE FETCHED PROPERLY FROM CPU MEMORY, THE NEED BUFFER ADDRESS (NBA) BIT IN TSSR IS HANDLED PROPERLY, AND THAT A PROPER MESSAGE PACKET IS STORED, WHERE APPROPRIATE. THIS TEST DOES NOT CHECK THAT THE VARIOUS FUNCTIONS ENABLED BY CHARACTERISTIC MODE DATA BITS OPERATE PROPERLY; THE FUNCTIONING OF THESE BITS IS VERIFIED IN SUBSEQUENT TESTS. ALL COMMANDS EXECUTED IN THIS TEST HAVE THE INTERRUPT ENABLE (IE) BIT CLEARED TO ZERO, SO NO INTERRUPTS SHOULD BE GENERATED. HOWEVER, THE PROGRAM RUNS AT PROCESSOR PRIORITY 0, WITH THE INTERRUPT SERVICE ROUTINE SET UP TO FLAG UNEXPECTED INTERRUPTS. IF AN INTERRUPT OCCURS, A PROBLEM EXISTS IN EITHER THE LSI-11 BUS INTERFACE SECTION OR IN THE ROM OR PIPELINE.

TEST 8: VOLUME CHECK

THIS TEST VERIFIES THAT THE VOLUME CHECK (VCK) BIT, A FLAG HELD WITHIN THE M7196 AND APPEARING IN XSTO, IS SET BY INITIALIZE AND CLEARED BY EXECUTING A WRITE CHARACTERISTICS COMMAND WITH THE CVC BIT SET. IT IS ALSO VERIFIED THAT A WRITE CHARACTERISTICS COMMAND WITH THE CVC BIT CLEAR DOES NOT AFFECT THE STATE OF THE VOLUME CHECK BIT. THE ACTUAL FUNCTION OF VOLUME CHECK, THAT OF PREVENTING OR ALLOWING A TAPE MOTION COMMAND DEPENDING UPON WHETHER VOLUME CHECK IS SET OR CLEAR, IS NOT CHECKED BY THIS TEST; THIS FUNCTIONALITY IS CHECKED IN THE INDIVIDUAL TESTS OF TAPE MOTION COMMANDS.

TEST 9: COMPLETION INTERRUPT

THIS TEST VERIFIES THAT AN INTERRUPT IS GENERATED AT THE COMPLETION OF THE WRITE CHARACTERISTICS COMMAND IF THE INTERRUPT ENABLE (IE) BIT IN THE COMMAND HEADER WORD IS SET. THIS TEST CHECKS THE FUNCTIONING OF THE INTERRUPT LOGIC AND BASIC PROCESSING OF THE IE BIT.

THE SEQUENCES OF TEST 7 ARE REPEATED, EXCEPT THAT THE INTERRUPT SERVICE ROUTINE IS SET UP TO EXPECT INTERRUPTS AND EACH WRITE CHARACTERISTICS COMMAND IS ISSUED WITH THE IE BIT SET (1). IT IS VERIFIED, WHERE APPROPRIATE, THAT THE IE STATUS BIT IN XST0 OF ANY MESSAGE PACKET IS SET AND THAT A COMPLETION INTERRUPT IS GENERATED. FINALLY, A SEQUENCE OF TWO COMMANDS ARE ISSUED, THE FIRST WITH IE=1 AND THE SECOND WITH IE=0. IT IS VERIFIED THAT NO INTERRUPT IS GENERATED AFTER THE SECOND COMMAND AND THAT THE IE BIT IN XST0 IS 0.

TEST 10: BASIC PACKET PROTOCOL

THIS TEST VERIFIES BASIC OPERATION OF THE MESSAGE BUFFER RELEASE COMMAND, THE FUNCTION OF THE ACK BIT IN THE COMMAND HEADER WORD, AND THE REGISTER MODIFICATION REFUSED (RMR) LOGIC.

TEST 11: NON-TAPE MOTION COMMANDS

THIS TEST VERIFIES PROPER OPERATION OF THE INITIALIZE COMMAND. TWO SUBTESTS ARE USED. THE FIRST VERIFIES THAT THE COMMAND RUNS TO COMPLETION AND STORES A VALID MESSAGE PACKET. THE SECOND VERIFIES THAT NON-ZERO VALUES IN THE COMMAND MODE FIELD CAUSES COMMAND REJECT.

7.0 MAINTENANCE HISTORY

REVISION A - MARCH 1982

REVISION B - JUNE 1984
MINOR CHANGES FOR THE ORION CPU (11/??).
ELIMINATED THE MESSAGE DESCRIBING THE CPU TYPE.

```
                                        .TITLE  TSV2   PROGRAM HEADER
                                        .SBTTL  PROGRAM HEADER
 000000                                 .PSECT  ABS

                                        .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  CVTSA,8,0,655.,0
 002000                         L$NAME::                ;DIAGNOSTIC NAME
 002000     103                         .ASCII /C/
 002001     126                         .ASCII /V/
 002002     124                         .ASCII /T/
 002003     123                         .ASCII /S/
 002004     101                         .ASCII /A/
 002005     000                         .BYTE   0
 002006     000                         .BYTE   0
 002007     000                         .BYTE   0
 002010                         L$REV::                 ;REVISION LEVEL
 002010     102                         .ASCII  /B/
 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  045624                         .WORD   L$HARD
 002020                         L$SPCP::                ;POINTER TO S.W. QUES.
 002020  045756                         .WORD   L$SOFT
 002022                         L$HPTP::                ;PTR. TO DEF. H.W. PTABLE
 002022  002154                         .WORD   L$HW
 002024                         L$SPTP::                ;PTR. TO S.W. PTABLE
 002024  002164                         .WORD   L$SW
 002026                         L$LADP::                ;DIAG. END ADDRESS
 002026  046404                         .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
```

PROGRAM HEADER

```
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  000C00                  .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  003400                  .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$DESP::                ;POINTER TO DIAG. DESCRIPTION
002076  003406                  .WORD   L$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   .IT 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
32
33
```

PROGRAM HEADER

```
                                        .SBTTL  DISPATCH TABLE

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

                                        DISPATCH 11
002122  000013                          .WORD   11
002124                          L$DISPATCH::
002124  023402                          .WORD   T1
002126  023622                          .WORD   T2
002130  024320                          .WORD   T3
002132  025012                          .WORD   T4
002134  026346                          .WORD   T5
002136  027452                          .WORD   T6
002140  030724                          .WORD   T7
002142  034312                          .WORD   T8
002144  035216                          .WORD   T9
002146  040342                          .WORD   T10
002150  043454                          .WORD   T11


                                        .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.
                                ;-
002152                                  BGNHW   DFPTBL          ;DEFAULT HARD-P-TABLE
002152  000003                          .WORD   L10000-L$HW/2
002154                          L$HW::
002154                          DFPTBL::

002154  172520                          .WORD   172520          ; 1ST (OF 2) REGISTERS.
002156  000224                          .WORD   224             ; INTERRUPT VECTOR
002160  000200                          .WORD   PRI04           ; INTERRUPT PRIORITY.
002162                                  ENDHW
002162                          L10000:

```

SOFTWARE P TABLE

```
                                        .SBTTL  SOFTWARE P TABLE

                                ;++
                                ; THE SOFTWARE P-TABLE CONTAINS THE VALUES OF THE PROGRAM
                                ; PARAMETERS THAT CAN BE CHANGED BY THE OPERATOR.
                                ;-
002162                                  BGNSW   SFPTBL
002162  000004                         .WORD   L10001-L$SW/2
002164                          L$SW::
002164                          SFPTBL::

002164  000000                 TRANSTST::      .WORD   0       ; ENABLE TEST OF TRANSPORT(S) IF =1
002166  000000                 NOITS::         .WORD   0       ; INHIBIT ITERATION OPTION.
                                                               ; ... 0 = ITERATE.
                                                               ; ...NZ = INHIBIT ITERATE.
002170  000017                 LERRMAX::       .WORD   15.     ; LOCAL (PER TEST) ERROR LIMIT
002172  000310                 GERRMAX::       .WORD   200.    ; GLOBAL (PER UNIT) ERROR LIMIT
002174                                  ENDSW
002174                          L10001:

002174                                  ENDMOD
```

```
                                .TITLE  TSV3  GLOBAL AREAS
                                .SBTTL  GLOBAL EQUATES SECTION

                                BGNMOD  TSV3
                        TSV3::

                                 SBTTL  GLOBAL EQUATES SECTION


                        ;++
                        ; THE GLOBAL EQUATES SECTION CONTAINS PROGRAM EQUATES THAT
                        ; ARE USED IN MORE THAN ONE TEST.
                        ;

                                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
```

```
                        ;
                        PRI07== 340
                        PRI06== 300
                        PRI05== 240
                        PRI04== 200
                        PRI03== 140
                        PRI02== 100
                        PRI01== 40
                        PRI00== 0
                        ;
                        ;OPERATOR FLAG BITS
                        ;
                        EVL==        4
                        LOT==       10
                        ADR==       20
                        IDU==       40
                        ISR==      100
                        UAM==      200
                        BOE==      400
                        PNT==     1000
                        PRI==     2000
                        IXE==     4000
                        IBE==    10000
                        IER==    20000
                        LOE==    40000
                        HOE==   100000
33
34 002174                       KT11    ;;                      ;DEFINE MEMORY MANAGEMENT REGISTERS
                        .SBTTL  MEMORY MANAGEMENT DEFINITIONS
                        ;*KT11 VECTOR ADDRESS
                        MMVEC=  250
                        ;*KT11 STATUS REGISTER ADDRESSES
                        SR0=    177572
                        SR1=    177574
                        SR2=    177576
                        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
```

MEMORY MANAGEMENT DEFINITIONS

```
;*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                  XSOTMK= BIT15           ;TAPE MARK DETECTED
040000                  XSORLS= BIT14           ;RECORD LENGTH SHORT
020000                  XSOLET= BIT13           ;LOGICAL END OF TAPE
010000                  XSORLL= BIT12           ;RECORD LENGTH LONG
004000                  XSOWLE= BIT11           ;WRITE LOCK ERROR
002000                  XSONEF= BIT10           ;NON EXECUTABLE FUNCTION
001000                  XSOILC= BIT9            ;ILLEGAL COMMAND
000400                  XSOILA= BIT8            ;ILLEGAL ADDRESS
000200                  XSOMOT= BIT7            ;TAPE IN MOTION
000100                  XSOONL= BIT6            ;TRANSPORT ON LINE
000040                  XSOIE=  BIT5            ;INTERRUPT ENABLE
000020                  XSOVCK= BIT4            ;VOLUME CHECK BIT
000010                  XSOPED= BIT3            ;PHASE ENCODED DRIVE
000004                  XSOWLK= BIT2            ;WRITE LOCKED
000002                  XSOBOT= BIT1            ;BEGINNING OF TAPE
000001                  XSOEOT= 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 AUDRESS
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 DEFINTTIONS
                        ;
                        ;-

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.IOTAD        = 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                  S0.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.
                                ;

002174  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.
                        ;
002176  000000          EPRTSW::        .WORD   0       ;PRINT SWITCH
002200  000000          UNITN::         .WORD   0       ;UNIT # UNDER TEST.
002202  000000          QVP::           .WORD   0       ;QUICK VERIFY FLAG.
002204  000000          CSRADDR::       .WORD   0       ;ADDRESS OF CSR FOR CURRENT DEVICE
002206  000224          IVEC::          .WORD   224     ;INTERRUPT VECTOR
002210  000200          IPRI::          .WORD   PRI04   ;INTERRUPT PRIORITY.
002212  000000          TSTCNT::        .WORD   0       ;NUMBER OF TESTS RUN IN THIS PASS
002214  000000          LOOPCNT::       .WORD   0       ;REMAINING ITERATION COUNT FOR TEST
002216  000000          DEVCNT::        .WORD   0       ;NUMBER OF DEVICE UNDER TEST
002220  000000          FATFLG::        .WORD   0       ;SET IF FATAL ERROR IS DETECTED IN TEST
002222  000000          INTRECV::       .WORD   0       ;SET IF TAPE INTERRUPT WAS RECEIVED
002224  000000          EXTFEA::        .WORD   0       ;EXTENDED FEATURES SOFTWARE SW 0=OFF;1=ON
002226  000000          BENBSW::        .WORD   0       ;BUFFER ENABLE SWITCH SW 0=OFF;1=ON
002230  000000          EXPD::          .WORD   0       ;EXPECTED RAM DATA FOR PRAMPKT ROUTINE
002232  000000          RECV::          .WORD   0       ;RECEIVED RAM DATA FOR PRAMPKT ROUTINE
002234  000000          ERRHI::         .WORD   0       ;HIGH ADDRESS MEMORY ERROR
002236  000000          ERRLO::         .WORD   0       ;LOW ADDRESS MEMORY ERROR
002240                  RAMDATA::       .BLKW   16.     ;DATA READ FROM RAM PACKET OR MESSAGE BUF AREA
002300  000000          RAMSIZ::        .WORD   0       ;RAM DATA SIZE FOR PRAMPKT ROUTINE
002302  000000          RCVHIADD::      .WORD   0       ;RECEIVED BUFFER HIGH ADDRESS
002304  000000          RCVLOADD::      .WORD   0       ;RECEIVED BUFFER LOW ADDRESS
002306  000000          COUNT::         .WORD   0       ;TEST COUNT PATTERN
002310  000000          DATA::          .WORD   0       ;TEST DATA
002312  000000          TSTFLAG::       .WORD   0       ;TEST FLAG WORD
002314  000000          TSTPTR::        .WORD   0       ;TSTBLK POINTER
002316  000000          PRMNO::         .WORD   0       ;PRINT ROUTINE TEMP
002320                  EXPMSG::        .BLKB   100.    ;EXPECTED MESSAGE BUFFER DATA
002464                  RECMSG::        .BLKB   100.    ;RECEIVED MESSAGE BUFFER DATA
002630                  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
                                ;
                                ;-

002750                          TSTBLK::
002750  000000                          .WORD   0               ;ALL ZEROS
002752  177777                          .WORD   177777          ;ALL ONES
002754  000001                          .WORD   BIT0            ;DATA FOR WALKING ONES
002756  000002                          .WORD   BIT1
002760  000004                          .WORD   BIT2
002762  000010                          .WORD   BIT3
002764  000020                          .WORD   BIT4
002766  000040                          .WORD   BIT5
002770  000100                          .WORD   BIT6
002772  000200                          .WORD   BIT7
002774  000400                          .WORD   BIT8
002776  001000                          .WORD   BIT9
003000  002000                          .WORD   BIT10
003002  004000                          .WORD   BIT11
003004  010000                          .WORD   BIT12
003006  020000                          .WORD   BIT13
003010  040000                          .WORD   BIT14
003012  100000                          .WORD   BIT15
003014  177776                          .WORD   ^CBIT0          ;DATA FOR WALKING ZEROS
003016  177775                          .WORD   ^CBIT1
003020  177773                          .WORD   ^CBIT2
003022  177767                          .WORD   ^CBIT3
003024  177757                          .WORD   ^CBIT4
003026  177737                          .WORD   ^CBIT5
003030  177677                          .WORD   ^CBIT6
003032  177577                          .WORD   ^CBIT7
003034  177377                          .WORD   ^CBIT8
003036  176777                          .WORD   ^CBIT9
003040  175777                          .WORD   ^CBIT10
003042  173777                          .WORD   ^CBIT11
003044  167777                          .WORD   ^CBIT12
003046  157777                          .WORD   ^CBIT13
003050  137777                          .WORD   ^CBIT14
003052  077777                          .WORD   ^CBIT15
003054  125252                          .WORD   125252          ;ALTERNATING ONES, ZEROS
003056  052525                          .WORD   052525          ;ALTERNATING ONES, ZERO OPPOSITE FROM ABOVE
003060                          TBLEND::
```

```
                                        .SBTTL  GLOBAL ENVIRONMENT STORAGE
                                ;
                                ;STORAGE FOR DEVICE REGISTERS
                                ;
003060  000000  100000  000000 DUMMY:  0,100000,0,0     ;DUMMY DEVICE REGISTERS...
003070  000000  000000  000000         0,0,0,0,0,0,0,0
                                                        ;...FOR MULTI-UNIT CHECKOUT.

003110  000000                 DUFLG::         .WORD   0               ;"DROPPED UNIT" FLAG.
                                                                       ;INHIBITS CODE IN "CLEAN-UP".
003112  000000                 NODEV::         .WORD   0               ;FLAG TO SAY NO DEVICE.

003114  000000                 TEMP1::         .WORD   0               ;SOME TEMP LOCATIONS.
003116  000000                 TEMP2::         .WORD   0
003120  000000                 XXCOMM::        .WORD   0               ;XXDP+ COMM BLOCK POINTER.
003122  000000                 FREE::          .WORD   0               ;1ST FREE MEMORY ADDRESS...
003124  000000                 FRESIZ::        .WORD   0               ;...AND SIZE (IN WORDS).
003126  000000                 FREEHI: .WORD   0               ;LAST WORD IN FREE SPACE
003130  000000                 KTFLG::         .WORD   0               ;KT11, MEM AVAIL FLAG -
                                                                       ;- .WORD        0 = <24K OR NO KT
                                                                       ;- NZ = >24K AND KT.
003132  000000                 KTENABLE::      .WORD   0               ;SET BY TEST ROUTINES TO FLAG >28K UNDER TEST
003134  000000                 NXMFLG::        .WORD   0               ;SET IF WE CAN TEST CLEARED OTHERWISE
003136  000000                 NXMLO::         .WORD   0               ;NXM LO ADDRESS BITS
003140  000000                 NXMHI::         .WORD   0               ;NXM HI ADDRESS BITS FOR DAL'S 16-21
003142  000000                 T23A::          .WORD   0               ;11/23A FLAG
003144  000000                 T23B::          .WORD   0               ;11/23B FLAG
003146  000000                 T3BFLG::        .WORD   0               ;TEST 3B FLAG +0
003150  002000                 PST32W::        .WORD   2000            ;32W BLOCK ADDRESS FOR 32K START
003152  000000                 SIFLAG::        .WORD   0               ;
003154  000000                 BADDAT::        .WORD   0               ;ACTUAL DATA
003156  000000                 GDDAT::         .WORD   0               ;EXPECTED DATA
003160  000000                 LOOPFL::        .WORD   0
003162                         CTAB::                                  ;CONFIGURATION TABLES.
003162  000000                 CTABM::         .WORD   0               ;CONFIG WORK.
003164  000000                                 .WORD   0
003166  000000                                 .WORD   0
003170  000000                                 .WORD   0
003172  177777                                 .WORD   -1              ;END OF MEM TABLE.
003174                         CTASE::
                                ;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
                                ;
003174                         ERTABL:         .BLKW   64.
003374  000000                 ERTABE:         .WORD   0

003376  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
                                ;-
003400                                  DEVTYP  <TSV05>
003400                          L$DVTYP::
003400  124  123  126                    .ASCIZ  /TSV05/
                                        .EVEN

                                ;*
                                ;TEST DESCRIPTION
                                ;-
003406                                  DESCRIPT <**** TSV05 LOGIC DIAGNOSTIC - REPLACE M7196 IF ERROR ****>
003406                          L$DESC::
003406  052  052  052                    .ASCIZ  /**** TSV05 LOGIC DIAGNOSTIC - REPLACE M7196 IF ERROR ****/
                                        .EVEN

                                ;*
                                ;BIT TO ASCII CONVERSION FOR TSSR REGISTER
                                ;-
003500  003540  003543  003547  TSSRBIT::       .WORD   1$,2$,3$,4$,5$,6$,7$,8$
003520  003601  003605  003611                  .WORD   9$,10$,11$,12$,13$,14$,15$,16$
003540    123    103    000  1$:     .ASCIZ  'SC'
003543    102    111    105  2$:     .ASCIZ  'BIE'
003547    123    103    105  3$:     .ASCIZ  'SCE'
003553    122    115    122  4$:     .ASCIZ  'RMR'
003557    116    130    115  5$:     .ASCIZ  'NXM'
003563    116    102    101  6$:     .ASCIZ  'NBA'
003567    102    111    124  7$:     .ASCIZ  'BIT9'
003574    102    111    124  8$:     .ASCIZ  'BIT8'
003601    123    123    122  9$:     .ASCIZ  'SSR'
003605    117    106    114  10$:    .ASCIZ  'OFL'
003611    102    111    124  11$:    .ASCIZ  'BIT5'
003616    102    111    124  12$:    .ASCIZ  'BIT4'
003623    102    111    124  13$:    .ASCIZ  'BIT3'
003630    102    111    124  14$:    .ASCIZ  'BIT2'
003635    102    111    124  15$:    .ASCIZ  'BIT1'
003642    102    111    124  16$:    .ASCIZ  'BIT0'
                                        .EVEN
003650    124    123    123  SFIERR: .ASCIZ  'TSSR ERROR AFTER SOFT INIT'
003703    124    123    123  SFHERR: .ASCIZ  'TSSR ERROR AFTER BUS RESET'
003736    040    040    116  NXR:    .ASCIZ  /  NON-EXISTANT DEVICE REGISTER/
003775    045    101    040  NXRX:   .ASCIZ  /%A  ADDRESS: %O6/
004016    045    101    040  TSSX:   .ASCII  /%A  TSBA,TSSR EXP'D: %O6%A,%O6%N/
004056    045    101    040          .ASCIZ  /%A  TSBA,TSSR REC'D: %O6%A,%O6/
004115    045    116    045  FUSI:   .ASCII  /%N%A/
004121    040    040    125  USI:    .ASCIZ  /  UNEXPECTED INTERRUPT/
004150    040    040    111  NSI:    .ASCIZ  /  INTERRUPT EXPECTED, NOT RECEIVED/
004213    045    116    045  FNOINTR:        .ASCII  /%N%A/
004217    040    040    116  NOINTR: .ASCIZ  /  NO INTERRUPT WAS GENERATED/
004254    040    040    111  IFAULT: .ASCIZ  /  INTERRUPT FAULT/
004276    045    101    040  INTX:   .ASCIZ  /%A  CPU PC: %O6%A  TSBA: %O6/
```

```
                                040     040     042  NOINIT: .ASCIZ  /  "BUS-INIT" DIDN'T INITIALIZE CONTROLLER/
                                040     040     042  NSINIT: .ASCIZ  /  "SOFT-INIT" DIDN'T INITIALIZE THE DPU/
                                040     040     042  BRINIT: .ASCIZ  /  "BUS-RESET" DIDN'T INITIALIZE THE DPU/
                                000                  NUL:    .ASCIZ  //
                                045     116     000  NULCR:  .ASCIZ  /%N/
                                045     101     040  EXPGOT: .ASCIZ  /%A EXP'D: %O6%A, REC'D: %O6/
                                045     116     045  EXPGT2: .ASCIZ  /%N%A EXP'D: %O6%A, %O6%N%A REC'D: %O%A, %O6/
                                045     101     040  DUAD12: .ASCIZ  /%A REG(W) WRITTEN TO: %O6%A REG(R) READ: EXP'D: %O6%A, REC'D: %O6/
                                122     101     115  PKTRAM::        .ASCIZ  'RAM Contents Do Not Match Packet Sent'
                                040     040     103  SCME:   .ASCIZ  /  CONFIG DOESN'T MATCH MFG. MASTER/
                                127     122     111  WRTMSG: .ASCIZ  'WRITE CHARACTERISTICS Failed'
                                124     123     123  WRTERR: .ASCIZ  'TSSR Incorrect After WRITE Command, More Bits Set Than SSR'
                                124     123     123  RDERR:  .ASCIZ  'TSSR Incorrect After READ Command, More Bits Set Than SSR'
                                106     101     124  SCHERR: .ASCIZ  'FATAL ERROR IN SUBTEST - CHECK TAPE,CABLES,TRANSPORT etc.'
                                105     122     122  RETERR: .ASCIZ  'ERROR IN SUBTEST - WRITE DATA RETRY FIVE TIMES FAILED'
                                045     116     045  NOMEM:  .ASCIZ  '%N%A ***** NO NXM ADDRESS--CANNOT TEST NXM TIMEOUT. ******%N'
                                045     116     045  M8186:  .ASCIZ  '%N%A ****************** 11/23A SYSTEM ******************%N'
                                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.
                                                     ;--
005734                                               BGNMSG  NXRERR          ;NON-EXISTANT DEVICE REGISTER.
                                                     NXRERR::
005734                                               PRINTX  #NXRX,NODEV     ;NODEV = NEXM ADDRESS.
005734  013746  003112                               MOV     NODEV,-(SP)
005740  012746  003775                               MOV     #NXRX,-(SP)
005744  012746  000002                               MOV     #2,-(SP)
005750  010600                                       MOV     SP,R0
005752  104415                                       TRAP    C$PNTX
005754  062706  000006                               ADD     #6,SP
005760  004737  005766                               JSR     PC,EXTEND       ; PRINT EXTENSION IF REQUIRED.
005764                                               ENDMSG
005764                                           L10002:
005764  104423                                       TRAP    C$MSG
                                                     ;
                                                     ; THIS ROUTINE APPENDS A UNIQUE EXTENSION (IF REQUIRED)
                                                     ; TO ANY OF THE ABOVE ERROR SIGNATURES.
                                                     ;
005766  005727                                   EXTEND: TST     (PC)+
005770  000000                                   EXTA:   0                       ; 0 = NO EXTENSION.
005772  001402                                           BEQ     1$
005774  004777  177770                               JSR     PC,@EXTA        ; APPEND EXTENSION TEXT.
006000                                           1$:     PRINTX  #NULCR          ; PRINT A BLANK LINE
006000  012746  004526                               MOV     #NULCR,-(SP)
006004  012746  000001                               MOV     #1,-(SP)
006010  010600                                       MOV     SP,R0
006012  104415                                       TRAP    C$PNTX
006014  062706  000004                               ADD     #4,SP
006020  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
                        ;
                        ;

006022                  PRITSSR:
006022                          SAVREG                          ;SAVE GENERAL REGISTERS
006026  010104                  MOV     R1,R4                   ;SAVE THE TSSR CONTENTS
006030                          PRINTB  #TSSRFOR,R4             ;PRINT THE CONTENTS OF TSSR
006030  010446                  MOV     R4,-(SP)
006032  012746  006413          MOV     #TSSRFOR,-(SP)
006036  012746  000002          MOV     #2,-(SP)
006042  010600                  MOV     SP,R0
006044  104414                  TRAP    C$PNTB
006046  062706  000006          ADD     #6,SP
006052  010400                  MOV     R4,R0                   ;GET TSSR BACK FOR CHKAMB
006054  004737  016044          JSR     PC,CHKAMB               ;ARE CONTENTS AMBIGUOUS ?
006060  103410                  BCS     5$                      ;BRANCH IF NOT
006062                          PRINTX  #AMBTSSR                ;SHOW CONTENTS ARE AMBIGUOUS
006062  012746  006633          MOV     #AMBTSSR,-(SP)
006066  012746  000001          MOV     #1,-(SP)
006072  010600                  MOV     SP,R0
006074  104415                  TRAP    C$PNTX
006076  062706  000004          ADD     #4,SP
006102  010403          5$:     MOV     R4,R3                   ;CONTENTS OF TSSR
006104  042703  001476          BIC     #HIADDR!FATERR!TERCLS,R3        ;CLEAR ALL MULTIPLE BIT FIELDS
006110  001434                  BEQ     20$                     ;NO BITS ARE SET
006112  012702  002630          MOV     #TMPBFR,R2              ;TEMPORARY ASCII BUFFER
006116  012701  003500          MOV     #TSSRBIT,R1             ;ASCII EQUIVALENT OF BITS
006122  005703          10$:    TST     R3                      ;REMAINING BITS TO CONVERT
006124  001413                  BEQ     15$                     ;BRANCH WHEN ALL ARE DONE
006126  000241                  CLC                             ;CLEAR CARRY FOR SHIFT
006130  006103                  ROL     R3                      ;SHIFT NEXT BIT TO CARRY
006132  103006                  BCC     13$                     ;BRANCH IF BIT NOT SET
006134  011100                  MOV     (R1),R0                 ;POINTER TO BIT DEFINITION
006136  112022           1$:    MOVB    (R0)+,(R2)+             ;MOVE ASCIZ TO BUFFER
006140  001376                  BNE     11$                     ;MOVE ALL BITS
006142  112762  000054  177777  MOVB    #',,-1(R2)              ;INSERT A COMMA TO TERMINATE
006150  005721          13$:    TST     (R1)+                   ;POINT TO NEXT DESCRIPTION
006152  000763                  BR      10$                     ;GET THE REMAINING BITS
006154  105042          15$:    CLRB    -(R2)                   ;TERMINATE THE LINE
006156                          PRINTX  #TSSDEF,#TMPBFR         ;PRINT THE BIT DEFINITIONS
006156  012746  002630          MOV     #TMPBFR,-(SP)
006162  012746  006604          MOV     #TSSDEF,-(SP)
```

```
                006166  012746  000002                  MOV     #2,-(SP)
                006172  010600                          MOV     SP,R0
                006174  104415                          TRAP    C$PNTX
                006176  062706  000006                  ADD     #6,SP
          718
          719   006202  010403                  20$:    MOV     R4,R3           ;GET THE TSSR CONTENTS
          720   006204  042703  177761                  BIC     #^CTERCLS,R3    ;CLEAR ALL BUT TERMINATION
          721   006210  016303  006674                  MOV     TCOCOD(R3),R3   ;GET THE TERMINATION CODE MEANING
          722   006214                                  PRINTX  #TCOASC,R3      ;PRINT THE TERMINATION CODE
                006214  010346                          MOV     R3,-(SP)
                006216  012746  006474                  MOV     #TCOASC,-(SP)
                006222  012746  000002                  MOV     #2,-(SP)
                006226  010600                          MOV     SP,R0
                006230  104415                          TRAP    C$PNTX
                006232  062706  000006                  ADD     #6,SP
          723   006236  010403                          MOV     R4,R3           ;TSSR CONTENTS AGAIN
          724   006240  042703  177717                  BIC     #^CFATERR,R3    ;CLEAR ALL BUT FATAL TERMINATION
          725   006244  001416                          BEQ     25$             ;DON'T PRINT IF ZERO
          726   006246  006203                          ASR     R3
          727   006250  006203                          ASR     R3
          728   006252  006203                          ASR     R3              ;ALINE TERMINATION CODE FOR INDEX
          729   006254  016303  007234                  MOV     TSFCOD(R3),R3   ;GET THE FATAL TERMINATION CODE
          730   006260                                  PRINTX  #TFCASC,R3      ;PRINT THE FATAL TERMINATION CODE
                006260  010346                          MOV     R3,-(SP)
                006262  012746  006535                  MOV     #TFCASC,-(SP)
                006266  012746  000002                  MOV     #2,-(SP)
                006272  010600                          MOV     SP,R0
                006274  104415                          TRAP    C$PNTX
                006276  062706  000006                  ADD     #6,SP
          731   006302  042704  176377          25$:    BIC     #^CHIADDR,R4    ;CLEAR ALL BUT EXTENDED ADDRESS
          732   006306  001411                          BEQ     30$             ;DON'T PRINT IF ZERO
          733   006310                                  PRINTX  #TEXASC,R4      ;PRINT THE EXTENDED ADDRESS BITS
                006310  010446                          MOV     R4,-(SP)
                006312  012746  006433                  MOV     #TEXASC,-(SP)
                006316  012746  000002                  MOV     #2,-(SP)
                006322  010600                          MOV     SP,R0
                006324  104415                          TRAP    C$PNTX
                006326  062706  000006                  ADD     #6,SP
          734   006332  013703  002176          30$:    MOV     EPRTSW,R3               ;PRINT MEAASGE BUFFER ADDRESS
          735   006336                                  PRINTX  R3                      ;PRINT PROPER MESSAGE
                006336  010346                          MOV     R3,-(SP)
                006340  012746  000001                  MOV     #1,-(SP)
                006344  010600                          MOV     SP,R0
                006346  104415                          TRAP    C$PNTX
                006350  062706  000004                  ADD     #4,SP
          736   006354  000207                          RTS     PC              ;RETURN TO CALLER
```

```
                                        EPRT2:
                                EPRT1:  .ASCIZ  '%N%A *****REPLACE M7196*****'
                                TSSRFOR:        .ASCIZ  '%N%A TSSR = %O6'
                                TEXASC:         .ASCIZ  '%N%A Extended Address Bits = %O6'
                                TCOASC:         .ASCIZ  '%N%A Termination Class Code = %T'
                                TFCASC:         .ASCIZ  '%N%A Fatal Termination Class Code = %T
                                TSSDEF:         .ASCIZ  '%N%A TSSR Bits Set: %T'
                                AMBTSSR:        .ASCIZ  '%N%A TSSR Contents Are Ambiguous'
                                                .EVEN
006674  006714  006737  006765  TCOCOD: .WORD   1$,2$,3$,4$,5$,6$,7$,8$
006714    116     157     162  1$:     .ASCIZ  'Normal Termination'
006737    124     145     162  2$:     .ASCIZ  'Termination Condition'
006765    124     141     160  3$:     .ASCIZ  'Tape Status Alert'
007007    106     165     156  4$:     .ASCIZ  'Function Reject'
007027    122     145     143  5$:     .ASCIZ  'Recoverable Error - Tape Position One Record Down'
007111    122     145     143  6$:     .ASCIZ  'Recoverable Error - Tape Was Not Moved'
007160    125     156     162  7$:     .ASCIZ  'Unrecoverable Error'
007204    106     141     164  8$:     .ASCIZ  'Fatal Controller Error'
                                        .EVEN

007234  007244  007300  007311  TSFCOD: .WORD   1$,2$,3$,4$
007244    111     156     164  1$:     .ASCIZ  'Internal Diagnostic Failure'
007300    122     145     163  2$:     .ASCIZ  'Reserved'
007311    102     165     163  3$:     .ASCIZ  'Bus Interface or Sanity Check Error'
007355    122     145     163  4$:     .ASCIZ  'Reserved'
                                        .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.
                                ;-

007366                          PRIPKT::
007366                                  SAVREG                          ;SAVE THE REGISTERS
007372  010005                          MOV     R0,R5                   ;SAVE NO. OF WORDS IN PACKET
007374  005737  003132                  TST     KTENABLE                ;ABOVE 28K UNDER TEST?
007400  001001                          BNE     10$                     ;BR IF YES
007402  005003                          CLR     R3                      ;SET HIGH ORDER ADDRESS TO 0
007404  010301                  10$:    MOV     R3,R1                   ;COPY HIGH ORDER ADDRESS
007406  010400                          MOV     R4,R0                   ;GET LOWER ADDRESS
007410  006100                          ROL     R0                      ;SHIFT BIT 15 INTO C BIT
007412  006101                          ROL     R1                      ;AND INTO HIGH ORDER.
007414                                  PRINTB  #PKTADD,R1,R4           ;PRINT PACKET ADDRESS
007414  010446                          MOV     R4,-(SP)
007416  010146                          MOV     R1,-(SP)
007420  012746  007552                  MOV     #PKTADD,-(SP)
007424  012746  000003                  MOV     #3,-(SP)
007430  010600                          MOV     SP,R0
007432  104414                          TRAP    C$PNTB
007434  062706  000010                  ADD     #10,SP
007440  010300                  15$:    MOV     R3,R0                   ;GET HIGH ORDER ADDRESS
007442  001404                          BEQ     20$                     ;BR IF NOT ABOVE 28K.
007444  010401                          MOV     R4,R1                   ;GET LOW ORDER ADDRESS
007446  004737  017316                  JSR     PC,SETMAP               ;SETUP PAR6 MAPPING FOR 18 BIT ADDRESS
007452  010004                          MOV     R0,R4                   ;GET RETURNED PAR6 ADDRESS BIAS
007454  005001                  20$:    CLR     R1                      ;SAVE WORD NUMBER
007456  012402                  25$:    MOV     (R4)+,R2                ;GET PACKET CONTENTS
007460                                  PRINTB  #PKTFRM,R1,R2           ;PRINT THE DATA
007460  010246                          MOV     R2,-(SP)
007462  010146                          MOV     R1,-(SP)
007464  012746  007514                  MOV     #PKTFRM,-(SP)
007470  012746  000003                  MOV     #3,-(SP)
007474  010600                          MOV     SP,R0
007476  104414                          TRAP    C$PNTB
007500  062706  000010                  ADD     #10,SP
007504  005201                          INC     R1                      ;NEXT WORD NUMBER
007506  020105                          CMP     R1,R5                   ;DONE ALL PACKET WORDS?
007510  002762                          BLT     25$                     ;LOOP TILL ALL DONE
007512  000207                          RTS     PC                      ;RETURN

007514    045    116    045  PKTFRM: .ASCIZ  '%N%A Packet Word #%D1%A = %O6
007552    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
                                ;
                                PRIBXOR::
007610                                  SAVREG                          ;SAVE THE REGISTERS
007610  010203                          MOV     R2,R3                   ;EXPECTED DATA
007614                                  XOR     R1,R3                   ;FORM THE EXCLUSIVE OR
007616  012700  177400                  MOV     #^C<377>,R0             ;BYTE MASK
007626  040001                          BIC     R0,R1                   ;SAVE LOW BYTE RECV
007632  040002                          BIC     R0,R2                   ;SAVE LOW BYTE EXPD
007634  040003                          BIC     R0,R3                   ;SAVE LOW BYTE XOR
007636                                  PRINTB  #XORBFOR,R2,R1,R3 ;PRINT THE MESSAGE
007640  010346                          MOV     R3,-(SP)
007640  010146                          MOV     R1,-(SP)
007642  010246                          MOV     R2,-(SP)
007644  012746  007672                  MOV     #XORBFOR,-(SP)
007646  012746  000004                  MOV     #4,-(SP)
007652  010600                          MOV     SP,R0
007656  104414                          TRAP    C$PNTB
007660  062706  000012                  ADD     #12,SP
007662  010300                          MOV     R3,R0                   ;R0 HAS XOR ON RETURN
007666  000207                          RTS     PC                      ;RETURN TO CALLER
007670
007672      045     116     045 XORBFOR:        .ASCIZ  '%N%A EXPD: %03%A RECV: %03%A XOR: %03'
                                        .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
                                ;
                                ;-
                                PRIXOR::
007740                                  SAVREG                          ;SAVE THE REGISTERS
007740  010203                          MOV     R2,R3                   ;EXPECTED DATA
007744                                  XOR     R1,R3                   ;FORM THE EXCLUSIVE OR
007746                                  PRINTB  #XORFOR,R2,R1,R3 ;PRINT THE MESSAGE
007756
```

```
TSV3 - GLOBAL AREAS     MACRO M1113  14-JUN 84 15:15                                    SEQ 0048
PRIXOR  - PRINT EXPD, RECV AND XOR

        007756  010346                          MOV     R3,-(SP)
        007760  010146                          MOV     R1,-(SP)
        007762  010246                          MOV     R2,-(SP)
        007764  012746  010010                  MOV     #XORFOR,-(SP)
        007770  012746  000004                  MOV     #4,-(SP)
        007774  010600                          MOV     SP,R0
        007776  104414                          TRAP    C$PNTB
        010000  062706  000012                  ADD     #12,SP
    872 010004  010300                          MOV     R3,R0           ;R0 HAS XOR ON RETURN
    873 010006  000207                          RTS     PC              ;RETURN TO CALLER
    874
    875 010010     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
                                ;
                                ;-

010056                          PRIEQU:
                                        SAVREG                          ;SAVE THE REGISTERS
010062  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
                                ;
                                ;-
010064                          PRIRAM:
010064                                  SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
010070                                  PRINTB  @RAMFOR,R4              ;PRINT RAM ADDRESS IN ERROR
010070  010446                          MOV     R4,-(SP)
010072  012746  010114                  MOV     @RAMFOR,-(SP)
010076  012746  000002                  MOV     #2,-(SP)
010102  010600                          MOV     SP,R0
010104  104414                          TRAP    C$PNTB
010106  062706  000006                  ADD     #6,SP
010112  000207                          RTS     PC                      ;RETURN

010114     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
                ;
                ;
010156          PRIADD:
010156                  SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
010162  013700  002234          MOV     ERRHI,R0        ;GET HIGH ADDRESSS
010166  013701  002236          MOV     ERRLO,R1        ;GET LOW ADDRESS
010172  010102                  MOV     R1,R2           ;COPY LOW ADDRESS
010174  006101                  ROL     R1              ;SHIFT BIT 15 TO C BIT
010176  006100                  ROL     R0              ;SHIFT INTO HIGH ORDER
010200                          PRINTB  #PRIA0,R0,R2    ;PRINT MEMORY ADDRESS IN ERROR
010200  010246                  MOV     R2,-(SP)
010202  010046                  MOV     R0,-(SP)
010204  012746  010226          MOV     #PRIA0,-(SP)
010210  012746  000003          MOV     #3,-(SP)
010214  010600                  MOV     SP,R0
010216  104414                  TRAP    C$PNTB
010220  062706  000010          ADD     #10,SP
010224  000207                  RTS     PC              ;RETURN

010226      045     116     045 PRIA0:  .ASCIZ  '%N%A MEMORY ERROR ADDRESS = %01%05'
                                .EVEN

                        .SBTTL  PRITADD - PRINT 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
                ;
                ;-
010272          PRITADD:
010272                  SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
010276  013702  002234          MOV     ERRHI,R2        ;GET HIGH ADDRESSS
010302  013701  002236          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
010306                          PRINTB  #PRIT0,R1       ;PRINT MEMORY ADDRESS LOW IN ERROR
010306  010146                  MOV     R1,-(SP)
010310  012746  010354          MOV     #PRIT0,-(SP)
010314  012746  000002          MOV     #2,-(SP)
010320  010600                  MOV     SP,R0
010322  104414                  TRAP    C$PNTB
```

```
TSV3 - GLOBAL AREAS     MACRO M1113  14 JUN-84 15:15                                    SEQ 0051
PRITADD - PRINT MEMORY TEST ADDRESS

        010324  062706  000006                  ADD     #6,SP
    960 010330                                  PRINTB  #PRIT1,R2       ;PRINT MEMORY ADDRESS HIGH IN ERROR
        010330  010246                          MOV     R2,-(SP)
        010332  012746  010417                  MOV     #PRIT1,-(SP)
        010336  012746  000002                  MOV     #2,-(SP)
        010342  010600                          MOV     SP,R0
        010344  104414                          TRAP    C$PNTB
        010346  062706  000006                  ADD     #6,SP
    961 010352  000207                          RTS     PC              ;RETURN
    962
    963 010354     045     116     045  PRITO:  .ASCIZ  '<NB>A MEMORY TEST ADDRESS LOW = <06>
    964 010417     045     116     045  PRIT1:  .ASCIZ  '<NB>A MEMORY TEST ADDRESS HIGH = <06>'
    965                                         .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
                        ;
                        ;
                        ;       R0      THE CONTENTS OF R4 IS MOVED TO R0
                        ;
                        ;
                        ;IMPLICIT OUTPUT:
                        ;
                        ;       TAPE HAS BEEN MOVED
                        ;
                        ;SIDE EFFECTS:
                        ;
                        ;
                        ;
010464                  SPACE::
010464                          SAVREG                          ;SAVE THE GENERAL REGISTERS
010470  012737  000764  010660          MOV     #500.,SDELAY    ;SET UP DELAY
010476  012737  140010  010650          MOV     #140010,80$     ;SET UP COMMAND, SPACE FORWARD
010504  005703                          TST     R3              ;CHECK FOR DIRECTION
010506  100403                          BMI     5$              ;BR, IF REVERSE INDICATED
010510  010337  010652                  MOV     R3,90$          ;LOAD UP NUMBER OF RECORDS TO SPACE
010514  000407                          BR      10$             ;GO DO COMMAND
010516  042703  100000          5$:     BIC     #BIT15,R3       ;CLEAR DIRECTION BIT
010522  010337  010652                  MOV     R3,90$          ;LOAD UP NUMBER OF RECORDS TO SPACE
010526  052737  000400  010650          BIS     #BIT8,80$       ;SET REVERSE BIT IN COMMAND PACKET
010534  012704  010C5C          10$:    MOV     #80$,R4         ;SET UP R4 WITH PACKET ADDRESS
010540  010465  000000                  MOV     R4,TSDB(R5)     ;SEND OUT COMMAND
010544  004737  016250          15$:    JSR     PC,WAITF        ;WAIT FOR SSR
010550  103420                          BCS     20$             ;BR, IF SSR IS SET AND OK
010552                                  DELAY   250         ;DELAY ABOUT .25 SECONDS
010552  012727  000250                  MOV     #250.,(PC)+
010556  000000                          .WORD   0
010560  013727  002116                  MOV     L$DLY,(PC)+
010564  000000                          .WORD   0
010566  005367  177772                  DEC     -6(PC)
010572  001375                          BNE     .-4
```

```
        010574  005367  177756                  DEC     -22(PC)
        010600  001367                          BNE     .-20
   1018 010602  005337  010660                  DEC     SDELAY                  ;BUMP DELAY COUNTER DOWN
   1019 010606  001356                          BNE     15$                     ;BR, IF MORE DELAY
   1020 010610  000411                          BR      60$                     ;BR IF TROUBLE CARRY = CLEAR
   1021 010612  016501  000002          20$:    MOV     TSSR(R5),R1             ;READ TSSR
   1022 010616  012702  000200                  MOV     #SSR,R2                 ;SET UP EXPECTED
   1023 010622  020201                  25$:    CMP     R2,R1                   ;ARE THEY OK
   1024 010624  001401                          BEQ     40$                     ;BR, IF EQUAL = OK
   1025 010626  000402                          BR      60$                     ;TROUBLE EXIT
   1026 010630  000261                  40$:    SEC                             ;SET CARRY NO TROUBLE
   1027 010632  000401                          BR      70$                     ;EXIT
   1028 010634  000241                  60$:    CLC                             ;CARRY CLEAR = ERROR
   1029 010636                          70$:
   1030 010636  010400                          MOV     R4,R0                   ;PASS PACKET ADDRESS
   1031 010640  00020?                          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  002226                  CLR     BENBSW          ;CLEAR BUFFER ENABLE SWITCH
010672  005037  002224                  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  002224                  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  002226                  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
                                
                                        .=<.+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                  SA"REG                          ;SAVE THE GENERAL REGISTERS
011120  012701  002240          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$:    SEC                     ;SHOW GOOD COMPARE
011214  012737  000010  002300  50$:    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:
                ;
                ;       R4      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  002240  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$:    JSR     PC,CHKTSSR      ;WAIT FOR SSH TO SET
011260  010265  000000  MOV     R2,TSDB(R5)             ;SELECT NEXT RAM ADDRESS
011264  004737  016336  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
011270  116511  000000  MOVB    TSBA(R5),(R1)           ;READ THE RAM DATA
011274  122124          CMPB    (R1)+,(R4)+             ;COMPARE TO EXPECTED
011276  001401          BEQ     20$                     ;BRANCH IF OK
011300  005203          INC     R3                      ;SET ERROR FLAG
011302  005202  20$:    INC     R2                      ;ADDRESS OF NEXT RAM LOCATION
011304  012737  000010  002300  MOV     #8.,RAMSIZ      ;ASSUME EXTFEA NOT SET
011312  005737  002224  TST     EXTFEA                  ;IS THE SOFTWARE EXTENDED FEATURES SET
011316  001407          BEQ     25$                     ;BR. IF NOT SET
011320  012737  000012  002300  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 ROUTINES.
                        ;
                        ;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  002302          MOV     R0,RCVHIADD     ;SAVE RECV HIGH ADDRESS
011370  010137  002304          MOV     R1,RCVLOAD      ;SAVE RECV LOW ADDRESS
011374  005737  003132          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$:    CLR     R4              ;WORD IN BUFFER
011412  005003                  CLR     R3              ;CLEAR ERROR SEEN FLAG
011414  010205                  MOV     R2,R5           ;GET EXPD BUFFER ADDRESS
011416  011264  002320  15$:    MOV     (R2),EXPMSG(R4) ;SAVE EXPD FOR ERROR REPORT
011422  011164  002464          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;@@D IS COUNT ABOVE MAX ALLOWED?
011510  003412                           BLE     5$                      ;@@D BR IF NO
011512  012703  000144                   MOV     #RECMSG-EXPMSG,R3;@@D
011516                                  PRINTF  #DEBUGMSG               ;@@D
011516  012746  011632                   MOV     #DEBUGMSG,-(SP)
011522  012746  000001                   MOV     #1,-(SP)
011526  010600                           MOV     SP,R0
011530  104417                           TRAP    C$PNTF
011532  062706  000004                   ADD     #4,SP
011536  010037  002302           5$:     MOV     R0,RCVHIADD             ;SAVE RECV HIGH ADDRESS
011542  010137  002304                   MOV     R1,RCVLOAD              ;SAVE RECV LOW ADDRESS
011546  005737  003132                   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$:    CLR     R4                      ;WORD IN BUFFER
011564  005005                           CLR     R5                      ;CLEAR ERROR SEEN FLAG
011566  111264  002320       15$:    MOVB    (R2),EXPMSG(R4) ;SAVE EXPD FOR ERROR REPORT
011572  111164  002464                   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
```

```
1371 011632      120     122     117  DEBUGMSG: .ASCIZ 'PROGRAM INTERNAL ERROR -CKMSG2 MESSAGE BUFFER EXCEEDED- ;a@D
1372 011722      045     116     045  FERCM:   .ASCII  /%N%A  ***/
1373 011733      040     040     124  ERCM:    .ASCIZ  /  TSSR ERROR CODE REC'D = /
1374 011766      056     056     056  SIMSG:   .ASCIZ  /.... AFTER DOING SOFT INIT/
1375 012021      124     105     123  TINERR:  .ASCIZ  /TEST: .../
1376                                           .EVEN
1377                                 ;*
1378                                 ;
1379                                 ;PRINT ROUTINE TO FATAL SOFT INIT ERRORS
1380                                 ;
1381                                 ;INPUT:
1382                                 ;
1383                                 ;       R1      CONTENTS OF TSSR AT ERROR
1384                                 ;
1385                                 ;SIDE EFFECTS:
1386                                 ;
1387                                 ;       EXECUTES DROP UNIT TO CEASE TESTING
1388                                 ;
1389                                 ;-
1390
1391 012034                                 BGNMSG  SFIMSG
     012034                          SFIMSG::
1392 012034  004737  006022                JSR     PC,PRITSSR      ;PRINT CONTENTS OF TSSR REGISTER
1393 012040  004737  017202                JSR     PC,CKDROP       ;DROP UNIT, IF ALLOWED
1394 012044                                ENDMSG
     012044                          L10003:
     012044  104423                        TRAP    C$MSG
1395
1396                                 ;*
1397                                 ;PRINT ROUTINE TO PRINT THE CONTENTS OF
1398                                 ;TSSR AND A COMMAND PACKET OTHER THAN GET STATUS COMMAND PACKET.
1399                                 ;
1400                                 ;INPUTS:
1401                                 ;
1402                                 ;       R1      TSSR CONTENTS
1403                                 ;       R4      ADDRESS OF COMMAND PACKET
1404                                 ;
1405                                 ;-
1406
1407 012046                                 BGNMSG  PKTSSR
     012046                          PKTSSR::
1408 012046  004737  006022                JSR     PC,PRITSSR      ;PRINT THE CONTENTS OF TSSR REGISTER
1409 012052  012700  000004                MOV     #4,R0           ;NO. OF WORDS IN PACKET
1410 012056  004737  007366                JSR     PC,PRIPKT       ;PRINT THE CONTENTS OF COMMAND PACKET
1411 012062                                ENDMSG
     012062                          L10004:
     012062  104423                        TRAP    C$MSG
```

```
                                        ;+
                                        ;PRINT ROUTINE TO PRINT THE CONTENTS OF
                                        ;TSSR AND A GET STATUS COMMAND PACKET.
                                        ;
                                        ;INPUTS:
                                        ;
                                        ;       R1      TSSR CONTENTS
                                        ;       R4      ADDRESS OF COMMAND PACKET
                                        ;-
                                                BGNMSG  PKTGETS
012064                                  PKTGETS::
012064  004737  006022                          JSR     PC,PRITSSR      ;PRINT THE CONTENTS OF TSSR REGISTER
012070  012700  000002                          MOV     #2,R0           ;NO. OF WORDS IN GET STATUS PACKET
012074  004737  007366                          JSR     PC,PRIPKT       ;PRINT THE CONTENTS OF COMMAND PACKET
012100                                          ENDMSG
012100                                  L10005:
012100  104423                                  TRAP    C$MSG
                                        ;+
                                        ;PRINT TSSR ERRORS FOR INITIALIZATION TESTS
                                        ;
                                        ;INPUTS:
                                        ;       R1      TSSR CONTENTS
                                        ;       R4      ADDRESS OF COMMAND PACKET
                                        ;-
                                                BGNMSG  SFFMSG
012102                                  SFFMSG::
012102  004737  006022                          JSR     PC,PRITSSR      ,PRINT CONTENTS OF TSSR REGISTER
012106                                          ENDMSG
012106                                  L10006:
012106  104423                                  TRAP    C$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
                                        ;
                                                BGNMSG  PKTMES
012110                                  PKTMES::
012110  004737  006022                          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
                                ;

                                        BGNMSG  ADDSSR
012126                          ADDSSR::
012126  004737  010272                  JSR     PC,PRITADD      ;PRINT MEMORY TEST ADDRESS
012132  016501  000002                  MOV     TSSR(R5),R1     ;GET CURRENT TSSR
012136  004737  006022                  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
                                ;-
                                        BGNMSG  MSGEXP
012144                          MSGEXP::
012144  012700  000007                  MOV     #7,R0           ;ASSUME NO EXT FEATURES
012150  005737  002224                  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)
                ;-
                        BGNMSG  FIFEXP
012170          FIFEXP::
                        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  '<CR><LF>A NUMBER OF BYTES TRANSFERRED = <D2
012311    045   116   045 FIF2MSG:    .ASCIZ  '<CR><LF>A FIFO DATA BYTES IN ERROR:'
                        .EVEN
```

```
                                        .SBTTL  MSGSTAT - PRINT STATUS 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
                                ;-
012350                                  BGNMSG  MSGSTAT
012350                          MSGSTAT::
012350  012701  012412                  MOV     #STATCOD,R1     ;ASCII ADDRESS TABLE
012354  012100                  10$:    MOV     (R1)+,R0        ;DONE ALL MSG LINES?
012356  001410                          BEQ     20$             ;BR IF YES
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$PNTX
012372  062706  000004                  ADD     #4,SP
012376  000766                          BR      10$             ;DO ANOTHER MSG LINE
012400  012700  000012          20$:    MOV     #10.,R0         ;NUMBER OF WORDS IN A READ STATUS BUFFER
012404  004737  014552                  JSR     PC,PRMSGEXP     ;PRINT EXPD/RECV MESSAGE BUFFERS
012410                                  ENDMSG
012410                          L10013:
012410  104423                          TRAP    C$MSG

012412  012430  012472  012563  STATCOD:        .WORD   1$,2$,3$,4$,5$,6$,0
012430    045    116    045    1$:.ASCIZ  '<CR><LF>Tape Bus Signals in Word #8:'
012472    045    116    045    2$:.ASCIZ  '<CR><LF>        PARERR<15>  IEOT  <12>  IFMK  <9>  IRDY<6>  IRWD<2>'
012563    045    116    045    3$:.ASCIZ  '<CR><LF>        IRESV2<14>  IIDENT<11>  IHER  <8>  IONL<5>  IFBY<1>'
012654    045    116    045    4$:.ASCIZ  '<CR><LF>        IRESV1<13>  ICER  <10>  ISPEED<7>  ILDP<4>  IFPT<0>'
012745    045    116    045    5$:.ASCIZ  '<CR><LF>Tape Bus Signals in Word #9:'
013007    045    116    045    6$:.ASCIZ  '<CR><LF>        DATMIS<7>  ILW<6>  OUTRDY<5>  INRDY<4>
                                        .EVEN
```

```
                                         .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 IHISP=>IEOT<12>   IWRT=>IIDENT<11>    IREV   =>ICER   <10>'
013417     045     116     045  4$:.ASCIZ  '%N%A IWFM =>IFMK<09>   IEDIT=>IMER <08>    IFAD   =>ISPEED<07>'
013516     045     116     045  5$:.ASCIZ  '%N%A ITAD0=>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$MSG
1598
1599                                            .SBTTL  MEMADD - PRINT MEMORY ADDRESS DATA ERROR
1600                                    ;+
1601                                    ;
1602                                    ;PRINT ROUTINE TO PRINT MEMORY ADDRESS DATA COMPARE ERROR
1603                                    ;
1604                                    ;IMPLICIT INPUTS:
1605                                    ;
1606                                    ;       ERRHI   - MEMORY ERROR HIGH ORDER ADDRESS
1607                                    ;       ERRLO   - MEMORY ERROR LOW ORDER ADDRESS
1608                                    ;       EXP     - EXPECTED DATA
1609                                    ;       RECV    - RECEIVED DATA
1610                                    ;-
1611 013754                                            BGNMSG  MEMADD
     013754                             MEMADD::
1612 013754  004737  010156                            JSR     PC,PRIADD       ;PRINT MEMORY ADDRESS IN ERROR
1613 013760  013701  002230                            MOV     EXPD,R1         ;GET EXPD DATA
1614 013764  013702  002232                            MOV     RECV,R2         ;GET RECEIVED DATA
1615 013770  004737  007740                            JSR     PC,PRIXOR       ;PRINT EXPD/RECV
1616 013774                                            ENDMSG
     013774                             L10016:
     013774  104423                                    TRAP    C$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
                ;-
014776          PRAMPKT:
014776                  SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
014002  012701  002240          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$,NOTSSR
014024  000436                  BR      10$             ;BRD
014026  116105  177777  7$:     MOVB    -1(R1),R5       ;GET RECV RAM DATA
014032  116403  177777          MOVB    -1(R4),R3       ;GET EXPD PACKET DATA
014036                          XOR     R5,R3           ;XOR EXPD/RECV
014046  042703  177400          BIC     #177400,R3      ;LOW BYTE ONLY
014052  116137  177777  002232  MOVB    -1(R1),RECV     ;GET RECEIVED RAM DATA
014060  116437  177777  002230  MOVB    -1(R4),EXPD     ;GET EXPECTED RAM DATA
014066                          PRINTB  @RAMASC,R2,RECV,EXPD,R3
014066  010346                  MOV     R3,-(SP)
014070  013746  002230          MOV     EXPD,-(SP)
014074  013746  002232          MOV     RECV,-(SP)
014100  010246                  MOV     R2,-(SP)
014102  012746  014156          MOV     @RAMASC,-(SP)
014106  012746  000005          MOV     #5,-(SP)
014112  010600                  MOV     SP,R0
014114  104414                  TRAP    C$PNTB
014116  062706  000014          ADD     #14,SP
014122  005202          10$:    INC     R2              ;UPDATE BYTE COUNT
014124  005737  002300          TST     RAMSIZ          ;DEFAULT TO 8.?
014130  001404                  BEQ     15$             ;BR IF YES
014132  020237  002300          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  002300  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 ORDER 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  003132                  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  '<CR><LF>A Message Buffer Address = <01><05>'
014465     045     116     045  PR1ASC: .ASCIZ  '<CR><LF>A Message Buffer Contents:'
014523     045     116     045  PRASC:  .ASCIZ  '<CR><LF>A    Word<01>A: <0>'
```

```
1702                                            .EVEN
1703                                            .SBTTL  PRMSGEXP - PRINT EXPD/RECV MESSAGE BUFFERS
1704                                    ;+
1705                                    ;ROUTINE TO PRINT EXPECTED AND RECEIVED MESSAGE BUFFERS
1706                                    ;       R0      - NUMBER OF WORDS IN BUFFER
1707                                    ;I%_ICIT INPUTS:
1708                                    ;       EXPMSG  - EXPECTED MESSAGE BUFFER
1709                                    ;       RECMSG  - RECEIVED MESSAGE BUFFER
1710                                    ;       RCVHIADD- RECEIVED MESSAGE BUFFER HIGH ORDER ADDRESS
1711                                    ;       RCVLOADD- RECEIVED MESSAGE BUFFER LOW ORDER ADDRESS
1712                                    ;-
1713 014552                            PRMSGEXP::
1714 014552                                    SAVREG                  ;SAVE R1-R5 UNTIL NEXT RETURN
1715 014556  010005                            MOV     R0,R5           ;SAVE NUMBER OF WORDS
1716 014560  013700  002304                    MOV     RCVLOADD,R0     ;GET RECV LOW ADDRESS
1717 014564  010004                            MOV     R0,R4           ;COPY LOW ADDRESS
1718 014566  013701  002302                    MOV     RCVHIADD,R1     ;GET RECV HIGH ADDRESS
1719 014572  006100                            ROL     R0              ;SHIFT BIT15 TO C BIT
1720 014574  006101                            ROL     R1              ;SHIFT TO HIGH ORDER FOR PRINTOUT
1721 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$PNTX
     014616  062706  000010                    ADD     #10,SP
1722 014622                                    PRINTX  #PRMSG1         ;PRINT HEADER FOR CONTENTS
     014622  012746  014777                    MOV     #PRMSG1,-(SP)
     014626  012746  000001                    MOV     #1,-(SP)
     014632  010600                            MOV     SP,R0
     014634  104415                            TRAP    C$PNTX
     014636  062706  000004                    ADD     #4,SP
1723 014642  005004                            CLR     R4              ;NUMBER OF THE CURRENT WORD
1724 014644  012701  002320                    MOV     #EXPMSG,R1      ;GET EXPD BUFFER ADDRESS
1725 014650  012702  002464                    MOV     #RECMSG,R2      ;GET RECV BUFFER ADDRESS
1726 014654  011100                    20$:    MOV     (R1),R0         ;GET EXPD
1727 014656  011203                            MOV     (R2),R3         ;GET RECV
1728 014660                                    XOR     R0,R3           ;XOR EXPD/RECV
1729 014670                                    PRINTX  #PRMSG2,R4,(R1)+,(R2)+,R3
     014670  010346                            MOV     R3,-(SP)
     014672  012246                            MOV     (R2)+,-(SP)
     014674  012146                            MOV     (R1)+,-(SP)
     014676  010446                            MOV     R4,-(SP)
     014700  012746  015035                    MOV     #PRMSG2,-(SP)
     014704  012746  000005                    MOV     #5,-(SP)
     014710  010600                            MOV     SP,R0
     014712  104415                            TRAP    C$PNTX
     014714  062706  000014                    ADD     #14,SP
1730 014720  005204                            INC     R4              ;NUMBER OF THE NEXT
1731 014722  020405                            CMP     R4,R5           ;DONE ALL YET?
1732 014724  002001                            BGE     50$             ;BR IF YES
1733 014726  000752                            BR      20$             ;DO ANOTHER
1734 014730  000207                    50$:    RTS     PC              ;RETURN
1735 014732     045     116     045    PRMSG0: .ASCIZ  '%N%A Message Buffer Address = %01%05'
1736 014777     045     116     045    PRMSG1: .ASCIZ  '%N%A Message Buffer Contents:'
1737 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
                                ;
                                ;       R0      - NUMBER OF BYTES IN BUFFER
                                ;
                                ;IMPLICIT INPUTS:
                                ;
                                ;       EXPMSG  - EXPECTED MESSAGE BUFFER
                                ;       RECMSG  - RECEIVED MESSAGE BUFFER
                                ;-
                                PRBYTEXP::
                                        SAVREG                  ;SAVE R1-R5 UNTIL NEXT RETURN
                                        MOV     R0,R5           ;SAVE NUMBER OF BYTES
                                        CLR     PRMNO           ;INIT ERROR COUNT
                                        CLR     R4              ;NUMBER OF THE CURRENT BYTE
                                        MOV     #EXPMSG,R1      ;GET EXPD BUFFER ADDRESS
                                        MOV     #RECMSG,R2      ;GET RECV BUFFER ADDRESS
                                20$:    MOVB    (R1),R0         ;GET EXPD BYTE
                                        BIC     #^C<377>,R0     ;CLEAR UPPER BYTE
                                        MOVB    R0,PRBEXP       ;SAVE FOR ERROR REPORT
                                        MOVB    (R2),R3         ;GET RECV BYTE
                                        BIC     #^C<377>,R3     ;CLEAR UPPER BYTE
                                        MOVB    R3,PRBREC       ;FOR ERROR REPORT
                                        XOR     R0,R3           ;XOR EXPD/RECV
                                        CMPB    (R1)+,(R2)+     ;EXPD = RECV?
                                        BEQ     30$             ;BR IF YES
                                        INC     PRMNO           ;UPDATE ERROR COUNT
                                        CMP     PRMNO,#8.       ;PRINTED 8?
                                        BHI     30$             ;BR IF YES
                                27$:    PRINTX  #PRBMSG,R4,PRBEXP,PRBREC,R3
                                        MOV     R3,-(SP)
                                        MOV     PRBREC,-(SP)
                                        MOV     PRBEXP,-(SP)
                                        MOV     R4,-(SP)
                                        MOV     #PRBMSG,-(SP)
                                        MOV     #5,-(SP)
                                        MOV     SP,R0
                                        TRAP    C$PNTX
                                        ADD     #14,SP
                                        FORCEXIT        50$     ;@@D
                                        BR      35$             ;@@D
                                30$:
                                        FORCERROR  27$,NOTSSR   ;@@D
                                35$:                            ;@@D
                                        INC     R4              ;NUMBER OF THE NEXT
                                        CMP     R4,R5           ;DONE ALL YET?
                                        BGE     50$             ;BR IF YES
                                        BR      20$             ;DO ANOTHER
                                50$:    PRINTX  #PRBTOT,PRMNO   ;PRINT TOTAL ERROR COUNT
                                        MOV     PRMNO,-(SP)
                                        MOV     #PRBTOT,-(SP)
                                        MOV     #2,-(SP)
                                        MOV     SP,R0
```

```
        015326  104415                          TRAP    C$PNTX
        015330  062706  000006                  ADD     #6,SP
  1783  015334  000207                          RTS     PC              ;RETURN
  1784
  1785  015336     045     116     045  PRBMSG: .ASCIZ  '<N><A>   BYTE #<D2><A>  EXPD: #<O3><A>  RECV: #<O3><A>  XOR: #<O3>'
  1786  015423     045     116     045  PRBTOT: .ASCIZ  '<N><A> NUMBER OF BYTES IN ERROR = #<D2>'
  1787                                            .EVEN
  1788  015470  000000                  PRBEXP: .WORD   0               ;EXPD
  1789  015472  000000                  PRBREC: .WORD   0               ;RECV
  1790                                          .SBTTL  EXPREC  - PRINT EXPD/RECV WORD DATA
  1791                                  ;+
  1792                                  ;
  1793                                  ;PRINT ROUTINE TO DISPLAY EXPD/RECV DATA
  1794                                  ;
  1795                                  ;INPUTS:
  1796                                  ;
  1797                                  ;       R1      RECEIVED DATA
  1798                                  ;       R2      EXPECTED DATA
  1799                                  ;
  1800                                  ;
  1801
  1802  015474                          EXPREC: BGNMSG  EXPREC
        015474                                  ::
  1803  015474  004737  007740                  JSR     PC,PRIXOR               ;PRINT THE DATA
  1804  015500                                  ENDMSG
        015500                          L10017:
        015500  104423                          TRAP    C$MSG
  1805                                          .SBTTL  EXPBREC - PRINT EXPD/RECV BYTE DATA
  1806                                  ;+
  1807                                  ;
  1808                                  ;PRINT ROUTINE TO DISPLAY BYTE EXPD/RECV DATA
  1809                                  ;
  1810                                  ;
  1811                                  ;INPUTS:
  1812                                  ;
  1813                                  ;       R1      RECEIVED DATA BYTE
  1814                                  ;       R2      EXPECTED DATA BYTE
  1815                                  ;
  1816                                  ;-
  1817
  1818  015502                          EXPBREC: BGNMSG EXPBREC
        015502                                  ::
  1819  015502  004737  007610                  JSR     PC,PRIBXOR              ;PRINT THE DATA
  1820  015506                                  ENDMSG
        015506                          L10020:
        015506  104423                          TRAP    C$MSG
  1821
  1822
  1823                                          .SBTTL  RAMERR  - PRINT RAM AND PACKET DATA
  1824                                  ;+
  1825                                  ;
  1826                                  ;PRINT ROUTINE TO DISPLAY RAM/PACKET DATA
  1827                                  ;
  1828                                  ;INPUTS:
  1829                                  ;
  1830                                  ;       R4      POINTER TO COMMAND PACKET
  1831                                  ;
```

```
                                ;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
                                ;-

                                        BGNMSG  RAMERR
                                RAMERR::
015510  004737  013776                  JSR     PC,PRAMPKT      ;PRINT RAM/PACKET DATA
                                        ENDMSG
                                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
                                ;-

                                        BGNMSG  RAMTADD
                                RAMTADD::
015516  004737  010272                  JSR     PC,PRITADD      ;PRINT TEST ADDRESS
015522  004737  013776                  JSR     PC,PRAMPKT      ;PRINT RAM/PACKET DATA
                                        ENDMSG
                                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
                                ;
                                ;
                                        BGNMSG  RAMEXP
015530                          RAMEXP::
015530                                  BIC     #^C<377>,R1             ;SAVE EXPD RAM DATA BYTE
015530  042701  177400                  BIC     #^C<377>,R2             ;SAVE EXPD RAM DATA BYTE
015534  042702  177400                  JSR     PC,PRIRAM               ;PRINT THE RAM ADDRESS
015540  004737  010064                  JSR     PC,PRIXOR               ;PRINT THE DATA
015544  004737  007740                  ENDMSG
015550                          L10023:
015550                                  TRAP    C$MSG
015550  104423
                                        .SBTTL  TIMEXP  - PRINT TIMER A,B AND EXP/REC
                                ;*
                                ;
                                ;PRINT ROUTINE TO DISPLAY EXPD/RECV DATA
                                ;AND TIMER A,B HEADER MESSAGE
                                ;
                                ;INPUTS:
                                ;
                                ;       R1      RECEIVED DATA
                                ;       R2      EXPECTED DATA
                                ;-
                                        BGNMSG  TIMEXP
015552                          TIMEXP::
015552                                  PRINTX  #TIMSG0                 ;PRINT HEADER
015552  012746  015600                  MOV     #TIMSG0,-(SP)
015556  012746  000001                  MOV     #1,-(SP)
015562  010600                          MOV     SP,R0
015564  104415                          TRAP    C$PNTX
015566  062706  000004                  ADD     #4,SP
015572  004737  007740                  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)
                                ;
                                ;


                                        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$PNTB
     015724  062706  000006                    ADD     #6,SP
1929 015730  012602                            MOV     (SP)+,R2                ;RESTORE R2
1930 015732  004737  006022                    JSR     PC,PRITSSR              ;DECODE TSSR CONTENTS
1931 015736                                    ENDMSG
     015736                            L10025:
     015736  104423                            TRAP    C$MSG
1932 015740     045     116     045  XFERASC:          .ASCIZ  '%N%A Data Transferred = %03'
```

```
                        .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 CPU 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  002206                  MOV     IVEC,R0         ;GET POINTER TO VECTORS
016160  012720  016216                  MOV     #INTR,(R0)+     ;SET UP INTERRUPT VECTOR
016164  012720  000340                  MOV     #PRI07,(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     #PRI07,2(SP)
016214  000002                          RTI
                                        .SBTTL  INTR    - INTERRUPT HANDLERS

                                        BGNSRV  INTR            ;DEFINE INTERRUPT ENTRY
016216                          INTR::
016216  012737  000001  002222          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
```

NF,


```
                                        .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:
                        ;       R0      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,R0                  ;SPECIAL CONDITION SET?
016356  001405                  BEQ     15$                     ;BR IF NO
016360  032700  074000          BIT     #<SCE!BIE!RMR!NXM>,R0   ;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$:     CLRVEC  #4                      ;...AND GIVE BACK THE VECTOR.
        016440  012700  000004          MOV     #4,R0
        016444  104436                  TRAP    C$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  002166                  TST     NOITS           ; ITERATIONS INHIBITED?
016462  001006                          BNE     1$              ; YES.
016464  005737  002202                  TST     QVP             ; NO.
016470  100403                          BMI     1$              ;LOOPS DISALLOWED IN QUICK PASS.
016472  005337  002214                  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 RAISED TO LEVEL OF
                                ;       THE DEVICE UNDER TEST
                                ;
                                ;-

016510                          TSTSETUP::
016510  010046                          MOV     R0,-(SP)        ;SAVE THE TEST ID MESSAGE
016512  005037  003152                  CLR     SIFLAG          ; CLEAR "SOFT INIT" FLAG
016516  005037  016756                  CLR     ERRK            ; CLEAR LOCAL ERROR COUNTER.
016522  005037  005770                  CLR     EXTA            ; CLEAR ERROR EXTENSION FLAG.
016526  105037  016144                  CLRB    INTMASK         ; CLEAR INTERRUPT MASK (CHECK ERROR)
016532  013700  002200                  MOV     UNITN,R0        ; GET THE UNIT NUMBER.
016536  006300                          ASL     R0              ; ... AND MAKE IT A WORD OFFSET.
016540  005737  003112                  TST     NODEV           ; DID STARTUP FIND THE DEVICE?
016544  001430                          BEQ     4$              ; BR IF YES
016546  100010                          BPL     3$              ; BR IF NOT IDLE
```

```
                                        BIS     #160000,ERTABL(R0) ; FLAG ERROR IN THE ERROR TABLE
                                        ERRDF   1,NXR,NXRERR    ; NO DEVICE HERE    PRINT IT
016556  104455                          TRAP    C$ERDF
016560  000001                          .WORD   1
016562  003736                          .WORD   NXR
016564  005734                          .WORD   NXRERR
                                        BR      2$
016570  052760  160001  003174  3$:     BIS     #160001,ERTABL(R0)      ; FLAG ERROR IN THE ERROR TABLE
                                        ERRDF   2,NOINIT        ; DEVICE NOT IDLE
016576  104455                          TRAP    C$ERDF
016600  000002                          .WORD   2
016602  004333                          .WORD   NOINIT
016604  000000                          .WORD   0
016606  012737  177777  003110  2$:     MOV     #-1,DUFLG       ; DROP THE UNIT
                                        DODU    UNITN
016614  013700  002200                  MOV     UNITN,R0
016620  104451                          TRAP    C$DODU
                                        DOCLN                   ; ABORT THE PASS
016622  104444                          TRAP    C$DCLN
                                        BR      5$

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
                                        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$PNTF
016656  062706  000006                  ADD     #6,SP
016662  005237  002212          1$:     INC     TSTCNT          ; BUMP TEST COUNTER.
                                        SETPRI  IPRI            ;PRIORITY THAT OF DEVICE
016666  013700  002210                  MOV     IPRI,R0
016672  104441                          TRAP    C$SPRI
016674  005726                  5$:     TST     (SP)+           ;FIX UP THE STACK
016676  013705  002204                  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
```

```
                                        .SBTTL  INCERK  - INCREMENT LOCAL ERROR COUNT
                                ;+
                                ; ROUTINES TO INCREMENT LOCAL ERROR COUNT AND CHECK FOR LIMIT:
                                ;-
017044  005237  016756          INCERK: INC     ERRK            ; INCREMENT LOCAL ERROR COUNT
017050  010046                          MOV     R0,-(SP)        ; SAVE R0
017052  013700  002200                  MOV     UNITN,R0        ; GET UNIT NUMBER,
017056  006300                          ASL     R0              ; ... AND MAKE IT A WORD OFFSET.
017060  062700  003174                  ADD     #ERTABL,R0      ; R0 GETS ADDRESS OF ERROR TABLE ENTRY.
017064  005210                          INC     (R0)            ; INCREMENT THE DEVICE ERROR COUNT
017066  032710  007777                  BIT     #7777,(R0)      ; DID WE OVERFLOW THE FIELD?
017072  001001                          BNE     1$              ; BR IF NO.
017074  005310                          DEC     (R0)            ; YES -- BACK IT UP TO 7777.
017076  012600                  1$:     MOV     (SP)+,R0        ; RESTORE R0
017100  000207                          RTS     PC              ; RETURN TO CALLER.

017102  010046                  CKEMAX: MOV     R0,-(SP)        ; SAVE R0
017104  013700  002200                  MOV     UNITN,R0        ; GET UNIT NUMBER
017110  006300                          ASL     R0              ; ... AND MAKE IT A WORD OFFSET
017112  016000  003174                  MOV     ERTABL(R0),R0   ; GET ERROR TABLE ENTRY
017116  042700  170000                  BIC     #170000,R0      ; EXTRACT ERROR COUNT FIELD
017122  020037  002172                  CMP     R0,GERRMAX      ; IS GLOBAL LIMIT EXCEEDED FOR THIS UNIT?
017126  103004                          BHIS    1$              ; BR IF YES
017130  023737  016756  002170          CMP     ERRK,LERRMAX    ; IS LOCAL LIMIT EXCEEDED FOR THIS TEST?
017136  103417                          BLO     2$              ; BR IF NO
017140                          1$:     RFLAGS  R0              ; GET OPERATOR FLAGS
017140  104421                          TRAP    C$RFLA
017142  032700  000040                  BIT     #IDU,R0         ; IS DROPPING INHIBITED?
017146  001013                          BNE     2$              ; BR IF YES.
017150  012737  177777  003110          MOV     #-1,DUFLG       ; NO -- DROP THE UNIT
017156                                  ERRDF   4,EMAXDU
017156  104455                          TRAP    C$ERDF
017160  000004                          .WORD   4
017162  016777                          .WORD   EMAXDU
017164  000000                          .WORD   0
017166                                  DODU    UNITN
017166  013700  002200                  MOV     UNITN,R0
017172  104451                          TRAP    C$DODU
017174                                  DOCLN
017174  104444                          TRAP    C$DCLN
017176  012600                  2$:     MOV     (SP)+,R0        ; RESTORE R0
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  003110          MOV     #-1,DUFLG
017234                                  DODU    UNITN
017234  013700  002200                  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  003130          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  003130          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
```

```
SETMAP    SETUP PAR6 MAPPING

                                        .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  003130                  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  003130                  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  003122                MOV     FREE,R1         ;GET FIRST FREE LOCATION
2393 017440  013702  003124                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  003130                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  003150                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  003130        CMP     @#KIPAR6,KTFLG  ;END OF MEMORY?
2414 017572  001427                        BEQ     50$             ;BR IF YES
2415 017574  005737  003142                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  003144        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  003122                  MOV     FREE,R1         ;GET FIRST FREE LOCATION
017676  013702  003124                  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  002236                  MOV     R1,ERRLO        ;SAVE ADDRESS IN ERROR
017712  005037  002234                  CLR     ERRHI           ;NO HIGH ADDRESS
017716  010337  002230                  MOV     R3,EXPD         ;SAVE EXPD FOR ERROR REPORT
017722  011137  002232                  MOV     (R1),RECV       ;SAVE RECV FOR ERPOR 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  003130                  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  003150                  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  002234                  MOV     R0,ERRHI        ;SAVE HIGH ORDER IN ERROR
```

```
2488 020040  010137  002236                    MOV     R1,ERRLO        ;SAVE LOW ORDER IN ERROR
2489 020044  010337  002230                    MOV     R3,EXPD         ;SAVE EXPD FOR ERROR REPORT
2490 020050  011437  002232                    MOV     (R4),RECV       ;SAVE RECV FOR ERROR REPORT
2491 020054  000421                            BR      50$             ;
2492 020056  062701  000002          32$:      ADD     #2,R1           ;UPDATE NON PAR6 ADDRESS
2493 020062  005500                            ADC     R0              ;MAKE IT DOUBLE PRECISION ADD
2494 020064  062704  000002                    ADD     #2,R4           ;UPDATE PAR FORMAT ADDRESS
2495 020070  020427  160000                    CMP     R4,#160000      ;END OF PAR6 MAPPING AREA?
2496 020074  103755                            BLO     30$             ;BR IF NO
2497 020076  162704  020000                    SUB     #20000,R4       ;BACKUP INTO PAR6 MAPPING BEGIN
2498 020102  062737  000200  172354            ADD     #200,@#KIPAR6   ;POINT TO NEXT 4K BLOCK >28K.
2499 020110  023737  172354  003130            CMP     @#KIPAR6,KTFLG  ;END OF MEMORY?
2500 020116  101744                            BLOS    30$             ;BR IF NO
2501 020120  004737  017274          50$:      JSR     PC,KTOFF        ;TURN OFF MEMORY MAPPING
2502 020124  000241                            CLC                     ;SET FAILURE
2503 020126  000403                            BR      60$             ;
2504 020130  004737  017274          55$:      JSR     PC,KTOFF        ;TURN OFF MEMORY MAPPING
2505 020134  000261                            SEC                     ;SET SUCCESS
2506 020136  000207                  60$:      RTS     PC
2507                                           .SBTTL  REGSAV  - SAVE R1-R5 ON STACK
2508                                 ;+
2509                                 ;
2510                                 ;ROUTINE TO
2511                                 ;SAVE R1 THROUGH R5 ON THE STACK
2512                                 ;
2513                                 ;CALLING SEQUENCE:
2514                                 ;
2515                                 ;       JSR     R5,REGSAV
2516                                 ;
2517                                 ;THIS IS A COOROUTINE WHICH TRANSFER CONTROL BACK TO
2518                                 ;THE CALLING ROUTINE. AT THE END OF THE CALLING ROUTINE,
2519                                 ;THE RTS PC RETURNS CONTROL TO THIS ROUTINE TO RESTORE
2520                                 ;REGISTERS.
2521                                 ;
2522                                 ;THIS ROUTINE SHOULD ONLY BE CALLED FROM ROUTINES WHICH ARE
2523                                 ;CALLED VIA A JSR PC INSTRUCTION
2524                                 ;
2525                                 ;-
2526
2527 020140                          REGSAV:
2528 020140  010446                            MOV     R4,-(SP)
2529 020142  010346                            MOV     R3,-(SP)
2530 020144  010246                            MOV     R2,-(SP)
2531 020146  010146                            MOV     R1,-(SP)
2532 020150  010546                            MOV     R5,-(SP)
2533 020152  016605  000012                    MOV     10.(SP),R5
2534 020156  004736                            JSR     PC,@(SP)+
2535 020160  012601                            MOV     (SP)+,R1
2536 020162  012602                            MOV     (SP)+,R2
2537 020164  012603                            MOV     (SP)+,R3
2538 020166  012604                            MOV     (SP)+,R4
2539 020170  012605                            MOV     (SP)+,R5
2540 020172  000207                            RTS     PC
```

```
                        .SBTTL  GETPAT  - GET 8 BIT PATTERN FROM OPERATOR
                ;+
                ;ROUTINE TO REQUEST AN 8 BIT DATA PATTERN FROM THE OPERATOR
                ;
                ;INPUTS:        NONE.
                ;
                ;OUTPUTS:
                ;       R0      OCTAL NUMBER FROM THE OPERATOR
                ;
                ;CALLING SEQUENCE:
                ;       JSR     PC,GETPAT
                ;-
020174          GETPAT::
                        SAVREG                          ;SAVE THE GENERAL REGISTERS
020174  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$HILIM
020220          10000$:
020220  103367          BNCOMPLETE      1$      ;RETRY IF ERROR
020220                  BCC     1$
020222  013700  020230  MOV     PATDAT,R0       ;DATA PATTERN FROM OPERATOR
020226  000207          RTS     PC              ;RETURN TO CALLER

                ;+
                ;LOCAL DATA AREA
                ;-

020230  000000  PATDAT: .WORD   0               ;TEMPORARY STORAGE FOR DATA
020232  105 116 124 DATASC: .ASCIZ  'ENTER DATA PATTERN'
                        .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  '%NBA *** Menu Selection Too Large ***
020442    045     116     045   SELASC: .ASCIZ  '%NBT'
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  105  045  NOMAN:  .ASCIZ  '%N%A *** Manual Intervention not Allowed   Test Aborted ***'
                               .even
```

```
                                        .SBTTL  ENVIRN    SETUP FREE DIAGNOSTIC SPACE
                                ;
                                ; SUBROUTINE TO SET-UP VARIOUS ENVIRONMENTAL PARAMETERS.
                                ;
020630                          ENVIRN: MEMORY  R0
020630  104431                         TRAP    C$MEM
020632  010037  003122                 MOV     R0,FREE         ; GET 1ST FREE ADDRESS...
020636  062737  000002  003122         ADD     #2,FREE
020644  011037  003124                 MOV     (R0),FRESIZ     ;...AND WORD COUNT.
020650  162737  000004  003124         SUB     #4,FRESIZ
020656  013702  002012                 MOV     L$UNIT,R2       ; GET NUMBER OF UNITS
020662  162737  000007  003124  10$:    SUB     #7,FRESIZ       ; TAKE AWAY 7 WORDS PER UNIT
020670  005302                         DEC     R2
020672  001373                         BNE     10$
020674  013700  003122                 MOV     FREE,R0         ;GET FIRST FREE ADDRESS
020700  063700  003124                 ADD     FRESIZ,R0       ;POINT TO LAST FREE ADDRESS
020704  162700  000002                 SUB     #2,R0           ;BACKUP 1 WORD
020710  010037  003126                 MOV     R0,FREEMI       ;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  003142                 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  003144         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  003130                  CLR     KTFLG           ; INIT >28K MEMORY FLAG
021014  005037  003132                  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$,@#ERRVEC    ; SET ERR VEC PTR.
021042  005737  177572                  TST     @#SR0           ; GOT KT11?
021046  000240                          NOP                     ;  (TRAP IF NO).
021050  013737  002120  003130          MOV     L$HIME,KTFLG    ; YES. SET KT FLAG.
021056  042737  000177  003130          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
```

```
2713                                    ;*
2714                                    ;       SUBROUTINE TO SET EXTENDED FEATURES SWITCH
2715                                    ;
2716                                    ;       Requires that SOFINIT and WRTCHR have been done previous to call.
2717                                    ;
2718                                    ;
2719                                    ;INPUTS:
2720                                    ;       R5      CURRENT UNIT NUMBER
2721                                    ;OUTPUTS:
2722                                    ;       The Extended Features Switch is set.
2723                                    ;
2724                                    ;-
2725
2726 021142                            INVERT::
2727
2728 021142  005737  002224                    TST     EXTFEA                  ; IS SWITCH SET?
2729 021146  001020                            BNE     1$                      ; YES,EXIT STAGE RIGHT!(or the next one outa town!)
2730 021150  012737  100206  021214            MOV     #100206,CMDPKT          ; WRT SUB-SYS MEM CMD
2731 021156  012737  021224  021216            MOV     #WSMBK,CMDPKT+2         ; MSG BUF ADDR
2732 021164  012737  000006  021222            MOV     #6,CMDPKT+6             ; BYTE COUNT
2733 021172  012737  100010  021224            MOV     #100010,WSMBK           ; INVERT THE SWITCH
2734 021200  012704  021214                    MOV     #CMDPKT,R4              ; SET CMDPKT INTO R4
2735 021204  004737  010662                    JSR     PC,WRTCHR               ; DO IT
2736 021210  000207                    1$:     RTS     PC                      ; RETURN
2737
2738                                    ;       COMMAND PACKET.
2739
2740         021214                     .       .       <.+3>&177774    ;MUST BE ON MOD 4 BOUNDRY.
2741
2742 021214  000000                    CMDPKT:: 0                      ;1ST WORD IS TSO5 COMMAND.
2743 021216  000000                             0                      ;2ND WORD IS THE BUFFER LOW ADDRESS.
2744 021220  000000                             0                      ;3RD WORD IS THE BUFFER HIGH ADDRESS.
2745 021222  000000                             0                      ;4TH WORD IS THE BYTE/RECORD/FILE COUNT.
2746
2747                                    ;       WRITE SUB-SYSTEM MEMORY CHARACTERISTIC BLOCK.
2748
2749 021224  000000                    WSMBK:: 0                       ;1ST WORD:: SEL 0
2750 021226  000000                            0                       ;2ND WORD:: SEL 2
2751 021230  000000                            0                       ;3RD WORD:: SEL 4
2752                                           .EVEN
2753                                    ;*
2754                                    ;       SUBROUTINE TO CHECK WETHER OR NOT WE'LL TEST NXM
2755                                    ;
2756                                    ;
2757                                    ;INPUTS:
2758                                    ;OUTPUTS:
2759                                    ;       The NXMFLG is set if we can test.
2760                                    ;       The NXMLO and NXMHI addresses are setup.
2761                                    ;-
2762
2763 021232                            MEMCK::
2764
2765 021232                                    SAVREG                          ;SAVE THE REGISTERS
2766 021236  005037  003134                    CLR     NXMFLG                  ;CLEAR THE FLAG
2767 021242  005037  003136                    CLR     NXMLO                   ;CLEAR THE TEST ADDRESS LO
2768 021246  005037  003140                    CLR     NXMHI                   ;CLEAR THE TEST ADDRESS HI
2769 021252  005737  003144                    TST     T238                    ;IS IT A 11/23B?
```

```
                                        BEQ     1$                      ;NO
                                        CMP     L$HIME,#7777            ; GREATER THAN 128K
                                        BLO     2$                      ; NO
                                        JSR     PC,NXMTST               ;SETUP THE ADDRESS
                                        BR      13$                     ;SET THE FLAG AND EXIT
                                1$:     TST     T23A                    ;IS IT A 11/23A?
                                        BEQ     4$                      ;NO
                                2$:     CMP     L$HIME,#5777            ;GREATER THAN 96K
                                        BHI     14$                     ;YES,23A/23B WITH 128K MEMORY
                                        CMP     L$HIME,#3777            ;GREATER THAN 64K BUT LESS THAN 92K?
                                        BLO     4$                      ;NO, CHECK 24K
                                        JSR     PC,NXMTST               ;SETUP THE ADDRESS
                                        BR      13$                     ;SET THE FLAG AND EXIT
                                4$:     CMP     L$HIME,#1577            ;GREATER THAN 24K BUT LESS THAN 64K?
                                        BLO     14$                     ;NO, TELL THEM AND EXIT WITH FLAG CLEAR
                                        JSR     PC,NXMTST               ;SETUP THE ADDRESS
                                        ADD     #77,NXMHI               ;FOOL THE 11/02 & 11/03
                                13$:    INC     NXMFLG                  ;SET THE FLAG
                                        BR      15$                     ;EXIT
                                14$:    BR      15$                     ;NOP FOR PRINTOUT
                                        PRINTF  @NOMEM                  ;TELL THEM & EXIT ***NO PRINT*****
021364  012746  005456                  MOV     @NOMEM,-(SP)
021370  012746  000001                  MOV     #1,-(SP)
021374  010600                          MOV     SP,R0
021376  104417                          TRAP    C$PNTF
021400  062706  000004                  ADD     #4,SP
                                15$:    RTS     PC                      ;RETURN

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

                                NXMTST: MOV     L$HIME,R1               ;GET TOP OF MEMORY
                                        ADD     #200,R1                 ;MAKE IT I/O BLOCK OR OTHER NXM
                                        BIC     #177,R1
                                        MOV     R1,R2                   ;RESAVE RESULTS
                                        .REPT   6
                                        ASL     R1                      ;PUT IN PLACE FOR XFER
                                        .ENDR
                                        MOV     R1,NXMLO                ;SAVE TEST ADDRESS LOW
                                        .REPT   10.
                                        ASR     R2                      ;PUT IN PLACE FOR XFER
                                        .ENDR
                                        BIC     #177700,R2              ;DON'T WANT ILA!
                                        MOV     R2,NXMHI                ;SAVE TEST ADDRESS HIGH
                                        RTS     PC                      ;RETURN

                                        ENDMOD
```

```
TSV4 - MISCELLANEOUS SECTIONS   MACRO M1113  14 JUN 84 15:15                                                    SEQ 0096
KTINIT  - SETUP KT11 MEMORY MANAGEMENT REGISTERS

                                                .TITLE  TSV4    MISCELLANEOUS SECTIONS
                                                
 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
```

INITIALIZE SECTION

```
                                        .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$INIT::
021512  005037  002224          40$:    CLR     EXTFEA
021516  005037  003134                  CLR     NXMFLG
021522  012737  006356  002176          MOV     @EPRT1,EPRTSW           ;SET UP PRIMARY MESSAGE FOR REPLACEMENT
021530  005037  003152                  CLR     SIFLAG                  ;CLEAR "SOFT INIT" FLAG
021534  005037  003132                  CLR     KTENABLE                ;CLEAR TEST ABOVE 28K FLAG
021540  005037  002300                  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  002200  002012          CMP     UNITN,L$UNIT            ;UNIT IN RANGE?
021562  103070                          BHIS    4$                      ;BR IF NO.
021564  005737  003110                  TST     DUFLG                   ;DROPPED UNIT?
021570  100472                          BMI     NXTU                    ;BR IF YES
021572  013701  002200                  MOV     UNITN,R1
021576  006301                          ASL     R1
021600  005761  003174                  TST     ERTABL(R1)
021604  001516                          BEQ     SETU
021606  032761  040000  003174          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
```

INITIALIZE SECTION

```
 65 021654  005037  002212                    CLR     TSTCNT                  ;NUMBER OF TESTS RUN IN PASS
 66 021660  005037  002220                    CLR     FATFLG                  ;CLEAR FATAL ERROR COUNT
 67 021664  005037  003142                    CLR     T23A                    ;CLEAR 11/23A FLAG
 68 021670  005037  003144                    CLR     T23B                    ;CLEAR 11/23B FLAG
 69                                     ;       MOV     #340,-(SP)
 70                                     ;       MOV     #20$,-(SP)              ;RETURN TO DEBUGGER
 71                                     ;       JMP     O.ODT           ;;@@ENTER THE DEBUGGER
 72 021674  005037  003376                    CLR     SKIPT           ;CLEAR THE SUBTEST "SKIPPER"
 73 021700                              20$:
 74 021700  012737  177777  002202            MOV     #-1,QVP                 ;...QUICK VERIFY...
 75 021706  004737  020630                    JSR     PC,ENVIRN               ;SET ENVIRONMENT.
 76 021712  004737  021010                    JSR     PC,KTINIT               ;INITIALIZE KT MEMORY MANAGEMENT
 77 021716  012700  003174                    MOV     #ERTABL,R0
 78 021722  005020                     30$:    CLR     (R0)+                   ;CLEAR THE ERROR TABLE
 79 021724  020027  003374                    CMP     R0,#ERTABE
 80 021730  103774                            BLO     30$
 81 021732  000404                            BR      4$
 82 021734  005037  002202             31$:    CLR     QVP
 83 021740  000137  022010                    JMP     PASRPT                  ;GO REPORT THE STATUS
 84
 85 021744                              4$:
 86 021744  012737  177777  002200    NEWPAS: MOV     #-1,UNITN               ;INIT UNIT NUMBER...
 87 021752  005037  002216                    CLR     DEVCNT                  ;CLEAR COUNT OF DEVICES RUNNING
 88 021756                              NXTU:   BREAK
    021756  104422                            TRAP    C$BRK
 89 021760  005237  002200                    INC     UNITN                   ;...AND SET NEXT UNIT NUMBER.
 90 021764  023737  002200  002012            CMP     UNITN,L$UNIT
 91 021772  103423                            BLO     SETU
 92 021774  012737  177777  003110            MOV     #-1,DUFLG
 93 022002  000401                            BR      11$
 94 022004                                      DOCLN                           ;ABORT, NO MORE UNITS.
    022004  104444                            TRAP    C$DCLN
 95 022006  000240                     11$:    NOP
 96 022010                              PASRPT:
 97 022010  023727  002012  000001            CMP     L$UNIT,#1               ;HOW MANY UNITS SELECTED?
 98 022016  101752                            BLOS    NEWPAS                  ;BR IF ONLY 1
 99 022020  005737  002216                    TST     DEVCNT                  ;ARE ANY STILL RUNNING?
100 022024  001747                            BEQ     NEWPAS                  ;BR IF NO
101 022026                                     RFLAGS  R0
    022026  104421                            TRAP    C$RFLA
102 022030  032700  000100                    BIT     #ISR,R0                 ;SHOULD WE PRINT STATISTICS
103 022034  001343                            BNE     NEWPAS                  ;BR IF NO
104
105 022036                                     DORPT
    022036  104424                            TRAP    C$DRPT
106 022040  000741                            BR      NEWPAS
107 022042                             10$:
108
109 022042                             SETU:   GPHARD  UNITN,R0                ;GET UNIT N P TABLE POINTER.
    022042  013700  002200                    MOV     UNITN,R0
    022046  104442                            TRAP    C$GPHRD
110 022050                                     BNCOMPLETE NXTU                 ;BR IF UNIT NOT AVAILABLE.
    022050  103342                            BCC     NXTU
111 022052  005037  003110                    CLR     DUFLG                   ;CLEAR "DROPPED" FLAG.
112 022056  005237  002216                    INC     DEVCNT
113 022062  012001                            MOV     (R0)+,R1                ;GET 1ST REGISTER ADDRESS.
114 022064  010137  002204                    MOV     R1,CSRADDR              ;ADDRESS OF REGISTERS OF UNIT UNDER TEST
```

INITIALIZE SECTION

```
                                        MOV     (R0)+,R1                ;GET VECTOR ADDRESS.
                                        ;MOV    (R0),R2                 ;GET INTERRUPT PRIORITY
                                        ;MOV    R2,IPRI                 ;SET INTERRUPT PRIORITY.
022072  010137  002206                  MOV     R1,IVEC                 ;SET INTERRUPT VECTOR POINTER...
022076  012721  016216                  MOV     #INTR,(R1)+             ;...VECTOR...
022102  013721  002210                  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  002200                  MOV     UNITN,R1
022112  006301                          ASL     R1
022114  052761  100000  003174          BIS     #BIT15,ERTABL(R1)       ;SAY DEVICE RUNNING
022122  005037  005770                  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  002200                  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  003112                  CLR     NODEV
022176  013701  002204                  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  003112                  MOV     R1,NODEV                ;FLAG DEVICE AS NON-EXISTENT
022222  012737  177777  003110          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$AU::
022306  010001                          MOV     R0,R1                   ; GET UNIT TO BE ADDED (R0)
022310  006301                          ASL     R1                      ; MAKE IT A WORD INDEX
022312  052761  100000  003174          BIS     #100000,ERTABL(R1)      ; SET THE "ACTIVE" BIT
022320  042761  040000  003174          BIC     #40000,ERTABL(R1)       ; CLEAR THE "DROPPED" BIT
022326                                  PRINTF  #1$,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

                                        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$DU::
022404  012737  177777  003110          MOV     #-1,DUFLG
022412  010001                          MOV     R0,R1
022414  006301                          ASL     R1
022416  052761  140000  003174          BIS     #140000,ERTABL(R1)      ; SAY DROPPED
022424  000240  000240  000240          240,240,240                     ; ?????????
022432                                  PRINTF  #1$,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 .
```

```
    197 022460     045     116     045 1$:     .ASCIZ  /%N%A  UNIT %D%A DROPPED/
    198                                 .EVEN
    199 022510                          ENDDU
        022510                      L10032:
        022510  104453                      TRAP    C$DU
    200                             ;++
    201                             ; AUTO-DROP CODE SECTION.
    202                             ;
    203 022512                          BGNAUTO
        022512                      L$AUTO::
    204 022512  013705  002204              MOV     CSRADDR,R5              ;POINT TO DEVICE REGISTER
    205 022516  012703  000550              MOV     #360.,R3                ;ENOUGH TIME FOR 2400' REEL TO REWIND
    206 022522  004737  016250      10$:    JSR     PC,WAITF                ;WAIT FOR SSR TO SET
    207 022526  103420                      BCS     20$                     ;LEAVE WHEN SSR IS SET
    208 022530                              DELAY   250.                    ;WAIT FOR .25 SECONDS
        022530  012727  000372              MOV     #250.,(PC)+
        022534  000000                      .WORD   0
        022536  013727  002116              MOV     L$DLY,(PC)+
        022542  000000                      .WORD   0
        022544  005367  177772              DEC     -6(PC)
        022550  001375                      BNE     .-4
        022552  005367  177756              DEC     -22(PC)
        022556  001367                      BNE     .-20
    209 022560  005303                      DEC     R3                      ;BUMP COUNTER DOWN
    210 022562  001357                      BNE     10$                     ;KEEP GOING
    211 022564  004737  017202              JSR     PC,CKDROP               ;TRY AND DROP UNIT
    212 022570                          20$:
    213 022570                              ENDAUTO                 ; UNUSED.
        022570                      L10033:
        022570  104461                      TRAP    C$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$CLEAN::
022572  013705  002204                   MOV     CSRADDR,R5              ;POINT TO DEVICE REGISTER
022576  005737  003110                   TST     DUFLG           ;"DROPPED" FLAG IS SET ON...
022602  100405                           BMI     1$              ;...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  003174                   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)
```

CLEAN-UP AND REPORT CODING SECTIONS

```
        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$:     ADD     #2,R4
    262 023042  005203                          INC     R3
    263 023044  020427  003374                  CMP     R4,#ERTABE
    264 023050  103701                          BLO     1$
    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  /<CR><LF>DEVICE STATUS SUMMARY:<CR><LF>/
    271 023117     045     101     040  DEVONL: .ASCIZ  /<BEL>  UNIT <D3><BEL>   ONLINE,  ERRORS = <D><CR><LF>/
    272 023167     045     101     040  DEVNXR: .ASCIZ  /<BEL>  UNIT <D3><BEL>   DROPPED, NON-EXISTENT REGISTER<CR><LF>/
    273 023251     045     101     040  DEVNRD: .ASCIZ  /<BEL>  UNIT <D3><BEL>   DROPPED, NOT READY AT STARTUP<CR><LF>/
    274 023332     045     101     040  DEVDRO: .ASCIZ  /<BEL>  UNIT <D3><BEL>   DROPPED, ERRORS = <D><CR><LF>/
    275                                         .EVEN
    276
    277 023402                                  ENDMOD
    278
```

```
                                        .TITLE  TSV5A   HARDWARE TESTS


023402                                  BGNMOD  TSV5
023402                          TSV5::


                                        .SBTTL  TEST  1: BUS RESET TEST


                                ;       THIS TEST VERIFIES THAT THE M7196 MODULE'S DEVICE REGISTERS ARE
                                ;       ACCESSIBLE ON THE BUS (SUBTEST 1) AND THEN CHECKS THAT THE
                                ;       BUILT-IN INITIALIZATION SELF-TEST MICRODIAGNOSTIC DID NOT FIND
                                ;       ANY BASIC PROBLEMS IN THE MODULE.  AREAS OF LOGIC TESTED BY THE
                                ;       SELF-TEST SEQUENCE ARE AS FOLLOWS:  ROM AND PIPELINE REGISTER,
                                ;       SEQUENCER, INTERNAL BUSES, 2901 MICROPROCESSOR, AND, RAM.  THIS
                                ;       TEST INITIALIZES THE CONTROLLER BY ISSUING THE BUS INIT SIGNAL
                                ;       VIA A RESET INSTRUCTION, OR BY WRITING INTO THE TSSR REGISTER,
                                ;       WAITS A PERIOD OF TIME (TO ALLOW THE CONTROLLER'S INITIALIZATION
                                ;       MICRODIAGNOSTIC SEQUENCE TO BE COMPLETED), AND THEN CHECKS THE
                                ;       CONTENTS OF THE TSSR REGISTER.  SUCCESSFUL INITIALIZATION IS
                                ;       INDICATED BY SUBSYSTEM READY (SSR) AND NEED BUFFER ADDRESS (NBA)
                                ;       BITS BEING SET (1) AND ALL OTHER BITS (EXCEPT A17 AND A16 AND
                                ;       OFL, WHICH ARE IGNORED FOR THIS TEST) BEING CLEAR (0).  IF THE
                                ;       CONTENTS OF TSSR ARE NOT AS EXPECTED, AN ERROR REPORT IS ISSUED
                                ;       LISTING THE EXPECTED DATA, ACTUAL DATA, AND THE DISCREPANCIES.
                                ;       THE ERROR REPORT ANALYZES THE TSSR CONTENTS AND DISCERNS AND
                                ;       REPORTS ONE OF THREE POSSIBILITIES:
                                ;
                                ;
                                ;            1.  TSSR CONTENTS ARE AMBIGUOUS (ANY OF BITS 11-14 ARE SET,
                                ;                OR STATES OF SSR AND SC BITS DO NOT CORRESPOND TO THE
                                ;                APPARENT ERROR CODE IN BITS 0-5):  INDICATES THAT THE
                                ;                TSSR CONTENT CANNOT BE TRUSTED.  INDICATES A
                                ;                CATASTROPHIC CONTROLLER MALFUNCTION.  THIS IS A FATAL
                                ;                ERROR (EXECUTION IS ABORTED).  FIELD ACTION WOULD BE TO
                                ;                REPLACE THE M7196.  IF THE M7196 ITSELF IS BEING
                                ;                DEBUGGED, THE PROGRAM SHOULD BE RESTARTED WITH LOOP ON
                                ;                ERROR ENABLED IN ORDER TO PROBE FOR THE PROBLEM.
                                ;
                                ;            2.  SSR = 0, SC = 0 AND THE ERROR CODE IN BITS 0-5 IS IN
                                ;                THE RANGE 17-13:  THIS IS A FATAL ERROR.  THE ERROR
                                ;                CODE IS DECODED AND THE APPROPRIATE DESCRIPTION GIVEN.
                                ;                INDICATES THAT A SERIOUS PROBLEM EXISTS.
                                ;


023402                                  BGNTST
023402                                                                  T1::
023402  012700  023600                  MOV     #TST1ID,R0              ;ASCII MESSAGE TO IDENTIFY TEST
023406  004737  016510                  JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
023412  012737  000024  002214          MOV     #20.,LOOPCNT            ;PERFORM 20 ITERATIONS
023420                          T1LOOP:
023420  005003                          CLR     R3                      ;USE R3 AS FATAL ERROR FLAG

023422                                  BGNSUB                          ;////////////// BEGIN SUBTEST //////////////
023422                                                                          T1.1:
023422  104402                                                                          TRAP    C$BSUB
```

```
     023424                          BRESET                                   ;ISSUE A BUS RESET
     023424  104433                                                                          TRAP    C$RESET
     023426  004737  016250          JSR     PC,WAITF                         ;WAIT FOR READY
     023432  016501  000002          MOV     TSSR(R5),R1                      ;GET THE CONTENTS OF TSSR
     023436  010102                  MOV     R1,R2                            ;CONTENTS OF TSSR
     023440  042702  176277          BIC     #^C<MIADDR!OFL>,R2               ;THESE BITS MAY BE SET
     023444  052702  002200          BIS     #SSR!NBA,R2                      ;READY AND NEW DATA SHOULD BE SET
     023450  020102                  CMP     R1,R2                            ;COMPARE EXPECTED TO RECEIVED
     023452  001405                  BEQ     10$                              ;BRANCH IF COMPARE
     023454                          ERRDF   ERRNO,SFHERR,SFFMSG              ;REPORT A FATAL ERROR
     023454  104455                                                                          TRAP    C$ERDF
     023456  000145                                                                          .WORD   101
     023460  003703                                                                          .WORD   SFHERR
     023462  012102                                                                          .WORD   SFFMSG
     023464  005203                  INC     R3                               ;SET THE FATAL ERROR FLAG
     023466                  10$:
     023466                          ENDSUB                                   ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\\
     023466                                                                                  L10037:
     023466  104403                                                                          TRAP    C$ESUB

     023470  005703                  TST     R3                               ;DID WE HAVE FATAL ERROR ?
     023472  001402                  BEQ     20$                              ;BRANCH IF NOT
     023474  004737  017202          JSR     PC,CKDROP                        ;GO DROP THIS UNIT, IF ALLOWED
     023500  005003          20$:    CLR     R3                               ;RESET FATAL ERROR FLAG


     023502                          BGNSUB                                   ;///////////// BEGIN SUBTEST ////////////
     023502                                                                                  T1.2:
     023502  104402                                                                          TRAP    C$BSUB

     023504  005065  000002          CLR     TSSR(R5)                         ;WRITE TO ISSUE A SOFT RESET
     023510  004737  016250          JSR     PC,WAITF                         ;WAIT FOR READY TO SET
     023514  016501  000002          MOV     TSSR(R5),R1                      ;GET REGISTER TSSR DATA
     023520  010102                  MOV     R1,R2                            ;CONTENTS OF TSSR
     023522  042702  176277          BIC     #^C<MIADDR!OFL>,R2               ;THESE BITS MAY BE SET
     023526  052702  002200          BIS     #SSR!NBA,R2                      ;READY AND NEW DATA SHOULD BE SET
     023532  020102                  CMP     R1,R2                            ;COMPARE EXPECTED TO RECEIVED
     023534  001405                  BEQ     10$                              ;BRANCH IF COMPARE
     023536                          ERRDF   ERRNO,SFIERR,SFFMSG              ;REPORT A FATAL ERROR
     023536  104455                                                                          TRAP    C$ERDF
     023540  000146                                                                          .WORD   102
     023542  003650                                                                          .WORD   SFIERR
     023544  012102                                                                          .WORD   SFFMSG
     023546  005203                  INC     R3                               ;SET THE ERROR FLAG
     023550                  10$:
     023550                          ENDSUB                                   ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\\
     023550                                                                                  L10040:
     023550  104403                                                                          TRAP    C$ESUB


     023552  005703                  TST     R3                               ;FATAL ERROR DETECTED ?
     023554  001402                  BEQ     20$                              ;BRANCH IF NOT
     023556  004737  017202          JSR     PC,CKDROP                        ;SEE IF TIME TO DROP UNIT
     023562  004737  016456  20$:    JSR     PC,TSTLOOP                       ;SHOULD WE DO ITERATIONS ?
     023566  103002                  BCC     40$                              ;BRANCH IF NOT
     023570  000137  023420          JMP     T1LOOP                           ;LOOP UNTIL COUNT EXPIRED
```

```
TSV5A - HARDWARE TESTS  MACRO M1113  14-JUN 84 15:15                                                    SEQ 0106
TEST  1: BUS RESET TEST

    124 023574                          408:    EXIT    TST                     ;ALL DONE THIS TEST
        023574  104432                                                                      TRAP    C$EXIT
        023576  000022                                                                      .WORD   L10036 .
    125
    126                                 ;-
    127                                 ;LOCAL TEXT MESSAGES FOR TEST
    128                                 ;-
    129
    130 023600      111     156     151 TST1ID: .ASCIZ  'Initialization'
    131                                         .EVEN
    132 023620                              ENDTST
        023620                                                                  L10036:
        023620  104401                                                                  TRAP    C$ETST
    133
    134                                         .SBTTL  TEST  2: WRAP DATA - HIGH BYTE
    135
    136
    137                                 ;       THIS TEST VERIFIES OPERATION OF:
    138                                 ;
    139                                 ;
    140                                 ;           1.  PART OF THE LSI-11 BUS INTERFACE SECTION OF THE M7196
    141                                 ;               MODULE:  PART OF THE INPUT FILE (TSDB HIGH BYTE), PART
    142                                 ;               OF THE OUTPUT FILE (TSSR HIGH BYTE AND TSBA, BOTH
    143                                 ;               BYTES), PART OF THE DC005 TRANSCEIVER CIRCUITS (ADDRESS
    144                                 ;               DECODER, BDAL DRIVERS, HIGH BYTE OF INTERNAL DAL BUS
    145                                 ;               DRIVERS), AND BASIC PROGRAMMED I/O CONTROL SEQUENCES
    146                                 ;               AND LOGIC;
    147                                 ;
    148                                 ;           2.  PART OF 2901 MICROPROCESSOR ELEMENTS (Q-REGISTER,
    149                                 ;               REGISTER 0, ROTATE AND NEGATE FUNCTIONS;
    150                                 ;
    151                                 ;           3.  Y AND SOURCE BUSES;
    152                                 ;
    153                                 ;           4.  BASIC MICROPROGRAM SEQUENCES.
    154                                 ;
    155                                 ;
    156                                 ;
    157                                 ;       THE PROGRAM WRITES A TEST DATA BYTE INTO THE HIGH BYTE OF TSDB,
    158                                 ;       WAITS FOR THE SSR BIT IN TSSR TO SET, THEN CHECKS THE CONTENTS
    159                                 ;       OF BOTH TSBA AND TSSR.  THE MODULE IS FUNCTIONING CORRECTLY IF
    160                                 ;       DATA WRITTEN APPEARS IN BOTH BYTES OF TSBA AND THE FINAL CONTENT
    161                                 ;       OF TSSR IS CORRECT (SAME AS AFTER INITIALIZATION EXCEPT FOR BITS
    162                                 ;       8 AND 9, WHICH SHOULD CONTAIN BITS 8 AND 9 OF THE DATA PATTERN
    163                                 ;       WRITTEN.  AN ERROR IS REPORTED AND A DESCRIPTIVE ANALYSIS GIVEN
    164                                 ;       IF A DISCREPANCY IN TSBA OR TSSR IS DETECTED.  THE ANALYSIS
    165                                 ;       LISTS LIKELY FAULTY CANDIDATES FROM THE LOGIC ELEMENTS LISTED
    166                                 ;       ABOVE.  THE TEST IS REPEATED FOR ALL COMBINATIONS OF TEST DATA
    167                                 ;       BYTES (0-377 OCTAL).
    168                                 ;
    169 023622                              BGNTST
        023622                                                                          T2::
    174 023622  012700  024270                  MOV     #TST2ID,R0          ;ASCII MESSAGE TO IDENTIFY TEST
    175 023626  004737  016510                  JSR     PC,TSTSETUP         ;DO INITIAL TEST SETUP
    176 023632  012737  000024  002214          MOV     #20.,LOOPCNT        ;PERFORM 20 ITERATIONS
    177 023640  005004                  T2LOOP: CLR     R4                  ;STARTING DATA PATTERN
    178 023642  012703  177777                  MOV     #-1,R3              ;DO INIT ON FIRST TIME THROUGH
    179 023646  005703                  5$:     TST     R3                  ;DO WE NEED SOFT INIT
```

```
                                        BEQ     10$                     ;BRANCH IF NOT
                                        LR      R3                      ;DON'T NEED INIT NEXT TIME THRU
                                        JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
                                        BCS     10$                     ;BR IF SOFT INIT = OK
                                        MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
                                        ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
                                                                                TRAP    C$ERDF
                                                                                .WORD   201
                                                                                .WORD   SFIERR
                                                                                .WORD   SFIMSG
                                        INC     R3                      ;FORCE SOFT INIT ON NEXT PASS
                                10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG

                                        BGNSEG                          ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
                                                                                TRAP    C$BSEG

                                        MOVB    R4,TSDBH(R5)            ;SET MAINT MODE + WRITE DATA
                                        JSR     PC,WAITF                ;WAIT FOR SSR TO SET
                                        BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
                                        MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
                                        MOV     R4,R2                   ;DATA THAT WAS WRITTEN
                                        ERRDF   ERRNO,T2SSR,EXPREC      ;DEVICE FATAL SSR FAILED TO SET
                                                                                TRAP    C$ERDF
                                                                                .WORD   202
                                                                                .WORD   T2SSR
                                                                                .WORD   EXPREC
                                        INC     R3                      ;FORCE SOFT INIT ON NEXT PASS
                                        INC     FATFLG                  ;SET FATAL ERROR FLAG
                                15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
                                                                                TRAP    C$CLP1
                                        TST     FATFLG                  ;WAS FATAL ERROR RECEIVED ?
                                        BEQ     20$                     ;BRANCH IF NOT
                                        JSR     PC,CKDROP               ;SEE IF TIME TO DROP UNIT
                                20$:    MOV     R4,R2                   ;DATA PATTERN WRITTEN
                                        BIC     #^C<BIT0!BIT1>,R2       ;CLEAR ALL BUT LOW 2 BITS
                                        SWAB    R2                      ;BITS 8 AND 9 HAVE LOW DATA BITS
                                        BIS     #SSR!NBA,R2             ;THESE BITS MUST BE SET ALSO
                                        MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
                                        BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
                                        BEQ     25$                     ;BRANCH IF NOT OFF-LINE
                                        BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
                                25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
                                        BEQ     30$                     ;OKAY IF MATCH
                                        ERRHRD  ERRNO,T2TSSR,EXPREC     ;TSSR WASN'T CORRECT
                                                                                TRAP    C$ERHRD
                                                                                .WORD   203
                                                                                .WORD   T2TSSR
                                                                                .WORD   EXPREC
                                        INC     R3                      ;FORCE SOFT INIT ON NEXT PASS
                                30$:    CKLOOP                          ;LOOP ON ERROR ?
                                                                                TRAP    C$CLP1
                                        MOV     TSBA(R5),R1             ;GET TSBA REGISTER CONTENTS
                                        CLR     R2                      ;
                                        BISB    R4,R2                   ;DATA PATTERN WRITTEN
                                        SWAB    R2                      ;MOVE INTO TOP BYTE
                                        BISB    R4,R2                   ;BOTH HALVES SHOULD BE SAME
                                        CMP     R1,R2                   ;COMPARE EXPECTED TO RECEIVED
```

TEST 2: WRAP DATA HIGH BYTE

```
231 024044  001405                        BEQ     35$                     ;ERROR IF NOT EQUAL
235 024046                                ERRHRD  ERRNO,T2TSBA,EXPREC     ;PRINT THE ERROR & EXPD/RECV
    024046  104456                                                            TRAP    C$ERHRD
    024050  000314                                                            .WORD   204
    024052  024104                                                            .WORD   T2TSBA
    024054  015474                                                            .WORD   EXPREC
236 024056  005203                        INC     R3                      ;FORCE SOFT INIT ON NEXT PASS
237
238 024060                          35$:  ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
    024060                                                                  10000$:
    024060  104405                                                            TRAP    C$ESEG
239
240 024062  105204                        INCB    R4                      ;NEXT DATA PATTERN TO TEST
241 024064  001270                        BNE     5$                      ;BRANCH TILL BACK TO ZERO
242 024066  004737  016456                JSR     PC,TSTLOOP              ;SHOULD WE DO ITERATIONS ?
243 024072  103002                        BCC     40$                     ;BRANCH IF NOT
244 024074  000137  023640                JMP     T2LOOP                  ;LOOP UNTIL COUNT EXPIRED
245 024100                          40$:  EXIT    TST                     ;ALL DONE THIS TEST
    024100  104432                                                            TRAP    C$EXIT
    024102  000214                                                            .WORD   L10041 .
246
247                                       ;+
248                                       ;LOCAL TEXT MESSAGES FOR TEST
249                                       ;-
250
251 024104    124   123   102   T2TSBA: .ASCIZ  'TSBA Incorrect After TSDB High Write'
252 024151    124   123   123   T2TSSR: .ASCIZ  'TSSR Incorrect After TSDB High Write'
253 024216    116   157   040   T2SSR:  .ASCIZ  'No Sub-System Ready After TSDB High Write
254 024270    127   162   141   TST2ID: .ASCIZ  'Wrap Data - High Byte'
255                                       .EVEN
256 024316                          ENDTST
    024316                                                                  L10041:
    024316  104401                                                            TRAP    C$ETST
257
258                                       .SBTTL  TEST  3: WRAP DATA - LOW BYTE
259
260                                   ;   THIS TEST FURTHER VERIFIES OPERATION OF MANY OF THE SAME
261                                   ;   ELEMENTS TESTED IN TEST 2, AND ADDITIONALLY VERIFIES:
262                                   ;
263                                   ;
264                                   ;       1.  LOW BYTE OF THE TSDB INPUT FILE REGISTER,
265                                   ;
266                                   ;       2.  LOW BYTE OF INTERNAL DAL BUS DRIVERS ON THE DC005
267                                   ;           TRANSCEIVER CIRCUITS,
268                                   ;
269                                   ;       3.  BASIC FUNCTIONING OF PARTS OF THE RAM.
270                                   ;
271                                   ;
272                                   ;
273                                   ;   THE PROGRAM WRITES A TEST DATA BYTE INTO THE LOW BYTE OF TSDB,
274                                   ;   WAITS FOR THE SSR BIT IN TSSR TO SET, THEN CHECKS THE CONTENTS
275                                   ;   OF BOTH TSBA AND TSSR.  THE MODULE IS FUNCTIONING CORRECTLY IF
276                                   ;   DATA WRITTEN APPEARS IN BOTH BYTES OF TSBA AND THE FINAL CONTENT
277                                   ;   OF TSSR IS CORRECT (SAME AS AFTER INITIALIZATION EXCEPT FOR BITS
278                                   ;   8 AND 9, WHICH SHOULD CONTAIN BITS 8 AND 9 OF THE DATA PATTERN
279                                   ;   WRITTEN.  AN ERROR IS REPORTED AND A DESCRIPTIVE ANALYSIS GIVEN
280                                   ;   IF A DISCREPANCY IN TSBA OR TSSR IS DETECTED.  THE ANALYSIS
```

```
                                        ;       LISTS LIKELY FAULTY CANDIDATES FROM THE LOGIC ELEMENTS LISTED
                                        ;       ABOVE.  THE TEST IS REPEATED FOR ALL COMBINATIONS OF TEST DATA
                                        ;       BYTES (0-377 OCTAL).
                                        ;
024320                                  BGNTST
024320                                                                                  T3::
024320  012700  024763                  MOV     #TST3ID,R0              ;ASCII MESSAGE TO IDENTIFY TEST
024324  004737  016510                  JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
024330  012737  000024  002214          MOV     #20.,LOOPCNT            ;PERFORM 20 ITERATIONS
024336  005004                  T3LOOP: CLR     R4                      ;STARTING DATA PATTERN
024340  012703  000001                  MOV     #1,R3                   ;FORCE SOFT INIT ON FIRST PASS
024344  005703                  5$:     TST     R3                      ;SET IF INIT IS REQUIRED
024346  001412                          BEQ     10$                     ;BRANCH IF NO INIT NEEDED
024350  005003                          CLR     R3                      ;ASSUME NO INIT NEEDED ON NEXT LOOP
024352  004737  015774                  JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
024356  103406                          BCS     10$                     ;BR IF SOFT INIT = OK
024360  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
024362                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
024362  104455                                                                  TRAP    C$ERDF
024364  000455                                                                  .WORD   301
024366  003650                                                                  .WORD   SFIERR
024370  012034                                                                  .WORD   SFIMSG
024372  005203                          INC     R3                      ;FORCE INIT ON NEXT PASS
024374  005037  002220          10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
                                
024400                                  BGNSEG                          ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
024400  104404                                                                  TRAP    C$BSEG
                                
024402  110465  000000                  MOVB    R4,TSDB(R5)             ;SET MAINT MODE + WRITE DATA
024406  004737  016250                  JSR     PC,WAITF                ;WAIT FOR SSR TO SET
024412  103411                          BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
024414  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
024416  010402                          MOV     R4,R2                   ;DATA THAT WAS WRITTEN
024420                                  ERRDF   ERRNO,T3SSR,EXPREC      ;DEVICE FATAL SSR FAILED TO SET
024420  104455                                                                  TRAP    C$ERDF
024422  000456                                                                  .WORD   302
024424  024712                                                                  .WORD   T3SSR
024426  015474                                                                  .WORD   EXPREC
024430  005203                          INC     R3                      ;FORCE INIT ON NEXT PASS
024432  005237  002220                  INC     FATFLG                  ;SET THE FATAL ERROR FLAG
024436                          15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
024436  104406                                                                  TRAP    C$CLP1
024440  005737  002220                  TST     FATFLG                  ;DID WE GET FATAL ERROR ?
024444  001402                          BEQ     20$                     ;BRANCH IF NOT
024446  004737  017202                  JSR     PC,CKDROP               ;DROP UNIT, IF DROP ALLOWED
024452  010402                  20$:    MOV     R4,R2                   ;DATA PATTERN WRITTEN
024454  042702  177774                  BIC     #^C<BIT0!BIT1>,R2       ;CLEAR ALL BUT LOW 2 BITS
024460  000302                          SWAB    R2                      ;BITS 8 AND 9 HAVE LOW DATA BITS
024462  052702  002200                  BIS     #SSR!NBA,R2             ;THESE BITS MUST BE SET ALSO
024466  016501  000002                  MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
024472  032701  000100                  BIT     #OFL,R1                 ;IS DRIVE OFF-LINE
024476  001402                          BEQ     25$                     ;BRANCH IF NOT OFFLINE
024500  052702  000100                  BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED
024504  020201                  25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
024506  001405                          BEQ     30$                     ;OKAY IF MATCH
024510                                  ERRHRD  ERRNO,T3TSSR,EXPREC     ;TSSR WASN'T CORRECT
024510  104456                                                                  TRAP    C$ERHRD
```

```
                                                                                .WORD   303
                                                                                .WORD   T3TSSR
                                                                                .WORD   EXPREC
339 024520  005203                      INC     R3              ;FORCE INIT ON NEXT PASS
340 024522                      30$:    CKLOOP                  ;LOOP ON ERROR ?
                                                                                TRAP    C$CLP1
    024522  104406
341 024524  016501  000000              MOV     TSBA(R5),R1     ;GET TSBA REGISTER CONTENTS
342 024530  005002                      CLR     R2              ;
343 024532  150402                      BISB    R4,R2           ;DATA PATTERN WRITTEN
344 024534  000302                      SWAB    R2              ;MOVE INTO TOP BYTE
345 024536  150402                      BISB    R4,R2           ;BOTH HALVES SHOULD BE SAME
346 024540  020102                      CMP     R1,R2           ;COMPARE EXPECTED TO RECEIVED
347 024542  001405                      BEQ     35$             ;BR IF ERROR NOT EQUAL
351 024544                              ERRHRD  ERRNO,T3TSBA,EXPREC     ;PRINT THE ERROR & EXPD/RECV
                                                                                TRAP    C$ERHRD
    024544  104456
    024546  000460                                                             .WORD   304
    024550  024602                                                             .WORD   T3TSBA
    024552  015474                                                             .WORD   EXPREC
352 024554  005203                      INC     R3              ;FORCE INIT ON NEXT PASS
353
354 024556                      35$:    ENDSEG                  ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
    024556                                                                      10000$:
                                                                                TRAP    C$ESEG
    024556  104405
355
356 024560  105204                      INCB    R4              ;NEXT DATA PATTERN TO TEST
357 024562  001270                      BNE     5$              ;ALL DONE WHEN BACK TO ZERO
358 024564  004737  016456              JSR     PC,TSTLOOP      ;SHOULD WE DO ITERATIONS ?
359 024570  103002                      BCC     40$             ;BRANCH IF NOT
360 024572  000137  024336              JMP     T3LOOP          ;LOOP UNTIL COUNT EXPIRED
361 024576                      40$:    EXIT    TST             ;ALL DONE THIS TEST
                                                                                TRAP    C$EXIT
    024576  104432
    024600  000210                                                             .WORD   L10042-.
362
363                                     ;+
364                                     ;LOCAL TEXT MESSAGES FOR TEST
365                                     ;-
366
367 024602     124     123     102      T3TSBA: .ASCIZ  'TSBA Incorrect After TSDB Low Write'
368 024646     124     123     123      T3TSSR: .ASCIZ  'TSSR Incorrect After TSDB Low Write'
369 024712     116     157     040      T3SSR:  .ASCIZ  'No Sub-System Ready After TSDB Low Write'
370 024763     127     162     141      TST3ID: .ASCIZ  'Wrap Data - Low Byte'
371                                             .EVEN
372 025010                              ENDTST
                                                                                L10042:
    025010                                                                      TRAP    C$ETST
    025010  104401
373
374                                     .SBTTL  TEST  4: RAM TEST
375
376                                     ;       THIS TEST VERIFIES THAT ALL LOCATIONS OF THE RAM ON THE M7196
377                                     ;       CAN PROPERLY STORE AND READ BACK ALL DATA PATTERNS, AND THAT
378                                     ;       EACH RAM LOCATION IS UNIQUELY ADDRESSED (I.E., THAT ONE AND ONLY
379                                     ;       ONE LOCATION IS ACCESSED BY ANY PARTICULAR ADDRESS).  THESE
380                                     ;       TESTS ARE PERFORMED BY THREE SUBTESTS, DESCRIBED BELOW.  A
381                                     ;       BYPRODUCT OF THESE TESTS IS A VERIFICATION OF TWO REGISTERS IN
382                                     ;       THE 2901 AND THE CAPABLITY OF THE 2901 TO CORRECTLY PERFORM AN
383                                     ;       ADD.
384                                     ;
```

TEST 4: RAM TEST

```
                        ;
                        ;
                        ;       TEST 4 , SUBTEST 1:
                        ;
                        ;       THIS SUBTEST VERIFIES EACH RAM LOCATION BY FIRST PLACING THE
                        ;       M7196 INTO MAINTENANCE MODE BY WRITING INTO THE LOW BYTE OF TSDB
                        ;       AND THEN PERFORMING THE FOLLOWING SEQUENCE FOR EACH ADDRESS
                        ;       0-7777 (OCTAL):
                        ;
                        ;            1.  THE ADDRESS TO BE TESTED IS LOADED INTO THE TSDB (VIA A
                        ;                WORD WRITE).
                        ;
                        ;            2.  THE ADDRESSED RAM LOCATION IS WRITTEN, THEN READ INTO
                        ;                THE LOW BYTE OF TSBA, BY WRITING A DATA BYTE INTO THE
                        ;                LOW BYTE OF TSDB.
                        ;
                        ;            3.  THE LOW BYTE OF TSBA IS CHECKED TO SEE IF IT CONTAINS
                        ;                THE DATA PATTERN ORIGINALLY WRITTEN;  A DISCREPANCY IS
                        ;                REPORTED AS AN ERROR.
                        ;
                        ;            4.  THE ADDRESS OF THE LOCATION BEING TESTED IS AGAIN
                        ;                WRITTEN INTO TSDB (WORD WRITE), TO CAUSE THE LOCATION
                        ;                UNDER TEST TO AGAIN BE READ INTO THE LOW BYTE OF TSBA.
                        ;                THE LOW BYTE OF TSBA IS AGAIN CHECKED AND DISCREPANCIES
                        ;                REPORTED.
                        ;
                        ;            5.  THE HIGH BYTE OF TSBA IS CHECKED;  IT SHOULD CONTAIN
                        ;                THE SUM OF THE HIGH AND LOW BYTES LAST WRITTEN INTO
                        ;                TSDB AS A WORD.  A DISCREPANCY IS REPORTED AS A 2901
                        ;                PROBLEM.
                        ;
                        ;            6.  THE CONTENT OF TSSR IS CHECKED;  SETTING OF THE SC BIT
                        ;                IS IGNORED.  OTHER DISCREPANCIES IN TSSR ARE REPORTED.
                        ;
                        ;
025012                          BGNTST
025012                                                          T4::
025012                          BGNSUB                          ;////////////// BEGIN SUBTEST ////////////
025012                                                          T4.1:
025012  104402                                                          TRAP    C$BSUB
025014  012700  026322          MOV     #TST4ID,R0              ;ASCII MESSAGE TO IDENTIFY TEST
025020  004737  016510          JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
025024  012737  000005  002214  MOV     #5,LOOPCNT              ;PERFORM 5 ITERATIONS
025032                  T4LOOP:
025032  004737  015774          JSR     PC,SOFINIT              ;DO INITIALIZE ON CONTROLLER
025036  103405                  BCS     20$                     ;BR IF INIT WAS OK
025040  010001                  MOV     R0,R1                   ;CONTENTS OF TSSR REGISTER
025042                          ERRDF   ERRNO,SFIERR,SFIMSG     ;FATAL ERROR TSSR WAS NOT OK
025042  104455                                                          TRAP    C$ERDF
025044  000621                                                          .WORD   401
025046  003650                                                          .WORD   SFIERR
025050  012034                                                          .WORD   SFIMSG
025052  005004          20$:    CLR     R4                      ;SET RAM ADDRESS AT ZERO
025054  004737  016336          JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
```

```
442 025060  105065  000000              CLRB    TSDB(R5)              ;SET INTO MAINTENANCE MODE
443 025064                          25$:
444 025064                              BGNSEG                        ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
    025064  104404                                                                 TRAP    C$BSEG
445
446 025066  110402                      MOVB    R4,R2                 ;EXPECTED DATA FROM WRAP-AROUND
447 025070  004737  016336              JSR     PC,CHKTSSR            ;WAIT FOR READY, NON-AMBIGUOUS
448 025074  010465  000000              MOV     R4,TSDB(R5)           ;LOAD ADDRESS INTO TSDB
449 025100  004737  016336              JSR     PC,CHKTSSR            ;WAIT FOR READY, NON-AMBIGUOUS
450 025104  110265  000000              MOVB    R2,TSDB(R5)           ;LOADS DATA INTO RAM LOCATION
451 025110  004737  016336              JSR     PC,CHKTSSR            ;WAIT FOR READY, NON-AMBIGUOUS
452 025114  016501  000000              MOV     TSBA(R5),R1           ;READS WRAP DATA
453 025120  120102                      CMPB    R1,R2                 ;DOES WRITTEN(WRAP) = READ
454 025122  001404                      BEQ     30$                   ;BR IF OK, THEY ARE EQUAL
458 025124                              ERRHRD  ERRNO,TSBAM2,EXPREC   ;DATA NOT WRAPPED CORRECTLY
    025124  104456                                                                  TRAP    C$ERHRD
    025126  000622                                                                 .WORD   402
    025130  026160                                                                 .WORD   TSBAM2
    025132  015474                                                                 .WORD   EXPREC
459 025134                          30$:
460 025134                              ENDSEG                        ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
    025134                                                                      10000$:
    025134  104405                                                                 TRAP    C$ESEG
461
462 025136  005204                      INC     R4                    ;NEXT ADDRESS
463 025140  020427  010000              CMP     R4,#10000             ;END OF RAM MEMORY CHECK
464 025144  001347                      BNE     25$                   ;LOOP TILL ALL RAM WRITTEN
465 025146                              ESCAPE  SUB                   ;DON'T CONTINUE IF ERROR ON WRITE
    025146  104410                                                                  TRAP    C$ESCAPE
    025150  000102                                                                 .WORD   L10044-.
466
467 025152  005002                      CLR     R2                    ;CLEAR OUT R2 HIGH BITS
468 025154  005304                      DEC     R4                    ;SET BACK TO 7777
469 025156  110402                  40$:MOVB    R4,R2                 ;GET DATA PATTERN BACK IN SHAPE
470 025160  004737  016336              JSR     PC,CHKTSSR            ;WAIT FOR READY, NON-AMBIGUOUS
471 025164  010465  000000              MOV     R4,TSDB(R5)           ;LOAD UP RAM ADDRESS POINTER
472 025170  004737  016336              JSR     PC,CHKTSSR            ;WAIT FOR READY, NON-AMBIGUOUS
473 025174  016501  000000              MOV     TSBA(R5),R1           ;READ RAM CONTENTS BACK
474 025200  120102                      CMPB    R1,R2                 ;CHECK WITH DATA WRITTEN
475 025202  001404                      BEQ     45$                   ;BR IF OK, DATA IN = DATA OUT
479 025204                              ERRHRD  ERRNO,TSBAM2,EXPREC   ;WRITTEN DATA NOT = TO READ
    025204  104456                                                                  TRAP    C$ERHRD
    025206  000623                                                                 .WORD   403
    025210  026160                                                                 .WORD   TSBAM2
    025212  015474                                                                 .WORD   EXPREC
480 025214                          45$:CKLOOP                        ;SCOPE LOOP
    025214  104406                                                                  TRAP    C$CLP1
481 025216  116501  000001              MOVB    TSBAH(R5),R1          ;HIGH BYTE READ OF TSBA
482 025222  010402                      MOV     R4,R2                 ;DATA PATTERN WRITTEN
483 025224  000302                      SWAB    R2                    ;HIGH TO LOW
484 025226  060402                      ADD     R4,R2                 ;TOTAL OF BYTES IN LOW BYTE
485 025230  120102                      CMPB    R1,R2                 ;SUM OF BYTES WRITTEN TO TSDB = TSBAH
486 025232  001404                      BEQ     50$                   ;BR IF OK, THEY SHOULD BE
490 025234                              ERRHRD  ERRNO,M2901,EXPREC    ;2901 PROBLEM ADDER
    025234  104456                                                                  TRAP    C$ERHRD
    025236  000624                                                                 .WORD   404
    025240  026070                                                                 .WORD   M2901
```

```
    025242  015474                                                              .WORD   EXPREC
    025244                          50$:    CKLOOP                          ;SCOPE LOOP
    025244  104406                                                              TRAP    C$CLP1
    025246  005304                          DEC     R4                      ;DROP DATA COUNTER (PATTERN)
    025250  002342                          BGE     40$                     ;NOT AT LOC. ZERO YET

    025252                                  ENDSUB                          ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
    025252                                                                          L10044:
    025252  104403                                                              TRAP    C$ESUB


    025254                                  BGNSUB                          ;///////////// BEGIN SUBTEST ////////////
    025254                                                                          T4.2:
    025254  104402                                                              TRAP    C$BSUB
                                    ;       TEST 4, SUBTEST 2

                                    ;
                                    ;       THIS SUBTEST WRITES RAM WITH ALL ZEROS
                                    ;       THEN WALKS AN ALL ONES WORD DOWN THROUGH MEMORY
                                    ;
    025256  004737  015774                  JSR     PC,SOFINIT              ;DO INITIALIZE ON CONTROLLER
    025262  103405                          BCS     20$                     ;BR IF INIT WAS OK
    025264  010001                          MOV     R0,R1                   ;CONTENTS OF TSSR REGISTER
    025266                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;FATAL ERROR TSSR WAS NOT OK
    025266  104455                                                              TRAP    C$ERDF
    025270  000625                                                              .WORD   405
    025272  003650                                                              .WORD   SFIERR
    025274  012034                                                              .WORD   SFIMSG
    025276  005002                  20$:    CLR     R2                      ;TEST DATA = 0
    025300  005004                          CLR     R4                      ;STARTING RAM ADDRESS = 0
    025302  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
    025306  105065  000000                  CLRB    TSDB(R5)                ;SET INTO MAINTENANCE MODE
    025312                          25$:
    025312                                  BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
    025312  104404                                                              TRAP    C$BSEG

    025314  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
    025320  010465  000000                  MOV     R4,TSDB(R5)             ;LOAD ADDRESS INTO TSDB
    025324  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
    025330  110265  000000                  MOVB    R2,TSDB(R5)             ;LOADS DATA INTO RAM LOCATION
    025334  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
    025340  016501  000000                  MOV     TSBA(R5),R1             ;READS WRAP DATA
    025344  120102                          CMPB    R1,R2                   ;DOES WRITTEN(WRAP) = READ ?
    025346  001404                          BEQ     30$                     ;BR IF OK, THEY ARE EQUAL
    025350                                  ERRHRD  ERRNO,TSBAM2,EXPREC     ;DATA NOT WRAPPED CORRECTLY
    025350  104456                                                              TRAP    C$ERHRD
    025352  000626                                                              .WORD   406
    025354  026160                                                              .WORD   TSBAM2
    025356  015474                                                              .WORD   EXPREC
    025360                          30$:
    025360                                  ENDSEG                          ;<<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
    025360                                                                          10000$:
    025360  104405                                                              TRAP    C$ESEG

    025362  005204                          INC     R4                      ;NEXT ADDRESS
    025364  020427  010000                  CMP     R4 #10000               ;END OF RAM MEMORY CHECK
    025370  001350                          BNE     25$                     ;BR, MORE RAM TO GO
```

```
537
538 025372  005304                35$:    DEC     R4                      ;SET BACK TO 7777
539 025374  005002                        CLR     R2                      ;SET TO ALL ZEROS
540 025376  004737  016336        40$:    JSR     PC,CHKTSSR              ;WAIT FOR READY (SSR) TO SET
541 025402  010465  000000                MOV     R4,TSDB(R5)             ;LOAD UP THE ADDRESS FOR RAM
542 025406  004737  016336                JSR     PC,CHKTSSR              ;WAIT FOR READY (SSR) TO SET
543 025412  016501  000000                MOV     TSBA(R5),R1             ;READ THE RAM CONTENTS BACK
544 025416  005002                        CLR     R2                      ;LOOKING FOR 000000 (EXPECTED)
545 025420  120102                        CMPB    R1,R2                   ;BOTH SHOULD BE 00000000 BINARY
546 025422  001404                        BEQ     43$                     ;BR, IF DATA IS GOOD
550 025424                                ERRHRD  ERRNO,TSBAM3,EXPREC     ;CHARACTERISTICS DATA NOT CORRECT
    025424  104456                                                            TRAP    C$ERHRD
    025426  000627                                                           .WORD   407
    025430  026242                                                           .WORD   TSBAM3
    025432  015474                                                           .WORD   EXPREC
551 025434  012702  000377        43$:    MOV     #000377,R2              ;SET ALL ONES WORD
552 025440  010465  000000                MOV     R4,TSDB(R5)             ;LOAD UP RAM ADDRESS POINTER
553 025444  004737  016336                JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
554 025450  110265  000000                MOVB    R2,TSDB(R5)             ;WRITE DATA INTO RAM
555 025454  004737  016336                JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
556 025460  016501  000000                MOV     TSBA(R5),R1             ;READ RAM CONTENTS BACK
557 025464  120102                        CMPB    R1,R2                   ;CHECK WITH DATA WRITTEN
558 025466  001404                        BEQ     45$                     ;BR IF OK, DATA IN = DATA OUT
562 025470                                ERRHRD  ERRNO,TSBAM2,EXPREC     ;WRITTEN DATA NOT = TO READ
    025470  104456                                                            TRAP    C$ERHRD
    025472  000630                                                           .WORD   408
    025474  026160                                                           .WORD   TSBAM2
    025476  015474                                                           .WORD   EXPREC
563 025500                        45$:    CKLOOP                          ;SCOPE LOOP
    025500  104406                                                            TRAP    C$C_P1
564 025502  004737  016336                JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
565 025506  010465  000000                MOV     R4,TSDB(R5)             ;WORD WRITE TO SET UP ADDRESS
566 025512  004737  016336                JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
567 025516  116501  000001                MOVB    TSBAH(R5),R1            ;HIGH BYTE READ OF TSBA
568 025522  010403                        MOV     R4,R3                   ;DATA PATTERN WRITTEN
569 025524  000303                        SWAB    R3                      ;HIGH TO LOW
570 025526  060403                        ADD     R4,R3                   ;TOTAL OF BYTES IN LOW BYTE
571 025530  120103                        CMPB    R1,R3                   ;SUM OF BYTES WRITTEN TO TSDB = TSBAH
572 025532  001404                        BEQ     50$                     ;BR IF OK, THEY SHOULD BE
576 025534                                ERRHRD  ERRNO,M2901,EXPREC      ;2901 PROBLEM ADDER
    025534  104456                                                            TRAP    C$ERHRD
    025536  000631                                                           .WORD   409
    025540  026070                                                           .WORD   M2901
    025542  015474                                                           .WORD   EXPREC
577 025544                        50$:    CKLOOP                          ;SCOPE LOOP
    025544  104406                                                            TRAP    C$CLP1
578 025546  005304                        DEC     R4                      ;DROP RAM ADDRESS POINTER
579 025550  002312                        BGE     40$                     ;NOT AT LOC. ZERO YET
580
581 025552                                ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
    025552                                                                L10045:
    025552  104403                                                            TRAP    C$ESUB
582
583
584 025554                                BGNSUB                          ;///////////// BEGIN SUBTEST ////////////
    025554                                                                T4.3:
    025554  104402                                                            TRAP    C$BSUB
```

```
                                ;       TEST 4, SUBTEST 3
                                ;
                                ;       THIS SUBTEST WRITES RAM WITH ALL ONES
                                ;       THEN WALKS A ZERO WORD DOWN THROUGH MEMORY
                                ;
025556  004737  015774          20$:    JSR     PC,$OFINIT              ;DO INITIALIZE ON CONTROLLER
025562  103405                          BCS     20$                     ;BR IF INIT WAS OK
025564  010001                          MOV     R0,R1                   ;CONTENTS OF TSSR REGISTER
025566                          30$:    ERRDF   ERRNO,SFIERR,SFIMSG     ;FATAL ERROR TSSR WAS NOT OK
025566  104455                                                                  TRAP    C$ERDF
025570  000632                                                                  .WORD   410
025572  003650                                                                  .WORD   SFIERR
025574  012034                                                                  .WORD   SFIMSG
025576  012702  177777          20$:    MOV     #177777,R2              ;SET DATA AT ALL ONES
025602  005004                          CLR     R4                      ;SET RAM ADDRESS AT ZERO
025604  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
025610  105065  000000                  CLRB    TSDB(R5)                ;SET INTO MAINTENANCE MODE
025614                          25$:
025614                          BGNSEG                                  ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
025614  104404                                                                  TRAP    C$BSEG

025616  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
025622  010465  000000                  MOV     R4,TSDB(R5)             ;LOAD ADDRESS INTO TSDB
025626  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
025632  110265  000000                  MOVB    R2,TSDB(R5)             ;LOADS DATA INTO RAM LOCATION
025636  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
025642  016501  000000                  MOV     TSBA(R5),R1             ;READS WRAP DATA
025646  120102                          CMPB    R1,R2                   ;DOES WRITTEN(WRAP) = READ ?
025650  001404                          BEQ     30$                     ;BR IF OK, THEY ARE EQUAL
025652                                  ERRHRD  ERRNO,TSBAM2,EXPREC     ;DATA NOT WRAPPED CORRECTLY
025652  104456                                                                  TRAP    C$ERHRD
025654  000633                                                                  .WORD   411
025656  026160                                                                  .WORD   TSBAM2
025660  015474                                                                  .WORD   EXPREC
025662                          30$:
025662                          ENDSEG                                  ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
025662                                                                                  10000$:
025662  104405                                                                  TRAP    C$ESEG

025664  005204                          INC     R4                      ;NEXT ADDRESS
025666  020427  010000                  CMP     R4,#10000               ;END OF RAM MEMORY CHECK
025672  001350                          BNE     25$                     ;BR, MORE RAM TO GO

025674                          ESCAPE  SUB                             ;NO CHECK IF WRITTEN INCORRECTLY
025674  104410                                                                  TRAP    C$ESCAPE
025676  000152                                                                  .WORD   L10046-.
025700  005304                  35$:    DEC     R4                      ;SET BACK TO 7777
025702  004737  016336          40$:    JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
025706  012702  000377                  MOV     #000377,R2              ;SET UP EXPECTED DATA REGISTER
025712  005001                          CLR     R1                      ;CLEAN OUT REGISTER
025714  010465  000000                  MOV     R4,TSDB(R5)             ;SELECT ADDRESS IN RAM
025720  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR READY (SSR)
025724  016501  000000                  MOV     TSBA(R5),R1             ;PICK UP RAM CONTENTS
025730  120102                          CMPB    R1,R2                   ;IS MEMORY STILL ALL ONES
025732  001404                          BEQ     43$                     ;BR, IF OK (ALL ONES)
025734                                  ERRHRD  ERRNO,TSBAM3,EXPREC     ;MEMORY CHANGED AFTER ALL ONES WRITE
```

```
                025734  104456                                                          TRAP    C$ERHRD
                025736  000634                                                          .WORD   412
                025740  026242                                                          .WORD   TSBAM3
                025742  015474                                                          .WORD   EXPREC
    638 025744  005002                  43$:    CLR     R2                      ;SET UP NEW EXPECTED
    639 025746  010465  000000                  MOV     R4,TSDB(R5)             ;LOAD UP RAM ADDRESS POINTER
    640 025752  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
    641 025756  110265  000000                  MOVB    R2,TSDB(R5)             ;WRITE DATA INTO RAM
    642 025762  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
    643 025766  016501  000000                  MOV     TSBA(R5),R1             ;READ RAM CONTENTS BACK
    644 025772  120102                          CMPB    R1,R2                   ;CHECK WITH DATA WRITTEN
    645 025774  001404                          BEQ     45$                     ;BR IF OK, DATA IN = DATA OUT
    649 025776                                  ERRHRD  ERRNO,TSBAM2,EXPREC     ;WRITTEN DATA NOT = TO READ
                025776  104456                                                          TRAP    C$ERHRD
                026000  000635                                                          .WORD   413
                026002  026160                                                          .WORD   TSBAM2
                026004  015474                                                          .WORD   EXPREC
    650 026006                  45$:    CKLOOP                          ;SCOPE LOOP
                026006  104406                                                          TRAP    C$CLP1
    651 026010  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
    652 026014  116501  000001                  MOVB    TSBAH(R5),R1            ;HIGH BYTE READ OF TSBA
    653 026020  010203                          MOV     R2,R3                   ;DATA PATTERN WRITTEN
    654 026022  000303                          SWAB    R3                      ;HIGH TO LOW
    655 026024  060203                          ADD     R2,R3                   ;TOTAL OF BYTES IN LOW BYTE
    656 026026  120103                          CMPB    R1,R3                   ;SUM OF BYTES WRITTEN TO TSDB = TSBAH
    657 026030  001404                          BEQ     50$                     ;BR IF OK, THEY SHOULD BE
    661 026032                                  ERRHRD  ERRNO,M2901,EXPREC      ;2901 PROBLEM ADDER
                026032  104456                                                          TRAP    C$ERHRD
                026034  000636                                                          .WORD   414
                026036  026070                                                          .WORD   M2901
                026040  015474                                                          .WORD   EXPREC
    662 026042                  50$:    CKLOOP                          ;SCOPE LOOP
                026042  104406                                                          TRAP    C$CLP1
    663 026044  005304                          DEC     R4                      ;DROP RAM ADDRESS POINTER
    664 026046  001315                          BNE     40$                     ;NOT AT LOC. ZERO YET
    665
    666 026050                                  ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
                026050                                                                  L10046:
                026050  104403                                                          TRAP    C$ESUB
    667
    668 026052  004737  016456                  JSR     PC,TSTLOOP              ;DO WE NEED TO ITERATE TEST ?
    669 026056  103002                          BCC     63$                     ;BRANCH IF NOT
    670 026060  000137  025032                  JMP     T4LOOP                  ;EXECUTE AGAIN
    671 026064                  63$:    EXIT    TST                             ;ALL DONE THIS TEST
                026064  104432                                                          TRAP    C$EXIT
                026066  000256                                                          .WORD   L10043-.
    672                         ;+
    673                         ;LOCAL TEXT MESSAGES FOR TEST
    674                         ;-
    675
    676 026070      040     124     123 M2901:  .ASCIZ  ' TSBA High Byte Not Sum of Last TSDB Write (2901 Error)'
    677 026160      040     127     162 TSBAM2: .ASCIZ  ' Write to TSDB Not Equal to Read of TSBA Low Byte'
    678 026242      127     162     151 TSBAM3: .ASCIZ  'Write To RAM Location Modified Another Location'
    679 026322      122     101     115 TST4ID: .ASCIZ  'RAM Verification'
    680                                 .EVEN
    681 026344                          ENDTST
                026344                                                                  L10043:
```

```
    026344  104401                                                              TRAP     C$ETST

                                            .SBTTL  TEST  5: SECOND INITIALIZATION TEST

                                    ;        THIS TEST VERIFIES THE SAME ELEMENTS AS DID INITIALIZATION TEST
                                    ;        #1 AND ALSO CHECKS THAT CERTAIN PARTS OF RAM IS CLEARED TO ZERO
                                    ;        AND THAT 2901 REGISTERS 10 AND 11 ARE ALSO CLEARED TO ZERO.
                                    ;        THIS IS A CONFIDENCE CHECK OF A PART OF THE SELF-TEST SEQUENCE
                                    ;        (I.E., THAT IT IS REALLY BEING EXECUTED).  FOR EACH OF TWO
                                    ;        SUBTESTS (ONE FOR INITIALIZING VIA A BUS INIT, THE OTHER FOR
                                    ;        INITIALIZING BY WRITING INTO THE TSSR), THE FOLLOWING SEQUENCE
                                    ;        IS PERFORMED:
                                    ;
                                    ;
                                    ;             1.  EACH RAM LOCATION AND 2901 REGISTERS 10 AND 11 ARE SET
                                    ;                 TO ALL 1'S BY USING WRITES INTO THE TSDB REGISTER (LOW
                                    ;                 BYTE AND MAINTENANCE MODE WORD WRITES).
                                    ;
                                    ;             2.  THE CONTROLLER IS INITIALIZED AND THE VARIOUS CHECKS ON
                                    ;                 THE TSSR DESCRIBED IN INITIALIZATION TEST #1 ARE
                                    ;                 PERFORMED.
                                    ;
                                    ;             3.  #1'S (377 OCTAL) ARE WRITTEN INTO THE LOW BYTE OF TSDB,
                                    ;                 WHICH SHOULD CAUSE RAM LOCATION 0 TO BE WRITTEN TO ALL
                                    ;                 1'S SINCE 2901 REGISTERS 10 AND 11, SPECIFYING THE RAM
                                    ;                 ADDRESS, SHOULD BE 0.  RAM LOCATION 0 IS VERIFIED BY
                                    ;                 WRITING A WORD OF ZEROS INTO THE TSDB.  THE RESULTING
                                    ;                 LOW BYTE OF TSBA SHOULD CONTAIN ALL 1'S.
                                    ;
                                    ;             4.  THE ENTIRE RAM IS SCANNED.  LOCATION 0 SHOULD CONTAIN
                                    ;                 ALL 1'S AND THE REMAINING LOCATIONS, EXCEPT FOR THE
                                    ;                 MESSAGE BUFFER IMAGE AREA, SHOULD CONTAIN 0.
                                    ;                 DISCREPANCIES ARE REPORTED.  AN ERROR AT THIS POINT IS
                                    ;                 MOST LIKELY DUE TO A ROM, PIPELINE OR SEQUENCER PROBLEM
                                    ;                 OR A TIMING PROBLEM.
                                    ;
                                    ;
                                    ;
                                    ;
    026346                                  BGNTST
    026346                                                                 T5::
    026346  012700  027320                  MOV     #TST5ID,R0              ;ASCII MESSAGE TO IDENTIFY TEST
    026352  004737  016510                  JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
    026356  012737  000024  002214          MOV     #20.,LOOPCNT            ;PERFORM 20 ITERATIONS
    026364                          T5LOOP:
    026364  005037  002220                  CLR     FATFLG                  ;CLEAR THE FATAL ERROR FLAG

    026370                                  BGNSUB                          ;///////////// BEGIN SUBTEST ////////////
    026370                                                                 T5.1:
    026370  104402                                                              TRAP     C$BSUB

    026372  004737  015774                  JSR     PC,SOFINIT              ;DO A SOFT TO START
    026376  103404                          BCS     10$                     ;BRANCH IF O.K.
    026400                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;REPORT ERROR AND DROP DRIVE
    026400  104455                                                              TRAP     C$ERDF
    026402  000765                                                              .WORD    501
    C26404  003650                                                              .WORD    SFIERR
```

```
TSV5A   HARDWARE TESTS  MACRO M1113  14 JUN 84 15:15                                    SEQ 0118
TEST  5: SECOND INITIALIZATION TEST

                                                                                .WORD   SFIMSG
739 026410  012702  177777          10$:    MOV     #-1,R2          ;ALL ONE DATA PATTERN
740 026414  005004                  CLR     R4              ;STARTING RAM ADDRESS
741 026416  004737  016336          JSR     PC,CHKTSSR      ;WAIT FOR READY, NON-AMBIGUOUS
742 026422  105065  000000          15$:    CLRB    TSDB(R5)        ;SET MAINTENANCE MODE
743 026426  004737  016336          JSR     PC,CHKTSSR      ;WAIT FOR READY, NON-AMBIGUOUS
744 026432  010465  000000          MOV     R4,TSDB(R5)     ;SET THE NEXT RAM ADDRESS
745 026436  004737  016336          JSR     PC,CHKTSSR      ;WAIT FOR READY, NON-AMBIGUOUS
746 026442  110265  000000          MOVB    R2,TSDB(R5)     ;LOAD TEST DATA
747 026446  005204                  INC     R4              ;NEXT ADDRESS TO TEST
748 026450  020427  007777          CMP     R4,#7777        ;COMPARE TO LAST ADDRESS
749 026454  003762                  BLE     15$             ;BRANCH TILL ALL DATA WRITTEN
750 026456                          BRESET                  ;ISSUE A BUS RESET
                                                                                TRAP    C$RESET
    026456  104433
751 026460  004737  016336          JSR     PC,CHKTSSR      ;WAIT FOR READY, NON-AMBIGUOUS
752 026464  016501  000002          MOV     TSSR(R5),R1     ;GET THE CONTENTS OF TSSR
753 026470  010102                  MOV     R1,R2           ;CONTENTS OF TSSR
754 026472  042702  176277          BIC     #^C<HIADDR!OFL>,R2      ;THESE BITS MAY BE SET
755 026476  052702  002200          BIS     #SSR!NBA,R2     ;READY AND NEW DATA SHOULD BE SET
756 026502  020102                  CMP     R1,R2           ;COMPARE EXPECTED TO RECEIVED
757 026504  001406                  BEQ     20$             ;BRANCH IF COMPARE
761 026506                          ERRDF   ERRNO,SFMERR,SFFMSG     ;REPORT A FATAL ERROR
                                                                                TRAP    C$ERDF
    026506  104455
    026510  000766                                                              .WORD   502
    026512  003703                                                              .WORD   SFMERR
    026514  012102                                                              .WORD   SFFMSG
762 026516  005237  002220          INC     FATFLG          ;SET FATAL ERROR FLAG
763 026522                  20$:    CKLOOP                  ;LOOP ON ERROR IF FLAG SET
                                                                                TRAP    C$CLP1
    026522  104406
764 026524                          ESCAPE  SUB             ;EXIT IF FATAL ERROR DETECTED
                                                                                TRAP    C$ESCAPE
    026524  104410
    026526  000170                                                              .WORD   L10050-.
765 026530  004737  016336          JSR     PC,CHKTSSR      ;WAIT FOR SSR TO SET
766 026534  105065  000000          CLRB    TSDB(R5)        ;PUT BACK INTO MAINTENANCE MODE
767 026540  004737  016336          JSR     PC,CHKTSSR      ;WAIT FOR READY, NON-AMBIGUOUS
768 026544  005065  000000          CLR     TSDB(R5)        ;SET ADDRESS BACK TO 0000
769 026550  012702  000377          MOV     #377,R2         ;
770 026554  004737  016336          JSR     PC,CHKTSSR      ;WAIT FOR READY, NON-AMBIGUOUS
771 026560  110265  000000          MOVB    R2,TSDB(R5)     ;SHOULD POINT TO RAM 0
772 026564  004737  016336          JSR     PC,CHKTSSR      ;WAIT FOR READY, NON-AMBIGUOUS
773 026570  005065  000000          CLR     TSDB(R5)        ;SELECT LOCATION 0
774 026574  004737  016336          JSR     PC,CHKTSSR      ;WAIT FOR READY, NON-AMBIGUOUS
775 026600  116501  000000          MOVB    TSBA(R5),R1     ;READ RAM LOCATION SPECIFIED
776 026604  120102                  CMPB    R1,R2           ;LOCATION SHOULD BE 377 OCTAL
777 026606  001406                  BEQ     25$             ;BR IF OK
778 026610                          ERRDF   ERRNO,TSADDR,EXPREC     ;WASN'T POINTING TO CORRECT LOC.
                                                                                TRAP    C$ERDF
    026610  104455
    026612  000766                                                              .WORD   502
    026614  027406                                                              .WORD   TSADDR
    026616  015474                                                              .WORD   EXPREC
779 026620  005237  002220          INC     FATFLG          ;SET THE FATAL ERROR FLAG
780 026624                  25$:    CKLOOP                  ;SCOPE LOOP
                                                                                TRAP    C$CLP1
    026624  104406
781 026626                          ESCAPE  SUB             ;NO MORE CHECKS IF FATAL ERROR
                                                                                TRAP    C$ESCAPE
    026626  104410
    026630  000066                                                              .WORD   L10050-.
782 026632  012704  000310          MOV     #310,R4         ;START WITH LOC 310
```

```
783 026636 005002                      CLR     R2                      ;MEMORY EXPECTED SHOULD BE 000000
784 026640 004737 016336               JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
785 026644 010465 000000        30$:   MOV     R4,TSDB(R5)             ;SELECT LOCATION SPECIFIED
786 026650 004737 016336               JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
787 026654 116501 000000               MOVB    TSDB(R5),R1             ;READ LOC CONTENTS
788 026660 120102                      CMPB    R1,R2                   ;CHECK MEMORY FOR 000000
789 026662 001406                      BEQ     40$                     ;BRANCH IF DATA OKAY
790 026664                             ERRDF   ERRNO,TSMEM,SFFMSG      ;MEMORY NOT ZERO AFTER INIT.
    026664 104455                                                              TRAP    C$ERDF
    026666 000766                                                              .WORD   502
    026670 027350                                                              .WORD   TSMEM
    026672 012102                                                              .WORD   SFFMSG
791 026674 005237 002220               INC     FATFLG                  ;SET THE FATAL ERROR FLAG
792 026700                      40$:   CKLOOP
    026700 104406                                                              TRAP    C$CLP1
793 026702                             ESCAPE  SUB                     ;EXIT ON FATAL ERROR
    026702 104410                                                              TRAP    C$ESCAPE
    026704 000012                                                              .WORD   L10050-.
794 026706 005204                      INC     R4                      ;LOOK AT NEXT RAM LOC.
795 026710 020427 000400               CMP     R4,#400                 ;AT TOP OF RAM ADDRESS SPACE
796 026714 001353                      BNE     30$                     ;BRANCH TILL ALL MEMORY TESTED
797
798 026716                             ENDSUB                          ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\\
    026716                                                                  L10050:
    026716 104403                                                              TRAP    C$ESUB
799
800 026720 005737 002220               TST     FATFLG                  ;IS FATAL ERROR FLAG SET ?
801 026724 001404                      BEQ     50$                     ;BRANCH IF NOT
802 026726 004737 017202               JSR     PC,CKDROP               ;NO LOOP, TRY TO DROP DEVICE
803 026732 005037 002220               CLR     FATFLG                  ;CLEAR THE FATAL ERROR FLAG
804 026736                      50$:
805
806 026736                             BGNSUB                          ;////////////// BEGIN SUBTEST ////////////
    026736                                                                     T5.2:
    026736 104402                                                              TRAP    C$BSUB
807
808 026740 004737 015774               JSR     PC,SOFINIT              ;DO A SOFT TO START
809 026744 103404                      BCS     10$                     ;BRANCH IF O.K.
813 026746                             ERRDF   ERRNO,SFIERR,SFIMSG     ;REPORT ERROR AND DROP DRIVE
    026746 104455                                                              TRAP    C$ERDF
    026750 000767                                                              .WORD   503
    026752 003650                                                              .WORD   SFIERR
    026754 012034                                                              .WORD   SFIMSG
814 026756 012702 177777        10$:   MOV     #-1,R2                  ;ALL ONE DATA PATTERN
815 026762 005004                      CLR     R4                      ;STARTING RAM ADDRESS
816 026764 004737 016336               JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
817 026770 105065 000000        15$:   CLRB    TSDB(R5)                ;SET MAINTENANCE MODE
818 026774 004737 016336               JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
819 027000 010465 000000               MOV     R4,TSDB(R5)             ;SET THE NEXT RAM ADDRESS
820 027004 004737 016336               JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
821 027010 110265 000000               MOVB    R2,TSDB(R5)             ;LOAD TEST DATA
822 027014 005204                      INC     R4                      ;NEXT ADDRESS TO TEST
823 027016 020427 007777               CMP     R4,#7777                ;COMPARE TO LAST ADDRESS
824 027022 003762                      BLE     15$                     ;BRANCH TILL ALL DATA WRITTEN
825 027024 005065 000002               CLR     TSSR(R5)                ;ISSUE A SOFT RESET
826 027030 004737 016336               JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
827 027034 016501 000002               MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
```

TEST 5: SECOND INITIALIZATION TEST

```
828 027040  010102                    MOV     R1,R2                   ;CONTENTS OF TSSR
829 027042  042702  176277            BIC     #^C<HIADDR!OFL>,R2      ;THESE BITS MAY BE SET
830 027046  052702  002200            BIS     #SSR!NBA,R2             ;READY AND NEW DATA SHOULD BE SET
831 027052  020102                    CMP     R1,R2                   ;COMPARE EXPECTED TO RECEIVED
832 027054  001406                    BEQ     20$                     ;BRANCH IF COMPARE
836 027056                            ERRDF   ERRNO,SFHERR,SFFMSG     ;REPORT A FATAL ERROR
    027056  104455                                                            TRAP    C$ERDF
    027060  000770                                                            .WORD   504
    027062  003703                                                            .WORD   SFHERR
    027064  012102                                                            .WORD   SFFMSG
837 027066  005237  002220            INC     FATFLG                  ;SET FATAL ERROR FLAG
838 027072                      20$:  CKLOOP                          ;LOOP ON ERROR IF FLAG SET
    027072  104406                                                            TRAP    C$CLP1
839 027074                            ESCAPE  SUB                     ;EXIT IF FATAL ERROR DETECTED
    027074  104410                                                            TRAP    C$ESCAPE
    027076  000170                                                            .WORD   L10051-.
840 027100  004737  016336            JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
841 027104  105065  000000            CLRB    TSDB(R5)                ;PUT BACK INTO MAINTENANCE MODE
842 027110  004737  016336            JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
843 027114  005065  000000            CLR     TSDB(R5)                ;SET ADDRESS BACK TO 0000
844 027120  012702  000377            MOV     #377,R2                 ;
845 027124  004737  016336            JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
846 027130  110265  000000            MOVB    R2,TSDB(R5)             ;SHOULD POINT TO RAM 0
847 027134  004737  016336            JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
848 027140  005065  000000            CLR     TSDB(R5)                ;SELECT LOCATION 0
849 027144  004737  016336            JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
850 027150  116501  000000            MOVB    TSBA(R5),R1             ;READ RAM LOCATION SPECIFIED
851 027154  120102                    CMPB    R1,R2                   ;LOCATION SHOULD BE 377 OCTAL
852 027156  001406                    BEQ     25$                     ;BR IF OK
853 027160                            ERRDF   ERRNO,TSADDR,EXPREC     ;WASN'T POINTING TO CORRECT LOC.
    027160  104455                                                            TRAP    C$ERDF
    027162  000770                                                            .WORD   504
    027164  027406                                                            .WORD   TSADDR
    027166  015474                                                            .WORD   EXPREC
854 027170  005237  002220            INC     FATFLG                  ;SET THE FATAL ERROR FLAG
855 027174                      25$:  CKLOOP                          ;SCOPE LOOP
    027174  104406                                                            TRAP    C$CLP1
856 027176                            ESCAPE  SUB                     ;NO MORE CHECKS IF FATAL ERROR
    027176  104410                                                            TRAP    C$ESCAPE
    027200  000066                                                            .WORD   L10051 .
857 027202  012704  000310            MOV     #310,R4                 ;START WITH LOC 310
858 027206  005002                    CLR     R2                      ;MEMORY EXPECTED SHOULD BE 000000
859 027210  004737  016336            JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
860 027214  010465  000000      30$:  MOV     R4,TSDB(R5)             ;SELECT LOCATION SPECIFIED
861 027220  004737  016336            JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
862 027224  116501  000000            MOVB    TSBA(R5),R1             ;READ LOC CONTENTS
863 027230  120102                    CMPB    R1,R2                   ;CHECK MEMORY FOR 000000
864 027232  001406                    BEQ     40$                     ;BRANCH IF DATA OKAY
865 027234                            ERRDF   ERRNO,TSMEM,SFFMSG      ;MEMORY NOT ZERO AFTER INIT.
    027234  104455                                                            TRAP    C$ERDF
    027236  000770                                                            .WORD   504
    027240  027350                                                            .WORD   TSMEM
    027242  012102                                                            .WORD   SFFMSG
866 027244  005237  002220            INC     FATFLG                  ;SET THE FATAL ERROR FLAG
867 027250                      40$:  CKLOOP
    027250  104406                                                            TRAP    C$CLP1
868 027252                            ESCAPE  SUB                     ;EXIT ON FATAL ERROR
```

```
TEST  5: SECOND INITIALIZATION TEST

    027252  104410                                                          TRAP    C$ESCAPE
    027254  000012                                                          .WORD   L10051 .
869 027256  005204                  INC     R4          ;LOOK AT NEXT RAM LOC.
870 027260  020427  000400          CMP     R4,#400     ;AT TOP OF RAM ADDRESS SPACE
871 027264  001353                  BNE     30$         ;BRANCH TILL ALL MEMORY TESTED
872
873 027266                          ENDSUB              ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\\
    027266                                                      L10051:
    027266  104403                                                          TRAP    C$ESUB
874
875 027270  005737  002220          TST     FATFLG      ;IS FATAL ERROR FLAG SET ?
876 027274  001402                  BEQ     50$         ;BRANCH IF NOT
877 027276  004737  017202          JSR     PC,CKDROP   ;NO LOOP, TRY TO DROP DEVICE
878 027302  004737  016456  50$:    JSR     PC,TSTLOOP  ;SHOULD WE DO ITERATIONS ?
879 027306  103002                  BCC     60$         ;BRANCH IF NOT
880 027310  000137  026364          JMP     TSLOOP      ;LOOP UNTIL COUNT EXPIRED
881 027314                  60$:    EXIT    TST         ;ALL DONE THIS TEST
    027314  104432                                                          TRAP    C$EXIT
    027316  000132                                                          .WORD   L10047-.
882
883                             ;+
884                             ;LOCAL TEXT MESSAGES FOR TEST
885                             ;-
886
887 027320     105     170     164  TST5ID: .ASCIZ  'Extended Initialization'
888 027350     111     156     143  TSMEM:  .ASCIZ  'Incorrect RAM Data After Init'
889 027406     111     156     143  TSADDR: .ASCIZ  'Incorrect RAM Address After Init'
890                                  .EVEN
891 027450                           ENDTST
    027450                                                      L10047:
    027450  104401                                                          TRAP    C$ETST
892
893
894                         .SBTTL  TEST  6: COMMAND REJECT
895
896
897                     ;       THIS TEST VERIFIES THAT ALL COMMANDS OTHER THAN WRITE
898                     ;       CHARACTERISTICS ARE REJECTED DUE TO THE NEED BUFFER ADDRESS
899                     ;       (NBA) BIT BEING SET IN TSSR, AND THAT THE TSBA AND TSSR
900                     ;       REGISTERS ARE LEFT IN THE PROPER STATE AFTER EACH COMMAND IS
901                     ;       REJECTED.  THIS TEST CHECKS MICROPROCESSOR SEQUENCING, BASIC
902                     ;       COMMAND DECODING AND DATI DMA HANDLING.  THIS TEST CONTAINS TWO
903                     ;       SUBTESTS:  SUBTEST 1 SEQUENCES THROUGH ALL COMMAND WORDS (OTHER
904                     ;       THAN WRITE CHARACTERISTICS) WITH THE INTERRUPT ENABLE (IE) BIT
905                     ;       CLEAR AND VERIFIES THAT AN INTERRUPT IS NOT GENERATED BY THE
906                     ;       REJECTED COMMAND;  SUBTEST 2 PERFORMS SIMILARLY TO SUBTEST 1 BUT
907                     ;       SETS THE IE BIT IN EACH COMMAND WORD AND VERIFIES THAT AN
908                     ;       INTERRUPT IS GENERATED WHEN THE COMMAND IS REJECTED.  SUBTEST 1
909                     ;       SETS UP THE INTERRUPT SERVICE ROUTINE TO FLAG UNEXPECTED
910                     ;       INTERRUPTS.  THE COMMAND WORD IN THE COMMAND BUFFER IS
911                     ;       INITIALIZED TO 100000 (OCTAL) AND THE REMAINING THREE WORDS IN
912                     ;       THE COMMAND BUFFER ARE SET TO KNOWN UNIQUE PATTERNS.  THEN THE
913                     ;       FOLLOWING SEQUENCE IS PERFORMED:
914                     ;
915                     ;
916                     ;           1.  INITIALIZE THE CONTROLLER BY WRITING INTO THE TSSR;
917                     ;               PROPER INITIAL CONDITIONS ARE VERIFIED.
```

```
                        ;
                        ;           2.  TSDB IS WRITTEN WITH ADDRESS OF THE COMMAND BUFFER TO
                        ;               START PROCESSING.
                        ;
                        ;           3.  THE PROGRAM WAITS FOR SSR TO SET;  IF SSR DOES NOT SET,
                        ;               AN ERROR REPORT IS ISSUED AND THE TEST IS ABORTED.
                        ;
                        ;           4.  THE CONTENTS OF TSSR ARE CHECKED.  TSSR IS CORRECT IF
                        ;               IT CONTAINS EITHER OCTAL 102206 OR 102306 (BIT 6
                        ;               DEPENDS UPON THE STATE OF THE TAPE TRANSPORT).
                        ;
                        ;           5.  THE CONTENTS OF TSBA ARE CHECKED.  TSBA SHOULD CONTAIN
                        ;               THE INITIAL COMMAND BUFFER ADDRESS (LOADED IN STEP 2)
                        ;               PLUS 10 (OCTAL);  I.E., TSBA SHOULD POINT TO THE WORD
                        ;               JUST AFTER THE COMMAND PACKET (NOTE THAT 4 COMMAND
                        ;               PACKET WORDS ARE ALWAYS FETCHED).
                        ;
                        ;           6.  USING THE MAINTENANCE MODE WRAPAROUND FUNCTIONS, THE
                        ;               COMMAND IMAGE BLOCK IN THE M7196'S RAM (LOCATIONS
                        ;               201-210 (OCTAL)) ARE CHECKED;  THE IMAGE SHOULD CONTAIN
                        ;               A COPY OF THE FOUR COMMAND PACKET WORDS AS SET UP IN
                        ;               CPU MEMORY.
                        ;
                        ;           7.  THE COMMAND WORD IN THE COMMAND BUFFER IS INCREMENTED
                        ;               TO THE NEXT PATTERN NOT CONTAINING WRITE
                        ;               CHARACTERISTICS OR IE.  THE REMAINING THREE WORD OF THE
                        ;               COMMAND BUFFER ARE SEQUENCED WITH PSEUDO-RANDOM DATA.
                        ;               IF THE COMMAND WORD HAS NOT REACHED ITS MAXIMUM VALUE
                        ;               (177777+1), THE TEST SEQUENCE IS REPEATED.
                        ;
                        ;
                        ;        SUBTEST 2 IS IDENTICAL TO SUBTEST 1, EXCEPT THAT THE PROGRAM
                        ;        CAUSES THE IE BIT TO BE SET IN EACH COMMAND WORD AND THEN
                        ;        VERIFIES THAT AN INTERRUPT OCCURS.
                        ;
027452                          BGNTST
027452                                                                  T6::
027452  012700  030703         MOV     #TST6ID,R0              ;ASCII MESSAGE TO IDENTIFY TEST
027456  004737  016510         JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
027462  012737  000024  002214 MOV     #20.,LOOPCNT            ;PERFORM 20 ITERATIONS
027470                  T6LOOP:
027470                          BGNSUB                          ;////////////// BEGIN SUBTEST ////////////
027470                                                                  T6.1:
027470  104402                                                          TRAP    C$BSUB
                        
027472                          SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
027472  012700  000000                                                  MOV     #PRI00,R0
027476  104441                                                          TRAP    C$SPRI
027500  012704  030360         MOV     #T6PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
027504  012703  002750         MOV     #TSTBLK,R3              ;BLOCK OF TEST DATA
027510  012314          5$:     MOV     (R3)+,(R4)              ;INSERT THE NEXT TEST DATA WORD
027512                          BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
027512  104404                                                          TRAP    C$BSEG
027514  004737  015774         JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
027520  103405                  BCS     10$                     ;BR IF SOFT INIT = OK
027522  010001                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
```

```
                                        ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
 027524  104455                                                                   TRAP    C$ERDF
 027526  001131                                                                   .WORD   601
 027530  003650                                                                   .WORD   SFIERR
 027532  012034                                                                   .WORD   SFIMSG
 027534  005037  002220        10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
 027540  005037  002222                CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
 027544  004737  016336                JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
 027550  042714  000200                BIC     #BIT7,(R4)              ;DISABLE INTERRUPTS
 027554  010465  000000                MOV     R4,TSD8(R5)             ;SET THE PACKET ADDRESS
 027560  004737  016250                JSR     PC,WAITF                ;WAIT FOR SSR TO SET
 027564  103407                      BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
 027566  010001                      MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
                                        ERRDF   ERRNO,T6SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
 027570  104455                                                                   TRAP    C$ERDF
 027572  001132                                                                   .WORD   602
 027574  030415                                                                   .WORD   T6SSR
 027576  012046                                                                   .WORD   PKTSSR
 027600  005237  002220                INC     FATFLG                  ;SET FATAL ERROR FLAG
 027604          15$:    CKLOOP                                  ;LOOP ON ERROR, IF FLAG SET
 027604  104406                                                                   TRAP    C$CLP1
                         ESCAPE  SUB                             ;BY-PASS SUBTEST IF FATAL ERROR
 027606  104410                                                                   TRAP    C$ESCAPE
 027610  000170                                                                   .WORD   L10053 .
 027612  005737  002222                TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
 027616  001404                      BEQ     22$                     ;BRANCH IF NOT
                                        ERRHRD  ERRNO,T6INT,PKTSSR
 027620  104456                                                                   TRAP    C$ERHRD
 027622  001133                                                                   .WORD   603
 027624  030473                                                                   .WORD   T6INT
 027626  012046                                                                   .WORD   PKTSSR
 027630  012702  102206        22$:    MOV     #SC!NBA!SSR!TSREJ,R2    ;EXPECTED CONTENTS OF TSSR
 027634  004737  016336                JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
 027640  016501  000002                MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
 027644  032701  000100                BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
 027650  001402                      BEQ     25$                     ;BRANCH IF NOT OFF-LINE
 027652  052702  000100                BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
 027656  020201        25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
 027660  001404                      BEQ     30$                     ;OKAY IF MATCH
                                        ERRHRD  ERRNO,T6NBA,PKTSSR      ;NBA NOT SET TO REJECT
 027662  104456                                                                   TRAP    C$ERHRD
 027664  001134                                                                   .WORD   604
 027666  030370                                                                   .WORD   T6NBA
 027670  012046                                                                   .WORD   PKTSSR
 027672          30$:    CKLOOP                                  ;LOOP ON ERROR ?
 027672  104406                                                                   TRAP    C$CLP1
 027674  004737  016336                JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
 027700  016501  000000                MOV     TSBA(R5),R1             ;GET TSBA REGISTER CONTENTS
 027704  010402                      MOV     R4,R2                   ;START OF THE PACKET
 027706  062702  000010                ADD     #10,R2                  ;EXPECT TSDA TO PACKET + 10
 027712  020102                      CMP     R1,R2                   ;COMPARE EXPECTED TO RECEIVED
 027714  001404                      BEQ     35$                     ;ERROR IF NOT EQUAL
                                        ERRHRD  ERRNO,T6TSBA,EXPREC     ;PRINT THE ERROR & EXPD/RECV
 027716  104456                                                                   TRAP    C$ERHRD
 027720  001135                                                                   .WORD   605
 027722  030631                                                                   .WORD   T6TSBA
 027724  015474                                                                   .WORD   EXPREC
```

```
1021
1022
1023 027726  004737  011114          35$:    JSR     PC,CKRAM                ;SEE IF DATA IN RAM IS CORRECT
1024 027732  103404                          BCS     40$                     ;BRANCH IF PACKET IN RAM IS CORRECT
1028 027734                                  ERRHRD  ERRNO,PKTRAM,RAMERR     ;REPORT THE RAM ERROR(S)
     027734  104456                                                                  TRAP    C$ERHRD
     027736  001136                                                                  .WORD   606
     027740  004743                                                                  .WORD   PKTRAM
     027742  015510                                                                  .WORD   RAMERR
1029 027744                          40$:    ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
     027744                                                                      10000$:
     027744  104405                                                                  TRAP    C$ESEG
1030 027746  011300                          MOV     (R3),R0                 ;PACKET COMMAND WORD
1031 027750  042700  177740                BIC     #177740,R0              ;GET BITS 0-4
1032 027754  020027  000004                CMP     R0,#4                   ;DON'T TEST WRITE CHARACTERISTICS
1033 027760  001002                          BNE     45$                     ;BRANCH IF OK
1034 027762  062703  000002                ADD     #2,R3                   ;GET NEXT WORD FROM DATA TABLE
1035 027766  020327  003060          45$:    CMP     R3,#TBLEND              ;REACHED END OF TABLE ?
1036 027772  103002                          BHIS    50$                     ;BRANCH IF END OF TABLE
1037 027774  000137  027510                JMP     5$                      ;CONTINUE TEST WITH NEW DATA
1038
1039 030000                          50$:    ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
     030000                                                                      L10053:
     030000  104403                                                                  TRAP    C$ESUB
1040
1041 030002  005737  002220                TST     FATFLG                  ;ANY FATAL ERRORS ?
1042 030006  001402                          BEQ     60$                     ;BRANCH IF NOT
1043 030010  004737  017202                JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
1044
1045 030014                          60$:    BGNSUB                          ;////////////// BEGIN SUBTEST //////////////
     030014                                                                      T6.2:
     030014  104402                                                                  TRAP    C$BSUB
1046
1047 030016                                  SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
     030016  012700  000000                                                          MOV     #PRI00,R0
     030022  104441                                                                  TRAP    C$SPRI
1048 030024  012704  030360                MOV     #T6PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
1049 030030  012703  002750                MOV     #TSTBLK,R3              ;START OF TEST DATA
1050 030034  012314          5$:     MOV     (R3)+,(R4)              ;PLACE NEXT DATA WORD IN PACKET
1051 030036                                  BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
     030036  104404                                                                  TRAP    C$BSEG
1052 030040  004737  015774                JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
1053 030044  103405                          BCS     10$                     ;BR IF SOFT INIT = OK
1057 030046  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
1058 030050                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
     030050  104455                                                                  TRAP    C$ERDF
     030052  001137                                                                  .WORD   607
     030054  003650                                                                  .WORD   SFIERR
     030056  012034                                                                  .WORD   SFIMSG
1059 030060  005037  002220          10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
1060 030064  005037  002222                CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
1061 030070  004737  016336                JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
1062 030074  052714  000200                BIS     #BIT7,(R4)              ;ENABLE INTERRUPTS
1063 030100  010465  000000                MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
1064 030104  004737  016250                JSR     PC,WAITF                ;WAIT FOR SSR TO SET
1065 030110  103407                          BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
1066 030112  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
```

```
1070 030114                                ERRDF   ERRNO,T6SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
     030114  104455                                                                TRAP    C$ERDF
     030116  001140                                                                .WORD   608
     030120  030415                                                                .WORD   T6SSR
     030122  012046                                                                .WORD   PKTSSR
1071 030124  005237  002220                INC     FATFLG                  ;SET FATAL ERROR FLAG
1072 030130                          15$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     030130  104406                                                                TPAP    C$CLP1
1073 030132                                ESCAPE  SUB                     ;BY-PASS SUBTEST IF FATAL ERROR
     030132  104410                                                                TRAP    C$ESCAPE
     030134  000170                                                                .WORD   L10054-.
1074 030136  005737  002222                TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
1075 030142  001004                        BNE     22$                     ;BRANCH IF YES
1079 030144                                ERRHRD  ERRNO,T6NINT,PKTSSR     ;REPORT ERROR IF NO INTERRUPT
     030144  104456                                                                TRAP    C$ERHRD
     030146  001141                                                                .WORD   609
     030150  030551                                                                .WORD   T6NINT
     030152  012046                                                                .WORD   PKTSSR
1080 030154  012702  102206          22$:   MOV     #SC!NBA!SSR!TSREJ,R2    ;EXPECTED CONTENTS OF TSSR
1081 030160  004737  016336                JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
1082 030164  016501  000002                MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
1083 030170  032701  000100                BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
1084 030174  001402                        BEQ     25$                     ;BRANCH IF NOT OFF-LINE
1085 030176  052702  000100                BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
1086 030202  020201                  25$:   CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
1087 030204  001404                        BEQ     30$                     ;OKAY IF MATCH
1091 030206                                ERRHRD  ERRNO,T6NBA,PKTSSR      ;NBA NOT SET TO REJECT
     030206  104456                                                                TRAP    C$ERHRD
     030210  001142                                                                .WORD   610
     030212  030370                                                                .WORD   T6NBA
     030214  012046                                                                .WORD   PKTSSR
1092 030216                          30$:   CKLOOP                          ;LOOP ON ERROR ?
     030216  104406                                                                TRAP    C$CLP1
1093 030220  004737  016336                JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
1094 030224  016501  000000                MOV     TSBA(R5),R1             ;GET TSBA REGISTER CONTENTS
1095 030230  010402                        MOV     R4,R2                   ;START OF THE PACKET
1096 030232  062702  000010                ADD     #10,R2                  ;EXPECT TSDA TO PACKET + 10
1097 030236  020102                        CMP     R1,R2                   ;COMPARE EXPECTED TO RECEIVED
1098 030240  001404                        BEQ     35$                     ;ERROR IF NOT EQUAL
1102 030242                                ERRHRD  ERRNO,T6TSBA,EXPREC     ;PRINT THE ERROR & EXPD/RECV
     030242  104456                                                                TRAP    C$ERHRD
     030244  001143                                                                .WORD   611
     030246  030631                                                                .WORD   T6TSBA
     030250  015474                                                                .WORD   EXPREC
1103
1104
1105 030252  004737  011114          35$:   JSR     PC,CKRAM                ;SEE IF DATA IN RAM IS CORRECT
1106 030256  103404                        BCS     40$                     ;BRANCH IF PACKET IN RAM IS CORRECT
1110 030260                                ERRHRD  ERRNO,PKTRAM,RAMERR     ;REPORT THE RAM ERROR(S)
     030260  104456                                                                TRAP    C$EPHRD
     030262  001144                                                                .WORD   612
     030264  004743                                                                .WORD   PKTRAM
     030266  015510                                                                .WORD   RAMERR
1111 030270                          40$:   ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
     030270                                                                   10000$:
     030270  104405                                                                TRAP    C$ESEG
1112 030272  011300                        MOV     (R3),R0                 ;NEXT PACKET COMMAND WORD
```

```
1113 030274  042700  177740                BIC     #177740,R0          ;GET BITS 0-4
1114 030300  020027  000004                CMP     R0,#4               ;DON'T TEST WRITE CHARACTERISTICS
1115 030304  001002                        BNE     45$                 ;BRANCH IF NOT WRITE CHARACTERISTICS
1116 030306  062703  000002                ADD     #2,R3               ;BY-PASS WRITE CHARACTERISTCS
1117 030312  020327  003060        45$:    CMP     R3,#TBLEND          ;HAVE WE COMPLETED DATA TABLE ?
1118 030316  103002                        BHIS    50$                 ;BRANCH IF ALL TESTED
1119 030320  000137  030034                JMP     5$                  ;TEST WITH NEXT DATA
1120
1121 030324                        50$:    ENDSUB                      ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
     030324                                                                    L10054:
     030324  104403                                                                TRAP    C$ESUB
1122 030326  005737  002220                TST     FATFLG              ;ANY FATAL ERRORS ?
1123 030332  001402                        BEQ     60$                 ;BRANCH IF NOT
1124 030334  004737  017202                JSR     PC,CKDROP           ;TRY TO DROP THE UNIT
1125 030340  004737  016456        60$:    JSR     PC,TSTLOOP          ;SHOULD WE DO ITERATIONS ?
1126 030344  103002                        BCC     62$                 ;BRANCH IF NOT
1127 030346  000137  027470                JMP     T6LOOP              ;LOOP UNTIL COUNT EXPIRED
1128 030352                        62$:    EXIT    TST                 ;ALL DONE THIS TEST
     030352  104432                                                                TRAP    C$EXIT
     030354  000346                                                                .WORD   L10052-.
1129
1130                                       ;+
1131                                       ;LOCAL STORAGE FOR THIS TEST
1132                                       ;-
1133
1135 030356                                .BLKB   10-<.-TSV2&7>
1137 030360                        16PACKET:                           ;COMMAND PACKET FOR TEST
1138 030360  000000                        .WORD   0                   ;WILL CONTAIN VARIABLE COMMANDS
1139 030362  052525                        .WORD   052525
1140 030364  125252                        .WORD   125252
1141 030366  052525                        .WORD   052525
1142
1143
1144                                       ;+
1145                                       ;LOCAL TEXT MESSAGES FOR TEST
1146                                       ;-
1147
1148 030370     103     157     155  T6NBA:  .ASCIZ  'Command Not Rejected'
1149 030415     103     157     156  T6SSR:  .ASCIZ  'Contents of TSSR Incorrect After Write Packet'
1150 030473     125     156     145  T6INT:  .ASCIZ  'Unexpected Interrupt Received On Write Packet'
1151 030551     105     170     160  T6NINT: .ASCIZ  'Expected Interrupt Not Received On Write Packet'
1152 030631     111     156     143  T6TSBA: .ASCIZ  'Incorrect TSBA Address After Packet Write'
1153 030703     103     157     155  TST6ID: .ASCIZ  'Command Reject'
1154                                       .EVEN
1155 030722                               ENDTST
     030722                                                                L10052:
     030722  104401                                                                TRAP    C$ETST
1156
1157                                       .SBTTL  TEST  7: WRITE CHARACTERISTICS
1158
1159
1160                                       ;       THIS TEST VERIFIES BASIC OPERATION OF THE WRITE CHARACTERISTICS
1161                                       ;       COMMAND.  IT VERIFIES THAT THE COMMAND BLOCK AND CHARACTERISTICS
1162                                       ;       DATA BLOCK ARE FETCHED PROPERLY FROM CPU MEMORY, THE NEED BUFFER
1163                                       ;       ADDRESS (NBA) BIT IN TSSR IS HANDLED PROPERLY, AND THAT A PROPER
1164                                       ;       MESSAGE PACKET IS STORED, WHERE APPROPRIATE.  THIS TEST DOES NOT
1165                                       ;       CHECK THAT THE VARIOUS FUNCTIONS ENABLED BY CHARACTERISTIC MODE
```

```
                                        ;       DATA BITS OPERATE PROPERLY;  THE FUNCTIONING OF THESE BITS IS
                                        ;       VERIFIED IN SUBSEQUENT TESTS.  ALL COMMANDS EXECUTED IN THIS
                                        ;       TEST HAVE THE INTERRUPT ENABLE (IE) BIT CLEARED TO ZERO, SO NO
                                        ;       INTERRUPTS SHOULD BE GENERATED.  HOWEVER, THE PROGRAM RUNS AT
                                        ;       PROCESSOR PRIORITY 0, WITH THE INTERRUPT SERVICE ROUTINE SET UP
                                        ;       TO FLAG UNEXPECTED INTERRUPTS.  IF AN INTERRUPT OCCURS, A
                                        ;       PROBLEM EXISTS IN EITHER THE LSI-11 BUS INTERFACE SECTION OR IN
                                        ;       THE ROM OR PIPELINE.
                                        ;
                                        ;       THIS TEST CHECKS VARIOUS MICROPROGRAM SEQUENCES, COMMAND
                                        ;       DECODING, DMA LOGIC, AND BASIC PACKET PROTOCOL HANDLING.  THIS
                                        ;       IS THE FIRST TEST IN WHICH DATO DMA CYCLES (FOR STORING THE
                                        ;       MESSAGE PACKET) ARE PERFORMED.  ANY ERRORS IN THE BODY OF THE
                                        ;       TEST (I.E. ERRORS OTHER THAN INITIALIZATION ERRORS RELATED TO
                                        ;       THE TRANSPORT BUS) DEFINITELY INDICATE A BAD M7196 MODULE.
                                        ;
                                        ;
                                        ;
030724                                  BGNTST
030724                                                                          T7::
030724  012700  034213                  MOV     #TST7ID,R0              ;ASCII MESSAGE TO IDENTIFY TEST
030730  004737  016510                  JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
030734  012737  000024  002214          MOV     #20.,LOOPCNT            ;PERFORM 20 ITERATIONS
030742                          T7LOOP:
030742                                  BGNSUB                          ;/////////// BEGIN SUBTEST ////////////
030742                                                                          T7.1:
030742  104402                                                                  TRAP    C$BSUB
030744  004737  034242                  JSR     PC,T7REST               ;SET PACKET TO START-UP VALUES

030750                                  SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
030750  012700  000000                                                          MOV     #PRI00,R0
030754  104441                                                                  TRAP    C$SPRI
030756  012703  002762                  MOV     #TSTBLK+10.,R3          ;START OF TEST DATA
030762  012704  033060                  MOV     #T7PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
030766  012764  000010  000006          MOV     #8.,PKBCNT(R4)          ;START WITH MINIMUM ALLOWABLE VALUE
030774                          5$:
030774                                  BGNSEG                          ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
030774  104404                                                                  TRAP    C$BSEG

030776  004737  015774                  JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
031002  103405                          BCS     10$                     ;BR IF SOFT INIT = OK
031004  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
031006                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
031006  104455                                                                  TRAP    C$ERDF
031010  001275                                                                  .WORD   701
031012  003650                                                                  .WORD   SFIERR
031014  012034                                                                  .WORD   SFIMSG
031016  005037  002220          10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
031022  005037  002222                  CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
031026  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
031032  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
031036  103407                          BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
031040  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
031042                                  ERRDF   ERRNO,T7SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
031042  104455                                                                  TRAP    C$ERDF
031044  001276                                                                  .WORD   702
031046  033661                                                                  .WORD   T7SSR
```

```
031050  012046                                                           .WORD   PKTSSR
031052  005237  002220                   INC     FATFLG          ;SET FATAL ERROR FLAG
031056                           15$:    CKLOOP                  ;LOOP ON ERROR, IF FLAG SET
031056  104406                                                           TRAP    C$CLP1
031060                                   ESCAPE  SEG             ;BY-PASS SUBTEST IF FATAL ERROR
031060  104410                                                           TRAP    C$ESCAPE
031062  000152                                                           .WORD   10000$ .
031064  005737  002222                   TST     INTRECV         ;DID AN INTERRUPT OCCUR ?
031070  001404                           BEQ     22$             ;BRANCH IF NOT
031072                                   ERRHRD  ERRNO,T7INT,PKTSSR
031072  104456                                                           TRAP    C$ERHRD
031074  001277                                                           .WORD   703
031076  034041                                                           .WORD   T7INT
031100  012046                                                           .WORD   PKTSSR
031102  016501  000002           22$:    MOV     TSSR(R5),R1     ;GET THE CONTENTS OF TSSR
031106  012702  000200                   MOV     #SSR,R2         ;EXPECTED CONTENTS OF TSSR
031112  032701  000100                   BIT     #OFL,R1         ;IS OFF-LINE BIT SET ?
031116  001402                           BEQ     25$             ;BRANCH IF NOT OFF-LINE
031120  052702  000100                   BIS     #OFL,R2         ;SET OFF-LINE IN EXPECTED DATA
031124  020201                   25$:    CMP     R2,R1           ;DOES EXPECTED MATCH RECEIVED ?
031126  001404                           BEQ     30$             ;OKAY IF MATCH
031130                                   ERRHRD  ERRNO,T7NBA,PKTSSR      ;NBA NOT ZERO
031130  104456                                                           TRAP    C$ERHRD
031132  001300                                                           .WORD   704
031134  033220                                                           .WORD   T7NBA
031136  012046                                                           .WORD   PKTSSR
031140                           30$:    CKLOOP                  ;LOOP ON ERROR ?
031140  104406                                                           TRAP    C$CLP1
031142  004737  016336                   JSR     PC,CHKTSSR      ;WAIT FOR READY, NON-AMBIGUOUS
031146  016501  000000                   MOV     TSBA(R5),R1     ;GET TSBA REGISTER CONTENTS
031152  012702  033106                   MOV     #T7BFR,R2       ;START OF THE DATA BUFFER
031156  032762  000200  000012           BIT     #BIT7,XST2(R2)  ;IS EXTENDED FEATURES BIT SET ?
031164  001404                           BEQ     32$             ;BRANCH IF EXTENDED FEATURES OFF
031166  005237  002224                   INC     EXTFEA          ;SET EXTENDED FEATURES FOR SUBTEST 6
031172  062702  000002                   ADD     #2,R2           ;EXTRA WORD IF SPECIAL FEATURES
031176  062702  000016           32$:    ADD     #14.,R2         ;EXPECTED CONTENTS OF TSDA
031202  020102                           CMP     R1,R2           ;COMPARE EXPECTED TO RECEIVED
031204  001404                           BEQ     35$             ;ERROR IF NOT EQUAL
031206                                   ERRHRD  ERRNO,T7TSBA,EXPREC     ;PRINT THE ERROR & EXPD/RECV
031206  104456                                                           TRAP    C$ERHRD
031210  001301                                                           .WORD   705
031212  034130                                                           .WORD   T7TSBA
031214  015474                                                           .WORD   EXPREC


031216  004737  011114           35$:    JSR     PC,CKRAM        ;SEE IF DATA IN RAM IS CORRECT
031222  103404                           BCS     40$             ;BRANCH IF PACKET IN RAM IS CORRECT
031224                                   ERRHRD  ERRNO,PKTRAM,RAMERR     ;REPORT THE RAM ERROR(S)
031224  104456                                                           TRAP    C$ERHRD
031226  001302                                                           .WORD   706
031230  004743                                                           .WORD   PKTRAM
031232  015510                                                           .WORD   RAMERR

031234                           40$:    ENDSEG                  ;<<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
031234                                                           10000$:
031234  104405                                                           TRAP    C$ESEG

```

TEST 7: WRITE CHARACTERISTICS

```
1266 031236  012364  000006                MOV     (R3)+,PKBCNT(R4)        ;SET THE TEST WORD
1267 031242  020327  003060                CMP     R3,#TBLEND              ;HAS ALL DATA BEEN TESTED ?
1268 031246  103002                        BHIS    55$                     ;BRANCH IF ALL DATA DONE
1269 031250  000137  030774                JMP     5$                      ;BRANCH TILL BACK TO ZERO
1270
1271 031254                        55$:    ENDSUB                          ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\\
     031254                                                                                  L10056:
     031254  104403                                                                             TRAP    C$ESUB
1272
1273 031256  005737  002220                TST     FATFLG                  ;ANY FATAL ERRORS ?
1274 031262  001402                        BEQ     60$                     ;BRANCH IF NOT
1275 031264  004737  017202                JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
1276 031270                        60$:
1277
1278                                       ;*
1279                                       ;
1280                                       ;TEST 7, SUBTEST 2
1281                                       ;
1282                                       ;CHECK THAT UNUSED BITS BEING SET CAUSES
1283                                       ;WRITE CHARACTERISTICS COMMAND TO BE REJECTED
1284                                       ;
1285                                       ;-
1286
1287 031270                                BGNSUB                          ;////////////// BEGIN SUBTEST //////////////
     031270                                                                                  T7.2:
     031270  104402                                                                             TRAP    C$BSUB
1288
1289 031272                                SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
     031272  012700  000000                                                                     MOV     #PRI00,R0
     031276  104441                                                                             TRAP    C$SPRI
1290 031300  012703  033126                MOV     #T72DATA,R3             ;START OF TEST DATA FOR SUBTEST
1291 031304  012704  033060        5$:     MOV     #T7PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
1292 031310  004737  034242                JSR     PC,T7REST               ;RESTORE PACKET TO STARTING VALUES
1293
1294 031314                                BGNSEG                          ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
     031314  104404                                                                             TRAP    C$BSEG
1295
1296 031316  004737  015774                JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
1297 031322  103405                        BCS     10$                     ;BR IF SOFT INIT = OK
1301 031324  010001                        MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
1302 031326                                ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
     031326  104455                                                                             TRAP    C$ERDF
     031330  001303                                                                             .WORD   707
     031332  003650                                                                             .WORD   SFIERR
     031334  012034                                                                             .WORD   SFIMSG
1303 031336  005037  002222        10$:    CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
1304 031342  010400                        MOV     R4,R0                   ;START OF THE COMMAND PACKET
1305 031344  061300                        ADD     (R3),R0                 ;OFFSET TO THE DATA WORD TO TEST
1306 031346  056310  000002                BIS     2(R3),(R0)              ;SET THE DATA BITS TO BE TESTED
1307 031352  010465  000000                MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
1308 031356  004737  016250                JSR     PC,WAITF                ;WAIT FOR SSR TO SET
1309 031362  103405                        BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
1310 031364  010001                        MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
1314 031366                                ERRDF   ERRNO,T7SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
     031366  104455                                                                             TPAP    C$ERDF
     031370  001304                                                                             .WORD   708
     031372  033661                                                                             .WORD   T7SSR
```

```
                031374  012046                                                          .WORD   PKTSSR
1315            031376                  15$:    CKLOOP                  ;LOOP ON ERROR, IF FLAG SET
                031376  104406                                                          TRAP    C$CLP1
1316            031400                          ESCAPE  SEG             ;BY-PASS CHECKS IF FATAL ERROR
                031400  104410                                                          TRAP    C$ESCAPE
                031402  000116                                                          .WORD   10000$ .
1317            031404  005737  002222          TST     INTRECV         ;DID AN INTERRUPT OCCUR ?
1318            031410  001404                  BEQ     22$             ;BRANCH IF NOT
1322            031412                          ERRHRD  ERRNO,T7INT,PKTSSR
                031412  104456                                                          TRAP    C$ERHRD
                031414  001305                                                          .WORD   709
                031416  034041                                                          .WORD   T7INT
                031420  012046                                                          .WORD   PKTSSR
1323            031422  016501  000002  22$:    MOV     TSSR(R5),R1     ;GET THE CONTENTS OF TSSR
1324            031426  012702  102206          MOV     #SC!SSR!TSREJ!NBA,R2    ;EXPECTED CONTENTS OF TSSR
1325            031432  032701  000100          BIT     #OFL,R1         ;IS OFF-LINE BIT SET ?
1326            031436  001402                  BEQ     25$             ;BRANCH IF NOT OFF-LINE
1327            031440  052702  000100          BIS     #OFL,R2         ;SET OFF-LINE IN EXPECTED DATA
1328            031444  020201  25$:    CMP     R2,R1           ;DOES EXPECTED MATCH RECEIVED ?
1329            031446  001414                  BEQ     30$             ;OKAY IF MATCH
1330            031450  010100                  MOV     R1,R0           ;DATA FROM TSSR
1331            031452                          XOR     R2,R0           ;FIND BITS IN ERROR
1332            031462  020027  002000          CMP     R0,#NBA         ;IS NBA ONLY BIT IN ERROR ?
1333            031466  001404                  BEQ     30$             ;DON'T PRINT ERROR IF NBA ONLY BAD BIT
1337            031470                          ERRHRD  ERRNO,T72REJ,PKTSSR     ;COMMAND NOT REJECTED
                031470  104456                                                          TRAP    C$ERHRD
                031472  001306                                                          .WORD   710
                031474  033273                                                          .WORD   T72REJ
                031476  012046                                                          .WORD   PKTSSR
1338            031500                  30$:    CKLOOP                  ;LOOP ON ERROR ?
                031500  104406                                                          TRAP    C$CLP1
1339            031502  032701  002000          BIT     #NBA,R1         ;IS NBA BIT SET ?
1340            031506  001004                  BNE     35$             ;OKAY IF NBA SET
1344            031510                          ERRHRD  ERRNO,T72NBA,PKTSSR     ;NBA NOT SET
                031510  104456                                                          TRAP    C$ERHRD
                031512  001307                                                          .WORD   711
                031514  033142                                                          .WORD   T72NBA
                031516  012046                                                          .WORD   PKTSSR
1345            031520                  35$:
1346            031520                          ENDSEG                  ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
                031520                                                                  10000$:
                031520  104405                                                          TRAP    C$ESEG
1347
1348            031522  062703  000004          ADD     #4,R3           ;POINT TO NEXT DATA PAIR
1349            031526  020327  033142          CMP     R3,#T72DONE     ;COMPARE TO END OF TEST DATA
1350            031532  103002                  BHIS    57$             ;BRANCH IF ALL DATA TESTED
1351            031534  000137  031304          JMP     5$              ;BRANCH TILL BACK TO ZERO
1352
1353            031540  57$:    ENDSUB                  ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
                031540                                                                  L10057:
                031540  104403                                                          TRAP    C$ESUB
1354
1355                            ;*
1356                            ;
1357                            ;TEST 7, SUBTEST 3
1358                            ;
1359                            ;CHECK THE WRITE CHARACTERISTICS COMMAND IS REJECTED
```

```
                                        ;IF ISSUED WITH AN INVALID DATA BLOCK BYTE COUNT
                                        ;
                                        ;

 031542                                 BGNSUB                          ;////////////// BEGIN SUBTEST ////////////
 031542                                                                                  T7.3:
 031542  104402                                                                                  TRAP    C$BSUB

 031544                                 SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
 031544  012700  000000                                                                          MOV     #PRI00,R0
 031550  104441                                                                                  TRAP    C$SPRI
 031552  012703  000001                 MOV     #1,R3                   ;STARTING BYTE COUNT
 031556  012704  033060         5$:     MOV     #T7PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
 031562  004737  034242                 JSR     PC,T7REST               ;RESTORE PACKET TO STARTING VALUES

 031566                                 BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
 031566  104404                                                                                  TRAP    C$BSEG

 031570  004737  015774                 JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
 031574  103405                         BCS     10$                     ;BR IF SOFT INIT = OK
 031576  010001                         MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 031600                                 ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
 031600  104455                                                                                  TRAP    C$ERDF
 031602  001310                                                                                  .WORD   712
 031604  003650                                                                                  .WORD   SFIERR
 031606  012034                                                                                  .WORD   SFIMSG
 031610  005037  002222         10$:    CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
 031614  010364  000006                 MOV     R3,PKBCNT(R4)           ;INSERT THE BYTE COUNT FOR TEST
 031620  010465  000000                 MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
 031624  004737  016250                 JSR     PC,WAITF                ;WAIT FOR SSR TO SET
 031630  103405                         BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
 031632  010001                         MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 031634                                 ERRDF   ERRNO,T7SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
 031634  104455                                                                                  TRAP    C$ERDF
 031636  001311                                                                                  .WORD   713
 031640  033661                                                                                  .WORD   T7SSR
 031642  012046                                                                                  .WORD   PKTSSR
 031644                         15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
 031644  104406                                                                                  TRAP    C$CLP1
 031646                                 ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
 031646  104410                                                                                  TRAP    C$ESCAPE
 031650  000116                                                                                  .WORD   10000$ .
 031652  005737  002222                 TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
 031656  001404                         BEQ     22$                     ;BRANCH IF NOT
 031660                                 ERRHRD  ERRNO,T7INT,PKTSSR
 031660  104456                                                                                  TRAP    C$ERHRD
 031662  001312                                                                                  .WORD   714
 031664  034041                                                                                  .WORD   T7INT
 031666  012046                                                                                  .WORD   PKTSSR
 031670  016501  000002         22$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
 031674  012702  102206                 MOV     #SC!SSR!TSREJ!NBA,R2    ;EXPECTED CONTENTS OF TSSR
 031700  032701  000100                 BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
 031704  001402                         BEQ     25$                     ;BRANCH IF NOT OFF-LINE
 031706  052702  000100                 BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
 031712  020201                 25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
 031714  001414                         BEQ     30$                     ;OKAY IF MATCH
 031716  010100                         MOV     R1,R0                   ;DATA FROM TSSR
```

```
1406 031720                                 XOR     R2,R0                   ;FIND BITS IN ERROR
1407 031730  020027  002000                 CMP     R0,#NBA                 ;IS NBA ONLY BIT IN ERROR ?
1408 031734  001404                         BEQ     30$                     ;DON'T PRINT ERROR IF NBA ONLY BAD BIT
1412 031736                                 ERRHRD  ERRNO,T73REJ,PKTSSR     ;COMMAND NOT REJECTED
     031736  104456                                                                TRAP    C$ERHRD
     031740  001313                                                                .WORD   715
     031742  033372                                                                .WORD   T73REJ
     031744  012046                                                                .WORD   PKTSSR
1413 031746                         30$:    CKLOOP                          ;LOOP ON ERROR ?
     031746  104406                                                                TRAP    C$CLP1
1414 031750  032701  002000                 BIT     #NBA,R1                 ;IS NBA BIT SET ?
1415 031754  001004                         BNE     35$                     ;OKAY IF NBA SET
1419 031756                                 ERRHRD  ERRNO,T72NBA,PKTSSR     ;NBA NOT SET
     031756  104456                                                                TRAP    C$ERHRD
     031760  001314                                                                .WORD   716
     031762  033142                                                                .WORD   T72NBA
     031764  012046                                                                .WORD   PKTSSR
1420 031766                         35$:
1421 031766                                 ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
     031766                                                                     10000$:
     031766  104405                                                                TRAP    C$ESEG
1422
1423 031770  005203                         INC     R3                      ;NEXT BYTE COUNT
1424 031772  020327  000006                 CMP     R3,#6                   ;TESTED ALL INVALID ?
1425 031776  002002                         BGE     57$                     ;BRANCH IF TEST DONE
1426 032000  000137  031556                 JMP     5$                      ;BRANCH TILL BACK TO ZERO
1427
1428 032004                         57$:    ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
     032004                                                                     L10060:
     032004  104403                                                                TRAP    C$ESUB
1429
1430                                ;*
1431                                ;
1432                                ;TEST 7, SUBTEST 4
1433                                ;
1434                                ;SUBTEST TO VERIFY THAT A WRITE CHARACTERISTICS COMMAND IS
1435                                ;REJECTED IF AN ILLEGAL DATA BLOCK ADDRESS IS ISSUED.
1436                                ;
1437                                ;-
1438
1439 032006                                 BGNSUB                          ;////////////// BEGIN SUBTEST //////////////
     032006                                                                     T7.4:
     032006  104402                                                                TRAP    C$BSUB
1440
1441 032010                                 SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
     032010  012700  000000                                                         MOV     #PRI00,R0
     032014  104441                                                                 TRAP    C$SPRI
1442 032016  012703  033126                 MOV     #T72DATA,R3             ;START OF TEST DATA FOR SUBTEST
1443 032022  012704  033060         5$:     MOV     #T7PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
1444 032026  004737  034242                 JSR     PC,T7REST               ;RESTORE PACKET TO STARTING VALUES
1445
1446
1447 032032  004737  015774                 JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
1448 032036  103405                         BCS     10$                     ;BR IF SOFT INIT = OK
1452 032040  010001                         MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
1453 032042                                 ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
     032042  104455                                                                TRAP    C$ERDF
```

```
                032044  001315                                                          .WORD   717
                032046  003650                                                          .WORD   SFIERR
                032050  012034                                                          .WORD   SFIMSG
1454            032052  005037  002222          10$:    CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
1455            032056  052737  000001  033070          BIS     #1,T7DATA               ;MAKE ADDRESS ODD
1456            032064  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
1457            032070  004737  016250                  JSR     PC,WAITF                ;WAIT FOR SSR TO SET
1458            032074  103405                          BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
1459            032076  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
1463            032100                                  ERRDF   ERRNO,T7SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
                032100  104455                                                          TRAP    C$ERDF
                032102  001316                                                          .WORD   718
                032104  033661                                                          .WORD   T7SSR
                032106  012046                                                          .WORD   PKTSSR
1464            032110                  15$:    CKLOOP                                  ;LOOP ON ERROR, IF FLAG SET
                032110  104406                                                          TRAP    C$CLP1
1465            032112                          ESCAPE  SUB                             ;BY-PASS SUBTEST IF FATAL ERROR
                032112  104410                                                          TRAP    C$ESCAPE
                032114  000116                                                          .WORD   L10061 .
1466            032116  005737  002222                  TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
1467            032122  001404                          BEQ     22$                     ;BRANCH IF NOT
1471            032124                                  ERRHRD  ERRNO,T7INT,PKTSSR
                032124  104456                                                          TRAP    C$ERHRD
                032126  001317                                                          .WORD   719
                032130  034041                                                          .WORD   T7INT
                032132  012046                                                          .WORD   PKTSSR
1472            032134  016501  000002          22$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
1473            032140  012702  102206                  MOV     #SC!SSR!TSREJ!NBA,R2    ;EXPECTED CONTENTS OF TSSR
1474            032144  032701  000100                  BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
1475            032150  001402                          BEQ     25$                     ;BRANCH IF NOT OFF-LINE
1476            032152  052702  000100                  BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
1477            032156  020201                  25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
1478            032160  001414                          BEQ     30$                     ;OKAY IF MATCH
1479            032162  010100                          MOV     R1,R0                   ;DATA FROM TSSR
1480            032164                                  XOR     R2,R0                   ;FIND BITS IN ERROR
1481            032174  020027  002000                  CMP     R0,#NBA                 ;IS NBA ONLY BIT IN ERROR ?
1482            032200  001404                          BEQ     30$                     ;DON'T PRINT ERROR IF NBA ONLY BAD BIT
1486            032202                                  ERRHRD  ERRNO,T74REJ,PKTSSR     ;COMMAND NOT REJECTED
                032202  104456                                                          TRAP    C$ERHRD
                032204  001320                                                          .WORD   720
                032206  033465                                                          .WORD   T74REJ
                032210  012046                                                          .WORD   PKTSSR
1487            032212                  30$:    CKLOOP                                  ;LOOP ON ERROR ?
                032212  104406                                                          TRAP    C$CLP1
1488            032214  032701  002000                  BIT     #NBA,R1                 ;IS NBA BIT SET ?
1489            032220  001004                          BNE     35$                     ;OKAY IF NBA SET
1493            032222                                  ERRHRD  ERRNO,T72NBA,PKTSSR     ;NBA NOT SET
                032222  104456                                                          TRAP    C$ERHRD
                032224  001321                                                          .WORD   721
                032226  033142                                                          .WORD   T72NBA
                032230  012046                                                          .WORD   PKTSSR
1494
1495            032232                  35$:    ENDSUB                                  ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
                032232                                                                  L10061:
                032232  104403                                                          TRAP    C$ESUB
1496
1497
```

```
                                        ;*
                                        ;
                                        ;TEST 7, SUBTEST 5
                                        ;
                                        ;CHECK THAT WRITE CHARACTERISTICS COMMAND IS REJECTED IF THE
                                        ;MESSAGE BUFFER LENGTH SPECIFIES AN INVALID COUNT (LESS THAN 14)
                                        ;
                                        ;-

                        BGNSUB                          ;////////////// BEGIN SUBTEST //////////////
                                                                T7.5:
032234  104402                                                    TRAP    C$BSUB

                        SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
032236  012700  000000                                            MOV     #PRI00,R0
032242  104441                                                    TRAP    C$SPRI
032244  012703  000001          MOV     #1,R3           ;STARTING BUFFER LENGTH
032250  012704  033060  5$:     MOV     #T7PACKET,R4    ;GET THE ADDRESS OF COMMAND PACKET
032254  004737  034242          JSR     PC,T7REST       ;RESTORE PACKET TO STARTING VALUES

                        BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
032260  104404                                                    TRAP    C$BSEG

032262  004737  015774          JSR     PC,SOFINIT      ;DO SOFT INIT OF CONTROLLER
032266  103405                  BCS     10$             ;BR IF SOFT INIT = OK
032270  010001                  MOV     R0,R1           ;SAVE CONTENTS OF TSSR
032272                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
032272  104455                                                    TRAP    C$ERDF
032274  001322                                                    .WORD   722
032276  003650                                                    .WORD   SFIERR
032300  012034                                                    .WORD   SFIMSG
032302  005037  002222  10$:     CLR     INTRECV         ;CLEAR INTERRUPT RECEIVED FLAG
032306  010337  033074          MOV     R3,T7DATA+4     ;INSERT THE BAD MESSAGE LENGTH
032312  010465  000000          MOV     R4,TSDB(R5)     ;SET THE PACKET ADDRESS
032316  004737  016250          JSR     PC,WAITF        ;WAIT FOR SSR TO SET
032322  103405                  BCS     15$             ;BR IF CARRY SET (GOOD RETURN)
032324  010001                  MOV     R0,R1           ;SAVE CONTENTS OF TSSR
032326                          ERRDF   ERRNO,T7SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
032326  104455                                                    TRAP    C$ERDF
032330  001323                                                    .WORD   723
032332  033661                                                    .WORD   T7SSR
032334  012046                                                    .WORD   PKTSSR
032336  104406          15$:    CKLOOP                  ;LOOP ON ERROR, IF FLAG SET
                                                                TRAP    C$CLP1
032340                          ESCAPE  SEG             ;BY-PASS SUBTEST IF FATAL ERROR
032340  104410                                                    TRAP    C$ESCAPE
032342  000116                                                    .WORD   10000$-.
032344  005737  002222          TST     INTRECV         ;DID AN INTERRUPT OCCUR ?
032350  001404                  BEQ     22$             ;BRANCH IF NOT
032352                          ERRHRD  ERRNO,T7INT,PKTSSR
032352  104456                                                    TRAP    C$ERHRD
032354  001324                                                    .WORD   724
032356  034041                                                    .WORD   T7INT
032360  012046                                                    .WORD   PKTSSR
032362  016501  000002  22$:     MOV     TSSR(R5),R1     ;GET THE CONTENTS OF TSSR
032366  012702  102206          MOV     #SC!SSR!TSREJ!NBA,R2    ;EXPECTED CONTENTS OF TSSR
032372  032701  000100          BIT     #OFL,R1         ;IS OFF-LINE BIT SET ?
```

```
1544 032376  001402                    BEQ     25$                     ;BRANCH IF NOT OFF-LINE
1545 032400  052702  000100            BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
1546 032404  020201              25$:   CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
1547 032406  001414                    BEQ     30$                     ;OKAY IF MATCH
1548 032410  010100                    MOV     R1,R0                   ;DATA FROM TSSR
1549 032412                            XOR     R2,R0                   ;FIND BITS IN ERROR
1550 032422  020027  002000            CMP     R0,#NBA                 ;IS NBA ONLY BIT IN ERROR ?
1551 032426  001404                    BEQ     30$                     ;DON'T PRINT ERROR IF NBA ONLY BAD BIT
1555 032430                            ERRHRD  ERRNO,T75REJ,PKTSSR     :COMMAND NOT REJECTED
     032430  104456                                                            TRAP    C$ERHRD
     032432  001325                                                            .WORD   725
     032434  033563                                                            .WORD   T75REJ
     032436  012046                                                            .WORD   PKTSSR
1556 032440              30$:   CKLOOP                                  ;LOOP ON ERROR ?
     032440  104406                                                            TRAP    C$CLP1
1557 032442  032701  002000            BIT     #NBA,R1                 ;IS NBA BIT SET ?
1558 032446  001004                    BNE     35$                     ;OKAY IF NBA SET
1562 032450                            ERRHRD  ERRNO,T72NBA,PKTSSR     ;NBA NOT SET
     032450  104456                                                            TRAP    C$ERHRD
     032452  001326                                                            .WORD   726
     032454  033142                                                            .WORD   T72NBA
     032456  012046                                                            .WORD   PKTSSR
1563 032460              35$:
1564 032460                            ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
     032460                                                                 10000$:
     032460  104405                                                            TRAP    C$ESEG
1565
1566 032462  005203                    INC     R3                      ;NEXT BUFFER LENGTH
1567 032464  020327  000016            CMP     R3,#14.                 ;HAVE ALL BAD VALUES BEEN TESTED ?
1568 032470  002002                    BGE     57$                     ;BRANCH IF ALL TESTED
1569 032472  000137  032250            JMP     5$                      ;BRANCH TILL BACK TO ZERO
1570
1571 032476              57$:   ENDSUB                                  ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
     032476                                                                 L10062:
     032476  104403                                                            TRAP    C$ESUB
1572
1573                                    ;*
1574                                    ;
1575                                    ;TEST 7, SUBTEST 6
1576                                    ;
1577                                    ;THIS SUBTEST IS EXECUTED ONLY IF THE EXTENDED
1578                                    ;FEATURES MODE IS ENABLED (AS DETERMINED BY EXAMINING
1579                                    ;XST2 AFTER A PREVIOUS EXECUTION OF WRITE CHARACTERISTICS).
1580                                    ;IT VERIFIES THAT A FIFTH CHARACTERISTICS DATA WORD IS FETCHED
1581                                    ;IF THE BYTE COUNT PARAMETER IN THE COMMAND PACKET IS 10 DECIMAL
1582                                    ;OR GREATER.
1583                                    ;
1584                                    ;-
1585 032500                            BGNSUB                          ;////////////// BEGIN SUBTEST //////////////
     032500                                                                 T7.6:
     032500  104402                                                            TRAP    C$BSUB
1586 032502  005737  002224            TST     EXTFEA                  ;IS EXTENDED FEATURES SOFT. SW SET?
1587 032506  001002                    BNE     4$                      ;BR. IF SOFTWARE SWITCH IS SET (ON)
1588 032510                            EXIT    TST                     ;NO EXTENDED FEATURES EXIT THIS TEST
     032510  104432                                                            TRAP    C$EXIT
     032512  001576                                                            .WORD   L10055-.
1589 032514  004737  034242      4$:   JSR     PC,T7REST               ;SET PACKET TO START-UP VALUES
```

```
1590
1591 032520                                SETPRI  #PRIOO                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
     032520  012700  000000                                                     MOV     #PRIOO,R0
     032524  104441                                                             TRAP    C$SPRI
1592 032526  012703  002764                MOV     #TSTBLK+12.,R3          ;START OF TEST DATA
1593 032532  012704  033060                MOV     #T7PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
1594 032536  012737  000200  033100        MOV     #200,T7SP               ;SPECIAL BIT SET FOR EXTFEA RAM RD
1595 032544  012764  000012  000006        MOV     #10.,PKBCNT(R4)         ;START WITH EXTENDED FEATURES VALUE
1596 032552                          5$:
1597 032552                                BGNSEG                          ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
     032552  104404                                                             TRAP    C$BSEG
1598
1599 032554  004737  015774                JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
1600 032560  103405                        BCS     10$                     ;BR IF SOFT INIT = OK
1604 032562  010001                        MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
1605 032564                                ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
     032564  104455                                                             TRAP    C$ERDF
     032566  001327                                                             .WORD   727
     032570  003650                                                             .WORD   SFIERR
     032572  012034                                                             .WORD   SFIMSG
1606 032574  005037  002220          10$:   CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
1607 032600  005037  002222                CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
1608 032604  010465  000000                MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
1609 032610  004737  016336                JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
1610 032614  103407                        BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
1611 032616  010001                        MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
1615 032620                                ERRDF   ERRNO,T7SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
     032620  104455                                                             TRAP    C$ERDF
     032622  001330                                                             .WORD   728
     032624  033661                                                             .WORD   T7SSR
     032626  012046                                                             .WORD   PKTSSR
1616 032630  005237  002220                INC     FATFLG                  ;SET FATAL ERROR FLAG
1617 032634                          15$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     032634  104406                                                             TRAP    C$CLP1
1618 032636                                ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
     032636  104410                                                             TRAP    C$ESCAPE
     032640  000156                                                             .WORD   10000$-.
1619 032642  005737  002222                TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
1620 032646  001404                        BEQ     22$                     ;BRANCH IF NOT
1624 032650                                ERRHRD  ERRNO,T7INT,PKTSSR
     032650  104456                                                             TRAP    C$ERHRD
     032652  001331                                                             .WORD   729
     032654  034041                                                             .WORD   T7INT
     032656  012046                                                             .WORD   PKTSSR
1625 032660  016501  000002          22$:   MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
1626 032664  012702  000200                MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
1627 032670  032701  000100                BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
1628 032674  001402                        BEQ     25$                     ;BRANCH IF NOT OFF-LINE
1629 032676  052702  000100                BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
1630 032702  020201          25$:   CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
1631 032704  001404                        BEQ     30$                     ;OKAY IF MATCH
1635 032706                                ERRHRD  ERRNO,T7NBA,PKTSSR      ;NBA NOT ZERO
     032706  104456                                                             TRAP    C$ERHRD
     032710  001332                                                             .WORD   730
     032712  033220                                                             .WORD   T7NBA
     032714  012046                                                             .WORD   PKTSSR
1636 032716                          30$:   CKLOOP                          ;LOOP ON ERROR ?
```

```
                032716  104406                                                          TRAP    C$CLP1
1637            032720  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
1638            032724  016501  000000                  MOV     TSBA(R5),R1             ;GET TSB% REGISTER CONTENTS
1639            032730  012702  033106                  MOV     #T7BFR,R2               ;START OF THE DATA BUFFER
1640            032734  032762  000200  000012          BIT     #BIT7,XST2(R2)          ;IS EXTENDED FEATURES BIT SET ?
1641            032742  001402                          BEQ     32$                     ;BRANCH IF EXTENDED FEATURES OFF
1642            032744  062702  000002                  ADD     #2,R2                   ;EXTRA WORD IF SPECIAL FEATURES
1643            032750  062702  000016          32$:    ADD     #14.,R2                 ;EXPECTED CONTENTS OF TSDA
1644            032754  020102                          CMP     R1,R2                   ;COMPARE EXPECTED TO RECEIVED
1645            032756  001404                          BEQ     35$                     ;ERROR IF NOT EQUAL
1649            032760                                  ERRHRD  ERRNO,T7TSBA,EXPREC     ;PRINT THE ERROR & EXPD/RECV
                032760  104456                                                          TRAP    C$ERHRD
                032762  001333                                                          .WORD   731
                032764  034130                                                          .WORD   T7TSBA
                032766  015474                                                          .WORD   EXPREC
1650
1651
1652            032770  012704  033070          35$:    MOV     #T7DATA,R4              ;SET POINTER FOR CHECKER
1653            032774  004737  011224                  JSR     PC,CKRAM2               ;SEE IF DATA IN RAM IS CORRECT
1654            033000  103404                          BCS     40$                     ;BRANCH IF PACKET IN RAM IS CORRECT
1658            033002                                  ERRHRD  ERRNO,PKTRAM,RAMERR     ;REPORT THE RAM ERROR(S)
                033002  104456                                                          TRAP    C$ERHRD
                033004  001334                                                          .WORD   732
                033006  004743                                                          .WORD   PKTRAM
                033010  015510                                                          .WORD   RAMERR
1659
1660            033012  012704  033060          40$:    MOV     #T7PACKET,R4            ;RESET PACKET POINTER
1661            033016                                  ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
                033016                                                                      10000$:
                033016  104405                                                          TRAP    C$ESEG
1662
1663            033020  012364  000006                  MOV     (R3)+,PKBCNT(R4)        ;SET THE TEST WORD
1664            033024  020327  003060                  CMP     R3,#TBLEND              ;HAS ALL DATA BEEN TESTED ?
1665            033030  103002                          BHIS    55$                     ;BRANCH IF ALL DATA DONE
1666            033032  000137  032552                  JMP     5$                      ;BRANCH TILL BACK TO ZERO
1667
1668            033036                          55$:    ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
                033036                                                                      L10063:
                033036  104403                                                          TRAP    C$ESUB
1669
1670            033040  005737  002220                  TST     FATFLG                  ;ANY FATAL ERRORS ?
1671            033044  001402                          BEQ     60$                     ;BRANCH IF NOT
1672            033046  004737  017202                  JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
1673            033052                          60$:
1674            033052                          EXIT    TST                             ;ALL DONE THIS TEST
                033052  104432                                                          TRAP    C$EXIT
                033054  001234                                                          .WORD   L10055 .
1675
1676                                            ;+
1677                                            ;LOCAL STORAGE FOR THIS TEST
1678                                            ;-
1679
1681            033056                                  .BLKB   10-<.-TSV2&7>
1683            033060                          T7PACKET:                               ;COMMAND PACKET FOR TEST
1684            033060  100004                          .WORD   100004                  ;WRITE CHARACTERISTICS COMMAND, WITH ACK
1685            033062  033070                          .WORD   T7DATA                  ;ADDRESS OF CHARACTERISTICS BLOCK
1686            033064  000000                          .WORD   0
```

```
1687 033066  000010                    .WORD   8.                      ;STARTING VALUE OF BLOCK SIZE
1688
1689 033070                            T7DATA:                         ;CHARACTERISTICS DATA BLOCK
1690 033070  033106                    .WORD   T7BFR                   ;ADDRESS OF MESSAGE BUFFER
1691 033072  000000                    .WORD   0
1692 033074  000016                    .WORD   14.                     ;LENGTH OF MESSAGE BUFFER
1693 033076  000000                    .WORD   0
1694 033100  000000                    T7SP:   .WORD   0               ;EXTFEA EXTRA WORD
1695
1696 033102  000000  000000            .WORD   0,0                     ;SPACE
1697 033106                            T7BFR:  .BLKW   8.              ;MESSAGE BUFFER
1698
1699                                   ;+
1700                                   ;
1701                                   ;TEST DATA FOR SUBTEST TWO
1702                                   ;
1703                                   ;DATA HAS FORMAT:
1704                                   ;
1705                                   ;       1ST WORD        OFFSET TO TEST WORD IN PACKET
1706                                   ;       2ND WORD        BITS TO SET FOR TEST
1707                                   ;
1708                                   ;-
1709
1710 033126                            T72DATA:
1711 033126  000000  037140            .WORD   0,BIT5!BIT6!BIT9!BIT10!BIT11!BIT12!BIT13
1712 033132  000002  000001            .WORD   2,BIT0
1713 033136  000004  100100            .WORD   4,BIT6!BIT15
1714         033142                    T72DONE=.
1715
1716
1717                                   ;+
1718                                   ;LOCAL TEXT MESSAGES FOR TEST
1719                                   ;-
1720
1721 033142     116     102     101   T72NBA: .ASCIZ  'NBA Not Set On Rejected WRITE CHARACTERISTICS
1722 033220     127     122     111   T7NBA:  .ASCIZ  'WRITE CHARACTERISTICS Command Not Accepted'
1723 033273     127     122     111   T72REJ: .ASCIZ  'WRITE CHARACTERISTICS Not Rejected With Non-Zero Unused Fields
1724 033372     127     122     111   T73REJ: .ASCIZ  'WRITE CHARACTERISTICS Not Rejected With Invalid Data Count'
1725 033465     127     122     111   T74REJ: .ASCIZ  'WRITE CHARACTERISTICS Not Rejected With Invalid Block Address
1726 033563     127     122     111   T75REJ: .ASCIZ  'WRITE CHARACTERISTICS Not Rejected With Invalid Buffer Length
1727 033661     103     157     156   T7SSR:  .ASCIZ  'Contents of TSSR Incorrect After WRITE CHARACTERISTICS'
1728 033750     105     170     160   T7NINT: .ASCIZ  'Expected Interrupt Not Received On WRITE CHARACTERISTICS
1729 034041     125     156     145   T7INT:  .ASCIZ  'Unexpected Interrupt Received On WRITE CHARACTERISTICS'
1730 034130     111     156     143   T7TSBA: .ASCIZ  'Incorrect TSBA Address After WRITE CHARACTERISTICS'
1731 034213     127     162     151   TST7ID: .ASCIZ  'Write Characteristics'
1732                                           .EVEN
1733
1734
1735                                   ;+
1736                                   ;
1737                                   ;ROUTINE TO RESTORE COMMAND PACKET TO START-UP (DEFAULT) VALUES
1738                                   ;
1739                                   ;-
1740
1741 034242                            T7REST:
1742 034242                                    SAVREG                  ;SAVE THE REGISTERS
1743 034246  012701  033060                    MOV     @T7PACKET,R1    ;START OF THE PACKET
```

```
1744 034252  012721  100004                MOV     #100004,(R1)+   ;WRITE CHARACTERISTICS WITH ACK
1745 034256  012721  033070                MOV     #T7DATA,(R1)+   ;ADDRESS OF CHAR DATA BLOCK
1746 034262  005021                        CLR     (R1)+           ;EXTENDED ADDRESS
1747 034264  012721  000010                MOV     #8.,(R1)+       ;SIZE OF DATA BLOCK IN BYTES
1748 034270  012721  033106                MOV     #T7BFR,(R1)+    ;ADDRESS OF MESSAGE BUFFER
1749 034274  005021                        CLR     (R1)+
1750 034276  012721  000020                MOV     #16.,(R1)+      ;LENGTH OF MESSAGE BUFFER
1751 034302  005021                        CLR     (R1)+
1752 034304  005011                        CLR     (R1)
1753 034306  000207                        RTS     PC              ;RETURN
1754 034310                                ENDTST
     034310                                                                L10055:
     034310  104401                                                               TRAP    C$ETST
1755
1756
1757                                       .SBTTL  TEST  8: VOLUME CHECK
1758
1759
1760                                ;       THIS TEST VERIFIES THAT THE VOLUME CHECK (VCK) BIT, A FLAG HELD
1761                                ;       WITHIN THE M7196 AND APPEARING IN XSTO, IS SET BY INITIALIZE AND
1762                                ;       CLEARED BY EXECUTING A WRITE CHARACTERISTICS COMMAND WITH THE
1763                                ;       CVC BIT SET.  IT IS ALSO VERIFIED THAT A WRITE CHARACTERISTICS
1764                                ;       COMMAND WITH THE CVC BIT CLEAR DOES NOT AFFECT THE STATE OF THE
1765                                ;       VOLUME CHECK BIT.  THE ACTUAL FUNCTION OF VOLUME CHECK, THAT OF
1766                                ;       PREVENTING OR ALLOWING A TAPE MOTION COMMAND DEPENDING UPON
1767                                ;       WHETHER VOLUME CHECK IS SET OR CLEAR, IS NOT CHECKED BY THIS
1768                                ;       TEST;  THIS FUNCTIONALITY IS CHECKED IN THE INDIVIDUAL TESTS OF
1769                                ;       TAPE MOTION COMMANDS.
1770                                ;
1771                                ;       THE TEST PROCEEDS AS FOLLOWS:
1772                                ;
1773                                ;            1.  THE CONTROLLER IS INITIALIZED BY WRITING INTO THE TSSR.
1774                                ;
1775                                ;            2.  A WRITE CHARACTERISTICS COMMAND IS ISSUED (WITH CVC=0)
1776                                ;                AND XSTO IN THE RETURNED MESSAGE BUFFER IS EXAMINED;
1777                                ;                THE VCK BIT SHOULD BE CLEAR (0).
1778                                ;
1779                                ;            3.  THE PREVIOUS STEP IS REPEATED TO VERIFY THAT VCK DOES
1780                                ;                NOT CHANGE (REMAINS AT 0).
1781                                ;
1782                                ;            4.  A WRITE CHARACTERISTICS COMMAND IS ISSUED WITH CVC=1
1783                                ;                AND THE VCK BIT IN XSTO IN THE MESSAGE BUFFER IS
1784                                ;                EXAMINED;  THE VCK BIT SHOULD BE CLEAR (0).
1785                                ;
1786                                ;            5.  A WRITE CHARACTERISTICS COMMAND IS ISSUED WITH CVC=0
1787                                ;                AND THE VCK BIT IN XSTO IN THE MESSAGE BUFFER IS
1788                                ;                EXAMINED;  THE VCK BIT SHOULD REMAIN CLEAR (0).
1789                                ;
1790                                ;
1791 034312                                BGNTST
     034312                                                                T8::
1796 034312  012700  035177                MOV     #TST8ID,R0              ;ASCII MESSAGE TO IDENTIFY TEST
1797 034316  004737  016510                JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
1798 034322  012737  000024  002214        MOV     #20.,LOOPCNT            ;PERFORM 20 ITERATIONS
1799 034330                          T8LOOP:
1800
1801 034330  012704  034720                MOV     #T8PACKET,R4            ;PACKET FOR WRITE CHARACTERISTICS
```

```
1802 034334  004737  015774          5$:     JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
1803 034340  103405                          BCS     10$                     ;BR IF SOFT INIT = OK
1807 034342  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
1808 034344                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
     034344  104455                                                                  TRAP    C$ERDF
     034346  001441                                                                  .WORD   801
     034350  003650                                                                  .WORD   SFIERR
     034352  012034                                                                  .WORD   SFIMSG
1809 034354  042714  040000          10$:    BIC     #BIT14,(R4)             ;CLEAR THE CVC BIT
1810 034360  010465  000000                   MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS FOR WRITE CHAR
1811 034364  004737  016336                   JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
1812 034370  103405                          BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
1813 034372  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
1817 034374                                  ERRDF   ERRNO,T8SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
     034374  104455                                                                  TRAP    C$ERDF
     034376  001442                                                                  .WORD   802
     034400  035110                                                                  .WORD   T8SSR
     034402  012046                                                                  .WORD   PKTSSR
1818 034404                          15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     034404  104406                                                                  TRAP    C$CLP1
1819 034406                                  ESCAPE  TST                     ;EXIT IF FATAL ERROR
     034406  104410                                                                  TRAP    C$ESCAPE
     034410  000604                                                                  .WORD   L10064 .
1820 034412  012702  034742                   MOV     #T8BFR,R2               ;ADDRESS OF THE MESSAGE BUFFER
1821 034416  032762  000020  000006          BIT     #XSOVCK,XSTO(R2)        ;IS VOLUME CHECK SET IN XSTO ?
1822 034424  001406                          BEQ     20$                     ;OKAY IF VOLUME CHECK IS CLEAR
1826 034426  016501  000002                   MOV     TSSR(R5),R1             ;CONTENTS OF TSSR FOR ERROR REPORT
1827 034432                                  ERRHRD  ERRNO,T8NVCK,PKTMES     ;VOLUME CHECK NOT CLEAR
     034432  104456                                                                  TRAP    C$ERHRD
     034434  001443                                                                  .WORD   803
     034436  035017                                                                  .WORD   T8NVCK
     034440  012110                                                                  .WORD   PKTMES
1828 034442                          20$:    CKLOOP                          ;LOOP ON ERROR ?
     034442  104406                                                                  TRAP    C$CLP1
1829 034444  010465  000000                   MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS FOR WRITE CHAR
1830 034450  004737  016336                   JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
1831 034454  103405                          BCS     25$                     ;BR IF CARRY SET (GOOD RETURN)
1832 034456  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
1836 034460                                  ERRDF   ERRNO,T8SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
     034460  104455                                                                  TRAP    C$ERDF
     034462  001444                                                                  .WORD   804
     034464  035110                                                                  .WORD   T8SSR
     034466  012046                                                                  .WORD   PKTSSR
1837 034470                          25$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     034470  104406                                                                  TRAP    C$CLP1
1838 034472                                  ESCAPE  TST                     ;EXIT IF FATAL ERROR
     034472  104410                                                                  TRAP    C$ESCAPE
     034474  000520                                                                  .WORD   L10064 .
1839 034476  032762  000020  000006          BIT     #XSOVCK,XSTO(R2)        ;IS VOLUME CHECK SET IN XSTO ?
1840 034504  001406                          BEQ     30$                     ;OKAY IF VOLUME CHECK IS SET
1844 034506  016501  000002                   MOV     TSSR(R5),R1             ;CONTENTS OF TSSR FOR ERROR REPORT
1845 034512                                  ERRHRD  ERRNO,T8NVCK,PKTMES     ;VOLUME CHECK NOT SET
     034512  104456                                                                  TRAP    C$ERHRD
     034514  001445                                                                  .WORD   805
     034516  035017                                                                  .WORD   T8NVCK
     034520  012110                                                                  .WORD   PKTMES
1846 034522                          30$:    CKLOOP                          ;LOOP ON ERROR ?
```

```
     034522  104406                                                               TRAP    C$CLP1
     034524  052714  040000                 BIS     #BIT14,(R4)          ;SET THE CVC BIT
     034530  010465  000000                 MOV     R4,TSDB(R5)          ;SET THE PACKET ADDRESS FOR WRITE CHAR
     034534  004737  016336                 JSR     PC,CHKTSSR           ;WAIT FOR SSR TO SET
     034540  103405                         BCS     35$                  ;BR IF CARRY SET (GOOD RETURN)
     034542  010001                         MOV     R0,R1                ;SAVE CONTENTS OF TSSR
     034544                                 ERRDF   ERRN?,T8SSR,PKTSSR   ;DEVICE FATAL SSR FAILED TO SET
     034544  104455                                                               TRAP    C$ERDF
     034546  001446                                                               .WORD   806
     034550  035110                                                               .WORD   T8SSR
     034552  012046                                                               .WORD   PKTSSR
     034554                         35$:    CKLOOP                       ;LOOP ON ERROR, IF FLAG SET
     034554  104406                                                               TRAP    C$CLP1
     034556                                 ESCAPE  TST                  ;EXIT IF FATAL ERROR
     034556  104410                                                               TRAP    C$ESCAPE
     034560  000434                                                               .WORD   L10064-.
     034562  032762  000020  000006         BIT     #XSOVCK,XSTO(R2)     ;IS VOLUME CHECK CLEAR IN XSTO ?
     034570  001406                         BEQ     40$                  ;OKAY IF VOLUME CHECK IS CLEARED
     034572  016501  000002                 MOV     TSSR(R5),R1          ;CONTENTS OF TSSR FOR ERROR REPORT
     034576                                 ERRHRD  ERRNO,T8VCK,PKTMES   ;VOLUME CHECK NOT CLEARED
     034576  104456                                                               TRAP    C$ERHRD
     034600  001447                                                               .WORD   807
     034602  034762                                                               .WORD   T8VCK
     034604  012110                                                               .WORD   PKTMES
     034606                         40$:    CKLOOP                       ;LOOP ON ERROR ?
     034606  104406                                                               TRAP    C$CLP1
     034610  042714  040000                 BIC     #BIT14,(R4)          ;CLEAR THE CVC BIT
     034614  010465  000000                 MOV     R4,TSDB(R5)          ;SET THE PACKET ADDRESS FOR WRITE CHAR
     034620  004737  016336                 JSR     PC,CHKTSSR           ;WAIT FOR SSR TO SET
     034624  103405                         BCS     45$                  ;BR IF CARRY SET (GOOD RETURN)
     034626  010001                         MOV     R0,R1                ;SAVE CONTENTS OF TSSR
     034630                                 ERRDF   ERRNO,T8SSR,PKTSSR   ;DEVICE FATAL SSR FAILED TO SET
     034630  104455                                                               TRAP    C$ERDF
     034632  001450                                                               .WORD   80C
     034634  035110                                                               .WORD   T8SSR
     034636  012046                                                               .WORD   PKTSSR
     034640                         45$:    CKLOOP                       ; OOP ON ERROR, IF FLAG SET
     034640  104406                                                               TRAP    C$CLP1
     034642                                 ESCAPE  TST                  ;EXIT IF FATAL ERROR
     034642  104410                                                               TRAP    C$ESCAPE
     034644  000350                                                               .WORD   L10064 .
     034646  032762  000020  000006         BIT     #XSOVCK,XSTO(R2)     ;IS VOLUME CHECK CLEAR IN XSTO ?
     034654  001406                         BEQ     50$                  ;OKAY IF VOLUME CHECK IS CLEARED
     034656  016501  000002                 MOV     TSSR(R5),R1          ;CONTENTS OF TSSR FOR ERROR REPORT
     034662                                 ERRHRD  ERRNO,T8VCK,PKTMES   ;VOLUME CHECK NOT CLEARED
     034662  104456                                                               TRAP    C$ERHRD
     034664  001451                                                               .WORD   809
     034666  034762                                                               .WORD   T8VCK
     034670  012110                                                               .WORD   PKTMES
     034672                         50$:    CKLOOP                       ;LOOP ON ERROR ?
     034672  104406                                                               TRAP    C$CLP1
     034674  004737  016456         60$:    JSR     PC,TSTLOOP           ;SHOULD WE DO ITERATIONS ?
     034700  103002                         BCC     62$                  ;BRANCH IF NOT
     034702  000137  034330                 JMP     T8LOOP               ;LOOP UNTIL COUNT EXPIRED
     034706                         62$:    EXIT    TST                  ;ALL DONE THIS TEST
     034706  104432                                                               TRAP    C$EXIT
     034710  000304                                                               .WORD   L10064 .
```

```
1889
1890                                    ;+
1891                                    ;LOCAL STORAGE FOR THIS TEST
1892                                    ;
1893
1895 034712                                     .BLKB   10-<.-TSV2&7>
1897 034720                             T8PACKET:                       ;COMMAND PACKET FOR TEST
1898 034720  100004                             .WORD   100004          ;WRITE CHARACTERISTICS COMMAND
1899 034722  034730                             .WORD   T8DATA          ;ADDRESS OF CHARACTERISTICS BLOCK
1900 034724  000000                             .WORD   0
1901 034726  000010                             .WORD   10              ;STARTING VALUE OF COUNTER
1902
1903 034730                             T8DA F:                         ;CHARACTERISTICS DATA BLOCK
1904 034730  034742                             .WORD   T88FR           ;ADDRESS OF MESSAGE BUFFER
1905 034732  000000                             .WORD   0
1906 034734  000020                             .WORD   16.             ;LENGTH OF MESSAGE BUFFER
1907 034736  000000  000000                     .WORD   0,0
1908
1909 034742                             T88FR:  .BLKW   8.              ;MESSAGE BUFFER
1910
1911
1912                                    ;+
1913                                    ;LOCAL TEXT MESSAGES FOR TEST
1914                                    ;-
1915
1916 034762     126     157     154    T8VCK:  .ASCIZ  'Volume Check Bit Not Cleared'
1917 035017     126     157     154    T8NVCK: .ASCIZ  'Volume Check Bit (VCK) Not Clear After Initialize (XST0)'
1918 035110     103     157     156    T8SSR:  .ASCIZ  'Contents of TSSR Incorrect After Write Characteristics
1919 035177     126     157     154    TST8ID: .ASCIZ  'Volume Check'
1920                                    .EVEN
1921 035214                             ENDTST
     035214                                                     L10064:
     035214  104401                                                       TRAP    C$ETST
1922
1923                                    .SBTTL  TEST  9: COMPLETION INTERRUPT
1924
1925
1926                                    ;       THIS TEST VERIFIES THAT AN INTERRUPT IS GENERATED AT THE
1927                                    ;       COMPLETION OF THE WRITE CHARACTERISTICS COMMAND IF THE INTERRUPT
1928                                    ;       ENABLE (IE) BIT IN THE COMMAND HEADER WORD IS SET.  THIS TEST
1929                                    ;       CHECKS THE FUNCTIONING OF THE INTERRUPT LOGIC AND BASIC
1930                                    ;       PROCESSING OF THE IE BIT.
1931                                    ;
1932                                    ;       THE SEQUENCES OF TEST 7 ARE REPEATED, EXCEPT THAT THE INTERRUPT
1933                                    ;       SERVICE ROUTINE IS SET UP TO EXPECT INTERRUPTS AND EACH WRITE
1934                                    ;       CHARACTERISTICS COMMAND IS ISSUED WITH THE IE BIT SET (1).  IT
1935                                    ;       IS VERIFIED, WHERE APPROPRIATE, THAT THE IE STATUS BIT IN XST0
1936                                    ;       OF ANY MESSAGE PACKET IS SET AND THAT A COMPLETION INTERRUPT IS
1937                                    ;       GENLRATED.  FINALLY, A SEQUENCE OF TWO COMMANDS ARE ISSUED, THE
1938                                    ;       FIRST WITH IE=1 AND THE SECOND WITH IE=0.  IT IS VERIFIED THAT
1939                                    ;       NO INTERRUPT IS GENERATED AFTER THE SECOND COMMAND AND THAT THE
1940                                    ;       IE BIT IN XST0 IS 0.
1941                                    ;
1942 035216                             BGNTST
     035216                                                     T9::
1947 035216  005037  002224             CLR     EXTFEA                  ;CLEAR EXTENDED FEATURES SWITCH
1948 035222  012700  040241             MOV     #TST9ID,R0              ;ASCII MESSAGE TO IDENTIFY TEST
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1949 035226  004737  016510                 JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
1950 035232  012737  000024  002214         MOV     #20.,LOOPCNT            ;PERFORM 20 ITERATIONS
1951 035240                          T9LOOP:
1952 035240                                 BGNSUB                          ;////////////// BEGIN SUBTEST ////////////
     035240                                                                                  T9.1:
     035240  104402                                                                             TRAP    C$BSUB
1953
1954 035242  004737  040266                 JSR     PC,T9REST               ;SET PACKET TO INITIAL VALUES
1955 035246                                 SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
     035246  012700  000000                                                                     MOV     #PRI00,R0
     035252  104441                                                                             TRAP    C$SPRI
1956 035254  012703  002762                 MOV     #TSTBLK+10.,R3          ;START OF TEST DATA
1957 035260  012704  037170                 MOV     #T9PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
1958 035264  012764  000010  000006         MOV     #8.,PKBCNT(R4)          ;START WITH MINIMUM ALLOWABLE VALUE
1959 035272                          5$:
1960 035272                                 BGNSEG                          ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
     035272  104404                                                                             TRAP    C$BSEG
1961
1962 035274  004737  015774                 JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
1963 035300  103405                         BCS     10$                     ;BR IF SOFT INIT = OK
1967 035302  010001                         MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
1968 035304                                 ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
     035304  104455                                                                             TRAP    C$ERDF
     035306  001605                                                                             .WORD   901
     035310  003650                                                                             .WORD   SFIERR
     035312  012034                                                                             .WORD   SFIMSG
1969 035314  005037  002220          10$:   CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
1970 035320  005037  002222                 CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
1971 035324  010465  000000                 MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
1972 035330  004737  016336                 JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
1973 035334  103407                         BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
1974 035336  010001                         MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
1978 035340                                 ERRDF   ERRNO,T9SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
     035340  104455                                                                             TRAP    C$ERDF
     035342  001606                                                                             .WORD   902
     035344  037707                                                                             .WORD   T9SSR
     035346  012046                                                                             .WORD   PKTSSR
1979 035350  005237  002220                 INC     FATFLG                  ;SET FATAL ERROR FLAG
1980 035354                          15$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     035354  104406                                                                             TRAP    C$CLP1
1981 035356                                 ESCAPE  SEG                     ;BY PASS SUBTEST IF FATAL ERROR
     035356  104410                                                                             TRAP    C$ESCAPE
     035360  000056                                                                             .WORD   10000$ .
1982 035362  005737  002222                 TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
1983 035366  001004                         BNE     22$                     ;BRANCH IF YES
1987 035370                                 ERRHRD  ERRNO,T9NINT,PKTSSR
     035370  104456                                                                             TRAP    C$ERHRD
     035372  001607                                                                             .WORD   903
     035374  037776                                                                             .WORD   T9NINT
     035376  012046                                                                             .WORD   PKTSSR
1988 035400  016501  000002          22$:   MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
1989 035404  012702  000200                 MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
1990 035410  032701  000100                 BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
1991 035414  001402                         BEQ     25$                     ;BRANCH IF NOT OFF-LINE
1992 035416  052702  000100                 BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
1993 035422  020201          25$:   CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
1994 035424  001404                         BEQ     30$                     ;OKAY IF MATCH
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1998 035426                                ERRMRD  ERRNO,T9NBA,PKTSSR      ;NBA NOT ZERO
     035426  104456                                                                TRAP    C$ERMRD
     035430  001610                                                                .WORD   904
     035432  037246                                                                .WORD   T9NBA
     035434  012046                                                                .WORD   PKTSSR
1999 035436                          30$:
2000 035436                                ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
     035436                                                                      100004:
     035436  104405                                                                TRAP    C$ESEG
2001
2002 035440  012364  000006                MOV     (R3)+,PKBCNT(R4)        ;SET THE TEST WORD
2003 035444  020327  003060                CMP     R3,#TBLEND              ;HAS ALL DATA BEEN TESTED ?
2004 035450  103002                        BHIS    55$                     ;BRANCH IF ALL DATA DONE
2005 035452  000137  035272                JMP     5$                      ;BRANCH TILL BACK TO ZERO
2006
2007 035456                          55$:  ENDSUB                          ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\\
     035456                                                                      L10066:
     035456  104403                                                                TRAP    C$ESUB
2008
2009 035460  005737  002220                TST     FATFLG                  ;ANY FATAL ERRORS ?
2010 035464  001402                        BEQ     60$                     ;BRANCH IF NOT
2011 035466  004737  017202                JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
2012 035472  033727  037224  000200  60$:  BIT     T9BFR+12,#BIT7          ;EXTENDED FEATURES SET?
2013 035500  001402                        BEQ     70$                     ;BR IF NO
2014 035502  005237  002224                INC     EXTFEA                  ;SET EXT FEATURE FLAG
2015 035506                          70$:
2016
2017                                 ;+
2018                                 ;
2019                                 ;TEST 9, SUBTEST 2
2020                                 ;
2021                                 ;CHECK THAT UNUSED BITS BEING SET CAUSES
2022                                 ;WRITE CHARACTERISTICS COMMAND TO BE REJECTED
2023                                 ;
2024                                 ;
2025
2026 035506                                BGNSUB                          ;////////////// BEGIN SUBTEST //////////////
     035506                                                                      T9.2:
     035506  104402                                                                TRAP    C$BSUB
2027
2028 035510                                SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
     035510  012700  000000                                                        MOV     #PRI00,R0
     035514  104441                                                                TRAP    C$SPRI
2029 035516  012703  037232                MOV     #T92DATA,R3             ;START OF TEST DATA FOR SUBTEST
2030 035522  012704  037170          5$:   MOV     #T9PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
2031 035526  004737  040266                JSR     PC,T9REST               ;RESTORE PACKET TO STARTING VALUES
2032
2033 035532                                BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
     035532  104404                                                                TRAP    C$BSEG
2034
2035 035534  004737  015774                JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
2036 035540  103405                        BCS     10$                     ;BR IF SOFT INIT = OK
2040 035542  010001                        MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
2041 035544                                ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
     035544  104455                                                                TRAP    C$ERDF
     035546  001611                                                                .WORD   905
     035550  003650                                                                .WORD   SFIERR
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                035552  012034                                                          .WORD   SFIMSG
2042            035554  005037  002222          10$:    CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
2043            035560  010400                          MOV     R4,R0                   ;START OF THE COMMAND PACKET
2044            035562  061300                          ADD     (R3),R0                 ;OFFSET TO THE DATA WORD TO TEST
2045            035564  056310  000002                  BIS     2(R3),(R0)              ;SET THE DATA BITS TO BE TESTED
2046            035570  010465  000000                  MOV     R4,TSDR(R5)             ;SET THE PACKET ADDRESS
2047            035574  004737  016250                  JSR     PC,WAITF                ;WAIT FOR SSR TO SET
2048            035600  103405                          BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
2049            035602  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
2053            035604                                  ERRDF   ERRNO,T9SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
                035604  104455                                                          TRAP    C$ERDF
                035606  001612                                                          .WORD   906
                035610  037707                                                          .WORD   T9SSR
                035612  012046                                                          .WORD   PKTSSR
2054            035614          15$:    CKLOOP                                  ;LOOP ON ERROR, IF FLAG SET
                035614  104406                                                          TRAP    C$CLP1
2055            035616                  ESCAPE  SEG                             ;BY-PASS CHECKS IF FATAL ERROR
                035616  104410                                                          TRAP    C$ESCAPE
                035620  000056                                                          .WORD   10000$ .
2056            035622  005737  002222                  TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
2057            035626  001004                          BNE     22$                     ;BRANCH IF YES
2061            035630                                  ERRHRD  ERRNO,T9NINT,PKTSSR
                035630  104456                                                          TRAP    C$ERHRD
                035632  001613                                                          .WORD   907
                035634  037776                                                          .WORD   T9NINT
                035636  012046                                                          .WORD   PKTSSR
2062            035640  016501  000002          22$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
2063            035644  012702  102206                  MOV     #SC!SSR!TSREJ!NBA,R2    ;EXPECTED CONTENTS OF TSSR
2064            035650  032701  000100                  BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
2065            035654  001402                          BEQ     25$                     ;BRANCH IF NOT OFF-LINE
2066            035656  052702  000100                  BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
2067            035662  020201          25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
2068            035664  001404                          BEQ     30$                     ;OKAY IF MATCH
2072            035666                                  ERRHRD  ERRNO,T92REJ,PKTSSR     ;COMMAND NOT REJECTED
                035666  104456                                                          TRAP    C$ERHRD
                035670  001614                                                          .WORD   908
                035672  037321                                                          .WORD   T92REJ
                035674  012046                                                          .WORD   PKTSSR
2073            035676          30$:
2074            035676                  ENDSEG                                  ;<<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<<
                035676                                                                  10000$:
                035676  104405                                                          TRAP    C$ESEG
2075
2076            035700  062703  000004                  ADD     #4,R3                   ;POINT TO NEXT DATA PAIR
2077            035704  020327  037246                  CMP     R3,#T92DONE             ;COMPARE TO END OF TEST DATA
2078            035710  103002                          BHIS    59$                     ;BRANCH IF ALL DATA TESTED
2079            035712  000137  035522                  JMP     5$                      ;BRANCH TILL BACK TO ZERO
2080
2081            035716          59$:    ENDSUB                                  ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\\
                035716                                                                  L10067:
                035716  104403                                                          TRAP    C$ESUB
2082
2083                            ;*
2084                            ;
2085                            ;TEST 9, SUBTEST 3
2086                            ;
2087                            ;CHECK THE WRITE CHARACTERISTICS COMMAND IS REJECTED
```

```
2088                                    ;IF ISSUED WITH AN INVALID DATA BLOCK BYTE COUNT
2089                                    ;
2090                                    ;
2091
2092 035720                             BGNSUB                          ;////////////// BEGIN SUBTEST //////////////
      035720                                                                          T9.3:
      035720  104402                                                                    TRAP    C$BSUB
2093
2094 035722                             SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
      035722  012700  000000                                                           MOV     #PRI00,R0
      035726  104441                                                                  TRAP    C$SPRI
2095 035730  012703  000001             MOV     #1,R3                   ;STARTING BYTE COUNT
2096 035734  012704  037170       5$:   MOV     #T9PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
2097 035740  004737  040266             JSR     PC,T9REST               ;RESTORE PACKET TO STARTING VALUES
2098
2099 035744                             BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
      035744  104404                                                                  TRAP    C$BSEG
2100
2101 035746  004737  015774             JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
2102 035752  103405                     BCS     10$                     ;BR IF SOFT INIT = OK
2106 035754  010001                     MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
2107 035756                             ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
      035756  104455                                                                  TRAP    C$EPDF
      035760  001615                                                                  .WORD   909
      035762  003650                                                                  .WORD   SFIERR
      035764  012034                                                                  .WORD   SFIMSG
2108 035766  005037  002222       10$:   CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
2109 035772  010364  000006             MOV     R3,PKBCNT(R4)           ;INSERT THE BYTE COUNT FOR TEST
2110 035776  010465  000000             MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
2111 036002  004737  016250             JSR     PC,WAITF                ;WAIT FOR SSR TO SET
2112 036006  103405                     BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
2113 036010  010001                     MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
2117 036012                             ERRDF   ERRNO,T9SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
      036012  104455                                                                  TRAP    C$ERDF
      036014  001616                                                                  .WORD   910
      036016  037707                                                                  .WORD   T9SSR
      036020  012046                                                                  .WORD   PKTSSR
2118 036022                       15$:  CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
      036022  104406                                                                  TRAP    C$CLP1
2119 036024                             ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
      036024  104410                                                                  TRAP    C$ESCAPE
      036026  000056                                                                  .WORD   10000$ .
2120 036030  005737  002222             TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
2121 036034  001004                     BNE     22$                     ;BRANCH IF YES
2125 036036                             ERRHRD  ERRNO,T9NINT,PKTSSR
      036036  104456                                                                  TRAP    C$ERHRD
      036040  001617                                                                  .WORD   911
      036042  037776                                                                  .WORD   T9NINT
      036044  012046                                                                  .WORD   PKTSSR
2126 036046  016501  000002       22$:   MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
2127 036052  012702  102206             MOV     #SC!SSR!TSREJ!NBA,R2    ;EXPECTED CONTENTS OF TSSR
2128 036056  032701  000100             BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
2129 036062  001402                     BEQ     25$                     ;BRANCH IF NOT OFF-LINE
2130 036064  052702  000100             BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
2131 036070  020201       25$:   CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
2132 036072  001404                     BEQ     30$                     ;OKAY IF MATCH
2136 036074                             ERRHRD  ERRNO,T93REJ,PKTSSR     ;COMMAND NOT REJECTED
```

```
        036074  104456                                                          TRAP    C$ERMRD
        036076  001620                                                          .WORD   912
        036100  037420                                                          .WORD   T93REJ
        036102  012046                                                          .WORD   PKTSSR
  2137  036104                        30$:
  2138  036104                                ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
        036104                                                                  10000$:
        036104  104405                                                          TRAP    C$ESEG
  2139
  2140  036106  005203                       INC     R3                      ;NEXT BYTE COUNT
  2141  036110  020327  000006              CMP     R3,#6                   ;TESTED ALL INVALID ?
  2142  036114  002002                       BGE     59$                     ;BRANCH IF TEST DONE
  2143  036116  000137  035734              JMP     5$                      ;BRANCH TILL BACK TO ZERO
  2144
  2145  036122                        59$:    ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
        036122                                                                  L10070:
        036122  104403                                                          TRAP    C$ESUB
  2146
  2147                                ;*
  2148                                ;
  2149                                ;TEST 9, SUBTEST 4
  2150                                ;
  2151                                ;SUBTEST TO VERIFY THAT A WRITE CHARACTERISTICS COMMAND IS
  2152                                ;REJECTED IF AN ILLEGAL DATA BLOCK ADDRESS IS ISSUED.
  2153                                ;
  2154                                ;-
  2155
  2156  036124                                BGNSUB                          ;////////////// BEGIN SUBTEST //////////////
        036124                                                                  T9.4:
        036124  104402                                                          TRAP    C$BSUB
  2157
  2158  036126                                SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
        036126  012700  000000                                                  MOV     #PRI00,R0
        036132  104441                                                          TRAP    C$SPRI
  2159  036134  012703  037232               MOV     #T92DATA,R3             ;START OF TEST DATA FOR SUBTEST
  2160  036140  012704  037170        5$:    MOV     #T9PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
  2161  036144  004737  040266              JSR     PC,T9REST               ;RESTORE PACKET TO STARTING VALUES
  2162
  2163
  2164  036150  004737  015774              JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
  2165  036154  103405                       BCS     10$                     ;BR IF SOFT INIT = OK
  2169  036156  010001                       MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
  2170  036160                               ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
        036160  104455                                                          TRAP    C$ERDF
        036162  001621                                                          .WORD   913
        036164  003650                                                          .WORD   SFIERR
        036166  012034                                                          .WORD   SFIMSG
  2171  036170  005037  002222        10$:    CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
  2172  036174  052737  000001  037200       BIS     #1,T9DATA               ;MAKE ADDRESS ODD
  2173  036202  010465  000000              MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
  2174  036206  004737  016250              JSR     PC,WAITF                ;WAIT FOR SSR TO SET
  2175  036212  103405                       BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
  2176  036214  010001                       MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
  2180  036216                               ERRDF   ERRNO,T9SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
        036216  104455                                                          TRAP    C$ERDF
        036220  001622                                                          .WORD   914
        036222  037707                                                          .WORD   T9SSR
```

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                036224  012046                                                          .WORD   PKTSSR
2181            036226                  15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
                036226  104406                                                          TRAP    C$CLP1
2182            036230                          ESCAPE  SUB                     ;BY-PASS SUBTEST IF FATAL ERROR
                036230  104410                                                          TRAP    C$ESCAPE
                036232  000056                                                          .WORD   L10071-.
2183            036234  005737  002222          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
2184            036240  001004                  BNE     22$                     ;BRANCH IF YES
2188            036242                          ERRHRD  ERRNO,T9NINT,PKTSSR
                036242  104456                                                          TRAP    C$ERHRD
                036244  001623                                                          .WORD   915
                036246  037776                                                          .WORD   T9NINT
                036250  012046                                                          .WORD   PKTSSR
2189            036252  016501  000002  22$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
2190            036256  012702  102206          MOV     #SC!SSR!TSREJ!NBA,R2    ;EXPECTED CONTENTS OF TSSR
2191            036262  032701  000100          BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
2192            036266  001402                  BEQ     25$                     ;BRANCH IF NOT OFF-LINE
2193            036270  052702  000100          BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
2194            036274  020201          25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
2195            036276  001404                  BEQ     30$                     ;OKAY IF MATCH
2199            036300                          ERRHRD  ERRNO,T94REJ,PKTSSR     ;COMMAND NOT REJECTED
                036300  104456                                                          TRAP    C$ERHRD
                036302  001624                                                          .WORD   916
                036304  037513                                                          .WORD   T94REJ
                036306  012046                                                          .WORD   PKTSSR
2200            036310                  30$:
2201
2202            036310                          ENDSUB                          ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\\
                036310                                                                  L10071:
                036310  104403                                                          TRAP    C$ESUB
2203
2204
2205                                    ;*
2206                                    ;
2207                                    ;TEST 9, SUBTEST 5
2208                                    ;
2209                                    ;CHECK THAT WRITE CHARACTERISTICS COMMAND IS REJECTED IF THE
2210                                    ;MESSAGE BUFFER LENGTH SPECIFIES AN INVALID COUNT (LESS THAN 14)
2211                                    ;
2212                                    ;-
2213
2214            036312                          BGNSUB                          ;////////////// BEGIN SUBTEST //////////////
                036312                                                                  T9.5:
                036312  104402                                                          TRAP    C$BSUB
2215
2216            036314                          SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
                036314  012700  000000                                                  MOV     #PRI00,R0
                036320  104441                                                          TRAP    C$SPRI
2217            036322  012703  000001          MOV     #1,R3                   ;STARTING BUFFER LENGTH
2218            036326  012704  037170  5$:     MOV     #T9PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
2219            036332  004737  040266          JSR     PC,T9REST               ;RESTORE PACKET TO STARTING VALUES
2220
2221            036336                          BGNSEG                          ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
                036336  104404                                                          TRAP    C$BSEG
2222
2223            036340  004737  015774          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
2224            036344  103405                  BCS     10$                     ;BR IF SOFT INIT = OK
```

```
2228 036346 010001                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
2229 036350                         ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
     036350 104455                                                          TRAP    C$ERDF
     036352 001625                                                          .WORD   917
     036354 003650                                                          .WORD   SFIERR
     036356 012034                                                          .WORD   SFIMSG
2230 036360 005037 002222   10$:    CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
2231 036364 010337 037204           MOV     R3,T9DATA+4             ;INSERT THE BAD MESSAGE LENGTH
2232 036370 010465 000000           MOV     R4,TSD8(R5)             ;SET THE PACKET ADDRESS
2233 036374 004737 016250           JSR     PC,WAITF                ;WAIT FOR SSR TO SET
2234 036400 103405                  BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
2235 036402 010001                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
2239 036404                         ERRDF   ERRNO,T9SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
     036404 104455                                                          TRAP    C$ERDF
     036406 001626                                                          .WORD   918
     036410 037707                                                          .WORD   T9SSR
     036412 012046                                                          .WORD   PKTSSR
2240 036414                 15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     036414 104406                                                          TRAP    C$CLP1
2241 036416                         ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
     036416 104410                                                          TRAP    C$ESCAPE
     036420 000056                                                          .WORD   10000$-.
2242 036422 005737 002222           TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
2243 036426 001004                  BNE     22$                     ;BRANCH IF YES
2247 036430                         ERRHRD  ERRNO,T9NINT,PKTSSR
     036430 104456                                                          TRAP    C$ERHRD
     036432 001627                                                          .WORD   919
     036434 037776                                                          .WORD   T9NINT
     036436 012046                                                          .WORD   PKTSSR
2248 036440 016501 000002   22$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
2249 036444 012702 102206           MOV     #SC!SSR!TSREJ!NBA,R2    ;EXPECTED CONTENTS OF TSSR
2250 036450 032701 000100           BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
2251 036454 001402                  BEQ     25$                     ;BRANCH IF NOT OFF-LINE
2252 036456 052702 000100           BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
2253 036462 020201          25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
2254 036464 001404                  BEQ     30$                     ;OKAY IF MATCH
2258 036466                         ERRHRD  ERRNO,T95REJ,PKTSSR     ;COMMAND NOT REJECTED
     036466 104456                                                          TRAP    C$ERHRD
     036470 001630                                                          .WORD   920
     036472 037611                                                          .WORD   T95REJ
     036474 012046                                                          .WORD   PKTSSR
2259 036476                 30$:
2260 036476                         ENDSEG                          ;<<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<<
     036476                                                                 10000$:
     036476 104405                                                          TRAP    C$ESEG
2261
2262 036500 005203                  INC     R3                      ;NEXT BUFFER LENGTH
2263 036502 020327 000014           CMP     R3,#14                  ;HAVE ALL BAD VALUES BEEN TESTED ?
2264 036506 002002                  BGE     59$                     ;BRANCH IF ALL TESTED
2265 036510 000137 036326           JMP     5$                      ;BRANCH TILL BACK TO ZERO
2266
2267 036514                 59$:    ENDSUB                          ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\\
     036514                                                                 L10072:
     036514 104403                                                          TRAP    C$ESUB
2268                                ;*
2269                                ;
2270                                ;TEST 9, SUBTEST 6
```

```
2271                                    ;
2272                                    ;THIS SUBTEST IS EXECUTED ONLY IF THE EXTENDED
2273                                    ;FEATURES MODE IS ENABLED (AS DETERMINED BY EXAMINING
2274                                    ;XST2 AFTER A PREVIOUS EXECUTION OF WRITE CHARACTERISTICS).
2275                                    ;IT VERIFIES THAT A FIFTH CHARACTERISTICS DATA WORD IS FETCHED
2276                                    ;IF THE BYTE COUNT PARAMETER IN THE COMMAND PACKET IS 10 DECIMAL
2277                                    ;OR GREATER.
2278                                    ;
2279                                    ;
2280 036516                            BGNSUB                          ;////////////// BEGIN SUBTEST //////////////
     036516                                                                            T9.6:
     036516  104402                                                                    TRAP    C$BSUB
2281 036520  005737  002224            TST     EXTFEA                  ;IS EXTENDED FEATURES SOFT. SW SET?
2282 036524  001002                    BNE     4$                      ;BR, IF SOFTWARE SWITCH IS SET (ON)
2283 036526  000137  036746            JMP     55$                     ;EXIT SUBTEST
2284 036532  004737  040266    4$:     JSR     PC,T9REST               ;SET PACKET TO START-UP VALUES
2285
2286 036536                            SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
     036536  012700  000000                                                            MOV     #PRI00,R0
     036542  104441                                                                    TRAP    C$SPRI
2287 036544  012703  002762            MOV     #TSTBLK+10.,R3          ;START OF TEST DATA
2288 036550  012704  037170            MOV     #T9PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
2289 036554  012764  000012  000006    MOV     #10.,PKBCNT(R4)         ;START WITH EXTENDED FEATURES VALUE
2290 036562                    5$:
2291 036562                            BGNSEG                          ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
     036562  104404                                                                    TRAP    C$BSEG
2292
2293 036564  004737  015774            JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
2294 036570  103405                    BCS     10$                     ;BR IF SOFT INIT = OK
2298 036572  010001                    MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
2299 036574                            ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
     036574  104455                                                                    TRAP    C$ERDF
     036576  001631                                                                    .WORD   921
     036600  003650                                                                    .WORD   SFIERR
     036602  012034                                                                    .WORD   SFIMSG
2300 036604  005037  002220    10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
2301 036610  005037  002222            CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
2302 036614  010465  000000            MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
2303 036620  004737  016336            JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
2304 036624  103407                    BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
2305 036626  010001                    MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
2309 036630                            ERRDF   ERRNO,T9SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
     036630  104455                                                                    TRAP    C$ERDF
     036632  001632                                                                    .WORD   922
     036634  037707                                                                    .WORD   T9SSR
     036636  012046                                                                    .WORD   PKTSSR
2310 036640  005237  002220            INC     FATFLG                  ;SET FATAL ERROR FLAG
2311 036644                    15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     036644  104406                                                                    TRAP    C$CLP1
2312 036646                            ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
     036646  104410                                                                    TRAP    C$ESCAPE
     036650  000056                                                                    .WORD   10000$-.
2313 036652  005737  002222            TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
2314 036656  001004                    BNE     22$                     ;BRANCH IF YES
2318 036660                            ERRHRD  ERRNO,T9NINT,PKTSSR
     036660  104456                                                                    TRAP    C$ERHRD
     036662  001633                                                                    .WORD   923
```

```
                036664  037776                                                          .WORD   T9NINT
                036666  012046                                                          .WORD   PKTSSR
2319            036670  016501  000002          22$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
2320            036674  012702  000200                  MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
2321            036700  032701  000100                  BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
2322            036704  001402                          BEQ     25$                     ;BRANCH IF NOT OFF-LINE
2323            036706  052702  000100                  BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
2324            036712  020201          25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
2325            036714  001404                          BEQ     30$                     ;OKAY IF MATCH
2329            036716                          ERRHRD  ERRNO,T9NBA,PKTSSR      ;NBA NOT ZERO
                036716  104456                                                          TRAP    C$ERHRD
                036720  001634                                                          .WORD   924
                036722  037246                                                          .WORD   T9NBA
                036724  012046                                                          .WORD   PKTSSR
2330            036726          30$:
2331            036726                          ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
                036726                                                                  10000$:
                036726  104405                                                          TRAP    C$ESEG
2332
2333            036730  012364  000006                  MOV     (R3)+,PKBCNT(R4)        ;SET THE TEST WORD
2334            036734  020327  003060                  CMP     R3,#TBLEND              ;HAS ALL DATA BEEN TESTED ?
2335            036740  103002                          BHIS    55$                     ;BRANCH IF ALL DATA DONE
2336            036742  000137  036562                  JMP     5$                      ;BRANCH TILL BACK TO ZERO
2337
2338            036746          55$:    ENDSUB                                  ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
                036746                                                                  L10073:
                036746  104403                                                          TRAP    C$ESUB
2339
2340
2341                                    ;+
2342                                    ;
2343                                    ;TEST 9, SUBTEST 7
2344                                    ;
2345                                    ;TEST WRITE CHARACTERISTICS WITH/WITHOUT INTERRUPTS ENABLED
2346                                    ;
2347                                    ;-
2348
2349            036750                          BGNSUB                          ;/////////// BEGIN SUBTEST ///////////
                036750                                                                  T9.7:
                036750  104402                                                          TRAP    C$BSUB
2350
2351            036752                          SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
                036752  012700  000000                                                  MOV     #PRI00,R0
                036756  104441                                                          TRAP    C$SPRI
2352            036760  012704  037170                  MOV     #T9PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
2353            036764  004737  040266                  JSR     PC,T9REST               ;SET UP A VALID PACKET
2354            036770  004737  015774                  JSR     PC,SDFINIT              ;DO SOFT INIT OF CONTROLLER
2355            036774  103405                          BCS     10$                     ;BR IF SOFT INIT = OK
2359            036776  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
2360            037000                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
                037000  104455                                                          TRAP    C$ERDF
                037002  001635                                                          .WORD   925
                037004  003650                                                          .WORD   SFIERR
                037006  012034                                                          .WORD   SFIMSG
2361            037010  005037  002222          10$:    CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
2362            037014  052714  000200                  BIS     #BIT7,(R4)              ;ENABLE INTERRUPTS
2363            037020  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
```

```
2364 037024  004737  016336          JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
2365 037030  103405                  BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
2366 037032  010001                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
2370 037034                          ERRDF   ERRNO,T9SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
     037034  104455                                                          TRAP    C$ERDF
     037036  001636                                                          .WORD   926
     037040  037707                                                          .WORD   T9SSP
     037042  012046                                                          .WORD   PKTSSP
2371 037044                  15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     037044  104406                                                          TRAP    C$CLP1
2372 037046                          ESCAPE  SUB                     ;BY PASS SUBTEST IF FATAL ERROR
     037046  104410                                                          TRAP    C$ESCAPE
     037050  000102                                                          .WORD   L10074-.
2373 037052  005737  002222          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
2374 037056  001004                  BNE     22$                     ;BRANCH IF YES
2378 037060                          ERRHRD  ERRNO,T9NINT,PKTSSR
     037060  104456                                                          TRAP    C$ERHRD
     037062  001637                                                          .WORD   927
     037064  037776                                                          .WORD   T9NINT
     037066  012046                                                          .WORD   PKTSSR
2379 037070                  22$:    CKLOOP                          ;LOOP ON ERROR ?
     037070  104406                                                          TRAP    C$CLP1
2380
2381 037072  005037  002222          CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
2382 037076  042714  000200          BIC     #BIT7,(R4)              ;DISABLE INTERRUPTS
2383 037102  010465  000000          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
2384 037106  004737  016336          JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
2385 037112  103405                  BCS     25$                     ;BR IF CARRY SET (GOOD RETURN)
2386 037114  010001                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
2390 037116                          ERRDF   ERRNO,T9SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
     037116  104455                                                          TRAP    C$ERDF
     037120  001640                                                          .WORD   928
     037122  037707                                                          .WORD   T9SSR
     037124  012046                                                          .WORD   PKTSSR
2391 037126                  25$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     037126  104406                                                          TRAP    C$CLP1
2392 037130                          ESCAPE  SUB                     ;BY-PASS SUBTEST IF FATAL ERROR
     037130  104410                                                          TRAP    C$ESCAPE
     037132  000020                                                          .WORD   L10074 .
2393 037134  005737  002222          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
2394 037140  001404                  BEQ     30$                     ;BRANCH IF NOT
2398 037142                          ERRHRD  ERRNO,T9INT,PKTSSR
     037142  104456                                                          TRAP    C$ERHRD
     037144  001641                                                          .WORD   929
     037146  040067                                                          .WORD   T9INT
     037150  012046                                                          .WORD   PKTSSR
2399 037152                  30$:
2400 037152                          ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
     037152                                                                  L10074:
     037152  104403                                                          TRAP    C$ESUB
2401
2402 037154                          EXIT    TST                     ;ALL DONE THIS TEST
     037154  104432                                                          TRAP    C$EXIT
     037156  001162                                                          .WORD   L10065 .
2403
2404                         ;+
2405                         ;LOCAL STORAGE FOR THIS TEST
```

```
2406                                    ;
2407
2409 037160                             .BLKB   10-<. TSV2&7>
2411 037170                             T9PACKET:                       ;COMMAND PACKET FOR TEST
2412 037170  100204                             .WORD   100204          ;WRITE CHAR COMMAND, WITH IE, ACK
2413 037172  037200                             .WORD   T9DATA          ;ADDRESS OF CHARACTERISTICS BLOCK
2414 037174  000000                             .WORD   0
2415 037176  000010                             .WORD   8.              ;STARTING VALUE OF BLOCK SIZE
2416
2417 037200                             T9DATA:                         ;CHARACTERISTICS DATA BLOCK
2418 037200  037212                             .WORD   T9BFR           ;ADDRESS OF MESSAGE BUFFER
2419 037202  000000                             .WORD   0
2420 037204  000016                             .WORD   14.             ;LENGTH OF MESSAGE BUFFER
2421 037206  000000  000000                     .WORD   0,0
2422
2423 037212                             T9BFR:  .BLKW   8.              ;MESSAGE BUFFER
2424
2425                                    ;+
2426                                    ;
2427                                    ;TEST DATA FOR SUBTEST TWO
2428                                    ;
2429                                    ;DATA HAS FORMAT:
2430                                    ;
2431                                    ;       1ST WORD        OFFSET TO TEST WORD IN PACKET
2432                                    ;       2ND WORD        BITS TO SET FOR TEST
2433                                    ;
2434                                    ;
2435
2436 037232                             T92DATA:
2437 037232  000000  037140                     .WORD   0,BIT5!BIT6!BIT9!BIT10!BIT11!BIT12!BIT13
2438 037236  000002  000001                     .WORD   2,BIT0
2439 037242  000004  100100                     .WORD   4,BIT6!BIT15
2440         037246                     T92DONE=.
2441
2442
2443                                    ;+
2444                                    ;LOCAL TEXT MESSAGES FOR TEST
2445                                    ;-
2446
2447 037246      127     122     111    T9NBA:  .ASCIZ  'WRITE CHARACTERISTICS Command Not Accepted'
2448 037321      127     122     111    T92REJ: .ASCIZ  'WRITE CHARACTERISTICS Not Rejected With Non-Zero Unused Fields'
2449 037420      127     122     111    T93REJ: .ASCIZ  'WRITE CHARACTERISTICS Not Rejected With Invalid Data Count'
2450 037513      127     122     111    T94REJ: .ASCIZ  'WRITE CHARACTERISTICS Not Rejected With Invalid Block Address
2451 037611      127     122     111    T95REJ: .ASCIZ  'WRITE CHARACTERISTICS Not Rejected With Invalid Buffer Length
2452 037707      103     157     156    T9SSR:  .ASCIZ  'Contents of TSSR Incorrect After WRITE CHARACTERISTICS'
2453 037776      105     170     160    T9NINT: .ASCIZ  'Expected Interrupt Not Received On WRITE CHARACTERISTICS'
2454 040067      125     156     145    T9INT:  .ASCIZ  'Unexpected Interrupt Received On WRITE CHARACTERISTICS'
2455 040156      111     156     143    T9TSBA: .ASCIZ  'Incorrect TSBA Address After WRITE CHARACTERISTICS'
2456 040241      103     157     155    TST9ID: .ASCIZ  'Completion Interrupt'
2457                                            .EVEN
2458
2459
2460                                    ;+
2461                                    ;
2462                                    ;ROUTINE TO RESTORE COMMAND PACKET TO START-UP (DEFAULT) VALUES
2463                                    ;
2464                                    ;-
```

```
                                        T9REST:
                                                SAVREG                  ;SAVE THE REGISTERS
040266  012701  037170                          MOV     #T9PACKET,R1    ;START OF THE PACKET
040272  012721  100204                          MOV     #100204,(R1)+   ;WRITE CHARACTERISTICS WITH ACK, IE
040276  012721  037200                          MOV     #T9DATA,(R1)+   ;ADDRESS OF CHAR DATA BLOCK
040302  005021                                  CLR     (R1)+           ;EXTENDED ADDRESS
040306  012721  000010                          MOV     #8.,(R1)+       ;SIZE OF DATA BLOCK IN BYTES
040310  012721  037212                          MOV     #T9BFR,(R1)+    ;ADDRESS OF MESSAGE BUFFER
040314  005021                                  CLR     (R1)+
040320  012721  000016                          MOV     #14.,(R1)+      ;LENGTH OF MESSAGE BUFFER
040322  005021                                  CLR     (R1)+
040326  005011                                  CLR     (R1)
040330  005037  037212                          CLR     T9BFR           ;CLEAR 1ST LOC IN MESSAGE BUFFER
040332  00020/                                  RTS     PC              ;RETURN
040334                                          ENDTST
040334                                                                          L10065:
040334  104401                                                                          TRAP    C$ETST

                                                .SBTTL  TEST  10. BASIC PACKET PROTOCOL

                                        ;       THIS TEST VERIFIES BASIC OPERATION OF THE MESSAGE BUFFER RELEASE
                                        ;       COMMAND, THE FUNCTION OF THE ACK BIT IN THE COMMAND HEADER WORD,
                                        ;       AND THE REGISTER MODIFICATION REFUSED (RMR) LOGIC.
                                        ;
                                        ;
                                        ;+
                                        ;TEST 10 SUBTEST 1
                                        ;
                                        ;CHECKS THAT THE MESSAGE BUFFER RELEASE COMMAND WORKS
                                        ;PROPERLY AND THAT NO INTERRUPT IS GENERATED EVEN
                                        ;IF THE "IE" BIT IS SET IN THE COMMAND PACKET
                                        ;
                                        ;-
                                                BGNTST
040342                                                                          T10::
040342  012700  043277                          MOV     #TST10ID,R0             ;ASCII MESSAGE TO IDENTIFY TEST
040346  004737  016510                          JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
040352  012737  000024  002214                  MOV     #20.,LOOPCNT            ;PERFORM 20 ITERATIONS
040360                                  T10LOOP:

040360                                          BGNSUB                          ;////////////// BEGIN SUBTEST ////////////
040360                                                                                  T10.1:
040360  104402                                                                                  TRAP    C$BSUB

040362  004737  043326                          JSR     PC,T10RST               ;SET PACKET TO INITIAL VALUES
040366                                          SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
040366  012700  000000                                                                  MOV     #PRI00,R0
040372  104441                                                                          TRAP    C$SPRI
040374  012704  042470                          MOV     #T10PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
040400  012764  000010  000006                  MOV     #8.,PKBCNT(R4)          ;START WITH MINIMUM ALLOWABLE VALUE
040406                                  5$:
040406                                          BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
040406  104404                                                                          TRAP    C$BSEG

040410  004737  015774                          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
040414  103405                                  BCS     10$                     ;BR IF SOFT INIT = OK
```

```
2521 040416  010001                    MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
2522 040420                            ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
     040420  104455                                                             TRAP    C$ERDF
     040422  001751                                                             .WORD   1001
     040424  003650                                                             .WORD   SFIERR
     040426  012034                                                             .WORD   SFIMSG
2523 040430  005037  002220      10$:   CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
2524 040434  005037  002222             CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
2525 040440  010465  000000             MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
2526 040444  004737  016336             JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
2527 040450  103407                    BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
2528 040452  010001                    MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
2532 040454                            ERRDF   ERRNO,T10SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
     040454  104455                                                             TRAP    C$ERDF
     040456  001752                                                             .WORD   1002
     040460  043030                                                             .WORD   T10SSR
     040462  012046                                                             .WORD   PKTSSR
2533 040464  005237  002220             INC     FATFLG                  ;SET FATAL ERROR FLAG
2534 040470                    15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     040470  104406                                                             TRAP    C$CLP1
2535 040472                            ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
     040472  104410                                                             TRAP    C$ESCAPE
     040474  000056                                                             .WORD   10000$-.
2536 040476  005737  002222             TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
2537 040502  001004                    BNE     22$                     ;BRANCH IF YES
2541 040504                            ERRHRD  ERRNO,T10NINT,PKTSSR
     040504  104456                                                             TRAP    C$ERHRD
     040506  001753                                                             .WORD   1003
     040510  043117                                                             .WORD   T10NINT
     040512  012046                                                             .WORD   PKTSSR
2542 040514  016501  000002      22$:   MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
2543 040520  012702  000200             MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
2544 040524  032701  000100             BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
2545 040530  001402                    BEQ     25$                     ;BRANCH IF NOT OFF LINE
2546 040532  052702  000100             BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
2547 040536  020201              25$:   CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
2548 040540  001404                    BEQ     30$                     ;OKAY IF MATCH
2552 040542                            ERRHRD  ERRNO,T10NBA,PKTSSR     ;NBA NOT ZERO
     040542  104456                                                             TRAP    C$ERHRD
     040544  001754                                                             .WORD   1004
     040546  042671                                                             .WORD   T10NBA
     040550  012046                                                             .WORD   PKTSSR
2553 040552                    30$:
2554 040552                            ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
     040552                                                                 10000$:
     040552  104405                                                             TRAP    C$ESEG
2555 040554                            BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
     040554  104404                                                             TRAP    C$BSEG
2556
2557 040556  005037  002222             CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
2558 040562  012737  025252  042512     MOV     #025252,T10BFR          ;WIPE OUT MESSAGE BUFFER AREA
2559 040570  012714  100212             MOV     #100212,(R4)            ;SET COMMAND PACKET TO MESS BUF REL
2560 040574  010465  000000             MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
2561 040600  004737  016336             JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
2562 040604  103407                    BCS     45$                     ;BR IF CARRY SET (GOOD RETURN)
2563 040606  010001                    MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
2567 040610                            ERRDF   ERRNO,T10SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
```

```
                040610  104455                                                          TRAP    C$ERDF
                040612  001755                                                          .WORD   1005
                040614  043030                                                          .WORD   T10SSR
                040616  012046                                                          .WORD   PKTSSR
2568            040620  005237  002220          INC     FATFLG          ;SET FATAL ERROR FLAG
2569            040624          45$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
                040624  104406                                                          TRAP    C$CLP1
2570            040626  005737  002222          TST     INTRECV         ;DID AN INTERRUPT OCCUR ?
2571            040632  001404                  BEQ     52$             ;BRANCH IF NO
2575            040634                          ERRHRD  ERRNO,T10INT,PKTSSR
                040634  104456                                                          TRAP    C$ERHRD
                040636  001756                                                          .WORD   1006
                040640  043210                                                          .WORD   T10INT
                040642  012046                                                          .WORD   PKTSSR
2576            040644  016501  000002  52$:    MOV     TSSR(R5),R1     ;GET THE CONTENTS OF TSSR
2577            040650  012702  000200          MOV     #SSR,R2         ;EXPECTED CONTENTS OF TSSR
2578            040654  032701  000100          BIT     #OFL,R1         ;IS OFF-LINE BIT SET ?
2579            040660  001402                  BEQ     55$             ;BRANCH IF NOT OFF-LINE
2580            040662  052702  000100          BIS     #OFL,R2         ;SET OFF-LINE IN EXPECTED DATA
2581            040666  020201          55$:    CMP     R2,R1           ;DOES EXPECTED MATCH RECEIVED ?
2582            040670  001404                  BEQ     60$             ;OKAY IF MATCH
2586            040672                          ERRHRD  ERRNO,T10NNBA,PKTSSR    ;NBA  SET
                040672  104456                                                          TRAP    C$ERHRD
                040674  001757                                                          .WORD   1007
                040676  042753                                                          .WORD   T10NNBA
                040700  012046                                                          .WORD   PKTSSR
2587            040702          60$:
2588            040702  013701  042512          MOV     T10BFR,R1       ;PICK UP THE 1ST WORD OF MESSAGE BUFFER
2589            040706  012702  025252          MOV     #025252,R2      ;SET UP EXPECTED DATA
2590            040712  020102                  CMP     R1,R2           ;WAS ANY MESSAGE REC'D
2591            040714  001404                  BEQ     70$             ;BR, IF OK (EQUAL)
2595            040716                          ERRHRD  ERRNO,T10MBF,EXPREC     ;MESSAGE BUFFER WAS MODIFIED
                040716  104456                                                          TRAP    C$ERHRD
                040720  001760                                                          .WORD   1008
                040722  042574                                                          .WORD   T10MBF
                040724  015474                                                          .WORD   EXPREC
2596            040726          70$:
2597            040726  005737  002220          TST     FATFLG          ;ANY FATAL ERRORS
2598            040732  001403                  BEQ     80$             ;BR, IF NO FATAL ERRORS
2599            040734  004737  017202          JSR     PC,CKDROP       ;TRY TO DROP THE UNIT
2600            040740                          ENDSEG                  ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
                040740                                                                  10001$:
                040740  104405                                                          TRAP    C$ESEG
2601            040742          80$:
2602            040742                          ENDSUB                  ;////////////// END SUBTEST ////////////
                040742                                                                  L10076:
                040742  104403                                                          TRAP    C$ESUB
2603
2604                            ;+
2605                            ;TEST 10 SUBTEST 2
2606                            ;
2607                            ;CHECKS THAT THE MESSAGE BUFFER RELEASE COMMAND WORKS
2608                            ;PROPERLY AND THAT THERE IS AN INTERRUPT IF THE "IE"
2609                            ;BIT IS SET IN THE COMMAND PACKET AND THE "ERI" BIT
2610                            ;IS SET IN THE CHARACTERISTICS DATA PACKET
2611                            ;
2612                            ;
```

```
040744                               BGNSUB                             ;///////////// BEGIN SUBTEST ////////////
040744                                                                               T10.2:
040744  104402                                                                       TRAP    C$BSUB

040746  004737  043326               JSR     PC,T10RST                  ;SET PACKET TO INITIAL VALUES
040752                               SETPRI  #PRI00                     ;LOWER PRIORITY TO ALLOW INTERRUPTS
040752  012700  000000                                                               MOV     #PRI00,R0
040756  104441                                                                       TRAP    C$SPRI
040760  012704  042470               MOV     #T10PACKET,R4              ;GET THE ADDRESS OF COMMAND PACKET
040764  012764  000010  000006       MOV     #8.,PKBCNT(R4)             ;START WITH MINIMUM ALLOWABLE VALUE
040772                       5$:
040772                               BGNSEG                             ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
040772  104404                                                                       TRAP    C$BSEG

040774  004737  015774               JSR     PC,SOFINIT                 ;DO SOFT INIT OF CONTROLLER
041000  103405                       BCS     10$                        ;BR IF SOFT INIT = OK
041002  010001                       MOV     R0,R1                      ;SAVE CONTENTS OF TSSR
041004                               ERRDF   ERRNO,SFIERR,SFIMSG        ;DEVICE FATAL ERROR DURING INIT
041004  104455                                                                       TRAP    C$ERDF
041006  001761                                                                       .WORD   1009
041010  003650                                                                       .WORD   SFIERR
041012  012034                                                                       .WORD   SFIMSG
041014  005037  002220       10$:    CLR     FATFLG                     ;CLEAR FATAL ERROR FLAG
041020  005037  002222               CLR     INTRECV                    ;CLEAR INTERRUPT RECEIVED FLAG
041024  012737  000020  042506       MOV     #000020,T10DATA+6          ;SET ERI IN CHARACTERISTICS DATA
041032  010465  000000               MOV     R4,TSDB(R5)                ;SET THE PACKET ADDRESS
041036  004737  016336               JSR     PC,CHKTSSR                 ;WAIT FOR SSR TO SET
041042  103407                       BCS     15$                        ;BR IF CARRY SET (GOOD RETURN)
041044  010001                       MOV     R0,R1                      ;SAVE CONTENTS OF TSSR
041046                               ERRDF   ERRNO,T10SSR,PKTSSR        ;DEVICE FATAL SSR FAILED TO SET
041046  104455                                                                       TRAP    C$ERDF
041050  001762                                                                       .WORD   1010
041052  043030                                                                       .WORD   T10SSR
041054  012046                                                                       .WORD   PKTSSR
041056  005237  002220               INC     FATFLG                     ;SET FATAL ERROR FLAG
041062                       15$:    CKLOOP                             ;LOOP ON ERROR, IF FLAG SET
041062  104406                                                                       TRAP    C$CLP1
041064                               ESCAPE  SEG                        ;BY-PASS SUBTEST IF FATAL ERROR
041064  104410                                                                       TRAP    C$ESCAPE
041066  000056                                                                       .WORD   10000$-.
041070  005737  002222               TST     INTRECV                    ;DID AN INTERRUPT OCCUR ?
041074  001004                       BNE     22$                        ;BRANCH IF YES
041076                               ERRHRD  ERRNO,T10NINT,PKTSSR
041076  104456                                                                       TRAP    C$ERHRD
041100  001763                                                                       .WORD   1011
041102  043117                                                                       .WORD   T10NINT
041104  012046                                                                       .WORD   PKTSSR
041106  016501  000002       22$:    MOV     TSSR(R5),R1                ;GET THE CONTENTS OF TSSR
041112  012702  000200               MOV     #SSR,R2                    ;EXPECTED CONTENTS OF TSSR
041116  032701  000100               BIT     #OFL,R1                    ;IS OFF-LINE BIT SET ?
041122  001402                       BEQ     25$                        ;BRANCH IF NOT OFF-LINE
041124  052702  000100               BIS     #OFL,R2                    ;SET OFF-LINE IN EXPECTED DATA
041130  020201               25$:    CMP     R2,R1                      ;DOES EXPECTED MATCH RECEIVED ?
041132  001404                       BEQ     30$                        ;OKAY IF MATCH
041134                               ERRHRD  ERRNO,T10NBA,PKTSSR        ;NBA NOT ZERO
041134  104456                                                                       TRAP    C$ERHRD
041136  001764                                                                       .WORD   1012
```

```
                041140  042671                                                          .WORD   T10NBA
                041142  012046                                                          .WORD   PKTSSR
        2660    041144                  30$:
        2661    041144                          ENDSEG                  ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
                041144                                                                  100000$:
                041144  104405                                                          TRAP    C$ESEG
        2662    041146                          BGNSEG                  ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
                041146  104404                                                          TRAP    C$BSEG
        2663
        2664    041150  005037  002222          CLR     INTRECV         ;CLEAR INTERRUPT RECEIVED FLAG
        2665    041154  012737  025252  042512  MOV     #025252,T10BFR  ;WIPE OUT MESSAGE BUFFER AREA
        2666    041162  012714  100212          MOV     #100212,(R4)    ;SET COMMAND PACKET TO MESS BUF REL
        2667    041166  010465  000000          MOV     R4,TSDB(R5)     ;SET THE PACKET ADDRESS
        2668    041172  004737  016336          JSR     PC,CHKTSSR      ;WAIT FOR SSR TO SET
        2669    041176  103407                  BCS     45$             ;BR IF CARRY SET (GOOD RETURN)
        2670    041200  010001                  MOV     R0,R1           ;SAVE CONTENTS OF TSSR
        2674    041202                          ERRDF   ERRNO,T10SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
                041202  104455                                                          TRAP    C$ERDF
                041204  001765                                                          .WORD   1013
                041206  043030                                                          .WORD   T10SSR
                041210  012046                                                          .WORD   PKTSSR
        2675    041212  005237  002220          INC     FATFLG          ;SET FATAL ERROR FLAG
        2676    041216                  45$:    CKLOOP                  ;LOOP ON ERROR, IF FLAG SET
                041216  104406                                                          TRAP    C$CLP1
        2677    041220  005737  002222          TST     INTRECV         ;DID AN INTERRUPT OCCUR ?
        2678    041224  001004                  BNE     52$             ;BRANCH IF YES
        2682    041226                          ERRHRD  ERRNO,T10INT,PKTSSR
                041226  104456                                                          TRAP    C$ERHRD
                041230  001766                                                          .WORD   1014
                041232  043210                                                          .WORD   T10INT
                041234  012046                                                          .WORD   PKTSSR
        2683    041236  016501  000002  52$:    MOV     TSSR(R5),R1     ;GET THE CONTENTS OF TSSR
        2684    041242  012702  000200          MOV     #SSR,R2         ;EXPECTED CONTENTS OF TSSR
        2685    041246  032701  000100          BIT     #OFL,R1         ;IS OFF-LINE BIT SET ?
        2686    041252  001402                  BEQ     55$             ;BRANCH IF NOT OFF-LINE
        2687    041254  052702  000100          BIS     #OFL,R2         ;SET OFF-LINE IN EXPECTED DATA
        2688    041260  020201          55$:    CMP     R2,R1           ;DOES EXPECTED MATCH RECEIVED ?
        2689    041262  001404                  BEQ     60$             ;OKAY IF MATCH
        2693    041264                          ERRHRD  ERRNO,T10NNBA,PKTSSR    ;NBA NOT SET
                041264  104456                                                          TRAP    C$ERHRD
                041266  001767                                                          .WORD   1015
                041270  042753                                                          .WORD   T10NNBA
                041272  012046                                                          .WORD   PKTSSR
        2694    041274                  60$:
        2695    041274  013701  042512          MOV     T10BFR,R1       ;PICK UP THE 1ST WORD OF MESSAGE BUFFER
        2696    041300  012702  025252          MOV     #025252,R2      ;SET UP EXPECTED DATA
        2697    041304  020102                  CMP     R1,R2           ;WAS ANY MESSAGE REC'D
        2698    041306  001404                  BEQ     70$             ;BR, IF OK (EQUAL)
        2702    041310                          ERRHRD  ERRNO,T10MBF,EXPREC     ;MESSAGE BUFFER WAS MODIFIED
                041310  104456                                                          TRAP    C$ERHRD
                041312  001770                                                          .WORD   1016
                041314  042574                                                          .WORD   T10MBF
                041316  015474                                                          .WORD   EXPREC
        2703
        2704    041320                  70$:
        2705    041320  005737  002220          TST     FATFLG          ;ANY FATAL ERRORS
        2706    041324  001402                  BEQ     80$             ;BR, IF NO FATAL ERRORS
```

```
                                        JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
                                80$:
                                        ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
                                                                                        10001$:
                                                                                        TRAP    C$ESEG
                                        ENDSUB                          ;////////////// END SUBTEST //////////////
                                                                                        L10077:
                                                                                        TRAP    C$ESUB

                                ;*
                                ;TEST 10 SUBTEST 3
                                ;
                                ;CHECKS THAT THE CPU GIVES UP OWNERSHIP OF THE MESSAGE BUFFER
                                ;AFTER THE MESSAGE BUFFER RELEASE, AND THAT FOLLOWING COMMANDS
                                ;WORK CORRECTLY
                                ;
                                ;
                                        BGNSUB                          ;////////////// BEGIN SUBTEST //////////////
                                                                                        T10.3:
                                                                                        TRAP    C$BSUB

041340  004737  043326                 JSR     PC,T10RST               ;SET PACKET TO INITIAL VALUES
041344                                  SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
041344  012700  000000                                                  MOV     #PRI00,R0
041350  104441                                                          TRAP    C$SPRI
041352  012704  042470                 MOV     #T10PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
041356  012764  000010  000006         MOV     #8.,PKBCNT(R4)          ;START WITH MINIMUM ALLOWABLE VALUE
041364                          5$:
041364                                  BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
041364  104404                                                          TRAP    C$BSEG

041366  004737  015774                 JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
041372  103405                          BCS     10$                     ;BR IF SOFT INIT = OK
041374  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
041376                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
041376  104455                                                          TRAP    C$ERDF
041400  001771                                                          .WORD   1017
041402  003650                                                          .WORD   SFIERR
041404  012034                                                          .WORD   SFIMSG
041406  005037  002220          10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
041412  005037  002222                  CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
041416  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
041422  004737  016336                 JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
041426  103407                          BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
041430  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
041432                                  ERRDF   ERRNO,T10SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
041432  104455                                                          TRAP    C$ERDF
041434  001772                                                          .WORD   1018
041436  043030                                                          .WORD   T10SSR
041440  012046                                                          .WORD   PKTSSR
041442  005237  002220                  INC     FATFLG                  ;SET FATAL ERROR FLAG
041446                          15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
041446  104406                                                          TRAP    C$CLP1
041450                                  ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
041450  104410                                                          TRAP    C$ESCAPE
041452  000056                                                          .WORD   10000$ .
041454  005737  002222                  TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
```

```
2750 041460  001004                    BNE     22$                     ;BRANCH IF YES
2754 041462                            ERRHRD  ERRNO,T10NINT,PKTSSR
     041462  104456                                                    TRAP    C$ERHRD
     041464  001773                                                    .WORD   1019
     041466  043117                                                    .WORD   T10NINT
     041470  012046                                                    .WORD   PKTSSR
2755 041472  016501  000002        22$:    MOV     TSSR(R5),R1         ;GET THE CONTENTS OF TSSR
2756 041476  012702  000200              MOV     #SSR,R2             ;EXPECTED CONTENTS OF TSSR
2757 041502  032701  000100              BIT     #OFL,R1             ;IS OFF-LINE BIT SET ?
2758 041506  001402                    BEQ     25$                 ;BRANCH IF NOT OFF-LINE
2759 041510  052702  000100              BIS     #OFL,R2             ;SET OFF-LINE IN EXPECTED DATA
2760 041514  020201        25$:    CMP     R2,R1               ;DOES EXPECTED MATCH RECEIVED ?
2761 041516  001404                    BEQ     30$                 ;OKAY IF MATCH
2765 041520                            ERRHRD  ERRNO,T10NBA,PKTSSR ;NBA NOT ZERO
     041520  104456                                                    TRAP    C$ERHRD
     041522  001774                                                    .WORD   1020
     041524  042671                                                    .WORD   T10NBA
     041526  012046                                                    .WORD   PKTSSR
2766 041530                    30$:
2767 041530                            ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
     041530                                                                  10000$:
     041530  104405                                                    TRAP    C$ESEG
2768 041532                            BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
     041532  104404                                                    TRAP    C$BSEG
2769 041534  004737  043326            JSR     PC,T10RST           ;RESET PACKETS AND COMMANDS
2770 041540  005037  002222            CLR     INTRECV             ;CLEAR INTERRUPT RECEIVED FLAG
2771 041544  012737  025252  042512    MOV     #025252,T10BFR      ;WIPE OUT MESSAGE BUFFER AREA
2772 041552  012714  100212            MOV     #100212,(R4)        ;SET COMMAND PACKET TO MESS BUF REL
2773 041556  010465  000000            MOV     R4,TSD8(R5)         ;SET THE PACKET ADDRESS
2774 041562  004737  016336            JSR     PC,CHKTSSR          ;WAIT FOR SSR TO SET
2775 041566  103407                    BCS     45$                 ;BR IF CARRY SET (GOOD RETURN)
2776 041570  010001                    MOV     R0,R1               ;SAVE CONTENTS OF TSSR
2780 041572                            ERRDF   ERRNO,T10SSR,PKTSSR ;DEVICE FATAL SSR FAILED TO SET
     041572  104455                                                    TRAP    C$ERDF
     041574  001775                                                    .WORD   1021
     041576  043030                                                    .WORD   T10SSR
     041600  012046                                                    .WORD   PKTSSR
2781 041602  005237  002220            INC     FATFLG              ;SET FATAL ERROR FLAG
2782 041606        45$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     041606  104406                                                    TRAP    C$CLP1
2783 041610  005737  002222            TST     INTRECV             ;DID AN INTERRUPT OCCUR ?
2784 041614  001404                    BEQ     52$                 ;BRANCH IF NO
2788 041616                            ERRHRD  ERRNO,T10INT,PKTSSR
     041616  104456                                                    TRAP    C$ERHRD
     041620  001776                                                    .WORD   1022
     041622  043210                                                    .WORD   T10INT
     041624  012046                                                    .WORD   PKTSSR
2789 041626  016501  000002        52$:    MOV     TSSR(R5),R1         ;GET THE CONTENTS OF TSSR
2790 041632  012702  000200              MOV     #SSR,R2             ;EXPECTED CONTENTS OF TSSR
2791 041636  032701  000100              BIT     #OFL,R1             ;IS OFF-LINE BIT SET ?
2792 041642  001402                    BEQ     55$                 ;BRANCH IF NOT OFF-LINE
2793 041644  052702  000100              BIS     #OFL,R2             ;SET OFF-LINE IN EXPECTED DATA
2794 041650  020201        55$:    CMP     R2,R1               ;DOES EXPECTED MATCH RECEIVED ?
2795 041652  001404                    BEQ     60$                 ;OKAY IF MATCH
2799 041654                            ERRHRD  ERRNO,T10NNBA,PKTSSR    ;NBA NOT SET
     041654  104456                                                    TRAP    C$ERHRD
     041656  001777                                                    .WORD   1023
```

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                041660  042753                                                          .WORD   T10NNBA
                041662  012046                                                          .WORD   PKTSSR
          2800  041664                        60$:
          2801  041664  013701  042512                MOV     T10BFR,R1               ;PICK UP THE 1ST WORD OF MESSAGE BUFFER
          2802  041670  012702  025252                MOV     #025252,R2              ;SET UP EXPECTED DATA
          2803  041674  020102                        CMP     R1,R2                   ;WAS ANY MESSAGE REC'D
          2804  041676  001404                        BEQ     70$                     ;BR, IF OK (EQUAL)
          2808  041700                                ERRHRD  ERRNO,T10MBF,EXPREC     ;MESSAGE BUFFER WAS MODIFIED
                041700  104456                                                          TRAP    C$ERHRD
                041702  002000                                                          .WORD   1024
                041704  042574                                                          .WORD   T10MBF
                041706  015474                                                          .WORD   EXPREC
          2809
          2810  041710                        70$:    CKLOOP                          ;LOOP ON ERROR IF FLAG SET
                041710  104406                                                          TRAP    C$CLP1
          2811
          2812  041712  005037  002222                CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
          2813  041716  004737  043326                JSR     PC,T10RST               ;RESET THE PACKETS AND COMMANDS
          2814  041722  042714  100000                BIC     #100000,(R4)            ;CLEAR THE ACK BIT
          2815  041726  010465  000000                MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
          2816  041732  004737  016336                JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
          2817  041736  103407                        BCS     75$                     ;BR IF CARRY SET (GOOD RETURN)
          2818  041740  010001                        MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
          2822  041742                                ERRDF   ERRNO,T10SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
                041742  104455                                                          TRAP    C$ERDF
                041744  002001                                                          .WORD   1025
                041746  043030                                                          .WORD   T10SSR
                041750  012046                                                          .WORD   PKTSSR
          2823  041752  005237  002220                INC     FATFLG                  ;SET FATAL ERROR FLAG
          2824  041756                        75$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
                041756  104406                                                          TRAP    C$CLP1
          2825  041760                                ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
                041760  104410                                                          TRAP    C$ESCAPE
                041762  000062                                                          .WORD   10001$-.
          2826  041764  005737  002222                TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
          2827  041770  001006                        BNE     82$                     ;BRANCH IF YES
          2831  041772  016500  000002                MOV     TSSR(R5),R0             ;GET TSSR FOR ERROR REPORT
          2832  041776                                ERRHRD  ERRNO,T10NINT,PKTSSR
                041776  104456                                                          TRAP    C$ERHRD
                042000  002002                                                          .WORD   1026
                042002  043117                                                          .WORD   T10NINT
                042004  012046                                                          .WORD   PKTSSR
          2833  042006  016501  000002        82$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
          2834  042012  012702  000200                MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
          2835  042016  032701  000100                BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
          2836  042022  001402                        BEQ     85$                     ;BRANCH IF NOT OFF-LINE
          2837  042024  052702  000100                BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
          2838  042030  020201        85$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
          2839  042032  001404                        BEQ     90$                     ;OKAY IF MATCH
          2843  042034                                ERRHRD  ERRNO,T10SSR,PKTSSR     ;NBA NOT ZERO
                042034  104456                                                          TRAP    C$ERHRD
                042036  002003                                                          .WORD   1027
                042040  043030                                                          .WORD   T10SSR
                042042  012046                                                          .WORD   PKTSSR
          2844  042044                        90$:
          2845  042044                        ENDSEG                          ;<<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<<
                042044                                                                10001$:
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                042044  104405                                                          TRAP    C$ESEG
2846            042046  005737  002220          TST     FATFLG                  ;ANY FATAL ERRORS
2847            042052  001403                  BEQ     95$                     ;BR, IF NO FATAL ERRORS
2848            042054  004737  017202          JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
2849
2850            042060                          BGNSEG                          ;<<<<<<<<<<<<< BGN SEGMENT <<<<<<<<<<<<<
                042060  104404                                                          TRAP    C$BSEG
2851            042062  005037  002222  95$:    CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
2852            042066  004737  043326          JSR     PC,T1ORST               ;RESET THE PACKETS AND COMMANDS
2853            042072  010465  000000          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
2854            042076  004737  016336          JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
2855            042102  103407                  BCS     100$                    ;BR IF CARRY SET (GOOD RETURN)
2856            042104  010001                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
2860            042106                          ERRDF   ERRNO,T10SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
                042106  104455                                                          TRAP    C$ERDF
                042110  002004                                                          .WORD   1028
                042112  043030                                                          .WORD   T10SSR
                042114  012046                                                          .WORD   PKTSSR
2861            042116  005237  002220          INC     FATFLG                  ;SET FATAL ERROR FLAG
2862            042122          100$:   CKLOOP                                  ;LOOP ON ERROR, IF FLAG SET
                042122  104406                                                          TRAP    C$CLP1
2863            042124                          ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
                042124  104410                                                          TRAP    C$ESCAPE
                042126  000062                                                          .WORD   10002$-.
2864            042130  005737  002222          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
2865            042134  001006                  BNE     112$                    ;BRANCH IF YES
2869            042136  016500  000002          MOV     TSSR(R5),R0             ;GET TSSR FOR ERROR REPORT
2870            042142                          ERRHRD  ERRNO,T10NINT,PKTSSR
                042142  104456                                                          TRAP    C$ERHRD
                042144  002005                                                          .WORD   1029
                042146  043117                                                          .WORD   T10NINT
                042150  012046                                                          .WORD   PKTSSR
2871            042152  016501  000002  112$:   MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
2872            042156  012702  000200          MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
2873            042162  032701  000100          BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
2874            042166  001402                  BEQ     125$                    ;BRANCH IF NOT OFF-LINE
2875            042170  052702  000100          BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
2876            042174  020201          125$:   CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
2877            042176  001405                  BEQ     130$                    ;OKAY IF MATCH
2881            042200                          ERRHRD  ERRNO,T10SSR,PKTSSR     ;NBA NOT ZERO
                042200  104456                                                          TRAP    C$ERHRD
                042202  002006                                                          .WORD   1030
                042204  043030                                                          .WORD   T10SSR
                042206  012046                                                          .WORD   PKTSSR
2882            042210                          ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
                042210                                                                  10002$:
                042210  104405                                                          TRAP    C$ESEG
2883            042212  005737  002220  130$:   TST     FATFLG                  ;CHECK FATAL FLAG FOR SET
2884            042216  001402                  BEQ     140$                    ;BR, IF NOT SET (OK)
2885            042220  004737  017202          JSR     PC,CKDROP               ;DROP DEVICE IF INDICATED
2886            042224          140$:
2887            042224                          ENDSUB                          ;////////////// END SUBTEST //////////////
                042224                                                                  L10100:
                042224  104403                                                          TRAP    C$ESUB
2888            042226          30$:
2889
2890                            ;*
```

```
2891                                    ;TEST 10 SUBTEST 4
2892                                    ;
2893                                    ;CHECKS THAT THE REGISTER MODIFICATION REFUSED (RMR) BIT IN
2894                                    ;THE TSSR WILL BE SET IF A WRITE CHARACTERISTICS COMMAND
2895                                    ;BEING EXECUTED AND ANOTHER "WC" COMMAND IS ATTEMPTED
2896                                    ;
2897                                    ;
2898
2899 042226                                    BGNSUB                          ;////////////// BEGIN SUBTEST //////////////
      042226                                                                                  T10.4:
      042226  104402                                                                            TRAP    C$BSUB
2900
2901 042230  004737  043400                    JSR     PC,T10RT2               ;SET SECOND PACKET UP
2902 042234  004737  043326                    JSR     PC,T10RST               ;SET PACKET TO INITIAL VALUES
2903 042240                                    SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
      042240  012700  000000                                                                          MOV     #PRI00,R0
      042244  104441                                                                                  TRAP    C$SPRI
2904 042246  012704  042470                    MOV     #T10PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
2905 042252  012703  042532                    MOV     #T10PKT,R3              ;GET THE ADDRESS OF 2ND CMD PACKET
2906 042256  012764  000010  000006            MOV     #8.,PKBCNT(R4)          ;START WITH MINIMUM ALLOWABLE VALUE
2907 042264  012763  000010  000006            MOV     #8.,PKBCNT(R3)          ;START WITH MINIMUM ALLOWABLE VALUE
2908 042272                            5$:
2909 042272                                    BGNSEG                          ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
      042272  104404                                                                                  TRAP    C$BSEG
2910 042274  004737  015774                    JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
2911 042300  103405                            BCS     10$                     ;BR IF SOFT INIT = OK
2915 042302  010001                            MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
2916 042304                                    ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
      042304  104455                                                                                  TRAP    C$ERDF
      042306  002007                                                                                  .WORD   1031
      042310  003650                                                                                  .WORD   SFIERR
      042312  012034                                                                                  .WORD   SFIMSG
2917 042314  005037  002220            10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
2918 042320  005037  002222                    CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
2919 042324  010465  000000                    MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
2920 042330  010365  000000                    MOV     R3,TSDB(R5)             ;SECOND COMMAND PACKET
2921 042334  004737  016250                    JSR     PC,WAITF                ;WAIT FOR SSR TO SET
2922 042340  016501  000002                    MOV     TSSR(R5),R1             ;GET CONTENTS OF TSSR REGISTER
2923 042344  032701  000200                    BIT     #SSR,R1                 ;CHECK FOR SSR (TSSR) SET
2924 042350  001006                            BNE     15$                     ;BR, IF SSR SET (COOD)
2928 042352                                    ERRDF   ERRNO,T10SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
      042352  104455                                                                                  TRAP    C$ERDF
      042354  002010                                                                                  .WORD   1032
      042356  043030                                                                                  .WORD   T10SSR
      042360  012046                                                                                  .WORD   PKTSSR
2929 042362  005237  002220                    INC     FATFLG                  ;SET FATAL ERROR FLAG
2930 042366                            15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
      042366  104406                                                                                  TRAP    C$CLP1
2931 042370                                    ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
      042370  104410                                                                                  TRAP    C$ESCAPE
      042372  000056                                                                                  .WORD   10000$ .
2932 042374  005737  002222                    TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
2933 042400  001004                            BNE     22$                     ;BRANCH IF YES
2934
2935
2939 042402                                    ERRHRD  ERRNO,T10NINT,PKTSSR
      042402  104456                                                                                  TRAP    C$ERHRD
```

```
                042404  002011                                                          .WORD   1033
                042406  043117                                                          .WORD   T10NINT
                042410  012046                                                          .WORD   PKTSSR
 2940           042412  016501  000002          22$:    MOV     TSSR(R5),R1           ;GET THE CONTENTS OF TSSR
 2941           042416  012702  110200                  MOV     #SSR!RMR!SC,R2        ;EXPECTED CONTENTS OF TSSR
 2942           042422  032701  000100                  BIT     #OFL,R1               ;IS OFF-LINE BIT SET ?
 2943           042426  001402                          BEQ     25$                   ;BRANCH IF NOT OFF-LINE
 2944           042430  052702  000100                  BIS     #OFL,R2               ;SET OFF-LINE IN EXPECTED DATA
 2945           042434  020201          25$:    CMP     R2,R1                 ;DOES EXPECTED MATCH RECEIVED ?
 2946           042436  001404                          BEQ     30$                   ;OKAY IF MATCH
 2950           042440                          ERRHRD  ERRNO,T10SSR,PKTSSR   ;NBA NOT ZERO
                042440  104456                                                          TRAP    C$ERHRD
                042442  002012                                                          .WORD   1034
                042444  043030                                                          .WORD   T10SSR
                042446  012046                                                          .WORD   PKTSSR
 2951           042450          30$:
 2952           042450                          ENDSEG                        ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
                042450                                                                10000$:
                042450  104405                                                          TRAP    C$ESEG
 2953           042452                          ENDSUB                        ;////////////// END SUBTEST //////////////
                042452                                                                L10101:
                042452  104403                                                          TRAP    C$ESUB
 2954           042454                          EXIT    TST                   ;ALL DONE WITH THIS TEST
                042454  104432                                                          TRAP    C$EXIT
                042456  000774                                                          .WORD   L10075 .
 2955
 2956                                   ;*
 2957                                   ;LOCAL STORAGE FOR THIS TEST
 2958                                   ;
 2959
 2961           042460                          .BLKB   10-<.-TSV2&7>
 2963           042470          T10PACKET:                                    ;COMMAND PACKET FOR TEST
 2964           042470  100204                  .WORD   100204                ;WRITE CHAR COMMAND, WITH IE, ACK
 2965           042472  042500                  .WORD   T10DATA               ;ADDRESS OF CHARACTERISTICS BLOCK
 2966           042474  000000                  .WORD   0
 2967           042476  000010                  .WORD   8.                    ;STARTING VALUE OF BLOCK SIZE
 2968
 2969           042500          T10DATA:                                              ;CHARACTERISTICS DATA BLOCK
 2970           042500  042512                  .WORD   T10BFR                ;ADDRESS OF MESSAGE BUFFER
 2971           042502  000000                  .WORD   0
 2972           042504  000016                  .WORD   14.                   ;LENGTH OF MESSAGE BUFFER
 2973           042506  000000  000000          .WORD   0,0
 2974
 2975           042512          T10BFR: .BLKW   8.                    ;MESSAGE BUFFER
 2976
 2977                                   ;*
 2978                                   ;
 2979                                   ;TEST DATA FOR SUBTEST FOUR
 2980                                   ;
 2981           042532          T10PKT:                                       ;COMMAND PACKET FOR TEST
 2982           042532  100204                  .WORD   100204                ;WRITE CHAR COMMAND, WITH IE, ACK
 2983           042534  042542                  .WORD   T10DTA                ;ADDRESS OF CHARACTERISTICS BLOCK
 2984           042536  000000                  .WORD   0
 2985           042540  000010                  .WORD   8.                    ;STARTING VALUE OF BLOCK SIZE
 2986
 2987           042542          T10DTA:                                       ;CHARACTERISTICS DATA BLOCK
 2988           042542  042554                  .WORD   T10BUFR               ;ADDRESS OF MESSAGE BUFFER
```

```
2989 042544  000000                          .WORD   0
2990 042546  000016                          .WORD   14.                     ;LENGTH OF MESSAGE BUFFER
2991 042550  000000  000000                  .WORD   0,0
2992
2993 042554                          T10BUFR:.BLKW   8.                      ;MESSAGE BUFFER
2994
2995                                 ;*
2996                                 ;LOCAL TEXT MESSAGES FOR TEST
2997                                 ;
2998
2999
3000 042574     115     145     163 T10MBF: .ASCIZ  'Message Buffer Modified after MESSAGE BUFFER RELEASE Command
3001 042671     116     102     101 T10NBA: .ASCIZ  'NBA Not Clear After WRITE CHARACTERISTICS Command'
3002 042753     116     102     101 T10NNBA:        .ASCIZ  'NBA Set After MESSAGE BUFFER RELEASE Command
3003 043030     103     157     156 T10SSR: .ASCIZ  'Contents of TSSR Incorrect After WRITE CHARACTERISTICS
3004 043117     105     170     160 T10NINT:        .ASCIZ  'Expected Interrupt Not Received On WRITE CHARACTERISTICS
3005 043210     125     156     145 T10INT: .ASCIZ  'Unexpected Interrupt Received On WRITE CHARACTERISTICS'
3006 043277     102     141     163 TST10ID:        .ASCIZ  'Basic Packet Protocol'
3007                                 .EVEN
3008
3009
3010
3011                                 ;*
3012                                 ;
3013                                 ;ROUTINE TO RESTORE COMMAND PACKET TO START-UP (DEFAULT) VALUES
3014                                 ;
3015                                 ;
3016
3017 043326                          T10RST:
3018 043326                                 SAVREG                          ;SAVE THE REGISTERS
3019 043332  012701  042470                 MOV     #T10PACKET,R1           ;START OF THE PACKET
3020 043336  012721  100204                 MOV     #100204,(R1)+           ;WRITE CHARACTERISTICS WITH ACK, IE
3021 043342  012721  042500                 MOV     #T10DATA,(R1)+          ;ADDRESS OF CHAR DATA BLOCK
3022 043346  005021                         CLR     (R1)+                   ;EXTENDED ADDRESS
3023 043350  012721  000010                 MOV     #8.,(R1)+               ;SIZE OF DATA BLOCK IN BYTES
3024 043354  012721  042512                 MOV     #T10BFR,(R1)+           ;ADDRESS OF MESSAGE BUFFER
3025 043360  005021                         CLR     (R1)+
3026 043362  012721  000016                 MOV     #14.,(R1)+              ;LENGTH OF MESSAGE BUFFER
3027 043366  005021                         CLR     (R1)+
3028 043370  005011                         CLR     (R1)
3029 043372  005037  042512                 CLR     T10BFR                  ;CLEAR 1ST LOC IN MESSAGE BUFFER
3030 043376  000207                         RTS     PC                      ;RETURN
3031                                 ;*
3032                                 ;
3033                                 ;ROUTINE TO RESTORE COMMAND PACKET #2 TO START-UP (DEFAULT) VALUES
3034                                 ;
3035                                 ;
3036
3037 043400                          T10RT2:
3038 043400                                 SAVREG                          ;SAVE THE REGISTERS
3039 043404  012701  042532                 MOV     #T10PKT,R1              ;START OF THE PACKET
3040 043410  012721  100204                 MOV     #100204,(R1)+           ;WRITE CHARACTERISTICS WITH ACK, IE
3041 043414  012721  042542                 MOV     #T10DTA,(R1)+           ;ADDRESS OF CHAR DATA BLOCK
3042 043420  005021                         CLR     (R1)+                   ;EXTENDED ADDRESS
3043 043422  012721  000010                 MOV     #8.,(R1)+               ;SIZE OF DATA BLOCK IN BYTES
3044 043426  012721  042554                 MOV     #T10BUFR,(R1)+          ;ADDRESS OF MESSAGE BUFFER
3045 043432  005021                         CLR     (R1)+
```

```
3046 043434  012721  000016                MOV     #14.,(R1)+      ;LENGTH OF MESSAGE BUFFER
3047 043440  005021                        CLR     (R1)+
3048 043442  005011                        CLR     (R1)
3049 043444  005037  042554                CLR     T10BUFR         ;CLEAR 1ST LOC IN MESSAGE BUFFER
3050 043450  000207                        RTS     PC              ;RETURN
3051 043452                                ENDTST
     043452                                                                L10075:
     043452  104401                                                              TRAP    C$ETST
3052
3053                                       .SBTTL  TEST  11: NON-TAPE MOTION COMMANDS
3054
3055                                ;+
3056                                ;
3057                                ;THIS TEST VERIFIES PROPER OPERATION OF THE INITIALIZE
3058                                ;COMMAND. TWO SUBTESTS ARE USED. THE FIRST VERIFIES THAT
3059                                ;THE COMMAND RUNS TO COMPLETION AND STORES A VALID
3060                                ;MESSAGE PACKET. THE SECOND VERIFIES THAT NON-ZERO
3061                                ;VALUES IN THE COMMAND MODE FIELD CAUSES COMMAND REJECT.
3062                                ;
3063                                ;
3064
3065 043454                                BGNTST
     043454                                                                T11::
3070 043454  012700  045462                MOV     #TST11ID,R0             ;ASCII MESSAGE TO IDENTIFY TEST
3071 043460  004737  016510                JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
3072 043464  012737  000024  002214        MOV     #20.,LOOPCNT            ;PERFORM 20 ITERATIONS
3073 043472                         T11LOOP:
3074 043472                                BGNSUB                          ;////////////// BEGIN SUBTEST ////////////
     043472                                                                T11.1:
     043472  104402                                                              TRAP    C$BSUB
3075
3076 043474                                SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
     043474  012700  000000                                                        MOV     #PRI00,R0
     043500  104441                                                              TRAP    C$SPPI
3077 043502  004737  015774                JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
3078 043506  103405                        BCS     3$                      ;BR IF SOFT INIT = OK
3082 043510  010001                        MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
3083 043512                                ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
     043512  104455                                                              TRAP    C$ERDF
     043514  002115                                                              .WORD   1101
     043516  003650                                                              .WORD   SFIERR
     043520  012034                                                              .WORD   SFIMSG
3084 043522                         3$:
3085 043522  012704  044710                MOV     #T11PK2,R4              ;WRITE CHARACTERISTICS PACKET
3086 043526  004737  010662                JSR     PC,WRTCHR               ;ISSUE WRITE CHARACTERISTICS
3087 043532  103404                        BCS     4$                      ;BR, IF COMMAND ISSUED OK
3091 043534                                ERRHRD  ERRNO,WRTMSG,SFIMSG     ;WRITE CHARACTERISTISC FAILED
     043534  104456                                                              TRAP    C$ERHRD
     043536  002116                                                              .WORD   1102
     043540  005054                                                              .WORD   WRTMSG
     043542  012034                                                              .WORD   SFIMSG
3092 043544                         4$:
3093 043544  004737  045514                JSR     PC,T11REST              ;SET UP PACKET FOR COMMAND
3094 043550  012704  044640                MOV     #T11PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
3095 043554                         5$:
3096 043554                                BGNSEG                          ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
     043554  104404                                                              TRAP    C$BSEG
```

```
3097
3098 043556  005037  002220          10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
3099 043562  005037  002222                  CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
3100 043566  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
3101 043572  004737  016336                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
3102 043576  103407                          BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
3103 043600  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
3107 043602                                  ERRDF   ERRNO,T11SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
     043602  104455                                                          TRAP    C$ERDF
     043604  002117                                                          .WORD   1103
     043606  045204                                                          .WORD   T11SSR
     043610  012046                                                          .WORD   PKTSSR
3108 043612  005237  002220                  INC     FATFLG                  ;SET FATAL ERROR FLAG
3109 043616                          15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     043616  104406                                                          TRAP    C$CLP1
3110 043620                                  ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
     043620  104410                                                          TRAP    C$ESCAPE
     043622  000074                                                          .WORD   10000$ .
3111 043624  005737  002222                   ST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
3112 043630  001004                          BNE     22$                     ;BRANCH IF YES
3116 043632                                  ERRHRD  ERRNO,T11NINT,PKTSSR
     043632  104456                                                          TRAP    C$ERHRD
     043634  002120                                                          .WORD   1104
     043636  045334                                                          .WORD   T11NINT
     043640  012046                                                          .WORD   PKTSSR
3117 043642  016501  000002          22$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
3118 043646  012702  000200                  MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
3119 043652  032701  000100                  BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
3120 043656  001402                          BEQ     25$                     ;BRANCH IF NOT OFF-LINE
3121 043660  052702  000100                  BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
3122 043664  020201                  25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
3123 043666  001404                          BEQ     30$                     ;OKAY IF MATCH
3127 043670                                  ERRHRD  ERRNO,T11NBA,PKTSSR     ;NBA NOT ZERO
     043670  104456                                                          TRAP    C$ERHRD
     043672  002121                                                          .WORD   1105
     043674  044752                                                          .WORD   T11NBA
     043676  012046                                                          .WORD   PKTSSR
3128 043700                          30$:
3129 043700  004737  011114          35$:    JSR     PC,CKRAM                ;CHECK RAM TO MEMORY
3130 043704  103405                          BCS     59$                     ;RAM OK GO ON
3134 043706                                  ERRHRD  ERRNO,PKTRAM,RAMERR     ;THEY DON'T MATCH
     043706  104456                                                          TRAP    C$ERHRD
     043710  002122                                                          .WORD   1106
     043712  004743                                                          .WORD   PKTRAM
     043714  015510                                                          .WORD   RAMERR
3135 043716                                  ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
     043716                                                              10000$:
     043716  104405                                                          TRAP    C$ESEG
3136
3137
3138 043720                          59$:    ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
     043720                                                              L10103:
     043720  104403                                                          TRAP    C$ESUB
3139
3140 043722  005737  002220                  TST     FATFLG                  ;ANY FATAL ERRORS ?
3141 043726  001402                          BEQ     60$                     ;BRANCH IF NOT
3142 043730  004737  017202                  JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
```

M13


```
043734                        60$:

                              ;+
                              ;
                              ;TEST 11, SUBTEST 2
                              ;
                              ;CHECK THAT NON-ZERO MODE BITS BEING SET CAUSES
                              ;INITIALIZE COMMAND TO BE REJECTED
                              ;
                              ;-

043734                                BGNSUB                          ;///////////// BEGIN SUBTEST ////////////
043734                                                                        T11.2:
043734  104402                                                                        TRAP    C$BSUB

043736                                SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
043736  012700  000000                                                                MOV     #PRI00,R0
043742  104441                                                                        TRAP    C$SPRI
043744                                BGNSEG                          ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>
043744  104404                                                                        TRAP    C$BSEG


043746  004737  015774                JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
043752  103405                        BCS     3$                      ;BR IF SOFT INIT = OK
043754  010001                        MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
043756                                ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
043756  104455                                                                        TRAP    C$ERDF
043760  002123                                                                        .WORD   1107
043762  003650                                                                        .WORD   SFIERR
043764  012034                                                                        .WORD   SFIMSG
043766                        3$:
043766  012704  044710                MOV     #T11PK2,R4              ;WRITE CHARACTERISTICS PACKET
043772  004737  010662                JSR     PC,WRTCHR               ;ISSUE WRITE CHARACTERISTICS
043776  103404                        BCS     4$                      ;BR, IF COMMAND ISSUED OK
044000                                ERRHRD  ERRNO,WRTMSG,SFIMSG     ;WRITE CHARACTERISTISC FAILED
044000  104456                                                                        TRAP    C$ERHRD
044002  002124                                                                        .WORD   1108
044004  005054                                                                        .WORD   WRTMSG
044006  012034                                                                        .WORD   SFIMSG
044010                        4$:
044010  004737  045514                JSR     PC,T11REST              ;SET UP PACKET FOR COMMAND
044014  012704  044640                MOV     #T11PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
044020                        5$:
044020  005037  002222        10$:    CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
044024  052714  007400                BIS     #P.MODE,(R4)            ;NON-ZERO COMMAND MODE BITS
044030  010465  000000                MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
044034  004737  016336                JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
044040  103405                        BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
044042  010001                        MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
044044                                ERRDF   ERRNO,T11SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
044044  104455                                                                        TRAP    C$ERDF
044046  002125                                                                        .WORD   1109
044050  045204                                                                        .WORD   T11SSR
044052  012046                                                                        .WORD   PKTSSR
044054                        15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
044054  104406                                                                        TRAP    C$CLP1
044056                                ESCAPE  SEG                     ;BY-PASS CHECKS IF FATAL ERROR
```

```
                044056  104410                                                          TRAP    C$ESCAPE
                044060  000074                                                          .WORD   10000$ .
     3191       044062  005737  002222          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
     3192       044066  001004                  BNE     22$                     ;BRANCH IF YES
     3196       044070                          ERRHRD  ERRNO,T11NINT,PKTSSR
                044070  104456                                                          TRAP    C$ERHRD
                044072  002126                                                          .WORD   1110
                044074  045334                                                          .WORD   T11NINT
                044076  012046                                                          .WORD   PKTSSR
     3197       044100  016501  000002  22$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
     3198       044104  012702  100206          MOV     #SC!SSR!TSREJ,R2        ;EXPECTED CONTENTS OF TSSR
     3199       044110  032701  000100          BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
     3200       044114  001402                  BEQ     25$                     ;BRANCH IF NOT OFF-LINE
     3201       044116  052702  000100          BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
     3202       044122  020201          25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
     3203       044124  001404                  BEQ     30$                     ;OKAY IF MATCH
     3207       044126                          ERRHRD  ERRNO,T112REJ,PKTSSR    ;COMMAND NOT REJECTED
                044126  104456                                                          TRAP    C$ERHRD
                044130  002127                                                          .WORD   1111
                044132  045012                                                          .WORD   T112REJ
                044134  012046                                                          .WORD   PKTSSR
     3208       044136                  30$:
     3209       044136  004737  011114  35$:    JSR     PC,CKRAM                ;CHECK RAM TO MEMORY
     3210       044142  103405                  BCS     59$                     ;RAM OK GO ON
     3214       044144                          ERRHRD  ERRNO,PKTRAM,RAMERR     ;THEY DON'T MATCH
                044144  104456                                                          TRAP    C$ERHRD
                044146  002130                                                          .WORD   1112
                044150  004743                                                          .WORD   PKTRAM
                044152  015510                                                          .WORD   RAMERR
     3215       044154                          ENDSEG                  ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
                044154                                                                  10000$:
                044154  104405                                                          TRAP    C$ESEG
     3216
     3217       044156                  59$:    ENDSUB                  ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
                044156                                                                  L10104:
                044156  104403                                                          TRAP    C$ESUB
     3218
     3219                               ;+
     3220                               ;
     3221                               ;TEST 11, SUBTEST 3
     3222                               ;
     3223                               ;CHECK THAT THE GET STATUS COMMAND IS ACCEPTED
     3224                               ;
     3225                               ;-
     3226
     3227       044160                          BGNSUB                  ;////////////// BEGIN SUBTEST ////////////
                044160                                                                  T11.3.
                044160  104402                                                          TRAP    C$BSUB
     3228
     3229       044162                          SETPRI  #PRI00          ;LOWER PRIORITY TO ALLOW INTERRUPTS
                044162  012700  000000                                                  MOV     #PRI00,R0
                044166  104441                                                          TRAP    C$SPRI
     3230       044170                          BGNSEG                  ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
                044170  104404                                                          TRAP    C$BSEG
     3231       044172  004737  015774          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
     3232       044176  103405                  BCS     3$                      ;BR IF SOFT INIT = OK
     3236       044200  010001                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
```

```
3237 044202                            ERROF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
     044202  104455                                                                  TRAP    C$ERDF
     044204  002131                                                                  .WORD   1113
     044206  003650                                                                  .WORD   SFIERR
     044210  012034                                                                  .WORD   SFIMSG
3238 044212                        3$:
3239 044212  012704  044710              MOV     #T11PK2,R4              ;WRITE CHARACTERISTICS PACKET
3240 044216  004737  010662              JSR     PC,WRTCHR               ;ISSUE WRITE CHARACTERISTICS
3241 044222  103404                      BCS     4$                      ;BR, IF COMMAND ISSUED OK
3245 044224                            ERRHRD  ERRNO,WRTMSG,SFIMSG     ;WRITE CHARACTERISTISC FAILED
     044224  104456                                                                  TRAP    C$ERHRD
     044226  002132                                                                  .WORD   1114
     044230  005054                                                                  .WORD   WRTMSG
     044232  012034                                                                  .WORD   SFIMSG
3246 044234                        4$:
3247 044234  004737  045514              JSR     PC,T11REST              ;SET UP PACKET FOR COMMAND
3248 044240  012704  044640              MOV     #T11PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
3249 044244                        5$:
3250 044244  005037  002222        10$:  CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
3251 044250  010465  000000              MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
3252 044254  004737  016336              JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
3253 044260  103405                      BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
3254 044262  010001                      MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
3258 044264                            ERROF   ERRNO,T11SR2,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
     044264  104455                                                                  TRAP    C$ERDF
     044266  002133                                                                  .WORD   1115
     044270  045260                                                                  .WORD   T11SR2
     044272  012046                                                                  .WORD   PKTSSR
3259 044274                        15$:  CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     044274  104406                                                                  TRAP    C$CLP1
3260 044276                            ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
     044276  104410                                                                  TRAP    C$ESCAPE
     044300  000074                                                                  .WORD   10000$
3261 044302  005737  002222              TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
3262 044306  001004                      BNE     22$                     ;BRANCH IF YES
3266 044310                            ERRHRD  ERRNO,T11NINT,PKTSSR
     044310  104456                                                                  TRAP    C$ERHRD
     044312  002134                                                                  .WORD   1116
     044314  045334                                                                  .WORD   T11NINT
     044316  012046                                                                  .WORD   PKTSSR
3267 044320  016501  000002        22$:  MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
3268 044324  012702  000200              MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
3269 044330  032701  000100              BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
3270 044334  001402                      BEQ     25$                     ;BRANCH IF NOT OFF-LINE
3271 044336  052702  000100              BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
3272 044342  020201        25$:  CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
3273 044344  001404                      BEQ     30$                     ;OKAY IF MATCH
3277 044346                            ERRHRD  ERRNO,T113REJ,PKTSSR    ;COMMAND NOT ACCEPTED
     044346  104456                                                                  TRAP    C$ERHRD
     044350  002135                                                                  .WORD   1117
     044352  045073                                                                  .WORD   T113REJ
     044354  012046                                                                  .WORD   PKTSSR
3278 044356                        30$:
3279 044356  004737  011114        35$:  JSR     PC,CKRAM                ;CHECK RAM TO MEMORY
3280 044362  103405                      BCS     59$                     ;RAM OK GO ON
3284 044364                            ERRHRD  ERRNO,PKTRAM,RAMERR     ;THEY DON'T MATCH
     044364  104456                                                                  TRAP    C$ERHRD
```

```
                044366  002136                                                          .WORD   1118
                044370  004743                                                          .WORD   PKTRAM
                044372  015510                                                          .WORD   RAMERR
3285            044374                          ENDSEG                  ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
                044374                                                  100004:
                044374  104405                                                          TRAP    C$ESEG
3286
3287
3288            044376                  594:    ENDSUB                  ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
                044376                                                  L10105:
                044376  104403                                                          TRAP    C$ESUB
3289
3290                                    ;*
3291                                    ;
3292                                    ;TEST 11, SUBTEST 4
3293                                    ;
3294                                    ;SUBTEST TO VERIFY THAT A GET STATUS COMMAND IS
3295                                    ;REJECTED IF A NON-ZERO COMMAND MODE FIELD IS USED
3296                                    ;
3297                                    ;-
3298
3299            044400                          BGNSUB                  ;////////////// BEGIN SUBTEST ////////////
                044400                                                  T11.4:
                044400  104402                                                          TRAP    C$BSUB
3300
3301            044402                          SETPRI  #PRI00          ;LOWER PRIORITY TO ALLOW INTERRUPTS
                044402  012700  000000                                                  MOV     #PRI00,R0
                044406  104441                                                          TRAP    C$SPRI
3302            044410                          BGNSEG                  ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
                044410  104404                                                          TRAP    C$BSEG
3303            044412  004737  015774          JSR     PC,SOFINIT      ;DO SOFT INIT OF CONTROLLER
3304            044416  103405                  BCS     3$              ;BR IF SOFT INIT = OK
3308            044420  010001                  MOV     R0,R1           ;SAVE CONTENTS OF TSSR
3309            044422                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
                044422  104455                                                          TRAP    C$ERDF
                044424  002137                                                          .WORD   1119
                044426  003650                                                          .WORD   SFIERR
                044430  012034                                                          .WORD   SFIMSG
3310            044432                  3$:
3311            044432  012704  044710          MOV     #T11PK2,R4      ;WRITE CHARACTERISTICS PACKET
3312            044436  004737  010662          JSR     PC,WRTCHR       ;ISSUE WRITE CHARACTERISTICS
3313            044442  103404                  BCS     4$              ;BR, IF COMMAND ISSUED OK
3317            044444                          ERRWRD  ERRNO,WRTMSG,SFIMSG     ;WRITE CHARACTERISTISC FAILED
                044444  104456                                                          TRAP    C$ERWRD
                044446  002140                                                          .WORD   1120
                044450  005054                                                          .WORD   WRTMSG
                044452  012034                                                          .WORD   SFIMSG
3318            044454                  4$:
3319            044454  004737  045514          JSR     PC,T11REST      ;SET UP PACKET FOR COMMAND
3320            044460  012704  044640          MOV     #T11PACKET,R4   ;GET THE ADDRESS OF COMMAND PACKET
3321            044464                  5$:
3322            044464  005037  002222  10$:    CLR     INTRCV          ;CLEAR INTERRUPT RECEIVED FLAG
3323            044470  052714  007000          BIS     #007000,(R4)    ;SET TO NON-ZERO MODE
3324            044474  010465  000000          MOV     R4,TSDB(R5)     ;SET THE PACKET ADDRESS
3325            044500  004737  016336          JSR     PC,CHKTSSR      ;WAIT FOR SSR TO SET
3326            044504  103405                  BCS     15$             ;BR IF CARRY SET (GOOD RETURN)
3327            044506  010001                  MOV     R0,R1           ;SAVE CONTENTS OF TSSR
```

```
3331 044510                            ERRDF   ERRNO,T11SR2,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
     044510  104455                                                                TRAP    C$ERDF
     044512  002141                                                                .WORD   1121
     044514  045260                                                                .WORD   T11SR2
     044516  012046                                                                .WORD   PKTSSR
3332 044520                         15$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     044520  104406                                                                TRAP    C$CLP1
3333 044522                            ESCAPE  SUB                         ;BY-PASS SUBTEST IF FATAL ERROR
     044522  104410                                                                TRAP    C$ESCAPE
     044524  000076                                                                .WORD   L10106 .
3334 044526  005737  002222            TST     INTRECV                     ;DID AN INTERRUPT OCCUR ?
3335 044532  001004                    BNE     22$                         ;BRANCH IF YES
3339 044534                            ERRHRD  ERRNO,T11NINT,PKTSSR
     044534  104456                                                                TRAP    C$ERHRD
     044536  002142                                                                .WORD   1122
     044540  045334                                                                .WORD   T11NINT
     044542  012046                                                                .WORD   PKTSSR
3340 044544  016501  000002        22$:   MOV     TSSR(R5),R1                 ;GET THE CONTENTS OF TSSR
3341 044550  012702  100206            MOV     #SC!SSR!TSREJ,R2            ;EXPECTED CONTENTS OF TSSR
3342 044554  032701  000100            BIT     #OFL,R1                     ;IS OFF-LINE BIT SET ?
3343 044560  001402                    BEQ     25$                         ;BRANCH IF NOT OFF-LINE
3344 044562  052702  000100            BIS     #OFL,R2                     ;SET OFF-LINE IN EXPECTED DATA
3345 044566  020201        25$:   CMP     R2,R1                       ;DOES EXPECTED MATCH RECEIVED ?
3346 044570  001404                    BEQ     30$                         ;OKAY IF MATCH
3350 044572                            ERRHRD  ERRNO,T114REJ,PKTSSR        ;COMMAND NOT REJECTED
     044572  104456                                                                TRAP    C$ERHRD
     044574  002143                                                                .WORD   1123
     044576  045123                                                                .WORD   T114REJ
     044600  012046                                                                .WORD   PKTSSR
3351 044602                         30$:
3352
3353 044602  004737  011114        35$:   JSR     PC,CKRAM                    ;CHECK RAM TO MEMORY
3354 044606  103404                    BCS     59$                         ;RAM OK GO ON
3358 044610                            ERRHRD  ERRNO,PKTRAM,RAMERR         ;THEY DON'T MATCH
     044610  104456                                                                TRAP    C$ERHRD
     044612  002144                                                                .WORD   1124
     044614  004743                                                                .WORD   PKTRAM
     044616  015510                                                                .WORD   RAMERR
3359 044620                         59$:
3360 044620                            ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<
     044620                                                                    10000$:
     044620  104405                                                                TRAP    C$ESEG
3361 044622                            ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\
     044622                                                                    L10106:
     044622  104403                                                                TRAP    C$ESUB
3362
3363 044624                            EXIT    TST                         ;ALL DONE THIS TEST
     044624  104432                                                                TRAP    C$EXIT
     044626  000772                                                                .WORD   L10102-.
3364
3365                                ;+
3366                                ;LOCAL STORAGE FOR THIS TEST
3367                                ;-
3368
3370 044630                                    .BLKB   10-<.-TSV2&7>
3372 044640                         T11PACKET:                             ;COMMAND PACKET FOR TEST
3373 044640  100204                            .WORD   100204              ;WRITE CHAR COMMAND, WITH IE, ACK
```

```
3374 044642  044650                    .WORD   T11DATA              ;ADDRESS OF CHARACTERISTICS BLOCK
3375 044644  000000                    .WORD   0
3376 044646  000010                    .WORD   8.                   ;STARTING VALUE OF BLOCK SIZE
3377
3378 044650                    T11DATA:                                      ;CHARACTERISTICS DATA BLOCK
3379 044650  044662                    .WORD   T11BFR               ;ADDRESS OF MESSAGE BUFFER
3380 044652  000000                    .WORD   0
3381 044654  000016                    .WORD   14.                  ;LENGTH OF MESSAGE BUFFER
3382 044656  000000  000000            .WORD   0,0
3383
3384 044662                    T11BFR: .BLKW   8.                   ;MESSAGE BUFFER
3385
3386
3388 044702                            .BLKB   10 <.-TSV267>
3390 044710                    T11PK2:                              ;COMMAND PACKET FOR TEST
3391 044710  100204                    .WORD   100204               ;WRITE CHAR COMMAND, WITH IE, ACK
3392 044712  044720                    .WORD   T11DTA               ;ADDRESS OF CHARACTERISTICS BLOCK
3393 044714  000000                    .WORD   0
3394 044716  000010                    .WORD   8.                   ;STARTING VALUE OF BLOCK SIZE
3395
3396 044720                    T11DTA:                              ;CHARACTERISTICS DATA BLOCK
3397 044720  044732                    .WORD   T11BF2               ;ADDRESS OF MESSAGE BUFFER
3398 044722  000000                    .WORD   0
3399 044724  000016                    .WORD   14.                  ;LENGTH OF MESSAGE BUFFER
3400 044726  000000  000000            .WORD   0,0
3401
3402 044732                    T11BF2: .BLKW   8.                   ;MESSAGE BUFFER
3403
3404
3405
3406                                   ;+
3407                                   ;LOCAL TEXT MESSAGES FOR TEST
3408                                   ;-
3409
3410 044752  111  116  111    T11NBA: .ASCIZ  'INITIALIZE Command Not Accepted'
3411 045012  111  116  111    T112REJ:        .ASCIZ  'INITIALIZE Not Rejected With Non Zero Mode Field'
3412 045073  107  105  124    T113REJ:        .ASCIZ  'GET STATUS Not Accepted'
3413 045123  107  105  124    T114REJ:        .ASCIZ  'GET STATUS Not Rejected With Non-Zero Mode Field'
3414 045204  103  157  156    T11SSR: .ASCIZ  'Contents of TSSR Incorrect After INITIALIZE'
3415 045260  103  157  156    T11SR2: .ASCIZ  'Contents of TSSR Incorrect After GET STATUS'
3416 045334  105  170  160    T11NINT:        .ASCIZ  'Expected Interrupt Not Received On INITIALIZE
3417 045412  111  156  143    T11TSBA:        .ASCIZ  'Incorrect TSBA Address After INITIALIZE'
3418 045462  116  157  156    TST11ID:        .ASCIZ  'Non-Tape Motion Commands'
3419                                   .EVEN
3420
3421
3422                                   ;+
3423                                   ;
3424                                   ;ROUTINE TO RESTORE COMMAND PACKET TO START-UP (DEFAULT) VALUES
3425                                   ;INITIALIZE COMMAND
3426                                   ;
3427                                   ;-
3428
3429 045514                    T11REST:
3430 045514                            SAVREG                       ;SAVE THE REGISTERS
3431 045520  012701  044640            MOV     #T11PACKET,R1        ;START OF THE PACKET
3432 045524  012721  100213            MOV     #100213,(R1)+        ;INITIALIZE WITH ACK, IE
```

```
3433 045530  005021                        CLR     (R1)+           ;ADDRESS OF CHAR DATA BLOCK
3434 045532  005021                        CLR     (R1)+           ;EXTENDED ADDRESS
3435 045534  005021                        CLR     (R1)+           ;SIZE OF DATA BLOCK IN BYTES
3436 045536  005021                        CLR     (R1)+           ;ADDRESS OF MESSAGE BUFFER
3437 045540  005021                        CLR     (R1)+
3438 045542  005021                        CLR     (R1)+           ;LENGTH OF MESSAGE BUFFER
3439 045544  005021                        CLR     (R1)+
3440 045546  005011                        CLR     (R1)
3441 045550  005037  044662                CLR     T11BFR          ;CLEAR 1ST LOC IN MESSAGE BUFFER
3442 045554  000207                        RTS     PC              ;RETURN
3443                                ;+
3444                                ;
3445                                ;ROUTINE TO RESTORE COMMAND PACKET TO START-UP (DEFAULT) VALUES
3446                                ;GET STATUS COMMAND
3447                                ;
3448                                ;-
3449
3450 045556                         T11RT2:
3451 045556                                SAVREG                  ;SAVE THE REGISTERS
3452 045562  012701  044640                MOV     #T11PACKET,R1   ;START OF THE PACKET
3453 045566  012721  100217                MOV     #100217,(R1)+   ;GET STATUS WITH ACK, IE
3454 045572  005021                        CLR     (R1)+           ;ADDRESS OF CHAR DATA BLOCK
3455 045574  005021                        CLR     (R1)+           ;EXTENDED ADDRESS
3456 045576  005021                        CLR     (R1)+           ;SIZE OF DATA BLOCK IN BYTES
3457 045600  005021                        CLR     (R1)+           ;ADDRESS OF MESSAGE BUFFER
3458 045602  005021                        CLR     (R1)+
3459 045604  005021                        CLR     (R1)+           ;LENGTH OF MESSAGE BUFFER
3460 045606  005021                        CLR     (R1)+
3461 045610  005011                        CLR     (R1)
3462 045612  005037  044662                CLR     T11BFR          ;CLEAR 1ST LOC IN MESSAGE BUFFER
3463 045616  000207                        RTS     PC              ;RETURN
3464 045620                                ENDTST
     045620                                                                L10102:
     045620  104401                                                              TRAP    C$ETST
3465 045622                                ENDMOD
```

```
                                        .TITLE  TSV6 - PARAMETER CODING
                                        BGNMOD  TSV6
045622                          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.
                                ;--
045622                                  BGNHRD
045622  000010                          .WORD L10107-L$HARD/2
045624                          L$HARD::
045624                                  GPRMA   HPM1,0,0,160010,177776,YES      ;GET TSBA/TSDB REGISTER ADDRESS.
045624  000031                          .WORD   T$CODE
045626  045644                          .WORD   HPM1
045630  160010                          .WORD   T$LOLIM
045632  177776                          .WORD   T$HILIM
045634                                  GPRMA   HPM2,2,0,0,776,YES              ;GET VECTOR ADDRESS.
045634  001031                          .WORD   T$CODE
045636  045700                          .WORD   HPM2
045640  000000                          .WORD   T$LOLIM
045642  000776                          .WORD   T$HILIM
                                        ;GPRMC  HPM3,4,0,340,0,7,YES            ;GET INTERRUPT PRIORITY.
045644                                  ENDHRD
                                        .EVEN
045644                          L10107:
045644  104  105  126  HPM1:   .ASCIZ  'DEVICE ADDRESS (TSBA/TSDB) '
045700  111  116  124  HPM2:   .ASCIZ  'INTERRUPT VECTOR    '
045724  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.
                                ;--
045754                                  BGNSFT
045754  000003                          .WORD L10110-L$SOFT/2
045756                          L$SOFT::
                                ;       GPRML   SPM1,0, 1,YES                   ; GET TRANSPORT TEST FLAG.
045756                                  GPRML   SPM4,2,-1,YES                   ; GET ITERATION CONTROL.
045756  001130                          .WORD   T$CODE
045760  046014                          .WORD   SPM4
045762  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
045764                                  ENDSFT
                                        .EVEN
045764                          L10110:

045764  105  116  101  SPM1:    .ASCIZ  'ENABLE TRANSPORT TESTS '
046014  111  116  110  SPM4:    .ASCIZ  'INHIBIT ITERATIONS     '
046044  120  105  122  SPM6:    .ASCIZ  'PER TEST ERROR LIMIT   '
046074  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).
                                ;

046124                          PATCH::

046124                                  .BLKW   32.

                                        .=.!377+1
046400                                  LASTAD          ;SET LAST USED ADDRESS.
                                        .EVEN
046400  000000                          .WORD   0
046402  000000                          .WORD   0
046404                          L$LAST::
046404                                  ENDMOD
                                        .END
```

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SYMBOL TABLE

```
ADDSSR  012126 G    C$AU  = 000052    DEVDRO  023332    FRESIZ  003124 G    INTFLA  016145
ADR     = 000020 G   C$AUTO= 000061    DEVNRD  023251    FUSI    004115      INTMAS  016144
AMBTSS  006633       C$BRK = 000022    DEVNXR  023167    F$AU    = 000015    INTR    016216 G
ASSEMB= 000010       C$BSEG= 000004    DEVONL  023117    F$AUTO= 000020      INTREC  002222 G
A1716 = 000003       C$BSUB= 000002    DEVSUM  023062    F$BGN   = 000040    INTVEC  016146
BADDAT  003154 G     C$CEFG= 000045    DFPTBL  002154 G  F$CLEA= 000007      INTX    004276
BADSSR  015700 G     C$CLCK= 000062    DIAGMC= 000000    F$DU    = 000016    INVERT  021142 G
BDVPCR= 177520 G     C$CLEA= 000012    DICEA = 000001    F$END   = 000041    IOKCKI= 000200
BENBSW  002226 G     C$CLOS= 000035    DSBINT  016204    F$HARD= 000004      IOKSTP= 000001
BIE     = 040000     C$CLP1= 000006    DUAD12  004641    F$HW    = 000013    IPRI    002210 G
BIT0    = 000001 G   C$CVEC= 000036    DUFLG   003110 G  F$INIT= 000006      ISR     = 000100 G
BIT00   = 000001 G   C$DCLN= 000044    DUMMY   003060    F$JMP   = 000050    IVEC    002206 G
BIT01   = 000002 G   C$DODU= 000051    EF CON= 000036 G  F$MOD   = 000000    IXE     = 004000 G
BIT02   = 000004 G   C$DRPT= 000024    EF.NEW= 000035 G  F$MSG   = 000011    I$AU    = 000041
BIT03   = 000010 G   C$DU  = 000053    EF.PWR= 000034 G  F$PROT= 000021      I$AUTO= 000041
BIT04   = 000020 G   C$EDIT= 000003    EF.RES= 000037 G  F$PWR   = 000017    I$CLN   = 000041
BIT05   = 000040 G   C$ERDF= 000055    EF.STA= 000040 G  F$RPT   = 000012    I$DU    = 000041
BIT06   = 000100 G   C$ERHR= 000056    EMAXDU  016777    F$SEG   = 000003    I$HRD   = 000041
BIT07   = 000200 G   C$ERRO= 000060    EN      = 000000  F$SOFT= 000005      I$INIT= 000041
BIT08   = 000400 G   C$ERSF= 000061    ENAINT  016152    F$SRV   = 000010    I$MOD   = 000041
BIT09   = 001000 G   C$ERSO= 000057    ENVIRN  020630    F$SUB   = 000002    I$MSG   = 000041
BIT1    = 000002 G   C$ESCA= 000010    EPRTSW  002176 G  F$SW    = 000014    I$PROT= 000040
BIT10   = 002000 G   C$ESEG= 000005    EPRT1   006356    F$TEST= 000001      I$PTAB= 000041
BIT11   = 004000 G   C$ESUB= 000003    EPRT2   006356    GDDAT   003156 G    I$PWR   = 000041
BIT12   = 010000 G   C$ETST= 000001    ERCM    011733    GERRMA  002172 G    I$RPT   = 000041
BIT13   = 020000 G   C$EXIT= 000032    ERRHI   002234 G  GETPAT  020174 G    I$SEG   = 000041
BIT14   = 040000 G   C$GETB= 000026    ERRK    016756    GETSEL  020256 G    I$SETU= 000042
BIT15   = 100000 G   C$GETW= 000027    ERRLO   002236 G  G$CNTO= 000200      I$SFT   = 000041
BIT2    = 000004 G   C$GMAN= 000043    ERRNU   = 002144  G$DELM= 000372      I$SRV   = 000041
BIT3    = 000010 G   C$GPHR= 000042    ERRVEC= 000004 G  G$DISP= 000003      I$SUB   = 000041
BIT4    = 000020 G   C$GPLO= 000030    ERTABE  003374    G$EXCP= 000400      I$TST   = 000041
BIT5    = 000040 G   C$GPRI= 000040    ERTABL  003174    G$HILI= 000002      J$JMP   = 000167
BIT6    = 000100 G   C$INIT= 000011    ESUM    016760    G$LOLI= 000001      KIPAR0= 172340
BIT7    = 000200 G   C$INLP= 000020    EVL     = 000004 G G$NO   = 000000    KIPAR1= 172342
BIT8    = 000400 G   C$MANI= 000050    EXBCNT= 000010    G$OFFS= 000400      KIPAR2= 172344
BIT9    = 001000 G   C$MEM = 000031    EXPBRE  015502 G  G$OFSI= 000376      KIPAR3= 172346
BOE     = 000400 G   C$MSG = 000023    EXPD    002230 G  G$PRMA= 000001      KIPAR4= 172350
BRINIT  004455       C$OPEN= 000034    EXPGOT  004531    G$PRMD= 000002      KIPAR5= 172352
BSEL0 = 000000       C$PNTB= 000014    EXPGT2  004565    G$PRML= 000000      KIPAR6= 172354
BSEL1 = 000001       C$PNTF= 000017    EXPMSG  002320 G  G$RADA= 000140      KIPAR7= 172356
CHKAMB  016044       C$PNTS= 000016    EXPREC  015474 G  G$RADB= 000000      KIPDR0= 172300
CHKMAN  020500 G     C$PNTX= 000015    EXTA    005770    G$RADD= 000040      KIPDR1= 172302
CHKTSS  016336       C$QIO = 000377    EXTEND  005766    G$RADL= 000120      KIPDR2= 172304
CKDROP  017202       C$RDBU= 000007    EXTFEA  002224 G  G$RADO= 000020      KIPDR3= 172306
CKEMAX  017102       C$REFG= 000047    E$END   = 002100  G$XFER= 000004      KIPDR4= 172310
CKMSG   011360 G     C$RESE= 000033    E$LOAD= 000035    G$YES   = 000010    KIPDR5= 172312
CKMSG2  011500 G     C$REVI= 000003    FATERR= 000060    HIADDR= 001400      KIPDR6= 172314
CKRAM   011114 G     C$RFLA= 000021    FATFLG  002220 G  HOE     = 100000 G  KIPDR7= 172316
CKRAM2  011224 G     C$RPT = 000025    FERCM   011722    HPM1    045644      KTENAB  003132 G
CMDPKT  021214 G     C$SEFG= 000046    FIFEXP  012170 G  HPM2    045700      KTFLG   003130 G
CMPMEM  017660       C$SPRI= 000041    FIF1MS  012242    HPM3    045724      KTINIT  021010
CONFIG  017250       C$SVEC= 000037    FIF2MS  012311    IBE     = 010000 G  KTOFF   017274
COUNT   002306 G     C$TPRI= 000013    FILLME  017422    IDU     = 000040 G  KTON    017256
CSRADD  002204 G     DATA    002310 G  FNOINT  004213    IER     = 020000 G  LERRMA  002170 G
CTAB    003162 G     DATASC  020232    FORCER  002174 G  IFAULT  004254      LISTAL= 000001
CTABE   003174 G     DEBUGM  011632    FREE    003122 G  INCERK  017044      LOE     = 040000 G
CTABM   003162 G     DEVCNT  002216 G  FREEHI  003126    INTCPC  016150      LOOPCN  002214 G
```

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SYMBOL TABLE

```
LOOPCO  013126          L10001  002174          L10073  036746          NXR     003736          PRIO5 = 000240 G
LOOPFL  003160 G        L10002  005764          L10074  037152          NXRERR  005734 G       PRIO6 = 000300 G
LOT   = 000010 G        L10003  012044          L10075  043452          NXRX    003775          PRIO7 = 000340 G
L$ACP   002110 G        L10004  012062          L10076  040742          NXTU    021756          PRMESS  014242
L$APT   002036 G        L10005  012100          L10077  041334          OFL   = 000100          PRMNO   C02316 G
L$AU    022306 G        L10006  012106          L10100  042224          ONEFIL= 000000          PRMSGE  014552 G
L$AUT   002070 G        L10007  012124          L10101  042452          O$APTS= 000000          PRMSGO  014732
L$AUTO  022512 G        L10010  012142          L10102  045620          O$AU  = 000001          PRMSG1  014777
L$CCP   002106 G        L10011  012156          L10103  043720          O$BGNR= 000001          PRMSG2  015035
L$CLEA  022572 G        L10012  012240          L10104  044156          O$BGNS= 000001          PROFSC  014420
L$CO    002032 G        L10013  012410          L10105  044376          O$DU  = 000001          PR1ASC  014465
L$DEPO  002011 G        L10014  013124          L10106  044622          O$ERRT= 000000          PST32W  003150 G
L$DESC  003406 G        L10015  013752          L10107  045644          O$GNSW= 000001          PUNIT   022240
L$DESP  002076 G        L10016  013774          L10110  045764          O$POIN= 000001          PW.D11= 000021
L$DEVP  002060 G        L10017  015500          MEMADD  013754 G        O$SETU= 000000          PW.D13= 000022
L$DISP  002124 G        L10020  015506          MEMCK   021232 G        PASRPT  022010          PW.D22= 000020
L$DLY   002116 G        L10021  015514          MENASC  020447          PATCH   046124 G        PW.NOP= 000000
L$DTP   002040 G        L10022  015526          MENERR  020374          PATDAT  020230          PW.NO1= 000023
L$DTYP  002034 G        L10023  015550          MENRES  020476          PC.ERA= 002400          PW.RDE= 000024
L$DU    022404 G        L10024  015576          MMVEC = 000250          PC.IER= 002000          PW.RDR= 000001
L$DUT   002072 G        L10025  015736          MSA.FR= 000006          PC.NOO= 001000          PW.RDS= 000005
L$DVTY  003400 G        L10026  016246          MSA.NO= 000000          PC.REL= 000000          PW.RFI= 000003
L$EF    002052 G        L10030  022236          MSA.NR= 000004          PC.REW= 000400          PW.WCT= 000006
L$ENVI  002044 G        L10031  022402          MSA.VO= 000002          PKBCNT= 000006          PW.WFI= 000004
L$ETP   002102 G        L10032  022510          MSGEXP  012144 G        PKHI  = 000004          PW.WFM= 000007
L$EXP1  002046 G        L10033  022570          MSGLOO  013064 G        PKLOW = 000002          PW.WMI= 000010
L$EXP4  002064 G        L10034  022616          MSGSTA  012350 G        PKTADD  007552          PW.WNP= 000011
L$EXP5  002066 G        L10035  023060          MSGSUB  013742 G        PKTFRM  007514          PW.WTR= 000002
L$HARD  045624 G        L10036  023620          MS.ATT= 000006          PKTGET  012064 G        P.ACK = 100000
L$HIME  002120 G        L10037  023466          MS.EXT= 000200          PKTMES  012110 G        P.CMD = 000037
L$HPCP  002016 G        L10040  023550          MS.RSD= 000001          PKTRAM  004743 G        P.CONT= 000012
L$HPTP  002022 G        L10041  024316          MS.RSF= 000020          PKTSSR  012046 G        P.CVC = 040000
L$HW    002154 G        L10042  025010          MS.RST= 000010          PNT   = 001000 G        P.FMT = 000140
L$ICP   002104 G        L10043  026344          M2901   026070          PRAMPK  013776          P.FORM= 000011
L$INIT  021512 G        L10044  025252          M8186   005552          PRASC   014523          P.GETS= 000017
L$LADP  002026 G        L10045  025552          M8189   005643          PRBEXP  015470          P.IE  = 000200
L$LAST  046404 G        L10046  026050          NBA   = 002000          PRBMSG  015336          P.INIT= 000013
L$LOAD  002100 G        L10047  027450          NEWPAS  021744          PRBREC  015472          P.MODE= 007400
L$LUN   002074 G        L10050  026716          NODEV   003112 G        PRBTOT  015423          P.OPP = 020000
L$MREV  002050 G        L10051  027266          NOINIT  004333          PRBYTE  015122 G        P.POSI= 000010
L$NAME  002000 G        L10052  030722          NOINTR  004217          PRI   = 002000 G        P.READ= 000001
L$PRIO  002042 G        L10053  030000          NOITS   002166 G        PRIADD  010156          P.SWB = 010000
L$PROT  021502 G        L10054  030324          NOMAN   020534          PRIAO   010226          P.WRIT= 000005
L$PRT   002112 G        L10055  034310          NOMEM   005456          PRIBXO  007610 G        P.WRTC= 000004
L$REPP  002062 G        L10056  031254          NP.IR = 000200          PRIEQU  010056          P.WRTS= 000006
L$REV   002010 G        L10057  031540          NP.LOO= 000040          PRIPKT  007366 G        QVP     002202 G
L$RPT   022620 G        L10060  032004          NP.OUT= 000100          PRIRAM  010064          RAMASC  014156
L$SOFT  045756 G        L10061  032232          NP.WRP= 000020          PRITAD  010272          RAMDAT  002240 G
L$SPC   002056 G        L10062  032476          NSI     004150          PRITSS  006022          RAMERR  015510 G
L$SPCP  002020 G        L10063  033036          NSINIT  004405          PRITO   010354          RAMEXP  015530 G
L$SPTP  002024 G        L10064  035214          NUL     004525          PRIT1   010417          RAMFOR  010114
L$STA   002030 G        L10065  040340          NULCR   004526          PRIXOR  007740 G        RAMSIZ  002300 G
L$SW    002164 G        L10066  035456          NXM   = 004000          PRIO0 = 000000 G        RAMTAD  015516 G
L$TEST  002114 G        L10067  035716          NXMFLG  003134 G        PRIO1 = 000040 G        RCVHIA  002302 G
L$TIML  002014 G        L10070  036122          NXMHI   003140 G        PRIO2 = 000100 G        RCVLOA  002304 G
L$UNIT  002012 G        L10071  036310          NXMLO   003136 G        PRIO3 = 000140 G        RDERR   005204
L10000  002162          L10072  036514          NXMTST  021406          PRIO4 = 000200 G        RECMSG  002464 G
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TSV6 - PARAMETER CODING MACRO M1113 14-JUN-84 15:15 SEQ 0179
SYMBOL TABLE

```
RECV    002232 G    S1.IEO= 010000      TST6ID  030703      T1.1    023422      T4      025012 G
REGSAV  020140      S1.IFM= 001000      TST7ID  034213      T1.2    023502      T4LOOP  025032
RETERR  005370      S1.IHE= 000400      TST8ID  035177      T10     040342 G    T4.1    025012
REWIND  011014 G    S1.IID= 004000      TST9ID  040241      T10BFR  042512      T4.2    025254
RMCHBE= 000167      S1.I1R= 020000      TSV2    002000 G    T10BUF  042554      T4.3    025554
RMCHEN= 000200      S1.I2R= 040000      TSV3    002174 G    T10DAT  042500      T5      026346 G
RMMSGB= 000215      S1.PAR= 100000      TSV4    021502 G    T10DTA  042542      T5ADDR  027406
RMMSGE= 000234      S2.ATI= 000010      TSV5    023402 G    T10INT  043210      T5LOOP  026364
RMPKTB= 000201      S2.BTI= 000004      TSV6    045622 G    T10LOO  040360      T5MEM   027350
RMPKTE= 000210      S2.DIM= 000200      TTIBFR= 177562 G    T10MBF  042574      T5.1    026370
RMR   = 010000      S2.ILW= 000100      TTICSR= 177560 G    T10NBA  042671      T5.2    026736
RWPACK  011110      S2.INR= 000020      TTIVEC= 000060 G    T10NIN  043117      T6      027452 G
SC    = 100000      S2.OUT= 000040      T$ARGC= 000003      T10NNB  042753      T6INT   030473
SCE   = 020000      S2.UND= 000003      T$CODE= 001130      T10PAC  042470      T6LOOP  027470
SCHERR  005276      TBLEND= 003060 G    T$ERRN= 002144      T10PKT  042532      T6NBA   030370
SCME    005011      TCOASC  006474      T$EXCP= 000000      T10RST  043326      T6NINT  030551
SDELAY  010660      TCOCOC  006674      T$FLAG= 000040      T10RT2  043400      T6PACK  030360
SELASC  020442      TEMP1   003114 G    T$GMAN= 000000      T10SSR  043030      T6SSR   030415
SELDAT= 000004      TEMP2   003116 G    T$HILI= 000776      T10.1   040360      T6TSBA  030631
SEL2  = 000002      TERCLS= 000016      T$LAST= 000001      T10.2   040744      T6.1    027470
SETMAP  017316      TESTNO= 000013      T$LOLI= 000000      T10.3   041336      T6.2    030014
SETU    022042      TEXASC  006433      T$LSYM= 010000      T10.4   042226      T7      030724 G
SFFMSG  012102 G    TFCASC  006535      T$LTNO= 000013      T11     043454 G    T7BFR   033106
SFHERR  003703      TIMEXP  015552 G    T$NEST= 177777      T11BFR  044662      T7DATA  033070
SFIERR  003650      TIMSGO  015600      T$NS0 = 000000      T11BF2  044732      T7INT   034041
SFIMSG  012034 G    TINERR  012021      T$NS1 = 000005      T11DAT  044650      T7LOOP  030742
SFPTBL  002164 G    TMPBFR  002630 G    T$NS2 = 000002      T11DTA  044720      T7NBA   033220
SIFLAG  003152 G    TNAM    016704      T$NS3 = 000003      T11LOO  043472      T7NINT  033750
SIMSG   011766      TRANST  002164 G    T$PTNU= 000000      T11NBA  044752      T7PACK  033060
SKIPT   003376      TSBA  = 000000 G    T$SAVL= 177777      T11NIN  045334      T7REST  034242
SOFINI  015774 G    TSBAH = 000001 G    T$SEGL= 177777      T11PAC  044640      T7SP    033100
SPACE   010464 G    TSBAM2  026160      T$SEKO= 010000      T11PK2  044710      T7SSR   033661
SPM1    045764      TSBAM3  026242      T$SUBN= 000004      T11RES  045514      T7TSBA  034130
SPM4    046014      TSDB  = 000000 G    T$TAGL= 177777      T11RT2  045556      T7.1    030742
SPM6    046044      TSDBH = 000001 G    T$TAGN= 010111      T11SR2  045260      T7.2    031270
SPM7    046074      TSFCOD  007234      T$TEMP= 000000      T11SSR  045204      T7.3    031542
SR0   = 177572      TSREJ = 000006      T$TEST= 000013      T11TSB  045412      T7.4    032006
SR1   = 177574      TSSDEF  006604      T$TSTM= 177777      T11.1   043472      T7.5    032234
SR2   = 177576      TSSR  = 000002 G    T$TSTS= 000001      T11.2   043734      T7.6    032500
SR3   = 172516      TSSRBI  003500 G    T$$AU = 010031      T11.3   044160      T72DAT  033126
SSR   = 000200      TSSRFO  006413      T$$AUT= 010033      T11.4   044400      T72DON= 033142
STATCO  012412      TSSRH = 000003 G    T$$CLE= 010034      T112RE  045012      T72NBA  033142
SVCGBL= 000000      TSSX    003016      T$$DU = 010032      T113RE  045073      T72REJ  033273
SVCINS= 000000      TSTBLK  002750 G    T$$HAR= 010107      T114RE  045123      T73REJ  033372
SVCSUB= 000001      TSTCNT  002212 G    T$$HW = 010000      T2      023622 G    T74REJ  033465
SVCTAG= 000000      TSTEND  016720      T$$INI= 010030      T2LOOP  023640      T75REJ  033563
SVCTST= 000001      TSTFLA  002312 G    T$$MSG= 010025      T2SSR   024216      T8      034312 G
S$LSYM= 010000      TSTLOO  016456 G    T$$PRO= 010027      T2TSBA  024104      T8BFR   034742
S0.IDB= 000010      TSTPTR  002314 G    T$$RPT= 010035      T2TSSR  024151      T8DATA  034730
S0.IFB= 000002      TSTSET  016510 G    T$$SEG= 010000      T23A    003142 G    T8LOOP  034330
S0.IFP= 000001      TST1ID  023600       T$$SOF= 010110      T23B    003144 G    T8NVCK  035017
S0.ILD= 000020      TST10I  043277       T$$SRV= 010026      T3      024320 G    T8PACK  034720
S0.ION= 000040      TST11I  045462       T$$SUB= 010106      T3BFLG  003146 G    T8SSR   035110
S0.IRD= 000100      TST2ID  024270       T$$SW = 010001      T3LOOP  024336      T8VCK   034762
S0.IRW= 000004      TST3ID  024763       T$$TES= 010102      T3SSR   024712      T9      035216 G
S0.ISP= 000200      TST4ID  026322       T1      023402 G    T3TSBA  024602      T9BFR   037212
S1.ICE= 002000      TST5ID  027320       T1LOOP  023420      T3TSSR  024646      T9DATA  037200
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TSV6   PARAMETER CODING MACRO M1113  14-JUN-84 15:15                                    SEQ 0180
SYMBOL TABLE

T9INT   040067          UAM   = 000200 G      WRTCHR  010662 G      XSOONL= 000100          X2.EXT= 000200
T9LOOP  035240          UNITN   002200 G      WRTERR  005111         XSOPED= 000010          X2.OPM= 100000
T9NBA   037246          UNREC = 000006         WRTMSG  005054         XSORLL= 010000          X2.RCE= 040000
T9NINT  037776          USI     004121         WSMBK   021224 G      XSORLS= 040000          X2.REV= 000077
T9PACK  037170          WAITF   016250 G      XFERAS  015740         XSOTMK= 100000          X2.SPA= 035400
T9REST  040266          WC.IFA= 000200         XNXM    016376         XSOVCK= 000020          X2.UNI= 000007
T9SSR   037707          WC.IFE= 000002         XORBFO  007672         XSOWLE= 004000          X2.WCF= 002000
T9TSBA  040156          WC.IGO= 000001         XORFOR  010010         XSOWLK= 000004          X3.DCK= 000010
T9.1    035240          WC.IRE= 000010         XST0  = 000006 G       XXCOMM  003120 G        X3.MBZ= 000006
T9.2    035506          WC.IRW= 000004         XST1  = 000010 G       X$ALWA= 000000          X3.MDE= 177400
T9.3    035720          WC.IOT= 000100         XST2  = 000012 G       X$FALS= 000040          X3.OPI= 000100
T9.4    036124          WC.I1T= 000040         XST3  = 000014 G       X$OFFS= 000400          X3.REV= 000040
T9.5    036312          WC.I5R= 000020         XST4  = 000016 G       X$TRUE= 000020          X3.RIB= 000001
T9.6    036516          WF.IED= 000010         XSOBOT= 000002         X1.COR= 020000          X3.SPA= 000200
T9.7    036750          WF.IER= 000004         XSOEOT= 000001         X1.DLT= 100000          X3.TRF= 000020
T92DAT  037232          WF.IHI= 000200         XSOIE = 000040         X1.MBZ= 017375          X4.HSP= 100000
T92DON= 037246          WF.IRE= 000040         XSOILA= 000400         X1.RBP= 000400          X4.MBZ= 017400
T92REJ  037321          WF.IWF= 000020         XSOILC= 001000         X1.SPA= 040000          X4.RCE= 040000
T93REJ  037420          WF.IWR= 000100         XSOLET= 020000         X1.UNC= 000002          X4.TSM= 020000
T94REJ  037513          WF.I3R= 000002         XSOMOT= 000200         X2.BUF= 000100          X4.WRC= 000377
T95REJ  037611          WF.I4R= 000001         XSONEF= 002000

. ABS.  046404    000
        000000    001
ABS     000000    002
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  28224 WORDS  ( 111 PAGES)
DYNAMIC MEMORY:  20614 WORDS  ( 79 PAGES)
ELAPSED TIME:  00:39:38
CVTSAB,CVTSAB/-SP=SVC/ML,TSV1A,TSV22A,TSV3B,TSV4,TSV5A,TSV6
.
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