11/Z1+ TSV05 CTRL LT1
TSV05 CNTSAAO

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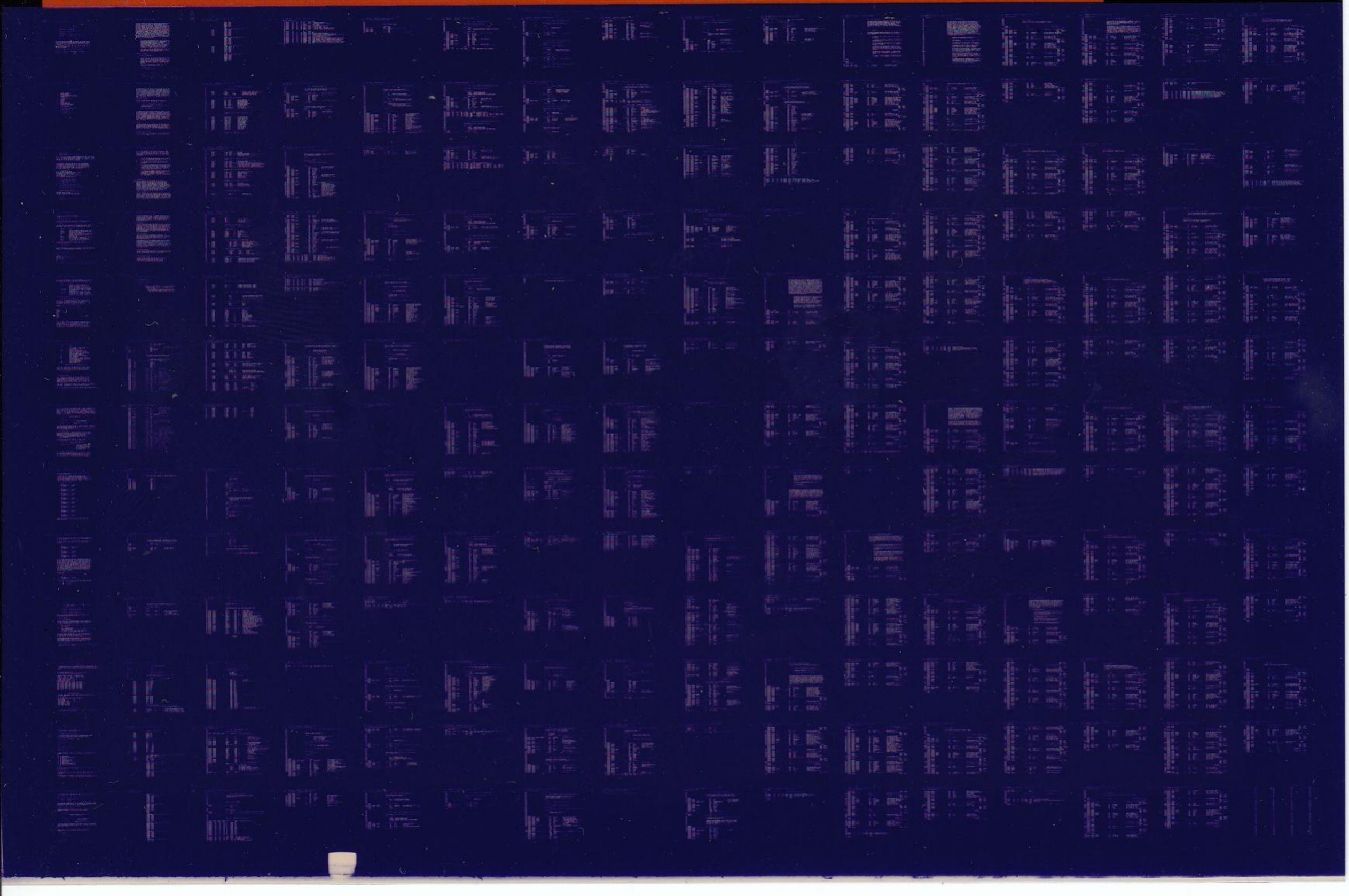

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IDENTIFICATION

PRODUCT ID: AC T814A MC

PRODUCT TITLE: CNTSAAO TSV05 CTRL LT1

DECO/DEPO: 1.0

DEPARTMENT: ISS/DIAGNOSTIC SERVICES

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1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

THIS IS A SBC-11/21+ RESIDENT DIAGNOSTIC WHICH CHECKS THE FUNCTIONALITY OF A TSV05 MAGTAPE SUBSYSTEM WHILE CONNECTED TO A SBC-11/21+ SYSTEM (Q BUS). THE PROGRAM PROVIDES ERROR MESSAGES WHICH IDENTIFY FAILING FUNCTIONS THAT AID IN THE REPAIR OF THE DEVICE. THIS DIAGNOSTIC CONSISTS 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

SBC-11/21+ 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 (HSAAA.SYS VERSION 34 OR LATER)
PDP 11 DIAGNOSTIC LOADER/MONITOR (XXDP+)

1.3 RELATED DOCUMENTS AND STANDARDS

DIGITAL EQUIPMENT CORPORATION DOCUMENTS:

1. XXDP+ USERS GUIDE
2. TSV05 TRANSPORT SUBSYSTEM USER'S GUIDE
3. TSV05 TRANSPORT SUBSYSTEM TECHNICAL MANUAL
4. TSV05 TRANSPORT SUBSYSTEM INSTALLATION MANUAL

1.4 DIAGNOSTIC HIERARCY PREREQUISITES

FUNCTIONAL SBC-11/21+ CENTRAL PROCESSOR AND MEMORY
FUNCTIONAL CONSOLE TERMINAL
FUNCTIONAL STANDALONE DIAGNOSTIC SUPERVISOR
FUNCTIONAL DIAGNOSTIC LOADER/MONITOR (XXDP+)

1.5 ASSUMPTIONS

ALL HARDWARE EXCEPT THE HARDWARE UNDER TEST IS ASSUMED TO WORK

PROPERLY OR FALSE ERRORS CAN BE REPORTED.
THE TAPE BEING USED ON THE TS05 TRANSPORT IS A KNOWN GOOD REEL OF TAPE.

2.0 OPERATING INSTRUCTIONS

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

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 SBC-11/21+ DIAGNOSTIC SUPERVISOR COMPATIBLE PROGRAM. ALL LOADING AND RUNTIME INSTRUCTIONS CAN BE REFERENCED IN THE XXDP+ USERS GUIDE. THE USER ENTRY IS IN QUOTES.

BOOT THE DIAGNOSTIC MEDIA

```
.R NTSA??
DIAG. RUN-TIME SERVICES REV D. APR 79
CNTSA-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 = 176000, 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.

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

UNIT 0

DEVICE ADDRESS  (O) 176000 ? <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 "0 UNITS?" QUESTION. LOGICAL UNIT NUMBERS ARE ASSIGNED IN ORDER, BEGINNING AT 0. UP TO FOUR UNITS CAN BE SELECTED FOR TESTING AS FOLLOWS:
UP TO 4 TSV05 CONTROLLERS PER 11/23 AND UP TO 2 DRIVES PER CONTROLLER

2.5 SOFTWARE QUESTIONS

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

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

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

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

2.6 EXTENDED P-TABLE DIALOGUE

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

DEVICE WITH SEVERAL LINES, THIS BECOMES TEDIOUS SINCE MOST OF THE ANSWERS ARE REPETITIOUS.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

UNIT 1
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  0 7<CR>
Q-FACTOR (O) O ?  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
CNTSA 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 0>
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 A UNRECOVERABLE ERROR OCCURED WHICH INDICATES THAT THE CONTROLLER MAY BE DEFECTIVE.

```
CNTSA 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  = 000000
 PACKET WORD 0  = 000024
```

ERROR MESSAGE EXAMPLE 3

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

```
CNTS HRD ERR 00121 ON UNIT 00 TST 001 SUB 002 PC: 023306
```

MOT BIT (XSTO) NOT SET DURING REWIND (EXTENDED FEATURES MODE)
EXPD: 000312 RECV: 000112 XOR: 000200

4.0 PERFORMANCE AND PROGRESS REPORTS

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

SUCCESSFUL RUN EXAMPLE (PDP 11/23)

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

UNITS (D) ?  1

UNIT 0

DEVICE ADDRESS  (O) 176000 ? <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 I.ITIALIZE  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 THE FALCON+ PROCESSOR.

THE PROGRAM RUNS IN TWO MODES; NO ITERATIONS AND DEFAULT MODE. IN THE NO ITERATIONS MO , EACH TEST IS RUN ONCE, WITH NO ITERATIONS. IN THE DEFAULT MODE EACH ST IS REPEATED BY THE NUMBER OF TIMES INDICATED Y

THE ITERATION COUNT. NO ITERATIONS MODE IS SELECTED BY ANSWERING THE INHIBIT ITERATIONS QUESTION WITH A "Y" (YES).

TIMES REQUIRED TO RUN TESTS 1 THROUGH 12:

```
Q.V.      2 MIN 15 SECONDS
DEFAULT   16 MINS
```

MORE EXHAUSTIVE CHECKS ARE AVAILABLE BY ALLOWING THE DIAGNOSTIC PROGRAMS TO RUN FOR MORE THAN ONE PASS. THE SECOND PASS OF THE PROGRAM IS MORE COMPREHENSIVE THAN THE FIRST PASS. ALL ITERATIONS AFTER THE FIRST PASS ARE THE SAME, HOWEVER, THEY ARE SUBSTANTIALLY LONGER.

5.0 DEVICE INFORMATION TABLES

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

```
CHANGE HW (L) ?

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

UNIT 0

DEVICE ADDRESS  (O) 176000 ? <ENTER THE ADDRESS OF THE
                             TSBA/TSDB REGISTER>

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

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

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

```
CHANGE SW (L) ?

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 11/21+ 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 11/21+ 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 XSTO 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 XSTO 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

CVTSAAO => CNTSAAO JAKI BERG 9-APR-1984

CHANGES WERE MADE TO CVTSAAO TO PRODUCE CNTSAAO FOR THE FALCON-PLUS PROJECT (SBC-11/21+). CHANGES, MARKED BY ";JB REV A-0", ARE:

- SET THE ODT BREAK VECTOR (LOCATION 140) TO THE STARTING ADDRESS OF FALCON'S ODT ROM (170000-OCTAL).
- LOWER THE GENERAL INTERRUPT PRIORITY FROM 7 TO 6. CHANGE DEFAULT CSR ADDRESS FROM 172540 TO 176000.

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

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

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


002000                                  POINTER BGNSW,BGNSFT,BGNAU,BGNDU,BGNRPT
002000                                  HEADER  CNTSA,A,0,655.,0
002000                          L$NAME::                ;DIAGNOSTIC NAME
002000      103                         .ASCII /C/
002001      116                         .ASCII /N/
002002      124                         .ASCII /T/
002003      123                         .ASCII /S/
002004      101                         .ASCII /A/
002005      000                         .BYTE   0
002006      000                         .BYTE   0
002007      000                         .BYTE   0
002010                          L$REV::                 ;REVISION LEVEL
002010      101                         .ASCII  /A/
002011                          L$DEPO::                ;O
002011      060                         .ASCII  /O/
002012                          L$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  045654                          .WORD   L$HARD
002020                          L$SPCP::                ;POINTER TO S.W. QUES.
002020  046006                          .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
002040  002124                          .WORD   L$DISPATCH
```

```
002042                          L$PRIO::                ;DIAGNOSTIC RUN PRIORITY
002042  000000                          .WORD   0
002044                          L$ENVI::                ;FLAGS DESCRIBE HOW IT WAS SETUP
002044  000000                          .WORD   0
002046                          L$EXP1::                ;EXPANSION WORD
002046  000000                          .WORD   0
002050                          L$MREV::                ;SVC REV AND EDIT #
002050     003                          .BYTE   C$REVISION
002051     003                          .BYTE   C$EDIT
002052                          L$EF::                  ;DIAG. EVENT FLAGS
002052  000000                          .WORD   0
002054  000000                          .WORD   0
002056                          L$SPC::
002056  000000                          .WORD   0
002060                          L$DEVP::                ; POINTER TO DEVICE TYPE LIST
002060  003376                          .WORD   L$DVTYP
002062                          L$REPP::                ;PTR. TO REPORT CODE
002062  022702                          .WORD   L$RPT
002064                          L$EXP4::
002064  000000                          .WORD   0
002066                          L$EXP5::
002066  000000                          .WORD   0
002070                          L$AUT::                 ;PTR. TO ADD UNIT CODE
002070  022370                          .WORD   L$AU
002072                          L$DUT::                 ;PTR. TO DROP UNIT CODE
002072  022466                          .WORD   L$DU
002074                          L$LUN::                 ;LUN FOR EXERCISERS TO FILL
002074  000000                          .WORD   0
002076                          L$DESP::                ;POINTER TO DIAG. DESCRIPTION
002076  003404                          .WORD   L$DESC
002100                          L$LOAD::                ;GENERATE SPECIAL AUTOLOAD EMT
002100  104035                          EMT     E$LOAD
002102                          L$ETP::                 ;POINTER TO ERRTBL
002102  000000                          .WORD   0
002104                          L$ICP::                 ;PTR. TO INIT CODE
002104  021546                          .WORD   L$INIT
002106                          L$CCP::                 ;PTR. TO CLEAN-UP CODE
002106  022654                          .WORD   L$CLEAN
002110                          L$ACP::                 ;PTR. TO AUTO CODE
002110  022574                          .WORD   L$AUTO
002112                          L$PRT::                 ;PTR. TO PROTECT TABLE
002112  021536                          .WORD   L$PROT
002114                          L$TEST::                ;TEST NUMBER
002114  000000                          .WORD   0
002116                          L$DLY::                 ;DELAY COUNT
002116  000000                          .WORD   0
002120                          L$HIME::                ;PTR. TO HIGH MEM
002120  000000                          .WORD   0
```

```
                                        .SBTTL  DISPATCH TABLE

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

002122                                  DISPATCH 11
002122  000013                          .WORD   11
002124                          L$DISPATCH::
002124  023464                          .WORD   T1
002126  023704                          .WORD   T2
002130  024402                          .WORD   T3
002132  025074                          .WORD   T4
002134  026430                          .WORD   T5
002136  027534                          .WORD   T6
002140  031004                          .WORD   T7
002142  034372                          .WORD   T8
002144  035276                          .WORD   T9
002146  040412                          .WORD   T10
002150  043514                          .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  176000                          .WORD   176000          ; 1ST (OF 2) REGISTERS.
002156  000224                          .WORD   224             ; INTERRUPT VECTOR
002160  000200                          .WORD   PRI04           ; INTERRUPT PRIORITY.
002162                                  ENDHW
002162                          L10000:
```

```
                                        .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

 002174                                 BGNMOD  TSV3
 002174                         TSV3::

                                        .SBTTL  GLOBAL EQUATES SECTION

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

 002174                                 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
                                ;
                                ;                                ;  BIT POSITION IN SECOND STATUS WORD
        000040                  EF.START==      32.              ; (100000) START COMMAND WAS ISSUED
        000037                  EF.RESTART==    31.              ; (040000) RESTART COMMAND WAS ISSUED
        000036                  EF.CONTINUE==   30.              ; (020000) CONTINUE COMMAND WAS ISSUED
        000035                  EF.NEW==        29.              ; (010000) A NEW PASS HAS BEEN STARTED
        000034                  EF.PWR==        28.              ; (004000) A POWER FAIL/POWER UP OCCURRED
                                ;
```

```
                                ;
                                ; PRIORITY LEVEL DEFINITIONS
                                ;
        000340                  PRI07=: 340
        000300                  PRI06=: 300
        000240                  PRI05=: 240
        000200                  PRI04=: 200
        000140                  PRI03=: 140
        000100                  PRI02=: 100
        000040                  PRI01=: 40
        000000                  PRI00=: 0
                                ;
                                ;OPERATOR FLAG BITS
                                ;
        000004                  EVL=:        4
        000010                  LOT=:       10
        000020                  ADR=:       20
        000040                  IDU=:       40
        000100                  ISR=:      100
        000200                  UAM=:      200
        000400                  BOE=:      400
        001000                  PNT=:     1000
        002000                  PRI=:     2000
        004000                  IXE=:     4000
        010000                  IBE=:    10000
        020000                  IER=:    20000
        040000                  LOE=:    40000
        100000                  HOE=:   100000
34
35 002174                               KT11    ,,                      ;DEFINE MEMORY MANAGEMENT REGISTERS
                                .SBTTL  MEMORY MANAGEMENT DEFINITIONS
                                ;*KT11 VECTOR ADDRESS
        000250                  MMVEC=  250
                                ;*KT11 STATUS REGISTER ADDRESSES
        177572                  SR0=    177572
        177574                  SR1=    177574
        177576                  SR2=    177576
        172516                  SR3=    172516
                                .IF NB
                                ;*USER "I" PAGE DESCRIPTOR REGISTERS
                                UIPDR0= 177600
                                UIPDR1= 177602
                                UIPDR2= 177604
                                UIPDR3= 177606
                                UIPDR4= 177610
                                UIPDR5= 177612
                                UIPDR6= 177614
                                UIPDR7= 177616
                                .IF NB
                                ;*USER "D" PAGE DESCRIPTOR REGISTORS
                                UDPDR0= 177620
                                UDPDR1= 177622
                                UDPDR2= 177624
                                UDPDR3= 177626
                                UDPDR4= 177630
                                UDPDR5= 177632
                                UDPDR6= 177634
```

```
UDPDR7= 177636
.ENDC
;*USER "I" PAGE ADDRESS REGISTERS
UIPAR0= 177640
UIPAR1= 177642
UIPAR2= 177644
UIPAR3= 177646
UIPAR4= 177650
UIPAR5= 177652
UIPAR6= 177654
UIPAR7= 177656
.IF NB
;*USER "D" PAGE ADDRESS REGISTERS
UDPAR0= 177660
UDPAR1= 177662
UDPAR2= 177664
UDPAR3= 177666
UDPAR4= 177670
UDPAR5= 177672
UDPAR6= 177674
UDPAR7= 177676
.ENDC
.ENDC
.IF NB
;*SUPERVISOR "I" PAGE DESCRIPTOR REGISTERS
SIPDR0= 172200
SIPDR1= 172202
SIPDR2= 172204
SIPDR3= 172206
SIPDR4= 172210
SIPDR5= 172212
SIPDR6= 172214
SIPDR7= 172216
.IF NB
;*SUPERVISOR "D" PAGE DESCRIPTOR REGISTERS
SDPDR0= 172220
SDPDR1= 172222
SDPDR2= 172224
SUPDR3= 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
SUPAR1= 172262
```

```
                                SDPAR2= 172264
                                SDPAR3= 172266
                                SDPAR4= 172270
                                SDPAR5= 172272
                                SDPAR6= 172274
                                SDPAR7= 172276
                                .ENDC
                                .ENDC
                                ;*KERNEL "I" PAGE DESCRIPTOR REGISTERS
172300                          KIPDR0= 172300
172302                          KIPDR1= 172302
172304                          KIPDR2= 172304
172306                          KIPDR3= 172306
172310                          KIPDR4= 172310
172312                          KIPDR5= 172312
172314                          KIPDR6= 172314
172316                          KIPDR7= 172316
                                .IF NB
                                ;*KERNEL "D" PAGE DESCRIPTOR REGISTERS
                                KDPDR0= 172320
                                KDPDR1= 172322
                                KDPDR2= 172324
                                KDPDR3= 172326
                                KDPDR4= 172330
                                KDPDR5= 172332
                                KDPDR6= 172334
                                KDPDR7= 172336
                                .ENDC
                                ;*KERNEL "I" PAGE ADDRESS REGISTERS
172340                          KIPAR0= 172340
172342                          KIPAR1= 172342
172344                          KIPAR2= 172344
172346                          KIPAR3= 172346
172350                          KIPAR4= 172350
172352                          KIPAR5= 172352
172354                          KIPAR6= 172354
172356                          KIPAR7= 172356
                                .IF NB
                                ;*KERNEL "D" PAGE ADDRESS REGISTERS
                                KDPAR0= 172360
                                KDPAR1= 172362
                                KDPAR2= 172364
                                KDPAR3= 172366
                                KDPAR4= 172370
                                KDPAR5= 172372
                                KDPAR6= 172374
                                KDPAR7= 172376
                                .ENDC
```

```
                                        .SBTTL  TSV05 REGISTER AND PACKET DEFINITIONS

                                ;
                                ; SOME GENERAL EQUATES.
                                ;

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

                                ;+
                                ;BIT DEFINITIONS FOR TSSR REGISTER
                                ;-

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


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

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


                                ;+
                                ;BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 1
                                ;(XST1)
```

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

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

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

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


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

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

                                ;+
                                ;
                                ;DEVICE REGISTER OFFSETS
```

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

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

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

                                ;+
                                ; COMMAND PACKET HEADER WORD BIT DEFINITIONS
                                ;-
100000                                  P.ACK   = BIT15         ;BUFFER AVAIL FOR CONTROLLER
040000                                  P.CVC   = BIT14         ;CLEAR VOLUME CHECK
020000                                  P.OPP   = BIT13         ;REVERSE SEQUENCE OF DATA BITS
010000                                  P.SWB   = BIT12         ;SWAP BYTES IN MEMORY
007400                                  P.MODE  = BIT11!BIT10!BIT9!BIT8 ;EXTENDED COMMAND MODE FIELD
000200                                  P.IE    = BIT7          ;INTERRUPT ENABLE
000140                                  P.FMT= BIT6!BIT5        ;PACKET HEADER TYPE (ALWAYS=0)
000037                                  P.CMD   = 37            ;MAJOR COMMAND FIELD

                                ;+
                                ; CONTROL COMMAND MODE CODES
                                ;-
000000                                  PC.RELEASE      = 0*256.        ;RELEASE BUFFER
000400                                  PC.REWIND       = 1*256.        ;REWIND
001000                                  PC.NOOP         = 2*256.        ;NO OP
002000                                  PC.IEREW        = 4*256.        ;REWIND IMMEDIATE INTERRUPT
002400                                  PC.ERASE        = 5*256.        ;SECURITY ERASE

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

```
                                ;+
                                ;
                                ;REGISTER DEFINITIONS IN THE MESSAGE BUFFER
                                ;
                                ;-

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


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

        000002                          PKLOW   = 2             ;LOW ORDER CHARACTERISTIC DATA POINTER
        000004                          PKHI    = 4             ;HIGH ORDER CHARACTFRISTIC 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          ;ITADO  - 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
```

H3

TSV05 REGISTER AND PACKET DEFINITIONS

```
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 FE TURES 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.    ;E..PECTED 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  177737                          .WORD   ↑CBIT5
003026  177677                          .WORD   ↑CBIT6
003030  177577                          .WORD   ↑CBIT7
003032  177377                          .WORD   ↑CBIT8
003034  176777                          .WORD   ↑CBIT9
003036  175777                          .WORD   ↑CBIT10
003040  173777                          .WORD   ↑CBIT11
003042  167777                          .WORD   ↑CBIT12
003044  157777                          .WORD   ↑CBIT13
003046  137777                          .WORD   ↑CBIT14
003050  077777                          .WORD   ↑CBIT15
003052  125252                          .WORD   125252          ;ALTERNATING ONES, ZEROS
003054  052525                          .WORD   052525          ;ALTERNATING ONES, ZERO OPPOSITE FROM ABOVE
        003056                  TBLEND=.
```

```
                                        .SBTTL  GLOBAL ENVIRONMENT STORAGE
                                ;
                                ;STORAGE FOR DEVICE REGISTERS
                                ;
003056  000000  100000  000000  DUMMY:  0,100000,0,0     ;DUMMY DEVICE REGISTERS...
003066  000000  000000  000000          0,0,0,0,0,0,0,0
                                                         ;...FOR MULTI-UNIT CHECKOUT.


003106  000000                  DUFLG::         .WORD   0               ;"DROPPED UNIT" FLAG.
                                                                        ;INHIBITS CODE IN "CLEAN-UP".
003110  000000                  NODEV::         .WORD   0               ;FLAG TO SAY NO DEVICE.

003112  000000                  TEMP1::         .WORD   0               ;SOME TEMP LOCATIONS.
003114  000000                  TEMP2::         .WORD   0
003116  000000                  XXCOMM::        .WORD   0               ;XXDP+ COMM BLOCK POINTER.
003120  000000                  FREE::          .WORD   0               ;1ST FREE MEMORY ADDRESS...
003122  000000                  FRESIZ::        .WORD   0               ;...AND SIZE (IN WORDS).
003124  000000                  FREEHI: .WORD   0               ;LAST WORD IN FREE SPACE
003126  000000                  KTFLG::         .WORD   0               ;KT11, MEM AVAIL FLAG -
                                                                        ;- .WORD        0 = <24K OR NO KT -
                                                                        ;- NZ = >24K AND KT.
003130  000000                  KTENABLE::      .WORD   0               ;SET BY TEST ROUTINES TO FLAG >28K UNDER TEST
003132  000000                  NXMFLG::        .WORD   0               ;SET IF WE CAN TEST CLEARED OTHERWISE
003134  000000                  NXMLO::         .WORD   0               ;NXM LO ADDRESS BITS
003136  000000                  NXMHI::         .WORD   0               ;NXM HI ADDRESS BITS FOR DAL'S 16-21
003140  000000                  T23A::          .WORD   0               ;11/23A FLAG
003142  000000                  T23B::          .WORD   0               ;11/23B FLAG
003144  000000                  T3BFLG::        .WORD   0               ;TEST 3B FLAG †0
003146  002000                  PST32W::        .WORD   2000            ;32W BLOCK ADDRESS FOR 32K START
003150  000000                  SIFLAG::        .WORD   0               ;
003152  000000                  BADDAT::        .WORD   0               ;ACTUAL DATA
003154  000000                  GDDAT::         .WORD   0               ;EXPECTED DATA
003156  000000                  LOOPFL::        .WORD   0
003160                          CTAB::                                  ;CONFIGURATION TABLES.
003160  000000                  CTABM::         .WORD   0               ;CONFIG WORK.
003162  000000                                  .WORD   0
003164  000000                                  .WORD   0
003166  000000                                  .WORD   0
003170  177777                                  .WORD   -1              ;END OF MEM TABLE.
003172                          CTABE::
                                ;ERROR STATISTICS TABLE (1 WORD PER UNIT), 64 UNITS MAX:
                                ;
                                ;       0       =       UNIT NOT TESTED
                                ;       100000  =       UNIT ONLINE, NO ERRORS
                                ;       10XXXX  =       UNIT ONLINE, ENCOUNTERED XXXX ERRORS
                                ;       160000  =       UNIT DROPPED, NON-EXISTENT DEVICE REGISTER
                                ;       160001  =       UNIT DROPPED, NOT IDLE AT START
                                ;       14XXXX  =       UNIT DROPPED, ENCOUNTERED XXXX ERRORS
                                ;
003172                          ERTABL:         .BLKW   64.
003372  000000                  ERTABE:         .WORD   0

003374  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
                                ;-
 003376                                 DEVTYP  <TSV05>
 003376                         L$DVTYP::
 003376     124     123     126         .ASCIZ  #TSV05#
                                        .EVEN

                                ;+
                                ;TEST DESCRIPTION
                                ;-
 003404                                 DESCRIPT <**** TSV05 LOGIC DIAGNOSTIC - REPLACE M7196 IF ERROR ****>
 003404                         L$DESC::
 003404     052     052     052         .ASCIZ  /**** TSV05 LOGIC DIAGNOSTIC - REPLACE M7196 IF ERROR ****/
                                        .EVEN



                                ;+
                                ;BIT TO ASCII CONVERSION FOR TSSR REGISTER
                                ;-

 003476  003536  003541  003545 TSSRBIT::       .WORD   1$,2$,3$,4$,5$,6$,7$,8$
 003516  003577  003603  003607                 .WORD   9$,10$,11$,12$,13$,14$,15$,16$
 003536     123     103     000 1$:     .ASCIZ  'SC'
 003541     102     111     105 2$:     .ASCIZ  'BIE'
 003545     123     103     105 3$:     .ASCIZ  'SCE'
 003551     122     115     122 4$:     .ASCIZ  'RMR'
 003555     116     130     115 5$:     .ASCIZ  'NXM'
 003561     116     102     101 6$:     .ASCIZ  'NBA'
 003565     102     111     124 7$:     .ASCIZ  'BIT9'
 003572     102     111     124 8$:     .ASCIZ  'BIT8'
 003577     123     123     122 9$:     .ASCIZ  'SSR'
 003603     117     106     114 10$:    .ASCIZ  'OFL'
 003607     102     111     124 11$:    .ASCIZ  'BIT5'
 003614     102     111     124 12$:    .ASCIZ  'BIT4'
 003621     102     111     124 13$:    .ASCIZ  'BIT3'
 003626     102     111     124 14$:    .ASCIZ  'BIT2'
 003633     102     111     124 15$:    .ASCIZ  'BIT1'
 003640     102     111     124 16$:    .ASCIZ  'BIT0'
                                        .EVEN
 003646     124     123     123 SFIERR: .ASCIZ  'TSSR ERROR AFTER SOFT INIT'
 003701     124     123     123 SFHERR: .ASCIZ  'TSSR ERROR AFTER BUS RESET'
 003734     040     040     116 NXR:    .ASCIZ  /  NON-EXISTANT DEVICE REGISTER/
 003773     045     101     040 NXRX:   .ASCIZ  /#A  ADDRESS: #06/
 004014     045     101     040 TSSX:   .ASCII  /#A  TSBA,TSSR EXP'D: #06#A,#06#N/
 004054     045     101     040         .ASCIZ  /#A  TSBA,TSSR REC'D: #06#A,#06/
```

```
004113   045   116   045  FUSI:    .ASCII  /¤N¤A/
004117   040   040   125  USI:     .ASCIZ  /  UNEXPECTED INTERRUPT/
004146   040   040   111  NSI:     .ASCIZ  /  INTERRUPT EXPECTED, NOT RECEIVED/
004211   045   116   045  FNOINTR:          .ASCII  /¤N¤A/
004215   040   040   116  NOINTR:  .ASCIZ  /  NO INTERRUPT WAS GENERATED/
004252   040   040   111  IFAULT:  .ASCIZ  /  INTERRUPT FAULT/
004274   045   101   040  INTX:    .ASCIZ  /¤A  CPU PC: ¤06¤A  TSBA: ¤06/
004331   040   040   042  NOINIT:  .ASCIZ  /  "BUS INIT" DIDN'T INITIALIZE CONTROLLER/
004403   040   040   042  NSINIT:  .ASCIZ  /  "SOFT-INIT" DIDN'T INITIALIZE THE DPU/
004453   040   040   042  BRINIT:  .ASCIZ  /  "BUS-RESET" DIDN'T INITIALIZE THE DPU/

004523   000              NUL:     .ASCIZ  //
004524   045   116   000  NULCR:   .ASCIZ  /¤N/
004527   045   101   040  EXPGOT:  .ASCIZ  /¤A EXP'D: ¤06¤A, REC'D: ¤06/
004563   045   116   045  EXPGT2:  .ASCIZ  /¤N¤A EXP'D: ¤06¤A, ¤06¤N¤A REC'D: ¤0¤A, ¤06/
004637   045   101   040  DUAD12:  .ASCIZ  /¤A REG(W) WRITTEN TO: ¤06¤A REG(R) READ; EXP'D: ¤06¤A, REC'D: ¤06/
004741   122   101   115  PKTRAM::         .ASCIZ  'RAM Contents Do Not Match Packet Sent'
005007   040   040   103  SCME:    .ASCIZ  /  CONFIG DOESN'T MATCH MFG. MASTER/
005052   127   122   111  WRTMSG:  .ASCIZ  'WRITE CHARACTERISTICS Failed'
005107   124   123   123  WRTERR:  .ASCIZ  'TSSR Incorrect After WRITE Command, More Bits Set Than SSR
005202   124   123   123  RDERR:   .ASCIZ  'TSSR Incorrect After READ Command, More Bits Set Than SSR'
005274   106   101   124  SCMERR:  .ASCIZ  'FATAL ERROR IN SUBTEST - CHECK TAPE,CABLES,TRANSPORT etc.'
005366   105   122   122  RETERR:  .ASCIZ  'ERROR IN SUBTEST - WRITE DATA RETRY FIVE TIMES FAILED'
005454   045   116   045  NOMEM:   .ASCIZ  '¤N¤A ***** NO NXM ADDRESS--CANNOT TEST NXM TIMEOUT. *****¤N'
005550   045   116   045  M8186:   .ASCIZ  '¤N¤A ****************** 11/23A SYSTEM ******************¤N'
005641   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.
                                ; -

005732                                  BGNMSG  NXRERR          ;NON EXISTANT DEVICE REGISTER.
005732                          NXRERR::
005732                                  PRINTX  #NXRX.NODEV     ;NODEV = NEXM ADDRESS.
005732  013746  003110                  MOV     NODEV,-(SP)
005736  012746  003773                  MOV     #NXRX,-(SP)
005742  012746  000002                  MOV     #2,-(SP)
005746  010600                          MOV     SP,R0
005750  104415                          TRAP    C$PNTX
005752  062706  000006                  ADD     #6,SP
005756  004737  005764                  JSR     PC,EXTEND       ; PRINT EXTENSION IF REQUIRED.
005762                                  ENDMSG
005762                          L10002:
005762  104423                          TRAP    C$MSG


                                ;
                                ; THIS ROUTINE APPENDS A UNIQUE EXTENSION (IF REQUIRED)
                                ; TO ANY OF THE ABOVE ERROR SIGNATURES.
                                ;
005764  005727                  EXTEND: TST     (PC)+
005766  000000                  EXTA:   0                       ; 0 = NO EXTENSION.
005770  001402                          BEQ     1$
005772  004777  177770                  JSR     PC,@EXTA        ; APPEND EXTENSION TEXT.
005776                          1$:     PRINTX  #NULCR          ; PRINT A BLANK LINE
005776  012746  004524                  MOV     #NULCR,-(SP)
006002  012746  000001                  MOV     #1,-(SP)
006006  010600                          MOV     SP,R0
006010  104415                          TRAP    C$PNTX
006012  062706  000004                  ADD     #4,SP
006016  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
                                ;
                                ;

006020                          PRITSSR:
006020                                  SAVREG                          ;SAVE GENERAL REGISTERS
006024  010104                          MOV     R1,R4                   ;SAVE THE TSSR CONTENTS
006026                                  PRINTB  #TSSRFOR,R4             ;PRINT THE CONTENTS OF TSSR
006026  010446                          MOV     R4,-(SP)
006030  012746  006411                  MOV     #TSSRFOR,-(SP)
006034  012746  000002                  MOV     #2,-(SP)
006040  010600                          MOV     SP,R0
006042  104414                          TRAP    C$PNTB
006044  062706  000006                  ADD     #6,SP
006050  010400                          MOV     R4,R0                   ;GET TSSR BACK FOR CHKAMB
006052  004737  016034                  JSR     PC,CHKAMB               ;ARE CONTENTS AMBIGUOUS ?
006056  103410                          BCS     5$                      ;BRANCH IF NOT
006060                                  PRINTX  #AMBTSSR                ;SHOW CONTENTS ARE AMBIGUOUS
006060  012746  006631                  MOV     #AMBTSSR,-(SP)
006064  012746  000001                  MOV     #1,-(SP)
006070  010600                          MOV     SP,R0
006072  104415                          TRAP    C$PNTX
006074  062706  000004                  ADD     #4,SP
006100  010403                  5$:     MOV     R4,R3                   ;CONTENTS OF TSSR
006102  042703  001476                  BIC     #HIADDR!FATERR!TERCLS,R3        ;CLEAR ALL MULTIPLE BIT FIELDS
006106  001434                          BEQ     20$                     ;NO BITS ARE SET
006110  012702  002630                  MOV     #TMPBFR,R2              ;TEMPORARY ASCII BUFFER
006114  012701  003476                  MOV     #TSSRBIT,R1             ;ASCII EQUIVALENT OF BITS
006120  005703                  10$:    TST     R3                      ;REMAINING BITS TO CONVERT
006122  001413                          BEQ     15$                     ;BRANCH WHEN ALL ARE DONE
006124  000241                          CLC                             ;CLEAR CARRY FOR SHIFT
006126  006103                          ROL     R3                      ;SHIFT NEXT BIT TO CARRY
006130  103006                          BCC     13$                     ;BRANCH IF BIT NOT SET
006132  011100                          MOV     (R1),R0                 ;POINTER TO BIT DEFINITION
006134  112022                  11$:    MOVB    (R0)+,(R2)+             ;MOVE ASCIZ TO BUFFER
006136  001376                          BNE     11$                     ;MOVE ALL BITS
006140  112762  000054  177777          MOVB    #',, 1(R2)              ;INSERT A COMMA TO TERMINATE
006146  005721                  13$:    TST     (R1)+                   ;POINT TO NEXT DESCRIPTION
006150  000763                          BR      10$                     ;GET THE REMAINING BITS
006152  105042                  15$:    CLRB    -(R2)                   ;TERMINATE THE LINE
006154                                  PRINTX  #TSSDEF,#TMPBFR         ;PRINT THE BIT DEFINITIONS
006154  012746  002630                  MOV     #TMPBFR, (SP)
006160  012746  006602                  MOV     #TSSDEF, (SP)
```

```
        006164  012746  000002                  MOV     #2,-(SP)
        006170  010600                          MOV     SP,R0
        006172  104415                          TRAP    C$PNTX
        006174  062706  000006                  ADD     #6,SP
    745
    746 006200  010403                  20$:    MOV     R4,R3           ;GET THE TSSR CONTENTS
    747 006202  042703  177761                  BIC     #^CTERCLS,R3    ;CLEAR ALL BUT TERMINATION
    748 006206  016303  006672                  MOV     TCOCOD(R3),R3   ;GET THE TERMINATION CODE MEANING
    749 006212                                  PRINTX  #TCOASC,R3      ;PRINT THE TERMINATION CODE
        006212  010346                          MOV     R3,-(SP)
        006214  012746  006472                  MOV     #TCOASC,-(SP)
        006220  012746  000002                  MOV     #2,-(SP)
        006224  010600                          MOV     SP,R0
        006226  104415                          TRAP    C$PNTX
        006230  062706  000006                  ADD     #6,SP
    750 006234  010403                          MOV     R4,R3           ;TSSR CONTENTS AGAIN
    751 006236  042703  177717                  BIC     #^CFATERR,R3    ;CLEAR ALL BUT FATAL TERMINATION
    752 006242  001416                          BEQ     25$             ;DON'T PRINT IF ZERO
    753 006244  006203                          ASR     R3
    754 006246  006203                          ASR     R3
    755 006250  006203                          ASR     R3              ;ALINE TERMINATION CODE FOR INDEX
    756 006252  016303  007232                  MOV     TSFCOD(R3),R3   ;GET THE FATAL TERMINATION CODE
    757 006256                                  PRINTX  #TFCASC,R3      ;PRINT THE FATAL TERMINATION CODE
        006256  010346                          MOV     R3,-(SP)
        006260  012746  006533                  MOV     #TFCASC,-(SP)
        006264  012746  000002                  MOV     #2,-(SP)
        006270  010600                          MOV     SP,R0
        006272  104415                          TRAP    C$PNTX
        006274  062706  000006                  ADD     #6,SP
    758 006300  042704  176377          25$:    BIC     #^CHIADDR,R4    ;CLEAR ALL BUT EXTENDED ADDRESS
    759 006304  001411                          BEQ     30$             ;DON'T PRINT IF ZERO
    760 006306                                  PRINTX  #TEXASC,R4      ;PRINT THE EXTENDED ADDRESS BITS
        006306  010446                          MOV     R4,-(SP)
        006310  012746  006431                  MOV     #TEXASC,-(SP)
        006314  012746  000002                  MOV     #2,-(SP)
        006320  010600                          MOV     SP,R0
        006322  104415                          TRAP    C$PNTX
        006324  062706  000006                  ADD     #6,SP
    761 006330  013703  002176          30$:    MOV     EPRTSW,R3               ;PRINT MEAASGE BUFFER ADDRESS
    762 006334                                  PRINTX  R3                      ;PRINT PROPER MESSAGE
        006334  010346                          MOV     R3,-(SP)
        006336  012746  000001                  MOV     #1,-(SP)
        006342  010600                          MOV     SP,R0
        006344  104415                          TRAP    C$PNTX
        006346  062706  000004                  ADD     #4,SP
    763 006352  000207                          RTS     PC              ;RETURN TO CALLER
    764
    766 006354                          EPRT2:
    767 006354      045     116     045 EPRT1:  .ASCIZ  '$N$A *****REPLACE M7196*****'
    782 006411      045     116     045 TSSRFOR:        .ASCIZ  '$N$A TSSR = $O6'
    783 006431      045     116     045 TEXASC:         .ASCIZ  '$N$A Extended Address Bits = $O6'
    784 006472      045     116     045 TCOASC:         .ASCIZ  '$N$A Termination Class Code = $T'
    785 006533      045     116     045 TFCASC:         .ASCIZ  '$N$A Fatal Termination Class Code = $T'
    786 006602      045     116     045 TSSDEF:         .ASCIZ  '$N$A TSSR Bits Set: $T'
    787 006631      045     116     045 AMBTSSR:        .ASCIZ  '$N$A TSSR Contents Are Ambiguous'
    788                                         .EVEN
    789 006672  006712  006735  006763  TCOCOD: .WORD  1$,2$,3$,4$,5$,6$,7$,8$
```

```
790 006712     116     157     162  1$:      .ASCIZ  'Normal Termination'
791 006735     124     145     162  2$:      .ASCIZ  'Termination Condition
792 006763     124     141     160  3$:      .ASCIZ  'Tape Status Alert'
793 007005     106     165     156  4$:      .ASCIZ  'Function Reject'
794 007025     122     145     143  5$:      .ASCIZ  'Recoverable Error   Tape Pos'tion One Record Down'
795 007107     122     145     143  6$:      .ASCIZ  'Recoverable Error - Tape Was Not Moved'
796 007156     125     156     162  7$:      .ASCIZ  'Unrecoverable Error'
797 007202     106     141     164  8$:      .ASCIZ  'Fatal Controller Error'
798                                          .EVEN
799
800 007232  007242  007276  007307  TSFCOD:  .WORD   1$,2$,3$,4$
801 007242     111     156     164  1$:      .ASCIZ  'Internal Diagnostic Failure'
802 007276     122     145     163  2$:      .ASCIZ  'Reserved'
803 007307     102     165     163  3$:      .ASCIZ  'Bus Interface or Sanity Check Error'
804 007353     122     145     163  4$:      .ASCIZ  'Reserved'
805                                          .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.
                                ;

007364                          PRIPKT::
007364                                  SAVREG                          ;SAVE THE REGISTERS
007370  010005                          MOV     R0,R5                   ;SAVE NO. OF WORDS IN PACKET
007372  005737  003130                  TST     KTENABLE                ;ABOVE 28K UNDER TEST?
007376  001001                          BNE     10$                     ;BR IF YES
007400  005003                          CLR     R3                      ;SET HIGH ORDER ADDRESS TO 0
007402  010301                  10$:    MOV     R3,R1                   ;COPY HIGH ORDER ADDRESS
007404  010400                          MOV     R4,R0                   ;GET LOWER ADDRESS
007406  006100                          ROL     R0                      ;SHIFT BIT 15 INTO C BIT
007410  006101                          ROL     R1                      ;AND INTO HIGH ORDER.
007412                                  PRINTB  @PKTADD,R1,R4           ;PRINT PACKET ADDRESS
007412  010446                          MOV     R4,-(SP)
007414  010146                          MOV     R1,-(SP)
007416  012746  007550                  MOV     @PKTADD,-(SP)
007422  012746  000003                  MOV     #3,-(SP)
007426  010600                          MOV     SP,R0
007430  104414                          TRAP    C$PNTB
007432  062706  000010                  ADD     #10,SP
007436  010300                  15$:    MOV     R3,R0                   ;GET HIGH ORDER ADDRESS
007440  001404                          BEQ     20$                     ;BR IF NOT ABOVE 28K.
007442  010401                          MOV     R4,R1                   ;GET LOW ORDER ADDRESS
007444  004737  017306                  JSR     PC,SETMAP               ;SETUP PAR6 MAPPING FOR 18 BIT ADDRESS
007450  010004                          MOV     R0,R4                   ;GET RETURNED PAR6 ADDRESS BIAS
007452  005001                  20$:    CLR     R1                      ;SAVE WORD NUMBER
007454  012402                  25$:    MOV     (R4)+,R2                ;GET PACKET CONTENTS
007456                                  PRINTB  @PKTFRM,R1,R2           ;PRINT THE DATA
007456  010246                          MOV     R2,-(SP)
007460  010146                          MOV     R1,-(SP)
007462  012746  007512                  MOV     @PKTFRM, (SP)
007466  012746  000003                  MOV     #3,-(SP)
007472  010600                          MOV     SP,R0
007474  104414                          TRAP    C$PNTB
007476  062706  000010                  ADD     #10,SP
007502  005201                          INC     R1                      ;NEXT WORD NUMBER
007504  020105                          CMP     R1,R5                   ;DONE ALL PACKET WORDS?
007506  002762                          BLT     25$                     ;LOOP TILL ALL DONE
007510  000207                          RTS     PC                      ;RETURN

007512     045     116     045  PKTFRM: .ASCIZ  '%N%A Packet Word #%D1%A = %O6'
007550     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
                                ;
                                ;-

007606                          PRIBXOR::
007606                                  SAVREG                          ;SAVE THE REGISTERS
007612  010203                          MOV     R2,R3                   ;EXPECTED DATA
007614                                  XOR     R1,R3                   ;FORM THE EXCLUSIVE OR
007624  012700  177400                  MOV     #^C<377>,R0             ;BYTE MASK
007630  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
007636  010346                          MOV     R3,-(SP)
007640  010146                          MOV     R1,-(SP)
007642  010246                          MOV     R2,-(SP)
007644  012746  007670                  MOV     #XORBFOR,-(SP)
007650  012746  000004                  MOV     #4,-(SP)
007654  010600                          MOV     SP,R0
007656  104414                          TRAP    C$PNTB
007660  062706  000012                  ADD     #12,SP
007664  010300                          MOV     R3,R0                   ;R0 HAS XOR ON RETURN
007666  000207                          RTS     PC                      ;RETURN TO CALLER

007670     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
                                ;
                                ;-

007736                          PRIXOR::
007736                                  SAVREG                          ;SAVE THE REGISTERS
007742  010203                          MOV     R2,R3                   ;EXPECTED DATA
007744                                  XOR     R1,R3                   ;FORM THE EXCLUSIVE OR
007754                                  PRINTB  @XORFOR,R2,R1,R3 ;PRINT THE MESSAGE
007754  010346                          MOV     R3,-(SP)
007756  010146                          MOV     R1,-(SP)
007760  010246                          MOV     R2,-(SP)
007762  012746  010006                  MOV     @XORFOR,-(SP)
007766  012746  000004                  MOV     @4,-(SP)
007772  010600                          MOV     SP,R0
007774  104414                          TRAP    C$PNTB
007776  062706  000012                  ADD     @12,SP
010002  010300                          MOV     R3,R0                   ;R0 HAS XOR ON RETURN
010004  000207                          RTS     PC                      ;RETURN TO CALLER

010006          045     116     045  XORFOR: .ASCIZ  '<N><A EXPD: <06><A RECV: <06><A XOR: <06'
                                             .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
                                ;
                                ;

010054                          PRIEQU:
010054                                  SAVREG                          ;SAVE THE REGISTERS
010060  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
                                ;
                                ;
010062                          PRIRAM:
010062                                  SAVREG                  ;SAVE R1-R5 UNTIL NEXT RETURN
010066                                  PRINTB  @RAMFOR,R4      ;PRINT RAM ADDRESS IN ERROR
010066  010446                          MOV     R4,-(SP)
010070  012746  010112                  MOV     @RAMFOR,-(SP)
010074  012746  000002                  MOV     #2,-(SP)
010100  010600                          MOV     SP,R0
010102  104414                          TRAP    C$PNTB
010104  062706  000006                  ADD     #6,SP
010110  000207                          RTS     PC              ;RETURN

010112     045     116     045  RAMFOR: .ASCIZ  '<N><A CONTROLLER RAM ADDRESS = <06'
                                        .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
```

```
                                        ;
                                        ;
010154                                  PRIADD:
010154                                          SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
010160  013700  002234                          MOV     ERRHI,R0                ;GET HIGH ADDRESSS
010164  013701  002236                          MOV     ERRLO,R1                ;GET LOW ADDRESS
010170  010102                                  MOV     R1,R2                   ;COPY LOW ADDRESS
010172  006101                                  ROL     R1                      ;SHIFT BIT 15 TO C BIT
010174  006100                                  ROL     R0                      ;SHIFT INTO HIGH ORDER
010176                                          PRINTB  #PRIA0,R0,R2            ;PRINT MEMORY ADDRESS IN ERROR
010176  010246                                  MOV     R2,-(SP)
010200  010046                                  MOV     R0,-(SP)
010202  012746  010224                          MOV     #PRIA0,-(SP)
010206  012746  000003                          MOV     #3,-(SP)
010212  010600                                  MOV     SP,R0
010214  104414                                  TRAP    C$PNTB
010216  062706  000010                          ADD     #10,SP
010222  000207                                  RTS     PC                      ;RETURN

010224     045     116     045  PRIA0:          .ASCIZ  '%N%A MEMORY ERROR ADDRESS = %O1%O5'
                                                .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
                                        ;
                                        ;-
010270                                  PRITADD:
010270                                          SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
010274  013702  002234                          MOV     ERRHI,R2                ;GET HIGH ADDRESSS
010300  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
010304                                          PRINTB  #PRIT0,R1               ;PRINT MEMORY ADDRESS LOW IN ERROR
010304  010146                                  MOV     R1,-(SP)
010306  012746  010352                          MOV     #PRIT0,-(SP)
010312  012746  000002                          MOV     #2,-(SP)
010316  010600                                  MOV     SP,R0
010320  104414                                  TRAP    C$PNTB
010322  062706  000006                          ADD     #6,SP
010326                                          PRINTB  #PRIT1,R2               ;PRINT MEMORY ADDRESS HIGH IN ERROR
010326  010246                                  MOV     R2,-(SP)
010330  012746  010415                          MOV     #PRIT1,-(SP)
010334  012746  000002                          MOV     #2,-(SP)
010340  010600                                  MOV     SP,R0
010342  104414                                  TRAP    C$PNTB
010344  062706  000006                          ADD     #6,SP
010350  000207                                  RTS     PC                      ;RETURN
```

PRITADD - PRINT MEMORY TEST ADDRESS

```
010352     045     116     045  PRITO:  .ASCIZ  '⇐N⇐A MEMORY TEST ADDRESS LOW = ⇐06'
010415     045     116     045  PRIT1:  .ASCIZ  '⇐N⇐A MEMORY TEST ADDRESS HIGH = ⇐06'
                                        .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:
                                ;
                                ;
                                ;-

010462                          SPACE::
010462                                  SAVREG                          ;SAVE THE GENERAL REGISTERS
010466  012737  000764  010650          MOV     #500.,SDELAY            ;SET UP DELAY
010474  012737  140010  010640          MOV     #140010,80$             ;SET UP COMMAND, SPACE FORWARD
010502  005703                          TST     R3                      ;CHECK FOR DIRECTION
010504  100403                          BMI     5$                      ;BR, IF REVERSE INDICATED
010506  010337  010642                  MOV     R3,90$                  ;LOAD UP NUMBER OF RECORDS TO SPACE
010512  000407                          BR      10$                     ;GO DO COMMAND
010514  042703  100000          5$:     BIC     #BIT15,R3               ;CLEAR DIRECTION BIT
010520  010337  010642                  MOV     R3,90$                  ;LOAD UP NUMBER OF RECORDS TO SPACE
010524  052737  000400  010640          BIS     #BIT8,80$               ;SET REVERSE BIT IN COMMAND PACKET
010532  012704  010640          10$:    MOV     #80$,R4                 ;SET UP R4 WITH PACKET ADDRESS
010536  010465  000000                  MOV     R4,TSDB(R5)             ;SEND OUT COMMAND
010542  004737  016240          15$:    JSR     PC,WAITF                ;WAIT FOR SSR
010546  103420                          BCS     20$                     ;BR, IF SSR IS SET AND OK
010550                                  DELAY   250             ;DELAY ABOUT .25 SECONDS
010550  012727  000250                  MOV     #250,(PC)+
010554  000000                          .WORD   0
010556  013727  002116                  MOV     L$DLY,(PC)+
010562  000000                          .WORD   0
010564  005367  177772                  DEC     -6(PC)
010570  001375                          BNE     . 4
```

```
        010572  005367  177756                  DEC     -22(PC)
        010576  001367                          BNE     .-20
   1062 010600  005337  010650                  DEC     SDELAY          ;BUMP DELAY COUNTER DOWN
   1063 010604  001356                          BNE     15$             ;BR, IF MORE DELAY
   1064 010606  000411                          BR      60$             ;BR IF TROUBLE CARRY = CLEAR
   1065 010610  016501  000002          20$:    MOV     TSSR(R5),R1     ;READ TSSR
   1066 010614  012702  000200                  MOV     ØSSR,R2         ;SET UP EXPECTED
   1067 010620  020201                  25$:    CMP     R2,R1           ;ARE THEY OK
   1068 010622  001401                          BEQ     40$             ;BR, IF EQUAL = OK
   1069 010624  000402                          BR      60$             ;TROUBLE EXIT
   1070 010626  000261                  40$:    SEC                     ;SET CARRY NO TROUBLE
   1071 010630  000401                          BR      70$             ;EXIT
   1072 010632  000241                  60$:    CLC                     ;CARRY CLEAR = ERROR
   1073 010634                          70$:
   1074 010634  010400                          MOV     R4,R0           ;PASS PACKET ADDRESS
   1075 010636  000207                          RTS     PC              ;RETURN
```

```
                                        ;
                                        ;
                                        ;
                                        ;PACKET FOR SPACE COMMAND
                                        ;
                                        ;
                                        ;COMMAND WORD
010640  000000                          80$:    .WORD
                                        ;NUMBER OF RECORDS TO BE SPACED OVER WORD
010642  000000                          90$:    .WORD
010644  000000                                  .WORD
010646  000000                                  .WORD
010650  000000                          SDELAY: .WORD   0                       ;DELAY COUNTER
                                                .EVEN
```

```
                                        .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:
                                ;
                                ;
                                ;-

010652                          WRTCHR::
010652                                  SAVREG                          ;SAVE THE GENERAL REGISTERS
010656  005037  002226                  CLR     BENBSW          ;CLEAR BUFFER ENABLE SWITCH
010662  005037  002224                  CLR     EXTFEA                  ;CLEAR EXTENDED FEATURES SW SWITCH
010666  010465  000000          10$:    MOV     R4,TSDB(R5)             ;SEND OUT COMMAND
010672  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR SSR
010676  103401                          BCS     20$                     ;BR, IF SSR IS SET AND OK
010700  000435                          BR      60$                     ;BR IF TROUBLE CARRY = CLEAR
010702  016501  000002          20$:    MOV     TSSR(R5),R1             ;READ TSSR
010706  012702  000200                  MOV     #SSR,R2                 ;SET UP EXPECTED
010712  032701  000100                  BIT     #OFL,R1                 ;WAS OFF LINE SET IN TSSR
010716  001402                          BEQ     25$                     ;BR, IF NO OFL SET
010720  052702  000100                  BIS     #OFL,R2                 ;MAKE THEM LOOK ALIKE
010724  020201                  25$:    CMP     R2,R1                   ;ARE THEY OK
010726  001401                          BEQ     40$                     ;BR, IF EQUAL = OK
010730  000421                          BR      60$                     ;TROUBLE EXIT
010732  062704  000010          40$:    ADD     #8.,R4                  ;POINT TO WRT CHARA DATA PACKET
010736  011403                          MOV     (R4),R3                 ;GET ADDRESS OF MESSAGE BUFFER
010740  032763  000200  000012          BIT     #X2.EXTF,XST2(R3)       ;EXTENDED FEATURES BIT SET?
010746  001402                          BEQ     45$                     ;BR IF NO
010750  005237  002224                  INC     EXTFEA                  ;SET EXTENDED FEATURES SW SWITCH
010754                          45$:
010754  032763  000100  000012          BIT     #X2.BUFE,XST2(R3)                       ;BUFFER ENABLE SWITCH SET
010762  001402                          BEQ     50$                     ;BR, IF SWITCH NOT SET
010764  005237  002226                  INC     BENBSW                  ;SET SOFTWARE SWITCH FOR ENABLED
```

```
010770                          50$:
010770  000261                          SEC                             ;SET CARRY NO TROUBLE
010772  000401                          BR      70$                     ;EXIT
010774  000241                  60$:    CLC                             ;CARRY CLEAR - ERROR
010776  016500  000002          70$:    MOV     TSSR(R5),R0             ;RETURN TSSR CONTENTS
011002  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
                                ;
                                ;
                                ;
011004                          REWIND::
011004                                  SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
011010  012704  011100                  MOV     #RWPACK,R4              ;GET PACKET ADDRESS
011014  010465  000000                  MOV     R4,TSDB(R5)             ;SEND PACKET ADDRESS TO EXECUTE
011020  012703  000550                  MOV     #360.,R3                ;ENOUGH TIME FOR 2400' REEL TO REWIND
011024  004737  016240          10$:    JSR     PC,WAITF                ;WAIT FOR SSR TO SET
011030  103417                          BCS     20$                     ;LEAVE WHEN SSR IS SET
011032                                  DELAY   250.                    ;WAIT FOR .25 SECONDS
011032  012727  000372                  MOV     #250.,(PC)+
011036  000000                          .WORD   0
011040  013727  002116                  MOV     L$DLY,(PC)+
011044  000000                          .WORD   0
011046  005367  177772                  DEC     -6(PC)
011052  001375                          BNE     .-4
011054  005367  177756                  DEC     -22(PC)
011060  001367                          BNE     .-20
011062  005303                          DEC     R3                      ;BUMP COUNTER DOWN
011064  001357                          BNE     10$                     ;KEEP GOING
011066  000241                          CLC                             ;CLEAR CARRY TO SET ERROR
011070  010400                  20$:    MOV     R4,R0                   ;PASS THE PACKET ADDRESS
011072  000207                          RTS     PC                      ;RETURN


                011100                  .=<.+10>&177770
011100                          RWPACK:
011100  102010                          .WORD   102010                  ;POSTION COMMAND (REWIND)
011102  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
                                ;
                                ;-

011104                          CKRAM::
011104                                  SAVREG                          ;SAVE THE GENERAL REGISTERS
011110  012701  002240                  MOV     #RAMDATA,R1             ;ADDRESS TO SAVE THE RAM DATA
011114  012702  000201                  MOV     #RMPKTBEG,R2            ;BYTE ADDRESS OF FIRST RAM DATA
011120  005003                          CLR     R3                      ;CLEAR THE ERROR FLAG
011122  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR SSR
011126  112765  000000  000000          MOVB    #0,TSDB(R5)             ;SET MAINTENANCE MODE
011134  004737  016326          10$:    JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
011140  010265  000000                  MOV     R2,TSDB(R5)             ;SELECT NEXT RAM ADDRESS
011144  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
011150  116511  000000                  MOVB    TSBA(R5),(R1)           ;READ THE RAM DATA
011154  122124                          CMPB    (R1)+,(R4)+             ;COMPARE TO EXPECTED
011156  001401                          BEQ     20$                     ;BRANCH IF OK
011160  005203                          INC     R3                      ;SET ERROR FLAG
011162  005202                  20$:    INC     R2                      ;ADDRESS OF NEXT RAM LOCATION
011164  020227  000210                  CMP     R2,#RMPKTEND            ;REACHED END YET ?
011170  003761                          BLE     10$                     ;BRANCH TILL ALL READ
011172  005703                          TST     R3                      ;WAS AN ERROR FOUND ?
011174  001402                          BEQ     30$                     ;BRANCH IF NOT
011176  000241                          CLC                             ;CLEAR CARRY TO SHOW ERROR
011200  000401                          BR      50$                     ;AND EXIT
011202  000261                  30$:    SEC                             ;SHOW GOOD COMPARE
011204  012737  000010  002300  50$:    MOV     #8.,RAMSIZ              ;SETUP RAMSIZ FOR PRAMPKT ROUTINE
011212  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
                                ;
                                ;-

011214                          CKRAM2::
011214                                  SAVREG                          ;SAVE THE GENERAL REGISTERS
011220  012701  002240                  MOV     #RAMDATA,R1             ;ADDRESS TO SAVE THE RAM DATA
011224  012702  000167                  MOV     #RMCHREG,R2             ;BYTE ADDRESS OF FIRST RAM DATA
011230  005003                          CLR     R3                      ;CLEAR THE ERROR FLAG
011232  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR SSR
011236  112765  000000  000000          MOVB    #0,TSDB(R5)             ;SET MAINTENANCE MODE
011244  004737  016326          10$:    JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
011250  010265  000000                  MOV     R2,TSDB(R5)             ;SELECT NEXT RAM ADDRESS
011254  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
011260  116511  000000                  MOVB    TSBA(R5),(R1)           ;READ THE RAM DATA
011264  122124                          CMPB    (R1)+,(R4)+             ;COMPARE TO EXPECTED
011266  001401                          BEQ     20$                     ;BRANCH IF OK
011270  005203                          INC     R3                      ;SET ERROR FLAG
011272  005202                  20$:    INC     R2                      ;ADDRESS OF NEXT RAM LOCATION
011274  012737  000010  002300          MOV     #8.,RAMSIZ              ;ASSUME EXTFEA NOT SET
011302  005737  002224                  TST     EXTFEA                  ;IS THE SOFTWARE EXTENDED FEATURES SET
011306  001407                          BEQ     25$                     ;BR, IF NOT SET
011310  012737  000012  002300          MOV     #10.,RAMSIZ             ;SET RAMSIZ FOR EXTEND FEATURES
011316  020227  000200                  CMP     R2,#RMCHEND             ;AT END OF EXTENDED BUFFER
011322  003750                          BLE     10$                     ;BR, IF NOT AT END YET
011324  000403                          BR      27$                     ;AT END BRANCH
011326  020227  000176          25$:    CMP     R2,#RMCHEND-2           ;REACHED END YET ?
011332  003744                          BLE     10$                     ;BRANCH TILL ALL READ
011334  005703                  27$:    TST     R3                      ;WAS AN ERROR FOUND ?
011336  001402                          BEQ     30$                     ;BRANCH IF NOT
011340  000241                          CLC                             ;CLEAR CARRY TO SHOW ERROR
011342  000401                          BR      50$                     ;AND EXIT
011344  000261                  30$:    SEC                             ;SHOW GOOD COMPARE
```

```
1324 011346  000207                50$:    RTS     PC                      ;RETURN
1325
```

```
                                        .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
                                ;
                                ;-
011350                          CKMSG::
011350                                  SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
011354  010037  002302                  MOV     R0,RCVHIADD             ;SAVE RECV HIGH ADDRESS
011360  010137  002304                  MOV     R1,RCVLOAD              ;SAVE RECV LOW ADDRESS
011364  005737  003130                  TST     KTENABLE                ;TESTING ABOVE 28K?
011370  001403                          BEQ     .0$                     ;BR IF NO
011372  004737  017306                  JSR     PC,SETMAP               ;RETURN ADDRESS BIASED TO PAR6 IN R0
011376  010001                          MOV     R0,R1                   ;GET RETURNED ADDRESS BIASED TO PAR6
011400  005004                  10$:    CLR     R4                      ;WORD IN BUFFER
011402  005003                          CLR     R3                      ;CLEAR ERROR SEEN FLAG
011404  010205                          MOV     R2,R5                   ;GET EXPD BUFFER ADDRESS
011406  011264  002320          15$:    MOV     (R2),EXPMSG(R4)         ;SAVE EXPD FOR ERROR REPORT
011412  011164  002464                  MOV     (R1),RECMSG(R4)         ;SAVE RECV FOR ERROR REPORT
011416  022221                          CMP     (R2)+,(R1)+             ;EXPD EQUAL RECV?
011420  001401                          BEQ     25$                     ;BR IF YES
011422  005203                          INC     R3                      ;SET ERROR SEEN FLAG
011424  062704  000002          25$:    ADD     #2,R4                   ;POINT TO NEXT WORD ADDRESS
011430  020427  000014                  CMP     R4,#14                  ;DONE FIRST 7 WORDS?
011434  003764                          BLE     15$                     ;BR IF NO
011436  032765  000200  000012          BIT     #X2.EXTF,XST2(R5)       ;IS EXTENDED FEATURES SET IN EXPD?
011444  001403                          BEQ     50$                     ;BR IF NO
011446  020427  000016                  CMP     R4,#16                  ;DONE EXTENDED FEATURES WORD?
011452  003755                          BLE     15$                     ;BR IF NO
011454  005703                  50$:    TST     R3                      ;ANY ERRORS SEEN?
011456  001402                          BEQ     55$                     ;BR IF NO
011460  000241                          CLC                             ;SET FAILURE
011462  000401                          BR      60$                     ;
011464  000261                  55$:    SEC                             ;SET SUCCESS
011466  000207                  60$:    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
                                ;
                                ;-
011470                          CKMSG2::
011470                                  SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
011474  020327  000144                  CMP     R3,#RECMSG-EXPMSG;&&D IS COUNT ABOVE MAX ALLOWED?
011500  003412                          BLE     5$                      ;&&D BR IF NO
011502  012703  000144                  MOV     #RECMSG-EXPMSG,R3;&&D
011506                                  PRINTF  #DEBUGMSG               ;&&D
011506  012746  011622                  MOV     #DEBUGMSG,-(SP)
011512  012746  000001                  MOV     #1,-(SP)
011516  010600                          MOV     SP,R0
011520  104417                          TRAP    C$PNTF
011522  062706  000004                  ADD     #4,SP
011526  010037  002302          5$:     MOV     R0,RCVHIADD             ;SAVE RECV HIGH ADDRESS
011532  010137  002304                  MOV     R1,RCVLOAD              ;SAVE RECV LOW ADDRESS
011536  005737  003130                  TST     KTENABLE                ;TESTING ABOVE 28K?
011542  001403                          BEQ     10$                     ;BR IF NO
011544  004737  017306                  JSR     PC,SETMAP               ;RETURN ADDRESS BIASED TO PAR6 IN R0
011550  010001                          MOV     R0,R1                   ;GET RETURNED ADDRESS BIASED TO PAR6
011552  005004                  10$:    CLR     R4                      ;WORD IN BUFFER
011554  005005                          CLR     R5                      ;CLEAR ERROR SEEN FLAG
011556  111264  002320          15$:    MOVB    (R2),EXPMSG(R4)         ;SAVE EXPD FOR ERROR REPORT
011562  111164  002464                  MOVB    (R1),RECMSG(R4)         ;SAVE RECV FOR ERROR REPORT
011566  122221                          CMPB    (R2)+,(R1)+             ;EXPD EQUAL RECV?
011570  001401                          BEQ     25$                     ;BR IF YES
011572  005205                          INC     R5                      ;SET ERROR SEEN FLAG
011574  062704  000001          25$:    ADD     #1,R4                   ;POINT TO NEXT BYTE
011600  020403                          CMP     R4,R3                   ;DONE ALL BYTES?
011602  002001                          BGE     50$                     ;BR IF YES
011604  000764                          BR      15$                     ;DO NEXT BYTE
011606  005705                  50$:    TST     R5                      ;ANY ERRORS SEEN?
011610  001402                          BEQ     55$                     ;BR IF NO
```

```
011612  000241                          CLC                     ;SET FAILURE
011614  000401                          BR      60$             ;
011616  000261                  55$:    SEC                     ;SET SUCCESS
011620  000207                  60$:    RTS     PC              ;RETURN

011622     120     122     117  DEBUGMSG:       .ASCIZ  'PROGRAM INTERNAL ERROR -CKMSG2 MESSAGE BUFFER EXCEEDED ';@@D
011712     045     116     045  FERCM:   .ASCII  /%N%A  ***/
011723     040     040     124  ERCM:    .ASCIZ  /  TSSR ERROR CODE REC'D = /
011756     056     056     056  SIMSG:   .ASCIZ  /.... AFTER DOING SOFT INIT/
012011     124     105     123  TINERR:  .ASCIZ  /TEST: .../
                                        .EVEN
```

```
                                        ;+
                                        ;
                                        ;PRINT ROUTINE TO FATAL SOFT INIT ERRORS
                                        ;
                                        ;INPUT:
                                        ;
                                        ;       R1      CONTENTS OF TSSR AT ERROR
                                        ;
                                        ;SIDE EFFECTS:
                                        ;
                                        ;       EXECUTES DROP UNIT TO CEASE TESTING
                                        ;
                                        ;-

012024                                          BGNMSG  SFIMSG
012024                                  SFIMSG::
012024  004737  006020                          JSR     PC,PRITSSR      ;PRINT CONTENTS OF TSSR REGISTER
012030  004737  017172                          JSR     PC,CKDROP       ;DROP UNIT, IF ALLOWED
012034                                          ENDMSG
012034                                  L10003:
012034  104423                                  TRAP    C$MSG

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

012036                                          BGNMSG  PKTSSR
012036                                  PKTSSR::
012036  004737  006020                          JSR     PC,PRITSSR      ;PRINT THE CONTENTS OF TSSR REGISTER
012042  012700  000004                          MOV     #4,R0           ;NO. OF WORDS IN PACKET
012046  004737  007364                          JSR     PC,PRIPKT       ;PRINT THE CONTENTS OF COMMAND PACKET
012052                                          ENDMSG
012052                                  L10004:
012052  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
                                        ;
                                        ;

012054                                          BGNMSG  PKTGETS
012054                                  PKTGETS::
```

```
012054  004737  006020                  JSR     PC,PRITSSR      ;PRINT THE CONTENTS OF TSSR REGISTER
012060  012700  000002                  MOV     #2,R0           ;NO. OF WORDS IN GET STATUS PACKET
012064  004737  007364                  JSR     PC,PRIPKT       ;PRINT THE CONTENTS OF COMMAND PACKET
012070                                  ENDMSG
012070                          L10005:
012070  104423                          TRAP    C$MSG


                                ;+
                                ;PRINT TSSR ERRORS FOR INITIALIZATION TESTS
                                ;
                                ;INPUTS:
                                ;
                                ;       R1      TSSR CONTENTS
                                ;       R4      ADDRESS OF COMMAND PACKET
                                ;-

012072                                  BGNMSG  SFFMSG
012072                          SFFMSG::
012072  004737  006020                  JSR     PC,PRITSSR      ;PRINT CONTENTS OF TSSR REGISTER
012076                                  ENDMSG
012076                          L10006:
012076  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
                                ;-

012100                                  BGNMSG  PKTMES
012100                          PKTMES::
012100  004737  006020                  JSR     PC,PRITSSR              ;PRINT CONTENTS OF TSSR
012104  010200                          MOV     R2,R0                   ;LOW ORDER ADDRESS
012106  010301                          MOV     R3,R1                   ;HIGH ORDER ADDRESS
012110  004737  014232                  JSR     PC,PRMESS               ;PRINT THE MESSAGE BUFFER
012114                                  ENDMSG
012114                          L10007:
012114  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
012116                          ADDSSR::
012116                                  JSR     PC,PRITADD      ;PRINT MEMORY TEST ADDRESS
012116  004737  010270                  MOV     TSSR(R5),R1     ;GET CURRENT TSSR
012122  016501  000002                  JSR     PC,PRITSSR      ;PRINT THE CONTENTS OF TSSR REGISTER
012126  004737  006020                  ENDMSG
012132                          L10010:
012132                                  TRAP    C$MSG
012132  104423


                                        .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
012134                          MSGEXP::
012134                                  MOV     #7,R0           ;ASSUME NO EXT FEATURES
012134  012700  000007                  TST     EXTFEA          ;EXT FEATURES SET?
012140  005737  002224                  BEQ     5$              ;BR IF NO
012144  001402                          MOV     #8.,R0          ;EXT FEATURE BUFFER IS 8 WORDS
012146  012700  000010          5$:     JSR     PC,PRMSGEXP     ;PRINT EXPD/RECV MESSAGE BUFFERS
012152  004737  014542                  ENDMSG
012156                          L10011:
012156                                  TRAP    C$MSG
012156  104423
```

```
                                        .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)
                                ;-
012160                                  BGNMSG  FIFEXP
012160                          FIFEXP::
012160                                  PRINTX  #FIF MSG,R1     ;PRINT BYTES TRANSFERRED
012160  010146                          MOV     R1,-(SP)
012162  012746  012232                  MOV     #FIF1MSG,-(SP)
012166  012746  000002                  MOV     #2,-(SP)
012172  010600                          MOV     SP,R0
012174  104415                          TRAP    C$PNTX
012176  062706  000006                  ADD     #6,SP
012202                                  PRINTX  #FIF2MSG        ;PRINT HEADER MSG
012202  012746  012301                  MOV     #FIF2MSG,-(SP)
012206  012746  000001                  MOV     #1,-(SP)
012212  010600                          MOV     SP,R0
012214  104415                          TRAP    C$PNTX
012216  062706  000004                  ADD     #4,SP
012222  010100                          MOV     R1,R0           ;GET BYTE COUNT
012224  004737  015112                  JSR     PC,PRBYTEXP     ;PRINT FIFO BYTES IN ERROR
012230                                  ENDMSG
012230                          L10012:
012230  104423                          TRAP    C$MSG
012232     045     116     045  FIF1MSG:         .ASCIZ  '#N#A NUMBER OF BYTES TRANSFERRED = #D2'
012301     045     116     045  FIF2MSG:         .ASCIZ  '#N#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
                                ;-
012340                                  BGNMSG  MSGSTAT
012340                          MSGSTAT::
012340  012701  012402                  MOV     #STATCOD,R1     ;ASCII ADDRESS TABLE
012344  012100                  10$:    MOV     (R1)+,R0        ;DONE ALL MSG LINES?
012346  001410                          BEQ     20$             ;BR IF YES
012350                                  PRINTX  R0              ;PRINT STATUS BIT NAMES
012350  010046                          MOV     R0,-(SP)
012352  012746  000001                  MOV     #1,-(SP)
012356  010600                          MOV     SP,R0
012360  104415                          TRAP    C$PNTX
012362  062706  000004                  ADD     #4,SP
012366  000766                          BR      10$             ;DO ANOTHER MSG LINE
012370  012700  000012          20$:    MOV     #10.,R0         ;NUMBER OF WORDS IN A READ STATUS BUFFER
012374  004737  014542                  JSR     PC,PRMSGEXP     ;PRINT EXPD/RECV MESSAGE BUFFERS
012400                                  ENDMSG
012400                          L10013:
012400  104423                          TRAP    C$MSG

012402  012420  012462  012553  STATCOD:        .WORD   1$,2$,3$,4$,5$,6$,0
012420     045     116     045  1$:.ASCIZ  '<NL>A Tape Bus Signals in Word #8:'
012462     045     116     045  2$:.ASCIZ  '<NL>A        PARERR<15>  IEOT  <12>  IFMK  <9>  IRDY<6>  IRWD<2>'
012553     045     116     045  3$:.ASCIZ  '<NL>A        IRESV2<14>  IIDENT<11>  IHER  <8>  IONL<5>  IFBY<1>'
012644     045     116     045  4$:.ASCIZ  '<NL>A        IRESV1<13>  ICER  <10>  ISPEED<7>  ILDP<4>  IFPT<0>'
012735     045     116     045  5$:.ASCIZ  '<NL>A Tape Bus Signals in Word #9:'
012777     045     116     045  6$:.ASCIZ  '<NL>A        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
                                ;
013054                                  BGNMSG  MSGLOOP
013054                          MSGLOOP::
013054  012701  013116                  MOV     #LOOPCOD,R1     ;ASCII ADDRESS TABLE
```

```
013060  012100                          10$:    MOV     (R1)+,R0        ;DONE ALL MSG LINES?
013062  001410                                  BEQ     20$             ;BR IF YES
013064                                          PRINTX  R0              ;PRINT STATUS BIT NAMES
013064  010046                                  MOV     R0,-(SP)
013066  012746  000001                          MOV     #1,-(SP)
013072  010600                                  MOV     SP,R0
013074  104415                                  TRAP    C$PNTX
013076  062706  000004                          ADD     #4,SP
013102  000766                                  BR      10$             ;DO ANOTHER MSG LINE
013104  012700  000012                  20$:    MOV     #10.,R0         ;NUMBER OF WORDS IN A READ STATUS BUFFER
013110  004737  014542                          JSR     PC,PRMSGEXP     ;PRINT EXPD/RECV MESSAGE BUFFERS
013114                                          ENDMSG
013114                                  L10014:
013114  104423                                  TRAP    C$MSG

013116  013136  013211  013310  LOOPCOD:        .WORD   1$,2$,3$,4$,5$,6$,7$,0
013136     045     116     045  1$:.ASCIZ  '%N%A Tape Bus Loopback Signals in Word #8:'
013211     045     116     045  2$:.ASCIZ  '%N%A      PARERR<15>          IRESV2<14>          IRESV1<13>'
013310     045     116     045  3$:.ASCIZ  '%N%A IHISP=>IEOT<12>    IWRT=>IIDENT<11>    IREV  =>ICER  <10>'
013407     045     116     045  4$:.ASCIZ  '%N%A IWFM =>IFMK<09>    IEDIT=>IHER <08>    IFAD  =>ISPEED<07>'
013506     045     116     045  5$:.ASCIZ  '%N%A ITADO=>IRDY<06>    ITAD1=>IONL <05>    IERASF=>ILDP  <04>'
013605     045     116     045  6$:.ASCIZ  '%N%A IREW =>IDBY<03>    IRWU =>IRWD <02>    IFEN  =>IFBY  <01>'
013704     045     116     045  7$:.ASCIZ  '%N%A IGO  =>IFPT<00>'
                                        .EVEN
```

```
                                        .SBTTL  MSGSUB - PRINT WRITE SUBSYSTEM MESSAGE BUFFER
                                ;+
                                ;
                                ;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
                                ;-
 013732                                 BGNMSG  MSGSUB
 013732                         MSGSUB::
 013732  012700  000012                 MOV     #10.,R0         ;SIZE OF WRITE SUBSYSTEM BUFFER
 013736  004737  014542                 JSR     PC,PRMSGEXP     ;PRINT EXPD/RECV MESSAGE BUFFERS
 013742                                 ENDMSG
 013742                         L10015:
 013742  104423                         TRAP    C$MSG


                                        .SBTTL  MEMADD - PRINT MEMORY ADDRESS DATA ERROR
                                ;+
                                ;
                                ;PRINT ROUTINE TO PRINT MEMORY ADDRESS DATA COMPARE ERROR
                                ;
                                ;IMPLICIT INPUTS:
                                ;
                                ;       ERRHI   - MEMORY ERROR HIGH ORDER ADDRESS
                                ;       ERRLO   - MEMORY ERROR LOW ORDER ADDRESS
                                ;       EXP     - EXPECTED DATA
                                ;       RECV    - RECEIVED DATA
                                ;-
 013744                                 BGNMSG  MEMADD
 013744                         MEMADD::
 013744  004737  010154                 JSR     PC,PRIADD       ;PRINT MEMORY ADDRESS IN ERROR
 013750  013701  002230                 MOV     EXPD,R1         ;GET EXPD DATA
 013754  013702  002232                 MOV     RECV,R2         ;GET RECEIVED DATA
 013760  004737  007736                 JSR     PC,PRIXOR       ;PRINT EXPD/RECV
 013764                                 ENDMSG
 013764                         L10016:
 013764  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
                                ;-

013766                          PRAMPKT:
013766                                  SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
013772  012701  002240                  MOV     #RAMDATA,R1             ;DATA FROM THE RAM
013776  005002                          CLR     R2                      ;INIT BYTE NUMBER
014000  122124                  5$:     CMPB    (R1)+,(R4)+             ;COMPARE EXPECTED, RECEIVED
014002  001005                          BNE     7$                      ;BR IF NO MATCH
014004                                  FORCERROR       7$,NOTSSR
014014  000436                          BR      10$                     ;BRD
014016  116105  177777          7$:     MOVB    -1(R1),R5               ;GET RECV RAM DATA
014022  116403  177777                  MOVB    -1(R4),R3               ;GET EXPD PACKET DATA
014026                                  XOR     R5,R3                   ;XOR EXPD/RECV
014036  042703  177400                  BIC     #177400,R3              ;LOW BYTE ONLY
014042  116137  177777  002232          MOVB    -1(R1),RECV             ;GET RECEIVED RAM DATA
014050  116437  177777  002230          MOVB    -1(R4),EXPD             ;GET EXPECTED RAM DATA
014056                                  PRINTB  #RAMASC,R2,RECV,EXPD,R3
014056  010346                          MOV     R3,-(SP)
014060  013746  002230                  MOV     EXPD,-(SP)
014064  013746  002232                  MOV     RECV,-(SP)
014070  010246                          MOV     R2,-(SP)
014072  012746  014146                  MOV     #RAMASC,-(SP)
014076  012746  000005                  MOV     #5,-(SP)
014102  010600                          MOV     SP,R0
014104  104414                          TRAP    C$PNTB
014106  062706  000014                  ADD     #14,SP
014112  005202                  10$:    INC     R2                      ;UPDATE BYTE COUNT
014114  005737  002300                  TST     RAMSIZ                  ;DEFAULT TO 8.?
014120  001404                          BEQ     15$                     ;BR IF YES
014122  020237  002300                  CMP     R2,RAMSIZ               ;DONE ALL BYTES?
014126  003724                          BLE     5$                      ;BR IF NO
014130  000403                          BR      25$                     ;
014132  020227  000010          15$:    CMP     R2,#8.                  ;DONE DEFAULT NUMBER OF BYTES?
014136  002720                  20$:    BLT     5$                      ;BR IF NO
014140  005037  002300          25$:    CLR     RAMSIZ                  ;SET DEFAULT RAMSIZ
014144  000207                          RTS     PC                      ;RETURN

014146     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
                                ;
                                ;-

014232                          PRMESS:
014232                                  SAVREG                          ;SAVE THE REGISTERS
014236  010005                          MOV     R0,R5                   ;SAVE LOW ORDER ADDRESS
014240  005737  003130                  TST     KTENABLE                ;ADDRESS ABOVE 28K?
014244  001001                          BNE     10$                     ;BR IF YES
014246  005001                          CLR     R1                      ;SET HIGH ORDER ADDRESS TO 0
014250  010103                  10$:    MOV     R1,R3                   ;SAVE HIGH ORDER ADDRESS
014252  006100                          ROL     R0                      ;SHIFT BIT15 TO C BIT
014254  006101                          ROL     R1                      ;SHIFT TO HIGH ORDER FOR PRINTOUT
014256                                  PRINTX  @PROASC,R1,R5           ;PRINT MESSAGE BUFFER ADDRESS
014256  010546                          MOV     R5,-(SP)
014260  010146                          MOV     R1,-(SP)
014262  012746  014410                  MOV     @PROASC,-(SP)
014266  012746  000003                  MOV     #3,-(SP)
014272  010600                          MOV     SP,R0
014274  104415                          TRAP    C$PNTX
014276  062706  000010                  ADD     #10,SP
014302                                  PRINTX  @PR1ASC                 ;PRINT HEADER FOR CONTENTS
014302  012746  014455                  MOV     @PR1ASC,-(SP)
014306  012746  000001                  MOV     #1,-(SP)
014312  010600                          MOV     SP,R0
014314  104415                          TRAP    C$PNTX
014316  062706  000004                  ADD     #4,SP
014322  005004                          CLR     R4                      ;NUMBER OF THE NEXT WORD
014324  010501                          MOV     R5,R1                   ;COPY LOW ORDER ADDRESS
014326  010300                          MOV     R3,R0                   ;COPY HIGH ORDER ADDRESS
014330  001403                          BEQ     20$                     ;BR IF NOT ABOVE 28K
014332  004737  017306                  JSR     PC,SETMAP               ;SETUP PAR ADDRESS IN R0
014336  010005                          MOV     R0,R5                   ;GET PAR FORMAT ADDRESS ABOVE 28K
014340                          20$:    PRINTX  @PRASC,R4,(R5)+         ;PRINT THE CONTENTS OF MEMORY BUFFER
014340  012546                          MOV     (R5)+,-(SP)
014342  010446                          MOV     R4,-(SP)
014344  012746  014513                  MOV     @PRASC,-(SP)
014350  012746  000003                  MOV     #3,-(SP)
014354  010600                          MOV     SP,R0
014356  104415                          TRAP    C$PNTX
014360  062706  000010                  ADD     #10,SP
014364  005204                          INC     R4                      ;NUMBER OF THE NEXT
014366  020427  000007                  CMP     R4,#7                   ;DONE ALL YET ?
014372  003005                          BGT     50$                     ;BRANCH IF ALL DONE
```

PRMESS - PRINT CONTENTS OF MESSAGE BUFFER

```
014374  002761                          BLT     20$                 ;PRINT FIRST 7 WORDS
014376  032763  000200  000012          BIT     ⌀X2.EXTF,XST2(R3);EXTENDED FEATUTES ON ?
014404  001355                          BNE     20$                 ;PRINT EXTENDED STATUS WORD
014406  000207                  50$:    RTS     PC                  ;RETURN

014410     045     116     045  PROASC: .ASCIZ  '⌀N⌀A Message Buffer Address = ⌀01⌀05'
014455     045     116     045  PR1ASC: .ASCIZ  '⌀N⌀A Message Buffer Contents:'
014513     045     116     045  PRASC:  .ASCIZ  '⌀N⌀A    Word⌀D1⌀A: ⌀O'
                                        .EVEN
```

```
                                        .SBTTL  PRMSGEXP - PRINT EXPD/RECV MESSAGE BUFFERS
                                ;+
                                ;
                                ;ROUTINE TO PRINT EXPECTED AND RECEIVED MESSAGE BUFFERS
                                ;
                                ;       R0          NUMBER OF WORDS IN BUFFER
                                ;
                                ;IMPLICIT INPUTS:
                                ;
                                ;       EXPMSG   - EXPECTED MESSAGE BUFFER
                                ;       RECMSG   - RECEIVED MESSAGE BUFFER
                                ;       RCVHIADD- RECEIVED MESSAGE BUFFER HIGH ORDER ADDRESS
                                ;       RCVLOADD- RECEIVED MESSAGE BUFFER LOW ORDER ADDRESS
                                ;-
014542                          PRMSGEXP::
014542                                  SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
014546  010005                          MOV     R0,R5                   ;SAVE NUMBER OF WORDS
014550  013700  002304                  MOV     RCVLOADD,R0             ;GET RECV LOW ADDRESS
014554  010004                          MOV     R0,R4                   ;COPY LOW ADDRESS
014556  013701  002302                  MOV     RCVHIADD,R1             ;GET RECV HIGH ADDRESS
014562  006100                          ROL     R0                      ;SHIFT BIT15 TO C BIT
014564  006101                          ROL     R1                      ;SHIFT TO HIGH ORDER FOR PRINTOUT
014566                                  PRINTX  #PRMSG0,R1,R4           ;PRINT MESSAGE BUFFER ADDRESS
014566  010446                          MOV     R4,-(SP)
014570  010146                          MOV     R1,-(SP)
014572  012746  014722                  MOV     #PRMSG0,-(SP)
014576  012746  000003                  MOV     #3,-(SP)
014602  010600                          MOV     SP,R0
014604  104415                          TRAP    C$PNTX
014606  062706  000010                  ADD     #10,SP
014612                                  PRINTX  #PRMSG1                 ;PRINT HEADER FOR CONTENTS
014612  012746  014767                  MOV     #PRMSG1,-(SP)
014616  012746  000001                  MOV     #1,-(SP)
014622  010600                          MOV     SP,R0
014624  104415                          TRAP    C$PNTX
014626  062706  000004                  ADD     #4,SP
014632  005004                          CLR     R4                      ;NUMBER OF THE CURRENT WORD
014634  012701  002320                  MOV     #EXPMSG,R1              ;GET EXPD BUFFER ADDRESS
014640  012702  002464                  MOV     #RECMSG,R2              ;GET RECV BUFFER ADDRESS
014644  011100                  20$:    MOV     (R1),R0                 ;GET EXPD
014646  011203                          MOV     (R2),R3                 ;GET RECV
014650                                  XOR     R0,R3                   ;XOR EXPD/RECV
014660                                  PRINTX  #PRMSG2,R4,(R1)+,(R2)+,R3
014660  010346                          MOV     R3,-(SP)
014662  012246                          MOV     (R2)+,-(SP)
014664  012146                          MOV     (R1)+,-(SP)
014666  010446                          MOV     R4,-(SP)
014670  012746  015025                  MOV     #PRMSG2,-(SP)
014674  012746  000005                  MOV     #5,-(SP)
014700  010600                          MOV     SP,R0
014702  104415                          TRAP    C$PNTX
014704  062706  000014                  ADD     #14,SP
014710  005204                          INC     R4                      ;NUMBER OF THE NEXT
014712  020405                          CMP     R4,R5                   ;DONE ALL YET?
014714  002001                          BGE     50$                     ;BR IF YES
014716  000752                          BR      20$                     ;DO ANOTHER
014720  000207                  50$:    RTS     PC                      ;RETURN
```

K6

PRMSGEXP PRINT EXPD/RECV MESSAGE BUFFERS

```
 1847
 1848 014722    045    116    045  PRMSG0: .ASCIZ  '%N%A Message Buffer Address = %01%05'
 1849 014767    045    116    045  PRMSG1: .ASCIZ  '%N%A Message Buffer Contents:'
 1850 015025    045    116    045  PRMSG2: .ASCIZ  '%N%A   WORD #%D2%A  EXPD: %06%A  RECV: %06%A  XOR: %06'
 1851                                        .EVEN
 1852
```

```
                                        .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
                                ;
015112                          PRBYTEXP::
015112                                  SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
015116  010005                          MOV     R0,R5                   ;SAVE NUMBER OF BYTES
015120  005037  002316                  CLR     PRMNO                   ;INIT ERROR COUNT
015124  005004                          CLR     R4                      ;NUMBER OF THE CURRENT BYTE
015126  012701  002320                  MOV     #EXPMSG,R1              ;GET EXPD BUFFER ADDRESS
015132  012702  002464                  MOV     #RECMSG,R2              ;GET RECV BUFFER ADDRESS
015136  111100                  20$:    MOVB    (R1),R0                 ;GET EXPD BYTE
015140  042700  177400                  BIC     #^C<377>,R0             ;CLEAR UPPER BYTE
015144  110037  015460                  MOVB    R0,PRBEXP               ;SAVE FOR ERROR REPORT
015150  111203                          MOVB    (R2),R3                 ;GET RECV BYTE
015152  042703  177400                  BIC     #^C<377>,R3             ;CLEAR UPPER BYTE
015156  110337  015462                  MOVB    R3,PRBREC               ;FOR ERROR REPORT
015162                                  XOR     R0,R3                   ;XOR EXPD/RECV
015172  122122                          CMPB    (R1)+,(R2)+             ;EXPD = RECV?
015174  001431                          BEQ     30$                     ;BR IF YES
015176  005237  002316                  INC     PRMNO                   ;UPDATE ERROR COUNT
015202  023727  002316  000010          CMP     PRMNO,#8.               ;PRINTED 8?
015210  101023                          BHI     30$                     ;BR IF YES
015212                          27$:    PRINTX  #PRBMSG,R4,PRBEXP,PRBREC,R3
015212  010346                          MOV     R3,-(SP)
015214  013746  015462                  MOV     PRBREC,-(SP)
015220  013746  015460                  MOV     PRBEXP,-(SP)
015224  010446                          MOV     R4,-(SP)
015226  012746  015326                  MOV     #PRBMSG,-(SP)
015232  012746  000005                  MOV     #5,-(SP)
015236  010600                          MOV     SP,R0
015240  104415                          TRAP    C$PNTX
015242  062706  000014                  ADD     #14,SP
015246                                  FORCEXIT        50$             ;BUD
015256  000404                          BR      35$                     ;BUD
015260                          30$:
015260                                  FORCERROR  27$,NOTSSR           ;BUD
015270                          35$:                                    ;BUD
015270  005204                          INC     R4                      ;NUMBER OF THE NEXT
015272  020405                          CMP     R4,R5                   ;DONE ALL YET?
015274  002001                          BGE     50$                     ;BR IF YES
015276  000717                          BR      20$                     ;DO ANOTHER
015300                          50$:    PRINTX  #PRBTOT,PRMNO           ;PRINT TOTAL ERROR COUNT
015300  013746  002316                  MOV     PRMNO,-(SP)
015304  012746  015413                  MOV     #PRBTOT,-(SP)
015310  012746  000002                  MOV     #2,-(SP)
015314  010600                          MOV     SP,R0
015316  104415                          TRAP    C$PNTX
```

PRBYTEXP PRINT FRROR BYTES IN EXP/REC MESSAGE BUFFER

```
        015320  062706  000006                  ADD     #6,SP
   1897 015324  000207                          RTS     PC              ;RETURN
   1898
   1899 015326     045     116     045  PRBMSG: .ASCIZ  '<N><A>   BYTE #<D2><A>  EXPD: <03><A>  RECV: <03><A>  XOR: <03>'
   1900 015413     045     116     045  PRBTOT: .ASCIZ  '<N><A> NUMBER OF BYTES IN ERROR = <D2>'
   1901                                         .EVEN
   1902 015460  000000                  PRBEXP: .WORD   0               ;EXPD
   1903 015462  000000                  PRBREC: .WORD   0               ;RECV
   1904
```

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

015464                                  BGNMSG  EXPREC
015464                          EXPREC::
015464  004737  007736                  JSR     PC,PRIXOR               ;PRINT THE DATA
015470                                  ENDMSG
015470                          L10017:
015470  104423                          TRAP    C$MSG
```

```
                                        .SBTTL  EXPBREC - PRINT EXPD/RECV BYTE DATA
                                ;+
                                ;
                                ;PRINT ROUTINE TO DISPLAY BYTE EXPD/RECV DATA
                                ;
                                ;
                                ;INPUTS:
                                ;
                                ;       R1      RECEIVED DATA BYTE
                                ;       R2      EXPECTED DATA BYTE
                                ;
                                ;
                                        BGNMSG  EXPBREC
 015472                         EXPBREC::
 015472  004737  007606                 JSR     PC,PRIBXOR              ;PRINT THE DATA
 015476                                 ENDMSG
 015476                         L10020:
 015476  104423                         TRAP    C$MSG


                                        .SBTTL  RAMERR  - PRINT RAM AND PACKET DATA
                                ;+
                                ;
                                ;PRINT ROUTINE TO DISPLAY RAM/PACKET DATA
                                ;
                                ;INPUTS:
                                ;
                                ;       R4      POINTER TO COMMAND PACKET
                                ;
                                ;IMPLICIT INPUTS:
                                ;
                                ;       RAMDATA         DATA AS READ FROM THE RAM
                                ;       RAMSIZ          NUMBER OF BYTES IN PACKET
                                ;                       IF RAMSIZ=0 THEN DEFAULT TO 8.
                                ;
                                ;IMPLICIT OUTPUTS:
                                ;
                                ;       RAMSIZ  SET TO 0
                                ;-

 015500                                 BGNMSG  RAMERR
 015500                         RAMERR::
 015500  004737  013766                 JSR     PC,PRAMPKT      ;PRINT RAM/PACKET DATA
 015504                                 ENDMSG
 015504                         L10021:
 015504  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
015506                                  RAMTADD::
015506                                          JSR     PC,PRITADD      ;PRINT TEST ADDRESS
015506  004737  010270                          JSR     PC,PRAMPKT      ;PRINT RAM/PACKET DATA
015512  004737  013766                          ENDMSG
015516                                  L10022:
015516                                          TRAP    C$MSG
015516  104423


                                                .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
015520                                  RAMEXP::
015520                                          BIC     #^C<377>,R1             ;SAVE EXPD RAM DATA BYTE
015520  042701  177400                          BIC     #^C<377>,R2             ;SAVE EXPD RAM DATA BYTE
015524  042702  177400                          JSR     PC,PRIRAM               ;PRINT THE RAM ADDRESS
015530  004737  010062                          JSR     PC,PRIXOR               ;PRINT THE DATA
015534  004737  007736                          ENDMSG
015540                                  L10023:
015540                                          TRAP    C$MSG
015540  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
015542                                  TIMEXP::
015542                                          PRINTX  #TIMSGO                 ;PRINT HEADER
015542  012746  015570                          MOV     #TIMSGO,-(SP)
015546  012746  000001                          MOV     #1,-(SP)
015552  010600                                  MOV     SP,R0
015554  104415                                  TRAP    C$PNTX
015556  062706  000004                          ADD     #4,SP
015562  004737  007736                          JSR     PC,PRIXOR               ;PRINT THE DATA
015566                                          ENDMSG
015566                                  L10024:
015566  104423                                  TRAP    C$MSG

015570     045     116     045          TIMSGO: .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)
                                ;
                                ;-
015670                                  BGNMSG  BADSSR
015670                          BADSSR::
015670  010246                          MOV     R2,-(SP)                ;SAVE DATA TRANSFERRED
015672  042702  177400                  BIC     #177400,R2              ;GET JUST ONE BYTE
015676                                  PRINTB  #XFERASC,R2
015676  010246                          MOV     R2,-(SP)
015700  012746  015730                  MOV     #XFERASC,-(SP)
015704  012746  000002                  MOV     #2, (SP)
015710  010600                          MOV     SP,R0
015712  104414                          TRAP    C$PNTB
015714  062706  000006                  ADD     #6,SP
015720  012602                          MOV     (SP)+,R2                ;RESTORE R2
015722  004737  006020                  JSR     PC,PRITSSR              ;DECODE TSSR CONTENTS
015726                                  ENDMSG
015726                          L10025:
015726  104423                          TRAP    C$MSG
015730     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
                                ;
                                ;-

015764                          SOFINIT::
015764                                  SAVREG                  ; SAVE THE REGISTERS
015770  012765  000000  000002          MOV     #0,TSSR(R5)     ; DO THE INIT.
015776  004737  016240                  JSR     PC,WAITF        ; WAIT FOR SSR
016002  016500  000002                  MOV     TSSR(R5),R0     ;GET THE TSSR REGISTER
016006  010004                          MOV     R0,R4           ;TSSR CONTENTS
016010  042704  176277                  BIC     #^C<HIADDR!OFL>,R4
016014  052704  002200                  BIS     #SSR!NBA,R4     ;R4 HAS EXPECTED CONTENTS
016020  020400                          CMP     R4,R0           ;ONLY EXPECTED BITS SET ?
016022  001402                          BEQ     5$              ;BRANCH IF OKAY
016024  000241                          CLC                     ;CLEAR THE CARRY FOR ERROR
016026  000401                          BR      10$             ;GO TO EXIT
016030  000261                  5$:     SEC                     ;SET THE CARRY BIT
016032  000207                  10$:    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
                                ;
                                ;-

016034                          CHKAMB:
016034                                  SAVREG                          ;SAVE THE GENERAL REGISTERS
016040  010004                          MOV     R0,R4                   ;CONTENTS OF TSSR
016042  032700  100000                  BIT     #SC,R0                  ;IS BIT 15 SET ?
016046  001004                          BNE     5$                      ;BRANCH IF YES
016050  032700  174077                  BIT     #^C<NBA!OFL!SSR!HIADDR>,R0      ;ANY OTHER BITS SET ?
016054  001023                          BNE     40$                     ;MUST BE AN ERROR
016056  000424                          BR      45$                     ;RETURN WITH SUCCESS
016060  032700  000200          5$:     BIT     #SSR,R0                 ;IS READY BIT SET ?
016064  001011                          BNE     10$                     ;BRANCH IF READY BIT IS SET.
016066  032700  000040                  BIT     #BIT5,R0                ;IS FATAL ERROR BIT SET ?
016072  001414                          BEQ     40$                     ;ERROR IF NOT
016074  042704  177761                  BIC     #^CTERCLS,R4            ;CLEAR ALL BUT TERMINATION CODE
016100  020427  000016                  CMP     R4,#16                  ;ALL THREE BITS MUST BE SET
016104  001007                          BNE     40$                     ;ERROR IF NOT SET
016106  000410                          BR      45$                     ;OK IF ALL ARE SET
016110  032700  000040          10$:    BIT     #BIT5,R0                ;IS FATAL ERROR BIT SET ?
016114  001405                          BEQ     45$                     ;ERROR IF BIT IS SET WITH SSR
016116  032700  000006                  BIT     #BIT2!BIT1,R0           ;IS THIS A FUNCTION REJECT
016122  001002                          BNE     45$                     ;BR, IF TSSR IS OK
016124  000241                  40$:    CLC                             ;AMBIGUOUS CONTENTS
016126  000401                          BR      50$
016130  000261                  45$:    SEC                             ;SHOW SUCCESS - NO AMBIGUITY
016132  000207                  50$:    RTS     PC                      ;RETURN TO CALLER
```

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

                                ; BIT DEFINITIONS FOR "INTMASK" AND "INTFLAG" BYTES:
                                ;
        000200                          IOKCKIN=BIT7    ; DON'T CHECK FOR BAD INTERRUPTS    TEST WILL.
        000001                          IOKSTP=BIT0     ; EXPECT "STOP" INTERRUPT.
                                ;
                                ;INTERRUPT MASK -- SAYS EXPECTING INTERRUPTS
016134     000                  INTMASK:        .BYTE   0
                                ;INTERRUPT FLAG -- SAYS WE GOT ONE (IF POSITIVE)
016135     000                  INTFLAG:        .BYTE   0

                                ;SAVED INTERRUPT VECTOR:
016136  000000                  INTVEC: .WORD   0
                                ;SAVE CPU PC
016140  000000                  INTCPC: .WORD   0

                                ;SUBROUTINE TO ENABLE INTERRUPTS:
016142  010046                  ENAINT: MOV     R0,-(SP)        ;SAVE R0
016144  013700  002206                  MOV     IVEC,R0         ;GET POINTER TO VECTORS
016150  012720  016206                  MOV     #INTR,(R0)+     ;SET UP INTERRUPT VECTOR
016154  012720  000300                  MOV     #PRI06,(R0)+
016160  012600                          MOV     (SP)+,R0        ;RESTORE R0
016162  011646                          MOV     (SP),-(SP)
016164  012766  000000  000002          MOV     #0,2(SP)        ;SET CPU TO LEVEL 0
016172  000002                          RTI

                                ;SUBROUTINE TO DISABLE INTERRUPTS (RAISE PRIORITY TO LEVEL 6)
016174  011646                  DSBINT: MOV     (SP),-(SP)
016176  012766  000300  000002          MOV     #PRI06,2(SP)
016204  000002                          RTI
```

```
                                                .SBTTL  INTR    - INTERRUPT HANDLERS

016206                                          BGNSRV  INTR            ;DEFINE INTERRUPT ENTRY
016206                          INTR::
016206  012737  000001  002222          MOV     #1,INTRECV      ;SET FLAG TO SHOW INTERRUPT RECEIVED
016214  105037  016135                  CLRB    INTFLAG         ;CLEAR FLAG TO SAY WE GOT INTERRUPT
016220  132737  000001  016134          BITB    #IOKSTP,INTMASK ;EXPECTING STOP INTERRUPT?
016226  001003                          BNE     1$              ;BR IF YES
016230  152737  000001  016135          BISB    #IOKSTP,INTFLAG ;NO. SET THE ERROR FLAG.

                                ;SAVE REGISTERS, MSG BUFFER, ETC.
016236                          1$:
016236                                  ENDSRV
016236                          L10026:
016236  000002                          RTI
```

```
                                        .SBTTL  WAITF   - WAIT FOR SUBSYSTEM READY
                                ;
                                ; SUBROUTINE TO WAIT FOR THE SUBSYSTEM READY FLAG
                                ;
                                ;INPUTS:
                                ;
                                ;       R5      ADDRESS OF FIRST DEVICE REGISTER
                                ;
                                ;OUTPUTS:
                                ;
                                ;       R0      CONTENTS OF LAST TSSR READ
                                ;       CARRY   SET - READY BIT SET
                                ;               CLR - TIMEOUT WAITING FOR READY
                                ;
016240  000401                  WAITF:: BR      1$              ;NOP WHEN SUPER FIXED
016242                                  BREAK                   ; DO A SUPVSR BREAK FIRST.
016242  104422                          TRAP    C$BRK
016244  012746  003000          1$:     MOV     #3000,-(SP)     ;300 MSEC TIMER
016250  016500  000002          2$:     MOV     TSSR(R5),R0     ;READ THE TSSR REGISTER
016254  105700                          TSTB    R0              ;TEST FOR READY BIT SET

016256  100420                          BMI     3$              ; EXIT ON STOP FLAG.
016260                                  DELAY   1               ; WAIT 100 USEC
016260  012727  000001                  MOV     #1,(PC)+
016264  000000                          .WORD   0
016266  013727  002116                  MOV     L$DLY,(PC)+
016272  000000                          .WORD   0
016274  005367  177772                  DEC     -6(PC)
016300  001375                          BNE     . 4
016302  005367  177756                  DEC     -22(PC)
016306  001367                          BNE     . 20
016310  005316                          DEC     (SP)            ;REDUCE DELAY COUNT
016312  001356                          BNE     2$              ;RETRY UNTIL TIMER EXPIRES
016314  000241                          CLC                     ; C = 0, CONTROLLER STILL RUNNING...
016316  000401                          BR      4$              ;...OR HUNG UP AFTER 300 MSEC.
016320  000261                  3$:     SEC                     ; C = 1, CONTROLLER IS STOPPED.
016322  005326                  4$:     DEC     (SP)+           ;RESTORE STACK WITHOUT CHANGING CARRY BIT
016324  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
                                ;
                                ;-

016326                          CHKTSSR:
016326  004737  016240                  JSR     PC,WAITF                ;WAIT FOR READY
016332  103014                          BCC     20$                     ;BRANCH IF TIME OUT
016334  004737  016034                  JSR     PC,CHKAMB               ;TSSR AMBIGOUS?
016340  103006                          BCC     10$                     ;BR IF YES
016342  032700  100000                  BIT     #SC,R0                  ;SPECIAL CONDITION SET?
016346  001405                          BEQ     15$                     ;BR IF NO
016350  032700  074000                  BIT     #<SCE!BIE!RMR!NXM>,R0   ;ANY ERROR BITS SET?
016354  001402                          BEQ     15$                     ;BR IF NO
016356  000241                  10$:    CLC                             ;SET FAILURE
016360  000401                          BR      20$                     ;
016362  000261                  15$:    SEC                             ;SET SUCCESS
016364  000207                  20$:    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.
                                ;
016366  012737  016420  000004  XNXM:   MOV     #2$,@#4         ; SET BUSERR VECTOR.
016374  012737  000200  000006          MOV     #PRI04,@#6
016402  005003                          CLR     R3              ;FLAG.
016404  005711                  1$:     TST     (R1)            ;TEST THE ADDRESS(ES).
                                                                ;IF ANY TRAP, CONTINUE AT 2$.
016406  020102                          CMP     R1,R2           ;OTHERWISE, CONTINUE HERE.
016410  001407                          BEQ     3$              ;BR IF FINISHED (NO NEXM'S).
016412  062701  000002                  ADD     #2,R1           ;SET NEXT ADDRESS...
016416  000772                          BR      1$              ;...AND CONTINUE.

016420  005103                  2$:     COM     R3              ;GOT ONE, SET FLAG...
016422  012716  016430                  MOV     #3$,(SP)
016426  000002                          RTI                     ;...AND DISMISS INTERRUPT...
016430                          3$:     CLRVEC  #4              ;...AND GIVE BACK THE VECTOR.
        016430  012700  000004          MOV     #4,R0
        016434  104436                  TRAP    C$CVEC
016436  005703                          TST     R3              ;DID WE CATCH ONE ??
016440  001401                          BEQ     .+4             ;NO, "C" = 0, SKIP NEXT.
016442  000261                          SEC                     ;YES, "C" = 1, (R1) = NEXM ADDR.
016444  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
                                ;
016446                          TSTLOOP::
016446  005737  002166                  TST     NOITS           ; ITERATIONS INHIBITED?
016452  001006                          BNE     1$              ; YES.
016454  005737  002202                  TST     QVP             ; NO.
016460  100403                          BMI     1$              ;LOOPS DISALLOWED IN QUICK PASS.
016462  005337  002214                  DEC     LOOPCNT         ; BUMP LOOP COUNTER.
016466  001002                          BNE     2$
016470  000241                  1$:     CLC                     ;LOOP DISALLOWED, OR DONE.
016472  000401                          BR      3$
016474  000261                  2$:     SEC                     ;LOOP ENABLED.
016476  000207                  3$:     RTS     PC
```

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

016500                          TSTSETUP::
016500  010046                          MOV     R0,-(SP)        ;SAVE THE TEST ID MESSAGE
016502  005037  003150                  CLR     SIFLAG          ; CLEAR "SOFT INIT" FLAG
016506  005037  016746                  CLR     ERRK            ; CLEAR LOCAL ERROR COUNTER.
016512  005037  005766                  CLR     EXTA            ; CLEAR ERROR EXTENSION FLAG.
016516  105037  016134                  CLRB    INTMASK         ; CLEAR INTERRUPT MASK (CHECK ERROR)
016522  013700  002200                  MOV     UNITN,R0        ; GET THE UNIT NUMBER.
016526  006300                          ASL     R0              ; ... AND MAKE IT A WORD OFFSET.
016530  005737  003110                  TST     NODEV           ; DID STARTUP FIND THE DEVICE?
016534  001430                          BEQ     4$              ; BR IF YES
016536  100010                          BPL     3$              ; BR IF NOT IDLE
016540  052760  160000  003172          BIS     #160000,ERTABL(R0) ; FLAG ERROR IN THE ERROR TABLE
016546                                  ERRDF   1,NXR,NXRERR    ; NO DEVICE HERE -- PRINT IT
016546  104455                          TRAP    C$ERDF
016550  000001                          .WORD   1
016552  003734                          .WORD   NXR
016554  005732                          .WORD   NXRERR
016556  000407                          BR      2$
016560  052760  160001  003172  3$:     BIS     #160001,ERTABL(R0)      ; FLAG ERROR IN THE ERROR TABLE
016566                                  ERRDF   2,NOINIT        ; DEVICE NOT IDLE
016566  104455                          TRAP    C$ERDF
016570  000002                          .WORD   2
016572  004331                          .WORD   NOINIT
016574  000000                          .WORD   0
016576  012737  177777  003106  2$:     MOV     #-1,DUFLG       ; DROP THE UNIT
016604                                  DODU    UNITN
016604  013700  002200                  MOV     UNITN,R0
016610  104451                          TRAP    C$DODU
016612                                  DOCLN                   ; ABORT THE PASS
```

```
        016612  104444                          TRAP    C$DCLN
  2373  016614  000423                          BR      5$
  2374
  2375  016616                          4$:     RFLAGS  R0              ; GET THE OPERATOR FLAGS.
        016616  104421                          TRAP    C$RFLA
  2376  016620  032700  001000                  BIT     #PNT,R0         ; PRINT THE TEST NUMBERS?
  2377  016624  001412                          BEQ     1$              ; BR IF NO
  2378  016626  011600                          MOV     (SP),R0         ;GET THE ID MESSAGE
  2379  016630                                  PRINTF  #TNAM,R0                ;DISPLAY THE TEST ID
        016630  010046                          MOV     R0,-(SP)
        016632  012746  016674                  MOV     #TNAM,-(SP)
        016636  012746  000002                  MOV     #2,-(SP)
        016642  010600                          MOV     SP,R0
        016644  104417                          TRAP    C$PNTF
        016646  062706  000006                  ADD     #6,SP
  2380  016652  005237  002212          1$:     INC     TSTCNT          ; BUMP TEST COUNTER.
  2381  016656                                  SETPRI  IPRI            ;PRIORITY THAT OF DEVICE
        016656  013700  002210                  MOV     IPRI,R0
        016662  104441                          TRAP    C$SPRI
  2382  016664  005726                  5$:     TST     (SP)+           ;FIX UP THE STACK
  2383  016666  013705  002204                  MOV     CSRADDR,R5      ; ADDRESS OF TSV REGISTERS ON UNIBUS
  2384  016672  000207                          RTS     PC
  2385  016674     045     123     045  TNAM:  .ASCIZ  '#S#T#A Test'
  2386                                          .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).
                                ;
016710                          TSTEND: RFLAGS  R0
016710  104421                          TRAP    C$RFLA
016712  030027  020000                  BIT     R0,#IER
016716  001412                          BEQ     1$              ; BR IF "IER" NOT SET.
016720                                  PRINTF  #ESUM,ERRK      ; PRINT ERROR COUNT.
016720  013746  016746                  MOV     ERRK,-(SP)
016724  012746  016750                  MOV     #ESUM,-(SP)
016730  012746  000002                  MOV     #2,-(SP)
016734  010600                          MOV     SP,R0
016736  104417                          TRAP    C$PNTF
016740  062706  000006                  ADD     #6,SP
016744  000207                  1$:     RTS     PC

016746  000000                  ERRK:   0                       ; LOCAL ERROR COUNT.
016750     045     101     040  ESUM:   .ASCIZ  /%A %D%A ERRORS/
016767     105     122     122  EMAXDU: .ASCIZ  /ERROR LIMIT REACHED -- DROPPING UNIT/
                                        .EVEN

                                        .SBTTL  INCERK  - INCREMENT LOCAL ERROR COUNT
                                ;+
                                ; ROUTINES TO INCREMENT LOCAL ERROR COUNT AND CHECK FOR LIMIT:
                                ;-
017034  005237  016746          INCERK: INC     ERRK            ; INCREMENT LOCAL ERROR COUNT
017040  010046                          MOV     R0,-(SP)        ; SAVE R0
017042  013700  002200                  MOV     UNITN,R0        ; GET UNIT NUMBER.
017046  006300                          ASL     R0              ; ... AND MAKE IT A WORD OFFSET.
017050  062700  003172                  ADD     #ERTABL,R0      ; R0 GETS ADDRESS OF ERROR TABLE ENTRY.
017054  005210                          INC     (R0)            ; INCREMENT THE DEVICE ERROR COUNT
017056  032710  007777                  BIT     #7777,(R0)      ; DID WE OVERFLOW THE FIELD?
017062  001001                          BNE     1$              ; BR IF NO.
017064  005310                          DEC     (R0)            ; YES -- BACK IT UP TO 7777.
017066  012600                  1$:     MOV     (SP)+,R0        ; RESTORE R0
017070  000207                          RTS     PC              ; RETURN TO CALLER.

017072  010046                  CKEMAX: MOV     R0,-(SP)        ; SAVE R0
017074  013700  002200                  MOV     UNITN,R0        ; GET UNIT NUMBER
017100  006300                          ASL     R0              ; ... AND MAKE IT A WORD OFFSET
017102  016000  003172                  MOV     ERTABL(R0),R0   ; GET ERROR TABLE ENTRY
017106  042700  170000                  BIC     #170000,R0      ; EXTRACT ERROR COUNT FIELD
017112  020037  002172                  CMP     R0,GERRMAX      ; IS GLOBAL LIMIT EXCEEDED FOR THIS UNIT?
017116  103004                          BHIS    1$              ; BR IF YES
017120  023737  016746  002170          CMP     ERRK,LERRMAX    ; IS LOCAL LIMIT EXCEEDED FOR THIS TEST?
017126  103417                          BLO     2$              ; BR IF NO
017130                          1$:     RFLAGS  R0              ; GET OPERATOR FLAGS
017130  104421                          TRAP    C$RFLA
017132  032700  000040                  BIT     #IDU,R0         ; IS DROPPING INHIBITED?
017136  001013                          BNE     2$              ; BR IF YES.
017140  012737  177777  003106          MOV     #-1,DUFLG       ; NO -- DROP THE UNIT
017146                                  ERRDF   4,EMAXDU
017146  104455                          TRAP    C$ERDF
017150  000004                          .WORD   4
017152  016767                          .WORD   EMAXDU
```

INCERK - INCREMENT LOCAL ERROR COUNT

```
        017154  000000                          .WORD   0
   2434 017156                                  DODU    UNITN
        017156  013700  002200                  MOV     UNITN,R0
        017162  104451                          TRAP    C$DODU
   2435 017164                                  DOCLN
        017164  104444                          TRAP    C$DCLN
   2436 017166  012600                  2$:     MOV     (SP)+,R0        ; RESTORE R0
   2437 017170  000207                          RTS     PC              ; RETURN TO CALLER
   2438
```

```
                                        .SBTTL  CKDROP    CHECK IF UNIT SHOULD BE DROPPED
                                ;+
                                ; CHECK IF UNIT SHOULD BE DROPPED
                                ;-
017172  010046                  CKDROP: MOV     R0,-(SP)
017174                                  FORCERROR       1$,NOTSSR
017204                                  RFLAGS  R0
017204  104421                          TRAP    C$RFLA
017206  032700  000040                  BIT     #IDU,R0
017212  001010                          BNE     1$
017214  011600                          MOV     (SP),R0
017216  012737  177777  003106          MOV     #-1,DUFLG
017224                                  DODU    UNITN
017224  013700  002200                  MOV     UNITN,R0
017230  104451                          TRAP    C$DODU
017232                                  DOCLN                   ;ABORT THE PASS
017232  104444                          TRAP    C$DCLN
017234  012600                  1$:     MOV     (SP)+,R0
017236  000207                          RTS     PC


                                        .SBTTL  CONFIG    DETERMINE CONFIGURATION OF SYSTEM
                                ;
                                ; SUBROUTINE - DETERMINE CONFIGURATION OF TSV05 SYSTEM.
                                ;
017240                          CONFIG:
017240  004737  015764                  JSR     PC,SOFINIT
017244  000207                          RTS     PC
```

```
                                                .SBTTL  KTON,KTOFF        ENABLE/DISABLE MEMORY MANAGEMENT
                                        ;
                                        ; SUBROUTINE - ENABLE MEM MGT.
                                        ;
017246  005737  003126                  KTON:   TST     KTFLG           ; GOT KT?
017252  001403                                  BEQ     1$              ; NO.
017254  012737  000001  177572                  MOV     #1,SR0          ; YES. ENABLE KT11.
017262  000207                          1$:     RTS     PC


                                        ;
                                        ; SUBROUTINE - DISABLE MEM MGT.
                                        ;
017264  005737  003126                  KTOFF:  TST     KTFLG           ; GOT KT11?
017270  001405                                  BEQ     1$              ; NO.
017272  000240                                  NOP
017274  000240                                  NOP
017276  012737  000000  177572                  MOV     #0,SR0          ; DISABLE KT.
017304  000207                          1$:     RTS     PC
```

```
                                        .SBTTL  SETMAP  - SETUP PAR6 MAPPING

                                ;+
                                ;
                                ;THIS ROUTINE SETS UP KERNEL PAR6 TP HANDLE
                                ;AN 18 BIT ADDRESS. THE OFFSET INTO THE PAGE
                                ;IS RETURNED BIASED TO PAR6.
                                ;
                                ;INPUTS:
                                ;
                                ;       R0      HIGH ORDER ADDRESS BITS
                                ;       R1      LOW ORDER ADDRESS BITS
                                ;
                                ;OUTPUTS:
                                ;
                                ;       R0      OFFSET INTO BLOCK WITH PAR6 BIAS (I.E. THE ADDRESS)
                                ;       CARRY   SET IF SUCCESS
                                ;               CLR IF ERROR
                                ;-
017306                          SETMAP:
017306                                  SAVREG                          ;SAVE R1-R4 UNTIL NEXT RETURN
017312  005737  003126                  TST     KTFLG                   ;SYSTEM HAVE ABOVE 28K?
017316  001433                          BEQ     10$                     ;BR IF NO
017320  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
017352  042701  000177                  BIC     #177,R1                 ;ALINE FOR LOWER 4K BOUNDARY
017356  020137  003126                  CMP     R1,KTFLG                ;HIGHER THAN EXISTING MEMORY?
017362  103011                          BHIS    10$                     ;BR IF YES
017364  010137  172354                  MOV     R1,@#KIPAR6             ;SETUP MAPPING REGISTER PAR6
017370  042702  160000                  BIC     #160000,R2              ;SETUP DISPLACEMENT IN PAGE
017374  062702  140000                  ADD     #140000,R2              ;ADD IN PAR6 BIAS
017400  010200                          MOV     R2,R0                   ;RETURN IN R0
017402  000261                          SEC                             ;SET SUCCESS
017404  000401                          BR      15$                     ;
017406  000241                  10$:    CLC                             ;SET FAILURE
017410  000207                  15$:    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
                                ;-
017412                          FILLMEM:
017412                                  SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
017416  004737  017264                  JSR     PC,KTOFF                ;DISABLE KT.
017422  010003                          MOV     R0,R3                   ;COPY TEST PATTERN
017424  013701  003120                  MOV     FREE,R1                 ;GET FIRST FREF LOCATION
017430  013702  003122                  MOV     FRESIZ,R2               ;SIZE OF FREE SPACE BELOW 28K.
017434  010321                  10$:    MOV     R3,(R1)+                ;STORE A BACKGROUND WORD
017436  005302                          DEC     R2                      ;DONE ALL MEMORY IN FREE SPACE?
017440  003375                          BGT     10$                     ;BR IF NO
017442  005737  003126                  TST     KTFLG                   ; GOT KT?
017446  001477                          BEQ     55$                     ; NO. GET OUT.
017450  004737  017246                  JSR     PC,KTON                 ; YES. ENABLE KT.
017454  005000                          CLR     R0                      ;HIGH ORDER ADDRESS START
017456  013701  003146                  MOV     PST32W,R1               ;GET >28K START ADDRESS (IN 32W BLOCKS)
        000006                          .REPT   6
                                        CLC                             ;CLEAR C BIT
                                        ROL     R1                      ;CONVERT BLOCKS TO WORDS
                                        ROL     R0                      ;MAKE IT DOUBLE PRECISION
                                        .ENDR
017526  004737  017306                  JSR     PC,SETMAP               ;SETUP PAR6 MAPPING REGISTER
017532  010320                  30$:    MOV     R3,(R0)+                ;STORE TEST PATTERN IN >28K ADDRESS
017534  020027  160000                  CMP     R0,#160000              ;END OF PAR6 MAPPING AREA?
017540  103774                          BLO     30$                     ;BR IF NO
017542  162700  020000                  SUB     #20000,R0               ;BACKUP INTO PAR6 MAPPING BEGIN
017546  062737  000200  172354          ADD     #200,@#KIPAR6           ;POINT TO NEXT 4K BLOCK >28K.
017554  023737  172354  003126          CMP     @#KIPAR6,KTFLG          ;END OF MEMORY?
017562  001427                          BEQ     50$                     ;BR IF YES
017564  005737  003140                  TST     T23A                    ;11/23A?
017570  001407                          BEQ     35$                     ;NO KEEP GOING
017572  013704  177572                  MOV     SR0,R4                  ;GET SR0 CONTENTS
017576  042704  177761                  BIC     #177761,R4              ;CLEAR ALL BUT PAGE NUMBER
017602  022704  000016                  CMP     #16,R4                  ;SEE IF PAGE 7
017606  001415                          BEQ     50$                     ;EXIT IF THERE
017610  005737  003142          35$:    TST     T23B                    ;11/23B?
017614  001410                          BEQ     45$                     ;NO KEEP GOING
017616  023727  172354  007600          CMP     @#KIPAR6,#7600          ;REACHED 18 BITS?
017624  103001                          BHIS    40$                     ;YES
017626  000403                          BR      45$                     ;NO KEEP GOING
017630  012737  000020  172516  40$:    MOV     #20,SR3                 ;SET 22 BIT RELOCATION
017636  000137  017532          45$:    JMP     30$                     ;KEEP GOING ON ETC.
017642  004737  017264          50$:    JSR     PC,KTOFF                ; DISABLE KT.
017646  000207                  55$:    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
                                ;-
017650                          CMPMEM:
017650                                  SAVREG                  ;SAVE R1-R5 UNTIL NEXT RETURN
017654  010003                          MOV     R0,R3           ;COPY TEST PATTERN
017656  004737  017264                  JSR     PC,KTOFF        ;DISABLE KT.
017662  013701  003120                  MOV     FREE,R1         ;GET FIRST FREE LOCATION
017666  013702  003122                  MOV     FRESIZ,R2       ;SIZE OF FREE SPACE BELOW 28K.
017672  020311                  10$:    CMP     R3,(R1)         ;FREE SPACE LOCATION EQUAL TO EXPD?
017674  001411                          BEQ     15$             ;BR IF YES
017676  010137  002236                  MOV     R1,ERRLO        ;SAVE ADDRESS IN ERROR
017702  005037  002234                  CLR     ERRHI           ;NO HIGH ADDRESS
017706  010337  002230                  MOV     R3,EXPD         ;SAVE EXPD FOR ERROR REPORT
017712  011137  002232                  MOV     (R1),RECV       ;SAVE RECV FOR ERROR REPORT
017716  000474                          BR      50$             ;
017720  005721                  15$:    TST     (R1)+           ;POINT TO NEXT ADDRESS
017722  005302                          DEC     R2              ;DONE ALL MEMORY IN FREE SPACE?
017724  003362                          BGT     10$             ;BR IF NO
017726  005737  003126                  TST     KTFLG           ; GOT KT?
017732  001472                          BEQ     55$             ; NO. GET OUT.
017734  004737  017246                  JSR     PC,KTON         ; YES. ENABLE KT.
017740  005000                          CLR     R0              ;HIGH ORDER ADDRESS START
017742  013701  003146                  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
017776  042701  000177                  BIC     #177,R1         ;ALINE 4K BOUNDARY
020002  010046                          MOV     R0,-(SP)        ;SAVE HIGH ORDER
020004  010146                          MOV     R1,-(SP)        ;SAVE LOW ORDER
020006  004737  017306                  JSR     PC,SETMAP       ;SETUP PAR6 MAPPING REGISTER
020012  010004                          MOV     R0,R4           ;COPY ADDRESS BIASED TO PAR6
020014  012601                          MOV     (SP)+,R1        ;RESTORE LOW ORDER IN NON PAR6 FORMAT
020016  012600                          MOV     (SP)+,R0        ;RESTORE HIGH ORDER IN NON PAR6 FORMAT
020020  020314                  30$:    CMP     R3,(R4)         ;ABOVE 28K LOCATION EQUAL EXPD?
020022  001411                          BEQ     32$             ;BR IF YES
020024  010037  002234                  MOV     R0,ERRHI        ;SAVE HIGH ORDER IN ERROR
```

CMPMEM - COMPARE MEMORY TO BACKGROUND PATTERN

```
020030  010137  002236                  MOV     R1,ERRLO          ;SAVE LOW ORDER IN ERROR
020034  010337  002230                  MOV     R3,EXPD           ;SAVE EXPD FOR ERROR REPORT
020040  011437  002232                  MOV     (R4),RECV         ;SAVE RECV FOR ERROR REPORT
020044  000421                          BR      50$               ;
020046  062701  000002          32$:    ADD     #2,R1             ;UPDATE NON PAR6 ADDRESS
020052  005500                          ADC     R0                ;MAKE IT DOUBLE PRECISION ADD
020054  062704  000002                  ADD     #2,R4             ;UPDATE PAR FORMAT ADDRESS
020060  020427  160000                  CMP     R4,#160000        ;END OF PAR6 MAPPING AREA?
020064  103755                          BLO     30$               ;BR IF NO
020066  162704  020000                  SUB     #20000,R4         ;BACKUP INTO PAR6 MAPPING BEGIN
020072  062737  000200  172354          ADD     #200,@#KIPAR6     ;POINT TO NEXT 4K BLOCK >28K.
020100  023737  172354  003126          CMP     @#KIPAR6,KTFLG    ;END OF MEMORY?
020106  101744                          BLOS    30$               ;BR IF NO
020110  004737  017264          50$:    JSR     PC,KTOFF          ;TURN OFF MEMORY MAPPING
020114  000241                          CLC                       ;SET FAILURE
020116  000403                          BR      60$               ;
020120  004737  017264          55$:    JSR     PC,KTOFF          ;TURN OFF MEMORY MAPPING
020124  000261                          SEC                       ;SET SUCCESS
020126  000207          60$:            RTS     PC
```

```
                                        .SBTTL  REGSAV  - SAVE R1 R5 ON STACK
                                ;+
                                ;
                                ;ROUTINE TO
                                ;SAVE R1 THROUGH R5 ON THE STACK
                                ;
                                ;CALLING SEQUENCE:
                                ;
                                ;       JSR     R5,REGSAV
                                ;
                                ;THIS IS A COOROUTINE WHICH TRANSFER CONTROL BACK TO
                                ;THE CALLING ROUTINE. AT THE END OF THE CALLING ROUTINE,
                                ;THE RTS PC RETURNS CONTROL TO THIS ROUTINE TO RESTORE
                                ;REGISTERS.
                                ;
                                ;THIS ROUTINE SHOULD ONLY BE CALLED FROM ROUTINES WHICH ARE
                                ;CALLED VIA A JSR PC INSTRUCTION
                                ;
                                ;

020130                          REGSAV:
020130  010446                          MOV     R4,-(SP)
020132  010346                          MOV     R3,-(SP)
020134  010246                          MOV     R2,-(SP)
020136  010146                          MOV     R1,-(SP)
020140  010546                          MOV     R5,-(SP)
020142  016605  000012                  MOV     10.(SP),R5
020146  004736                          JSR     PC,@(SP)+
020150  012601                          MOV     (SP)+,R1
020152  012602                          MOV     (SP)+,R2
020154  012603                          MOV     (SP)+,R3
020156  012604                          MOV     (SP)+,R4
020160  012605                          MOV     (SP)+,R5
020162  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
                                ;
                                ;-
                                GETPAT::
020164                                  SAVREG                          ;SAVE THE GENERAL REGISTERS
020164                          1$:     GMANID  DATASC,PATDAT,0,377,0,377,NO
020170  104443                          TRAP    C$GMAN
020172  000406                          BR      10000$
020174  020220                          .WORD   PATDAT
020176  000022                          .WORD   T$CODE
020200  020222                          .WORD   DATASC
020202  000377                          .WORD   377
020204  000000                          .WORD   T$LOLIM
020206  000377                          .WORD   T$HILIM
020210                          10000$:
020210                                  BNCOMPLETE      1$              ;RETRY IF ERROR
020210  103367                          BCC     1$
020212  013700  020220                  MOV     PATDAT,R0               ;DATA PATTERN FROM OPERATOR
020216  000207                          RTS     PC                      ;RETURN TO CALLER

                                ;+
                                ;LOCAL DATA AREA
                                ;-

020220  000000                  PATDAT: .WORD   0                       ;TEMPORARY STORAGE FOR DATA
020222     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
                                ;
                                ;-

020246                          GETSEL::
020246                                  SAVREG                          ;SAVE GENERAL REGISTERS
020252  010002                          MOV     R0,R2                   ;SAVE THE MENU ADDRESS
020254  010203                  1$:     MOV     R2,R3                   ;START OF MENU STRING
020256  005713                  2$:     TST     (R3)                    ;END OF ASCII ?
020260  001412                          BEQ     3$                      ;BRANCH IF ALL LINES DISPLAYED
020262                                  PRINTF  #SELASC,(R3)+           ;DISPLAY THE MENU
020262  012346                          MOV     (R3)+,-(SP)
020264  012746  020432                  MOV     #SELASC,-(SP)
020270  012746  000002                  MOV     #2,-(SP)
020274  010600                          MOV     SP,R0
020276  104417                          TRAP    C$PNTF
020300  062706  000006                  ADD     #6,SP
020304  000764                          BR      2$
020306                          3$:     GMANID  MENASC,MENRES,D,-1,0, 1,NO
020306  104443                          TRAP    C$GMAN
020310  000406                          BR      10001$
020312  020466                          .WORD   MENRES
020314  000042                          .WORD   T$CODE
020316  020437                          .WORD   MENASC
020320  177777                          .WORD   -1
020322  000000                          .WORD   T$LOLIM
020324  177777                          .WORD   T$HILIM
020326                          10001$:
020326                                  BNCOMPLETE      1$              ;RETRY IF ERROR
020326  103352                          BCC     1$
020330  013700  020466                  MOV     MENRES,R0               ;GET THE OPERATOR'S REPLY
020334  020001                          CMP     R0,R1                   ;COMPARE TO MAXIMUM ALLOWED
020336  101411                          BLOS    5$                      ;BRANCH IF OK
020340                                  PRINTF  #MENERR                 ;DISPLAY ERROR MESSAGE
020340  012746  020364                  MOV     #MENERR,-(SP)
020344  012746  000001                  MOV     #1,-(SP)
020350  010600                          MOV     SP,R0
020352  104417                          TRAP    C$PNTF
020354  062706  000004                  ADD     #4,SP
020360  000735                          BR      1$                      ;RETRY
020362  000207                  5$:     RTS     PC                      ;RETURN TO CALLER
020364     045     116     045  MENERR: .ASCIZ  '<N><A *** Menu Selection Too Large ***'
020432     045     116     045  SELASC: .ASCIZ  '<N><T'
020437     105     156     164  MENASC: .ASCIZ  'Enter Menu Selection: '
```

```
                                        .EVEN
020466  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.
                                ;
                                ;-

020470                          CHKMAN::
020470                                  SAVREG                          ;SAVE THE REGISTERS
020474                                  MANUAL                          ;SEE IF MANUAL INTERVENTION OK
020474  104450                          TRAP    C$MANI
020476                                  BCOMPLETE 1$                    ;BRANCH IF ALLOWED
020476  103411                          BCS     1$
020500                                  PRINTF  #NOMAN                  ;PRINT THE WARNING MESSAGE
020500  012746  020524                  MOV     #NOMAN,-(SP)
020504  012746  000001                  MOV     #1,-(SP)
020510  010600                          MOV     SP,R0
020512  104417                          TRAP    C$PNTF
020514  062706  000004                  ADD     #4,SP
020520  000241                          CLC                             ;CLEAR CARRY FOR ERROR
020522  000207                  1$:     RTS     PC                      ;RETURN

020524     045     116     045  NOMAN:  .ASCIZ  '%N%A *** Manual Intervent'on not Allowed - Test Aborted ***'
                                        .even
```

```
                                        .SBTTL  ENVIRN  - SETUP FREE DIAGNOSTIC SPACE
                                ;
                                ; SUBROUTINE TO SET-UP VARIOUS ENVIRONMENTAL PARAMETERS.
                                ;
020620                          ENVIRN: MEMORY  R0
020620  104431                          TRAP    C$MEM
020622  010037  003120                  MOV     R0,FREE         ; GET 1ST FREE ADDRESS...
020626  062737  000002  003120          ADD     #2,FREE
020634  011037  003122                  MOV     (R0),FRESIZ     ;...AND WORD COUNT.
020640  162737  000004  003122          SUB     #4,FRESIZ
020646  013702  002012                  MOV     L$UNIT,R2       ; GET NUMBER OF UNITS
020652  162737  000007  003122  10$:    SUB     #7,FRESIZ       ; TAKE AWAY 7 WORDS PER UNIT
020660  005302                          DEC     R2
020662  001373                          BNE     10$
020664  013700  003120                  MOV     FREE,R0         ;GET FIRST FREE ADDRESS
020670  063700  003122                  ADD     FRESIZ,R0       ;POINT TO LAST FREE ADDRESS
020674  162700  000002                  SUB     #2,R0           ;BACKUP 1 WORD
020700  010037  003124                  MOV     R0,FREEHI       ;STORE LAST FREE ADDRESS
020704  000240                          NOP                     ;*****************************************
020706  012701  177520                  MOV     #BDVPCR,R1      ;GET BDV11 PCR ADDRESS
020712  010102                          MOV     R1,R2           ;COPY TO R2
020714  062702  000002                  ADD     #2,R2           ;SET THE RANGE
020720  004737  016366                  JSR     PC,XNXM         ;SEE IF WE HAVE ONE
020724  103001                          BCC     15$             ;OK TO SET FLAGS
020726  000445                          BR      40$             ;RETURN WITH FLAGS CLEAR
020730  013701  177520          15$:    MOV     BDVPCR,R1       ;SAVE PCR CONTENTS
020734  062701  000001                  ADD     #1,R1           ;ADD ONE TO IT
020740  012702  177520                  MOV     #BDVPCR,R2      ;GET BDV11 PCR ADDRESS
020744  005212                          INC     (R2)            ;TRY TO WRITE TO IT
020746  013703  177520                  MOV     BDVPCR,R3       ;GET RESULTS
020752  020103                          CMP     R1,R3           ;DID IT CHANGE?
020754  001017                          BNE     20$             ;NO, MUST BE 11/23B
020756  005237  003140                  INC     T23A            ;SET THE FLAG
020762  042737  170000  002120          BIC     #170000,L$HIME  ;SUPERVISOR COULD BE WRONG
020770  000240                          NOP                     ;BR 40$ FOR RELEASE
020772                                  PRINTF  #M8186          ;TELL THE SYSTEM TYPE
020772  012746  005550                  MOV     #M8186,-(SP)
020776  012746  000001                  MOV     #1,-(SP)
021002  010600                          MOV     SP,R0
021004  104417                          TRAP    C$PNTF
021006  062706  000004                  ADD     #4,SP
021012  000413                          BR      40$             ;RETURN
021014  005237  003142          20$:    INC     T23B            ;SET THE FLAG
021020  000240                          NOP                     ;BR 40$ FOR RELEASE
021022                                  PRINTF  #M8189          ;TELL THE SYSTEM TYPE
021022  012746  005641                  MOV     #M8189,-(SP)
021026  012746  000001                  MOV     #1,-(SP)
021032  010600                          MOV     SP,R0
021034  104417                          TRAP    C$PNTF
021036  062706  000004                  ADD     #4,SP
021042  000207                  40$:    RTS     PC              ;RETURN
```

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

021044                                  KTINIT:
021044  005037  003126                          CLR     KTFLG           ; INIT >28K MEMORY FLAG
021050  005037  003130                          CLR     KTENABLE        ; INIT TEST >28K FLAG
021054  023727  002120  001577                  CMP     L$HIME,#1577    ; GOT ENOUGH MEMORY (>28K)?
021062  101444                                  BLOS    9$              ; NO.
021064  013700  000004                          MOV     @#ERRVEC,R0     ; SAVE OLD ERR VEC PTR.
021070  012737  021162  000004                  MOV     #2$,@#ERRVEC    ; SET ERR VEC PTR.
021076  005737  177572                          TST     @#SR0           ; GOT KT11?
021102  000240                                  NOP                     ;  (TRAP IF NO).
021104  013737  002120  003126                  MOV     L$HIME,KTFLG    ; YES. SET KT FLAG.
021112  042737  000177  003126                  BIC     #177,KTFLG      ;
021120  010037  000004                          MOV     R0,@#ERRVEC     ; RESTORE OLD ERR VEC PTR.
021124  005000                                  CLR     R0              ; R0 = AR DATA.
021126  012701  172340                          MOV     #KIPAR0,R1      ; R1 = KI REGS PTR.
021132  012761  077406  177740          1$:     MOV     #77406,-40(R1)  ; SET DESCRIPTOR REG.
021140  010021                                  MOV     R0,(R1)+        ; SET KIPAR REG.
021142  062700  000200                          ADD     #200,R0         ; BUMP AR DATA BY "4K".
021146  020027  002000                          CMP     R0,#2000        ; AT "I/O"?
021152  001367                                  BNE     1$              ; NO.
021154  012741  177600                          MOV     #177600,-(R1)   ; YES. SET KTPAR7 FOR I/O.
021160  000405                                  BR      9$

021162  012716  021170          2$:             MOV     #6$,(SP)        ; SET UP RETURN
021166  000002                                  RTI                     ; RTI TO NEXT LOCATION

021170  010037  000004          6$:             MOV     R0,@#ERRVEC     ; RESTORE OLD ERR VEC PTR.

021174  000207                  9$:             RTS     PC
```

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

021176                                  INVERT::

021176  005737  002224                          TST     EXTFEA                  ; IS SWITCH SET?
021202  001020                                  BNE     1$                      ; YES,EXIT STAGE RIGHT!(or the next one outa town!)
021204  012737  100206  021250                  MOV     #100206,CMDPKT          ; WRT SUB-SYS MEM CMD
021212  012737  021260  021252                  MOV     #WSMBK,CMDPKT+2         ; MSG BUF ADDR
021220  012737  000006  021256                  MOV     #6,CMDPKT+6             ; BYTE COUNT
021226  012737  100010  021260                  MOV     #100010,WSMBK           ; INVERT THE SWITCH
021234  012704  021250                          MOV     #CMDPKT,R4              ; SET CMDPKT INTO R4
021240  004737  010652                          JSR     PC,WRTCHR               ; DO IT
021244  000207                          1$:     RTS     PC                      ; RETURN


                                        ;       COMMAND PACKET.

        021250                          .       =       <.+3>&177774    ;MUST BE ON MOD 4 BOUNDRY.

021250  000000                          CMDPKT:: 0                      ;1ST WORD IS TSO5 COMMAND.
021252  000000                                   0                      ;2ND WORD IS THE BUFFER LOW ADDRESS.
021254  000000                                   0                      ;3RD WORD IS THE BUFFER HIGH ADDRESS.
021256  000000                                   0                      ;4TH WORD IS THE BYTE/RECORD/FILE COUNT.


                                        ;       WRITE SUB-SYSTEM MEMORY CHARACTERISTIC BLOCK.

021260  000000                          WSMBK:: 0                       ;1ST WORD:: SEL 0
021262  000000                                  0                       ;2ND WORD:: SEL 2
021264  000000                                  0                       ;3RD WORD:: SEL 4
                                                .EVEN
```

```
                                        ;*
                                        ;       SUBROUTINE TO CHECK WETHER OR NOT WE'LL TEST NXM
                                        ;
                                        ;
                                        ;INPUTS:
                                        ;OUTPUTS:
                                        ;       The NXMFLG is set if we can test.
                                        ;       The NXMLO and NXMHI addresses are setup.
                                        ;-

021266                                  MEMCK::

021266                                          SAVREG                          ;SAVE THE REGISTERS
021272  005037  003132                          CLR     NXMFLG                  ;CLEAR THE FLAG
021276  005037  003134                          CLR     NXMLO                   ;CLEAR THE TEST ADDRESS LO
021302  005037  003136                          CLR     NXMHI                   ;CLEAR THE TEST ADDRESS HI
021306  005737  003142                          TST     T23B                    ;IS IT A 11/23B?
021312  001407                                  BEQ     1$                      ;NO
021314  023727  002120  007777                  CMP     L$HIME,#7777            ; GREATER THAN 128K
021322  103406                                  BLO     2$                      ; NO
021324  004737  021442                          JSR     PC,NXMTST               ;SETUP THE ADDRESS
021330  000427                                  BR      13$                     ;SET THE FLAG AND EXIT
021332  005737  003140                  1$:     TST     T23A                    ;IS IT A 11/23A?
021336  001413                                  BEQ     4$                      ;NO
021340  023727  002120  005777          2$:     CMP     L$HIME,#5777            ;GREATER THAN 96K
021346  101023                                  BHI     14$                     ;YES,23A/23B WITH 128K MEMORY
021350  023727  002120  003777                  CMP     L$HIME,#3777            ;GREATER THAN 64K BUT LESS THAN 92K?
021356  103403                                  BLO     4$                      ;NO, CHECK 24k
021360  004737  021442                          JSR     PC,NXMTST               ;SETUP THE ADDRESS
021364  000411                                  BR      13$                     ;SET THE FLAG AND EXIT
021366  023727  002120  001577          4$:     CMP     L$HIME,#1577            ;GREATER THAN 24K BUT LESS THAN 64K?
021374  103410                                  BLO     14$                     ;NO, TELL THEM AND EXIT WITH FLAG CLEAR
021376  004737  021442                          JSR     PC,NXMTST               ;SETUP THE ADDRESS
021402  062737  000077  003136                  ADD     #77,NXMHI               ;FOOL THE 11/02 & 11/03
021410  005237  003132                  13$:    INC     NXMFLG                  ;SET THE FLAG
021414  000411                                  BR      15$                     ;EXIT
021416  000410                          14$:    BR      15$                     ;NOP FOR PRINTOUT
021420                                          PRINTF  #NOMEM                  ;TELL THEM & EXIT ***NO PRINT*****
021420  012746  005454                          MOV     #NOMEM,-(SP)
021424  012746  000001                          MOV     #1,-(SP)
021430  010600                                  MOV     SP,R0
021432  104417                                  TRAP    C$PNTF
021434  062706  000004                          ADD     #4,SP
021440  000207                          15$:    RTS     PC                      ;RETURN


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

021442  013701  002120                  NXMTST: MOV     L$HIME,R1               ;GET TOP OF MEMORY
021446  062701  000200                          ADD     #200,R1                 ;MAKE IT I/O BLOCK OR OTHER NXM
021452  042701  000177                          BIC     #177,R1
021456  010102                                  MOV     R1,R2                   ;RESAVE RESULTS
```

```
                000006                          .REPT   6
                                                ASL     R1                      ;PUT IN PLACE FOR XFER
                                                .ENDR
021474          010137  003134                  MOV     R1,NXMLO                ;SAVE TEST ADDRESS LOW
                000012                          .REPT   10.
                                                ASR     R2                      ;PUT IN PLACE FOR XFER
                                                .ENDR
021524          042702  177700                  BIC     #177700,R2              ;DON'T WANT ILA!
021530          010237  003136                  MOV     R2,NXMHI                ;SAVE TEST ADDRESS HIGH
021534          000207                          RTS     PC                      ;RETURN

021536                                          ENDMOD
```

```
                                        .TITLE  TSV4 - MISCELLANEOUS SECTIONS

 021536                                 BGNMOD  TSV4
 021536                         TSV4::
```

```
                                        .SBTTL  PROTECTION TABLE
021536                                  BGNPROT
021536                          L$PROT::
021536  177777  177777  177777          .WORD    1,  1,  1,  1          ;NO DEVICE PROTECTION REQUIRED.
021546                                  ENDPROT
```

```
                                        .SBTTL  INITIALIZE SECTION

                                ;++
                                ;THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
                                ;AT THE BEGINNING OF EACH PASS.
                                ;
                                ;IF "START" OR "RESTART", SET QUICK-PASS FLAG AND BUS INIT.
                                ;IF "CONTINUE", NOTHING IS REQUIRED.
                                ;
                                ;--
                                ;+
                                ;INSERT TEMPORARY JUMP TO ODT
                                ;-
021546                                  BGNINIT
021546                          L$INIT::

021546                                  SETVEC  #140,#170000,#34C       ;ODT ROM ADDRESS                ;JB REV A 0
021546  012746  000340                  MOV     #340,-(SP)
021552  012746  170000                  MOV     #170000,-(SP)
021556  012746  000140                  MOV     #140,-(SP)
021562  012746  000003                  MOV     #3,-(SP)
021566  104437                          TRAP    C$SVEC
021570  062706  000010                  ADD     #10,SP

021574  005037  002224          40$:    CLR     EXTFEA
021600  005037  003132                  CLR     NXMFLG
021604  012737  006354  002176          MOV     #EPRT1,EPRTSW           ;SET UP PRIMARY MESSAGE FOR REPLACEMENT
021612  005037  003150                  CLR     SIFLAG                  ;CLEAR "SOFT INIT" FLAG
021616  005037  003130                  CLR     KTENABLE                ;CLEAR TEST ABOVE 28K FLAG
021622  005037  002300                  CLR     RAMSIZ                  ;CLEAR RAM SIZE FOR RAMERR ROUTINE
021626                                  READEF  #EF.CONTINUE
021626  012700  000036                  MOV     #EF.CONTINUE,R0
021632  104447                          TRAP    C$REFG
021634                                  BNCOMPLETE 1$
021634  103023                          BCC     1$
021636  023737  002200  002012          CMP     UNITN,L$UNIT            ;UNIT IN RANGE?
021644  103070                          BHIS    4$                      ;BR IF NO.
021646  005737  003106                  TST     DUFLG                   ;DROPPED UNIT?
021652  100472                          BMI     NXTU                    ;BR IF YES
021654  013701  002200                  MOV     UNITN,R1
021660  006301                          ASL     R1
021662  005761  003172                  TST     ERTABL(R1)
021666  001516                          BEQ     SETU
021670  032761  040000  003172          BIT     #BIT14,ERTABL(R1)       ;DROPPED?
021676  001060                          BNE     NXTU
021700                                  EXIT    INIT                    ;DO NOTHING IF "CONTINUE".
021700  104432                          TRAP    C$EXIT
021702  000416                          .WORD   L10030-.
021704                          1$:     READEF  #EF.NEW
021704  012700  000035                  MOV     #EF.NEW,R0
021710  104447                          TRAP    C$REFG
021712                                  BNCOMPLETE NXTU                 ;TAKE NEXT UNIT IF NOT NEW PASS.
021712  103052                          BCC     NXTU
021714                                  READEF  #EF.START
021714  012700  000040                  MOV     #EF.START,R0
021720  104447                          TRAP    C$REFG
021722                                  BCOMPLETE 2$
```

INITIALIZE SECTION

```
     021722  103404                          BCS     2$
  64 021724                                  READEF  #EF.RESTART
     021724  012700  000037                  MOV     #EF.RESTART,R0
     021730  104447                          TRAP    C$REFG
  65 021732                                  BNCOMPLETE 31$
     021732  103031                          BCC     31$
  66 021734                          2$:                                     ;1ST PASS, BUS-INIT...
  67 021734                                  BRESET                          ;BUS RESET.
     021734  104433                          TRAP    C$RESET
  68 021736  005037  002212                  CLR     TSTCNT                  ;NUMBER OF TESTS RUN IN PASS
  69 021742  005037  002220                  CLR     FATFLG                  ;CLEAR FATAL ERROR COUNT
  70 021746  005037  003140                  CLR     T23A                    ;CLEAR 11/23A FLAG
  71 021752  005037  003142                  CLR     T23B                    ;CLEAR 11/23B FLAG
  72                                 ;       MOV     #340,-(SP)
  73                                 ;       MOV     #20$,-(SP)              ;RETURN TO DEBUGGER
  74                                 ;       JMP     O.ODT           ;;@@ENTER THE DEBUGGER
  75 021756  005037  003374                  CLR     SKIPT           ;CLEAR THE SUBTEST "SKIPPER"
  76 021762                          20$:
  77 021762  012737  177777  002202          MOV     #-1,QVP                 ;...QUICK VERIFY...
  78 021770  004737  020620                  JSR     PC,ENVIRN               ;SET ENVIRONMENT.
  79 021774  004737  021044                  JSR     PC,KTINIT               ;INITIALIZE KT MEMORY MANAGEMENT
  80 022000  012700  003172                  MOV     #ERTABL,R0
  81 022004  005020                  30$:    CLR     (R0)+                   ;CLEAR THE ERROR TABLE
  82 022006  020027  003372                  CMP     R0,#ERTABE
  83 022012  103774                          BLO     30$
  84 022014  000404                          BR      4$
  85 022016  005037  002202          31$:    CLR     QVP
  86 022022  000137  022072                  JMP     PASRPT                  ;GO REPORT THE STATUS
  87
  88 022026                          4$:
  89 022026  012737  177777  002200  NEWPAS: MOV     #-1,UNITN               ;INIT UNIT NUMBER...
  90 022034  005037  002216                  CLR     DEVCNT                  ;CLEAR COUNT OF DEVICES RUNNING
  91 022040                          NXTU:   BREAK
     022040  104422                          TRAP    C$BRK
  92 022042  005237  002200                  INC     UNITN                   ;...AND SET NEXT UNIT NUMBER.
  93 022046  023737  002200  002012          CMP     UNITN,L$UNIT
  94 022054  103423                          BLO     SETU
  95 022056  012737  177777  003106          MOV     # 1,DUFLG
  96 022064  000401                          BR      11$
  97 022066                                  DOCLN                           ;ABORT, NO MORE UNITS.
     022066  104444                          TRAP    C$DCLN
  98 022070  000240                  11$:    NOP
  99 022072                          PASRPT:
 100 022072  023727  002012  000001          CMP     L$UNIT,#1               ;HOW MANY UNITS SELECTED?
 101 022100  101752                          BLOS    NEWPAS                  ;BR IF ONLY 1
 102 022102  005737  002216                  TST     DEVCNT                  ;ARE ANY STILL RUNNING?
 103 022106  001747                          BEQ     NEWPAS                  ;BR IF NO
 104 022110                                  RFLAGS  R0
     022110  104421                          TRAP    C$RFLA
 105 022112  032700  000100                  BIT     #ISR,R0                 ;SHOULD WE PRINT STATISTICS
 106 022116  001343                          BNE     NEWPAS                  ;BR IF NO
 107
 108 022120                                  DORPT
     022120  104424                          TRAP    C$DRPT
 109 022122  000741                          BR      NEWPAS
 110 022124                          10$:
 111
```

```
022124                          SETU:   GPHARD  UNITN,R0                ;GET UNIT N P-TABLE POINTER.
022124  013700  002200                  MOV     UNITN,R0
022130  104442                          TRAP    C$GPHRD
022132                                  BNCOMPLETE NXTU                  ;BR IF UNIT NOT AVAILABLE.
022132  103342                          BCC     NXTU
022134  005037  003106                  CLR     DUFLG                    ;CLEAR "DROPPED" FLAG.
022140  005237  002216                  INC     DEVCNT
022144  012001                          MOV     (R0)+,R1                 ;GET 1ST REGISTER ADDRESS.
022146  010137  002204                  MOV     R1,CSRADDR               ;ADDRESS OF REGISTERS OF UNIT UNDER TEST

022152  012001                          MOV     (R0)+,R1                 ;GET VECTOR ADDRESS.
                                        ;MOV    (R0),R2                  ;GET INTERRUPT PRIORITY
                                        ;MOV    R2,IPRI                  ;SET INTERRUPT PRIORITY.
022154  010137  002206                  MOV     R1,IVEC                  ;SET INTERRUPT VECTOR POINTER...
022160  012721  016206                  MOV     #INTR,(R1)+              ;...VECTOR...
022164  013721  002210                  MOV     IPRI,(R1)+               ;...AND PRIORITY.

022170                          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.
                                ;
022170  013701  002200                  MOV     UNITN,R1
022174  006301                          ASL     R1
022176  052761  100000  003172          BIS     #BIT15,ERTABL(R1)        ;SAY DEVICE RUNNING
022204  005037  005766                  CLR     EXTA                     ;CLEAR ERROR EXTENSION FLAG.
022210  023727  002012  000001          CMP     L$UNIT,#1                ;ARE WE TESTING MULTIPLE UNITS?
022216  101416                          BLOS    10$                      ;BR IF NO.
022220                                  RFLAGS  R0                       ;YES -- GET OPERATOR FLAGS.
022220  104421                          TRAP    C$RFLA
022222  032700  001000                  BIT     #PNT,R0                  ;SHOULD WE PRINT UNIT #?
022226  001412                          BEQ     10$                      ;BR IF NOT.
022230                                  PRINTF  #PUNIT,UNITN             ;PRINT THE UNIT #
022230  013746  002200                  MOV     UNITN,-(SP)
022234  012746  022322                  MOV     #PUNIT,-(SP)
022240  012746  000002                  MOV     #2,-(SP)
022244  010600                          MOV     SP,R0
022246  104417                          TRAP    C$PNTF
022250  062706  000006                  ADD     #6,SP
022254                          10$:
022254  005037  003110                  CLR     NODEV
022260  013701  002204                  MOV     CSRADDR,R1               ;ADDRESS OF FIRST REGISTER
022264  010102                          MOV     R1,R2                    ;START OF REGISTERS
022266  062702  000002                  ADD     #TSSR,R2                 ;ADDRESS OF TSSR REGISTER
022272  004737  016366                  JSR     PC,XNXM                  ;TEST BOTH CONTROLLER REGISTERS...
022276  103005                          BCC     2$                       ;...AND BR IF ALL OK.
022300  010137  003110                  MOV     R1,NODEV                 ;FLAG DEVICE AS NON-EXISTENT
022304  012737  177777  003106          MOV     #-1,DUFLG                ;DROP THIS UNIT.
022312                          2$:
                                ;
                                ;FINALLY, SET CPU PRIORITY AND WE'RE DONE.
                                ;
022312                          5$:     SETPRI  #PRI00          ;ENABLE INTERRUPTS.
022312  012700  000000                  MOV     #PRI00,R0
```

INITIALIZE SECTION

```
        022316  104441                          TRAP    C$SPRI
    158 022320                                  ENDINIT
        022320                          L10030:
        022320  104411                          TRAP    C$INIT
    159
    160 022322     045     116     045  PUNIT:  .ASCIZ  /%N%N%A***** TESTING UNIT %D2%A *****/
    161                                         .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.
                                ;--
022370                                  BGNAU
022370                          L$AU::
022370  010001                          MOV     R0,R1                   ; GET UNIT TO BE ADDED (R0)
022372  006301                          ASL     R1                      ; MAKE IT A WORD INDEX
022374  052761  100000  003172          BIS     #100000,ERTABL(R1)      ; SET THE "ACTIVE" BIT
022402  042761  040000  003172          BIC     #40000,ERTABL(R1)       ; CLEAR THE "DROPPED" BIT
022410                                  PRINTF  #1$,R0
022410  010046                          MOV     R0,-(SP)
022412  012746  022436                  MOV     #1$,-(SP)
022416  012746  000002                  MOV     #2,-(SP)
022422  010600                          MOV     SP,R0
022424  104417                          TRAP    C$PNTF
022426  062706  000006                  ADD     #6,SP
022432                                  EXIT    AU
022432  000167                          .WORD   J$JMP
022434  000026                          .WORD   L10031-2-.
022436     045     116     045  1$:     .ASCIZ  /%N%A  UNIT %D%A ADDED/
                                        .EVEN

022464                                  ENDAU           ; UNUSED.
022464                          L10031:
022464  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.

022466                                  BGNDU
022466                          L$DU::
022466  012737  177777  003106          MOV     #-1,DUFLG
022474  010001                          MOV     R0,R1
022476  006301                          ASL     R1
022500  052761  140000  003172          BIS     #140000,ERTABL(R1)      ; SAY DROPPED
022506  000240  000240  000240          240,240,240                     ; ?????????
022514                                  PRINTF  #1$,R0
022514  010046                          MOV     R0,-(SP)
022516  012746  022542                  MOV     #1$, (SP)
022522  012746  000002                  MOV     #2,-(SP)
022526  010600                          MOV     SP,R0
022530  104417                          TRAP    C$PNTF
022532  062706  000006                  ADD     #6,SP
022536                                  EXIT    DU
022536  000167                          .WORD   J$JMP
022540  000030                          .WORD   L10032 2-.
```

```
022542     045     116     045  1$:     .ASCIZ  /%N%A  UNIT %D%A DROPPED/
                                        .EVEN
022572                                  ENDDU
022572                          L10032:
022572  104453                          TRAP    C$DU
                                ;+
                                ; AUTO-DROP CODE SECTION.
                                ;-
022574                                  BGNAUTO
022574                          L$AUTO::
022574  013705  002204                  MOV     CSRADDR,R5              ;POINT TO DEVICE REGISTER
022600  012703  000550                  MOV     #360.,R3                ;ENOUGH TIME FOR 2400' REEL TO REWIND
022604  004737  016240          10$:    JSR     PC,WAITF                ;WAIT FOR SSR TO SET
022610  103420                          BCS     20$                     ;LEAVE WHEN SSR IS SET
022612                                  DELAY   250.                    ;WAIT FOR .25 SECONDS
022612  012727  000372                  MOV     #250.,(PC)+
022616  000000                          .WORD   0
022620  013727  002116                  MOV     L$DLY,(PC)+
022624  000000                          .WORD   0
022626  005367  177772                  DEC     -6(PC)
022632  001375                          BNE     .-4
022634  005367  177756                  DEC     -22(PC)
022640  001367                          BNE     .-20
022642  005303                          DEC     R3                      ;BUMP COUNTER DOWN
022644  001357                          BNE     10$                     ;KEEP GOING
022646  004737  017172                  JSR     PC,CKDROP               ;TRY AND DROP UNIT
022652                          20$:
022652                                  ENDAUTO                 ; UNUSED.
022652                          L10033:
022652  104461                          TRAP    C$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.
                                ;-
022654                                  BGNCLN
022654                          L$CLEAN::
022654  013705  002204                  MOV     CSRADDR,R5              ;POINT TO DEVICE REGISTER
022660  005737  003106                  TST     DUFLG           ;"DROPPED" FLAG IS SET ON...
022664  100405                          BMI     1$              ;...AND GROSS CONTROLLER FAULT...
                                                                ;...DON'T TRY TO XCT CLEANUP CODE.

022666  012765  000000  000002          MOV     #0,TSSR(R5)     ;DO SOFT INIT
022674  004737  016240                  JSR     PC,WAITF
022700                          1$:
022700                          2$:     ENDCLN
022700                          L10034:
022700  104412                          TRAP    C$CLEAN
                                ;+
                                ; THE REPORT CODING SECTION CONTAINS THE
                                ; "PRINTS" CALLS THAT GENERATE STATISTICAL REPORTS.
                                ;-
022702                                  BGNRPT
022702                          L$RPT::
022702                                  PRINTS  #DEVSUM
022702  012746  023144                  MOV     #DEVSUM, (SP)
022706  012746  000001                  MOV     #1,-(SP)
022712  010600                          MOV     SP,R0
022714  104416                          TRAP    C$PNTS
022716  062706  000004                  ADD     #4,SP
022722  010246                          MOV     R2,-(SP)
022724  010346                          MOV     R3,-(SP)
022726  010446                          MOV     R4,-(SP)
022730  012704  003172                  MOV     #ERTABL,R4      ; GET START OF ERROR TABLE.
022734  005003                          CLR     R3              ; CLEAR UNIT NUMBER
022736  011402                  1$:     MOV     (R4),R2         ; GET ERROR TABLE ENTRY & TEST IT.
022740  001467                          BEQ     4$              ; ZERO IF UNIT NOT RUN
022742  100066                          BPL     4$
022744  032702  040000                  BIT     #BIT14,R2       ; WAS UNIT DROPPED?
022750  001015                          BNE     2$              ; BR IF YES
022752  042702  170000                  BIC     #^C7777,R2      ; GET ERROR COUNT FIELD
022756                                  PRINTS  #DEVONL,R3,R2   ; PRINT
022756  010246                          MOV     R2,-(SP)
022760  010346                          MOV     R3,-(SP)
022762  012746  023201                  MOV     #DEVONL,-(SP)
022766  012746  000003                  MOV     #3,-(SP)
022772  010600                          MOV     SP,R0
022774  104416                          TRAP    C$PNTS
022776  062706  000010                  ADD     #10,SP
023002  000446                          BR      4$
023004  020227  160000          2$:     CMP     R2,#160000      ; WAS UNIT NON-EXISTENT?
023010  001012                          BNE     3$              ; BR IF NO
023012                                  PRINTS  #DEVNXR,R3
023012  010346                          MOV     R3,-(SP)
023014  012746  023251                  MOV     #DEVNXR,-(SP)
```

```
        023020  012746  000002                  MOV     #2,-(SP)
        023024  010600                          MOV     SP,R0
        023026  104416                          TRAP    C$PNTS
        023030  062706  000006                  ADD     #6,SP
    257 023034  000431                          BR      4$
    258 023036  020227  160001          3$:     CMP     R2,#160001      ; WAS UNIT NOT READY AT STARTUP?
    259 023042  001012                          BNE     30$             ; BR IF NO.
    260 023044                                  PRINTS  #DEVNRD,R3
        023044  010346                          MOV     R3,-(SP)
        023046  012746  023333                  MOV     #DEVNRD,-(SP)
        023052  012746  000002                  MOV     #2,-(SP)
        023056  010600                          MOV     SP,R0
        023060  104416                          TRAP    C$PNTS
        023062  062706  000006                  ADD     #6,SP
    261 023066  000414                          BR      4$
    262 023070  042702  170000          30$:    BIC     #^C7777,R2
    263 023074                                  PRINTS  #DEVDRO,R3,R2
        023074  010246                          MOV     R2,-(SP)
        023076  010346                          MOV     R3,-(SP)
        023100  012746  023414                  MOV     #DEVDRO,-(SP)
        023104  012746  000003                  MOV     #3,-(SP)
        023110  010600                          MOV     SP,R0
        023112  104416                          TRAP    C$PNTS
        023114  062706  000010                  ADD     #10,SP
    264 023120  062704  000002          4$:     ADD     #2,R4
    265 023124  005203                          INC     R3
    266 023126  020427  003372                  CMP     R4,#ERTABE
    267 023132  103701                          BLO     1$
    268 023134  012604                          MOV     (SP)+,R4
    269 023136  012603                          MOV     (SP)+,R3
    270 023140  012602                          MOV     (SP)+,R2
    271 023142                                  ENDRPT          ; UNUSED.
        023142                          L10035:
        023142  104425                          TRAP    C$RPT
    272
    273
    274 023144      045     116     045  DEVSUM: .ASCIZ  /%N%ADEVICE STATUS SUMMARY:%N/
    275 023201      045     101     040  DEVONL: .ASCIZ  /%A  UNIT %D3%A   ONLINE,  ERRORS = %D%N/
    276 023251      045     101     040  DEVNXR: .ASCIZ  /%A  UNIT %D3%A   DROPPED, NON-EXISTENT REGISTER%N/
    277 023333      045     101     040  DEVNRD: .ASCIZ  /%A  UNIT %D3%A   DROPPED, NOT READY AT STARTUP%N/
    278 023414      045     101     040  DEVDRO: .ASCIZ  /%A  UNIT %D3%A   DROPPED, ERRORS = %D%N/
    279                                          .EVEN
    280
    281 023464                                  ENDMOD
    282
    283
```

```
                                        .TITLE  TSV5A - HARDWARE TESTS

023464                                  BGNMOD  TSV5
023464                          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.
                                ;

023464                                  BGNTST
023464                                                                                  T1::
023464  012700  023662                  MOV     #TST1ID,R0              ;ASCII MESSAGE TO IDENTIFY TEST
023470  004737  016500                  JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
023474  012737  000024  002214          MOV     #20.,LOOPCNT            ;PERFORM 20 ITERATIONS
023502                          T1LOOP:
023502  005003                          CLR     R3                      ;USE R3 AS FATAL ERROR FLAG

023504                                  BGNSUB                          ;//////////// BEGIN SUBTEST ////////////
023504                                                                                  T1.1:
023504  104402                                                                                  TRAP    C$BSUB

023506                                  BRESET                          ;ISSUE A BUS RESET
023506  104433                                                                                  TRAP    C$RESET
023510  004737  016240                  JSR     PC,WAITF                ;WAIT FOR READY
023514  016501  000002                  MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
023520  010102                          MOV     R1,R2                   ;CONTENTS OF TSSR
023522  042702  176277                  BIC     #^C<HIADDR!OFL>,R2      ;THESE BITS MAY BE SET
```

TEST 1: BUS RESET TEST

```
 83 023526  052702  002200                BIS     #SSR!NBA,R2            ;READY AND NEW DATA SHOULD BE SET
 84 023532  020102                        CMP     R1,R2                  ;COMPARE EXPECTED TO RECEIVED
 85 023534  001405                        BEQ     10$                    ;BRANCH IF COMPARE
 89 023536                                ERRDF   ERRNO,SFHERR,SFFMSG    ;PEPORT A FATAL ERROR
    023536  104455                                                                          TRAP    C$ERDF
    023540  000145                                                                          .WORD   101
    023542  003701                                                                          .WORD   SFHERR
    023544  012072                                                                          .WORD   SFFMSG
 90 023546  005203                        INC     R3                     ;SET THE FATAL ERROR FLAG
 91 023550                          10$:
 92 023550                                ENDSUB                         ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
    023550                                                                           L10037:
    023550  104403                                                                          TRAP    C$ESUB
 93
```

```
023552  005703                          TST     R3                      ;DID WE HAVE FATAL ERROR ?
023554  001402                          BEQ     20$                     ;BRANCH IF NOT
023556  004737  017172                  JSR     PC,CKDROP               ;GO DROP THIS UNIT, IF ALLOWED
023562  005003                  20$:    CLR     R3                      ;RESET FATAL ERROR FLAG


023564                                  BGNSUB                          ;//////////// BEGIN SUBTEST ////////////
023564                                                                                  T1.2:
023564  104402                                                                                  TRAP    C$BSUB

023566  005065  000002                  CLR     TSSR(R5)                ;WRITE TO ISSUE A SOFT RESET
023572  004737  016240                  JSR     PC,WAITF                ;WAIT FOR READY TO SET
023576  016501  000002                  MOV     TSSR(R5),R1             ;GET REGISTER TSSR DATA
023602  010102                          MOV     R1,R2                   ;CONTENTS OF TSSR
023604  042702  176277                  BIC     #^C<HIADDR!OFL>,R2      ;THESE BITS MAY BE SET
023610  052702  002200                  BIS     #SSR!NBA,R2             ;READY AND NEW DATA SHOULD BE SET
023614  020102                          CMP     R1,R2                   ;COMPARE EXPECTED TO RECEIVED
023616  001405                          BEQ     10$                     ;BRANCH IF COMPARE
023620                                  ERRDF   ERRNO,SFIERR,SFFMSG     ;REPORT A FATAL ERROR
023620  104455                                                                          TRAP    C$ERDF
023622  000146                                                                          .WORD   102
023624  003646                                                                          .WORD   SFIERR
023626  012072                                                                          .WORD   SFFMSG
023630  005203                          INC     R3                      ;SET THE ERROR FLAG
023632                          10$:
023632                                  ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
023632                                                                                  L10040:
023632  104403                                                                          TRAP    C$ESUB


023634  005703                          TST     R3                      ;FATAL ERROR DETECTED ?
023636  001402                          BEQ     20$                     ;BRANCH IF NOT
023640  004737  017172                  JSR     PC,CKDROP               ;SEE IF TIME TO DROP UNIT
023644  004737  016446          20$:    JSR     PC,TSTLOOP              ;SHOULD WE DO ITERATIONS ?
023650  103002                          BCC     40$                     ;BRANCH IF NOT
023652  000137  023502                  JMP     T1LOOP                  ;LOOP UNTIL COUNT EXPIRED
023656                          40$:    EXIT    TST                     ;ALL DONE THIS TEST
023656  104432                                                                          TRAP    C$EXIT
023660  000022                                                                          .WORD   L10036-.


                                ;+
                                ;LOCAL TEXT MESSAGES FOR TEST
                                ;-

023662     111     156     151  TST1ID: .ASCIZ  'Initialization'
                                        .EVEN
023702                                  ENDTST
023702                                                                          L10036:
023702  104401                                                                          TRAP    C$ETST
```

```
                                                .SBTTL  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).
                                        ;
023704                                          BGNTST
023704                                                                                          T2::
023704  012700  024352                          MOV     #TST2ID,R0                      ;ASCII MESSAGE TO IDENTIFY TEST
023710  004737  016500                          JSR     PC,TSTSETUP                     ;DO INITIAL TEST SETUP
023714  012737  000024  002214                  MOV     #20.,LOOPCNT                    ;PERFORM 20 ITERATIONS
023722  005004                          T2LOOP: CLR     R4                              ;STARTING DATA PATTERN
023724  012703  177777                          MOV     #-1,R3                          ;DO INIT ON FIRST TIME THROUGH
023730  005703                          5$:     TST     R3                              ;DO WE NEED SOFT INIT
023732  001412                                  BEQ     10$                             ;BRANCH IF NOT
023734  005003                                  CLR     R3                              ;DON'T NEED INIT NEXT TIME THRU
023736  004737  015764                          JSR     PC,SOFINIT                      ;DO SOFT INIT OF CONTROLLER
023742  103406                                  BCS     10$                             ;BR IF SOFT INIT = OK
023744  010001                                  MOV     R0,R1                           ;SAVE CONTENTS OF TSSR
023746                                          ERRDF   ERRNO,SFIERR,SFIMSG             ;DEVICE FATAL ERROR DURING INIT
023746  104455                                                                                          TRAP    C$ERDF
023750  000311                                                                                          .WORD   201
023752  003646                                                                                          .WORD   SFIERR
023754  012024                                                                                          .WORD   SFIMSG
023756  005203                                  INC     R3                              ;FORCE SOFT INIT ON NEXT PASS
023760  005037  002220                  10$:    CLR     FATFLG                          ;CLEAR FATAL ERROR FLAG

023764                                          BGNSEG                                  ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
```

TEST 2: WRAP DATA - HIGH BYTE

```
        023764  104404                                                                    TRAP    C$BSEG
    197
    198 023766  110465  000001                  MOVB    R4,TSDBH(R5)            ;SET MAINT MODE + WRITE DATA
    199 023772  004737  016240                  JSR     PC,WAITF                ;WAIT FOR SSR TO SET
    200 023776  103411                          BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
    201 024000  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
    202 024002  010402                          MOV     R4,R2                   ;DATA THAT WAS WRITTEN
    206 024004                                  ERRDF   ERRNO,T2SSR,EXPREC      ;DEVICE FATAL SSR FAILED TO SET
        024004  104455                                                                    TRAP    C$ERDF
        024006  000312                                                                    .WORD   202
        024010  024300                                                                    .WORD   T2SSR
        024012  015464                                                                    .WORD   EXPREC
    207 024014  005203                          INC     R3                      ;FORCE SOFT INIT ON NEXT PASS
    208 024016  005237  002220                  INC     FATFLG                  ;SET FATAL ERROR FLAG
    209 024022                          15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
        024022  104406                                                                    TRAP    C$CLP1
    210 024024  005737  002220                  TST     FATFLG                  ;WAS FATAL ERROR RECEIVED ?
    211 024030  001402                          BEQ     20$                     ;BRANCH IF NOT
    212 024032  004737  017172                  JSR     PC,CKDROP               ;SEE IF TIME TO DROP UNIT
    213 024036  010402                  20$:    MOV     R4,R2                   ;DATA PATTERN WRITTEN
    214 024040  042702  177774                  BIC     #^C<BIT0!BIT1>,R2       ;CLEAR ALL BUT LOW 2 BITS
    215 024044  000302                          SWAB    R2                      ;BITS 8 AND 9 HAVE LOW DATA BITS
    216 024046  052702  002200                  BIS     #SSR!NBA,R2             ;THESE BITS MUST BE SET ALSO
    217 024052  016501  000002                  MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
    218 024056  032701  000100                  BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
    219 024062  001402                          BEQ     25$                     ;BRANCH IF NOT OFF-LINE
    220 024064  052702  000100                  BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
    221 024070  020201                  25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
    222 024072  001405                          BEQ     30$                     ;OKAY IF MATCH
    226 024074                                  ERRHRD  ERRNO,T2TSSR,EXPREC     ;TSSR WASN'T CORRECT
        024074  104456                                                                    TRAP    C$ERHRD
        024076  000313                                                                    .WORD   203
        024100  024233                                                                    .WORD   T2TSSR
        024102  015464                                                                    .WORD   EXPREC
    227 024104  005203                          INC     R3                      ;FORCE SOFT INIT ON NEXT PASS
    228 024106                          30$:    CKLOOP                          ;LOOP ON ERROR ?
        024106  104406                                                                    TRAP    C$CLP1
    229 024110  016501  000000                  MOV     TSBA(R5),R1             ;GET TSBA REGISTER CONTENTS
    230 024114  005002                          CLR     R2                      ;
    231 024116  150402                          BISB    R4,R2                   ;DATA PATTERN WRITTEN
    232 024120  000302                          SWAB    R2                      ;MOVE INTO TOP BYTE
    233 024122  150402                          BISB    R4,R2                   ;BOTH HALVES SHOULD BE SAME
    234 024124  020102                          CMP     R1,R2                   ;COMPARE EXPECTED TO RECEIVED
    235 024126  001405                          BEQ     35$                     ;ERROR IF NOT EQUAL
    239 024130                                  ERRHRD  ERRNO,T2TSBA,EXPREC     ;PRINT THE ERROR & EXPD/RECV
        024130  104456                                                                    TRAP    C$ERHRD
        024132  000314                                                                    .WORD   204
        024134  024166                                                                    .WORD   T2TSBA
        024136  015464                                                                    .WORD   EXPREC
    240 024140  005203                          INC     R3                      ;FORCE SOFT INIT ON NEXT PASS
    241
    242 024142                          35$:    ENDSEG                          ;<<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
        024142                                                                            10000$:
        024142  104405                                                                    TRAP    C$ESEG
    243
    244 024144  105204                          INCB    R4                      ;NEXT DATA PATTERN TO TEST
    245 024146  001270                          BNE     5$                      ;BRANCH TILL BACK TO ZERO
```

TEST 2: WRAP DATA - HIGH BYTE

```
024150  004737  016446                  JSR     PC,TSTLOOP              ;SHOULD WE DO ITERATIONS ?
024154  103002                          BCC     40$                     ;BRANCH IF NOT
024156  000137  023722                  JMP     T2LOOP                  ;LOOP UNTIL COUNT EXPIRED
024162                          40$:    EXIT    TST                     ;ALL DONE THIS TEST
024162  104432                                                                          TRAP    C$EXIT
024164  000214                                                                          .WORD   L10041-.

                                ;+
                                ;LOCAL TEXT MESSAGES FOR TEST
                                ;-

024166     124     123     102  T2TSBA: .ASCIZ  'TSBA Incorrect After TSDB High Write'
024233     124     123     123  T2TSSR: .ASCIZ  'TSSR Incorrect After TSDB High Write'
024300     116     157     040  T2SSR:  .ASCIZ  'No Sub-System Ready After TSDB High Write'
024352     127     162     141  TST2ID: .ASCIZ  'Wrap Data - High Byte'
                                        .EVEN
024400                                  ENDTST
024400                                                                  L10041:
024400  104401                                                                          TRAP    C$ETST
```

```
                                        .SBTTL  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).
                                ;
024402                          BGNTST
024402                                                                          T3::
024402  012700  025045          MOV     #TST3ID,R0              ;ASCII MESSAGE TO IDENTIFY TEST
024406  004737  016500          JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
024412  012737  000024  002214  MOV     #20.,LOOPCNT            ;PERFORM 20 ITERATIONS
024420  005004                  T3LOOP: CLR     R4                      ;STARTING DATA PATTERN
024422  012703  000001          MOV     #1,R3                   ;FORCE SOFT INIT ON FIRST PASS
024426  005703                  5$:     TST     R3                      ;SET IF INIT IS REQUIRED
024430  001412                  BEQ     10$                     ;BRANCH IF NO INIT NEEDED
024432  005003                  CLR     R3                      ;ASSUME NO INIT NEEDED ON NEXT LOOP
024434  004737  015764          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
024440  103406                  BCS     10$                     ;BR IF SOFT INIT = OK
024442  010001                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
024444                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
024444  104455                                                                  TRAP    C$ERDF
024446  000455                                                                  .WORD   301
024450  003646                                                                  .WORD   SFIERR
024452  012024                                                                  .WORD   SFIMSG
024454  005203                  INC     R3                      ;FORCE INIT ON NEXT PASS
024456  005037  002220          10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG

024462                          BGNSEG                          ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
024462  104404                                                                  TRAP    C$BSEG

024464  110465  000000          MOVB    R4,TSDB(R5)             ;SET MAINT MODE + WRITE DATA
024470  004737  016240          JSR     PC,WAITF                ;WAIT FOR SSR TO SET
024474  103411                  BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
024476  010001                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
024500  010402                  MOV     R4,R2                   ;DATA THAT WAS WRITTEN
024502                          ERRDF   ERRNO,T3SSR,EXPREC      ;DEVICE FATAL SSR FAILED TO SET
```

TEST 3: WRAP DATA - LOW BYTE

```
     024502  104455                                                                    TRAP    C$ERDF
     024504  000456                                                                    .WORD   302
     024506  024774                                                                    .WORD   T3SSR
     024510  015464                                                                    .WORD   EXPREC
325  024512  005203                  INC     R3                      ;FORCE INIT ON NEXT PASS
326  024514  005237  002220          INC     FATFLG                  ;SET THE FATAL ERROR FLAG
327  024520                  15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     024520  104406                                                                    TRAP    C$CLP1
328  024522  005737  002220          TST     FATFLG                  ;DID WE GET FATAL ERROR ?
329  024526  001402                  BEQ     20$                     ;BRANCH IF NOT
330  024530  004737  017172          JSR     PC,CKDROP               ;DROP UNIT, IF DROP ALLOWED
331  024534  010402          20$:    MOV     R4,R2                   ;DATA PATTERN WRITTEN
332  024536  042702  177774          BIC     #^C<BIT0!BIT1>,R2       ;CLEAR ALL BUT LOW 2 BITS
333  024542  000302                  SWAB    R2                      ;BITS 8 AND 9 HAVE LOW DATA BITS
334  024544  052702  002200          BIS     #SSR!NBA,R2             ;THESE BITS MUST BE SET ALSO
335  024550  016501  000002          MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
336  024554  032701  000100          BIT     #OFL,R1                 ;IS DRIVE OFF-LINE
337  024560  001402                  BEQ     25$                     ;BRANCH IF NOT OFFLINE
338  024562  052702  000100          BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED
339  024566  020201          25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
340  024570  001405                  BEQ     30$                     ;OKAY IF MATCH
344  024572                          ERRHRD  ERRNO,T3TSSR,EXPREC     ;TSSR WASN'T CORRECT
     024572  104456                                                                    TRAP    C$ERHRD
     024574  000457                                                                    .WORD   303
     024576  024730                                                                    .WORD   T3TSSR
     024600  015464                                                                    .WORD   EXPREC
345  024602  005203                  INC     R3                      ;FORCE INIT ON NEXT PASS
346  024604                  30$:    CKLOOP                          ;LOOP ON ERROR ?
     024604  104406                                                                    TRAP    C$CLP1
347  024606  016501  000000          MOV     TSBA(R5),R1             ;GET TSBA REGISTER CONTENTS
348  024612  005002                  CLR     R2                      ;
349  024614  150402                  BISB    R4,R2                   ;DATA PATTERN WRITTEN
350  024616  000302                  SWAB    R2                      ;MOVE INTO TOP BYTE
351  024620  150402                  BISB    R4,R2                   ;BOTH HALVES SHOULD BE SAME
352  024622  020102                  CMP     R1,R2                   ;COMPARE EXPECTED TO RECEIVED
353  024624  001405                  BEQ     35$                     ;BR IF ERROR NOT EQUAL
357  024626                          ERRHRD  ERRNO,T3TSBA,EXPREC     ;PRINT THE ERROR & EXPD/RECV
     024626  104456                                                                    TRAP    C$ERHRD
     024630  000460                                                                    .WORD   304
     024632  024664                                                                    .WORD   T3TSBA
     024634  015464                                                                    .WORD   EXPREC
358  024636  005203                  INC     R3                      ;FORCE INIT ON NEXT PASS
359
360  024640                  35$:    ENDSEG                          ;<<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
     024640                                                                            10000$:
     024640  104405                                                                    TRAP    C$ESEG
361
362  024642  105204                  INCB    R4                      ;NEXT DATA PATTERN TO TEST
363  024644  001270                  BNE     5$                      ;ALL DONE WHEN BACK TO ZERO
364  024646  004737  016446          JSR     PC,TSTLOOP              ;SHOULD WE DO ITERATIONS ?
365  024652  103002                  BCC     40$                     ;BRANCH IF NOT
366  024654  000137  024420          JMP     T3LOOP                  ;LOOP UNTIL COUNT EXPIRED
367  024660                  40$:    EXIT    TST                     ;ALL DONE THIS TEST
     024660  104432                                                                    TRAP    C$EXIT
     024662  000210                                                                    .WORD   L10042-.
368
369                          ;+
```

```
                                        ;LOCAL TEXT MESSAGES FOR TEST
                                        ;

024664     124     123     102  T3TSBA: .ASCIZ  'TSBA Incorrect After TSDB Low Write'
024730     124     123     123  T3TSSR: .ASCIZ  'TSSR Incorrect After TSDB Low Write'
024774     116     157     040  T3SSR:  .ASCIZ  'No Sub-System Ready After TSDB Low Write'
025045     127     162     141  TST3ID: .ASCIZ  'Wrap Data - Low Byte'
                                        .EVEN
025072                                  ENDTST
025072                                                                          L10042:
025072  104401                                                                          TRAP    C$ETST
```

```
                                        .SBTTL  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).  THESE
                                ;       TESTS ARE PERFORMED BY THREE SUBTESTS, DESCRIBED BELOW.  A
                                ;       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 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.
                                ;
                                ;
025074                                  BGNTST
025074                                                                  T4::
025074                                  BGNSUB                  ;////////////// BEGIN SUBTEST ////////////
025074                                                                  T4.1:
025074  104402                                                                  TRAP    C$BSUB

025076  012700  026404                  MOV     #TST4ID,R0              ;ASCII MESSAGE TO IDENTIFY TEST
025102  004737  016500                  JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
025106  012737  000005  002214          MOV     #5,LOOPCNT              ;PERFORM 5 ITERATIONS
```

```
440 025114                          T4LOOP:
441 025114  004737  015764                  JSR     PC,SOFINIT              ;DO INITIALIZE ON CONTROLLER
442 025120  103405                          BCS     20$                     ;BR IF INIT WAS OK
446 025122  010001                          MOV     R0,R1                   ;CONTENTS OF TSSR REGISTER
447 025124                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;FATAL ERROR TSSR WAS NOT OK
    025124  104455                                                                          TRAP    C$ERDF
    025126  000621                                                                          .WORD   401
    025130  003646                                                                          .WORD   SFIERR
    025132  012024                                                                          .WORD   SFIMSG
448 025134  005004                  20$:    CLR     R4                      ;SET RAM ADDRESS AT ZERO
449 025136  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
450 025142  105065  000000                  CLRB    TSDB(R5)                ;SET INTO MAINTENANCE MODE
451 025146                          25$:
452 025146                                  BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
    025146  104404                                                                          TRAP    C$BSEG
453
454 025150  110402                          MOVB    R4,R2                   ;EXPECTED DATA FROM WRAP-AROUND
455 025152  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
456 025156  010465  000000                  MOV     R4,TSDB(R5)             ;LOAD ADDRESS INTO TSDB
457 025162  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
458 025166  110265  000000                  MOVB    R2,TSDB(R5)             ;LOADS DATA INTO RAM LOCATION
459 025172  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
460 025176  016501  000000                  MOV     TSBA(R5),R1             ;READS WRAP DATA
461 025202  120102                          CMPB    R1,R2                   ;DOES WRITTEN(WRAP) = READ
462 025204  001404                          BEQ     30$                     ;BR IF OK, THEY ARE EQUAL
466 025206                                  ERRHRD  ERRNO,TSBAM2,EXPREC     ;DATA NOT WRAPPED CORRECTLY
    025206  104456                                                                          TRAP    C$ERHRD
    025210  000622                                                                          .WORD   402
    025212  026242                                                                          .WORD   TSBAM2
    025214  015464                                                                          .WORD   EXPREC
467 025216                          30$:
468 025216                                  ENDSEG                          ;<<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
    025216                                                                          10000$:
    025216  104405                                                                          TRAP    C$ESEG
469
470 025220  005204                          INC     R4                      ;NEXT ADDRESS
471 025222  020427  010000                  CMP     R4,#10000               ;END OF RAM MEMORY CHECK
472 025226  001347                          BNE     25$                     ;LOOP TILL ALL RAM WRITTEN
473 025230                                  ESCAPE  SUB                     ;DON'T CONTINUE IF ERROR ON WRITE
    025230  104410                                                                          TRAP    C$ESCAPE
    025232  000102                                                                          .WORD   L10044 .
474
475 025234  005002                          CLR     R2                      ;CLEAR OUT R2 HIGH BITS
476 025236  005304                          DEC     R4                      ;SET BACK TO 7777
477 025240  110402                  40$:    MOVB    R4,R2                   ;GET DATA PATTERN BACK IN SHAPE
478 025242  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
479 025246  010465  000000                  MOV     R4,TSDB(R5)             ;LOAD UP RAM ADDRESS POINTER
480 025252  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
481 025256  016501  000000                  MOV     TSBA(R5),R1             ;READ RAM CONTENTS BACK
482 025262  120102                          CMPB    R1,R2                   ;CHECK WITH DATA WRITTEN
483 025264  001404                          BEQ     45$                     ;BR IF OK, DATA IN = DATA OUT
487 025266                                  ERRHRD  ERRNO,TSBAM2,EXPREC     ;WRITTEN DATA NOT = TO READ
    025266  104456                                                                          TRAP    C$ERHRD
    025270  000623                                                                          .WORD   403
    025272  026242                                                                          .WORD   TSBAM2
    025274  015464                                                                          .WORD   EXPREC
488 025276                          45$:    CKLOOP                          ;SCOPE LOOP
```

```
     025276  104406
489  025300  116501  000001          MOVB    TSBAH(R5),R1        ;HIGH BYTE READ OF TSBA                TRAP    C$CLP1
490  025304  010402                  MOV     R4,R2               ;DATA PATTERN WRITTEN
491  025306  000302                  SWAB    R2                  ;HIGH TO LOW
492  025310  060402                  ADD     R4,R2               ;TOTAL OF BYTES IN LOW BYTE
493  025312  120102                  CMPB    R1,R2               ;SUM OF BYTES WRITTEN TO TSDB = TSBAH
494  025314  001404                  BEQ     50$                 ;BR IF OK, THEY SHOULD BE
498  025316                          ERRHRD  ERRNO,M2901,EXPREC  ;2901 PROBLEM ADDER
     025316  104456                                                                         TRAP    C$ERHRD
     025320  000624                                                                         .WORD   404
     025322  026152                                                                         .WORD   M2901
     025324  015464                                                                         .WORD   EXPREC
499  025326                  50$:    CKLOOP                      ;SCOPE LOOP
     025326  104406                                                                         TRAP    C$CLP1
500  025330  005304                  DEC     R4                  ;DROP DATA COUNTER (PATTERN)
501  025332  002342                  BGE     40$                 ;NOT AT LOC. ZERO YET
502
503  025334                          ENDSUB                      ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
     025334                                                                  L10044:
     025334  104403                                                                         TRAP    C$ESUB
504
```

```
506
507 025336                                  BGNSUB                          ;///////////// BEGIN SUBTEST ///////////
    025336                                                                                   T4.2:
    025336  104402                                                                                   TRAP    C$BSUB
508                                 ;       TEST 4, SUBTEST 2
509
510                                 ;
511                                 ;       THIS SUBTEST WRITES RAM WITH ALL ZEROS
512                                 ;       THEN WALKS AN ALL ONES WORD DOWN THROUGH MEMORY
513                                 ;
514 025340  004737  015764                  JSR     PC,SOFINIT              ;DO INITIALIZE ON CONTROLLER
515 025344  103405                          BCS     20$                     ;BR IF INIT WAS OK
519 025346  010001                          MOV     R0,R1                   ;CONTENTS OF TSSR REGISTER
520 025350                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;FATAL ERROR TSSR WAS NOT OK
    025350  104455                                                                           TRAP    C$ERDF
    025352  000625                                                                           .WORD   405
    025354  003646                                                                           .WORD   SFIERR
    025356  012024                                                                           .WORD   SFIMSG
521 025360  005002                  20$:    CLR     R2                      ;TEST DATA = 0
522 025362  005004                          CLR     R4                      ;STARTING RAM ADDRESS = 0
523 025364  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON AMBIGUOUS
524 025370  105065  000000                  CLRB    TSDB(R5)                ;SET INTO MAINTENANCE MODE
525 025374                          25$:
526 025374                                  BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
    025374  104404                                                                           TRAP    C$BSEG
527
528 025376  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
529 025402  010465  000000                  MOV     R4,TSDB(R5)             ;LOAD ADDRESS INTO TSDB
530 025406  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
531 025412  110265  000000                  MOVB    R2,TSDB(R5)             ;LOADS DATA INTO RAM LOCATION
532 025416  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
533 025422  016501  000000                  MOV     TSBA(R5),R1             ;READS WRAP DATA
534 025426  120102                          CMPB    R1,R2                   ;DOES WRITTEN(WRAP) = READ ?
535 025430  001404                          BEQ     30$                     ;BR IF OK, THEY ARE EQUAL
539 025432                                  ERRHRD  ERRNO,TSBAM2,EXPREC     ;DATA NOT WRAPPED CORRECTLY
    025432  104456                                                                           TRAP    C$ERHRD
    025434  000626                                                                           .WORD   406
    025436  026242                                                                           .WORD   TSBAM2
    025440  015464                                                                           .WORD   EXPREC
540 025442                          30$:
541 025442                                  ENDSEG                          ;<<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
    025442                                                                                   10000$:
    025442  104405                                                                           TRAP    C$ESEG
542
543 025444  005204                          INC     R4                      ;NEXT ADDRESS
544 025446  020427  010000                  CMP     R4,#10000               ;END OF RAM MEMORY CHECK
545 025452  001350                          BNE     25$                     ;BR, MORE RAM TO GO
546
547 025454  005304                  35$:    DEC     R4                      ;SET BACK TO 7777
548 025456  005002                          CLR     R2                      ;SET TO ALL ZEROS
549 025460  004737  016326          40$:    JSR     PC,CHKTSSR              ;WAIT FOR READY (SSR) TO SET
550 025464  010465  000000                  MOV     R4,TSDB(R5)             ;LOAD UP THE ADDRESS FOR RAM
551 025470  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY (SSR) TO SET
552 025474  016501  000000                  MOV     TSBA(R5),R1             ;READ THE RAM CONTENTS BACK
553 025500  005002                          CLR     R2                      ;LOOKING FOR 000000 (EXPECTED)
554 025502  120102                          CMPB    R1,R2                   ;BOTH SHOULD BE 00000000 BINARY
555 025504  001404                          BEQ     43$                     ;BR, IF DATA IS GOOD
```

```
025506                                  ERRHRD  ERRNO,TSBAM3,EXPREC     ;CHARACTERISTICS DATA NOT CORRECT
025506  104456                                                                          TRAP    C$ERHRD
025510  000627                                                                          .WORD   407
025512  026324                                                                          .WORD   TSBAM3
025514  015464                                                                          .WORD   EXPREC
025516  012702  000377          43$:    MOV     #000377,R2              ;SET ALL ONES WORD
025522  010465  000000                  MOV     R4,TSDB(R5)             ;LOAD UP RAM ADDRESS POINTER
025526  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
025532  110265  000000                  MOVB    R2,TSDB(R5)             ;WRITE DATA INTO RAM
025536  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
025542  016501  000000                  MOV     TSBA(R5),R1             ;READ RAM CONTENTS BACK
025546  120102                          CMPB    R1,R2                   ;CHECK WITH DATA WRITTEN
025550  001404                          BEQ     45$                     ;BR IF OK, DATA IN = DATA OUT
025552                                  ERRHRD  ERRNO,TSBAM2,EXPREC     ;WRITTEN DATA NOT = TO READ
025552  104456                                                                          TRAP    C$ERHRD
025554  000630                                                                          .WORD   408
025556  026242                                                                          .WORD   TSBAM2
025560  015464                                                                          .WORD   EXPREC
025562                          45$.    CKLOOP                          ;SCOPE LOOP
025562  104406                                                                          TRAP    C$CLP1
025564  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
025570  010465  000000                  MOV     R4,TSDB(R5)             ;WORD WRITE TO SET UP ADDRESS
025574  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
025600  116501  000001                  MOVB    TSBAH(R5),R1            ;HIGH BYTE READ OF TSBA
025604  010403                          MOV     R4,R3                   ;DATA PATTERN WRITTEN
025606  000303                          SWAB    R3                      ;HIGH TO LOW
025610  060403                          ADD     R4,R3                   ;TOTAL OF BYTES IN LOW BYTE
025612  120103                          CMPB    R1,R3                   ;SUM OF BYTES WRITTEN TO TSDB = TSBAH
025614  001404                          BEQ     50$                     ;BR IF OK, THEY SHOULD BE
025616                                  ERRHRD  ERRNO,M2901,EXPREC      ;^901 PROBLEM ADDER
025616  104456                                                                          TRAP    C$ERHRD
025620  000631                                                                          .WORD   409
025622  026152                                                                          .WORD   M2901
025624  015464                                                                          .WORD   EXPREC
025626                          50$:    CKLOOP                          ;SCOPE LOOP
025626  104406                                                                          TRAP    C$CLP1
025630  005304                          DEC     R4                      ;DROP RAM ADDRESS POINTER
025632  002312                          BGE     40$                     ;NOT AT LOC. ZERO YET

025634                                  ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
025634                                                                          L10045:
025634  104403                                                                          TRAP    C$ESUB
```

```
025636                                  BGNSUB                          ;////,////// BEGIN SUBTEST ////////////
025636                                                                                  T4.3:
025636  104402                                                                                  TRAP    C$BSUB

                                ;       TEST 4, SUBTEST 3
                                ;
                                ;       THIS SUBTEST WRITES RAM WITH ALL ONES
                                ;       THEN WALKS A ZERO WORD DOWN THROUGH MEMORY
                                ;
025640  004737  015764                  JSR     PC,SOFINIT              ;DO INITIALIZE ON CONTROLLER
025644  103405                          BCS     20$                     ;BR IF INIT WAS OK
025646  010001                          MOV     R0,R1                   ;CONTENTS OF TSSR REGISTER
025650                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;FATAL ERROR TSSR WAS NOT OK
025650  104455                                                                                  TRAP    C$ERDF
025652  000632                                                                                  .WORD   410
025654  003646                                                                                  .WORD   SFIERR
025656  012024                                                                                  .WORD   SFIMSG
025660  012702  177777          20$:    MOV     #177777,R2              ;SET DATA AT ALL ONES
025664  005004                          CLR     R4                      ;SET RAM ADDRESS AT ZERO
025666  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
025672  105065  000000                  CLRB    TSDB(R5)                ;SET INTO MAINTENANCE MODE
025676                          25$:
025676                                  BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
025676  104404                                                                                  TRAP    C$BSEG

025700  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
025704  010465  000000                  MOV     R4,TSDB(R5)             ;LOAD ADDRESS INTO TSDB
025710  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
025714  110265  000000                  MOVB    R2,TSDB(R5)             ;LOADS DATA INTO RAM LOCATION
025720  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
025724  016501  000000                  MOV     TSBA(R5),R1             ;READS WRAP DATA
025730  120102                          CMPB    R1,R2                   ;DOES WRITTEN(WRAP) = READ ?
025732  001404                          BEQ     30$                     ;BR IF OK, THEY ARE EQUAL
025734                                  ERRHRD  ERRNO,TSBAM2,EXPREC     ;DATA NOT WRAPPED CORRECTLY
025734  104456                                                                                  TRAP    C$ERHRD
025736  000633                                                                                  .WORD   411
025740  026242                                                                                  .WORD   TSBAM2
025742  015464                                                                                  .WORD   EXPREC
025744                          30$:
025744                                  ENDSEG                          ;<<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<<
025744                                                                                  10000$:
025744  104405                                                                                  TRAP    C$ESEG

025746  005204                          INC     R4                      ;NEXT ADDRESS
025750  020427  010000                  CMP     R4,#10000               ;END OF RAM MEMORY CHECK
025754  001350                          BNE     25$                     ;BR, MORE RAM TO GO

025756                                  ESCAPE  SUB                     ;NO CHECK IF WRITTEN INCORRECTLY
025756  104410                                                                                  TRAP    C$ESCAPE
025760  000152                                                                                  WORD    L10046 .
025762  005304                  35$:    DEC     R4                      ;SET BACK TO 7777
025764  004737  016326          40$:    JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
025770  012702  000377                  MOV     #000377,R2              ;SET UP EXPECTED DATA REGISTER
025774  005001                          CLR     R1                      ;CLEAN OUT REGISTER
025776  010465  000000                  MOV     R4,TSDB(R5)             ;SELECT ADDRESS IN RAM
026002  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY (SSR)
```

TEST 4: RAM TEST

```
026006  016501  000000                  MOV     TSBA(R5),R1             ;PICK UP RAM CONTENTS
026012  120102                          CMPB    R1,R2                   ;IS MEMORY STILL ALL ONES
026014  001404                          BEQ     43$                     ;BR, IF OK (ALL ONES)
026016                                  ERRHRD  ERRNO,TSBAM3,EXPREC     ;MEMORY CHANGED AFTER ALL ONES WRITE
026016  104456                                                                          TRAP    C$ERHRD
026020  000634                                                                          .WORD   412
026022  026324                                                                          .WORD   TSBAM3
026024  015464                                                                          .WORD   EXPREC
026026  005002                  43$:    CLR     R2                      ;SET UP NEW EXPECTED
026030  010465  000000                  MOV     R4,TSDB(R5)             ;LOAD UP RAM ADDRESS POINTER
026034  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
026040  110265  000000                  MOVB    R2,TSDB(R5)             ;WRITE DATA INTO RAM
026044  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
026050  016501  000000                  MOV     TSBA(R5),R1             ;READ RAM CONTENTS BACK
026054  120102                          CMPB    R1,R2                   ;CHECK WITH DATA WRITTEN
026056  001404                          BEQ     45$                     ;BR IF OK, DATA IN = DATA OUT
026060                                  ERRHRD  ERRNO,TSBAM2,EXPREC     ;WRITTEN DATA NOT = TO READ
026060  104456                                                                          TRAP    C$ERHRD
026062  000635                                                                          .WORD   413
026064  026242                                                                          .WORD   TSBAM2
026066  015464                                                                          .WORD   EXPREC
026070                          45$:    CKLOOP                          ;SCOPE LOOP
026070  104406                                                                          TRAP    C$CLP1
026072  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
026076  116501  000001                  MOVB    TSBAH(R5),R1            ;HIGH BYTE READ OF TSBA
026102  010203                          MOV     R2,R3                   ;DATA PATTERN WRITTEN
026104  000303                          SWAB    R3                      ;HIGH TO LOW
026106  060203                          ADD     R2,R3                   ;TOTAL OF BYTES IN LOW BYTE
026110  120103                          CMPB    R1,R3                   ;SUM OF BYTES WRITTEN TO TSDB = TSBAH
026112  001404                          BEQ     50$                     ;BR IF OK, THEY SHOULD BE
026114                                  ERRHRD  ERRNO,M2901,EXPREC      ;2901 PROBLEM ADDER
026114  104456                                                                          TRAP    C$ERHRD
026116  000636                                                                          .WORD   414
026120  026152                                                                          .WORD   M2901
026122  015464                                                                          .WORD   EXPREC
026124                          50$:    CKLOOP                          ;SCOPE LOOP
026124  104406                                                                          TRAP    C$CLP1
026126  005304                          DEC     R4                      ;DROP RAM ADDRESS POINTER
026130  001315                          BNE     40$                     ;NOT AT LOC. ZERO YET

026132                                  ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
026132                                                                                  L10046:
026132  104403                                                                          TRAP    C$ESUB

026134  004737  016446                  JSR     PC,TSTLOOP              ;DO WE NEED TO ITERATE TEST ?
026140  103002                          BCC     63$                     ;BRANCH IF NOT
026142  000137  025114                  JMP     T4LOOP                  ;EXECUTE AGAIN
026146                          63$:    EXIT    TST                     ;ALL DONE THIS TEST
026146  104432                                                                          TRAP    C$EXIT
026150  000256                                                                          .WORD   L10043 .
                                ;+
                                ;LOCAL TEXT MESSAGES FOR TEST
                                ;-

026152     040     124     123  M2901:  .ASCIZ  ' TSBA High Byte Not Sum of Last TSDB Write (2901 Error)'
026242     040     127     162  TSBAM2: .ASCIZ  ' Write to TSDB Not Equal to Read of TSBA Low Byte'
026324     127     162     151  TSBAM3: .ASCIZ  'Write To RAM Location Modified Another Location'
```

```
026404     122     101     115  TST4ID: .ASCIZ  'RAM Verification'
                                        .EVEN
026426                                  ENDTST
026426                                                          L10043:
026426  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.
                                ;
                                ;
                                ;
                                ;
026430                                  BGNTST
026430                                                                                  T5::
026430  012700  027402                  MOV     #TST5ID,R0              ;ASCII MESSAGE TO IDENTIFY TEST
026434  004737  016500                  JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
026440  012737  000024  002214          MOV     #20.,LOOPCNT            ;PERFORM 20 ITERATIONS
026446                          T5LOOP:
026446  005037  002220                  CLR     FATFLG                  ;CLEAR THE FATAL ERROR FLAG

026452                                  BGNSUB                          ;///////////// BEGIN SUBTEST ////////////
026452                                                                                  T5.1:
026452  104402                                                                                  TRAP    C$BSUB

026454  004737  015764                  JSR     PC,SOFINIT              ;DO A SOFT TO START
026460  103404                          BCS     10$                     ;BRANCH IF O.K.
026462                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;REPORT ERROR AND DROP DRIVE
026462  104455                                                                                  TRAP    C$ERDF
026464  000765                                                                                  .WORD   501
026466  003646                                                                                  .WORD   SFIERR
026470  012024                                                                                  .WORD   SFIMSG
026472  012702  177777          10$:    MOV     # 1,R2                  ;ALL ONE DATA PATTERN
```

TEST 5: SECOND INITIALIZATION TEST

```
026476  005004                          CLR     R4                      ;STARTING RAM ADDRESS
026500  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
026504  105065  000000          15$:    CLRB    TSDB(R5)                ;SET MAINTENANCE MODE
026510  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
026514  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE NEXT RAM ADDRESS
026520  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
026524  110265  000000                  MOVB    R2,TSDB(R5)             ;LOAD TEST DATA
026530  005204                          INC     R4                      ;NEXT ADDRESS TO TEST
026532  020427  007777                  CMP     R4,#7777                ;COMPARE TO LAST ADDRESS
026536  003762                          BLE     15$                     ;BRANCH TILL ALL DATA WRITTEN
026540                                  BRESET                          ;ISSUE A BUS RESET
026540  104433                                                                          TRAP    C$RESET
026542  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
026546  016501  000002                  MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
026552  010102                          MOV     R1,R2                   ;CONTENTS OF TSSR
026554  042702  176277                  BIC     #^C<HIADDR!OFL>,R2      ;THESE BITS MAY BE SET
026560  052702  002200                  BIS     #SSR!NBA,R2             ;READY AND NEW DATA SHOULD BE SET
026564  020102                          CMP     R1,R2                   ;COMPARE EXPECTED TO RECEIVED
026566  001406                          BEQ     20$                     ;BRANCH IF COMPARE
026570                                  ERRDF   ERRNO,SFHERR,SFFMSG     ;REPORT A FATAL ERROR
026570  104455                                                                          TRAP    C$ERDF
026572  000766                                                                          .WORD   502
026574  003701                                                                          .WORD   SFHERR
026576  012072                                                                          .WORD   SFFMSG
026600  005237  002220                  INC     FATFLG                  ;SET FATAL ERROR FLAG
026604                          20$:    CKLOOP                          ;LOOP ON ERROR IF FLAG SET
026604  104406                                                                          TRAP    C$CLP1
026606                                  ESCAPE  SUB                     ;EXIT IF FATAL ERROR DETECTED
026606  104410                                                                          TRAP    C$ESCAPE
026610  000170                                                                          .WORD   L10050-.
026612  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
026616  105065  000000                  CLRB    TSDB(R5)                ;PUT BACK INTO MAINTENANCE MODE
026622  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
026626  005065  000000                  CLR     TSDB(R5)                ;SET ADDRESS BACK TO 0000
026632  012702  000377                  MOV     #377,R2                 ;
026636  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
026642  110265  000000                  MOVB    R2,TSDB(R5)             ;SHOULD POINT TO RAM 0
026646  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
026652  005065  000000                  CLR     TSDB(R5)                ;SELECT LOCATION 0
026656  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
026662  116501  000000                  MOVB    TSBA(R5),R1             ;READ RAM LOCATION SPECIFIED
026666  120102                          CMPB    R1,R2                   ;LOCATION SHOULD BE 377 OCTAL
026670  001406                          BEQ     25$                     ;BR IF OK
026672                                  ERRDF   ERRNO,T5ADDR,EXPREC     ;WASN'T POINTING TO CORRECT LOC.
026672  104455                                                                          TRAP    C$ERDF
026674  000766                                                                          .WORD   502
026676  027470                                                                          .WORD   T5ADDR
026700  015464                                                                          .WORD   EXPREC
026702  005237  002220                  INC     FATFLG                  ;SET THE FATAL ERROR FLAG
026706                          25$:    CKLOOP                          ;SCOPE LOOP
026706  104406                                                                          TRAP    C$CLP1
026710                                  ESCAPE  SUB                     ;NO MORE CHECKS IF FATAL ERROR
026710  104410                                                                          TRAP    C$ESCAPE
026712  000066                                                                          .WORD   L10050-.
026714  012704  000310                  MOV     #310,R4                 ;START WITH LOC 310
026720  005002                          CLR     R2                      ;MEMORY EXPECTED SHOULD BE 000000
026722  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON AMBIGUOUS
```

```
026726  010465  000000          30$:    MOV     R4,TSDB(R5)             ;SELECT LOCATION SPECIFIED
026732  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
026736  116501  000000                  MOVB    TSBA(R5),R1             ;READ LOC CONTENTS
026742  120102                          CMPB    R1,R2                   ;CHECK MEMORY FOR 000000
026744  001406                          BEQ     40$                     ;BRANCH IF DATA OKAY
026746                                  ERRDF   ERRNO,T5MEM,SFFMSG      ;MEMORY NOT ZERO AFTER INIT.
026746  104455                                                                          TRAP    C$ERDF
026750  000766                                                                          .WORD   502
026752  027432                                                                          .WORD   T5MEM
026754  012072                                                                          .WORD   SFFMSG
026756  005237  002220                  INC     FATFLG                  ;SET THE FATAL ERROR FLAG
026762                          40$:    CKLOOP
026762  104406                                                                          TRAP    C$CLP1
026764                                  ESCAPE  SUB                     ;EXIT ON FATAL ERROR
026764  104410                                                                          TRAP    C$ESCAPE
026766  000012                                                                          .WORD   L10050-.
026770  005204                          INC     R4                      ;LOOK AT NEXT RAM LOC.
026772  020427  000400                  CMP     R4,#400                 ;AT TOP OF RAM ADDRESS SPACE
026776  001353                          BNE     30$                     ;BRANCH TILL ALL MEMORY TESTED

027000                                  ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
027000                                                                                  L10050:
027000  104403                                                                          TRAP    C$ESUB

027002  005737  002220                  TST     FATFLG                  ;IS FATAL ERROR FLAG SET ?
027006  001404                          BEQ     50$                     ;BRANCH IF NOT
027010  004737  017172                  JSR     PC,CKDROP               ;NO LOOP, TRY TO DROP DEVICE
027014  005037  002220                  CLR     FATFLG                  ;CLEAR THE FATAL ERROR FLAG
027020                          50$:
```

```
817 027020                                  BGNSUB                          ;///////////// BEGIN SUBTEST ///////////
    027020                                                                                   T5.2:
    027020  104402                                                                                   TRAP    C$BSUB
818
819 027022  004737  015764                  JSR     PC,SOFINIT              ;DO A SOFT TO START
820 027026  103404                          BCS     10$                     ;BRANCH IF O.K.
824 027030                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;REPORT ERROR AND DROP DRIVE
    027030  104455                                                                                   TRAP    C$ERDF
    027032  000767                                                                                   .WORD   503
    027034  003646                                                                                   .WORD   SFIERR
    027036  012024                                                                                   .WORD   SFIMSG
825 027040  012702  177777          10$:    MOV     #-1,R2                  ;ALL ONE DATA PATTERN
826 027044  005004                          CLR     R4                      ;STARTING RAM ADDRESS
827 027046  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
828 027052  105065  000000          15$:    CLRB    TSDB(R5)                ;SET MAINTENANCE MODE
829 027056  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
830 027062  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE NEXT RAM ADDRESS
831 027066  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
832 027072  110265  000000                  MOVB    R2,TSDB(R5)             ;LOAD TEST DATA
833 027076  005204                          INC     R4                      ;NEXT ADDRESS TO TEST
834 027100  020427  007777                  CMP     R4,#7777                ;COMPARE TO LAST ADDRESS
835 027104  003762                          BLE     15$                     ;BRANCH TILL ALL DATA WRITTEN
836 027106  005065  000002                  CLR     TSSR(R5)                ;ISSUE A SOFT RESET
837 027112  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
838 027116  016501  000002                  MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
839 027122  010102                          MOV     R1,R2                   ;CONTENTS OF TSSR
840 027124  042702  176277                  BIC     #^C<HIADDR!OFL>,R2      ;THESE BITS MAY BE SET
841 027130  052702  002200                  BIS     #SSR!NBA,R2             ;READY AND NEW DATA SHOULD BE SET
842 027134  020102                          CMP     R1,R2                   ;COMPARE EXPECTED TO RECEIVED
843 027136  001406                          BEQ     20$                     ;BRANCH IF COMPARE
847 027140                                  ERRDF   ERRNO,SFHERR,SFFMSG     ;REPORT A FATAL ERROR
    027140  104455                                                                                   TRAP    C$ERDF
    027142  000770                                                                                   .WORD   504
    027144  003701                                                                                   .WORD   SFHERR
    027146  012072                                                                                   .WORD   SFFMSG
848 027150  005237  002220                  INC     FATFLG                  ;SET FATAL ERROR FLAG
849 027154                          20$:    CKLOOP                          ;LOOP ON ERROR IF FLAG SET
    027154  104406                                                                                   TRAP    C$CLP1
850 027156                                  ESCAPE  SUB                     ;EXIT IF FATAL ERROR DETECTED
    027156  104410                                                                                   TRAP    C$ESCAPE
    027160  000170                                                                                   .WORD   L10051 .
851 027162  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
852 027166  105065  000000                  CLRB    TSDB(R5)                ;PUT BACK INTO MAINTENANCE MODE
853 027172  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
854 027176  005065  000000                  CLR     TSDB(R5)                ;SET ADDRESS BACK TO 0000
855 027202  012702  000377                  MOV     #377,R2                 ;
856 027206  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
857 027212  110265  000000                  MOVB    R2,TSDB(R5)             ;SHOULD POINT TO RAM 0
858 027216  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
859 027222  005065  000000                  CLR     TSDB(R5)                ;SELECT LOCATION 0
860 027226  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
861 027232  116501  000000                  MOVB    TSBA(R5),R1             ;READ RAM LOCATION SPECIFIED
862 027236  120102                          CMPB    R1,R2                   ;LOCATION SHOULD BE 377 OCTAL
863 027240  001406                          BEQ     25$                     ;BR IF OK
864 027242                                  ERRDF   ERRNO,T5ADDR,EXPREC     ;WASN'T POINTING TO CORRECT LOC.
    027242  104455                                                                                   TRAP    C$ERDF
    027244  000770                                                                                   .WORD   504
```

```
        027246  027470                                                                    .WORD   T5ADDR
        027250  015464                                                                    .WORD   EXPREC
    865 027252  005237  002220                  INC     FATFLG                  ;SET THE FATAL ERROR FLAG
    866 027256                          25$:    CKLOOP                          ;SCOPE LOOP
        027256  104406                                                                    TRAP    C$CLP1
    867 027260                                  ESCAPE  SUB                     ;NO MORE CHECKS IF FATAL ERROR
        027260  104410                                                                    TRAP    C$ESCAPE
        027262  000066                                                                    .WORD   L10051-.
    868 027264  012704  000310                  MOV     #310,R4                 ;START WITH LOC 310
    869 027270  005002                          CLR     R2                      ;MEMORY EXPECTED SHOULD BE 000000
    870 027272  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
    871 027276  010465  000000          30$:    MOV     R4,TSDB(R5)             ;SELECT LOCATION SPECIFIED
    872 027302  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
    873 027306  116501  000000                  MOVB    TSBA(R5),R1             ;READ LOC CONTENTS
    874 027312  120102                          CMPB    R1,R2                   ;CHECK MEMORY FOR 000000
    875 027314  001406                          BEQ     40$                     ;BRANCH IF DATA OKAY
    876 027316                                  ERRDF   ERRNO,T5MEM,SFFMSG      ;MEMORY NOT ZERO AFTER INIT.
        027316  104455                                                                    TRAP    C$ERDF
        027320  000770                                                                    .WORD   504
        027322  027432                                                                    .WORD   T5MEM
        027324  012072                                                                    .WORD   SFFMSG
    877 027326  005237  002220                  INC     FATFLG                  ;SET THE FATAL ERROR FLAG
    878 027332                          40$:    CKLOOP
        027332  104406                                                                    TRAP    C$CLP1
    879 027334                                  ESCAPE  SUB                     ;EXIT ON FATAL ERROR
        027334  104410                                                                    TRAP    C$ESCAPE
        027336  000012                                                                    .WORD   L10051-.
    880 027340  005204                          INC     R4                      ;LOOK AT NEXT RAM LOC.
    881 027342  020427  000400                  CMP     R4,#400                 ;AT TOP OF RAM ADDRESS SPACE
    882 027346  001353                          BNE     30$                     ;BRANCH TILL ALL MEMORY TESTED
    883
    884 027350                                  ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
        027350                                                                            L10051:
        027350  104403                                                                    TRAP    C$ESUB
    885
    886 027352  005737  002220                  TST     FATFLG                  ;IS FATAL ERROR FLAG SET ?
    887 027356  001402                          BEQ     50$                     ;BRANCH IF NOT
    888 027360  004737  017172                  JSR     PC,CKDROP               ;NO LOOP, TRY TO DROP DEVICE
    889 027364  004737  016446          50$:    JSR     PC,TSTLOOP              ;SHOULD WE DO ITERATIONS ?
    890 027370  103002                          BCC     60$                     ;BRANCH IF NOT
    891 027372  000137  026446                  JMP     T5LOOP                  ;LOOP UNTIL COUNT EXPIRED
    892 027376                          60$:    EXIT    TST                     ;ALL DONE THIS TEST
        027376  104432                                                                    TRAP    C$EXIT
        027400  000132                                                                    .WORD   L10047-.
    893
    894                                 ;+
    895                                 ;LOCAL TEXT MESSAGES FOR TEST
    896                                 ;-
    897
    898 027402      105     170     164 TST5ID: .ASCIZ  'Extended Initialization'
    899 027432      111     156     143 T5MEM:  .ASCIZ  'Incorrect RAM Data After Init'
    900 027470      111     156     143 T5ADDR: .ASCIZ  'Incorrect RAM Address After Init'
    901                                         .EVEN
    902 027532                                  ENDTST
        027532                                                                            L10047:
        027532  104401                                                                    TRAP    C$ETST
    903
```

```
                                        .SBTTL  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.  SUBTEST 1
                                ;       SETS UP THE INTERRUPT SERVICE ROUTINE TO FLAG UNEXPECTED
                                ;       INTERRUPTS.  THE COMMAND WORD IN THE COMMAND BUFFER IS
                                ;       INITIALIZED TO 100000 (OCTAL) AND THE REMAINING THREE WORDS IN
                                ;       THE COMMAND BUFFER ARE SET TO KNOWN UNIQUE PATTERNS.  THEN THE
                                ;       FOLLOWING SEQUENCE IS PERFORMED:
                                ;
                                ;
                                ;            1.  INITIALIZE THE CONTROLLER BY WRITING INTO THE TSSR;
                                ;                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.
                                        ;
027534                                          BGNTST
027534                                                                                          T6::
027534  012700  030763                          MOV     #TST6ID,R0              ;ASCII MESSAGE TO IDENTIFY TEST
027540  004737  016500                          JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
027544  012737  000024  002214                  MOV     #20.,LOOPCNT            ;PERFORM 20 ITERATIONS
027552                                  T6LOOP:
027552                                          BGNSUB                          ;///////////// BEGIN SUBTEST ///////////
027552                                                                                          T6.1:
027552  104402                                                                                          TRAP    C$BSUB

027554                                          SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
027554  012700  000000                                                                                  MOV     #PRI00,R0
027560  104441                                                                                          TRAP    C$SPRI
027562  012704  030440                          MOV     #T6PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
027566  012703  002750                          MOV     #TSTBLK,R3              ;BLOCK OF TEST DATA
027572  012314                          5$:     MOV     (R3)+,(R4)              ;INSERT THE NEXT TEST DATA WORD
027574                                          BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
027574  104404                                                                                          TRAP    C$BSEG
027576  004737  015764                          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
027602  103405                                  BCS     10$                     ;BR IF SOFT INIT = OK
027604  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
027606                                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
027606  104455                                                                                          TRAP    C$ERDF
027610  001131                                                                                          .WORD   601
027612  003646                                                                                          .WORD   SFIERR
027614  012024                                                                                          .WORD   SFIMSG
027616  005037  002220                  10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
027622  005037  002222                          CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
027626  004737  016326                          JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
027632  042714  000200                          BIC     #BIT7,(R4)              ;DISABLE INTERRUPTS
027636  010465  000000                          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
027642  004737  016240                          JSR     PC,WAITF                ;WAIT FOR SSR TO SET
027646  103407                                  BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
027650  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
027652                                          ERRDF   ERRNO,T6SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
027652  104455                                                                                          TRAP    C$ERDF
027654  001132                                                                                          .WORD   602
027656  030475                                                                                          .WORD   T6SSR
027660  012036                                                                                          .WORD   PKTSSR
027662  005237  002220                          INC     FATFLG                  ;SET FATAL ERROR FLAG
027666                                  15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
027666  104406                                                                                          TRAP    C$CLP1
027670                                          ESCAPE  SUB                     ;BY PASS SUBTEST IF FATAL ERROR
027670  104410                                                                                          TRAP    C$ESCAPE
027672  000170                                                                                          .WORD   L10053 .
027674  005737  002222                          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
027700  001404                                  BEQ     22$                     ;BRANCH IF NOT
027702                                          ERRHRD  ERRNO,T6INT,PKTSSR
027702  104456                                                                                          TRAP    C$ERHRD
027704  001133                                                                                          .WORD   603
027706  030553                                                                                          .WORD   T6INT
027710  012036                                                                                          .WORD   PKTSSR
027712  012702  102206                  22$:    MOV     #SC!NBA!SSR!TSNEJ,R2    ;EXPECTED CONTENTS OF TSSR
027716  004737  016326                          JSR     PC,CHKTSSR              ;WAIT FOR READY, NON AMBIGUOUS
```

TEST 6: COMMAND REJECT

```
027722  016501  000002                  MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
027726  032701  000100                  BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
027732  001402                          BEQ     25$                     ;BRANCH IF NOT OFF-LINE
027734  052702  000100                  BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
027740  020201                  25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
027742  001404                          BEQ     30$                     ;OKAY IF MATCH
027744                                  ERRHRD  ERRNO,T6NBA,PKTSSR      ;NBA NOT SET TO REJECT
027744  104456                                                                          TRAP    C$ERHRD
027746  001134                                                                          .WORD   604
027750  030450                                                                          .WORD   T6NBA
027752  012036                                                                          .WORD   PKTSSR
027754                          30$:    CKLOOP                          ;LOOP ON ERROR ?
027754  104406                                                                          TRAP    C$CLP1
027756  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
027762  016501  000000                  MOV     TSBA(R5),R1             ;GET TSBA REGISTER CONTENTS
027766  010402                          MOV     R4,R2                   ;START OF THE PACKET
027770  062702  000010                  ADD     #10,R2                  ;EXPECT TSDA TO PACKET + 10
027774  020102                          CMP     R1,R2                   ;COMPARE EXPECTED TO RECEIVED
027776  001404                          BEQ     35$                     ;ERROR IF NOT EQUAL
030000                                  ERRHRD  ERRNO,T6TSBA,EXPREC     ;PRINT THE ERROR & EXPD/RECV
030000  104456                                                                          TRAP    C$ERHRD
030002  001135                                                                          .WORD   605
030004  030711                                                                          .WORD   T6TSBA
030006  015464                                                                          .WORD   EXPREC

030010  004737  011104          35$:    JSR     PC,CKRAM                ;SEE IF DATA IN RAM IS CORRECT
030014  103404                          BCS     40$                     ;BRANCH IF PACKET IN RAM IS CORRECT
030016                                  ERRHRD  ERRNO,PKTRAM,RAMERR     ;REPORT THE RAM ERROR(S)
030016  104456                                                                          TRAP    C$ERHRD
030020  001136                                                                          .WORD   606
030022  004741                                                                          .WORD   PKTRAM
030024  015500                                                                          .WORD   RAMERR
030026                          40$:    ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<
030026                                                                          10000$:
030026  104405                                                                          TRAP    C$ESEG
030030  011300                          MOV     (R3),R0                 ;PACKET COMMAND WORD
030032  042700  177740                  BIC     #177740,R0              ;GET BITS 0-4
030036  020027  000004                  CMP     R0,#4                   ;DON'T TEST WRITE CHARACTERISTICS
030042  001002                          BNE     45$                     ;BRANCH IF OK
030044  062703  000002                  ADD     #2,R3                   ;GET NEXT WORD FROM DATA TABLE
030050  020327  003056          45$:    CMP     R3,#TBLEND              ;REACHED END OF TABLE ?
030054  103002                          BHIS    50$                     ;BRANCH IF END OF TAB
030056  000137  027572                  JMP     5$                      ;CONTINUE TEST WITH NEW DATA

030062                          50$:    ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\
030062                                                                          L10053:
030062  104403                                                                          TRAP    C$ESUB

030064  005737  002220                  TST     FATFLG                  ;ANY FATAL ERRORS ?
030070  001402                          BEQ     60$                     ;BRANCH IF NOT
030072  004737  017172                  JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
```

```
1056 030076                          60$:    BGNSUB                          ;///////////// BEGIN SUBTEST ///////////
     030076                                                                                  T6.2:
     030076  104402                                                                                  TRAP    C$BSUB
1057
1058 030100                                  SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
     030100  012700  000000                                                                          MOV     #PRI00,R0
     030104  104441                                                                                  TRAP    C$SPRI
1059 030106  012704  030440                  MOV     #T6PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
1060 030112  012703  002750                  MOV     #TSTBLK,R3              ;START OF TEST DATA
1061 030116  012314                  5$:     MOV     (R3)+,(R4)              ;PLACE NEXT DATA WORD IN PACKET
1062 030120                                  BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
     030120  104404                                                                                  TRAP    C$BSEG
1063 030122  004737  015764                  JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
1064 030126  103405                          BCS     10$                     ;BR IF SOFT INIT = OK
1068 030130  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
1069 030132                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
     030132  104455                                                                                  TRAP    C$ERDF
     030134  001137                                                                                  .WORD   607
     030136  003646                                                                                  .WORD   SFIERR
     030140  012024                                                                                  .WORD   SFIMSG
1070 030142  005037  002220          10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
1071 030146  005037  002222                  CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
1072 030152  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
1073 030156  052714  000200                  BIS     #BIT7,(R4)              ;ENABLE INTERRUPTS
1074 030162  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
1075 030166  004737  016240                  JSR     PC,WAITF                ;WAIT FOR SSR TO SET
1076 030172  103407                          BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
1077 030174  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
1081 030176                                  ERRDF   ERRNO,T6SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
     030176  104455                                                                                  TRAP    C$ERDF
     030200  001140                                                                                  .WORD   608
     030202  030475                                                                                  .WORD   T6SSR
     030204  012036                                                                                  .WORD   PKTSSR
1082 030206  005237  002220                  INC     FATFLG                  ;SET FATAL ERROR FLAG
1083 030212                          15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     030212  104406                                                                                  TRAP    C$CLP1
1084 030214                                  ESCAPE  SUB                     ;BY-PASS SUBTEST IF FATAL ERROR
     030214  104410                                                                                  TRAP    C$ESCAPE
     030216  000170                                                                                  .WORD   L10054 .
1085 030220  005737  002222                  TST     INTRFCV                 ;DID AN INTERRUPT OCCUR ?
1086 030224  001004                          BNE     22$                     ;BRANCH IF YES
1090 030226                                  ERRHRD  ERRNO,T6NINT,PKTSSR     ;REPORT ERROR IF NO INTERRUPT
     030226  104456                                                                                  TRAP    C$ERHRD
     030230  001141                                                                                  .WORD   609
     030232  030631                                                                                  .WORD   T6NINT
     030234  012036                                                                                  .WORD   PKTSSR
1091 030236  012702  102206          22$:    MOV     #SC!NBA!SSR!TSREJ,R2    ;EXPECTED CONTENTS OF TSSR
1092 030242  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
1093 030246  016501  000002                  MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
1094 030252  032701  000100                  BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
1095 030256  001402                          BEQ     25$                     ;BRANCH IF NOT OFF-LINE
1096 030260  052702  000100                  BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
1097 030264  020201                  25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
1098 030266  001404                          BEQ     30$                     ;OKAY IF MATCH
1102 030270                                  ERRHRD  ERRNO,T6NBA,PKTSSR      ;NBA NOT SET TO REJECT
     030270  104456                                                                                  TRAP    C$ERHRD
     030272  001142                                                                                  .WORD   610
```

TEST 6: COMMAND REJECT

```
        030274  030450                                                                  .WORD   T6NBA
        030276  012036                                                                  .WORD   PKTSSR
   1103 030300                          30$:    CKLOOP                          ;LOOP ON ERROR ?
        030300  104406                                                                  TRAP    C$CLP1
   1104 030302  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
   1105 030306  016501  000000                  MOV     TSBA(R5),R1             ;GET TSBA REGISTER CONTENTS
   1106 030312  010402                          MOV     R4,R2                   ;START OF THE PACKET
   1107 030314  062702  000010                  ADD     #10,R2                  ;EXPECT TSDA TO PACKET + 10
   1108 030320  020102                          CMP     R1,R2                   ;COMPARE EXPECTED TO RECEIVED
   1109 030322  001404                          BEQ     35$                     ;ERROR IF NOT EQUAL
   1113 030324                                  ERRHRD  ERRNO,T6TSBA,EXPREC     ;PRINT THE ERROR & EXPD/RECV
        030324  104456                                                                  TRAP    C$ERHRD
        030326  001143                                                                  .WORD   611
        030330  030711                                                                  .WORD   T6TSBA
        030332  015464                                                                  .WORD   EXPREC
   1114
   1115
   1116 030334  004737  011104          35$:    JSR     PC,CKRAM                ;SEE IF DATA IN RAM IS CORRECT
   1117 030340  103404                          BCS     40$                     ;BRANCH IF PACKET IN RAM IS CORRECT
   1121 030342                                  ERRHRD  ERRNO,PKTRAM,RAMERR     ;REPORT THE RAM ERROR(S)
        030342  104456                                                                  TRAP    C$ERHRD
        030344  001144                                                                  .WORD   612
        030346  004741                                                                  .WORD   PKTRAM
        030350  015500                                                                  .WORD   RAMERR
   1122 030352                          40$:    ENDSEG                          ;<<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
        030352                                                                                  10000$:
        030352  104405                                                                  TRAP    C$ESEG
   1123 030354  011300                          MOV     (R3),R0                 ;NEXT PACKET COMMAND WORD
   1124 030356  042700  177740                  BIC     #177740,R0              ;GET BITS 0-4
   1125 030362  020027  000004                  CMP     R0,#4                   ;DON'T TEST WRITE CHARACTERISTICS
   1126 030366  001002                          BNE     45$                     ;BRANCH IF NOT WRITE CHARACTERISTICS
   1127 030370  062703  000002                  ADD     #2,R3                   ;BY-PASS WRITE CHARACTERISTCS
   1128 030374  020327  003056          45$:    CMP     R3,#TBLEND              ;HAVE WE COMPLETED DATA TABLE ?
   1129 030400  103002                          BHIS    50$                     ;BRANCH IF ALL TESTED
   1130 030402  000137  030116                  JMP     5$                      ;TEST WITH NEXT DATA
   1131
   1132 030406                          50$:    ENDSUB                          ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\\
        030406                                                                                  L10054:
        030406  104403                                                                  TRAP    C$ESUB
   1133 030410  005737  002220                  TST     FATFLG                  ;ANY FATAL ERRORS ?
   1134 030414  001402                          BEQ     60$                     ;BRANCH IF NOT
   1135 030416  004737  017172                  JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
   1136 030422  004737  016446          60$:    JSR     PC,TSTLOOP              ;SHOULD WE DO ITERATIONS ?
   1137 030426  103002                          BCC     62$                     ;BRANCH IF NOT
   1138 030430  000137  027552                  JMP     T6LOOP                  ;LOOP UNTIL COUNT EXPIRED
   1139 030434                          62$:    EXIT    TST                     ;ALL DONE THIS TEST
        030434  104432                                                                  TRAP    C$EXIT
        030436  000344                                                                  .WORD   L10052 .
   1140
   1141                                 ;+
   1142                                 ;LOCAL STORAGE FOR THIS TEST
   1143                                 ;-
   1144
   1148 030440                          T6PACKET:                               ;COMMAND PACKET FOR TEST
   1149 030440  000000                          .WORD   0                       ;WILL CONTAIN VARIABLE COMMANDS
   1150 030442  052525                          .WORD   052525
   1151 030444  125252                          .WORD   125252
```

```
030446  052525                          .WORD   052525


                                ;+
                                ;LOCAL TEXT MESSAGES FOR TEST
                                ;

030450     103     157     155  T6NBA:  .ASCIZ  'Command Not Rejected'
030475     103     157     156  T6SSR:  .ASCIZ  'Contents of TSSR Incorrect After Write Packet'
030553     125     156     145  T6INT:  .ASCIZ  'Unexpected Interrupt Received On Write Packet'
030631     105     170     160  T6NINT: .ASCIZ  'Expected Interrupt Not Received On Write Packet'
030711     111     156     143  T6TSBA: .ASCIZ  'Incorrect TSBA Address After Packet Write'
030763     103     157     155  TST6ID: .ASCIZ  'Command Reject'
                                        .EVEN
031002                                  ENDTST
031002                                                                  L10052:
031002  104401                                                                  TRAP    C$ETST
```

```
                                        .SBTTL  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.
                                ;
                                ;       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.
                                ;
                                ;
                                ;
031004                          BGNTST
031004                                                                  T7::
031004  012700  034273          MOV     #TST7ID,R0              ;ASCII MESSAGE TO IDENTIFY TEST
031010  004737  016500          JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
031014  012737  000024  002214  MOV     #20.,LOOPCNT            ;PERFORM 20 ITERATIONS
031022                  T7LOOP:
031022                          BGNSUB                          ;///////////// BEGIN SUBTEST ////////////
031022                                                                  T7.1:
031022  104402                                                                  TRAP    C$BSUB
031024  004737  034322          JSR     PC,T7REST               ;SET PACKET TO START-UP VALUES

031030                          SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
031030  012700  000000                                                          MOV     #PRI00,R0
031034  104441                                                                  TRAP    C$SPRI
031036  012703  002762          MOV     #TSTBLK+10.,R3          ;START OF TEST DATA
031042  012704  033140          MOV     #T7PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
031046  012764  000010  000006  MOV     #8.,PKBCNT(R4)          ;START WITH MINIMUM ALLOWABLE VALUE
031054                  5$:
031054                          BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
031054  104404                                                                  TRAP    C$BSEG

031056  004737  015764          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
031062  103405                  BCS     10$                     ;BR IF SOFT INIT = OK
031064  010001                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
031066                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
031066  104455                                                                  TRAP    C$ERDF
031070  001275                                                                  .WORD   701
031072  003646                                                                  .WORD   SFIERR
031074  012024                                                                  .WORD   SFIMSG
```

```
1222 031076  005037  002220          10$:   CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
1223 031102  005037  002222                 CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
1224 031106  010465  000000                 MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
1225 031112  004737  016326                 JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
1226 031116  103407                         BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
1227 031120  010001                         MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
1231 031122                                 ERRDF   ERRNO,T7SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
     031122  104455                                                                                  TRAP    C$ERDF
     031124  001276                                                                                  .WORD   702
     031126  033741                                                                                  .WORD   T7SSR
     031130  012036                                                                                  .WORD   PKTSSR
1232 031132  005237  002220                 INC     FATFLG                  ;SET FATAL ERROR FLAG
1233 031136                          15$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     031136  104406                                                                                  TRAP    C$CLP1
1234 031140                                 ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
     031140  104410                                                                                  TRAP    C$ESCAPE
     031142  000152                                                                                  .WORD   10000$ .
1235 031144  005737  002222                 TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
1236 031150  001404                         BEQ     22$                     ;BRANCH IF NOT
1240 031152                                 ERRHRD  ERRNO,T7INT,PKTSSR
     031152  104456                                                                                  TRAP    C$ERHRD
     031154  001277                                                                                  .WORD   703
     031156  034121                                                                                  .WORD   T7INT
     031160  012036                                                                                  .WORD   PKTSSR
1241 031162  016501  000002          22$:   MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
1242 031166  012702  000200                 MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
1243 031172  032701  000100                 BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
1244 031176  001402                         BEQ     25$                     ;BRANCH IF NOT OFF-LINE
1245 031200  052702  000100                 BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
1246 031204  020201                  25$:   CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
1247 031206  001404                         BEQ     30$                     ;OKAY IF MATCH
1251 031210                                 ERRHRD  ERRNO,T7NBA,PKTSSR      ;NBA NOT ZERO
     031210  104456                                                                                  TRAP    C$ERHRD
     031212  001300                                                                                  .WORD   704
     031214  033300                                                                                  .WORD   T7NBA
     031216  012036                                                                                  .WORD   PKTSSR
1252 031220                          30$:   CKLOOP                          ;LOOP ON ERROR ?
     031220  104406                                                                                  TRAP    C$CLP1
1253 031222  004737  016326                 JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
1254 031226  016501  000000                 MOV     TSBA(R5),R1             ;GET TSBA REGISTER CONTENTS
1255 031232  012702  033166                 MOV     #T7BFR,R2               ;START OF THE DATA BUFFER
1256 031236  032762  000200  000012         BIT     #BIT7,XST2(R2)          ;IS EXTENDED FEATURES BIT SET ?
1257 031244  001404                         BEQ     32$                     ;BRANCH IF EXTENDED FEATURES OFF
1258 031246  005237  002224                 INC     EXTFEA                  ;SET EXTENDED FEATURES FOR SUBTEST 6
1259 031252  062702  000002                 ADD     #2,R2                   ;EXTRA WORD IF SPECIAL FEATURES
1260 031256  062702  000016          32$:   ADD     #14.,R2                 ;EXPECTED CONTENTS OF TSDA
1261 031262  020102                         CMP     R1,R2                   ;COMPARE EXPECTED TO RECEIVED
1262 031264  001404                         BEQ     35$                     ;ERROR IF NOT EQUAL
1266 031266                                 ERRHRD  ERRNO,T7TSBA,EXPREC     ;PRINT THE ERROR & EXPD/RECV
     031266  104456                                                                                  TRAP    C$ERHRD
     031270  001301                                                                                  .WORD   705
     031272  034210                                                                                  .WORD   T7TSBA
     031274  015464                                                                                  .WORD   EXPREC
1267
1268
1269 031276  004737  011104          35$:   JSR     PC,CKRAM                ;SEE IF DATA IN RAM IS CORRECT
1270 031302  103404                         BCS     40$                     ;BRANCH IF PACKET IN RAM IS CORRECT
```

```
031304
031304  104456                  ERRHRD  ERRNO,PKTRAM,RAMERR     ;REPORT THE RAM ERROR(S)
031306  001302                                                          TRAP    C$ERHRD
031310  004741                                                          .WORD   706
031312  015500                                                          .WORD   PKTRAM
                                                                        .WORD   RAMERR
031314                  40$:    ENDSEG                          ;<<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
031314                                                                  10000$:
031314  104405                                                          TRAP    C$ESEG
031316  012364  000006          MOV     (R3)+,PKBCNT(R4)        ;SET THE TEST WORD
031322  020327  003056          CMP     R3,#TBLEND              ;HAS ALL DATA BEEN TESTED ?
031326  103002                  BHIS    55$                     ;BRANCH IF ALL DATA DONE
031330  000137  031054          JMP     5$                      ;BRANCH TILL BACK TO ZERO
031334                  55$:    ENDSUB                          ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\\
031334                                                                  L10056:
031334  104403                                                          TRAP    C$ESUB
031336  005737  002220          TST     FATFLG                  ;ANY FATAL ERRORS ?
031342  001402                  BEQ     60$                     ;BRANCH IF NOT
031344  004737  017172          JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
031350                  60$:
```

TEST 7: WRITE CHARACTERISTICS

```
                                        ;+
                                        ;
                                        ;TEST 7, SUBTEST 2
                                        ;
                                        ;CHECK THAT UNUSED BITS BEING SET CAUSES
                                        ;WRITE CHARACTERISTICS COMMAND TO BE REJECTED
                                        ;
                                        ;-

031350                                          BGNSUB                          ;///////////// BEGIN SUBTEST ///////////
031350                                                                                          T7.2:
031350  104402                                                                                          TRAP    C$BSUB

031352                                          SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
031352  012700  000000                                                                                  MOV     #PRI00,R0
031356  104441                                                                                          TRAP    C$SPRI
031360  012703  033206                          MOV     #T72DATA,R3             ;START OF TEST DATA FOR SUBTEST
031364  012704  033140                  5$:     MOV     #T7PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
031370  004737  034322                          JSR     PC,T7REST               ;RESTORE PACKET TO STARTING VALUES

031374                                          BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
031374  104404                                                                                          TRAP    C$BSEG

031376  004737  015764                          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
031402  103405                                  BCS     10$                     ;BR IF SOFT INIT = OK
031404  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
031406                                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
031406  104455                                                                                          TRAP    C$ERDF
031410  001303                                                                                          .WORD   707
031412  003646                                                                                          .WORD   SFIERR
031414  012024                                                                                          .WORD   SFIMSG
031416  005037  002222                  10$:    CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
031422  010400                                  MOV     R4,R0                   ;START OF THE COMMAND PACKET
031424  061300                                  ADD     (R3),R0                 ;OFFSET TO THE DATA WORD TO TEST
031426  056310  000002                          BIS     2(R3),(R0)              ;SET THE DATA BITS TO BE TESTED
031432  010465  000000                          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
031436  004737  016240                          JSR     PC,WAITF                ;WAIT FOR SSR TO SET
031442  103405                                  BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
031444  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
031446                                          ERRDF   ERRNO,T7SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
031446  104455                                                                                          TRAP    C$ERDF
031450  001304                                                                                          .WORD   708
031452  033741                                                                                          .WORD   T7SSR
031454  012036                                                                                          .WORD   PKTSSR
031456                                  15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
031456  104406                                                                                          TRAP    C$CLP1
031460                                          ESCAPE  SEG                     ;BY-PASS CHECKS IF FATAL ERROR
031460  104410                                                                                          TRAP    C$ESCAPE
031462  000116                                                                                          .WORD   10000$-.
031464  005737  002222                          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
031470  001404                                  BEQ     22$                     ;BRANCH IF NOT
031472                                          ERRHRD  ERRNO,T7INT,PKTSSR
031472  104456                                                                                          TRAP    C$ERHRD
031474  001305                                                                                          .WORD   709
031476  034121                                                                                          .WORD   T7INT
031500  012036                                                                                          .WORD   PKTSSR
031502  016501  000002                  22$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
```

```
1336 031506  012702  102206                MOV     #SC!SSR!TSREJ!NBA,R2     ;EXPECTED CONTENTS OF TSSR
1337 031512  032701  000100                BIT     #OFL,R1                  ;IS OFF-LINE BIT SET ?
1338 031516  001402                        BEQ     25$                      ;BRANCH IF NOT OFF-LINE
1339 031520  052702  000100                BIS     #OFL,R2                  ;SET OFF-LINE IN EXPECTED DATA
1340 031524  020201                25$:    CMP     R2,R1                    ;DOES EXPECTED MATCH RECEIVED ?
1341 031526  001414                        BEQ     30$                      ;OKAY IF MATCH
1342 031530  010100                        MOV     R1,R0                    ;DATA FROM TSSR
1343 031532                                XOR     R2,R0                    ;FIND BITS IN ERROR
1344 031542  020027  002000                CMP     R0,#NBA                  ;IS NBA ONLY BIT IN ERROR ?
1345 031546  001404                        BEQ     30$                      ;DON'T PRINT ERROR IF NBA ONLY BAD BIT
1349 031550                                ERRHRD  ERRNO,T72REJ,PKTSSR      ;COMMAND NOT REJECTED
     031550  104456                                                                                TRAP    C$ERHRD
     031552  001306                                                                                .WORD   710
     031554  033353                                                                                .WORD   T72REJ
     031556  012036                                                                                .WORD   PKTSSR
1350 031560                        30$:    CKLOOP                           ;LOOP ON ERROR ?
     031560  104406                                                                                TRAP    C$CLP1
1351 031562  032701  002000                BIT     #NBA,R1                  ;IS NBA BIT SET ?
1352 031566  001004                        BNE     35$                      ;OKAY IF NBA SET
1356 031570                                ERRHRD  ERRNO,T72NBA,PKTSSR      ;NBA NOT SET
     031570  104456                                                                                TRAP    C$ERHRD
     031572  001307                                                                                .WORD   711
     031574  033222                                                                                .WORD   T72NBA
     031576  012036                                                                                .WORD   PKTSSR
1357 031600                        35$:
1358 031600                                ENDSEG                           ;<<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
     031600                                                                          10000$:
     031600  104405                                                                                TRAP    C$ESEG
1359
1360 031602  062703  000004                ADD     #4,R3                    ;POINT TO NEXT DATA PAIR
1361 031606  020327  033222                CMP     R3,#T72DONE              ;COMPARE TO END OF TEST DATA
1362 031612  103002                        BHIS    57$                      ;BRANCH IF ALL DATA TESTED
1363 031614  000137  031364                JMP     5$                       ;BRANCH TILL BACK TO ZERO
1364
1365 031620                        57$:    ENDSUB                           ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
     031620                                                                          L10057:
     031620  104403                                                                                TRAP    C$ESUB
```

```
                                        ;+
                                        ;
                                        ;TEST 7, SUBTEST 3
                                        ;
                                        ;CHECK THE WRITE CHARACTERISTICS COMMAND IS REJECTED
                                        ;IF ISSUED WITH AN INVALID DATA BLOCK BYTE COUNT
                                        ;
                                        ;-

031622                                          BGNSUB                          ;///////////// BEGIN SUBTEST ////////////
031622                                                                                          T7.3:
031622  104402                                                                                          TRAP    C$BSUB

031624                                          SETPRI  #PRIOO                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
031624  012700  000000                                                                                  MOV     #PRIOO,RO
031630  104441                                                                                          TRAP    C$SPRI
031632  012703  000001                          MOV     #1,R3                   ;STARTING BYTE COUNT
031636  012704  033140          5$:             MOV     #T7PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
031642  004737  034322                          JSR     PC,T7REST               ;RESTORE PACKET TO STARTING VALUES

031646                                          BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
031646  104404                                                                                          TRAP    C$BSEG

031650  004737  015764                          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
031654  103405                                  BCS     10$                     ;BR IF SOFT INIT = OK
031656  010001                                  MOV     RO,R1                   ;SAVE CONTENTS OF TSSR
031660                                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
031660  104455                                                                                          TRAP    C$ERDF
031662  001310                                                                                          .WORD   712
031664  003646                                                                                          .WORD   SFIERR
031666  012024                                                                                          .WORD   SFIMSG
031670  005037  002222          10$:            CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
031674  010364  000006                          MOV     R3,PKBCNT(R4)           ;INSERT THE BYTE COUNT FOR TEST
031700  010465  000000                          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
031704  004737  016240                          JSR     PC,WAITF                ;WAIT FOR SSR TO SET
031710  103405                                  BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
031712  010001                                  MOV     RO,R1                   ;SAVE CONTENTS OF TSSR
031714                                          ERRDF   ERRNO,T7SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
031714  104455                                                                                          TRAP    C$ERDF
031716  001311                                                                                          .WORD   713
031720  033741                                                                                          .WORD   T7SSR
031722  012036                                                                                          .WORD   PKTSSR
031724                          15$:            CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
031724  104406                                                                                          TRAP    C$CLP1
C31726                                          ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
031726  104410                                                                                          TRAP    C$ESCAPE
031730  000116                                                                                          .WORD   10000$-.
031732  005737  002222                          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
031736  001404                                  BEQ     22$                     ;BRANCH IF NOT
031740                                          ERRHRD  ERRNO,T7INT,PKTSSR
031740  104456                                                                                          TRAP    C$ERHRD
031742  001312                                                                                          .WORD   714
031744  034121                                                                                          .WORD   T7INT
031746  012036                                                                                          .WORD   PKTSSR
031750  016501  000002          22$:            MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
031754  012702  102206                          MOV     #SC!SSR!TSREJ!NBA,R2    ;EXPECTED CONTENTS OF TSSR
031760  032701  000100                          BIT     #OFL,R1                 ;IS OFF LINE BIT SET ?
```

```
1413 031764  001402                        BEQ     25$                     ;BRANCH IF NOT OFF-LINE
1414 031766  052702  000100                BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
1415 031772  020201                 25$:   CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
1416 031774  001414                        BEQ     30$                     ;OKAY IF MATCH
1417 031776  010100                        MOV     R1,R0                   ;DATA FROM TSSR
1418 032000                                XOR     R2,R0                   ;FIND BITS IN ERROR
1419 032010  020027  002000                CMP     R0,#NBA                 ;IS NBA ONLY BIT IN ERROR ?
1420 032014  001404                        BEQ     30$                     ;DON'T PRINT ERROR IF NBA ONLY BAD BIT
1424 032016                                ERRHRD  ERRNO,T73REJ,PKTSSR     ;COMMAND NOT REJECTED
     032016  104456                                                                     TRAP    C$ERHRD
     032020  001313                                                                     .WORD   715
     032022  033452                                                                     .WORD   T73REJ
     032024  012036                                                                     .WORD   PKTSSR
1425 032026                         30$:   CKLOOP                          ;LOOP ON ERROR ?
     032026  104406                                                                     TRAP    C$CLP1
1426 032030  032701  002000                BIT     #NBA,R1                 ;IS NBA BIT SET ?
1427 032034  001004                        BNE     35$                     ;OKAY IF NBA SET
1431 032036                                ERRHRD  ERRNO,T72NBA,PKTSSR     ;NBA NOT SET
     032036  104456                                                                     TRAP    C$ERHRD
     032040  001314                                                                     .WORD   716
     032042  033222                                                                     .WORD   T72NBA
     032044  012036                                                                     .WORD   PKTSSR
1432 032046                         35$:
1433 032046                                ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<
     032046                                                                        10000$:
     032046  104405                                                                     TRAP    C$ESEG
1434
1435 032050  005203                        INC     R3                      ;NEXT BYTE COUNT
1436 032052  020327  000006                CMP     R3,#6                   ;TESTED ALL INVALID ?
1437 032056  002002                        BGE     57$                     ;BRANCH IF TEST DONE
1438 032060  000137  031636                JMP     5$                      ;BRANCH TILL BACK TO ZERO
1439
1440 032064                         57$:   ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\
     032064                                                                        L10060:
     032064  104403                                                                     TRAP    C$ESUB
```

```
                                        ;*
                                        ;
                                        ;TEST 7, SUBTEST 4
                                        ;
                                        ;SUBTEST TO VERIFY THAT A WRITE CHARACTERISTICS COMMAND IS
                                        ;REJECTED IF AN ILLEGAL DATA BLOCK ADDRESS IS ISSUED.
                                        ;
                                        ;-

032066                                  BGNSUB                          ;//////////// BEGIN SUBTEST ////////////
032066                                                                                  T7.4:
032066  104402                                                                                  TRAP    C$BSUB

032070                                  SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
032070  012700  000000                                                                          MOV     #PRI00,R0
032074  104441                                                                                  TRAP    C$SPRI
032076  012703  033206                  MOV     #T72DATA,R3             ;START OF TEST DATA FOR SUBTEST
032102  012704  033140          5$:     MOV     #T7PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
032106  004737  034322                  JSR     PC,T7REST               ;RESTORE PACKET TO STARTING VALUES


032112  004737  015764                  JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
032116  103405                          BCS     10$                     ;BR IF SOFT INIT - OK
032120  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
032122                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
032122  104455                                                                                  TRAP    C$ERDF
032124  001315                                                                                  .WORD   717
032126  003646                                                                                  .WORD   SFIERR
032130  012024                                                                                  .WORD   SFIMSG
032132  005037  002222          10$:    CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
032136  052737  000001  033150          BIS     #1,T7DATA               ;MAKE ADDRESS ODD
032144  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
032150  004737  016240                  JSR     PC,WAITF                ;WAIT FOR SSR TO SET
032154  103405                          BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
032156  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
032160                                  ERRDF   ERRNO,T7SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
032160  104455                                                                                  TRAP    C$ERDF
032162  001316                                                                                  .WORD   718
032164  033741                                                                                  .WORD   T7SSR
032166  012036                                                                                  .WORD   PKTSSR
032170                          15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
032170  104406                                                                                  TRAP    C$CLP1
032172                                  ESCAPE  SUB                     ;BY-PASS SUBTEST IF FATAL ERROR
032172  104410                                                                                  TRAP    C$ESCAPE
032174  000116                                                                                  .WORD   L10061-.
032176  005737  002222                  TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
032202  001404                          BEQ     22$                     ;BRANCH IF NOT
032204                                  ERRHRD  ERRNO,T7INT,PKTSSR
032204  104456                                                                                  TRAP    C$ERHRD
032206  001317                                                                                  .WORD   719
032210  034121                                                                                  .WORD   T7INT
032212  012036                                                                                  .WORD   PKTSSR
032214  016501  000002          22$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
032220  012702  102206                  MOV     #SC!SSR!TSREJ!NBA,R2    ;EXPECTED CONTENTS OF TSSR
032224  032701  000100                  BIT     #OFL,R1                 ;IS OFF LINE BIT SET ?
032230  001402                          BEQ     25$                     ;BRANCH IF NOT OFF-LINE
032232  052702  000100                  BIS     #OFL,R2                 ;SET OFF LINE IN EXPECTED DATA
```

```
1489 032236  020201                25$:   CMP     R2,R1                  ;DOES EXPECTED MATCH RECEIVED ?
1490 032240  001414                       BEQ     30$                    ;OKAY IF MATCH
1491 032242  010100                       MOV     R1,R0                  ;DATA FROM TSSR
1492 032244                               XOR     R2,R0                  ;FIND BITS IN ERROR
1493 032254  020027  002000               CMP     R0,#NBA                ;IS NBA ONLY BIT IN ERROR ?
1494 032260  001404                       BEQ     30$                    ;DON'T PRINT ERROR IF NBA ONLY BAD BIT
1498 032262                               ERRHRD  ERRNO,T74REJ,PKTSSR    ;COMMAND NOT REJECTED
     032262  104456                                                                        TRAP    C$ERHRD
     032264  001320                                                                        .WORD   720
     032266  033545                                                                        .WORD   T74REJ
     032270  012036                                                                        .WORD   PKTSSR
1499 032272                        30$:   CKLOOP                         ;LOOP ON ERROR ?
     032272  104406                                                                        TRAP    C$CLP1
1500 032274  032701  002000               BIT     #NBA,R1                ;IS NBA BIT SET ?
1501 032300  001004                       BNE     35$                    ;OKAY IF NBA SET
1505 032302                               ERRHRD  ERRNO,T72NBA,PKTSSR    ;NBA NOT SET
     032302  104456                                                                        TRAP    C$ERHRD
     032304  001321                                                                        .WORD   721
     032306  033222                                                                        .WORD   T72NBA
     032310  012036                                                                        .WORD   PKTSSR
1506
1507 032312                        35$:   ENDSUB                         ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
     032312                                                                   L10061:
     032312  104403                                                                        TRAP    C$ESUB
1508
```

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

032314                                          BGNSUB                          ;//////////// BEGIN SUBTEST ////////////
032314                                                                                          T7.5:
032314  104402                                                                                          TRAP    C$BSUB

032316                                          SETPRI  #PRI00                  ;LOWER PRIORITY TO ^LLOW INTERRUPTS
032316  012700  000000                                                                                  MOV     #PRI00,R0
032322  104441                                                                                          TRAP    C$SPRI
032324  012703  000001                          MOV     #1,R3                   ;STARTING BUFFER LENGTH
032330  012704  033140          5$:             MOV     #T7PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
032334  004737  034322                          JSR     PC,T7REST               ;RESTORE PACKET TO STARTING VALUES

032340                                          BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
032340  104404                                                                                          TRAP    C$BSEG

032342  004737  015764                          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
032346  103405                                  BCS     10$                     ;BR IF SOFT INIT - OK
032350  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
032352                                          ERRDF   ERRNO,SFIERR,SFIMSC     ;DEVICE FATAL ERROR DURING INIT
032352  104455                                                                                          TRAP    C$ERDF
032354  001322                                                                                          .WORD   722
032356  003646                                                                                          .WORD   SFIERR
032360  012024                                                                                          .WORD   SFIMSG
032362  005037  002222          10$:            CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
032366  010337  033154                          MOV     R3,T7DATA+4             ;INSERT THE BAD MESSAGE LENGTH
032372  010465  000000                          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
032376  004737  016240                          JSR     PC,WAITF                ;WAIT FOR SSR TO SET
032402  103405                                  BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
032404  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
032406                                          ERRDF   ERRNO,T7SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
032406  104455                                                                                          TRAP    C$ERDF
032410  001323                                                                                          .WORD   723
032412  033741                                                                                          .WORD   T7SSR
032414  012036                                                                                          .WORD   PKTSSR
032416                          15$:            CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
032416  104406                                                                                          TRAP    C$CLP1
032420                                          ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
032420  104410                                                                                          TRAP    C$ESCAPE
032422  000116                                                                                          .WORD   10000$ .
032424  005737  002222                          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
032430  001404                                  BEQ     22$                     ;BRANCH IF NOT
032432                                          ERRHRD  ERRNO,T7INT,PKTSSR
032432  104456                                                                                          TRAP    C$ERHRD
032434  001324                                                                                          .WORD   724
032436  034121                                                                                          .WORD   T7INT
032440  012036                                                                                          .WORD   PKTSSR
032442  016501  000002          22$:            MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
032446  012702  102206                          MOV     #SC!SSR!TSREJ!NBA,R2    ;EXPECTED CONTENTS OF TSSR
032452  032701  000100                          BIT     #OFL,R1                 ;IS OFF LINE BIT SET ?
```

```
1556 032456  001402                          BEQ     25$                     ;BRANCH IF NOT OFF LINE
1557 032460  052702  000100                  BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
1558 032464  020201                   25$:   CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
1559 032466  001414                          BEQ     30$                     ;OKAY IF MATCH
1560 032470  010100                          MOV     R1,R0                   ;DATA FROM TSSR
1561 032472                                  XOR     R2,R0                   ;FIND BITS IN ERROR
1562 032502  020027  002000                  CMP     R0,#NBA                 ;IS NBA ONLY BIT IN ERROR ?
1563 032506  001404                          BEQ     30$                     ;DON'T PRINT ERROR IF NBA ONLY BAD BIT
1567 032510                                  ERRHRD  ERRNO,T75REJ,PKTSSR     ;COMMAND NOT REJECTED
     032510  104456                                                                          TRAP    C$ERHRD
     032512  001325                                                                          .WORD   725
     032514  033643                                                                          .WORD   T75REJ
     032516  012036                                                                          .WORD   PKTSSR
1568 032520                           30$:   CKLOOP                          ;LOOP ON ERROR ?
     032520  104406                                                                          TRAP    C$CLP1
1569 032522  032701  002000                  BIT     #NBA,R1                 ;IS NBA BIT SET ?
1570 032526  001004                          BNE     35$                     ;OKAY IF NBA SET
1574 032530                                  ERRHRD  ERRNO,T72NBA,PKTSSR     ;NBA NOT SET
     032530  104456                                                                          TRAP    C$ERHRD
     032532  001326                                                                          .WORD   726
     032534  033222                                                                          .WORD   T72NBA
     032536  012036                                                                          .WORD   PKTSSR
1575 032540                           35$:
1576 032540                                  ENDSEG                          ;<<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
     032540                                                                                  10000$:
     032540  104405                                                                          TRAP    C$ESEG
1577
1578 032542  005203                          INC     R3                      ;NEXT BUFFER LENGTH
1579 032544  020327  000016                  CMP     R3,#14.                 ;HAVE ALL BAD VALUES BEEN TESTED ?
1580 032550  002002                          BGE     57$                     ;BRANCH IF ALL TESTED
1581 032552  000137  032330                  JMP     5$                      ;BRANCH TILL BACK TO ZERO
1582
1583 032556                           57$:   ENDSUB                          ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
     032556                                                                                  L10062:
     032556  104403                                                                          TRAP    C$ESUB
```

```
                                        ;+
                                        ;
                                        ;TEST 7, SUBTEST 6
                                        ;
                                        ;THIS SUBTEST IS EXECUTED ONLY IF THE EXTENDED
                                        ;FEATURES MODE IS ENABLED (AS DETERMINED BY EXAMINING
                                        ;XST2 AFTER A PREVIOUS EXECUTION OF WRITE CHARACTERISTICS).
                                        ;IT VERIFIES THAT A FIFTH CHARACTERISTICS DATA WORD IS FETCHED
                                        ;IF THE BYTE COUNT PARAMETER IN THE COMMAND PACKET IS 10 DECIMAL
                                        ;OR GREATER.
                                        ;
                                        ;-
 032560                                         BGNSUB                          ;///////////// BEGIN SUBTEST ///////////
 032560                                                                                          T7.6:
 032560  104402                                                                                          TRAP    C$BSUB
 032562  005737  002224                         TST     EXTFEA                  ;IS EXTENDED FEATURES SOFT. SW SET?
 032566  001002                                 BNE     4$                      ;BR. IF SOFTWARE SWITCH IS SET (ON)
 032570                                         EXIT    TST                     ;NO EXTENDED FEATURES EXIT THIS TEST
 032570  104432                                                                                          TRAP    C$EXIT
 032572  001576                                                                                          .WORD   L10055 .
 032574  004737  034322                 4$:     JSR     PC,T7REST               ;SET PACKET TO START-UP VALUES
                                                
 032600                                         SETPRI  @PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
 032600  012700  000000                                                                                  MOV     @PRI00,R0
 032604  104441                                                                                          TRAP    C$SPRI
 032606  012703  002764                         MOV     @TSTBLK+12.,R3          ;START OF TEST DATA
 032612  012704  033140                         MOV     @T7PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
 032616  012737  000200  033160                 MOV     @200,T7SP               ;SPECIAL BIT SET FOR EXTFEA RAM RD
 032624  012764  000012  000006                 MOV     @10.,PKBCNT(R4)         ;START WITH EXTENDED FEATURES VALUE
 032632                                 5$:
 032632                                         BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
 032632  104404                                                                                          TRAP    C$BSEG
                                                
 032634  004737  015764                         JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
 032640  103405                                 BCS     10$                     ;BR IF SOFT INIT = OK
 032642  010001                                 MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 032644                                         ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
 032644  104455                                                                                          TRAP    C$ERDF
 032646  001327                                                                                          .WORD   727
 032650  003646                                                                                          .WORD   SFIERR
 032652  012024                                                                                          WORD    SFIMSG
 032654  005037  002220                 10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
 032660  005037  002222                         CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
 032664  010465  000000                         MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
 032670  004737  016326                         JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
 032674  103407                                 BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
 032676  010001                                 MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 032700                                         ERRDF   ERRNO,T7SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
 032700  104455                                                                                          TRAP    C$ERDF
 032702  001330                                                                                          .WORD   728
 032704  033741                                                                                          .WORD   T7SSR
 032706  012036                                                                                          .WORD   PKTSSR
 032710  005237  002220                         INC     FATFLG                  ;SET FATAL ERROR FLAG
 032714                                 15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
 032714  104406                                                                                          TRAP    C$CLP1
 032716                                         ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
 032716  104410                                                                                          TRAP    C$ESCAPE
```

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     032720  000156
1631 032722  005737  002222                TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?                .WORD   10000$-.
1632 032726  001404                        BEQ     22$                     ;BRANCH IF NOT
1636 032730                                ERRHRD  ERRNO,T7INT,PKTSSR
     032730  104456                                                                                                 TRAP    C$ERHRD
     032732  001331                                                                                                 .WORD   729
     032734  034121                                                                                                 .WORD   T7INT
     032736  012036                                                                                                 .WORD   PKTSSR
1637 032740  016501  000002          22$:  MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
1638 032744  012702  000200                MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
1639 032750  032701  000100                BIT     #OFL,R1                 ;IS OFF LINE BIT SET ?
1640 032754  001402                        BEQ     25$                     ;BRANCH IF NOT OFF-LINE
1641 032756  052702  000100                BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
1642 032762  020201                  25$:  CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
1643 032764  001404                        BEQ     30$                     ;OKAY IF MATCH
1647 032766                                ERRHRD  ERRNO,T7NBA,PKTSSR      ;NBA NOT ZERO
     032766  104456                                                                                                 TRAP    C$ERHRD
     032770  001332                                                                                                 .WORD   730
     032772  033300                                                                                                 .WORD   T7NBA
     032774  012036                                                                                                 .WORD   PKTSSR
1648 032776                          30$:  CKLOOP                          ;LOOP ON ERROR ?
     032776  104406                                                                                                 TRAP    C$CLP1
1649 033000  004737  016326                JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
1650 033004  016501  000000                MOV     TSBA(R5),R1             ;GET TSBA REGISTER CONTENTS
1651 033010  012702  033166                MOV     #T7BFR,R2               ;START OF THE DATA BUFFER
1652 033014  032762  000200  000012        BIT     #BIT7,XST2(R2)          ;IS EXTENDED FEATURES BIT SET ?
1653 033022  001402                        BEQ     32$                     ;BRANCH IF EXTENDED FEATURES OFF
1654 033024  062702  000002                ADD     #2,R2                   ;EXTRA WORD IF SPECIAL FEATURES
1655 033030  062702  000016          32$:  ADD     #14.,R2                 ;EXPECTED CONTENTS OF TSDA
1656 033034  020102                        CMP     R1,R2                   ;COMPARE EXPECTED TO RECEIVED
1657 033036  001404                        BEQ     35$                     ;ERROR IF NOT EQUAL
1661 033040                                ERRHRD  ERRNO,T7TSBA,EXPREC     ;PRINT THE ERROR & EXPD/RECV
     033040  104456                                                                                                 TRAP    C$ERHRD
     033042  001333                                                                                                 .WORD   731
     033044  034210                                                                                                 .WORD   T7TSBA
     033046  015464                                                                                                 .WORD   EXPREC
1662
1663
1664 033050  012704  033150          35$:  MOV     #T7DATA,R4              ;SET POINTER FOR CHECKER
1665 033054  004737  011214                JSR     PC,CKRAM2               ;SEE IF DATA IN RAM IS CORRECT
1666 033060  103404                        BCS     40$                     ;BRANCH IF PACKET IN RAM IS CORRECT
1670 033062                                ERRHRD  ERRNO,PKTRAM,RAMERR     ;REPORT THE RAM ERROR(S)
     033062  104456                                                                                                 TRAP    C$ERHRD
     033064  001334                                                                                                 .WORD   732
     033066  004741                                                                                                 .WORD   PKTRAM
     033070  015500                                                                                                 .WORD   RAMERR
1671
1672 033072  012704  033140          40$:  MOV     #T7PACKET,R4            ;RESET PACKET POINTER
1673 033076                                ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
     033076                                                                                   10000$:
     033076  104405                                                                                                 TRAP    C$ESEG
1674
1675 033100  012364  000006                MOV     (R3)+,PKBCNT(R4)        ;SET THE TEST WORD
1676 033104  020327  003056                CMP     R3,#TBLEND              ;HAS ALL DATA BEEN TESTED ?
1677 033110  103002                        BHIS    55$                     ;BRANCH IF ALL DATA DONE
1678 033112  000137  032632                JMP     5$                      ;BRANCH TILL BACK TO ZERO
1679
```

```
033116                          55$:    ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
033116                                                                                  L10063:
033116  104403                                                                                  TRAP    C$ESUB

033120  005737  002220                  TST     FATFLG                  ;ANY FATAL ERRORS ?
033124  001402                          BEQ     60$                     ;BRANCH IF NOT
033126  004737  017172                  JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
033132                          60$:
033132                                  EXIT    TST                     ;ALL DONE THIS TEST
033132  104432                                                                                  TRAP    C$EXIT
033134  001234                                                                                  .WORD   L10055-.

                                ;+
                                ;LOCAL STORAGE FOR THIS TEST
                                ;

        033140                          .=<.+10>&177770
033140                          T7PACKET:                               ;COMMAND PACKET FOR TEST
033140  100004                          .WORD   100004                  ;WRITE CHARACTERISTICS COMMAND, WITH ACK
033142  033150                          .WORD   T7DATA                  ;ADDRESS OF CHARACTERISTICS BLOCK
033144  000000                          .WORD   0
033146  000010                          .WORD   8.                      ;STARTING VALUE OF BLOCK SIZE

033150                          T7DATA:                                 ;CHARACTERISTICS DATA BLOCK
033150  033166                          .WORD   T7BFR                   ;ADDRESS OF MESSAGE BUFFER
033152  000000                          .WORD   0
033154  000016                          .WORD   14.                     ;LENGTH OF MESSAGE BUFFER
033156  000000                          .WORD   0
033160  000000                  T7SP:   .WORD   0                       ;EXTFEA EXTRA WORD

033162  000000  000000                  .WORD   0,0                     ;SPACE
033166                          T7BFR:  .BLKW   8.                      ;MESSAGE BUFFER

                                ;+
                                ;
                                ;TEST DATA FOR SUBTEST TWO
                                ;
                                ;DATA HAS FORMAT:
                                ;
                                ;       1ST WORD        OFFSET TO TEST WORD IN PACKET
                                ;       2ND WORD        BITS TO SET FOR TEST
                                ;
                                ;-

033206                          T72DATA:
033206  000000  037140                  .WORD   0,BIT5!BIT6!BIT9!BIT10!BIT11!BIT12!BIT13
033212  000002  000001                  .WORD   2,BIT0
033216  000004  100100                  .WORD   4,BIT6!BIT15
        033222                  T72DONE=.


                                ;+
                                ;LOCAL TEXT MESSAGES FOR TEST
                                ;

033222      116     102     101 T72NBA: .ASCIZ  'NBA Not Set On Rejected WRITE CHARACTERISTICS'
033300      127     122     111 T7NBA:  .ASCIZ  'WRITE CHARACTERISTICS Command Not Accepted'
```

```
033353     127     122     111  T72REJ: .ASCIZ  'WRITE CHARACTERISTICS Not Rejected With Non-Zero Unused Fields'
033452     127     122     111  T73REJ: .ASCIZ  'WRITE CHARACTERISTICS Not Rejected With Invalid Data Count'
033545     127     122     111  T74REJ: .ASCIZ  'WRITE CHARACTERISTICS Not Rejected With Invalid Block Address'
033643     127     122     111  T75REJ: .ASCIZ  'WRITE CHARACTERISTICS Not Rejected With Invalid Buffer Length'
033741     103     157     156  T7SSR:  .ASCIZ  'Contents of TSSR Incorrect After WRITE CHARACTERISTICS'
034030     105     170     160  T7NINT: .ASCIZ  'Expected Interrupt Not Received On WRITE CHARACTERISTICS'
034121     125     156     145  T7INT:  .ASCIZ  'Unexpected Interrupt Received On WRITE CHARACTERISTICS'
034210     111     156     143  T7TSBA: .ASCIZ  'Incorrect TSBA Address After WRITE CHARACTERISTICS'
034273     127     162     151  TST7ID: .ASCIZ  'Write Characteristics'
                                        .EVEN
```

TEST 7: WRITE CHARACTERISTICS

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

034322                                  T7REST:
034322                                          SAVREG                          ;SAVE THE REGISTERS
034326  012701  033140                          MOV     #T7PACKET,R1            ;START OF THE PACKET
034332  012721  100004                          MOV     #100004,(R1)+           ;WRITE CHARACTERISTICS WITH ACK
034336  012721  033150                          MOV     #T7DATA,(R1)+           ;ADDRESS OF CHAR DATA BLOCK
034342  005021                                  CLR     (R1)+                   ;EXTENDED ADDRESS
034344  012721  000010                          MOV     #8.,(R1)+               ;SIZE OF DATA BLOCK IN BYTES
034350  012721  033166                          MOV     #T7BFR,(R1)+            ;ADDRESS OF MESSAGE BUFFER
034354  005021                                  CLR     (R1)+
034356  012721  000020                          MOV     #16.,(R1)+              ;LENGTH OF MESSAGE BUFFER
034362  005021                                  CLR     (R1)+
034364  005011                                  CLR     (R1)
034366  000207                                  RTS     PC                      ;RETURN
034370                                          ENDTST
034370                                                                                  L10055:
034370  104401                                                                                  TRAP    C$ETST
```

```
                                        .SBTTL  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.
                                ;
                                ;       THE TEST PROCEEDS AS FOLLOWS:
                                ;
                                ;            1.  THE CONTROLLER IS INITIALIZED BY WRITING INTO THE TSSR.
                                ;
                                ;            2.  A WRITE CHARACTERISTICS COMMAND IS ISSUED (WITH CVC=0)
                                ;                AND XSTO IN THE RETURNED MESSAGE BUFFER IS EXAMINED;
                                ;                THE VCK BIT SHOULD BE CLEAR (0).
                                ;
                                ;            3.  THE PREVIOUS STEP IS REPEATED TO VERIFY THAT VCK DOES
                                ;                NOT CHANGE (REMAINS AT 0).
                                ;
                                ;            4.  A WRITE CHARACTERISTICS COMMAND IS ISSUED WITH CVC=1
                                ;                AND THE VCK BIT IN XSTO IN THE MESSAGE BUFFER IS
                                ;                EXAMINED;  THE VCK BIT SHOULD BE CLEAR (0).
                                ;
                                ;            5.  A WRITE CHARACTERISTICS COMMAND IS ISSUED WITH CVC=0
                                ;                AND THE VCK BIT IN XSTO IN THE MESSAGE BUFFER IS
                                ;                EXAMINED;  THE VCK BIT SHOULD REMAIN CLEAR (0).
                                ;
                                ;
034372                                  BGNTST
034372                                                                                  T8::
034372  012700  035257                  MOV     #TST8ID,R0              ;ASCII MESSAGE TO IDENTIFY TEST
034376  004737  016500                  JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
034402  012737  000024  002214          MOV     #20.,LOOPCNT            ;PERFORM 20 ITERATIONS
034410                          T8LOOP:

034410  012704  035000                  MOV     #T8PACKET,R4            ;PACKET FOR WRITE CHARACTERISTICS
034414  004737  015764          5$:     JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
034420  103405                          BCS     10$                     ;BR IF SOFT INIT = OK
034422  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
034424                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
034424  104455                                                                          TRAP    C$ERDF
034426  001441                                                                          .WORD   801
034430  003646                                                                          .WORD   SFIERR
034432  012024                                                                          .WORD   SFIMSG
034434  042714  040000          10$:    BIC     #BIT14,(R4)             ;CLEAR THE CVC BIT
034440  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS FOR WRITE CHAR
034444  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
034450  103405                          BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
034452  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
034454                                  ERRDF   ERRNO,T8SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
034454  104455                                                                          TRAP    C$ERDF
```

TEST 8: VOLUME CHECK

```
        034456  001442                                                                  .WORD   802
        034460  035170                                                                  .WORD   T8SSR
        034462  012036                                                                  .WORD   PKTSSR
   1831 034464                          15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
        034464  104406                                                                  TRAP    C$CLP1
   1832 034466                                  ESCAPE  TST                     ;EXIT IF FATAL ERROR
        034466  104410                                                                  TRAP    C$ESCAPE
        034470  000604                                                                  .WORD   L10064 .
   1833 034472  012702  035022                  MOV     #T8BFR,R2               ;ADDRESS OF THE MESSAGE BUFFER
   1834 034476  032762  000020  000006          BIT     #XSOVCK,XSTO(R2)        ;IS VOLUME CHECK SET IN XSTO ?
   1835 034504  001406                          BEQ     20$                     ;OKAY IF VOLUME CHECK IS CLEAR
   1839 034506  016501  000002                  MOV     TSSR(R5),R1             ;CONTENTS OF TSSR FOR ERROR REPORT
   1840 034512                                  ERRHRD  ERRNO,T8NVCK,PKTMES     ;VOLUME CHECK NOT CLEAR
        034512  104456                                                                  TRAP    C$ERHRD
        034514  001443                                                                  .WORD   803
        034516  035077                                                                  .WORD   T8NVCK
        034520  012100                                                                  .WORD   PKTMES
   1841 034522                          20$:    CKLOOP                          ;LOOP ON ERROR ?
        034522  104406                                                                  TRAP    C$CLP1
   1842 034524  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS FOR WRITE CHAR
   1843 034530  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
   1844 034534  103405                          BCS     25$                     ;BR IF CARRY SET (GOOD RETURN)
   1845 034536  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
   1849 034540                                  ERRDF   ERRNO,T8SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
        034540  104455                                                                  TRAP    C$ERDF
        034542  001444                                                                  .WORD   804
        034544  035170                                                                  .WORD   T8SSR
        034546  012036                                                                  .WORD   PKTSSR
   1850 034550                          25$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
        034550  104406                                                                  TRAP    C$CLP1
   1851 034552                                  ESCAPE  TST                     ;EXIT IF FATAL ERROR
        034552  104410                                                                  TRAP    C$ESCAPE
        034554  000520                                                                  .WORD   L10064-.
   1852 034556  032762  000020  000006          BIT     #XSOVCK,XSTO(R2)        ;IS VOLUME CHECK SET IN XSTO ?
   1853 034564  001406                          BEQ     30$                     ;OKAY IF VOLUME CHECK IS SET
   1857 034566  016501  000002                  MOV     TSSR(R5),R1             ;CONTENTS OF TSSR FOR ERROR REPORT
   1858 034572                                  ERRHRD  ERRNO,T8NVCK,PKTMES     ;VOLUME CHECK NOT SET
        034572  104456                                                                  TRAP    C$ERHRD
        034574  001445                                                                  .WORD   805
        034576  035077                                                                  .WORD   T8NVCK
        034600  012100                                                                  .WORD   PKTMES
   1859 034602                          30$:    CKLOOP                          ;LOOP ON ERROR ?
        034602  104406                                                                  TRAP    C$CLP1
   1860 034604  052714  040000                  BIS     #BIT14,(R4)             ;SET THE CVC BIT
   1861 034610  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS FOR WRITE CHAR
   1862 034614  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
   1863 034620  103405                          BCS     35$                     ;BR IF CARRY SET (GOOD RETURN)
   1864 034622  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
   1868 034624                                  ERRDF   ERRNO,T8SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
        034624  104455                                                                  TRAP    C$ERDF
        034626  001446                                                                  .WORD   806
        034630  035170                                                                  .WORD   T8SSR
        034632  012036                                                                  .WORD   PKTSSR
   1869 034634                          35$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
        034634  104406                                                                  TRAP    C$CLP1
   1870 034636                                  ESCAPE  TST                     ;EXIT IF FATAL ERROR
        034636  104410                                                                  TRAP    C$ESCAPE
```

TEST 8: VOLUME CHECK

```
        034640  000434                                                                  .WORD   L10064-.
   1871 034642  032762  000020  000006          BIT     #XSOVCK,XSTO(R2)        ;IS VOLUME CHECK CLEAR IN XSTO ?
   1872 034650  001406                          BEQ     40$                     ;OKAY IF VOLUME CHECK IS CLEARED
   1876 034652  016501  000002                  MOV     TSSR(R5),R1             ;CONTENTS OF TSSR FOR ERROR REPORT
   1877 034656                                  ERRHRD  ERRNO,T8VCK,PKTMES      ;VOLUME CHECK NOT CLEARED
        034656  104456                                                                  TRAP    C$ERHRD
        034660  001447                                                                  .WORD   807
        034662  035042                                                                  .WORD   T8VCK
        034664  012100                                                                  .WORD   PKTMES
   1878 034666                          40$:    CKLOOP                          ;LOOP ON ERROR ?
        034666  104406                                                                  TRAP    C$CLP1
   1879 034670  042714  040000                  BIC     #BIT14,(R4)             ;CLEAR THE CVC BIT
   1880 034674  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS FOR WRITE CHAR
   1881 034700  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
   1882 034704  103405                          BCS     45$                     ;BR IF CARRY SET (GOOD RETURN)
   1883 034706  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
   1887 034710                                  ERRDF   ERRNO,T8SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
        034710  104455                                                                  TRAP    C$ERDF
        034712  001450                                                                  .WORD   808
        034714  035170                                                                  .WORD   T8SSR
        034716  012036                                                                  .WORD   PKTSSR
   1888 034720                          45$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
        034720  104406                                                                  TRAP    C$CLP1
   1889 034722                                  ESCAPE  TST                     ;EXIT IF FATAL ERROR
        034722  104410                                                                  TRAP    C$ESCAPE
        034724  000350                                                                  .WORD   L10064-.
   1890 034726  032762  000020  000006          BIT     #XSOVCK,XSTO(R2)        ;IS VOLUME CHECK CLEAR IN XSTO ?
   1891 034734  001406                          BEQ     50$                     ;OKAY IF VOLUME CHECK IS CLEARED
   1895 034736  016501  000002                  MOV     TSSR(R5),R1             ;CONTENTS OF TSSR FOR ERROR REPORT
   1896 034742                                  ERRHRD  ERRNO,T8VCK,PKTMES      ;VOLUME CHECK NOT CLEARED
        034742  104456                                                                  TRAP    C$ERHRD
        034744  001451                                                                  .WORD   809
        034746  035042                                                                  .WORD   T8VCK
        034750  012100                                                                  .WORD   PKTMES
   1897 034752                          50$:    CKLOOP                          ;LOOP ON ERROR ?
        034752  104406                                                                  TRAP    C$CLP1
   1898 034754  004737  016446          60$:    JSR     PC,TSTLOOP              ;SHOULD WE DO ITERATIONS ?
   1899 034760  103002                          BCC     62$                     ;BRANCH IF NOT
   1900 034762  000137  034410                  JMP     T8LOOP                  ;LOOP UNTIL COUNT EXPIRED
   1901 034766                          62$:    EXIT    TST                     ;ALL DONE THIS TEST
        034766  104432                                                                  TRAP    C$EXIT
        034770  000304                                                                  .WORD   L10064 .
   1902
   1903                                 ;+
   1904                                 ;LOCAL STORAGE FOR THIS TEST
   1905                                 ;-
   1906
   1908         035000                          .=<.+10>&177770
   1910 035000                          T8PACKET:                               ;COMMAND PACKET FOR TEST
   1911 035000  100004                          .WORD   100004                  ;WRITE CHARACTERISTICS COMMAND
   1912 035002  035010                          .WORD   T8DATA                  ;ADDRESS OF CHARACTERISTICS BLOCK
   1913 035004  000000                          .WORD   0
   1914 035006  000010                          .WORD   10                      ;STARTING VALUE OF COUNTER
   1915
   1916 035010                          T8DATA:                                 ;CHARACTERISTICS DATA BLOCK
   1917 035010  035022                          .WORD   T8BFR                   ;ADDRESS OF MESSAGE BUFFER
   1918 035012  000000                          .WORD   0
```

```
035014  000020                          .WORD   16.                     ;LENGTH OF MESSAGE BUFFER
035016  000000  000000                  .WORD   0,0

035022                          T8BFR:  .BLKW   8.                      ;MESSAGE BUFFER


                                ;+
                                ;LOCAL TEXT MESSAGES FOR TEST
                                ;-

035042     126     157     154  T8VCK:  .ASCIZ  'Volume Check Bit Not Cleared'
035077     126     157     154  T8NVCK: .ASCIZ  'Volume Check Bit (VCK) Not Clear After Initialize (XSTO)'
035170     103     157     156  T8SSR:  .ASCIZ  'Contents of TSSR Incorrect After Write Characteristics'
035257     126     157     154  TST8ID: .ASCIZ  'Volume Check'
                                        .EVEN
035274                                  ENDTST
035274                                                          L10064:
035274  104401                                                          TRAP    C$ETST
```

```
                                        .SBTTL  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 XSTO
                                ;        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 XSTO IS 0.
                                ;
035276                          BGNTST
035276                                                                          T9::
035276  005037  002224          CLR     EXTFEA                  ;CLEAR EXTENDED FEATURES SWITCH
035302  012700  040311          MOV     #TST9ID,R0              ;ASCII MESSAGE TO IDENTIFY TEST
035306  004737  016500          JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
035312  012737  000024  002214  MOV     #20.,LOOPCNT            ;PERFORM 20 ITERATIONS
035320                          T9LOOP:
035320                          BGNSUB                          ;//////////// BEGIN SUBTEST ////////////
035320                                                                          T9.1:
035320  104402                                                                          TRAP    C$BSUB

035322  004737  040336          JSR     PC,T9REST               ;SET PACKET TO INITIAL VALUES
035326                          SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
035326  012700  000000                                                          MOV     #PRI00,R0
035332  104441                                                                  TRAP    C$SPRI
035334  012703  002762          MOV     #TSTBLK+10.,R3          ;START OF TEST DATA
035340  012704  037240          MOV     #T9PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
035344  012764  000010  000006  MOV     #8.,PKBCNT(R4)          ;START WITH MINIMUM ALLOWABLE VALUE
035352                          5$:
035352                          BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
035352  104404                                                                  TRAP    C$BSEG

035354  004737  015764          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
035360  103405                  BCS     10$                     ;BR IF SOFT INIT = OK
035362  010001                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
035364                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
035364  104455                                                                  TRAP    C$ERDF
035366  001605                                                                  .WORD   901
035370  003646                                                                  .WORD   SFIERR
035372  012024                                                                  .WORD   SFIMSG
035374  005037  002220          10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
035400  005037  002222          CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
035404  010465  000000          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
035410  004737  016326          JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
035414  103407                  BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
035416  010001                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
035420                          ERRDF   ERRNO,T9SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
035420  104455                                                                  TRAP    C$ERDF
```

TEST 9: COMPLETION INTERRUPT

```
        035422  001606                                                                  .WORD   902
        035424  037757                                                                  .WORD   T9SSR
        035426  012036                                                                  .WORD   PKTSSR
   1992 035430  005237  002220                INC     FATFLG                  ;SET FATAL ERROR FLAG
   1993 035434                          15$:  CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
        035434  104406                                                                  TRAP    C$CLP1
   1994 035436                                ESCAPE  SEG                     ;BY PASS SUBTEST IF FATAL ERROR
        035436  104410                                                                  TRAP    C$ESCAPE
        035440  000056                                                                  .WORD   10000$ .
   1995 035442  005737  002222                TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
   1996 035446  001004                        BNE     22$                     ;BRANCH IF YES
   2000 035450                                ERRHRD  ERRNO,T9NINT,PKTSSR
        035450  104456                                                                  TRAP    C$ERHRD
        035452  001607                                                                  .WORD   903
        035454  040046                                                                  .WORD   T9NINT
        035456  012036                                                                  .WORD   PKTSSR
   2001 035460  016501  000002          22$:  MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
   2002 035464  012702  000200                MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
   2003 035470  032701  000100                BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
   2004 035474  001402                        BEQ     25$                     ;BRANCH IF NOT OFF LINE
   2005 035476  052702  000100                BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
   2006 035502  020201                  25$:  CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
   2007 035504  001404                        BEQ     30$                     ;OKAY IF MATCH
   2011 035506                                ERRHRD  ERRNO,T9NBA,PKTSSR      ;NBA NOT ZERO
        035506  104456                                                                  TRAP    C$ERHRD
        035510  001610                                                                  .WORD   904
        035512  037316                                                                  .WORD   T9NBA
        035514  012036                                                                  .WORD   PKTSSR
   2012 035516                          30$:
   2013 035516                                ENDSEG                          ;<<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
        035516                                                                                  10000$:
        035516  104405                                                                  TRAP    C$ESEG
   2014
   2015 035520  012364  000006                MOV     (R3)+,PKBCNT(R4)        ;SET THE TEST WORD
   2016 035524  020327  003056                CMP     R3,#TBLEND              ;HAS ALL DATA BEEN TESTED ?
   2017 035530  103002                        BHIS    55$                     ;BRANCH IF ALL DATA DONE
   2018 035532  000137  035352                JMP     5$                      ;BRANCH TILL BACK TO ZERO
   2019
   2020 035536                          55$:  ENDSUB                          ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
        035536                                                                                  L10066:
        035536  104403                                                                          TRAP    C$ESUB
   2021
   2022 035540  005737  002220                TST     FATFLG                  ;ANY FATAL ERRORS ?
   2023 035544  001402                        BEQ     60$                     ;BRANCH IF NOT
   2024 035546  004737  017172                JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
   2025 035552  033727  037274  000200  60$:  BIT     T9BFR+12,#BIT7          ;EXTENDED FEATURES SET?
   2026 035560  001402                        BEQ     70$                     ;BR IF NO
   2027 035562  005237  002224                INC     EXTFEA                  ;SET EXT FEATURE FLAG
   2028 035566                          70$:
```

```
                                        ;+
                                        ;
                                        ;TEST 9, SUBTEST 2
                                        ;
                                        ;CHECK THAT UNUSED BITS BEING SET CAUSES
                                        ;WRITE CHARACTERISTICS COMMAND TO BE REJECTED
                                        ;
                                        ;-

035566                                          BGNSUB                          ;///////////// BEGIN SUBTEST ////////////
035566                                                                                          T9.2:
035566  104402                                                                                          TRAP    C$BSUB

035570                                          SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
035570  012700  000000                                                                                  MOV     #PRI00,R0
035574  104441                                                                                          TRAP    C$SPRI
035576  012703  037302                          MOV     #T92DATA,R3             ;START OF TEST DATA FOR SUBTEST
035602  012704  037240          5$:             MOV     #T9PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
035606  004737  040336                          JSR     PC,T9REST               ;RESTORE PACKET TO STARTING VALUES

035612                                          BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
035612  104404                                                                                          TRAP    C$BSEG

035614  004737  015764                          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
035620  103405                                  BCS     10$                     ;BR IF SOFT INIT = OK
035622  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
035624                                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
035624  104455                                                                                          TRAP    C$ERDF
035626  001611                                                                                          .WORD   905
035630  003646                                                                                          .WORD   SFIERR
035632  012024                                                                                          .WORD   SFIMSG
035634  005037  002222          10$:            CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
035640  010400                                  MOV     R4,R0                   ;START OF THE COMMAND PACKET
035642  061300                                  ADD     (R3),R0                 ;OFFSET TO THE DATA WORD TO TEST
035644  056310  000002                          BIS     2(R3),(R0)              ;SET THE DATA BITS TO BE TESTED
035650  010465  000000                          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
035654  004737  016240                          JSR     PC,WAITF                ;WAIT FOR SSR TO SET
035660  103405                                  BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
035662  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
035664                                          ERRDF   ERRNO,T9SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
035664  104455                                                                                          TRAP    C$ERDF
035666  001612                                                                                          .WORD   906
035670  037757                                                                                          .WORD   T9SSR
035672  012036                                                                                          .WORD   PKTSSR
035674                          15$:            CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
035674  104406                                                                                          TRAP    C$CLP1
035676                                          ESCAPE  SEG                     ;BY-PASS CHECKS IF FATAL ERROR
035676  104410                                                                                          TRAP    C$ESCAPE
035700  000056                                                                                          .WORD   10000$-.
035702  005737  002222                          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
035706  001004                                  BNE     22$                     ;BRANCH IF YES
035710                                          ERRHRD  ERRNO,T9NINT,PKTSSR
035710  104456                                                                                          TRAP    C$ERHRD
035712  001613                                                                                          .WORD   907
035714  040046                                                                                          .WORD   T9NINT
035716  012036                                                                                          .WORD   PKTSSR
035720  016501  000002          22$:            MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
```

TEST 9: COMPLETION INTERRUPT

```
2076 035724  012702  102206                MOV     #SC!SSR!TSREJ!NBA,R2     ;EXPECTED CONTENTS OF TSSR
2077 035730  032701  000100                BIT     #OFL,R1                  ;IS OFF-LINE BIT SET ?
2078 035734  001402                        BEQ     25$                      ;BRANCH IF NOT OFF-LINE
2079 035736  052702  000100                BIS     #OFL,R2                  ;SET OFF-LINE IN EXPECTED DATA
2080 035742  020201                 25$:   CMP     R2,R1                    ;DOES EXPECTED MATCH RECEIVED ?
2081 035744  001404                        BEQ     30$                      ;OKAY IF MATCH
2085 035746                                ERRHRD  ERRNO,T92REJ,PKTSSR      ;COMMAND NOT REJECTED
     035746  104456                                                                                TRAP    C$ERHRD
     035750  001614                                                                                .WORD   908
     035752  037371                                                                                .WORD   T92REJ
     035754  012036                                                                                .WORD   PKTSSR
2086 035756                         30$:
2087 035756                                ENDSEG                           ;<<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
     035756                                                                                  10000$:
     035756  104405                                                                                TRAP    C$ESEG
2088
2089 035760  062703  000004                ADD     #4,R3                    ;POINT TO NEXT DATA PAIR
2090 035764  020327  037316                CMP     R3,#T92DONE              ;COMPARE TO END OF TEST DATA
2091 035770  103002                        BHIS    59$                      ;BRANCH IF ALL DATA TESTED
2092 035772  000137  035602                JMP     5$                       ;BRANCH TILL BACK TO ZERO
2093
2094 035776                         59$:   ENDSUB                           ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\\
     035776                                                                                  L10067:
     035776  104403                                                                                TRAP    C$ESUB
```

```
                                        ;+
                                        ;
                                        ;TEST 9, SUBTEST 3
                                        ;
                                        ;CHECK THE WRITE CHARACTERISTICS COMMAND IS REJECTED
                                        ;IF ISSUED WITH AN INVALID DATA BLOCK BYTE COUNT
                                        ;
                                        ;-

036000                                          BGNSUB                          ;///////////// BEGIN SUBTEST ///////////
036000                                                                                          T9.3:
036000  104402                                                                                          TRAP    C$BSUB

036002                                          SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS.
036002  012700  000000                                                                                  MOV     #PRI00,R0
036006  104441                                                                                          TRAP    C$SPRI
036010  012703  000001                          MOV     #1,R3                   ;STARTING BYTE COUNT
036014  012704  037240          5$:             MOV     #T9PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
036020  004737  040336                          JSR     PC,T9REST               ;RESTORE PACKET TO STARTING VALUES

036024                                          BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
036024  104404                                                                                          TRAP    C$BSEG

036026  004737  015764                          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
036032  103405                                  BCS     10$                     ;BR IF SOFT INIT = OK
036034  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
036036                                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
036036  104455                                                                                          TRAP    C$ERDF
036040  001615                                                                                          .WORD   909
036042  003646                                                                                          .WORD   SFIERR
036044  012024                                                                                          .WORD   SFIMSG
036046  005037  002222          10$:            CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
036052  010364  000006                          MOV     R3,PKBCNT(R4)           ;INSERT THE BYTE COUNT FOR TEST
036056  010465  000000                          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
036062  004737  016240                          JSR     PC,WAITF                ;WAIT FOR SSR TO SET
036066  103405                                  BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
036070  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
036072                                          ERRDF   ERRNO,T9SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
036072  104455                                                                                          TRAP    C$ERDF
036074  001616                                                                                          .WORD   910
036076  037757                                                                                          .WORD   T9SSR
036100  012036                                                                                          .WORD   PKTSSR
036102                          15$:            CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
036102  104406                                                                                          TRAP    C$CLP1
036104                                          ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
036104  104410                                                                                          TRAP    C$ESCAPE
036106  000056                                                                                          .WORD   10000$
036110  005737  002222                          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
036114  001004                                  BNE     22$                     ;BRANCH IF YES
036116                                          ERRHRD  ERRNO,T9NINT,PKTSSR
036116  104456                                                                                          TRAP    C$ERHRD
036120  001617                                                                                          .WORD   911
036122  040046                                                                                          .WORD   T9NINT
036124  012036                                                                                          .WORD   PKTSSR
036126  016501  000002          22$:            MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
036132  012702  102206                          MOV     #SC!SSR!TSREJ!NBA,R2    ;EXPECTED CONTENTS OF TSSR
036136  032701  000100                          BIT     #OFL,R1                 ;IS OFF LINE BIT SET ?
```

```
2142 036142  001402                          BEQ     25$                     ;BRANCH IF NOT OFF-LINE
2143 036144  052702  000100                  BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
2144 036150  020201                  25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
2145 036152  001404                          BEQ     30$                     ;OKAY IF MATCH
2149 036154                                  ERRHRD  ERRNO,T93REJ,PKTSSR     ;COMMAND NOT REJECTED
     036154  104456                                                                          TRAP    C$ERHRD
     036156  001620                                                                          .WORD   912
     036160  037470                                                                          .WORD   T93REJ
     036162  012036                                                                          .WORD   PKTSSR
2150 036164                          30$:
2151 036164                                  ENDSEG                          ;<<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
     036164                                                                                  10000$:
     036164  104405                                                                          TRAP    C$ESEG
2152
2153 036166  005203                          INC     R3                      ;NEXT BYTE COUNT
2154 036170  020327  000006                  CMP     R3,#6                   ;TESTED ALL INVALID ?
2155 036174  002002                          BGE     59$                     ;BRANCH IF TEST DONE
2156 036176  000137  036014                  JMP     5$                      ;BRANCH TILL BACK TO ZERO
2157
2158 036202                          59$:    ENDSUB                          ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\\
     036202                                                                                  L10070:
     036202  104403                                                                          TRAP    C$ESUB
```

```
                                        ;+
                                        ;
                                        ;TEST 9, SUBTEST 4
                                        ;
                                        ;SUBTEST TO VERIFY THAT A WRITE CHARACTERISTICS COMMAND IS
                                        ;REJECTED IF AN ILLEGAL DATA BLOCK ADDRESS IS ISSUED.
                                        ;
                                        ;-

036204                                          BGNSUB                          ;///////////// BEGIN SUBTEST ////////////
036204                                                                                          T9.4:
036204  104402                                                                                          TRAP    C$BSUB

036206                                          SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
036206  012700  000000                                                                                  MOV     #PRI00,R0
036212  104441                                                                                          TRAP    C$SPRI
036214  012703  037302                          MOV     #T92DATA,R3             ;START OF TEST DATA FOR SUBTEST
036220  012704  037240          5$:             MOV     #T9PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
036224  004737  040336                          JSR     PC,T9REST               ;RESTORE PACKET TO STARTING VALUES

036230  004737  015764                          JS      PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
036234  103405                                  BCS     10$                     ;BR IF SOFT INIT = OK
036236  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
036240                                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
036240  104455                                                                                          TRAP    C$ERDF
036242  001621                                                                                          .WORD   913
036244  003646                                                                                          .WORD   SFIERR
036246  012024                                                                                          .WORD   SFIMSG
036250  005037  002222          10$:            CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
036254  052737  000001  037250                  BIS     #1,T9DATA               ;MAKE ADDRESS ODD
036262  010465  000000                          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
036266  004737  016240                          JSR     PC,WAITF                ;WAIT FOR SSR TO SET
036272  103405                                  BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
036274  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
036276                                          ERRDF   ERRNO,T9SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
036276  104455                                                                                          TRAP    C$ERDF
036300  001622                                                                                          .WORD   914
036302  037757                                                                                          .WORD   T9SSR
036304  012036                                                                                          .WORD   PKTSSR
036306                          15$:            CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
036306  104406                                                                                          TRAP    C$CLP1
036310                                          ESCAPE  SUB                     ;BY-PASS SUBTEST IF FATAL ERROR
036310  104410                                                                                          TRAP    C$ESCAPE
036312  000056                                                                                          .WORD   L10071 .
036314  005737  002222                          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
036320  001004                                  BNE     22$                     ;BRANCH IF YES
036322                                          ERRHRD  ERRNO,T9NINT,PKTSSR
036322  104456                                                                                          TRAP    C$ERHRD
036324  001623                                                                                          .WORD   915
036326  040046                                                                                          .WORD   T9NINT
036330  012036                                                                                          .WORD   PKTSSR
036332  016501  000002          22$:            MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
036336  012702  102206                          MOV     #SC!SSR!TSREJ!NBA,R2    ;EXPECTED CONTENTS OF TSSR
036342  032701  000100                          BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
036346  001402                                  BEQ     25$                     ;BRANCH IF NOT OFF-LINE
036350  052702  000100                          BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
```

```
2207 036354  020201          25$:   CMP     R2,R1                    ;DOES EXPECTED MATCH RECEIVED ?
2208 036356  001404                 BEQ     30$                      ;OKAY IF MATCH
2212 036360                         ERRHRD  ERRNO,T94REJ,PKTSSR      ;COMMAND NOT REJECTED
     036360  104456                                                                TRAP    C$ERHRD
     036362  001624                                                                .WORD   916
     036364  037563                                                                .WORD   T94REJ
     036366  012036                                                                .WORD   PKTSSR
2213 036370                         30$:
2214
2215 036370                         ENDSUB                           ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
     036370                                                                  L10071:
     036370  104403                                                                TRAP    C$ESUB
2216
```

```
                                        ;+
                                        ;
                                        ;TEST 9, SUBTEST 5
                                        ;
                                        ;CHECK THAT WRITE CHARACTERISTICS COMMAND IS REJECTED IF THE
                                        ;MESSAGE BUFFER LENGTH SPECIFIES AN INVALID COUNT (LESS THAN 14)
                                        ;
                                        ;-

036372                                          BGNSUB                          ;///////////// BEGIN SUBTEST ///////////
036372                                                                                          T9.5:
036372  104402                                                                                          TRAP    C$BSUB

036374                                          SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
036374  012700  000000                                                                                  MOV     #PRI00,R0
036400  104441                                                                                          TRAP    C$SPRI
036402  012703  000001                          MOV     #1,R3                   ;STARTING BUFFER LENGTH
036406  012704  037240          5$:             MOV     #T9PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
036412  004737  040336                          JSR     PC,T9REST               ;RESTORE PACKET TO STARTING VALUES

036416                                          BGNSEG                          ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
036416  104404                                                                                          TRAP    C$BSEG

036420  004737  015764                          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
036424  103405                                  BCS     10$                     ;BR IF SOFT INIT = OK
036426  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
036430                                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
036430  104455                                                                                          TRAP    C$ERDF
036432  001625                                                                                          .WORD   917
036434  003646                                                                                          .WORD   SFIERR
036436  012024                                                                                          .WORD   SFIMSG
036440  005037  002222          10$:            CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
036444  010337  037254                          MOV     R3,T9DATA+4             ;INSERT THE BAD MESSAGE LENGTH
036450  010465  000000                          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
036454  004737  016240                          JSR     PC,WAITF                ;WAIT FOR SSR TO SET
036460  103405                                  BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
036462  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
036464                                          ERRDF   ERRNO,T9SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
036464  104455                                                                                          TRAP    C$ERDF
036466  001626                                                                                          .WORD   918
036470  037757                                                                                          .WORD   T9SSR
036472  012036                                                                                          .WORD   PKTSSR
036474                          15$:            CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
036474  104406                                                                                          TRAP    C$CLP1
036476                                          ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
036476  104410                                                                                          TRAP    C$ESCAPE
036500  000056                                                                                          .WORD   10000$ .
036502  005737  002222                          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
036506  001004                                  BNE     22$                     ;BRANCH IF YES
036510                                          ERRHRD  ERRNO,T9NINT,PKTSSR
036510  104456                                                                                          TRAP    C$ERHRD
036512  001627                                                                                          .WORD   919
036514  040046                                                                                          .WORD   T9NINT
036516  012036                                                                                          .WORD   PKTSSR
036520  016501  000002          22$:            MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
036524  012702  102206                          MOV     #SC!SSR!TSREJ!NBA,R2    ;EXPECTED CONTENTS OF TSSR
036530  032701  000100                          BIT     #OFL,R1                 ;IS OFF LINE BIT SET ?
```

```
036534  001402                          BEQ     25$                     ;BRANCH IF NOT OFF-LINE
036536  052702  000100                  BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
036542  020201                  25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
036544  001404                          BEQ     30$                     ;OKAY IF MATCH
036546                                  ERRHRD  ERRNO,T95REJ,PKTSSR     ;COMMAND NOT REJECTED
036546  104456                                                                          TRAP    C$ERHRD
036550  001630                                                                          .WORD   920
036552  037661                                                                          .WORD   T95REJ
036554  012036                                                                          .WORD   PKTSSR
036556                          30$:
036556                                  ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<
036556                                                                                  10000$:
036556  104405                                                                          TRAP    C$ESEG

036560  005203                          INC     R3                      ;NEXT BUFFER LENGTH
036562  020327  000014                  CMP     R3,#14                  ;HAVE ALL BAD VALUES BEEN TESTED ?
036566  002002                          BGE     59$                     ;BRANCH IF ALL TESTED
036570  000137  036406                  JMP     5$                      ;BRANCH TILL BACK TO ZERO

036574                          59$:    ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
036574                                                                                  L10072:
036574  104403                                                                          TRAP    C$ESUB
```

```
                                        ;+
                                        ;
                                        ;TEST 9, SUBTEST 6
                                        ;
                                        ;THIS SUBTEST IS EXECUTED ONLY IF THE EXTENDED
                                        ;FEATURES MODE IS ENABLED (AS DETERMINED BY EXAMINING
                                        ;XST2 AFTER A PREVIOUS EXECUTION OF WRITE CHARACTERISTICS).
                                        ;IT VERIFIES THAT A FIFTH CHARACTERISTICS DATA WORD IS FETCHED
                                        ;IF THE BYTE COUNT PARAMETER IN THE COMMAND PACKET IS 10 DECIMAL
                                        ;OR GREATER.
                                        ;
                                        ;-
036576                                          BGNSUB                          ;//////////// BEGIN SUBTEST ////////////
036576                                                                                                  T9.6:
036576  104402                                                                                                  TRAP    C$BSUB
036600  005737  002224                          TST     EXTFEA                  ;IS EXTENDED FEATURES SOFT. SW SET?
036604  001002                                  BNE     4$                      ;BR, IF SOFTWARE SWITCH IS SET (ON)
036606  000137  037026                          JMP     55$                     ;EXIT SUBTEST
036612  004737  040336                  4$:     JSR     PC,T9REST               ;SET PACKET TO START-UP VALUES

036616                                          SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
036616  012700  000000                                                                                          MOV     #PRI00,R0
036622  104441                                                                                                  TRAP    C$SPRI
036624  012703  002762                          MOV     #TSTBLK+10.,R3          ;START OF TEST DATA
036630  012704  037240                          MOV     #T9PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
036634  012764  000012  000006                  MOV     #10.,PKBCNT(R4)         ;START WITH EXTENDED FEATURES VALUE
036642                                  5$:
036642                                          BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
036642  104404                                                                                                  TRAP    C$BSEG

036644  004737  015764                          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
036650  103405                                  BCS     10$                     ;BR IF SOFT INIT = OK
036652  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
036654                                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
036654  104455                                                                                                  TRAP    C$ERDF
036656  001631                                                                                                  .WORD   921
036660  003646                                                                                                  .WORD   SFIERR
036662  012024                                                                                                  .WORD   SFIMSG
036664  005037  002220                  10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
036670  005037  002222                          CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
036674  010465  000000                          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
036700  004737  016326                          JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
036704  103407                                  BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
036706  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
036710                                          ERRDF   ERRNO,T9SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
036710  104455                                                                                                  TRAP    C$ERDF
036712  001632                                                                                                  .WORD   922
036714  037757                                                                                                  .WORD   T9SSR
036716  012036                                                                                                  .WORD   PKTSSR
036720  005237  002220                          INC     FATFLG                  ;SET FATAL ERROR FLAG
036724                                  15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
036724  104406                                                                                                  TRAP    C$CLP1
036726                                          ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
036726  104410                                                                                                  TRAP    C$ESCAPE
036730  000056                                                                                                  .WORD   10000$-.
036732  005737  002222                          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
036736  001004                                  BNE     22$                     ;BRANCH IF YES
```

TEST 9: COMPLETION INTERRUPT

```
2332 036740                                ERRHRD  ERRNO,T9NINT,PKTSSR
     036740  104456                                                                TRAP    C$ERHRD
     036742  001633                                                                .WORD   923
     036744  040046                                                                .WORD   T9NINT
     036746  012036                                                                .WORD   PKTSSR
2333 036750  016501  000002        22$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
2334 036754  012702  000200                MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
2335 036760  032701  000100                BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
2336 036764  001402                        BEQ     25$                     ;BRANCH IF NOT OFF-LINE
2337 036766  052702  000100                BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
2338 036772  020201                25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
2339 036774  001404                        BEQ     30$                     ;OKAY IF MATCH
2343 036776                                ERRHRD  ERRNO,T9NBA,PKTSSR      ;NBA NOT ZERO
     036776  104456                                                                TRAP    C$ERHRD
     037000  001634                                                                .WORD   924
     037002  037316                                                                .WORD   T9NBA
     037004  012036                                                                .WORD   PKTSSR
2344 037006                        30$:
2345 037006                                ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<
     037006                                                                        10000$:
     037006  104405                                                                TRAP    C$ESEG
2346
2347 037010  012364  000006                MOV     (R3)+,PKBCNT(R4)        ;SET THE TEST WORD
2348 037014  020327  003056                CMP     R3,#TBLEND              ;HAS ALL DATA BEEN TESTED ?
2349 037020  103002                        BHIS    55$                     ;BRANCH IF ALL DATA DONE
2350 037022  000137  036642                JMP     5$                      ;BRANCH TILL BACK TO ZERO
2351
2352 037026                        55$:    ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
     037026                                                                        L10073:
     037026  104403                                                                TRAP    C$ESUB
```

```
                                        ;+
                                        ;
                                        ;TEST 9, SUBTEST 7
                                        ;
                                        ;TEST WRITE CHARACTERISTICS WITH/WITHOUT INTERRUPTS ENABLED
                                        ;
                                        ;-

037030                                          BGNSUB                          ;///////////// BEGIN SUBTEST ////////////
037030                                                                                          T9.7:
037030  104402                                                                                          TRAP    C$BSUB

037032                                          SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
037032  012700  000000                                                                                  MOV     #PRI00,R0
037036  104441                                                                                          TRAP    C$SPRI
037040  012704  037240                          MOV     #T9PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
037044  004737  040336                          JSR     PC,T9REST               ;SET UP A VALID PACKET
037050  004737  015764                          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
037054  103405                                  BCS     10$                     ;BR IF SOFT INIT = OK
037056  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
037060                                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
037060  104455                                                                                          TRAP    C$ERDF
037062  001635                                                                                          .WORD   925
037064  003646                                                                                          .WORD   SFIERR
037066  012024                                                                                          .WORD   SFIMSG
037070  005037  002222                  10$:    CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
037074  052714  000200                          BIS     #BIT7,(R4)              ;ENABLE INTERRUPTS
037100  010465  000000                          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
037104  004737  016326                          JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
037110  103405                                  BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
037112  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
037114                                          ERRDF   ERRNO,T9SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
037114  104455                                                                                          TRAP    C$ERDF
037116  001636                                                                                          .WORD   926
037120  037757                                                                                          .WORD   T9SSR
037122  012036                                                                                          .WORD   PKTSSR
037124                                  15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
037124  104406                                                                                          TRAP    C$CLP1
037126                                          ESCAPE  SUB                     ;BY-PASS SUBTEST IF FATAL ERROR
037126  104410                                                                                          TRAP    C$ESCAPE
037130  000102                                                                                          .WORD   L10074-.
037132  005737  002222                          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
037136  001004                                  BNE     22$                     ;BRANCH IF YES
037140                                          ERRHRD  ERRNO,T9NINT,PKTSSR
037140  104456                                                                                          TRAP    C$ERHRD
037142  001637                                                                                          .WORD   927
037144  040046                                                                                          .WORD   T9NINT
037146  012036                                                                                          .WORD   PKTSSR
037150                                  22$:    CKLOOP                          ;LOOP ON ERROR ?
037150  104406                                                                                          TRAP    C$CLP1

037152  005037  002222                          CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
037156  042714  000200                          BIC     #BIT7,(R4)              ;DISABLE INTERRUPTS
037162  010465  000000                          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
037166  004737  016326                          JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
037172  103405                                  BCS     25$                     ;BR IF CARRY SET (GOOD RETURN)
```

```
037174  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
037176                                  ERRDF   ERRNO,T9SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
037176  104455                                                                          TRAP    C$ERDF
037200  001640                                                                          .WORD   928
037202  037757                                                                          .WORD   T9SSR
037204  012036                                                                          .WORD   PKTSSR
037206                          25$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
037206  104406                                                                          TRAP    C$CLP1
037210                                  ESCAPE  SUB                     ;BY PASS SUBTEST IF FATAL ERROR
037210  104410                                                                          TRAP    C$ESCAPE
037212  000020                                                                          .WORD   L10074 .
037214  005737  002222                  TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
037220  001404                          BEQ     30$                     ;BRANCH IF NOT
037222                                  ERRHRD  ERRNO,T9INT,PKTSSR
037222  104456                                                                          TRAP    C$ERHRD
037224  001641                                                                          .WORD   929
037226  040137                                                                          .WORD   T9INT
037230  012036                                                                          .WORD   PKTSSR
037232                          30$:
037232                                  ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\
037232                                                                                  L10074:
037232  104403                                                                          TRAP    C$ESUB

037234                                  EXIT    TST                     ;ALL DONE THIS TEST
037234  104432                                                                          TRAP    C$EXIT
037236  001152                                                                          .WORD   L10065-.

                                ;
                                ;LOCAL STORAGE FOR THIS TEST
                                ;

037240                          T9PACKET:                               ;COMMAND PACKET FOR TEST
037240  100204                          .WORD   100204                  ;WRITE CHAR COMMAND, WITH IE, ACK
037242  037250                          .WORD   T9DATA                  ;ADDRESS OF CHARACTERISTICS BLOCK
037244  000000                          .WORD   0
037246  000010                          .WORD   8.                      ;STARTING VALUE OF BLOCK SIZE

037250                          T9DATA:                                 ;CHARACTERISTICS DATA BLOCK
037250  037262                          .WORD   T9BFR                   ;ADDRESS OF MESSAGE BUFFER
037252  000000                          .WORD   0
037254  000016                          .WORD   14.                     ;LENGTH OF MESSAGE BUFFER
037256  000000  000000                  .WORD   0,0

037262                          T9BFR:  .BLKW   8.                      ;MESSAGE BUFFER

                                ;
                                ;
                                ;TEST DATA FOR SUBTEST TWO
                                ;
                                ;DATA HAS FORMAT:
                                ;
                                ;       1ST WORD        OFFSET TO TEST WORD IN PACKET
                                ;       2ND WORD        BITS TO SET FOR TEST
                                ;
                                ;

037302                          T92DATA:
```

```
037302  000000  037140                  .WORD   0,BIT5!BIT6!BIT9!BIT10!BIT11!BIT12!BIT13
037306  000002  000001                  .WORD   2,BIT0
037312  000004  100100                  .WORD   4,BIT6!BIT15
        037316                  T92DONE=.


                                ;+
                                ;LOCAL TEXT MESSAGES FOR TEST
                                ;-

037316     127     122     111  T9NBA:   .ASCIZ  'WRITE CHARACTERISTICS Command Not Accepted'
037371     127     122     111  T92REJ:  .ASCIZ  'WRITE CHARACTERISTICS Not Rejected With Non-Zero Unused Fields'
037470     127     122     111  T93REJ:  .ASCIZ  'WRITE CHARACTERISTICS Not Rejected With Invalid Data Count'
037563     127     122     111  T94REJ:  .ASCIZ  'WRITE CHARACTERISTICS Not Rejected With Invalid Block Address'
037661     127     122     111  T95REJ:  .ASCIZ  'WRITE CHARACTERISTICS Not Rejected With Invalid Buffer Length'
037757     103     157     156  T9SSR:   .ASCIZ  'Contents of TSSR Incorrect After WRITE CHARACTERISTICS'
040046     105     170     160  T9NINT:  .ASCIZ  'Expected Interrupt Not Received On WRITE CHARACTERISTICS'
040137     125     156     145  T9INT:   .ASCIZ  'Unexpected Interrupt Received On WRITE CHARACTERISTICS'
040226     111     156     143  T9TSBA:  .ASCIZ  'Incorrect TSBA Address After WRITE CHARACTERISTICS'
040311     103     157     155  TST9ID:  .ASCIZ  'Completion Interrupt'
                                        .EVEN
```

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

040336                                  T9REST:
040336                                          SAVREG                          ;SAVE THE REGISTERS
040342  012701  037240                          MOV     #T9PACKET,R1            ;START OF THE PACKET
040346  012721  100204                          MOV     #100204,(R1)+           ;WRITE CHARACTERISTICS WITH ACK, IE
040352  012721  037250                          MOV     #T9DATA,(R1)+           ;ADDRESS OF CHAR DATA BLOCK
040356  005021                                  CLR     (R1)+                   ;EXTENDED ADDRESS
040360  012721  000010                          MOV     #8.,(R1)+               ;SIZE OF DATA BLOCK IN BYTES
040364  012721  037262                          MOV     #T9BFR,(R1)+            ;ADDRESS OF MESSAGE BUFFER
040370  005021                                  CLR     (R1)+
040372  012721  000016                          MOV     #14.,(R1)+              ;LENGTH OF MESSAGE BUFFER
040376  005021                                  CLR     (R1)+
040400  005011                                  CLR     (R1)
040402  005037  037262                          CLR     T9BFR                   ;CLEAR 1ST LOC IN MESSAGE BUFFER
040406  000207                                  RTS     PC                      ;RETURN
040410                                          ENDTST
040410                                                                                  L10065:
040410  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
                                ;
                                ;-
040412                                  BGNTST
040412                                                                          T10::
040412  012700  043337                  MOV     #TST10ID,R0             ;ASCII MESSAGE TO IDENTIFY TEST
040416  004737  016500                  JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
040422  012737  000024  002214          MOV     #20.,LOOPCNT            ;PERFORM 20 ITERATIONS
040430                          T10LOOP:

040430                                  BGNSUB                          ;///////////// BEGIN SUBTEST ///////////
040430                                                                          T10.1:
040430  104402                                                                          TRAP    C$BSUB

040432  004737  043366                  JSR     PC,T10RST               ;SET PACKET TO INITIAL VALUES
040436                                  SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
040436  012700  000000                                                          MOV     #PRI00,R0
040442  104441                                                                  TRAP    C$SPRI
040444  012704  042530                  MOV     #T10PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
040450  012764  000010  000006          MOV     #8.,PKBCNT(R4)          ;START WITH MINIMUM ALLOWABLE VALUE
040456                          5$:
040456                                  BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
040456  104404                                                                  TRAP    C$BSEG

040460  004737  015764                  JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
040464  103405                          BCS     10$                     ;BR IF SOFT INIT = OK
040466  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
040470                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
040470  104455                                                                  TRAP    C$ERDF
040472  001751                                                                  .WORD   1001
040474  003646                                                                  .WORD   SFIERR
040476  012024                                                                  .WORD   SFIMSG
040500  005037  002220          10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
040504  005037  002222                  CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
040510  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
040514  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
040520  103407                          BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
040522  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
040524                                  ERRDF   ERRNO,T10SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
040524  104455                                                                  TRAP    C$ERDF
040526  001752                                                                  .WORD   1002
040530  043070                                                                  .WORD   T10SSR
040532  012036                                                                  .WORD   PKTSSR
040534  005237  002220                  INC     FATFLG                  ;SET FATAL ERROR FLAG
040540                          15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
```

TEST 10: BASIC PACKET PROTOCOL

```
        040540  104406                                                                  TRAP    C$CLP1
   2550 040542                          ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
        040542  104410                                                                  TRAP    C$ESCAPE
        040544  000056                                                                  .WORD   10000$ .
   2551 040546  005737  002222          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
   2552 040552  001004                  BNE     22$                     ;BRANCH IF YES
   2556 040554                          ERRHRD  ERRNO,T10NINT,PKTSSR
        040554  104456                                                                  TRAP    C$ERHRD
        040556  001753                                                                  .WORD   1003
        040560  043157                                                                  .WORD   T10NINT
        040562  012036                                                                  .WORD   PKTSSR
   2557 040564  016501  000002  22$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
   2558 040570  012702  000200          MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
   2559 040574  032701  000100          BIT     #OFL,R1                 ;IS OFF LINE BIT SET ?
   2560 040600  001402                  BEQ     25$                     ;BRANCH IF NOT OFF-LINE
   2561 040602  052702  000100          BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
   2562 040606  020201  25$:            CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
   2563 040610  001404                  BEQ     30$                     ;OKAY IF MATCH
   2567 040612                          ERRHRD  ERRNO,T10NBA,PKTSSR     ;NBA NOT ZERO
        040612  104456                                                                  TRAP    C$ERHRD
        040614  001754                                                                  .WORD   1004
        040616  042731                                                                  .WORD   T10NBA
        040620  012036                                                                  .WORD   PKTSSR
   2568 040622                          30$:
   2569 040622                          ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<
        040622                                                                          10000$:
        040622  104405                                                                  TRAP    C$ESEG
   2570 040624                          BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
        040624  104404                                                                  TRAP    C$BSEG
   2571
   2572 040626  005037  002222          CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
   2573 040632  012737  025252  042552  MOV     #025252,T10BFR          ;WIPE OUT MESSAGE BUFFER AREA
   2574 040640  012714  100212          MOV     #100212,(R4)            ;SET COMMAND PACKET TO MESS BUF REL
   2575 040644  010465  000000          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
   2576 040650  004737  016326          JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
   2577 040654  103407                  BCS     45$                     ;BR IF CARRY SET (GOOD RETURN)
   2578 040656  010001                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
   2582 040660                          ERRDF   ERRNO,T10SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
        040660  104455                                                                  TRAP    C$ERDF
        040662  001755                                                                  .WORD   1005
        040664  043070                                                                  .WORD   T10SSR
        040666  012036                                                                  .WORD   PKTSSR
   2583 040670  005237  002220          INC     FATFLG                  ;SET FATAL ERROR FLAG
   2584 040674                  45$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
        040674  104406                                                                  TRAP    C$CLP1
   2585 040676  005737  002222          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
   2586 040702  001404                  BEQ     52$                     ;BRANCH IF NO
   2590 040704                          ERRHRD  ERRNO,T10INT,PKTSSR
        040704  104456                                                                  TRAP    C$ERHRD
        040706  001756                                                                  .WORD   1006
        040710  043250                                                                  .WORD   T10INT
        040712  012036                                                                  .WORD   PKTSSR
   2591 040714  016501  000002  52$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
   2592 040720  012702  000200          MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
   2593 040724  032701  000100          BIT     #OFL,R1                 ;IS OFF LINE BIT SET ?
   2594 040730  001402                  BEQ     55$                     ;BRANCH IF NOT OFF LINE
   2595 040732  052702  000100          BIS     #OFL,R2                 ;SET OFF LINE IN EXPECTED DATA
```

```
040736  020201                  55$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
040740  001404                          BEQ     60$                     ;OKAY IF MATCH
040742                                  ERRHRD  ERRNO,T10NNBA,PKTSSR    ;NBA  SET
040742  104456                                                                          TRAP    C$ERHRD
040744  001757                                                                          .WORD   1007
040746  043013                                                                          .WORD   T10NNBA
040750  012036                                                                          .WORD   PKTSSR
040752                          60$:
040752  013701  042552                  MOV     T10BFR,R1               ;PICK UP THE 1ST WORD OF MESSAGE BUFFER
040756  012702  025252                  MOV     #025252,R2              ;SET UP EXPECTED DATA
040762  020102                          CMP     R1,R2                   ;WAS ANY MESSAGE REC'D
040764  001404                          BEQ     70$                     ;BR, IF OK (EQUAL)
040766                                  ERRHRD  ERRNO,T10MBF,EXPREC     ;MESSAGE BUFFER WAS MODIFIED
040766  104456                                                                          TRAP    C$ERHRD
040770  001760                                                                          .WORD   1008
040772  042634                                                                          .WORD   T10MBF
040774  015464                                                                          .WORD   EXPREC
040776                          70$:
040776  005737  002220                  TST     FATFLG                  ;ANY FATAL ERRORS
041002  001403                          BEQ     80$                     ;BR, IF NO FATAL ERRORS
041004  004737  017172                  JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
041010                                  ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<
041010                                                                                  10001$:
041010  104405                                                                          TRAP    C$ESEG
041012                          80$:
041012                                  ENDSUB                          ;///////////// END SUBTEST ///////////
041012                                                                                  L10076:
041012  104403                                                                          TRAP    C$ESUB
```

```
                                        ;+
                                        ;TEST 10 SUBTEST 2
                                        ;
                                        ;CHECKS THAT THE MESSAGE BUFFER RELEASE COMMAND WORKS
                                        ;PROPERLY AND THAT THERE IS AN INTERRUPT IF THE "IE"
                                        ;BIT IS SET IN THE COMMAND PACKET AND THE "ERI" BIT
                                        ;IS SET IN THE CHARACTERISTICS DATA PACKET
                                        ;
                                        ;-
041014                                          BGNSUB                          ;//////////// BEGIN SUBTEST ////////////
041014                                                                                          T10.2:
041014  104402                                                                                          TRAP    C$BSUB

041016  004737  043366                          JSR     PC,T10RST               ;SET PACKET TO INITIAL VALUES
041022                                          SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
041022  012700  000000                                                                                  MOV     #PRI00 R0
041026  104441                                                                                          TRAP    C$SPRI
041030  012704  042530                          MOV     #T10PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
041034  012764  000010  000006                  MOV     #8.,PKBCNT(R4)          ;START WITH MINIMUM ALLOWABLE VALUE
041042                                  5$:
041042                                          BGNSEG                          ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
041042  104404                                                                                          TRAP    C$BSEG

041044  004737  015764                          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
041050  103405                                  BCS     10$                     ;BR IF SOFT INIT = OK
041052  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
041054                                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
041054  104455                                                                                          TRAP    C$ERDF
041056  001761                                                                                          .WORD   1009
041060  003646                                                                                          .WORD   SFIERR
041062  012024                                                                                          .WORD   SFIMSG
041064  005037  002220                  10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
041070  005037  002222                          CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
041074  012737  000020  042546                  MOV     #000020,T10DATA+6       ;SET ERI IN CHARACTERISTICS DATA
041102  010465  000000                          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
041106  004737  016326                          JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
041112  103407                                  BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
041114  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
041116                                          ERRDF   ERRNO,T10SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
041116  104455                                                                                          TRAP    C$ERDF
041120  001762                                                                                          .WORD   1010
041122  043070                                                                                          .WORD   T10SSR
041124  012036                                                                                          .WORD   PKTSSR
041126  005237  002220                          INC     FATFLG                  ;SET FATAL ERROR FLAG
041132                                  15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
041132  104406                                                                                          TRAP    C$CLP1
041134                                          ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
041134  104410                                                                                          TRAP    C$ESCAPE
041136  000056                                                                                          .WORD   10000$ .
041140  005737  002222                          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
041144  001004                                  BNE     22$                     ;BRANCH IF YES
041146                                          ERRHRD  ERRNO,T10NINT,PKTSSR
041146  104456                                                                                          TRAP    C$ERHRD
041150  001763                                                                                          .WORD   1011
041152  043157                                                                                          .WORD   T10NINT
041154  012036                                                                                          .WORD   PKTSSR
041156  016501  000002                  22$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
```

```
041162  012702  000200                  MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
041166  032701  000100                  BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
041172  001402                          BEQ     25$                     ;BRANCH IF NOT OFF-LINE
041174  052702  000100                  BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
041200  020201                  25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
041202  001404                          BEQ     30$                     ;OKAY IF MATCH
041204                                  ERRHRD  ERRNO,T10NBA,PKTSSR     ;NBA NOT ZERO
041204  104456                                                                          TRAP    C$ERHRD
041206  001764                                                                          .WORD   1012
041210  042731                                                                          .WORD   T10NBA
041212  012036                                                                          .WORD   PKTSSR
041214                          30$:
041214                                  ENDSEG                          ;<<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
041214                                                                                  10000$:
041214  104405                                                                          TRAP    C$ESEG
041216                                  BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
041216  104404                                                                          TRAP    C$BSEG

041220  005037  002222                  CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
041224  012737  025252  042552          MOV     #025252,T10BFR          ;WIPE OUT MESSAGE BUFFER AREA
041232  012714  100212                  MOV     #100212,(R4)            ;SET COMMAND PACKET TO MESS BUF REL
041236  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
041242  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
041246  103407                          BCS     45$                     ;BR IF CARRY SET (GOOD RETURN)
041250  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
041252                                  ERRDF   ERRNO,T10SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
041252  104455                                                                          TRAP    C$ERDF
041254  001765                                                                          .WORD   1013
041256  043070                                                                          .WORD   T10SSR
041260  012036                                                                          .WORD   PKTSSR
041262  005237  002220                  INC     FATFLG                  ;SET FATAL ERROR FLAG
041266                          45$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
041266  104406                                                                          TRAP    C$CLP1
041270  005737  002222                  TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
041274  001004                          BNE     52$                     ;BRANCH IF YES
041276                                  ERRHRD  ERRNO,T10INT,PKTSSR
041276  104456                                                                          TRAP    C$ERHRD
041300  001766                                                                          .WORD   1014
041302  043250                                                                          .WORD   T10INT
041304  012036                                                                          .WORD   PKTSSR
041306  016501  000002          52$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
041312  012702  000200                  MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
041316  032701  000100                  BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
041322  001402                          BEQ     55$                     ;BRANCH IF NOT OFF-LINE
041324  052702  000100                  BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
041330  020201                  55$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
041332  001404                          BEQ     60$                     ;OKAY IF MATCH
041334                                  ERRHRD  ERRNO,T10NNBA,PKTSSR    ;NBA NOT SET
041334  104456                                                                          TRAP    C$ERHRD
041336  001767                                                                          .WORD   1015
041340  043013                                                                          .WORD   T10NNBA
041342  012036                                                                          .WORD   PKTSSR
041344                          60$:
041344  013701  042552                  MOV     T10BFR,R1               ;PICK UP THE 1ST WORD OF MESSAGE BUFFER
041350  012702  025252                  MOV     #025252,R2              ;SET UP EXPECTED DATA
041354  020102                          CMP     R1,R2                   ;WAS ANY MESSAGE REC'D
041356  001404                          BEQ     70$                     ;BR, IF OK (EQUAL)
```

```
041360                                  ERRHRD  ERRNO,T10MBF,EXPREC     ;MESSAGE BUFFER WAS MODIFIED
041360  104456                                                                          TRAP    C$ERHRD
041362  001770                                                                          .WORD   1016
041364  042634                                                                          .WORD   T10MBF
041366  015464                                                                          .WORD   EXPREC

041370                          70$:
041370  005737  002220                  TST     FATFLG                  ;ANY FATAL ERRORS
041374  001402                          BEQ     80$                     ;BR, IF NO FATAL ERRORS
041376  004737  017172                  JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
041402                          80$:
041402                                  ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<
041402                                                                                  10001$:
041402  104405                                                                          TRAP    C$ESEG
041404                                  ENDSUB                          ;///////////// END SUBTEST ///////////
041404                                                                                  L10077:
041404  104403                                                                          TRAP    C$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
                                        ;
                                        ;
041406                                          BGNSUB                          ;///////////// BEGIN SUBTEST ///////////
041406                                                                                          T10.3:
041406  104402                                                                                          TRAP    C$BSUB

041410  004737  043366                          JSR     PC,T10RST               ;SET PACKET TO INITIAL VALUES
041414                                          SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
041414  012700  000000                                                                                  MOV     #PRI00,R0
041420  104441                                                                                          TRAP    C$SPRI
041422  012704  042530                          MOV     #T10PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
041426  012764  000010  000006                  MOV     #8.,PKBCNT(R4)          ;START WITH MINIMUM ALLOWABLE VALUE
041434                                  5$:
041434                                          BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
041434  104404                                                                                          TRAP    C$BSEG

041436  004737  015764                          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
041442  103405                                  BCS     10$                     ;BR IF SOFT INIT = OK
041444  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
041446                                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
041446  104455                                                                                          TRAP    C$ERDF
041450  001771                                                                                          .WORD   1017
041452  003646                                                                                          .WORD   SFIERR
041454  012024                                                                                          .WORD   SFIMSG
041456  005037  002220                  10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
041462  005037  002222                          CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
041466  010465  000000                          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
041472  004737  016326                          JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
041476  103407                                  BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
041500  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
041502                                          ERRDF   ERRNO,T10SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
041502  104455                                                                                          TRAP    C$ERDF
041504  001772                                                                                          .WORD   1018
041506  043070                                                                                          .WORD   T10SSR
041510  012036                                                                                          .WORD   PKTSSR
041512  005237  002220                          INC     FATFLG                  ;SET FATAL ERROR FLAG
041516                                  15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
041516  104406                                                                                          TRAP    C$CLP1
041520                                          ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
041520  104410                                                                                          TRAP    C$ESCAPE
041522  000056                                                                                          .WORD   10000$-.
041524  005737  002222                          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
041530  001004                                  BNE     22$                     ;BRANCH IF YES
041532                                          ERRHRD  ERRNO,T10NINT,PKTSSR
041532  104456                                                                                          TRAP    C$ERHRD
041534  001773                                                                                          .WORD   1019
041536  043157                                                                                          .WORD   T10NINT
041540  012036                                                                                          .WORD   PKTSSR
041542  016501  000002                  22$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
041546  012702  000200                          MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
041552  032701  000100                          BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
```

```
041556  001402                          BEQ     25$                     ;BRANCH IF NOT OFF-LINE
041560  052702  000100                  BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
041564  020201                  25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
041566  001404                          BEQ     30$                     ;OKAY IF MATCH
041570                                  ERRHRD  ERRNO,T10NBA,PKTSSR     ;NBA NOT ZERO
041570  104456                                                                          TRAP    C$ERHRD
041572  001774                                                                          .WORD   1020
041574  042731                                                                          .WORD   T10NBA
041576  012036                                                                          .WORD   PKTSSR
041600                          30$:
041600                                  ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<
041600                                                                                  10000$:
041600  104405                                                                          TRAP    C$ESEG
041602                                  BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
041602  104404                                                                          TRAP    C$BSEG
041604  004737  043366                  JSR     PC,T10RST               ;RESET PACKETS AND COMMANDS
041610  005037  002222                  CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
041614  012737  025252  042552          MOV     #025252,T10BFR          ;WIPE OUT MESSAGE BUFFER AREA
041622  012714  100212                  MOV     #100212,(R4)            ;SET COMMAND PACKET TO MESS BUF REL
041626  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
041632  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
041636  103407                          BCS     45$                     ;BR IF CARRY SET (GOOD RETURN)
041640  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
041642                                  ERRDF   ERRNO,T10SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
041642  104455                                                                          TRAP    C$ERDF
041644  001775                                                                          .WORD   1021
041646  043070                                                                          .WORD   T10SSR
041650  012036                                                                          .WORD   PKTSSR
041652  005237  002220                  INC     FATFLG                  ;SET FATAL ERROR FLAG
041656                          45$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
041656  104406                                                                          TRAP    C$CLP1
041660  005737  002222                  TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
041664  001404                          BEQ     52$                     ;BRANCH IF NO
041666                                  ERRHRD  ERRNO,T10INT,PKTSSR
041666  104456                                                                          TRAP    C$ERHRD
041670  001776                                                                          .WORD   1022
041672  043250                                                                          .WORD   T10INT
041674  012036                                                                          .WORD   PKTSSR
041676  016501  000002          52$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
041702  012702  000200                  MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
041706  032701  000100                  BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
041712  001402                          BEQ     55$                     ;BRANCH IF NOT OFF-LINE
041714  052702  000100                  BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
041720  020201                  55$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
041722  001404                          BEQ     60$                     ;OKAY IF MATCH
041724                                  ERRHRD  ERRNO,T10NNBA,PKTSSR    ;NBA NOT SET
041724  104456                                                                          TRAP    C$ERHRD
041726  001777                                                                          .WORD   1023
041730  043013                                                                          .WORD   T10NNBA
041732  012036                                                                          .WORD   PKTSSR
041734                          60$:
041734  013701  042552                  MOV     T10BFR,R1               ;PICK UP THE 1ST WORD OF MESSAGE BUFFER
041740  012702  025252                  MOV     #025252,R2              ;SET UP EXPECTED DATA
041744  020102                          CMP     R1,R2                   ;WAS ANY MESSAGE REC'D
041746  001404                          BEQ     70$                     ;BR, IF OK (EQUAL)
041750                                  ERRHRD  ERRNO,T10MBF,EXPREC     ;MESSAGE BUFFER WAS MODIFIED
041750  104456                                                                          TRAP    C$ERHRD
```

```
        041752  002000                                                                  .WORD   1024
        041754  042634                                                                  .WORD   T10MBF
        041756  015464                                                                  .WORD   EXPREC
   2825
   2826 041760                          70$:    CKLOOP                          ;LOOP ON ERROR IF FLAG SET
        041760  104406                                                                  TRAP    C$CLP1
   2827
   2828 041762  005037  002222                  CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
   2829 041766  004737  043366                  JSR     PC,T10RST               ;RESET THE PACKETS AND COMMANDS
   2830 041772  042714  100000                  BIC     #100000,(R4)            ;CLEAR THE ACK BIT
   2831 041776  010465  000000                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
   2832 042002  004737  016326                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
   2833 042006  103407                          BCS     75$                     ;BR IF CARRY SET (GOOD RETURN)
   2834 042010  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
   2838 042012                                  ERRDF   ERRNO,T10SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
        042012  104455                                                                  TRAP    C$ERDF
        042014  002001                                                                  .WORD   1025
        042016  043070                                                                  .WORD   T10SSR
        042020  012036                                                                  .WORD   PKTSSR
   2839 042022  005237  002220                  INC     FATFLG                  ;SET FATAL ERROR FLAG
   2840 042026                          75$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
        042026  104406                                                                  TRAP    C$CLP1
   2841 042030                                  ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
        042030  104410                                                                  TRAP    C$ESCAPE
        042032  000062                                                                  .WORD   10001$-.
   2842 042034  005737  002222                  TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
   2843 042040  001006                          BNE     82$                     ;BRANCH IF YES
   2847 042042  016500  000002                  MOV     TSSR(R5),R0             ;GET TSSR FOR ERROR REPORT
   2848 042046                                  ERRHRD  ERRNO,T10NINT,PKTSSR
        042046  104456                                                                  TRAP    C$ERHRD
        042050  002002                                                                  .WORD   1026
        042052  043157                                                                  .WORD   T10NINT
        042054  012036                                                                  .WORD   PKTSSR
   2849 042056  016501  000002          82$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
   2850 042062  012702  000200                  MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
   2851 042066  032701  000100                  BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
   2852 042072  001402                          BEQ     85$                     ;BRANCH IF NOT OFF-LINE
   2853 042074  052702  000100                  BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
   2854 042100  020201                  85$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
   2855 042102  001404                          BEQ     90$                     ;OKAY IF MATCH
   2859 042104                                  ERRHRD  ERRNO,T10SSR,PKTSSR     ;NBA NOT ZERO
        042104  104456                                                                  TRAP    C$ERHRD
        042106  002003                                                                  .WORD   1027
        042110  043070                                                                  .WORD   T10SSR
        042112  012036                                                                  .WORD   PKTSSR
   2860 042114                          90$:
   2861 042114                                  ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
        042114                                                                          10001$:
        042114  104405                                                                  TRAP    C$ESEG
   2862 042116  005737  002220                  TST     FATFLG                  ;ANY FATAL ERRORS
   2863 042122  001403                          BEQ     95$                     ;BR, IF NO FATAL ERRORS
   2864 042124  004737  017172                  JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
   2865
   2866 042130                                  BGNSEG                          ;<<<<<<<<<<<<< BGN SEGMENT <<<<<<<<<<<<<
        042130  104404                                                                  TRAP    C$BSEG
   2867 042132  005037  002222          95$:    CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
   2868 042136  004737  043366                  JSR     PC,T10RST               ;RESET THE PACKETS AND COMMANDS
```

```
042142  010465  000000                MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
042146  004737  016326                JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
042152  103407                        BCS     100$                    ;BR IF CARRY SET (GOOD RETURN)
042154  010001                        MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
042156                                ERRDF   ERRNO,T10SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
042156  104455                                                                                  TRAP    C$ERDF
042160  002004                                                                                  .WORD   1028
042162  043070                                                                                  .WORD   T10SSR
042164  012036                                                                                  .WORD   PKTSSR
042166  005237  002220                INC     FATFLG                  ;SET FATAL ERROR FLAG
042172                        100$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
042172  104406                                                                                  TRAP    C$CLP1
042174                                ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
042174  104410                                                                                  TRAP    C$ESCAPE
042176  000062                                                                                  .WORD   10002$-.
042200  005737  002222                TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
042204  001006                        BNE     112$                    ;BRANCH IF YES
042206  016500  000002                MOV     TSSR(R5),R0             ;GET TSSR FOR ERROR REPORT
042212                                ERRHRD  ERRNO,T10NINT,PKTSSR
042212  104456                                                                                  TRAP    C$ERHRD
042214  002005                                                                                  .WORD   1029
042216  043157                                                                                  .WORD   T10NINT
042220  012036                                                                                  .WORD   PKTSSR
042222  016501  000002        112$:   MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
042226  012702  000200                MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
042232  032701  000100                BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
042236  001402                        BEQ     125$                    ;BRANCH IF NOT OFF-LINE
042240  052702  000100                BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
042244  020201                125$:   CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
042246  001405                        BEQ     130$                    ;OKAY IF MATCH
042250                                ERRHRD  ERRNO,T10SSR,PKTSSR     ;NBA NOT ZERO
042250  104456                                                                                  TRAP    C$ERHRD
042252  002006                                                                                  .WORD   1030
042254  043070                                                                                  .WORD   T10SSR
042256  012036                                                                                  .WORD   PKTSSR
042260                                ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<
042260                                                                                  10002$:
042260  104405                                                                                  TRAP    C$ESEG
042262  005737  002220        130$:   TST     FATFLG                  ;CHECK FATAL FLAG FOR SET
042266  001402                        BEQ     140$                    ;BR, IF NOT SET (OK)
042270  004737  017172                JSR     PC,CKDROP               ;DROP DEVICE IF INDICATED
042274                        140$:
042274                                ENDSUB                          ;///////////// END SUBTEST ///////////
042274                                                                                  L10100:
042274  104403                                                                                  TRAP    C$ESUB
042276                        30$:
```

```
                                        ;+
                                        ;TEST 10 SUBTEST 4
                                        ;
                                        ;CHECKS THAT THE REGISTER MODIFICATION REFUSED (RMR) BIT IN
                                        ;THE TSSR WILL BE SET IF A WRITE CHARACTERISTICS COMMAND
                                        ;BEING EXECUTED AND ANOTHER "WC" COMMAND IS ATTEMPTED
                                        ;
                                        ;-

042276                                          BGNSUB                          ;///////////// BEGIN SUBTEST ////////////
042276                                                                                          T10.4:
042276  104402                                                                                          TRAP    C$BSUB

042300  004737  043440                          JSR     PC,T10RT2               ;SET SECOND PACKET UP
042304  004737  043366                          JSR     PC,T10RST               ;SET PACKET TO INITIAL VALUES
042310                                          SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
042310  012700  000000                                                                                  MOV     #PRI00,R0
042314  104441                                                                                          TRAP    C$SPRI
042316  012704  042530                          MOV     #T10PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
042322  012703  042572                          MOV     #T10PKT,R3              ;GET THE ADDRESS OF 2ND CMD PACKET
042326  012764  000010  000006                  MOV     #8.,PKBCNT(R4)          ;START WITH MINIMUM ALLOWABLE VALUE
042334  012763  000010  000006                  MOV     #8.,PKBCNT(R3)          ;START WITH MINIMUM ALLOWABLE VALUE
042342                                  5$:
042342                                          BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
042342  104404                                                                                          TRAP    C$BSEG
042344  004737  015764                          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
042350  103405                                  BCS     10$                     ;BR IF SOFT INIT = OK
042352  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
042354                                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
042354  104455                                                                                          TRAP    C$ERDF
042356  002007                                                                                          .WORD   1031
042360  003646                                                                                          .WORD   SFIERR
042362  012024                                                                                          .WORD   SFIMSG
042364  005037  002220                  10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
042370  005037  002222                          CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
042374  010465  000000                          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
042400  010365  000000                          MOV     R3,TSDB(R5)             ;SECOND COMMAND PACKET
042404  004737  016240                          JSR     PC,WAITF                ;WAIT FOR SSR TO SET
042410  016501  000002                          MOV     TSSR(R5),R1             ;GET CONTENTS OF TSSR REGISTER
042414  032701  000200                          BIT     #SSR,R1                 ;CHECK FOR SSR (TSSR) SET
042420  001006                                  BNE     15$                     ;BR, IF SSR SET (GOOD)
042422                                          ERRDF   ERRNO,T10SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
042422  104455                                                                                          TRAP    C$ERDF
042424  002010                                                                                          .WORD   1032
042426  043070                                                                                          .WORD   T10SSR
042430  012036                                                                                          .WORD   PKTSSR
042432  005237  002220                          INC     FATFLG                  ;SET FATAL ERROR FLAG
042436                                  15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
042436  104406                                                                                          TRAP    C$CLP1
042440                                          ESCAPE  SEG                     ;BY PASS SUBTEST IF FATAL ERROR
042440  104410                                                                                          TRAP    C$ESCAPE
042442  000056                                                                                          .WORD   10000$ .
042444  005737  002222                          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
042450  001004                                  BNE     22$                     ;BRANCH IF YES


042452                                          ERRHRD  ERRNO,T10NINT,PKTSSR
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```
        042452  104456                                                                    TRAP    C$ERHRD
        042454  002011                                                                    .WORD   1033
        042456  043157                                                                    .WORD   T10NINT
        042460  012036                                                                    .WORD   PKTSSR
   2956 042462  016501  000002          22$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
   2957 042466  012702  110200                  MOV     #SCR!RMR!SC,R2          ;EXPECTED CONTENTS OF TSSR
   2958 042472  032701  000100                  BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
   2959 042476  001402                          BEQ     25$                     ;BRANCH IF NOT OFF-LINE
   2960 042500  052702  000100                  BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
   2961 042504  020201                  25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
   2962 042506  001404                          BEQ     30$                     ;OKAY IF MATCH
   2966 042510                                  ERRHRD  ERRNO,T10SSR,PKTSSR     ;NBA NOT ZERO
        042510  104456                                                                    TRAP    C$ERHRD
        042512  002012                                                                    .WORD   1034
        042514  043070                                                                    .WORD   T10SSR
        042516  012036                                                                    .WORD   PKTSSR
   2967 042520                          30$:
   2968 042520                                  ENDSEG                          ;<<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
        042520                                                                          10000$:
        042520  104405                                                                    TRAP    C$ESEG
   2969 042522                                  ENDSUB                          ;///////////// END SUBTEST /////////////
        042522                                                                          L10101:
        042522  104403                                                                    TRAP    C$ESUB
   2970 042524                                  EXIT    TST                     ;ALL DONE WITH THIS TEST
        042524  104432                                                                    TRAP    C$EXIT
        042526  000764                                                                    .WORD   L10075-.
```

```
                                        ;*
                                        ;LOCAL STORAGE FOR THIS TEST
                                        ;

042530                                  T10PACKET:                              ;COMMAND PACKET FOR TEST
042530  100204                                  .WORD   100204                  ;WRITE CHAR COMMAND, WITH IE, ACK
042532  042540                                  .WORD   T10DATA                 ;ADDRESS OF CHARACTERISTICS BLOCK
042534  000000                                  .WORD   0
042536  000010                                  .WORD   8.                      ;STARTING VALUE OF BLOCK SIZE

042540                                  T10DATA:                                        ;CHARACTERISTICS DATA BLOCK
042540  042552                                  .WORD   T10BFR                  ;ADDRESS OF MESSAGE BUFFER
042542  000000                                  .WORD   0
042544  000016                                  .WORD   14.                     ;LENGTH OF MESSAGE BUFFER
042546  000000  000000                          .WORD   0,0

042552                                  T10BFR: .BLKW   8.                      ;MESSAGE BUFFER

                                        ;*
                                        ;
                                        ;TEST DATA FOR SUBTEST FOUR
                                        ;
042572                                  T10PKT:                                 ;COMMAND PACKET FOR TEST
042572  100204                                  .WORD   100204                  ;WRITE CHAR COMMAND, WITH IE, ACK
042574  042602                                  .WORD   T10DTA                  ;ADDRESS OF CHARACTERISTICS BLOCK
042576  000000                                  .WORD   0
042600  000010                                  .WORD   8.                      ;STARTING VALUE OF BLOCK SIZE

042602                                  T10DTA:                                 ;CHARACTERISTICS DATA BLOCK
042602  042614                                  .WORD   T10BUFR                 ;ADDRESS OF MESSAGE BUFFER
042604  000000                                  .WORD   0
042606  000016                                  .WORD   14.                     ;LENGTH OF MESSAGE BUFFER
042610  000000  000000                          .WORD   0,0

042614                                  T10BUFR:.BLKW   8.                      ;MESSAGE BUFFER

                                        ;*
                                        ;LOCAL TEXT MESSAGES FOR TEST
                                        ;-

042634          115     145     163     T10MBF: .ASCIZ  'Message Buffer Modified after MESSAGE BUFFER RELEASE Command'
042731          116     102     101     T10NBA: .ASCIZ  'NBA Not Clear After WRITE CHARACTERISTICS Command'
043013          116     102     101     T10NNBA:        .ASCIZ  'NBA Set After MESSAGE BUFFER RELEASE Command'
043070          103     157     156     T10SSR: .ASCIZ  'Contents of TSSR Incorrect After WRITE CHARACTERISTICS'
043157          105     170     160     T10NINT:        .ASCIZ  'Expected Interrupt Not Received On WRITE CHARACTERISTICS
043250          125     156     145     T10INT: .ASCIZ  'Unexpected Interrupt Received On WRITE CHARACTERISTICS
043337          102     141     163     TST10ID:        .ASCIZ  'Basic Packet Protocol'
                                                .EVEN
```

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

043366                                  T10RST:
043366                                          SAVREG                          ;SAVE THE REGISTERS
043372  012701  042530                          MOV     #T10PACKET,R1           ;START OF THE PACKET
043376  012721  100204                          MOV     #100204,(R1)+           ;WRITE CHARACTERISTICS WITH ACK, IE
043402  012721  042540                          MOV     #T10DATA,(R1)+          ;ADDRESS OF CHAR DATA BLOCK
043406  005021                                  CLR     (R1)+                   ;EXTENDED ADDRESS
043410  012721  000010                          MOV     #8.,(R1)+               ;SIZE OF DATA BLOCK IN BYTES
043414  012721  042552                          MOV     #T10BFR,(R1)+           ;ADDRESS OF MESSAGE BUFFER
043420  005021                                  CLR     (R1)+
043422  012721  000016                          MOV     #14.,(R1)+              ;LENGTH OF MESSAGE BUFFER
043426  005021                                  CLR     (R1)+
043430  005011                                  CLR     (R1)
043432  005037  042552                          CLR     T10BFR                  ;CLEAR 1ST LOC IN MESSAGE BUFFER
043436  000207                                  RTS     PC                      ;RETURN
                                        ;+
                                        ;
                                        ;ROUTINE TO RESTORE COMMAND PACKET #2 TO START UP (DEFAULT) VALUES
                                        ;
                                        ;

043440                                  T10RT2:
043440                                          SAVREG                          ;SAVE THE REGISTERS
043444  012701  042572                          MOV     #T10PKT,R1              ;START OF THE PACKET
043450  012721  100204                          MOV     #100204,(R1)+           ;WRITE CHARACTERISTICS WITH ACK, IE
043454  012721  042602                          MOV     #T10DTA,(R1)+           ;ADDRESS OF CHAR DATA BLOCK
043460  005021                                  CLR     (R1)+                   ;EXTENDED ADDRESS
043462  012721  000010                          MOV     #8.,(R1)+               ;SIZE OF DATA BLOCK IN BYTES
043466  012721  042614                          MOV     #T10BUFR,(R1)+          ;ADDRESS OF MESSAGE BUFFER
043472  005021                                  CLR     (R1)+
043474  012721  000016                          MOV     #14.,(R1)+              ;LENGTH OF MESSAGE BUFFER
043500  005021                                  CLR     (R1)+
043502  005011                                  CLR     (R1)
043504  005037  042614                          CLR     T10BUFR                 ;CLEAR 1ST LOC IN MESSAGE BUFFER
043510  000207                                  RTS     PC                      ;RETURN
043512                                          ENDTST
043512                                                                                  L10075:
043512  104401                                                                                  TRAP    C$ETST
```

```
                                        .SBTTL  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.
                                ;
                                ;

 043514                                 BGNTST
 043514                                                                                 T11::
 043514  012700  045512                 MOV     #TST1.ID,R0             ;ASCII MESSAGE TO IDENTIFY TEST
 043520  004737  016500                 JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
 043524  012737  000024  002214         MOV     #20.,LOOPCNT            ;PERFORM 20 ITERATIONS
 043532                         T11LOOP:
 043532                                 BGNSUB                          ;//////////// BEGIN SUBTEST ////////////
 043532                                                                                 T11.1:
 043532  104402                                                                                 TRAP    C$BSUB

 043534                                 SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
 043534  012700  000000                                                                         MOV     #PRI00,R0
 043540  104441                                                                                 TRAP    C$SPRI
 043542  004737  015764                 JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
 043546  103405                         BCS     3$                      ;BR IF SOFT INIT = OK
 043550  010001                         MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 043552                                 ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
 043552  104455                                                                                 TRAP    C$ERDF
 043554  002115                                                                                 .WORD   1101
 043556  003646                                                                                 .WORD   SFIERR
 043560  012024                                                                                 .WORD   SFIMSG
 043562                         3$:
 043562  012704  044740                 MOV     #T11PK2,R4              ;WRITE CHARACTERISTICS PACKET
 043566  004737  010652                 JSR     PC,WRTCHR               ;ISSUE WRITE CHARACTERISTICS
 043572  103404                         BCS     4$                      ;BR, IF COMMAND ISSUED OK
 043574                                 ERRHRD  ERRNO,WRTMSG,SFIMSG     ;WRITE CHARACTERISTISC FAILED
 043574  104456                                                                                 TRAP    C$ERHRD
 043576  002116                                                                                 .WORD   1102
 043600  005052                                                                                 .WORD   WRTMSG
 043602  012024                                                                                 .WORD   SFIMSG
 043604                         4$:
 043604  004737  045544                 JSR     PC,T11REST              ;SET UP PACKET FOR COMMAND
 043610  012704  044670                 MOV     #T11PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
 043614                         5$:
 043614                                 BGNSEG                          ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
 043614  104404                                                                                 TRAP    C$BSEG

 043616  005037  002220         10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
 043622  005037  002222                 CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
 043626  010465  000000                 MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
 043632  004737  016326                 JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
 043636  103407                         BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
 043640  010001                         MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 043642                                 ERRDF   ERRNO,T11SSR,PITSSR     ;DEVICE FATAL SSR FAILED TO SET
 043642  104455                                                                                 TRAP    C$ERDF
```

```
        043644  002117                                                                    .WORD   1103
        043646  045234                                                                    .WORD   T11SSR
        043650  012036                                                                    .WORD   PKTSSR
   3125 043652  005237  002220          INC     FATFLG                  ;SET FATAL ERROR FLAG
   3126 043656                  15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
        043656  104406                                                                    TRAP    C$CLP1
   3127 043660                          ESCAPE  SEG                     ;BY PASS SUBTEST IF FATAL ERROR
        043660  104410                                                                    TRAP    C$ESCAPE
        043662  000074                                                                    .WORD   10000$-.
   3128 043664  005737  002222          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
   3129 043670  001004                  BNE     22$                     ;BRANCH IF YES
   3133 043672                          ERRHRD  ERRNO,T11NINT,PKTSSR
        043672  104456                                                                    TRAP    C$ERHRD
        043674  002120                                                                    .WORD   1104
        043676  045364                                                                    .WORD   T11NINT
        043700  012036                                                                    .WORD   PKTSSR
   3134 043702  016501  000002  22$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
   3135 043706  012702  000200          MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
   3136 043712  032701  000100          BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
   3137 043716  001402                  BEQ     25$                     ;BRANCH IF NOT OFF-LINE
   3138 043720  052702  000100          BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
   3139 043724  020201          25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
   3140 043726  001404                  BEQ     30$                     ;OKAY IF MATCH
   3144 043730                          ERRHRD  ERRNO,T11NBA,PKTSSR     ;NBA NOT ZERO
        043730  104456                                                                    TRAP    C$ERHRD
        043732  002121                                                                    .WORD   1105
        043734  045002                                                                    .WORD   T11NBA
        043736  012036                                                                    .WORD   PKTSSR
   3145 043740                  30$:
   3146 043740  004737  011104  35$:    JSR     PC,CKRAM                ;CHECK RAM TO MEMORY
   3147 043744  103405                  BCS     59$                     ;RAM OK GO ON
   3151 043746                          ERRHRD  ERRNO,PKTRAM,RAMERR     ;THEY DON'T MATCH
        043746  104456                                                                    TRAP    C$ERHRD
        043750  002122                                                                    .WORD   1106
        043752  004741                                                                    .WORD   PKTRAM
        043754  015500                                                                    .WORD   RAMERR
   3152 043756                          ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<
        043756                                                                   10000$:
        043756  104405                                                                    TRAP    C$ESEG
   3153
   3154
   3155 043760                  59$:    ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\
        043760                                                                   L10103:
        043760  104403                                                                    TRAP    C$ESUB
   3156
   3157 043762  005737  002220          TST     FATFLG                  ;ANY FATAL ERRORS ?
   3158 043766  001402                  BEQ     60$                     ;BRANCH IF NOT
   3159 043770  004737  017172          JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
   3160 043774                  60$:
```

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

043774                                          BGNSUB                          ;//////////// BEGIN SUBTEST ////////////
043774                                                                                  T11.2:
043774  104402                                                                                  TRAP    C$BSUB

043776                                          SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
043776  012700  000000                                                                          MOV     #PRI00,R0
044002  104441                                                                                  TRAP    C$SPRI
044004                                          BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
044004  104404                                                                                  TRAP    C$BSEG


044006  004737  015764                          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
044012  103405                                  BCS     3$                      ;BR IF SOFT INIT = OK
044014  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
044016                                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
044016  104455                                                                                  TRAP    C$ERDF
044020  002123                                                                                  .WORD   1107
044022  003646                                                                                  .WORD   SFIERR
044024  012024                                                                                  .WORD   SFIMSG
044026                                  3$:
044026  012704  04474C                          MOV     #T11PK2,R4              ;WRITE CHARACTERISTICS PACKET
044032  004737  010652                          JSR     PC,WRTCHR               ;ISSUE WRITE CHARACTERISTICS
044036  103404                                  BCS     4$                      ;BR, IF COMMAND ISSUED OK
044040                                          ERRHRD  ERRNO,WRTMSG,SFIMSG     ;WRITE CHARACTERISTISC FAILED
044040  104456                                                                                  TRAP    C$ERHRD
044042  002124                                                                                  .WORD   1108
044044  005052                                                                                  .WORD   WRTMSG
044046  012024                                                                                  .WORD   SFIMSG
044050                                  4$:
044050  004737  045544                          JSR     PC,T11REST              ;SET UP PACKET FOR COMMAND
044054  012704  044670                          MOV     #T11PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
044060                                  5$:
044060  005037  002222                  10$:    CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
044064  052714  007400                          BIS     #P.MODE,(R4)            ;NON-ZERO COMMAND MODE BITS
044070  010465  000000                          MOV     R4,T5DB(R5)             ;SET THE PACKET ADDRESS
044074  004737  016326                          JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
044100  103405                                  BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
044102  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
044104                                          ERRDF   ERRNO,T11SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
044104  104455                                                                                  TRAP    C$ERDF
044106  002125                                                                                  .WORD   1109
044110  045234                                                                                  .WORD   T11SSR
044112  012036                                                                                  .WORD   PKTSSR
044114                                  15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
044114  104406                                                                                  TRAP    C$CLP1
044116                                          ESCAPE  SEG                     ;BY PASS CHECKS IF FATAL ERROR
044116  104410                                                                                  TRAP    C$ESCAPE
044120  000074                                                                                  .WORD   10000$ .
```

```
3208 044122  005737  002222                TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
3209 044126  001004                        BNE     22$                     ;BRANCH IF YES
3213 044130                                ERRHRD  ERRNO,T11NINT,PKTSSR
     044130  104456                                                                    TRAP    C$ERHRD
     044132  002126                                                                    .WORD   1110
     044134  045364                                                                    .WORD   T11NINT
     044136  012036                                                                    .WORD   PKTSSR
3214 044140  016501  000002        22$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
3215 044144  012702  100206                MOV     #SC!SSR!TSREJ,R2        ;EXPECTED CONTENTS OF TSSR
3216 044150  032701  000100                BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
3217 044154  001402                        BEQ     25$                     ;BRANCH IF NOT OFF-LINE
3218 044156  052702  000100                BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
3219 044162  020201                25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
3220 044164  001404                        BEQ     30$                     ;OKAY IF MATCH
3224 044166                                ERRHRD  ERRNO,T112REJ,PKTSSR    ;COMMAND NOT REJECTED
     044166  104456                                                                    TRAP    C$ERHRD
     044170  002127                                                                    .WORD   1111
     044172  045042                                                                    .WORD   T112REJ
     044174  012036                                                                    .WORD   PKTSSR
3225 044176                        30$:
3226 044176  004737  011104        35$:    JSR     PC,CKRAM                ;CHECK RAM TO MEMORY
3227 044202  103405                        BCS     59$                     ;RAM OK GO ON
3231 044204                                ERRHRD  ERRNO,PKTRAM,RAMERR     ;THEY DON'T MATCH
     044204  104456                                                                    TRAP    C$ERHRD
     044206  002130                                                                    .WORD   1112
     044210  004741                                                                    .WORD   PKTRAM
     044212  015500                                                                    .WORD   RAMERR
3232 044214                                ENDSEG                          ;<<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
     044214                                                                      10000$:
     044214  104405                                                                    TRAP    C$ESEG
3233
3234 044216                        59$:    ENDSUB                          ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
     044216                                                                      L10104:
     044216  104403                                                                    TRAP    C$ESUB
```

```
                                        ;*
                                        ;
                                        ;TEST 11, SUBTEST 3
                                        ;
                                        ;CHECK THAT THE GET STATUS COMMAND IS ACCEPTED
                                        ;
                                        ;

044220                                          BGNSUB                          ;////////////// BEGIN SUBTEST ////////////
044220                                                                                          T11.3:
044220  104402                                                                                          TRAP    C$BSUB

044222                                          SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
044222  012700  000000                                                                                  MOV     #PRI00,R0
044226  104441                                                                                          TRAP    C$SPRI
044230                                          BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
044230  104404                                                                                          TRAP    C$BSEG
044232  004737  015764                          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
044236  103405                                  BCS     3$                      ;BR IF SOFT INIT = OK
044240  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
044242                                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
044242  104455                                                                                          TRAP    C$ERDF
044244  002131                                                                                          .WORD   1113
044246  003646                                                                                          .WORD   SFIERR
044250  012024                                                                                          .WORD   SFIMSG
044252                                  3$:
044252  012704  044740                          MOV     #T11PK2,R4              ;WRITE CHARACTERISTICS PACKET
044256  004737  010652                          JSR     PC,WRTCHR               ;ISSUE WRITE CHARACTERISTICS
044262  103404                                  BCS     4$                      ;BR, IF COMMAND ISSUED OK
044264                                          ERRHRD  ERRNO,WRTMSG,SFIMSG     ;WRITE CHARACTERISTISC FAILED
044264  104456                                                                                          TRAP    C$ERHRD
044266  002132                                                                                          .WORD   1114
044270  005052                                                                                          .WORD   WRTMSG
044272  012024                                                                                          .WORD   SFIMSG
044274                                  4$:
044274  004737  045544                          JSR     PC,T11REST              ;SET UP PACKET FOR COMMAND
044300  012704  044670                          MOV     #T11PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
044304                                  5$:
044304  005037  002222                  10$:    CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
044310  010465  000000                          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
044314  004737  016326                          JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
044320  103405                                  BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
044322  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
044324                                          ERRDF   ERRNO,T11SR2,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
044324  104455                                                                                          TRAP    C$ERDF
044326  002133                                                                                          .WORD   1115
044330  045310                                                                                          .WORD   T11SR2
044332  012036                                                                                          .WORD   PKTSSR
044334                                  15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
044334  104406                                                                                          TRAP    C$CLP1
044336                                          ESCAPE  SL3                     ;BY-PASS SUBTEST IF FATAL ERROR
044336  104410                                                                                          TRAP    C$ESCAPE
044340  000074                                                                                          .WORD   10000$ .
044342  005737  002222                          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
044346  001004                                  BNE     22$                     ;BRANCH IF YES
044350                                          ERRHRD  ERRNO,T11NINT,PKTSSR
044350  104456                                                                                          TRAP    C$ERHRD
```

```
        044352  002134                                                                  .WORD   1116
        044354  045364                                                                  .WORD   T11NINT
        044356  012036                                                                  .WORD   PKTSSR
   3284 044360  016501  000002          22$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
   3285 044364  012702  000200                  MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
   3286 044370  032701  000100                  BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
   3287 044374  001402                          BEQ     25$                     ;BRANCH IF NOT OFF-LINE
   3288 044376  052702  000100                  BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
   3289 044402  020201                  25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
   3290 044404  001404                          BEQ     30$                     ;OKAY IF MATCH
   3294 044406                                  ERRHRD  ERRNO,T113REJ,PKTSSR    ;COMMAND NOT ACCEPTED
        044406  104456                                                                  TRAP    C$ERHRD
        044410  002135                                                                  .WORD   1117
        044412  045123                                                                  .WORD   T113REJ
        044414  012036                                                                  .WORD   PKTSSR
   3295 044416                          30$:
   3296 044416  004737  011104          35$:    JSR     PC,CKRAM                ;CHECK RAM TO MEMORY
   3297 044422  103405                          BCS     59$                     ;RAM OK GO ON
   3301 044424                                  ERRHRD  ERRNO,PKTRAM,RAMERR     ;THEY DON'T MATCH
        044424  104456                                                                  TRAP    C$ERHRD
        044426  002136                                                                  .WORD   1118
        044430  004741                                                                  .WORD   PKTRAM
        044432  015500                                                                  .WORD   RAMERR
   3302 044434                                  ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
        044434                                                                          10000$:
        044434  104405                                                                  TRAP    C$ESEG
   3303
   3304
   3305 044436                          59$:    ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
        044436                                                                          L10105:
        044436  104403                                                                  TRAP    C$ESUB
```

```
                                        ;+
                                        ;
                                        ;TEST 11, SUBTEST 4
                                        ;
                                        ;SUBTEST TO VERIFY THAT A GET STATUS COMMAND IS
                                        ;REJECTED IF A NON-ZERO COMMAND MODE FIELD IS USED
                                        ;
                                        ;-

044440                                          BGNSUB                          ;//////////// BEGIN SUBTEST ////////////
044440                                                                                          T11.4:
044440  104402                                                                                          TRAP    C$BSUB

044442                                          SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
044442  012700  000000                                                                                  MOV     #PRI00,R0
044446  104441                                                                                          TRAP    C$SPRI
044450                                          BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
044450  104404                                                                                          TRAP    C$BSEG
044452  004737  015764                          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
044456  103405                                  BCS     3$                      ;BR IF SOFT INIT = OK
044460  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
044462                                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
044462  104455                                                                                          TRAP    C$ERDF
044464  002137                                                                                          .WORD   1119
044466  003646                                                                                          .WORD   SFIERR
044470  012024                                                                                          .WORD   SFIMSG
044472                                  3$:
044472  012704  044740                          MOV     #T11PK2,R4              ;WRITE CHARACTERISTICS PACKET
044476  004737  010652                          JSR     PC,WRTCHR               ;ISSUE WRITE CHARACTERISTICS
044502  103404                                  BCS     4$                      ;BR, IF COMMAND ISSUED OK
044504                                          ERRHRD  ERRNO,WRTMSG,SFIMSG     ;WRITE CHARACTERISTISC FAILED
044504  104456                                                                                          TRAP    C$ERHRD
044506  002140                                                                                          .WORD   1120
044510  005052                                                                                          .WORD   WRTMSG
044512  012024                                                                                          .WORD   SFIMSG
044514                                  4$:
044514  004737  045544                          JSR     PC,T11REST              ;SET UP PACKET FOR COMMAND
044520  012704  044670                          MOV     #T11PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
044524                                  5$:
044524  005037  002222                  10$:    CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
044530  052714  007000                          BIS     #007000,(R4)            ;SET TO NON-ZERO MODE
044534  010465  000000                          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
044540  004737  016326                          JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
044544  103405                                  BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
044546  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
044550                                          ERRDF   ERRNO,T11SR2,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
044550  104455                                                                                          TRAP    C$ERDF
044552  002141                                                                                          .WORD   1121
044554  045310                                                                                          .WORD   T11SR2
044556  012036                                                                                          .WORD   PKTSSR
044560                                  15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
044560  104406                                                                                          TRAP    C$CLP1
044562                                          ESCAPE  SUB                     ;BY PASS SUBTEST IF FATAL ERROR
044562  104410                                                                                          TRAP    C$FSCAPE
044564  000076                                                                                          .WORD   L10106-.
044566  005737  002222                          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
044572  001004                                  BNE     22$                     ;BRANCH IF YES
```

TEST 11: NON-TAPE MOTION COMMANDS

```
3356 044574                                ERRHRD  ERRNO,T11NINT,PKTSSR
     044574  104456                                                                    TRAP    C$ERHRD
     044576  002142                                                                    .WORD   1122
     044600  045364                                                                    .WORD   T11NINT
     044602  012036                                                                    .WORD   PKTSSR
3357 044604  016501  000002        22$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
3358 044610  012702  100206                MOV     #SC!SSR!TSREJ,R2        ;EXPECTED CONTENTS OF TSSR
3359 044614  032701  000100                BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
3360 044620  001402                        BEQ     25$                     ;BRANCH IF NOT OFF-LINE
3361 044622  052702  000100                BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
3362 044626  020201        25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
3363 044630  001404                        BEQ     30$                     ;OKAY IF MATCH
3367 044632                                ERRHRD  ERRNO,T114REJ,PKTSSR    ;COMMAND NOT REJECTED
     044632  104456                                                                    TRAP    C$ERHRD
     044634  002143                                                                    .WORD   1123
     044636  045153                                                                    .WORD   T114REJ
     044640  012036                                                                    .WORD   PKTSSR
3368 044642                        30$:
3369
3370 044642  004737  011104        35$:    JSR     PC,CKRAM                ;CHECK RAM TO MEMORY
3371 044646  103404                        BCS     59$                     ;RAM OK GO ON
3375 044650                                ERRHRD  ERRNO,PKTRAM,RAMERR     ;THEY DON'T MATCH
     044650  104456                                                                    TRAP    C$ERHRD
     044652  002144                                                                    .WORD   1124
     044654  004741                                                                    .WORD   PKTRAM
     044656  015500                                                                    .WORD   RAMERR
3376 044660                        59$:
3377 044660                                ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<
     044660                                                                            10000$:
     044660  104405                                                                    TRAP    C$ESEG
3378 044662                                ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
     044662                                                                            L10106:
     044662  104403                                                                    TRAP    C$ESUB
3379
```

```
044664                                  EXIT    TST                     ;ALL DONE THIS TEST
044664  104432                                                                          TRAP    C$EXIT
044666  000762                                                                          .WORD   L10102-.

                                ;+
                                ;LOCAL STORAGE FOR THIS TEST
                                ;-

044670                          T11PACKET:                              ;COMMAND PACKET FOR TEST
044670  100204                          .WORD   100204                  ;WRITE CHAR COMMAND, WITH IE, ACK
044672  044700                          .WORD   T11DATA                 ;ADDRESS OF CHARACTERISTICS BLOCK
044674  000000                          .WORD   0
044676  000010                          .WORD   8.                      ;STARTING VALUE OF BLOCK SIZE

044700                          T11DATA:                                        ;CHARACTERISTICS DATA BLOCK
044700  044712                          .WORD   T11BFR                  ;ADDRESS OF MESSAGE BUFFER
044702  000000                          .WORD   0
044704  000016                          .WORD   14.                     ;LENGTH OF MESSAGE BUFFER
044706  000000  000000                  .WORD   0,0

044712                          T11BFR: .BLKW   8.                      ;MESSAGE BUFFER


        044740                          .=<.+10>&177770
044740                          T11PK2:                                 ;COMMAND PACKET FOR TEST
044740  100204                          .WORD   100204                  ;WRITE CHAR COMMAND, WITH IE, ACK
044742  044750                          .WORD   T11DTA                  ;ADDRESS OF CHARACTERISTICS BLOCK
044744  000000                          .WORD   0
044746  000010                          .WORD   8.                      ;STARTING VALUE OF BLOCK SIZE

044750                          T11DTA:                                 ;CHARACTERISTICS DATA BLOCK
044750  044762                          .WORD   T11BF2                  ;ADDRESS OF MESSAGE BUFFER
044752  000000                          .WORD   0
044754  000016                          .WORD   14.                     ;LENGTH OF MESSAGE BUFFER
044756  000000  000000                  .WORD   0,0

044762                          T11BF2: .BLKW   8.                      ;MESSAGE BUFFER



                                ;+
                                ;LOCAL TEXT MESSAGES FOR TEST
                                ;-

045002     111     116     111  T11NBA: .ASCIZ  'INITIALIZE Command Not Accepted'
045042     111     116     111  T112REJ:        .ASCIZ  'INITIALIZE Not Rejected With Non-Zero Mode Field'
045123     107     105     124  T113REJ:        .ASCIZ  'GET STATUS Not Accepted'
045153     107     105     124  T114REJ:        .ASCIZ  'GET STATUS Not Rejected With Non-Zero Mode Field'
045234     103     157     156  T11SSR: .ASCIZ  'Contents of TSSR Incorrect After INITIALIZE'
045310     103     157     156  T11SR2: .ASCIZ  'Contents of TSSR Incorrect After GET STATUS'
045364     105     170     160  T11NINT:        .ASCIZ  'Expected Interrupt Not Received On INITIALIZE'
045442     111     156     143  T11TSBA:        .ASCIZ  'Incorrect TSBA Address After INITIALIZE'
045512     116     157     156  TST11ID:        .ASCIZ  'Non-Tape Motion Commands'
                                        .EVEN
```

```
                                        ;*
                                        ;
                                        ;ROUTINE TO RESTORE COMMAND PACKET TO START-UP (DEFAULT) VALUES
                                        ;INITIALIZE COMMAND
                                        ;
                                        ;

045544                                  T11REST:
045544                                          SAVREG                          ;SAVE THE REGISTERS
045550  012701  044670                          MOV     #T11PACKET,R1           ;START OF THE PACKET
045554  012721  100213                          MOV     #100213,(R1)+           ;INITIALIZE WITH ACK, IE
045560  005021                                  CLR     (R1)+                   ;ADDRESS OF CHAR DATA BLOCK
045562  005021                                  CLR     (R1)+                   ;EXTENDED ADDRESS
045564  005021                                  CLR     (R1)+                   ;SIZE OF DATA BLOCK IN BYTES
045566  005021                                  CLR     (R1)+                   ;ADDRESS OF MESSAGE BUFFER
045570  005021                                  CLR     (R1)+
045572  005021                                  CLR     (R1)+                   ;LENGTH OF MESSAGE BUFFER
045574  005021                                  CLR     (R1)+
045576  005011                                  CLR     (R1)
045600  005037  044712                          CLR     T11BFR                  ;CLEAR 1ST LOC IN MESSAGE BUFFER
045604  000207                                  RTS     PC                      ;RETURN
                                        ;*
                                        ;
                                        ;ROUTINE TO RESTORE COMMAND PACKET TO START UP (DEFAULT) VALUES
                                        ;GET STATUS COMMAND
                                        ;
                                        ;

045606                                  T11RT2:
045606                                          SAVREG                          ;SAVE THE REGISTERS
045612  012701  044670                          MOV     #T11PACKET,R1           ;START OF THE PACKET
045616  012721  100217                          MOV     #100217,(R1)+           ;GET STATUS WITH ACK, IE
045622  005021                                  CLR     (R1)+                   ;ADDRESS OF CHAR DATA BLOCK
045624  005021                                  CLR     (R1)+                   ;EXTENDED ADDRESS
045626  005021                                  CLR     (R1)+                   ;SIZE OF DATA BLOCK IN BYTES
045630  005021                                  CLR     (R1)+                   ;ADDRESS OF MESSAGE BUFFER
045632  005021                                  CLR     (R1)+
045634  005021                                  CLR     (R1)+                   ;LENGTH OF MESSAGE BUFFER
045636  005021                                  CLR     (R1)+
045640  005011                                  CLR     (R1)
045642  005037  044712                          CLR     T11BFR                  ;CLEAR 1ST LOC IN MESSAGE BUFFER
045646  000207                                  RTS     PC                      ;RETURN
045650                                          ENDTST
045650                                                                                  L10102:
045650  104401                                                                                  TRAP    C$ETST
045652                                          ENDMOD
```

```
                                        .TITLE  TSV6 - PARAMETER CODING
045652                                  BGNMOD  TSV6
045652                          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.
                                ;--
045652                                  BGNHRD
045652  000010                          .WORD L10107-L$HARD/2
045654                          L$HARD::
045654                                  GPRMA   HPM1,0,0,160010,177776,YES      ;GET TSBA/TSDB REGISTER ADDRESS.
045654  000031                          .WORD   T$CODE
045656  045674                          .WORD   HPM1
045660  160010                          .WORD   T$LOLIM
045662  177776                          .WORD   T$HILIM
045664                                  GPRMA   HPM2,2,0,0,776,YES              ;GET VECTOR ADDRESS.
045664  001031                          .WORD   T$CODE
045666  045730                          .WORD   HPM2
045670  000000                          .WORD   T$LOLIM
045672  000776                          .WORD   T$HILIM
                                        ;GPRMD  HPM3,4,0,340,0,7,YES            ;GET INTERRUPT PRIORITY.
045674                                  ENDHRD
                                        .EVEN
045674                          L10107:
045674     104     105     126  HPM1:   .ASCIZ  'DEVICE ADDRESS (TSBA/TSDB) '
045730     111     116     124  HPM2:   .ASCIZ  'INTERRUPT VECTOR    '
045754     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.
                                ;--
046004                                  BGNSFT
046004  000003                          .WORD L10110-L$SOFT/2
046006                          L$SOFT::
                                ;       GPRML   SPM1,0,-1,YES                   ; GET TRANSPORT TEST FLAG.
046006                                  GPRML   SPM4,2,-1,YES                   ; GET ITERATION CONTROL.
046006  001130                          .WORD   T$CODE
046010  046044                          .WORD   SPM4
046012  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
046014                                  ENDSFT
                                        .EVEN
046014                          L10110:

046014     105     116     101  SPM1:   .ASCIZ  'ENABLE TRANSPORT TESTS '
046044     111     116     110  SPM4:   .ASCIZ  'INHIBIT ITERATIONS     '
046074     120     105     122  SPM6:   .ASCIZ  'PER TEST ERROR LIMIT   '
046124     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).
                                ;

046154                          PATCH::

046154                                  .BLKW   32.

        046400                          .=.!377+1
046400                                  LASTAD          ;SET LAST USED ADDRESS.
                                        .EVEN
046400  000000                          .WORD   0
046402  000000                          .WORD   0
046404                          L$LAST::
046404                                  ENDMOD
        000001                          .END
```

SYMBOL TABLE

```
ADDSSR  012116 G
ADR   = 000020 G
AMBTSS  006631
ASSEMB= 000010
A1716 = 000003
BADDAT  003152 G
BADSSR  015670 G
BDVPCR= 177520 G
BENBSW  002226 G
BIE   = 040000
BIT0  = 000001 G
BIT00 = 000001 G
BIT01 = 000002 G
BIT02 = 000004 G
BIT03 = 000010 G
BIT04 = 000020 G
BIT05 = 000040 G
BIT06 = 000100 G
BIT07 = 000200 G
BIT08 = 000400 G
BIT09 = 001000 G
BIT1  = 000002 G
BIT10 = 002000 G
BIT11 = 004000 G
BIT12 = 010000 G
BIT13 = 020000 G
BIT14 = 040000 G
BIT15 = 100000 G
BIT2  = 000004 G
BIT3  = 000010 G
BIT4  = 000020 G
BIT5  = 000040 G
BIT6  = 000100 G
BIT7  = 000200 G
BIT8  = 000400 G
BIT9  = 001000 G
BOE   = 000400 G
BRINIT  004453
BSEL0 = 000000
BSEL1 = 000001
CHKAMB  016034
CHKMAN  020470 G
CHKTSS  016326
CKDROP  017172
CKEMAX  017072
CKMSG   011350 G
CKMSG2  011470 G
CKRAM   011104 G
CKRAM2  011214 G
CMDPKT  021250 G
CMPMEM  017650
CONFIG  017240
COUNT   002306 G
CSRADD  002204 G
CTAB    003160 G
CTABE   003172 G
CTABM   003160 G
C$AU  = 000052
C$AUTO= 000061
C$BRK = 000022
C$BSEG= 000004
C$BSUB= 000002
C$CEFG= 000045
C$CLCK= 000062
C$CLEA= 000012
C$CLOS= 000035
C$CLP1= 000006
C$CVEC= 000036
C$DCLN= 000044
C$DODU= 000051
C$DRPT= 000024
C$DU  = 000053
C$EDIT= 000003
C$ERDF= 000055
C$ERHR= 000056
C$ERRO= 000060
C$ERSF= 000054
C$ERSO= 000057
C$ESCA= 000010
C$ESEG= 000005
C$ESUB= 000003
C$ETST= 000001
C$EXIT= 000032
C$GETB= 000026
C$GETW= 000027
C$GMAN= 000043
C$GPHR= 000042
C$GPLO= 000030
C$GPRI= 000040
C$INIT= 000011
C$INLP= 000020
C$MANI= 000050
C$MEM = 000031
C$MSG = 000023
C$OPEN= 000034
C$PNTB= 000014
C$PNTF= 000017
C$PNTS= 000016
C$PNTX= 000015
C$QIO = 000377
C$RDBU= 000007
C$REFG= 000047
C$RESE= 000033
C$REVI= 000003
C$RFLA= 000021
C$RPT = 000025
C$SEFG= 000046
C$SPRI= 000041
C$SVEC= 000037
C$TPRI= 000013
DATA    002310 G
DATASC  020222
DEBUGM  011622
DEVCNT  002216 G
DEVDRO  023414
DEVNRD  023333
DEVNXR  023251
DEVONL  023201
DEVSUM  023144
DFPTBL  002154 G
DIAGMC= 000000
DICEA = 000001
DSBINT  016174
DUAD12  004637
DUFLG   003106 G
DUMMY   003056
EF.CON= 000036 G
EF.NEW= 000035 G
EF.PWR= 000034 G
EF.RES= 000037 G
EF.STA= 000040 G
EMAXDU  016767
EN    = 000000
ENAINT  016142
ENVIRN  020620
EPRTSW  002176 G
EPRT1   006354
EPRT2   006354
ERCM    011723
ERRHI   002234 G
ERRK    016746
ERRLO   002236 G
ERRNO = 002144
ERRVEC= 000004 G
ERTABE  003372
ERTABL  003172
ESUM    016750
EVL   = 000004 G
EXBCNT= 000010
EXPBRE  015472 G
EXPD    002230 G
EXPGOT  004527
EXPGT2  004563
EXPMSG  002320 G
EXPREC  015464 G
EXTA    005766
EXTEND  005764
EXTFEA  002224 G
E$END = 002100
E$LOAD= 000035
FATERR= 000060
FATFLG  002220 G
FERCM   011712
FIFEXP  012160 G
FIF1MS  012232
FIF2MS  012301
FILLME  017412
FNOINT  004211
FORCER  002174 G
FREE    003120 G
FREEHI  003124
FRESIZ  003122 G
FUSI    004113
F$AU  = 000015
F$AUTO= 000020
F$BGN = 000040
F$CLEA= 000007
F$DU  = 000016
F$END = 000041
F$HARD= 000004
F$HW  = 000013
F$INIT= 000006
F$JMP = 000050
F$MOD = 000000
F$MSG = 000011
F$PROT= 000021
F$PWR = 000017
F$RPT = 000012
F$SEG = 000003
F$SOFT= 000005
F$SRV = 000010
F$SUB = 000002
F$SW  = 000014
F$TEST= 000001
GDDAT   003154 G
GERRMA  002172 G
GETPAT  020164 G
GETSEL  020246 G
G$CNTO= 000200
G$DELM= 000372
G$DISP= 000003
G$EXCP= 000400
G$HILI= 000002
G$LOLI= 000001
G$NO  = 000000
G$OFFS= 000400
G$OFSI= 000376
G$PRMA= 000001
G$PRMD= 000002
G$PRML= 000000
G$RADA= 000140
G$RADB= 000000
G$RADD= 000040
G$RADL= 000120
G$RADO= 000020
G$XFER= 000004
G$YES = 000010
HIADDR= 001400
HOE   = 100000 G
HPM1    045674
HPM2    045730
HPM3    045754
IBE   = 010000 G
IDU   = 000040 G
IER   = 020000 G
IFAULT  004252
INCERK  017034
INTCPC  016140
INTFLA  016135
INTMAS  016134
INTR    016206 G
INTREC  002222 G
INTVEC  016136
INTX    004274
INVERT  021176 G
IOKCKI= 000200
IOKSTP= 000001
IPRI    002210 G
ISR   = 000100 G
IVEC    002206 G
IXE   = 004000 G
I$AU  = 000041
I$AUTO= 000041
I$CLN = 000041
I$DU  = 000041
I$HRD = 000041
I$INIT= 000041
I$MOD = 000041
I$MSG = 000041
I$PROT= 000040
I$PTAB= 000041
I$PWR = 000041
I$RPT = 000041
I$SEG = 000041
I$SETU= 000041
I$SFT = 000041
I$SRV = 000041
I$SUB = 000041
I$TST = 000041
J$JMP = 000167
KIPAR0= 172340
KIPAR1= 172342
KIPAR2= 172344
KIPAR3= 172346
KIPAR4= 172350
KIPAR5= 172352
KIPAR6= 172354
KIPAR7= 172356
KIPDR0= 172300
KIPDR1= 172302
KIPDR2= 172304
KIPDR3= 172306
KIPDR4= 172310
KIPDR5= 172312
KIPDR6= 172314
KIPDR7= 172316
KTENAB  003170 G
KTFLG   003126 G
KTINIT  021044
KTOFF   017264
KTON    017246
LEHRMA  002170 G
LISTAL= 000001
LOE   = 040000 G
LOOPCN  002214 G
```

SYMBOL TABLE

```
LOOPCO  013116          L10001  002174          L10073  037026          NXR     003734          PRIO5 = 000240 G
LOOPFL  003156 G        L10002  005762          L10074  037232          NXRERR  005732 G        PRIO6 = 000300 G
LOT   = 000010 G        L10003  012034          L10075  043512          NXRX    003773          PRIO7 = 000340 G
L$ACP   002110 G        L10004  012052          L10076  041012          NXTU    022040          PRMESS  014232
L$APT   002036 G        L10005  012070          L10077  041404          OFL   = 000100          PRMNO   002316 G
L$AU    022370 G        L10006  012076          L10100  042274          ONEFIL= 000000          PRMSGE  014542 G
L$AUT   002070 G        L10007  012114          L10101  042522          O$APTS= 000000          PRMSG0  014722
L$AUTO  022574 G        L10010  012132          L10102  045650          O$AU  = 000001          PRMSG1  014767
L$CCP   002106 G        L10011  012156          L10103  043760          O$BGNR= 000001          PRMSG2  015025
L$CLEA  022654 G        L10012  012230          L10104  044216          O$BGNS= 000001          PROASC  014410
L$CO    002032 G        L10013  012400          L10105  044436          O$DU  = 000001          PR1ASC  014455
L$DEPO  002011 G        L10014  013114          L10106  044662          O$ERRT= 000000          PST32W  003146 G
L$DESC  003404 G        L10015  013742          L10107  045674          O$GNSW= 000001          PUNIT   022322
L$DESP  002076 G        L10016  013764          L10110  046014          O$POIN= 000001          PW.D11= 000021
L$DEVP  002060 G        L10017  015470          MEMADD  013744 G        O$SETU= 000000          PW.D13= 000022
L$DISP  002124 G        L10020  015476          MEMCK   021266 G        PASRPT  022072          PW.D22= 000020
L$DLY   002116 G        L10021  015504          MENASC  020437          PATCH   046154 G        PW.NOP= 000000
L$DTP   002040 G        L10022  015516          MENERR  020364          PATDAT  020220          PW.NO1= 000023
L$DTYP  002034 G        L10023  015540          MENRES  020466          PC.ERA= 002400          PW.RDE= 000024
L$DU    022466 G        L10024  015566          MMVEC = 000250          PC.IER= 002000          PW.RDR= 000001
L$DUT   002072 G        L10025  015726          MSA.FR= 000006          PC.NOO= 001000          PW.RDS= 000005
L$DVTY  003376 G        L10026  016236          MSA.NO= 000000          PC.REL= 000000          PW.RFI= 000003
L$EF    002052 G        L10030  022320          MSA.NR= 000004          PC.REW= 000400          PW.WCT= 000006
L$ENVI  002044 G        L10031  022464          MSA.VO= 000002          PKBCNT= 000006          PW.WFI= 000004
L$ETP   002102 G        L10032  022572          MSGEXP  012134 G        PKHI  = 000004          PW.WFM= 000007
L$EXP1  002046 G        L10033  022652          MSGLOO  013054 G        PKLOW = 000002          PW.WMI= 000010
L$EXP4  002064 G        L10034  022700          MSGSTA  012340 G        PKTADD  007550          PW.WNP= 000011
L$EXP5  002066 G        L10035  023142          MSGSUB  013732 G        PKTFRM  007512          PW.WTR= 000002
L$HARD  045654 G        L10036  023702          MS.ATT= 000006          PKTGET  012054 G        P.ACK = 100000
L$HIME  002120 G        L10037  023550          MS.EXT= 000200          PKTMES  012100 G        P.CMD = 000037
L$HPCP  002016 G        L10040  023632          MS.RSD= 000001          PKTRAM  004741 G        P.CONT= 000012
L$HPTP  002022 G        L10041  024400          MS.RSF= 000020          PKTSSR  012036 G        P.CVC = 040000
L$HW    002154 G        L10042  025072          MS.RST= 000010          PNT   = 001000 G        P.FMT = 000140
L$ICP   002104 G        L10043  026426          M2901   026152          PRAMPK  013766          P.FORM= 000011
L$INIT  021546 G        L10044  025334          M8186   005550          PRASC   014513          P.GETS= 000017
L$LADP  002026 G        L10045  025634          M8189   005641          PRBEXP  015460          P.IE  = 000200
L$LAST  046404 G        L10046  026132          NBA   = 002000          PRBMSG  015326          P.INIT= 000013
L$LOAD  002100 G        L10047  027532          NEWPAS  022026          PRBREC  015462          P.MODE= 007400
L$LUN   002074 G        L10050  027000          NODEV   003110 G        PRBTOT  015413          P.OPP = 020000
L$MREV  002050 G        L10051  027350          NOINIT  004331          PRBYTE  015112 G        P.POSI= 000010
L$NAME  002000 G        L10052  031002          NOINTR  004215          PRI   = 002000 G        P.READ= 000001
L$PRIO  002042 G        L10053  030062          NOITS   002166 G        PRIADD  010154          P.SWB = 010000
L$PROT  021536 G        L10054  030406          NOMAN   020524          PRIAO   010224          P.WRIT= 000005
L$PRT   002112 G        L10055  034370          NOMEM   005454          PRIBXO  007606 G        P.WRTC= 000004
L$REPP  002062 G        L10056  031334          NP.IR = 000200          PRIEQU  010054          P.WRTS= 000006
L$REV   002010 G        L10057  031620          NP.LOO= 000040          PRIPKT  007364 G        QVP     002202 G
L$RPT   022702 G        L10060  032064          NP.OUT= 000100          PRIRAM  010062          RAMASC  014146
L$SOFT  046006 G        L10061  032312          NP.WRP= 000020          PRITAD  010270          RAMDAT  002240 G
L$SPC   002056 G        L10062  032556          NSI     004146          PRITSS  006020          RAMERR  015500 G
L$SPCP  002020 G        L10063  033116          NSINIT  004403          PRITO   010352          RAMEXP  015520 G
L$SPTP  002024 G        L10064  035274          NUL     004523          PRIT1   010415          RAMFOR  010112
L$STA   002030 G        L10065  040410          NULCR   004524          PRIXOR  007736 G        RAMSIZ  002300 G
L$SW    002164 G        L10066  035536          NXM   = 004000          PRIOO = 000000 G        RAMTAD  015506 G
L$TEST  002114 G        L10067  035776          NXMFLG  003132 G        PRIO1 = 000040 G        RCVHIA  002302 G
L$TIML  002014 G        L10070  036202          NXMHI   003136 G        PRIO2 = 000100 G        RCVLOA  002304 G
L$UNIT  002012 G        L10071  036370          NXMLO   003134 G        PRIO3 = 000140 G        RDERR   005202
L10000  002162          L10072  036574          NXMTST  021442          PRIO4 = 000200 G        RECMSG  002464 G
```

SYMBOL TABLE

RECV	002232 G	S1.IEO=	010000	TST6ID	030763	T1.1	023504	T4	025074 G
REGSAV	020130	S1.IFM=	001000	TST7ID	034273	T1.2	023564	T4LOOP	025114
RETERR	005366	S1.IHE=	000400	TST8ID	035257	T10	040412 G	T4.1	025074
REWIND	011004 G	S1.IID=	004000	TST9ID	040311	T10BFR	042552	T4.2	025336
RMCHBE=	000167	S1.I1R=	020000	TSV2	002000 G	T10BUF	042614	T4.3	025636
RMCHEN=	000200	S1.I2R=	040000	TSV3	002174 G	T10DAT	042540	T5	026430 G
RMMSGB=	000215	S1.PAR=	100000	TSV4	021536 G	T10DTA	042602	T5ADDR	027470
RMMSGE=	000234	S2.ATI=	000010	TSV5	023464 G	T10INT	043250	T5LOOP	026446
RMPKTB=	000201	S2.BTI=	000004	TSV6	045652 G	T10LOO	040430	T5MEM	027432
RMPKTE=	000210	S2.DIM=	000200	TTIBFR=	177562 G	T10MBF	042634	T5.1	026452
RMR =	010000	S2.ILW=	000100	TTICSR=	177560 G	T10NBA	042731	T5.2	027020
RWPACK	011100	S2.INR=	000020	TTIVEC=	000060 G	T10NIN	043157	T6	027534 G
SC =	100000	S2.OUT=	000040	T$ARGC=	000003	T10NNB	043013	T6INT	030553
SCE =	020000	S2.UND=	000003	T$CODE=	001130	T10PAC	042530	T6LOOP	027552
SCHERR	005274	TBLEND=	003056 G	T$ERRN=	002144	T10PKT	042572	T6NBA	030450
SCME	005007	TCOASC	006472	T$EXCP=	000000	T10RST	043366	T6NINT	030631
SDELAY	010650	TCOCOD	006672	T$FLAG=	000040	T10RT2	043440	T6PACK	030440
SELASC	020432	TEMP1	003112 G	T$GMAN=	000000	T10SSR	043070	T6SSR	030475
SELDAT=	000004	TEMP2	003114 G	T$HILI=	000776	T10.1	040430	T6TSBA	030711
SEL2 =	000002	TERCLS=	000016	T$LAST=	000001	T10.2	041014	T6.1	027552
SETMAP	017306	TESTNO=	000013	T$LOLI=	000000	T10.3	041406	T6.2	030076
SETU	022124	TEXASC	006431	T$LSYM=	010000	T10.4	042276	T7	031004 G
SFFMSG	012072 G	TFCASC	006533	T$LTNO=	000013	T11	043514 G	T7BFR	033166
SFHERR	003701	TIMEXP	015542 G	T$NEST=	177777	T11BFR	044712	T7DATA	033150
SFIERR	003646	TIMSGO	015570	T$NS0 =	000000	T11BF2	044762	T7INT	034121
SFIMSG	012024 G	TINERR	012011	T$NS1 =	000005	T11DAT	044700	T7LOOP	031022
SFPTBL	002164 G	TMPBFR	002630 G	T$NS2 =	000002	T11DTA	044750	T7NBA	033300
SIFLAG	003150 G	TNAM	016674	T$NS3 =	000003	T11LOO	043532	T7NINT	034030
SIMSG	011756	TRANST	002164 G	T$PTNU=	000000	T11NBA	045002	T7PACK	033140
SKIPT	003374	TSBA =	000000 G	T$SAVL=	177777	T11NIN	045364	T7REST	034322
SOFINI	015764 G	TSBAH =	000001 G	T$SEGL=	177777	T11PAC	044670	T7SP	033160
SPACE	010462 G	TSBAM2	026242	T$SEKO=	010000	T11PK2	044740	T7SSR	033741
SPM1	046014	TSBAM3	026324	T$SUBN=	000004	T11RES	045544	T7TSBA	034210
SPM4	046044	TSDB =	000000 G	T$TAGL=	177777	T11RT2	045606	T7.1	031022
SPM6	046074	TSDBH =	000001 G	T$TAGN=	010111	T11SR2	045310	T7.2	031350
SPM7	046124	TSFCOD	007232	T$TEMP=	000000	T11SSR	045234	T7.3	031622
SR0 =	177572	TSREJ =	000006	T$TEST=	000013	T11TSB	045442	T7.4	032066
SR1 =	177574	TSSDEF	006602	T$TSTM=	177777	T11.1	043532	T7.5	032314
SR2 =	177576	TSSR =	000002 G	T$TSTS=	000001	T11.2	043774	T7.6	032560
SR3 =	172516	TSSRBI	003476 G	T$$AU =	010031	T11.3	044220	T72DAT	033206
SSR =	000200	TSSRFO	006411	T$$AUT=	010033	T11.4	044440	T72DON=	033222
STATCO	012402	TSSRH =	000003 G	T$$CLE=	010034	T112RE	045042	T72NBA	033222
SVCGBL=	000000	TSSX	004014	T$$DU =	010032	T113RE	045123	T72REJ	033353
SVCINS=	000000	TSTBLK	002750 G	T$$HAR=	010107	T114RE	045153	T73REJ	033452
SVCSUB=	000001	TSTCNT	002212 G	T$$HW =	010000	T2	023704 G	T74REJ	033545
SVCTAG=	000000	TSTEND	016710	T$$INI=	010030	T2LOOP	023722	T75REJ	033643
SVCTST=	000001	TSTFLA	002312 G	T$$MSG=	010025	T2SSR	024300	T8	034372 G
S$LSYM=	010000	TSTLOO	016446 G	T$$PRO=	010027	T2TSBA	024166	T8BFR	035022
SO.IDB=	000010	TSTPTR	002314 G	T$$RPT=	010035	T2TSSR	024233	T8DATA	035010
SO.IFB=	000002	TSTSET	016500 G	T$$SEG=	010000	T23A	003140 G	T8LOOP	034410
SO.IFP=	000001	TST1ID	023662	T$$SOF=	010110	T23B	003142 G	T8NVCK	035077
SO.ILD=	000020	TST10I	043337	T$$SRV=	010026	T3	024402 G	T8PACK	035000
SO.ION=	000040	TST11I	045512	T$$SUB=	010106	T3BFLG	003144 G	T8SSR	035170
SO.IRD=	000100	TST2ID	024352	T$$SW =	010001	T3LOOP	024420	T8VCK	035042
SO.IRW=	000004	TST3ID	025045	T$$TES=	010102	T3SSR	024774	T9	035276 G
SO.ISP=	000200	TST4ID	026404	T1	023464 G	T3TSBA	024664	T9BFR	037262
S1.ICE=	002000	TST5ID	027402	T1LOOP	023502	T3TSSR	024730	T9DATA	037250

SYMBOL TABLE

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T9INT   040137          UAM    = 000200 G       WRTCHR  010652 G       XSOONL= 000100          X2.EXT= 000200
T9LOOP  035320          UNITN    002200 G       WRTERR  005107         XSOPED= 000010          X2.OPM= 100000
T9NBA   037316          UNREC  = 000006         WRTMSG  005052         XSORLL= 010000          X2.RCE= 040000
T9NINT  040046          USI      004117         WSMBK   021260 G       XSORLS= 040000          X2.REV= 000077
T9PACK  037240          WAITF    016240 G       XFERAS  015730         XSOTMK= 100000          X2.SPA= 035400
T9REST  040336          WC.IFA= 000200          XNXM    016366         XSOVCK= 000020          X2.UNI= 000007
T9SSR   037757          WC.IFE= 000002          XORBFO  007670         XSOWLE= 004000          X2.WCF= 002000
T9TSBA  040226          WC.IGO= 000001          XORFOR  010006         XSOWLK= 000004          X3.DCK= 000010
T9.1    035320          WC.IRE= 000010          XSTO   = 000006 G       XXCOMM  003116 G        X3.MBZ= 000006
T9.2    035566          WC.IRW= 000004          XST1   = 000010 G       X$ALWA= 000000          X3.MDE= 177400
T9.3    036000          WC.IOT= 000100          XST2   = 000012 G       X$FALS= 000040          X3.OPI= 000100
T9.4    036204          WC.I1T= 000040          XST3   = 000014 G       X$OFFS= 000400          X3.REV= 000040
T9.5    036372          WC.I5R= 000020          XST4   = 000016 G       X$TRUE= 000020          X3.RIB= 000001
T9.6    036576          WF.IED= 000010          XSOBOT  000002          X1.COR= 020000          X3.SPA= 000200
T9.7    037030          WF.IER= 000004          XSOEOT= 000001          X1.DLT= 100000          X3.TRF= 000020
T92DAT  037302          WF.IHI= 000200          XSOIE = 000040          X1.MBZ= 017375          X4.HSP= 100000
T92DON= 037316          WF.IRE= 000040          XSOILA= 000400          X1.RBP= 000400          X4.MBZ= 017400
T92REJ  037371          WF.IWF= 000020          XSOILC= 001000          X1.SPA= 040000          X4.RCE= 040000
T93REJ  037470          WF.IWR= 000100          XSOLET= 020000          X1.UNC= 000002          X4.TSM= 020000
T94REJ  037563          WF.I3R= 000002          XSOMOT= 000200          X2.BUF= 000100          X4.WRC= 000377
T95REJ  037661          WF.I4R= 000001          XSONEF= 002000

. ABS.  046404     000
        000000     001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  28880 WORDS  ( 113 PAGES)
DYNAMIC MEMORY:  20060 WORDS  ( 77 PAGES)
ELAPSED TIME:  00:37:00
CNTSAAO.BIC,CNTSAAO.SEQ/-SP=SVC34/ML,TSV1A,TSV22A,TSV3A,TSV4,TSV5A,TSV6
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