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IDENTIFICATION

PRODUCT ID: AC-T775A-MC
PRODUCT TITLE: CZTKEA TK25 FRT END FUNC #1
PRODUCT DATE: MARCH, 1984
DEPARTMENT: TAPE DIAGNOSTIC ENGINEERING
AUTHOR: DICE SYSTEMS, INC.

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ABSTRACT

1.0 ABSTRACT

THIS IS A PDP-11/LSI RESIDENT DIAGNOSTIC WHICH CHECKS THE FUNCTIONALITY OF AN TK25 MAGTAPE SUBSYSTEM WHILE CONNECTED TO A PDP-11 SYSTEM (Q-BUS OR UNIBUS). THE PROGRAM HAS BEEN DIVIDED INTO FOUR MAJOR PIECES: CZTKE, CZTKF, CZTKG, CZTKH. SUCCESSFUL RUN EXAMPLES, AND TEST DESCRIPTIONS HAVE BEEN PROVIDED FOR EACH PROGRAM.

THE PROGRAMS PROVIDE ERROR MESSAGES WHICH IDENTIFY FAILING FUNCTIONS, AND AID IN DEVICE REPAIR. REFERENCE THE FOLLOWING DIGITAL EQUIPMENT DOCUMENTS:

1. CIQPMA0 XXDP+ PROGRAMMER'S MANUAL, DOCUMENT NUMBER AC-S296A-AC; DATE: 14 JULY 1980.

1.1 REVISION HISTORY

NEW RELEASE APRIL 1984

2.0 REQUIREMENTS

2.1 HARDWARE REQUIREMENTS

PDP-11 FAMILY PROCESSOR WITH 32K WORDS OF MEMORY
TK25 MAGTAPE SUBSYSTEM (DRIVE AND CONTROLLER)
CAUTION:DIAGNOSTIC REQUIRES 32K WORDS OF MEMORY
(28K USEABLE I.E. 4K FOR I/O PAGE)

2.1.1 OPTIONAL HARDWARE -

FOUR TK25 CONTROLLERS PER PDP-11, ONE
DRIVE PER CONTROLLER

2.2 SOFTWARE REQUIREMENTS

PDP-11 DIAGNOSTIC SUPERVISOR (CIQPMAO VERSION 34 OR LATER)
PDP-11 DIAGNOSTIC LOADER/MONITOR (XXDP+)

2.3 PREREQUISITES

FUNCTIONAL PDP-11/LSI FAMILY CENTRAL PROCESSOR AND MEMORY
FUNCTIONAL CONSOLE TERMINAL
FUNCTIONAL STANDALONE DIAGNOSTIC SUPERVISOR

3.0 OPERATING INSTRUCTIONS - OPERATOR COMMANDS

3.1 OPERATOR COMMANDS

THE TK25 DIAGNOSTICS ARE PDP-11 DIAGNOSTIC SUPERVISOR COMPATIBLE PROGRAMS. ALL LOADING AND RUN TIME INSTRUCTIONS CAN BE REFERENCED IN THE PDP-11 PROGRAMMER'S MANUAL "CIQPMAO XXDP" PROGRAMMER'S MANUAL NUMBER AC-S296A-AC.

BOOT THE DIAGNOSTIC XXDP+ MEDIA (OPERATOR RESPONSES ARE UNDERLINED)

```
CHMOLEO XXDP+ DL MONITOR
BOOTED VIA 'NIT 0
28K NON-UNIBUS SYSTEM

ENTER DATE <DD-MMM-YY>: 29-JAN-82
                        ---------
RESTART ADDRESS: 152010
THIS IS XYDP+ TYPE "H" OR "H/L" FOR HELP.

.R CZTKEA
  - ------
CZTKEA.BIC

DRS-E0
CZTKE-A-0
CZTKEA TK-25 FRT END FUNC #1 UNIT IS TK25
RSTRT ADR 147642
DR>START/FLAG:PNT:HOE
   ----------------.
```

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".

3.2 HARDWARE PARAMETERS

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) RESPONCE TO THE QUESTION, THE PROGRAM WILL USE IT'S DEFAULT HARDWARE PARAMETER VALUES. IT WILL DEFAULT TO ONE UNIT SELECTED (UNIT 0), THE DEFAULT TSBA/TSDB WILL BE 172522 AND THE INTERRUPT VECTOR WILL BE 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 ONLY IF 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)" THAT A LOGICAL RESPONSE IS TO BE MADE: "Y" FOR YES, "N' FOR NO.

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


UNIT 0

DEVICE ADDRESS (O) 172522 ? <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 EIGHT UNITS CAN BE SELECTED FOR TESTING.

3.3 SOFTWARE PARAMETERS

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.>

ENABLE RAM DUMP ON ERROR (L) N? < TYPE "Y" TO DUMP
SELECTED RAM CONTENTS IN THE
CONTROLLER MODULE.>

4.0 OPERATING INSTRUCTIONS - SAMPLE PRINTOUTS

4.1 SUCCESSUL RUN EXAMPLES

4.1.1 SUCCESSFUL RUN EXAMPLE - CZTKE -

```
TST: 001 INITIALIZATION TEST
TST: 002 RAM TEST
TST: 003 COMMAND REJECT TEST
TST: 004 WRITE CHARACTERISTICS TEST
TST: 005 VOLUME CHECK TEST
TST: 006 COMPLETION INTERRUPT TEST
TST: 007 BASIC PACKET PROTOCAL TEST
TST: 008 NON-TAPE MOTION COMMANDS TEST
TST: 009 DMA MEMORY ADDRESSING TEST
TST: 010 INITIALIZATION AFTER WRITE CHARACTERISTICS TEST
TST: 011 BASIC WRITE SUBSYSTEM MEMORY TEST
CZTKE EOP 1
    0 TOTAL ERRS

NOTE: PROGRAM NOW STARTS OVER AGAIN AT TEST 1
```

4.2 OPERATING INSTRUCTIONS - SAMPLE ERROR MESSAGE

ERROR MESSAGE EXAMPLE

```
TST: 001
CZTKE DVC FTL ERR  00001 ON UNIT 00 TST 001 SUB 000 PC: 017300
  NON-EXISTANT DEVICE REGISTER
  ADDRESS: 172500


  UNIT     0 DROPPED
PASS ABRTD THS UNIT
CZTKE EOP    1
    1 TOTAL ERRS
```

5.0 PROGRAM RUN TIMES

THE AVERAGE RUN TIMES OF THE PROGRAMS ARE LISTED BELOW. THESE FIGURES ARE TO BE USED AS A GUIDE. THE TIMING WAS DONE ON A PDP-11/23 (LSI) PROCESSOR WITH A LA-120 CONSOLE.

THE PROGRAMS RUN IN NON-ITERATIVE MODE. EACH TEST IS RUN ONCE, WITH NO ITERATIONS. THEREFOR, THE DEFAULT MODE (NORMALLY ITERATIVE) AND THE NON-ITERATIVE MODE TIMES ARE IDENTICAL.

5.1 RUN TIMES - CZTKE

TEST NUMBER	N/I SECS.	DEF SECS.
1	8	8
2	11	11
3	9	9
4	10	10
5	12	12
6	10	10
7	2	2
8	8	8
9	5	5
10	8	8
11	13	13

THE TIMES REQUIRED TO RUN TESTS 1 THROUGH 11 IN ONE COMMAND:

Q.V.	1 MIN 46 SECONDS
DEFAULT	1 MIN 46 SECONDS

6.0 TEST DESCRIPTIONS - CZTKE

6.1 TEST 1 - INITIALIZATION TEST 1

```
**************************************************************************
* NOTE: IF THIS TEST DETECTS AN ERROR, REPLACE THE TK25'S                *
* CONTROLLER                                                             *
**************************************************************************
```

THIS TEST VERIFIES THAT THE 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 WITH THE MODULE. AREAS OF LOGIC TESTED BY THE SELF-TEST SEQUENCER ARE AS FOLLOWS: ROM AND PIPELINE REGISTER, SEQUENCER, INTERNAL BUSES, 2901 MICROPROCESSOR, RAM AND TRANSPORT STATUS FLOPS. THIS TEST INITIALIZES THE CONTROLLER BY ISSUING THE BUS INIT SIGNAL VIA A RESET INSTRUCTION, OR BY WRITING INTO THE TSSR REGISTER, 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, A16, AND OFL, WHICH ARE IGNORED FOR THIS TEST) BEING CLEARED (0). IF THE CONTENTS OF THE TSSR ARE NOT AS EXPECTED, AN ERROR REPORT IS ISSUED LISTING THE EXPECTED DATA, ACTUAL DATA, AND THE DISCREPANCIES.

6.2 TEST 2 - RAM TEST

```
**********************************************************************
* NOTE: IF THIS TEST DETECTS AN ERROR REPLACE THE TK25'S             *
* CONTROLLER                                                         *
**********************************************************************
```

THIS TEST VERIFIES THAT ALL LOCATIONS OF THE RAM ON THE CONTROLLER CAN PROPERLY STORE AND READ BACK ALL DATA PATTERNS, AND THAT EACH RAM LOCATION IS UNIQUELY ADDRESSED (IE: THAT ONE AND ONLY ONE LOCATION IS ACCESSED BY ANY PARTICULAR ADDRESS). THESE TESTS ARE PERFORMED BY THREE SUBTESTS DESCRIBED BELOW.

6.2.1 TEST 2, SUBTEST 1: -

THIS SUBTEST VERIFIES EACH LOCATION BY PERFORMING THE FOLLOWING SEQUENCE FOR EACH ADDRESS 0-377 (OCTAL):

1. THE ADDRESS TO BE TESTED IS LOADED INTO THE TSDB+1 (VIA A HI-WRITE BYTE).
2. THE ADDRESSED RAM LOCATION IS READ, THEN WRITTEN INTO THE LOW BYTE OF THE TSBA.
3. THE LOW BYTE OF THE 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+1 (HI-BYTE 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.

6.2.2 TEST 2, SUBTEST 2: -

THIS SUBTEST USES THE SAME RAM READ/WRITE TECHNIQUES AS SUBTEST 1, EXCEPT THAT MEMORY IS FILLED WITH ZEROS AND A ONES WORD IS "WALKED" DOWN THROUGH. PRIOR TO THE ALL ONES WRITE TO MEMORY THE MEMORY IS CHECKED TO BE SURE THAT THE ZERO WORD HASN'T "PICKED" A BIT.

6.2.3 TEST 2, SUBTEST 3: -

THIS SUBTEST IS SIMILAR TO SUBTEST 2, EXCEPT THAT MEMORY IS FIRST SET TO ALL ONES AND A BYTE OF ZEROS IS "WALKED" DOWN THROUGH MEMORY BEGINNING AT LOCATION TOP-2.

PRIBXOR - PRINT EXPD, RECV AND XOR BYTE

```
                                        .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
                                ;
                                ;-

007164                          PRIBXOR::
007164                                  SAVREG                          ;SAVE THE REGISTERS
007170  010203                          MOV     R2,R3                   ;EXPECTED DATA
007172                                  XOR     R1,R3                   ;FORM THE EXCLUSIVE OR
007202  012700  177400                  MOV     #^C<377>,R0             ;BYTE MASK
007206  040001                          BIC     R0,R1                   ;SAVE LOW BYTE RECV
007210  040002                          BIC     R0,R2                   ;SAVE LOW BYTE EXPD
007212  040003                          BIC     R0,R3                   ;SAVE LOW BYTE XOR
007214                                  PRINTB  #XORBFOR,R2,R1,R3 ;PRINT THE MESSAGE
007214  010346                          MOV     R3,-(SP)
007216  010146                          MOV     R1,-(SP)
007220  010246                          MOV     R2,-(SP)
007222  012746  007246                  MOV     #XORBFOR,-(SP)
007226  012746  000004                  MOV     #4,-(SP)
007232  010600                          MOV     SP,R0
007234  104414                          TRAP    C$PNTB
007236  062706  000012                  ADD     #12,SP
007242  010300                          MOV     R3,R0                   ;R0 HAS XOR ON RETURN
007244  000207                          RTS     PC                      ;RETURN TO CALLER

007246     045     116     045  XORBFOR:        .ASCIZ  '%N%A EXPD: %03%A RECV: %03%A XOR: %03'
                                        .EVEN
```

6.4 TEST 4 - WRITE CHARACTERISTICS

```
**************************************************************************
* NOTE: IF THIS TEST DETECTS A FAILURE REPLACE THE TK25'S                *
* CONTROLLER                                                             *
**************************************************************************
```

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 THE 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 CHARACTERISTICS 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 PROCEESOR PRIORITY ZERO, 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 TESTS VARIOUS MICROPROGRAM SEQUENCES, COMMAND DECODING, DMA LOGIC, AND BASIC PACKET PROTOCAL HANDLING. THIS IS THE FIRST TEST IN WHICH DATA DMA CYCLES (FOR STORING THE MESSAGE PACKET) ARE PERFORMED. ANY ERRORS IN THE BODY OF THE TEST (IE; ERRORS OTHER THAN INITIALIZATION ERRORS RELATED TO THE TRANSPORT BUS) DEFINITELY INDICATES A BAD CONTROLLER MODULE.

6.4.1 TEST 4, SUBTEST 1: -

VERIFIES BASIC STANDARD OPERATION (USING PROPER MESSAGE BUFFER AND LENGTH DATA IN AN INCREMENTING SERIES OF VALUES FOR THE FOURTH CHARACTERISTICS DATA IN THE CHARACTERISTICS DATA BLOCK.). AFTER THE COMMAND IS EXECUTED FOR EACH VALUE OF THE FOURTH CHARACTERISTICS DATA WORD, THE PROGRAM VERIFIES THAT:

1. THE TSSR IS CORRECT, INCLUDING A CHECK THAT THE NBA BIT IS CLEARED AND THAT NORMAL TERMINATION WAS ACCOMPLISHED.
2. THAT A PROPER MESSAGE PACKET IS STORED.
3. THAT THE COMMAND PACKET CHRACTERISTIC DATA, AND MESSAGE PACKET IMAGE BLOCKS IN CONTROLLER RAM ARE CORRECT.

6.4.2 TEST 4, SUBTEST 2: -

VERIFIES THAT THE COMMAND IS REJECTED AND THAT THE NBA BIT DOES NOT GET CLEARED IF NONZERO BITS ARE SET INTO ANY RESERVED OR UNUSED FIELD WITHIN THE FIRST THREE COMMAND PACKET WORDS.

6.4.3 TEST 4, SUBTEST 3: -

VERIFIES THAT THE COMMAND IS REJECTED AND THAT THE NBA BIT DOES NOT GET CLEARED IF THE MESSAGE BUFFER ADDRESS SPECIFIED IN THE CHARACTERISTICS DATA BLOCK DOES NOT SPECIFY A LEGAL ADDRESS.

6.5 TEST 5: VOLUME CHECK

```
**************************************************************************
* NOTE: IF THIS TEST DETECTS AN ERROR REPLACE THE TK25'S                 *
* CONTROLLER                                                             *
**************************************************************************
```

THIS TEST VERIFIES THAT THE VOLUME CHECK (VCK) BIT, A FLAG HELD WITHIN THE CONTROLLER AND APPEARING IN XSTO, IS SET BY INITAILIZE AND CLEARED BY EXECUTING A WRITE CHARACTERISTICS COMMAND WITH THE CVC SET. IT IS ALSO VERIFIED THAT A WRITE CHARACTERISTICS 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 MOTIN COMMAND DEPENDING ON 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)
3. THE PREVIOUS STEP IS REPEATED TO VERIFY THAT VCK DOES NOT CHANGE (REMAINS AT 0).
4. A WRITE CHARACTERISTICS COMMAND IS ISUED 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 ISUED WITH CVC=0 AND THE VCK BIT IN XSTO IN THE MESSAGE BUFFER IS EXAMINED; THE VCK BIT SHOULD REMAIN CLEAR (0). THIS 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 IS VERIFIED BY LOW BYTE OF TSBA WHICH SHOULD CONTAIN ALL 1'S.
6. 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.

6.6 TEST 6 - COMPLETION INTERRUPT

```
**********************************************************************
* NOTE: IF THIS TEST DETECTS AN ERROR REPLACE THE TK25'S             *
* CONTROLLER                                                         *
**********************************************************************
```

THIS TEST VERIFIES THAT AN INTERUPT 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 STATUS BIT IN XST0 OF ANY MESSAGE PACKET IS SET AND THAT A COMPLETTION INTERRUPT IS GENERATED. FINALLY A SEQUENCE OF TWO COMMANDS IS ISSUED, THE FIRST WITH IE=1, AND THE SECOND WITH IE=0. IT IS VERIFIED THAT NO INTERRUPT IS GENERATED AFTER THE SECOND COMMAND AND THAT THE IE BIT IN XST0 IS 0.

6.7 TEST 7 - BASIC PACKET PROTOCAL

```
**************************************************************************
* NOTE: IF THIS TEST DETECTS AN ERROR REPLACE THE TK25'S                 *
* CONTROLLER                                                             *
**************************************************************************
```

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.

6.7.1 TEST 7, SUBTEST 1: -

VERIFIES THAT THE BASIC MESSAGE BUFFER RELEASE COMMAND OPERATES PROPERLY WHEN MESSAGE BUFFER RELEASE INTERRUPTS ARE DISABLED (ERI=0 ON PREVIOUS WRITE CHARACTERISTICS COMMAND). CHECKS THAT TSSR IS UPDATED PROPERLY AND THAT NO INTERRUPT IS GENERATED (EVEN IF THE IE BIT IN THE COMMAND WORD IS SET) AND THAT NO MESSAGE PACKET IS STORED.

6.7.2 TEST 7, SUBTEST 2: -

VERIFIES THAT THE BASIC MESSAGE BUFFER RELEASE COMMAND OPERATES PROPERLY WHEN MESSAGE BUFFER RELEASE INTERRUPTS ARE ENABLED (ERI=1 ON PREVIOUS WRITE CHARACTERISTICS COMMAND). CHECKS THAT TSSR IS UPDATED PROPERLY AND THAT AN INTERRUPT IS GENERATED (IF THE IE BIT IN THE COMMAND WORD IS SET) BUT THAT NO MESSAGE PACKET IS STORED.

6.7.3 TEST 7, SUBTEST 3: -

VERIFIES THAT AFTER THE CPU GIVES UP OWNERSHIP OF A MESSAGE BUFFER (VIA THE MESSAGE BUFFER RELEASE COMMAND), THAT A NEW COMMAND (E.G., WRITE CHARACTERISTICS) IS PROPERLY EXECUTED WHEN ISSUED WITH THE ACK BIT IN THE COMMAND HEADER EITHER SET OR CLEAR.

6.7.4 TEST 7, SUBTEST 4: -

VERIFIES THAT THE REGISTER VERIFICATION REFUSED (RMR) BIT IN TSSR OPERATES PROPERLY WHEN A COMMAND (WRITE CHARACTERISTICS) IS BEING EXECUTED. THE PROGRAM ISSUES THE WRITE CHARACTERISTICS COMMAND (FROM ONE COMMAND BUFFER) THEN IMMEDIATELY WRITES THE ADDRESS OF ANOTHER COMMAND BUFFER (CONTAINING ANOTHER WRITE CHARACTERISTICS COMMAND, BUT WITH THIS ONE SPECIFYING DIFFERENT CHARACTERISTICS DATA). WHEN SSR SETS, THE PROGRAM VERIFIES THAT THE FIRST COMMAND COMPLETED PROPERLY, THAT RMR IS SET, AND THAT THE SECOND COMMAND IS IGNORED.

6.8 TEST 8 - NON-TAPE MOTION COMMANDS

```
**************************************************************************
* NOTE: IF THIS TEST DETECTS AN ERROR REPLACE THE TK25'S                 *
* CONTROLLER                                                             *
**************************************************************************
```

THIS TEST VERIFIES PROPER OPERATION OF THE GET STATUS AND INITIALIZE COMMANDS. THREE SUBTESTS ARE USED. THE FIRST TWO VERIFY THAT THE RESPECTIVE COMMANDS RUN TO COMPLETION AND STORE A VALID MESSAGE PACKET.

6.9 TEST 9 - MEMORY ADDRESSING TEST

```
**********************************************************************
* NOTE: IF THIS TEST DETECTS AN ERROR REPLACE THE TK25'S             *
* CONTROLLER                                                         *
**********************************************************************
```

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

6.9.1 TEST 9, SUBTEST 1: -

THIS SUBTEST VERIFIES THAT THE CONTROLLER CAN FETCH A GET STATUS COMMAND FROM ALL AVAILABLE MEMORY LOCATIONS. TWO WORD BLOCKS ARE TESTED ONE AT A TIME BY FIRST SETTING ALL AVAILABLE MEMORY TO A BACKGROUND PATTERN OF 125252. A GET STATUS COMMAND IS THEN EXECUTED TO VARIOUS ADDRESSES IN EACH AVAILABLE MEMORY 4K BLOCK. THE VARIOUS ADDRESSES ARE DETERMINED BY FLOATING FIRST A (1) THEN A (0) THROUGH THE ADDRESS BITS.

6.9.2 TEST 9, SUBTEST 2: -

THIS SUBTEST VERIFIES THAT THE CONTROLLER CAN DEPOSIT MESSAGE PACKETS TO ALL AVAILABLE MEMORY LOCATIONS. FIRST ALL AVAILABLE MEMORY IS SET TO A BACKGROUND PATTERN OF 125252. WRITE CHARACTERISTICS COMMANDS ARE THEN EXECUTED WITH MESSAGE BUFFER ADDRESSES SET TO VARIOUS ADDRESSES IN EACH AVAILABLE MEMORY LOCATION. THE VARIOUS ADDRESSES ARE DETERMINED BY FLOATING FIRST A (1) THEN A (0) THROUGH THE ADDRESS BITS.

6.9.3 TEST 9, SUBTEST 3: -

THIS SUBTEST VERIFIES THAT A CONTROLLER CAN FETCH A WRITE CHARACTERISTICS DATA BLOCK FROM ALL AVAILABLE MEMORY LOCATIONS. FIRST ALL AVAILABLE MEMORY IS SET TO A BACKGROUND PATTERND OF 125252. THE WRITE CHARACTERISTICS COMMANDS ARE EXECUTED WITH CHARACTERISTIC DATA BLOCKS AT VARIOUS MEMORY ADDRESSES. THE VARIOUS MEMORY ADDRESSES ARE DETERMINED BY FLOATING FIRST A (1) THEN A (0) THROUGH THE ADDRESS BITS.

6.9.4 TEST 9, SUBTEST 4: -

THIS SUBTEST VERIFIES THAT THE NXM ERROR BIT IN THE TSSR REGISTER IS SET WHEN ATTEMPTING TO FETCH DATA (A CHARACTERISTIC DATA BLOCK) FROM SELECTED NONEXISTANT LOCATIONS. IF NXM FAILS TO SET IT IS LIKELY THAT

AN LSI-11 BUS DRIVER IS FAILING TO ASSERT AN ADDRESS LINE. ADDRESSES TESTED INCLUDE ALL COMBINATIONS OF HIGH ORDER ADDRESS BITS (IE: BITS 16-21).

6.10 TEST 10 - INITIALIZE AFTER WRITE CHARACTERISTICS

```
**\*************************************************************
* NOTE: IF THIS TEST DETECTS AN ERROR REPLACE THE TK25'S       *
* CONTROLLER                                                   *
*************************************************************
```

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

6.11 TEST 11 - BASIC WRITE SUBSYSTEM MEMORY COMMAND

```
**********************************************************************
* NOTE: IF THIS TEST DETECTS AN ERROR REPLACE THE TK25'S             *
* CONTROLLER                                                         *
**********************************************************************
```

THIS TEST VERIFIES THAT THE WRITE SUBSYSTEM MEMORY COMMAND WITH A BSELO SELECT CODE OF 0 (NO-OP) EXECUTES CORRECTLY. THE TEST FURTHER VERIFIES MICROPROGRA COMMAND DECODING AND HANDLING SEQUENCES.

```
                \

                                .SBTTL  PROGRAM HEADER
                                .MCALL  SVC
000000                          SVC                     ; INITIALIZE SUPERVISOR MACROS
                                .ENABLE LC
                                .NLIST  BEX,CND
000000                          .ENABL  AMA,ABS
        002000                  . = 2000
002000                                  BGNMOD  TUV2A
002000                          TUV2A::

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


002000                                  POINTER BGNSW,BGNSFT,BGNAU,BGNDU,BGNRPT,BGNSETUP
002000                                  HEADER  CZTKE,A,0,655.,0
002000                          L$NAME::                ;DIAGNOSTIC NAME
002000      103                         .ASCII /C/
002001      132                         .ASCII /Z/
002002      124                         .ASCII /T/
002003      113                         .ASCII /K/
002004      105                         .ASCII /E/
002005      000                         .BYTE   0
002006      000                         .BYTE   0
002007      000                 L$REV::                 ;REVISION LEVEL
002010      101                         .ASCII  /A/
002010                          L$DEPO::                ;0
002011      060                         .ASCII  /0/
002011                          L$UNIT::                ;NUMBER OF UNITS
002012  000001                          .WORD   T$PTHV
002012                          L$TIML::                ;LONGEST TEST TIME
002014  001217                          .WORD   655.
002014                          L$HPCP::                ;POINTER TO H.W. QUES.
002016  046052                          .WORD   L$HARD
002016                          L$SPCP::                ;POINTER TO S.W. QUES.
002020  046212                          .WORD   L$SOFT
002020                          L$HPTP::                ;PTR. TO DEF. H.W. PTABLE
002022  002124                          .WORD   L$HW
002022                          L$SPTP::                ;PTR. TO S.W. PTABLE
002024  002134                          .WORD   L$SW
002024                          L$LADP::                ;DIAG. END ADDRESS
002026  046436                          .WORD   L$LAST
002026                          L$STA::                 ;RESERVED FOR APT STATS
002030  000000                          .WORD   0
002030                          L$CO::
002032  000000                          .WORD   0
002032                          L$DTYP::                ;DIAGNOSTIC TYPE
002034  000000                          .WORD   0
002034                          L$APT::                 ;APT EXPANSION
002036  000000                          .WORD   0
002036                          L$DTP::                 ;PTR. TO DISPATCH TABLE
002040  046404                          .WORD   L$DISPATCH
002040
```

```
002042
002042  000000                  L$PRIO::                ;DIAGNOSTIC RUN PRIORITY
                                .WORD   0
002044
002044  000000                  L$ENVI::                ;FLAGS DESCRIBE HOW IT WAS SETUP
                                .WORD   0
002046
002046  000000                  L$EXP1::                ;EXPANSION WORD
                                .WORD   0
002050
002050     003                  L$MREV::                ;SVC REV AND EDIT #
                                .BYTE   C$REVISION
002051     003                  .BYTE   C$EDIT
002052
002052  000000                  L$EF::                  ;DIAG. EVENT FLAGS
                                .WORD   0
002054  000000                  .WORD   0
002056
002056  000000                  L$SPC::
                                .WORD   0
002060
002060  003334                  L$DEVP::                ; POINTER TO DEVICE TYPE LIST
                                .WORD   L$DVTYP
002062
002062  022674                  L$REPP::                ;PTR. TO REPORT CODE
                                .WORD   L$RPT
002064
002064  000000                  L$EXP4::
                                .WORD   0
002066
002066  000000                  L$EXP5::
                                .WORD   0
002070
002070  022366                  L$AUT::                 ;PTR. TO ADD UNIT CODE
                                .WORD   L$AU
002072
002072  022464                  L$DUT::                 ;PTR. TO DROP UNIT CODE
                                .WORD   L$DU
002074
002074  000000                  L$LUN::                 ;LUN FOR EXERCISERS TO FILL
                                .WORD   0
002076
002076  003342                  L$DESP::                ;POINTER TO DIAG. DESCRIPTION
                                .WORD   L$DESC
002100
002100  104035                  L$LOAD::                ;GENERATE SPECIAL AUTOLOAD EMT
                                EMT     E$LOAD
002102
002102  000000                  L$ETP::                 ;POINTER TO ERRTBL
                                .WORD   0
002104
002104  021606                  L$ICP::                 ;PTR. TO INIT CODE
                                .WORD   L$INIT
002106
002106  022646                  L$CCP::                 ;PTR. TO CLEAN-UP CODE
                                .WORD   L$CLEAN
002110
002110  022572                  L$ACP::                 ;PTR. TO AUTO CODE
                                .WORD   L$AUTO
002112
002112  021576                  L$PRT::                 ;PTR. TO PROTECT TABLE
                                .WORD   L$PROT
002114
002114  000000                  L$TEST::                ;TEST NUMBER
                                .WORD   0
002116
002116  000000                  L$DLY::                 ;DELAY COUNT
                                .WORD   0
002120
002120  000000                  L$HIME::                ;PTR. TO HIGH MEM
                                .WORD   0
```

```
                        .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.
                ;--
002122                  BGNHW   DFPTBL          ;DEFAULT HARD-P-TABLE
002122  000003          .WORD   L10000-L$HW/2
002124          L$HW::
002124          DFPTBL::

002124  172522          .WORD   172522          ; 2ND (OF 2) REGISTERS.
002126  000224          .WORD   224             ; INTERRUPT VECTOR
002130  000240          .WORD   PRI05           ; INTERRUPT PRIORITY.
002132                  ENDHW
002132          L10000:
```

```
                                        .SBTTL  SOFTWARE P-TABLE

                                ;++
                                ; THE SOFTWARE P-TABLE CONTAINS THE VALUES OF THE PROGRAM
                                ; PARAMETERS THAT CAN BE CHANGED BY THE OPERATOR.
                                ;--
002132                                  BGNSW   SFPTBL
002132  000004                         .WORD   L10001-L$SW/2
002134                          L$SW::
002134                          SFPTBL::

002134  000000                  TRANSTST::      .WORD   0       ;ENABLE RAM DUMP IF =1
002136  000000                  NOITS::         .WORD   0       ; INHIBIT ITERATION OPTION.
                                                                ; ... 0 = ITERATE.
                                                                ; ...NZ = INHIBIT ITERATE.
002140  000031                  LERRMAX::       .WORD   25.     ; LOCAL (PER TEST) ERROR LIMIT
002142  000310                  GERRMAX::       .WORD   200.    ; GLOBAL (PER UNIT) ERROR LIMIT
002144                                  ENDSW
002144                          L10001:

```

```
802
809                                     .SBTTL  GLOBAL EQUATES SECTION
814
820
821
822
823                                     .SBTTL  GLOBAL EQUATES SECTION
824
825                                 ;++
826                                 ; THE GLOBAL EQUATES SECTION CONTAINS PROGRAM EQUATES THAT
827                                 ; ARE USED IN MORE THAN ONE TEST.
828                                 ;--
829
833 002144                              EQUALS          ; GET STANDARD EQUATES.
                                    ;
                                    ; BIT DIFINITIONS
                                    ;
            100000                  BIT15== 100000
            040000                  BIT14== 40000
            020000                  BIT13== 20000
            010000                  BIT12== 10000
            004000                  BIT11== 4000
            002000                  BIT10== 2000
            001000                  BIT09== 1000
            000400                  BIT08== 400
            000200                  BIT07== 200
            000100                  BIT06== 100
            000040                  BIT05== 40
            000020                  BIT04== 20
            000010                  BIT03== 10
            000004                  BIT02== 4
            000002                  BIT01== 2
            000001                  BIT00== 1
                                    ;
            001000                  BIT9==  BIT09
            000400                  BIT8==  BIT08
            000200                  BIT7==  BIT07
            000100                  BIT6==  BIT06
            000040                  BIT5==  BIT05
            000020                  BIT4==  BIT04
            000010                  BIT3==  BIT03
            000004                  BIT2==  BIT02
            000002                  BIT1==  BIT01
            000001                  BIT0==  BIT00
                                    ;
                                    ; EVENT FLAG DEFINITIONS
                                    ;   EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
                                    ;
            000040                  EF.START==      32.             ; START COMMAND WAS ISSUED
            000037                  EF.RESTART==    31.             ; RESTART COMMAND WAS ISSUED
            000036                  EF.CONTINUE==   30.             ; CONTINUE COMMAND WAS ISSUED
            000035                  EF.NEW==        29.             ; A NEW PASS HAS BEEN STARTED
            000034                  EF.PWR==        28.             ; A POWER-FAIL/POWER-UP OCCURRED
                                    ;
                                    ;
                                    ; PRIORITY LEVEL DEFINITIONS
                                    ;
```

```
000340                  PRI07== 340
000300                  PRI06== 300
000240                  PRI05== 240
000200                  PRI04== 200
000140                  PRI03== 140
000100                  PRI02== 100
000040                  PRI01== 40
000000                  PRI00== 0
                        ;
                        ;OPERATOR FLAG BITS
                        ;
000004                  EVL==     4
000010                  LOT==    10
000020                  ADR==    20
000040                  IDU==    40
000100                  ISR==   100
000200                  UAM==   200
000400                  BOE==   400
001000                  PNT==  1000
002000                  PRI==  2000
004000                  1XE==  4000
010000                  IBE== 10000
020000                  IER== 20000
040000                  LOE== 40000
100000                  HOE== 100000
834
835 002144                      KT11    ,,      ;DEFINE MEMORY MANAGEMENT REGISTERS
                        .SBTTL  MEMORY MANAGEMENT DEFINITIONS
                        ;*KT11 VECTOR ADDRESS
000250                  MMVEC=  250
                        ;*KT11 STATUS REGISTER ADDRESSES
177572                  SR0=    177572
177574                  SR1=    177574
177576                  SR2=    177576
172516                  SR3=    172516
                        .IF NB
                        ;*USER "I" PAGE DESCRIPTOR REGISTERS
                        UIPDR0= 177600
                        UIPDR1= 177602
                        UIPDR2= 177604
                        UIPDR3= 177606
                        UIPDR4= 177610
                        UIPDR5= 177612
                        UIPDR6= 177614
                        UIPDR7= 177616
                        .IF NB
                        ;*USER "D" PAGE DESCRIPTOR REGISTORS
                        UDPDR0= 177620
                        UDPDR1= 177622
                        UDPDR2= 177624
                        UDPDR3= 177626
                        UDPDR4= 177630
                        UDPDR5= 177632
                        UDPDR6= 177634
                        UDPDR7= 177636
                        .ENDC
                        ;*USER "I" PAGE ADDRESS REGISTERS
```

```
UIPAR0= 177640
UIPAR1= 177642
UIPAR2= 177644
UIPAR3= 177646
UIPAR4= 177650
UIPAR5= 177652
UIPAR6= 177654
UIPAR7= 177656
.IF NB
;*USER "D" PAGE ADDRESS REGISTERS
UDPAR0= 177660
UDPAR1= 177662
UDPAR2= 177664
UDPAR3= 177666
UDPAR4= 177670
UDPAR5= 177672
UDPAR6= 177674
UDPAR7= 177676
.ENDC
.ENDC
.IF NB
;*SUPERVISOR "I" PAGE DESCRIPTOR REGISTERS
SIPDR0= 172200
SIPDR1= 172202
SIPDR2= 172204
SIPDR3= 172206
SIPDR4= 172210
SIPDR5= 172212
SIPDR6= 172214
SIPDR7= 172216
.IF NB
;*SUPERVISOR "D" PAGE DESCRIPTOR REGISTERS
SDPDR0= 172220
SDPDR1= 172222
SDPDR2= 172224
SDPDR3= 172226
SDPDR4= 172230
SDPDR5= 172232
SDPDR6= 172234
SDPDR7= 172236
.ENDC
;*SUPERVISOR "I" PAGE ADDRESS REGISTERS
SIPAR0= 172240
SIPAR1= 172242
SIPAR2= 172244
SIPAR3= 172246
SIPAR4= 172250
SIPAR5= 172252
SIPAR6= 172254
SIPAR7= 172256
.IF NB
;*SUPERVISOR "D" PAGE ADDRESS REGISTERS
SDPAR0= 172260
SDPAR1= 172262
SDPAR2= 172264
SDPAR3= 172266
SDPAR4= 172270
```

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

```
                                .SBTTL  TK-25 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

                        ;+
                        ;BIT DEFINITIONS FOR TSSR REGISTER
                        ;-

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

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

100000                  XSOTMK= BIT15                   ;TAPE MARK DETECTED
040000                  XSORLS= BIT14                   ;RECORD LENGTH SHORT
020000                  XSOLET= BIT13                   ;LOGICAL END OF TAPE
010000                  XSORLL= BIT12                   ;RECORD LENGTH LONG
004000                  XSOWLE= BIT11                   ;WRITE LOCK ERROR
002000                  XSONEF= BIT10                   ;NON EXECUTABLE FUNCTION
001000                  XSOILC= BIT9                    ;ILLEGAL COMMAND
000400                  XSOILA= BIT8                    ;ILLEGAL ADDRESS
000200                  XSOMOT= BIT7                    ;TAPE IN MOTION
000100                  XSOONL= BIT6                    ;TRANSPORT ON LINE
000040                  XSOIE=  BIT5                    ;INTERRUPT ENABLE
000020                  XSOVCK= BIT4                    ;VOLUME CHECK BIT
000010                  XSOPED= BIT3                    ;PHASE ENCODED DRIVE
000004                  XSOWLK= BIT2                    ;WRITE LOCKED
000002                  XSOBOT= BIT1                    ;BEGINNING OF TAPE
000001                  XSOEOT= BIT0                    ;END OF TAPE


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

H3

TK-25 REGISTER AND PACKET DEFINITIONS

```
897          100000                  X1.DLT  = BIT15                         ;DATA LATE
898          040000                  X1.SPARE= BIT14                         ;NOT USED
899          020000                  X1.COR  = BIT13                         ;CORRECTABLE DATA ERROR
900          017375                  X1.MBZ  = BIT12+BIT11+BIT10+BIT9+BIT7+BIT6+BIT5+BIT4+BIT3+BIT2+BIT0 ;ALWAYS 0
901          000400                  X1.RBP  = BIT8                          ;READ BUS PARITY ERROR
902          000002                  X1.UNC  = BIT1                          ;UNCORRECTABLE DATA OR HARD ERROR
903
904                                  ;+
905                                  ;BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 2
906                                  ;(XST2)
907                                  ;-
908          100000                  X2.OPM  = BIT15                         ;OPERATION IN PROGRESS (TAPE MOVING)
909          040000                  X2.RCE  = BIT14                         ;RAM CHECKSUM ERROR
910          035400                  X2.SPARE= BIT13+BIT12+BIT11+BIT9+BIT8   ;NOT USED BY TK-25 (ALWAYS=0)
911          002000                  X2.WCF  = BIT10                         ;WRITE CLOCK FAILURE (FIFO NOT EMPTIED BY TRANSPORT)
912          000200                  X2.EXTF = BIT7                          ;IF WRITE CHAR CMD THEN = EXTENDED FEATURES ENABLED
913          000100                  X2.BUFE = BIT6                          ;IF WRITE CHAR CMD THEN = BUFFERING ENABLED
914          000077                  X2.REV  = 000077                        ;IF WRITE CHAR CMD THEN = MICROCODE REVISION LEVEL
915          000007                  X2.UNIT = BIT2+BIT1+BIT0                ;IF GET STATUS THEN = CURRENTLY SELECTED UNIT NO.
916
917                                  ;+
918                                  ;BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 3
919                                  ;(XST3)
920                                  ;-
921          177400                  X3.MDE  = 177400                        ;MICRO-DIAGNOSTIC ERROR CODE
922          000200                  X3.SPARE= BIT7                          ;NOT USED BY TK-25
923          000100                  X3.OPI  = BIT6                          ;OPERATION INCOMPLETE
924          000040                  X3.REV  = BIT5                          ;REVERSE
925          000020                  X3.TRF  = BIT4                          ;TRANSPORT RESPONSE FAILURE
926          000010                  X3.DCK  = BIT3                          ;DENSITY CHECK
927          000006                  X3.MBZ  =BIT2+BIT1                      ;NOT USED ALWAYS 0
928          000001                  X3.RIB  = BIT0                          ;REVERSE INTO BOT
929
930                                  ;+
931                                  ;BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 4
932                                  ;(XST4)
933                                  ;-
934          100000                  X4.HSP  = BIT15                         ;HIGH SPEED
935          040000                  X4.RCE  = BIT14                         ;RETRY COUNT EXCEEDED
936          020000                  X4.TSM  = BIT13                         ;TRANSPORT SPECIAL MODE
937          017400                  X4.MBZ  = BIT12+BIT11+BIT10+BIT9+BIT8   ;NOT USED ALWAYS 0
938          000377                  X4.WRC  = 000377                        ;WRITE RETRY COUNT FIELD
939
940
941                                  ;+
942                                  ;
943                                  ;TSSR TERMINATION CODES (BIT 0-2)
944                                  ;
945                                  ;-
946
947          000006                          TSREJ=  3*2                     ;COMMAND REJECTED
948          000006                          UNREC=  6                       ;UNRECOVERABLE ERROR
949
950                                  ;+
951                                  ;
952                                  ;DEVICE REGISTER OFFSETS
953                                  ;
```

```
                        ;-
                        ;
177776                  TSBA**  -2
177776                  TSBAL** -2
177776                  TSDB**  -2                      ;TSDB/TSBA REGISTER
177776                  TSDBL** -2                      ;TSDB/TSBA REGISTER
177777                  TSBAH** -1
177777                  TSDBH** -1                      ;TSDB/TSBA REGISTER HIGH BYTE
000000                  TSSR**  0                       ;TSSR REGISTER
000001                  TSSRH** 1                       ;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
000020                  RMPKTBEG= 20                    ;COMMAND PACKET BEGIN RAM ADDRESS
000027                  RMPKTEND= 27                    ;COMMAND PACKET END RAM ADDRESS
000104                  RMMSGBEG= 104                   ;MESSAGE BUFFER BEGIN RAM ADDRESS
```

```
1011          000117                  RMMSGEND= 117                           ;MESSAGE BUFFER END RAM ADDRESS
1012                                  ;*
1013                                  ;
1014                                  ;REGISTER DEFINITIONS IN THE MESSAGE BUFFER
1015                                  ;
1016                                  ;-
1017
1018          000006                  XST0==  6                               ;EXTENDED STATUS REGISTER 0 (WORD 4)
1019          000010                  XST1==  8.                              ;EXTENDED STATUS REGISTER 1 (WORD 5)
1020          000012                  XST2==  10.                             ;EXTENDED STATUS REGISTER 2 (WORD 6)
1021          000014                  XST3==  12.                             ;EXTENDED STATUS REGISTER 3 (WORD 7)
1022          000016                  XST4==  14.                             ;EXTENDED STATUS REGISTER 4 (WORD 8)
1023
1024
1025                                  ;*
1026                                  ;
1027                                  ;OFFSETS TO WORD LOCATIONS IN PACKET DEFINITIONS
1028                                  ;
1029                                  ;-
1030
1031          000002                          PKLOW   = 2                     ;LOW ORDER CHARACTERISTIC DATA POINTER
1032          000004                          PKHI    = 4                     ;HIGH ORDER CHARACTERISTIC DATA POINTER
1033          000006                          PKBCNT  = 6                     ;NUMBER OF BYTES IN DATA PACKET
1034
1035          000010                          EXBCNT=10                       ;NUMBER OF BYTES IN EXTENDED DATA PACKET
1036
1037                                  ;*
1038                                  ;DATA PACKET OFFSETS FOR WRITE SUBSYTEM COMMAND
1039                                  ;-
1040          000000                          BSEL0   = 0                     ;BYTE 0
1041          000001                          BSEL1   = 1                     ;BYTE 1
1042          000002                          SEL2    = 2                     ;WORD 2
1043          000004                          SELDATA = 4                     ;WORD 3
1044
1045                                  ;*
1046                                  ;BSEL0 SELECT CODES FOR WRITE SUBSYSTEM COMMAND
1047                                  ;-
1048          000000                  PW.NOP          = 0                     ;NO-OP
1049          000001                  PW.RDRAM        = 1                     ;READ RAM
1050          000002                  PW.WTRAM        = 2                     ;WRITE RAM
1051          000003                  PW.RFIFO        = 3                     ;READ FIFO
1052          000004                  PW.WFIFO        = 4                     ;WRITE FIFO
1053          000005                  PW.RDSTAT       = 5                     ;READ STATUS
1054          000006                  PW.WCTL         = 6                     ;WRITE TAPE CONTROL
1055          000007                  PW.WFMT         = 7                     ;WRITE TAPE FORMAT
1056          000010                  PW.WMISC        = 10                    ;WRITE MISCELLANEOUS
1057          000011                  PW.WNPR         = 11                    ;WRITE NPR CONTROL
1058          000020                  PW.D22          = 20                    ;DO MICROTEST 22
1059          000021                  PW.D11          = 21                    ;DO MICROTEST 11
1060          000022                  PW.D13          = 22                    ;DO MICROTEST 13
1061          000023                  PW.ND1311       = 23                    ;DISABLE MICROTEST 11 AND 13
1062          000024                  PW.RDEXT        = 24                    ;READ EXT. TAPE STATUS (NOT SUPPORTED BY ALL TRANSPO
RTS
1063
1064                                  ;*
1065                                  ;BSEL1 CODES FOR WRITE TAPE CONTROL
1066                                  ;-
1067          000200                  WC.IFAD         = BIT7                  ;IFAD - FORMATTER ADDRESS
```

```
                                ;+
                                ;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
```

```
1125    010000          S1.IEOT     = BIT12         ;             IEOT L
1126    004000          S1.IIDENT   = BIT11         ;             IIDENT H
1127    002000          S1.ICER     = BIT10         ;             ICER H
1128    001000          S1.IFMK     = BIT9          ;             IFMK H
1129    000400          S1.IHER     = BIT8          ;             IHER H
1130    000200          S0.ISPEED   = BIT7          ;WORD #8 BYTE 0 ISPEED H
1131    000100          S0.IRDY     = BIT6          ;             IRDY L
1132    000040          S0.IONL     = BIT5          ;             IONL L
1133    000020          S0.ILDP     = BIT4          ;             ILDP L
1134    000010          S0.IDBY     = BIT3          ;             IDBY L
1135    000004          S0.IRWD     = BIT2          ;             IRWD L
1136    000002          S0.IFBY     = BIT1          ;             IFBY L
1137    000001          S0.IFPT     = BIT0          ;             IFPT L
1138                    ;       SPECIAL KEYBORD STUFF FOR MOVER PROGRAM
1139
1140    177560              TKS     =177560         ;KEYBOARD STATUS REGISTER
1141    177562              TKB     =177562         ;KEYBOARD DATA REGISTER
1142    177564              TPS     =177564         ;CONSOLE PRINTER STATUS REG
1143    177566              TPB     =177566         ;CONSOLE PRINTER DATA REGISTER
1144    007776              HIMEM   =007776         ;HIGH MEMORY MASK VALUE
1145                    ;       CONTROLLER DEFINITIONS
1146                    ;
1147                    ;
1148    174400              CSR     =174400         ;STATUS AND CONTROL REGISTER
1149    174402              BAR     =174402         ;DL ADDRESS REGISTER
1150    174404              DAR     =174404         ;PLATTER ADDRESS
1151    174406              MPR     =174406         ;MULTIPURPOSE REGISTER
1152                    ;
1153                    ;
1154                    ;
1155                    ;
1156                    ;
1157                    ;       CONTROLLER COMMANDS
1158                    ;
1159                    ;
1160    000004              DLGETS  =4              ;GET STATUS COMMAND
1161    000006              SEEK    =6              ;SEEK TRACK AND HEAD SELECT
1162    000010              DLRDHD  =10             ;READ SECTOR HEADER
1163    000014              READ    =14             ;READ COMMAND
1164    000016              DLRDNH  =16             ;READ SECTOR NO HEADER CHECK
1165                    ;
1166                    ;
1167                    ;
1168                    ;
1169                    ;
1170                    ;
1171    000001              READY   =1              ;DRIVE READY BIT IN STATUS REG.
1172    000013              DLSR    =13             ;STATUS AND RESET
1173    177730              DLERR   =177730         ;MASK FOR COVER OPEN
1174    000006              DLUN    =6              ;HEADS UNLOADED
1175    000177              DLCYL   =000177         ;MASK FOR CYLINDER ADDRESS
1176    100200              DLDNER  =100200         ;DONE SET OR ERROR SET BITS
1177                    ;
1178                    ;
1179                    ;
1180                    ;
1181    177560              TTICSR  =       177560  ;KEYBOARD INPUT STATUS
```

```
1182        177562                  TTIBFR  =       177562          ;KEYBOARD DATA REGISTER
1183        177564                  TTOCSR  =       177564          ;CONSOLE PRINTER STATUS REGISTER
1184        177566                  TTOBFR  =       177566          ;CONSOLE PRINTER DATA REGISTER
1185
```

```
                        .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
                ;       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.
                        ;

002144  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.
                        ;
002146  000000          EPRTSW::        .WORD   0               ;PRINT SWITCH
002150  000000          UNITN::         .WORD   0               ;UNIT # UNDER TEST.
002152  000000          QVP::           .WORD   0               ;QUICK VERIFY FLAG.
002154  000000          CSRADDR::       .WORD   0               ;ADDRESS OF CSR FOR CURRENT DEVICE
002156  000224          IVEC::          .WORD   224             ;INTERRUPT VECTOR
002160  000200          IPRI::          .WORD   PRI04           ;INTERRUPT PRIORITY.
002162  000000          TSTCNT::        .WORD   0               ;NUMBER OF TESTS RUN IN THIS PASS
002164  000000          LOOPCNT::       .WORD   0               ;REMAINING ITERATION COUNT FOR TEST
002166  000000          DEVCNT::        .WORD   0               ;NUMBER OF DEVICE UNDER TEST
002170  000000          FATFLG::        .WORD   0               ;SET IF FATAL ERROR IS DETECTED IN TEST
002172  000000          INTRECV::       .WORD   0               ;SET IF TAPE INTERRUPT WAS RECEIVED
002174  000000          BENBSW::        .WORD   0               ;BUFFER ENABLE SWITCH SW 0=OFF;1=ON
002176  000000          EXPD::          .WORD   0               ;EXPECTED RAM DATA FOR PRAMPKT ROUTINE
002200  000000          RECV::          .WORD   0               ;RECEIVED RAM DATA FOR PRAMPKT ROUTINE
002202  000000          ERRHI::         .WORD   0               ;HIGH ADDRESS MEMORY ERROR
002204  000000          ERRLO::         .WORD   0               ;LOW ADDRESS MEMORY ERROR
002206                  RAMDATA::       .BLKW   16.             ;DATA READ FROM RAM PACKET OR MESSAGE BUF AREA
002246  000000          RAMSIZ::        .WORD   0               ;RAM DATA SIZE FOR PRAMPKT ROUTINE
002250  000000          RCVHIADD::      .WORD   0               ;RECEIVED BUFFER HIGH ADDRESS
002252  000000          RCVLOADD::      .WORD   0               ;RECEIVED BUFFER LOW ADDRESS
002254  000000          COUNT::         .WORD   0               ;TEST COUNT PATTERN
002256  000000          DATA::          .WORD   0               ;TEST DATA
002260  000000          TSTFLAG::       .WORD   0               ;TEST FLAG WORD
002262  000000          TSTPTR::        .WORD   0               ;TSTBLK POINTER
002264  000000          PRMNO::         .WORD   0               ;PRINT ROUTINE TEMP
002266                  EXPMSG::        .BLKB   100.            ;EXPECTED MESSAGE BUFFER DATA
002432                  RECMSG::        .BLKB   100.            ;RECEIVED MESSAGE BUFFER DATA
002576                  TMPBFR::        .BLKB   80.             ;TEMPORARY STORAGE FOR PRINT
002716  000000          MESBFA::        .WORD   0               ;STORES ADDRESS OF MESSAGE BUFFER FOR ERR PRT
```

```
                                        .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
                                ;
                                ;-

002720                          TSTBLK::
002720  000000                          .WORD   0                       ;ALL ZEROS
002722  177777                          .WORD   177777                  ;ALL ONES
002724  000001                          .WORD   BIT0                    ;DATA FOR WALKING ONES
002726  000002                          .WORD   BIT1
002730  000004                          .WORD   BIT2
002732  000010                          .WORD   BIT3
002734  000020                          .WORD   BIT4
002736  000040                          .WORD   BIT5
002740  000100                          .WORD   BIT6
002742  000200                          .WORD   BIT7
002744  000400                          .WORD   BIT8
002746  001000                          .WORD   BIT9
002750  002000                          .WORD   BIT10
002752  004000                          .WORD   BIT11
002754  010000                          .WORD   BIT12
002756  020000                          .WORD   BIT13
002760  040000                          .WORD   BIT14
002762  100000                          .WORD   BIT15
002764  177776                          .WORD   ^C BIT0                 ;DATA FOR WALKING ZEROS
002766  177775                          .WORD   ^C BIT1
002770  177773                          .WORD   ^C BIT2
002772  177767                          .WORD   ^C BIT3
002774  177757                          .WORD   ^C BIT4
002776  177737                          .WORD   ^C BIT5
003000  177677                          .WORD   ^C BIT6
003002  177577                          .WORD   ^C BIT7
003004  177377                          .WORD   ^C BIT8
003006  176777                          .WORD   ^C BIT9
003010  175777                          .WORD   ^C BIT10
003012  173777                          .WORD   ^C BIT11
003014  167777                          .WORD   ^C BIT12
003016  157777                          .WORD   ^C BIT13
003020  137777                          .WORD   ^C BIT14
003022  077777                          .WORD   ^C BIT15
003024  125252                          .WORD   125252                  ;ALTERNATING ONES, ZEROS
003026  052525                          .WORD   052525                  ;ALTERNATING ONES, ZERO OPPOSITE FROM ABOVE
003030                          TBLEND::
```

```
                                        .SBTTL  GLOBAL ENVIRONMENT STORAGE
                                ;
                                ;STORAGE FOR DEVICE REGISTERS
                                ;
003030  000000  100000  000000  DUMMY:  0,100000,0,0                    ;DUMMY DEVICE REGISTERS...
003040  000000  000000  000000          0,0,0,0,0,0,0,0
                                                                        ;...FOR MULTI-UNIT CHECKOUT.


003060  000000                  DUFLG::         .WORD   0               ;"DROPPED UNIT" FLAG.
                                                                        ;INHIBITS CODE IN "CLEAN-UP".
003062  000000                  NODEV::         .WORD   0               ;FLAG TO SAY NO DEVICE.

003064  000000                  TEMP1::         .WORD   0               ;SOME TEMP LOCATIONS.
003066  000000                  TEMP2::         .WORD   0
003070  000000                  XXCOMM::        .WORD   0               ;XXDP+ COMM BLOCK POINTER.
003072  000000                  FREE::          .WORD   0               ;1ST FREE MEMORY ADDRESS...
003074  000000                  FRESIZ::        .WORD   0               ;...AND SIZE (IN WORDS).
003076  000000                  FREEHI:         .WORD   0               ;LAST WORD IN FREE SPACE
003100  000000                  KTFLG::         .WORD   0               ;KT11, MEM AVAIL FLAG -
                                                                        ;- .WORD        0 = <24K OR NO KT -
                                                                        ;- NZ = >24K AND KT.
003102  000000                  KTENABLE::      .WORD   0               ;SET BY TEST ROUTINES TO FLAG >28K UNDER TEST
003104  002000                  PST32W::        .WORD   2000            ;32W BLOCK ADDRESS FOR 32K START
003106  000000                  SIFLAG::        .WORD   0               ;
003110  000000                  BADDAT::        .WORD   0               ;ACTUAL DATA
003112  000000                  GDDAT::         .WORD   0               ;EXPECTED DATA
003114  000000                  LOOPFL::        .WORD   0
003116                          CTAB::                                  ;CONFIGURATION TABLES.
003116  000000                  CTABM::         .WORD   0               ;CONFIG WORK.
003120  000000                                  .WORD   0
003122  000000                                  .WORD   0
003124  000000                                  .WORD   0
003126  177777                                  .WORD   -1              ;END OF MEM TABLE.
003130                          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
                                ;
003130                          ERTABL:         .BLKW   64.
003330  000000                  ERTABE:         .WORD   0

003332  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
                                ;-

003334                                  DEVTYP  <TK-25>
003334                          L$DVTYP::
003334  124     113     055             .ASCIZ  /TK-25/
                                        .EVEN


                                ;+
                                ;TEST DESCRIPTION
                                ;-

003342                                  DESCRIPT <CZTKEA TK-25 FRT END FUNC #1>
003342                          L$DESC::
003342  103     132     124             .ASCIZ  /CZTKEA TK-25 FRT END FUNC #1/
                                        .EVEN

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

003400  003440  003443  003447  TSSRBIT::        .WORD   1$,2$,3$,4$,5$,6$,7$,8$
003420  003501  003505  003511                  .WORD   9$,10$,11$,12$,13$,14$,15$,16$
003440     123     103     000  1$:     .ASCIZ  'SC'
003443     102     111     105  2$:     .ASCIZ  'BIE'
003447     123     103     105  3$:     .ASCIZ  'SCE'
003453     122     115     122  4$:     .ASCIZ  'RMR'
003457     116     130     115  5$:     .ASCIZ  'NXM'
003463     116     102     101  6$:     .ASCIZ  'NBA'
003467     102     111     124  7$:     .ASCIZ  'BIT9'
003474     102     111     124  8$:     .ASCIZ  'BIT8'
003501     123     123     122  9$:     .ASCIZ  'SSR'
003505     117     106     114  10$:    .ASCIZ  'OFL'
003511     102     111     124  11$:    .ASCIZ  'BIT5'
003516     102     111     124  12$:    .ASCIZ  'BIT4'
003523     102     111     124  13$:    .ASCIZ  'BIT3'
003530     102     111     124  14$:    .ASCIZ  'BIT2'
003535     102     111     124  15$:    .ASCIZ  'BIT1'
003542     102     111     124  16$:    .ASCIZ  'BIT0'
                                .EVEN
003550     124     123     123  SFIERR: .ASCIZ  'TSSR ERROR AFTER SOFT INIT'
003603     124     123     123  SFHERR: .ASCIZ  'TSSR ERROR AFTER BUS RESET'
003636     040     040     116  NXR:    .ASCIZ  /  NON-EXISTANT DEVICE REGISTER/
003675     045     101     040  NXRX:   .ASCIZ  /%A  ADDRESS: %O6/
003716     045     101     040  TSSX:   .ASCII  /%A  TSBA,TSSR EXP'D: %O6%A,%O6%N/
003756     045     101     040          .ASCIZ  /%A  TSBA,TSSR REC'D: %O6%A,%O6/
004015     045     116     045  FUSI:   .ASCII  /%N%A/
```

```
1465 004021  040  040  125  USI:     .ASCIZ  /  UNEXPECTED INTERRUPT/
1466 004050  040  040  111  NSI:     .ASCIZ  /  INTERRUPT EXPECTED, NOT RECEIVED/
1467 004113  045  116  045  FNOINTR:         .ASCII  /%N%A/
1468 004117  040  040  116  NOINTR: .ASCIZ  /  NO INTERRUPT WAS GENERATED/
1469 004154  040  040  111  IFAULT: .ASCIZ  /  INTERRUPT FAULT/
1470 004176  045  101  040  INTX:   .ASCIZ  /%A  CPU PC: %O6%A  TSBA: %O6/
1471 004233  040  040  042  NOINIT: .ASCIZ  /  "BUS-INIT" DIDN'T INITIALIZE CONTROLLER/
1472 004305  040  040  042  NSINIT: .ASCIZ  /  "SOFT-INIT" DIDN'T INITIALIZE THE DPU/
1473 004355  040  040  042  BRINIT: .ASCIZ  /  "BUS-RESET" DIDN'T INITIALIZE THE DPU/
1474
1475 004425  000            NUL:    .ASCIZ  //
1476 004426  045  116  000  NULCR:  .ASCIZ  /%N/
1477 004431  045  101  040  EXPGOT: .ASCIZ  /%A EXP'D: %O6%A, REC'D: %O6/
1478 004465  045  116  045  EXPGT2: .ASCIZ  /%N%A EXP'D: %O6%A, %O6%N%A REC'D: %O%A, %O6/
1479 004541  045  101  040  DUAD12: .ASCIZ  /%A REG(W) WRITTEN TO: %O6%A REG(R) READ; EXP'D: %O6%A, REC'D: %O6/
1480 004643  122  101  115  PKTRAM:: .ASCIZ  'RAM Contents Do Not Match Packet Sent'
1481 004711  040  040  103  SCME:   .ASCIZ  /  CONFIG DOESN'T MATCH MFG. MASTER/
1482 004754  127  122  111  WRTMSG: .ASCIZ  'WRITE CHARACTERISTICS Failed'
1483 005011  124  123  123  WRTERR: .ASCIZ  'TSSR Incorrect After WRITE Command, More Bits Set Than SSR'
1484 005104  124  123  123  RDERR:  .ASCIZ  'TSSR Incorrect After READ Command, More Bits Set Than SSR'
1485                         .EVEN
1486
1487
1488
```

```
                                        .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.
                                ;--

005176                                  BGNMSG  NXRERR                  ;NON-EXISTANT DEVICE REGISTER.
005176                          NXRERR::
005176                                  PRINTX  #NXRX,NODEV             ;NODEV = NEXM ADDRESS.
005176  013746  003062                    MOV     NODEV,-(SP)
005202  012746  003675                    MOV     #NXRX,-(SP)
005206  012746  000002                    MOV     #2,-(SP)
005212  010600                            MOV     SP,R0
005214  104415                            TRAP    C$PNTX
005216  062706  000006                    ADD     #6,SP
005222  004737  005230                    JSR     PC,EXTEND               ; PRINT EXTENSION IF REQUIRED.
005226                                  ENDMSG
005226                          L10002:
005226  104423                          TRAP    C$MSG


                                ;
                                ; THIS ROUTINE APPENDS A UNIQUE EXTENSION (IF REQUIRED)
                                ; TO ANY OF THE ABOVE ERROR SIGNATURES.
                                ;
005230  005727                  EXTEND: TST     (PC)+
005232  000000                  EXTA:   0                               ; 0 = NO EXTENSION.
005234  001402                          BEQ     1$
005236  004777  177770                  JSR     PC,@EXTA                ; APPEND EXTENSION TEXT.
005242                          1$:     PRINTX  #NULCR                  ; PRINT A BLANK LINE
005242  012746  004426                    MOV     #NULCR,-(SP)
005246  012746  000001                    MOV     #1,-(SP)
005252  010600                            MOV     SP,R0
005254  104415                            TRAP    C$PNTX
005256  062706  000004                    ADD     #4,SP
005262  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
                                ;
                                ;-

                                PRITSSR:
005264                                  SAVREG                          ;SAVE GENERAL REGISTERS
005264  010104                          MOV     R1,R4                   ;SAVE THE TSSR CONTENTS
005270                                  PRINTB  #TSSRFOR,R4             ;PRINT THE CONTENTS OF TSSR
005272  010446                          MOV     R4,-(SP)
005274  012746  005736                  MOV     #TSSRFOR,-(SP)
005300  012746  000002                  MOV     #2,-(SP)
005304  010600                          MOV     SP,R0
005306  104414                          TRAP    C$PNTB
005310  062706  000006                  ADD     #6,SP
005314  010400                          MOV     R4,R0                   ;GET TSSR BACK FOR CHKAMB
005316  004737  01[illegible]           JSR     PC,CHKAMB               ;ARE CONTENTS AMBIGUOUS ?
005322  103410                          BCS     5$                      ;BRANCH IF NOT
005324                                  PRINTX  #AMBTSSR                ;SHOW CONTENTS ARE AMBIGUOUS
005324  012746  0[illegible]            MOV     #AMBTSSR,-(SP)
005330  012746  000001                  MOV     #1,-(SP)
005334  010600                          MOV     SP,R0
005336  104415                          TRAP    C.PNTX
005340  062706  000004                  ADD     #4,SP
005344  010403                  5$:     MOV     R4,R3                   ;CONTENTS OF TSSR
005346  042703  001476                  BIC     #HIADDR!FATERR!TERCLS,R3        ;CLEAR ALL MULTIPLE BIT FIELDS
005352  001434                          BEQ     20$                     ;NO BITS ARE SET
005354  012702  002576                  MOV     #TMPBFR,R2              ;TEMPORARY ASCII BUFFER
005360  012701  003400                  MOV     #TSSRBIT,R1             ;ASCII EQUIVALENT OF BITS
005364  005703                  10$:    TST     R3                      ;REMAINING BITS TO CONVERT
005366  001413                          BEQ     15$                     ;BRANCH WHEN ALL ARE DONE
005370  000241                          CLC                             ;CLEAR CARRY FOR SHIFT
005372  006103                          ROL     R3                      ;SHIFT NEXT BIT TO CARRY
005374  103006                          BCC     13$                     ;BRANCH IF BIT NOT SET
005376  011100                          MOV     (R1),R0                 ;POINTER TO BIT DEFINITION
005400  112022                  11$:    MOVB    (R0)+,(R2)+             ;MOVE ASCIZ TO BUFFER
005402  001376                          BNE     11$                     ;MOVE ALL BITS
005404  112762  000054  177777          MOVB    #',,-1(R2)              ;INSERT A COMMA TO TERMINATE
005412  005721                  13$:    TST     (R1)+                   ;POINT TO NEXT DESCRIPTION
005414  000763                          BR      10$                     ;GET THE REMAINING BITS
005416  105042                  15$:    CLRB    -(R2)                   ;TERMINATE THE LINE
005420                                  PRINTX  #TSSDEF,#TMPBFR         ;PRINT THE BIT DEFINITIONS
005420  012746  002576                  MOV     #TMPBFR,-(SP)
005424  012746  006127                  MOV     #TSSDEF,-(SP)
```

```
                005430  012746  000002                  MOV     #2,-(SP)
                005434  010600                          MOV     SP,R0
                005436  104415                          TRAP    C$PNTX
                005440  062706  000006                  ADD     #6,SP
     1560
     1561 005444  010403                        20$:     MOV     R4,R3                   ;GET THE TSSR CONTENTS
     1562 005446  042703  177761                        BIC     #^CTERCLS,R3            ;CLEAR ALL BUT TERMINATION
     1563 005452  016303  006220                        MOV     TCOCOD(R3),R3           ;GET THE TERMINATION CODE MEANING
     1564 005456                                        PRINTX  #TCOASC,R3              ;PRINT THE TERMINATION CODE
                005456  010346                          MOV     R3,-(SP)
                005460  012746  006017                  MOV     #TCOASC,-(SP)
                005464  012746  000002                  MOV     #2,-(SP)
                005470  010600                          MOV     SP,R0
                005472  104415                          TRAP    C$PNTX
                005474  062706  000006                  ADD     #6,SP
     1565 005500  010403                                MOV     R4,R3                   ;TSSR CONTENTS AGAIN
     1566 005502  042703  177717                        BIC     #^CFATERR,R3            ;CLEAR ALL BUT FATAL TERMINATION
     1567 005506  001421                                BEQ     25$                     ;DON'T PRINT IF ZERO
     1568 005510  006203                                ASR     R3
     1569 005512  006203                                ASR     R3
     1570 005514  006203                                ASR     R3                      ;ALINE TERMINATION CODE FOR INDEX
     1571 005516  016303  006560                        MOV     TSFCOD(R3),R3           ;GET THE FATAL TERMINATION CODE
     1572 005522                                        PRINTX  #TFCASC,R3              ;PRINT THE FATAL TERMINATION CODE
                005522  010346                          MOV     R3,-(SP)
                005524  012746  006060                  MOV     #TFCASC,-(SP)
                005530  012746  000002                  MOV     #2,-(SP)
                005534  010600                          MOV     SP,R0
                005536  104415                          TRAP    C$PNTX
                005540  062706  000006                  ADD     #6,SP
     1573 005544  012737  000031  002170                MOV     #25.,FATFLG             ;DROP UNIT AFTER THIS ERROR
     1574 005552  010403                        25$:     MOV     R4,R3                   ;GET TSSR CONTENTS
     1575 005554  042703  176377                        BIC     #^CHIADDR,R3            ;CLEAR ALL BUT EXTENDED ADDRESS
     1576 005560  001411                                BEQ     30$                     ;DON'T PRINT IF ZERO
     1577 005562                                        PRINTX  #TEXASC,R3              ;PRINT THE EXTENDED ADDRESS BITS
                005562  010346                          MOV     R3,-(SP)
                005564  012746  005756                  MOV     #TEXASC,-(SP)
                005570  012746  000002                  MOV     #2,-(SP)
                005574  010600                          MOV     SP,R0
                005576  104415                          TRAP    C$PNTX
                005600  062706  000006                  ADD     #6,SP
     1578 005604  022704  100210                30$:     CMP     #100210,R4              ;CHECK FOR MEDIA ERROR
     1579 005610  001003                                BNE     31$                     ;BR, IF PROBABLY NOT TAPE ERROR
     1580 005612  012737  005672  002146                MOV     #EPRT3,EPRTSW           ;"PROBABLY MEDIA RELETED ERROR - BAD TAPE"
     1581 005620  005737  002146                31$:     TST     EPRTSW                  ;CHECK FOR THE SWITCH EMPTY
     1582 005624  001003                                BNE     310$                    ;BR, IF SWITCH IS NOT EMPTY
     1583 005626  012737  005672  002146                MOV     #EPRT1,EPRTSW           ;SET SWITCH TO DEFAULT
     1584 005634  013737  002146  005644  310$:        MOV     EPRTSW,32$+2            ;PUT REAL SWITCHABLE MESSAGE IN PLACE
     1585 005642                                32$:     PRINTB  #EPRT1                  ;PRINT THE ERROR MESSAGE
                005642  012746  005672                  MOV     #EPRT1,-(SP)
                005646  012746  000001                  MOV     #1,-(SP)
                005652  010600                          MOV     SP,R0
                005654  104414                          TRAP    C$PNTB
                005656  062706  000004                  ADD     #4,SP
     1586 005662  012737  005672  002146                MOV     #EPRT1,EPRTSW           ;RESET TO NORMAL ERROR POINTER
     1587 005670  000207                                RTS     PC                      ;RETURN TO CALLER
     1588
     1589 005672                                EPRT2:
```

```
1590 005672                                EPRT3:
1591 005672     045     116     045  EPRT1:  .ASCIZ  '%N%1 *****REPLACE CONTROLLER******%S'
1592 005736     045     116     045  TSSRFOR:        .ASCIZ  '%N%A TSSR = %O6'
1593 005756     045     116     045  TEXASC:         .ASCIZ  '%N%A Extended Address Bits = %O6'
1594 006017     045     116     045  TCOASC:         .ASCIZ  '%N%A Termination Class Code = %T'
1595 006060     045     116     045  TFCASC:         .ASCIZ  '%N%A Fatal Termination Class Code = %T'
1596 006127     045     116     045  TSSDEF:         .ASCIZ  '%N%A TSSR Bits Set: %T'
1597 006156     045     116     045  AMBTSSR:        .ASCIZ  '%N%A TSSR Contents Are Ambiguous'
1598                                        .EVEN
1599 006220  006240  006263  006311  TCOCOD: .WORD   1$,2$,3$,4$,5$,6$,7$ 3$
1600 006240     116     157     162  1$:     .ASCIZ  'Normal Termination'
1601 006263     124     145     162  2$:     .ASCIZ  'Termination Condition'
1602 006311     124     141     160  3$:     .ASCIZ  'Tape Status Alert'
1603 006333     106     165     156  4$:     .ASCIZ  'Function Reject'
1604 006353     122     145     143  5$:     .ASCIZ  'Recoverable Error - Tape Position One Record Down'
1605 006435     122     145     143  6$:     .ASCIZ  'Recoverable Error - Tape Was Not Moved'
1606 006504     125     156     162  7$:     .ASCIZ  'Unrecoverable Error'
1607 006530     106     141     164  8$:     .ASCIZ  'Fatal Controller Error'
1608                                        .EVEN
1609
1610 006560  006570  006624  006635  FSFCOD: .WORD   1$,2$,3$,4$
1611 006570     111     156     164  1$:     .ASCIZ  'Internal Diagnostic Failure'
1612 006624     122     145     163  2$:     .ASCIZ  'Reserved'
1613 006635     102     165     163  3$:     .ASCIZ  'Bus Interface or Sanity Check Error'
1614 006701     122     145     163  4$:     .ASCIZ  'Reserved'
1615                                        .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.
                                ;-

006712                          PRIPKT::
006712                                  SAVREG                          ;SAVE THE REGISTERS
006716  010005                          MOV     R0,R5                   ;SAVE NO. OF WORDS IN PACKET
006720  005737  003102                  TST     KTENABLE                ;ABOVE 28K UNDER TEST?
006724  001001                          BNE     10$                     ;BR IF YES
006726  005003                          CLR     R3                      ;SET HIGH ORDER ADDRESS TO 0
006730  010301                  10$:    MOV     R3,R1                   ;COPY HIGH ORDER ADDRESS
006732  010400                          MOV     R4,R0                   ;GET LOWER ADDRESS
006734  006100                          ROL     R0                      ;SHIFT BIT 15 INTO C BIT
006736  006101                          ROL     R1                      ;AND INTO HIGH ORDER.
006740                                  PRINTB  #PKTADD,R1,R4           ;PRINT PACKET ADDRESS
006740  010446                          MOV     R4,-(SP)
006742  010146                          MOV     R1,-(SP)
006744  012746  007116                  MOV     #PKTADD,-(SP)
006750  012746  000003                  MOV     #3,-(SP)
006754  010600                          MOV     SP,R0
006756  104414                          TRAP    C$PNTB
006760  062706  000010                  ADD     #10,SP
006764  010300                  15$:    MOV     R3,R0                   ;GET HIGH ORDER ADDRESS
006766  001404                          BEQ     20$                     ;BR IF NOT ABOVE 28K.
006770  010401                          MOV     R4,R1                   ;GET LOW ORDER ADDRESS
006772  004737  020112                  JSR     PC,SETMAP               ;SETUP PAR6 MAPPING FOR 18 BIT ADDRESS
006776  010004                          MOV     R0,R4                   ;GET RETURNED PAR6 ADDRESS BIAS
007000  005001                  20$:    CLR     R1                      ;SAVE WORD NUMBER
007002  012402                  25$:    MOV     (R4)+,R2                ;GET PACKET CONTENTS
007004                                  PRINTB  #PKTFRM,R1,R2           ;PRINT THE DATA
007004  010246                          MOV     R2,-(SP)
007006  010146                          MOV     R1,-(SP)
007010  012746  007060                  MOV     #PKTFRM,-(SP)
007014  012746  000003                  MOV     #3,-(SP)
007020  010600                          MOV     SP,R0
007022  104414                          TRAP    C$PNTB
007024  062706  000010                  ADD     #10,SP
007030  005201                          INC     R1                      ;NEXT WORD NUMBER
007032  020105                          CMP     R1,R5                   ;DONE ALL PACKET WORDS?
007034  002762                          BLT     25$                     ;LOOP TILL ALL DONE
007036                                  PRINTB  #PKTNEW                 ;JUST A COUPLE NEW LINES
007036  012746  007153                  MOV     #PKTNEW,-(SP)
007042  012746  000001                  MOV     #1,-(SP)
007046  010600                          MOV     SP,R0
007050  104414                          TRAP    C$PNTB
007052  062706  000004                  ADD     #4,SP
```

M4

PRIPKT - PRINT THE ADDRESS/CONTENTS OF COMMAND PACKET

```
1655 007056  000207                          RTS     PC              ;RETURN
1656
1657 007060     045     116     045  PKTFRM: .ASCIZ  '%N%A Packet Word #%D1%A = %06'
1658 007116     045     116     045  PKTADD: .ASCIZ  '%N%A Packet Address = %01%05'
1659
1660 007153     045     116     045  PKTNEW: .ASCIZ  '%N%N%A  '
1661                                  .EVEN
1662
```

PRIBXOR - PRINT EXPD, RECV AND XOR BYTE

```
                                        .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
                                ;
                                ;-

007164                          PRIBXOR::
007164                                  SAVREG                          ;SAVE THE REGISTERS
007170  010203                          MOV     R2,R3                   ;EXPECTED DATA
007172                                  XOR     R1,R3                   ;FORM THE EXCLUSIVE OR
007202  012700  177400                  MOV     #^C<377>,R0             ;BYTE MASK
007206  040001                          BIC     R0,R1                   ;SAVE LOW BYTE RECV
007210  040002                          BIC     R0,R2                   ;SAVE LOW BYTE EXPD
007212  040003                          BIC     R0,R3                   ;SAVE LOW BYTE XOR
007214                                  PRINTB  #XORBFOR,R2,R1,R3 ;PRINT THE MESSAGE
007214  010346                          MOV     R3,-(SP)
007216  010146                          MOV     R1,-(SP)
007220  010246                          MOV     R2,-(SP)
007222  012746  007246                  MOV     #XORBFOR,-(SP)
007226  012746  000004                  MOV     #4,-(SP)
007232  010600                          MOV     SP,R0
007234  104414                          TRAP    C$PNTB
007236  062706  000012                  ADD     #12,SP
007242  010300                          MOV     R3,R0                   ;R0 HAS XOR ON RETURN
007244  000207                          RTS     PC                      ;RETURN TO CALLER

007246      045     116     045 XORBFOR:        .ASCIZ  '%N%A EXPD: %03%A RECV: %03%A XOR: %03'
                                        .EVEN
```

```
                        .SBTTL  PRIXOR  - PRINT EXPD, RECV AND XOR

                ;+
                ;
                ;PRINT EXPECTED DATA, RECEIVED DATA, AND XOR OF THE TWO
                ;THIS ROUTINE IS NORMALLY CALLED ONLY FOR PRINT ROUTINES.
                ;
                ;INPUTS:
                ;
                ;       R1      RECEIVED DATA
                ;       R2      EXPECTED DATA
                ;
                ;OUTPUT:
                ;
                ;       R0      XOR OF EXPECTED/RECEIVED DATA
                ;
                ;-

                PRIXOR::
                        SAVREG                          ;SAVE THE REGISTERS
                        MOV     R2,R3                   ;EXPECTED DATA
                        XOR     R1,R3                   ;FORM THE EXCLUSIVE OR
                        PRINTB  #XORFOR,R2,R1,R3 ;PRINT THE MESSAGE
007332  010346          MOV     R3,-(SP)
007334  010146          MOV     R1,-(SP)
007336  010246          MOV     R2,-(SP)
007340  012746  007364  MOV     #XORFOR,-(SP)
007344  012746  000004  MOV     #4,-(SP)
007350  010600          MOV     SP,R0
007352  104414          TRAP    C$PNTB
007354  062706  000012  ADD     #12,SP
007360  010300          MOV     R3,R0                   ;R0 HAS XOR ON RETURN
007362  000207          RTS     PC                      ;RETURN TO CALLER

007364   045  116  045  XORFOR: .ASCIZ  '%N%A EXPD: %Q6%A RECV: %Q6%A XOR: %Q6'
                        .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
                                ;
                                ;-

007432                          PRIEQU:
007432                                  SAVREG                          ;SAVE THE REGISTERS
007436  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
                                ;
                                ;-
007440                          PRIRAM:
007440                                  SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
007444                                  PRINTB  #RAMFOR,R4              ;PRINT RAM ADDRESS IN ERROR
007444  010446                          MOV     R4,-(SP)
007446  012746  007470                  MOV     #RAMFOR,-(SP)
007452  012746  000002                  MOV     #2,-(SP)
007456  010600                          MOV     SP,R0
007460  104414                          TRAP    C$PNTB
007462  062706  000006                  ADD     #6,SP
007466  000207                          RTS     PC                      ;RETURN

007470      045     116     045 RAMFOR: .ASCIZ  '%N%A CONTROLLER RAM ADDRESS = %O6'
                                        .EVEN


                                        .SBTTL  PRIADD  - PRINT MEMORY ERROR ADDRESS
                                ;+
                                ;
                                ;PRINT MEMORY ADDRESS
                                ;THIS ROUTINE IS NORMALLY CALLED ONLY FROM PRINT ROUTINES.
                                ;
                                ; IMPLICIT INPUTS
                                ;
                                ;       ERRHI   - HIGH ORDER ADDRESS
                                ;       ERRLO   - LOW ORDER ADDRESS
```

```
1778                                    ;
1779                                    ;.
1780 007532                             PRIADD:
1781 007532                                     SAVREG                  ;SAVE R1-R5 UNTIL NEXT RETURN
1782 007536  013700  002202                     MOV     ERRHI,R0        ;GET HIGH ADDRESSS
1783 007542  013701  002204                     MOV     ERRLO,R1        ;GET LOW ADDRESS
1784 007546  010102                             MOV     R1,R2           ;COPY LOW ADDRESS
1785 007550  006101                             ROL     R1              ;SHIFT BIT 15 TO C BIT
1786 007552  006100                             ROL     R0              ;SHIFT INTO HIGH ORDER
1787 007554                                     PRINTB  #PRIA0,R0,R2    ;PRINT MEMORY ADDRESS IN ERROR
     007554  010246                             MOV     R2,-(SP)
     007556  010046                             MOV     R0,-(SP)
     007560  012746  007602                     MOV     #PRIA0,-(SP)
     007564  012746  000003                     MOV     #3,-(SP)
     007570  010600                             MOV     SP,R0
     007572  104414                             TRAP    C$PNTB
     007574  062706  000010                     ADD     #10,SP
1788 007600  000207                             RTS     PC              ;RETURN
1789
1790 007602     045     116     045  PRIA0:    .ASCIZ  '%N%A MEMORY ERROR ADDRESS = %01%05'
1791                                             .EVEN
1792
1793
1794                                             .SBTTL  PRITADD - PRINT MEMORY TEST ADDRESS
1795                                    ;*
1796                                    ;
1797                                    ;PRINT MEMORY ADDRESS
1798                                    ;THIS ROUTINE IS NORMALLY CALLED ONLY FROM PRINT ROUTINES.
1799                                    ;
1800                                    ; IMPLICIT INPUTS
1801                                    ;
1802                                    ;       ERRHI   - HIGH ORDER ADDRESS
1803                                    ;       ERRLO   - LOW ORDER ADDRESS
1804                                    ;
1805                                    ;-
1806 007646                             PRITADD:
1807 007646                                     SAVREG                  ;SAVE R1-R5 UNTIL NEXT RETURN
1808 007652  013700  002202                     MOV     ERRHI,R0        ;GET HIGH ADDRESSS
1809 007656  013701  002204                     MOV     ERRLO,R1        ;GET LOW ADDRESS
1810 007662  010102                             MOV     R1,R2           ;COPY LOW ADDRESS
1811 007664  006101                             ROL     R1              ;SHIFT BIT 15 TO C BIT
1812 007666  006100                             ROL     R0              ;SHIFT INTO HIGH ORDER
1813 007670                                     PRINTB  #PRIT0,R0,R2    ;PRINT MEMORY ADDRESS IN ERROR
     007670  010246                             MOV     R2,-(SP)
     007672  010046                             MOV     R0,-(SP)
     007674  012746  007716                     MOV     #PRIT0,-(SP)
     007700  012746  000003                     MOV     #3,-(SP)
     007704  010600                             MOV     SP,R0
     007706  104414                             TRAP    C$PNTB
     007710  062706  000010                     ADD     #10,SP
1814 007714  000207                             RTS     PC              ;RETURN
1815
1816 007716     045     116     045  PRIT0:    .ASCIZ  '%N%A MEMORY TEST ADDRESS = %01%05'
1817                                             .EVEN
1818
1819
1820
```

```
1822                                    .SBTTL  SPACE   - SPACE RECORDS (FORWARD AND REVERSE) COMMAND
1823
1824                            ;*
1825                            ;
1826                            ;ROUTINE TO ISSUE A SPACE RECORDS
1827                            ;COMMAND (FORWARD OR REVERSE)
1828                            ;
1829                            ;INPUT:
1830                            ;
1831                            ;       R3      NUMBER OF RECORDS TO BE SPACED OVER
1832                            ;               BIT15 CONTROLS DIRECTION
1833                            ;               BIT15 = 0 IS FORWARD
1834                            ;               BIT15 = 1 IS REVERSE
1835                            ;       R5      FIRST DEVICE UNIBUS ADDRESS
1836                            ;
1837                            ;       REQUIRES A WRITE CHARACTERISTICS DONE PREVIOUSLY
1838                            ;
1839                            ;OUTPUT:
1840                            ;
1841                            ;       CARRY   SET - SPACE RECORDS COMMAND OK
1842                            ;               CLR - SPACE RECORDS FAILED
1843                            ;
1844                            ;
1845                            ;       R0      THE CONTENTS OF R4 IS MOVED TO R0
1846                            ;
1847                            ;
1848                            ;IMPLICIT OUTPUT:
1849                            ;
1850                            ;       TAPE HAS BEEN MOVED
1851                            ;
1852                            ;SIDE EFFECTS:
1853                            ;
1854                            ;
1855                            ;-
1856
1857 007760                     SPACE::
1858 007760                             SAVREG                          ;SAVE THE GENERAL REGISTERS
1859 007764  012737  000764  010150      MOV     #500.,SDELAY            ;SET UP DELAY
1860 007772  012737  140010  010140      MOV     #140010,80$             ;SET UP COMMAND, SPACE FORWARD
1861 010000  005703                     TST     R3                      ;CHECK FOR DIRECTION
1862 010002  100403                     BMI     5$                      ;BR. IF REVERSE INDICATED
1863 010004  010337  010142              MOV     R3,90$                  ;LOAD UP NUMBER OF RECORDS TO SPACE
1864 010010  000407                     BR      10$                     ;GO DO COMMAND
1865 010012  042703  100000      5$:     BIC     #BIT15,R3               ;CLEAR DIRECTION BIT
1866 010016  010337  010142              MOV     R3,90$                  ;LOAD UP NUMBER OF RECORDS TO SPACE
1867 010022  052737  000400  010140      BIS     #BIT8,80$               ;SET REVERSE BIT IN COMMAND PACKET
1868 010030  012704  010140      10$:    MOV     #80$,R4                 ;SET UP R4 WITH PACKET ADDRESS
1869 010034  010465  177776              MOV     R4,TSDB(R5)             ;SEND OUT COMMAND
1870 010040  004737  016744      15$:    JSR     PC,WAITF                ;WAIT FOR SSR
1871 010044  103420                     BCS     20$                     ;BR. IF SSR IS SET AND OK
1872 010046                             DELAY   250                     ;DELAY ABOUT .25 SECONDS
     010046  012727  000250              MOV     #250.,(PC)+
     010052  000000                      .WORD   0
     010054  013727  002116              MOV     L$DLY,(PC)+
     010060  000000                      .WORD   0
     010062  005367  177772              DEC     -6(PC)
     010066  001375                      BNE     .-4
```

```
        010070  005367  177756                  DEC     -22(PC)
        010074  001367                          BNE     .-20
  1873  010076  005337  010150                  DEC     $DELAY          ;BUMP DELAY COUNTER DOWN
  1874  010102  001356                          BNE     15$             ;BR, IF MORE DELAY
  1875  010104  000411                          BR      60$             ;BR IF TROUBLE CARRY = CLEAR
  1876  010106  016501  000000          20$:    MOV     TSSR(R5),R1     ;READ TSSR
  1877  010112  012702  000200                  MOV     #SSR,R2         ;SET UP EXPECTED
  1878  010116  020201                  25$:    CMP     R2,R1           ;ARE THEY OK
  1879  010120  001401                          BEQ     40$             ;BR, IF EQUAL = OK
  1880  010122  000402                          BR      60$             ;TROUBLE EXIT
  1881  010124  000261                  40$:    SEC                     ;SET CARRY NO TROUBLE
  1882  010126  000401                          BR      70$             ;EXIT
  1883  010130  000241                  60$:    CLC                     ;CARRY CLEAR = ERROR
  1884  010132                          70$:
  1885  010132  010400                          MOV     R4,R0           ;PASS PACKET ADDRESS
  1886  010134  000207                          RTS     PC              ;RETURN
```

```
                                        ;
                                        ;
                                        ;
                                        ;PACKET FOR SPACE COMMAND
                                        ;
010136                                          .BLKB   10-<.-TUV2A&7>
                                        ;
                                        ;COMMAND WORD
010140  000000                          80$:    .WORD
                                        ;NUMBER OF RECORDS TO BE SPACED OVER WORD
010142  000000                          90$:    .WORD
010144  000000                                  .WORD
010146  000000                                  .WORD
010150  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:
                                ;               BENBSW = BUFFER ENABLE SWITCH ON OR OFF
                                ;
                                ;SIDE EFFECTS:
                                ;
                                ;-

                                WRTCHR::
                                        SAVREG                  ;SAVE THE GENERAL REGISTERS
                                        CLR     BENBSW          ;CLEAR BUFFER ENABLE SWITCH
                                10$:    MOV     R4,TSDB(R5)     ;SEND OUT COMMAND
                                        JSR     PC,CHKTSSR      ;WAIT FOR SSR
                                        BCS     20$             ;BR, IF SSR IS SET AND OK
                                        BR      60$             ;BR IF TROUBLE CARRY = CLEAR
                                20$:    MOV     TSSR(R5),R1     ;READ TSSR
                                        MOV     #SSR,R2         ;SET UP EXPECTED
                                        BIT     #OFL,R1         ;WAS OFF LINE SET IN TSSR
                                        BEQ     25$             ;BR, IF NO OFL SET
                                        BIS     #OFL,R2         ;MAKE THEM LOOK ALIKE
                                25$:    CMP     R2,R1           ;ARE THEY OK
                                        BEQ     40$             ;BR, IF EQUAL = OK
                                        BR      60$             ;TROUBLE EXIT
                                40$:    ADD     #8.,R4          ;POINT TO WRT CHARA DATA PACKET
                                        MOV     (R4),R3         ;GET ADDRESS OF MESSAGE BUFFER
                                        MOV     R3,MESBFA       ;STORE FOR PRINT ROUTINES
                                        SEC                     ;SET CARRY NO TROUBLE
                                        BR      70$             ;EXIT
                                60$:    CLC                     ;CARRY CLEAR = ERROR
                                70$:    MOV     TSSR(R5),R0     ;RETURN TSSR CONTENTS
                                        RTS     PC              ;RETURN
```

REWIND - POSITION TAPE (REWIND) COMMAND

```
                                        .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
                                ;
                                ;
                                ;-
010254                          REWIND::
010254                                  SAVREG                  ;SAVE R1-R5 UNTIL NEXT RETURN
010260  012704  010350                  MOV     #RWPACK,R4      ;GET PACKET ADDRESS
010264  010465  177776                  MOV     R4,TSDB(R5)     ;SEND PACKET ADDRESS TO EXECUTE
010270  012703  000550                  MOV     #360.,R3        ;ENOUGH TIME FOR 2400' REEL TO REWIND
010274  004737  016744          10$:    JSR     PC,WAITF        ;WAIT FOR SSR TO SET
010300  103417                          BCS     20$             ;LEAVE WHEN SSR IS SET
010302                                  DELAY   250.            ;WAIT FOR .25 SECONDS
010302  012727  000372                  MOV     #250.,(PC)+
010306  000000                          .WORD   0
010310  013727  002116                  MOV     L$DLY,(PC)+
010314  000000                          .WORD   0
010316  005367  177772                  DEC     -6(PC)
010322  001375                          BNE     .-4
010324  005367  177756                  DEC     -22(PC)
010330  001367                          BNE     .-20
010332  005303                          DEC     R3              ;BUMP COUNTER DOWN
010334  001357                          BNE     10$             ;KEEP GOING
010336  000241                          CLC                     ;CLEAR CARRY TO SET ERROR
010340  010400                  20$:    MOV     R4,R0           ;PASS THE PACKET ADDRESS
010342  000207                          RTS     PC              ;RETURN


010344                                  .BLKB   10-<.-TUV2A&7>
010350                          RWPACK:
010350  102010                          .WORD   102010          ;POSTION COMMAND (REWIND)
010352  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:
                        ;
                        ;
                        ;-
010354                  CKRAM::
010354                          SAVREG                  ;SAVE THE GENERAL REGISTERS
010360  012701  002206          MOV     #RAMDATA,R1     ;ADDRESS TO SAVE THE RAM DATA
010364  012702  000020          MOV     #RMPKTBEG,R2    ;BYTE ADDRESS OF FIRST RAM DATA
010370  005003                  CLR     R3              ;CLEAR THE ERROR FLAG
010372  004737  017060          JSR     PC,CHKTSSR      ;WAIT FOR SSR
010376  004737  017060  10$:    JSR     PC,CHKTSSR      ;WAIT FOR SSR TO SET
010402  110265  177777          MOVB    R2,TSDBH(R5)    ;SELECT NEXT RAM ADDRESS
010406  004737  017060          JSR     PC,CHKTSSR      ;WAIT FOR SSR TO SET
010412  116511  177776          MOVB    TSBAL(R5),(R1)  ;READ THE RAM DATA
010416  122124                  CMPB    (R1)+,(R4)+     ;COMPARE TO EXPECTED
010420  001401                  BEQ     20$             ;BRANCH IF OK
010422  005203                  INC     R3              ;SET ERROR FLAG
010424  005202          20$:    INC     R2              ;ADDRESS OF NEXT RAM LOCATION
010426  020227  000027          CMP     R2,#RMPKTEND    ;REACHED END YET ?
010432  003761                  BLE     10$             ;BRANCH TILL ALL READ
010434  005703                  TST     R3              ;WAS AN ERROR FOUND ?
010436  001402                  BEQ     30$             ;BRANCH IF NOT
010440  000241                  CLC                     ;CLEAR CARRY TO SHOW ERROR
010442  000401                  BR      50$             ;AND EXIT
010444  000261          30$:    SEC                     ;SHOW GOOD COMPARE
010446  012737  000010  002246  50$:    MOV     #8.,RAMSIZ      ;SETUP RAMSIZ FOR PRAMPKT ROUTINE
010454  000207                  RTS     PC              ;RETURN
```

```
                                        .SBTTL RAMER - READ AND DISPLAY SELECTED RAM
                                ;+
                                ;
                                ;ROUTINE TO READ THE SELECTED RAM LOCATIONS
                                ;
                                ;INPUT:
                                ;
                                ;       R5      FIRST DEVICE UNIBUS ADDRESS
                                ;       CONSOLE WILL ALSO BE PRINTED TO
                                ;
                                ;IMPLICIT OUTPUT:
                                ;
                                ;       THE TABLE RAMDATA IS FILLED WITH THE
                                ;       DATA HELD IN RAM.
                                ;
                                ;SIDE EFFECTS:
                                ;
                                ;
                                ;-
                                RAMER::
                                        SAVREG                  ;SAVE THE GENERAL REGISTERS
010462  013705  010642                  MOV     RAMR5H,R5       ;RESET R5 TO FIRST DEVICE REGISTER
010466  012701  002206                  MOV     #RAMDATA,R1     ;ADDRESS TO SAVE THE RAM DATA
010472  013702  010640                  MOV     RAMHLD,R2       ;BYTE ADDRESS OF THE FIRST RAM DATA
010476  013703  002246                  MOV     RAMSIZ,R3       ;SET THE SIZE OF THE READ UP
010502  004737  017060          10$:    JSR     PC,CHKTSSR      ;WAIT FOR THE SSR TO SET
010506  110265  177777                  MOVB    R2,TSDBH(R5)    ;SELECT NEXT RAM ADDRESS
010512  004737  017060                  JSR     PC,CHKTSSR      ;WAIT FOR SSR TO SET
010516  116521  177776                  MOVB    TSBAL(R5),(R1)+ ;READ THE RAM DATA
010522  062702  000001          20$:    ADD     #1,R2           ;ADDRESS OF THE NEXT RAM LOCATION
010526  077313                          SOB     R3,10$          ;NUMBER OF LOCATIONS COUNTER
010530  013704  002246                  MOV     RAMSIZ,R4       ;GET THE RAM SIZE
010534  013702  010640                  MOV     RAMHLD,R2       ;GET THE STARTING RAM ADDRESS
010540  060204                          ADD     R2,R4           ;CALCULATE THE END ADDRESS
010542  162704  000001                  SUB     #1,R4           ;CORRECT VALUE OF PRINTOUT
010546                                  PRINTX  #RAMIOP,R2,R4   ;RAM ADDRESS = 10 - 17, ETC.
010546  010446                          MOV     R4,-(SP)
010550  010246                          MOV     R2,-(SP)
010552  012746  010644                  MOV     #RAMIOP,-(SP)
010556  012746  000003                  MOV     #3,-(SP)
010562  010600                          MOV     SP,R0
010564  104415                          TRAP    C$PNTX
010566  062706  000010                  ADD     #10,SP
010572  012701  002206                  MOV     #RAMDATA,R1     ;ADDRESS OF WHERE RAM DATA IS
010576  013703  002246                  MOV     RAMSIZ,R3       ;THE SIZE OF THE RAM FIELD READ
010602  005004                  30$:    CLR     R4              ;NO EXTRA DATA LEFT OVER
010604  112104                          MOVB    (R1)+,R4        ;PICK UP BYTE OF RAM DATA
010606  042704  177400                  BIC     #177400,R4      ;GET RID OF SIGN EXTEND
010612                                  PRINTX  #RAMPD,R4       ;"010 211 111 222 377 000 123 134 ETC."
010612  010446                          MOV     R4,-(SP)
010614  012746  010715                  MOV     #RAMPD,-(SP)
010620  012746  000002                  MOV     #2,-(SP)
010624  010600                          MOV     SP,R0
010626  104415                          TRAP    C$PNTX
010630  062706  000006                  ADD     #6,SP
010634  077316                          SOB     R3,30$          ;LOOP UNTIL ALL PRINTED
```

```
2110 010636  000207                  50$:    RTS     PC              ;RETURN
2111
2112 010640  000000                  RAMHLD: .WORD   0               ;RAM ADDR HOLDER 1ST ADDRESS
2113 010642  000000                  RAMR5H: .WORD   0               ;HOLDS R5 FOR LATER
2114 010644     045     116     045  RAMIOP: .ASCIZ  '%N%A Ram Address (Octal) = %03%A - %03%N'
2115 010715     045     101     040  RAMPD:  .ASCIZ  '%A %03%A '
2116                                 .EVEN
2117
```

```
                                        .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:
                                ;
                                ;
                                ;-
010730                          CKRAM2::
010730                                  SAVREG                  ;SAVE THE GENERAL REGISTERS
010734  012701  002206                  MOV     #RAMDATA,R1     ;ADDRESS TO SAVE THE RAM DATA
010740  012702  000167                  MOV     #RMCHBEG,R2     ;BYTE ADDRESS OF FIRST RAM DATA
010744  005003                          CLR     R3              ;CLEAR THE ERROR FLAG
010746  004737  017060                  JSR     PC,CHKTSSR      ;WAIT FOR SSR
010752  004737  017060          10$:    JSR     PC,CHKTSSR      ;WAIT FOR SSR TO SET
010756  110265  177777                  MOVB    R2,TSDBH(R5)    ;SELECT NEXT RAM ADDRESS
010762  004737  017060                  JSR     PC,CHKTSSR      ;WAIT FOR SSR TO SET
010766  116511  177776                  MOVB    TSBAL(R5),(R1)  ;READ THE RAM DATA
010772  122124                          CMPB    (R1)+,(R4)+     ;COMPARE TO EXPECTED
010774  001401                          BEQ     20$             ;BRANCH IF OK
010776  005203                          INC     R3              ;SET ERROR FLAG
011000  005202                  20$:    INC     R2              ;ADDRESS OF NEXT RAM LOCATION
011002  012737  000010  002246          MOV     #8.,RAMSIZ      ;ASSUME NORMAL NOT SET
011010  020227  000176                  CMP     R2,#RMCHEND-2   ;REACHED END YET ?
011014  003756                          BLE     10$             ;BRANCH TILL ALL READ
011016  005703                  27$:    TST     R3              ;WAS AN ERROR FOUND ?
011020  001402                          BEQ     30$             ;BRANCH IF NOT
011022  000241                          CLC                     ;CLEAR CARRY TO SHOW ERROR
011024  000401                          BR      50$             ;AND EXIT
011026  000261                  30$:    SEC                     ;SHOW GOOD COMPARE
011030  000207                  50$:    RTS     PC              ;RETURN
```

```
                                        .SBTTL  CKMSG   - COMPARE WRITE CHAR. MESSAGE BUFFERS
                                ;+
                                ;
                                ;ROUTINE TO COMPARE A WRITE CHARACTERISTICS EXPD AND RECV
                                ;BUFFER. THE EXPECTED AND RECEIVED BUFFERS ARE STORED FOR
                                ;ERROR PRINT ROUTINES.
                                ;
                                ;INPUT:
                                ;
                                ;       R0      RECV MESSAGE BUFFER HIGH ORDER ADDRESS
                                ;       R1      RECV MESSAGE BUFFER LOW ORDER ADDRESS
                                ;       R2      EXPD MESSAGE BUFFER ADDRESS
                                ;OUTPUT:
                                ;
                                ;       CARRY   SET - MESSAGE BUFFERS MATCH
                                ;               CLR -MESSAGE BUFFERS DON'T MATCH
                                ;
                                ;IMPLICIT OUTPUT:
                                ;
                                ;       EXPMSG          BUFFER IS SET TO EXPD DATA
                                ;       RECMSG          BUFFER IS SET TO RECV DATA
                                ;       RCVHIADD        SET TO HIGH ORDER ADDRESS OF RECV
                                ;       RCVLOADD        SET TO LOW ORDER ADDRESS OF RECV
                                ;
                                ;-
011032                          CKMSG::
011032                          SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
011036  010037  002250          MOV     R0,RCVHIADD             ;SAVE RECV HIGH ADDRESS
011042  010137  002252          MOV     R1,RCVLOAD              ;SAVE RECV LOW ADDRESS
011046  005737  003102          TST     KTENABLE                ;TESTING ABOVE 28K?
011052  001403                  BEQ     10$                     ;BR IF NO
011054  004737  020112          JSR     PC,SETMAP               ;RETURN ADDRESS BIASED TO PAR6 IN R0
011060  010001                  MOV     R0,R1                   ;GET RETURNED ADDRESS BIASED TO PAR6
011062  005004          10$:    CLR     R4                      ;WORD IN BUFFER
011064  005003                  CLR     R3                      ;CLEAR ERROR SEEN FLAG
011066  010205                  MOV     R2,R5                   ;GET EXPD BUFFER ADDRESS
011070  011264  002266  15$:    MOV     (R2),EXPMSG(R4)         ;SAVE EXPD FOR ERROR REPORT
011074  011164  002432          MOV     (R1),RECMSG(R4)         ;SAVE RECV FOR ERROR REPORT
011100  022221                  CMP     (R2)+,(R1)+             ;EXPD EQUAL RECV?
011102  001401                  BEQ     25$                     ;BR IF YES
011104  005203                  INC     R3                      ;SET ERROR SEEN FLAG
011106  062704  000002  25$:    ADD     #2,R4                   ;POINT TO NEXT WORD ADDRESS
011112  020427  000014          CMP     R4,#14                  ;DONE FIRST 7 WORDS?
011116  003764                  BLE     15$                     ;BR IF NO
011120  032765  000200  000012  BIT     #X2.EXTF,XST2(R5)       ;IS EXTENDED FEATURES SET IN EXPD?
011126  001403                  BEQ     50$                     ;BR IF NO
011130  020427  000016          CMP     R4,#16                  ;DONE EXTENDED FEATURES WORD?
011134  003755                  BLE     15$                     ;BR IF NO
011136  005703          50$:    TST     R3                      ;ANY ERRORS SEEN?
011140  001402                  BEQ     55$                     ;BR IF NO
011142  000241                  CLC                             ;SET FAILURE
011144  000401                  BR      60$                     ;
011146  000261          55$:    SEC                             ;SET SUCCESS
011150  000207          60$:    RTS     PC                      ;RETURN
```

```
2227                                            .SBTTL  CKMSG2  - COMPARE EXPD RECV MESSAGE BUFFERS
2228                                    ;*
2229                                    ;
2230                                    ;ROUTINE TO COMPARE AN EXPECTED AND RECEIVED MESSAGE
2231                                    ;BUFFER. THE EXPECTED AND RECEIVED BUFFERS ARE STORED FOR
2232                                    ;ERROR PRINT ROUTINES.
2233                                    ;
2234                                    ;INPUT:
2235                                    ;
2236                                    ;       R0      RECV MESSAGE BUFFER HIGH ORDER ADDRESS
2237                                    ;       R1      RECV MESSAGE BUFFER LOW ORDER ADDRESS
2238                                    ;       R2      EXPD MESSAGE BUFFER ADDRESS
2239                                    ;       R3      NUMBER OF BYTES TO COMPARE
2240                                    ;
2241                                    ;OUTPUT:
2242                                    ;
2243                                    ;       CARRY   SET - MESSAGE BUFFERS MATCH
2244                                    ;               CLR - MESSAGE BUFFERS DON'T MATCH
2245                                    ;
2246                                    ;IMPLICIT OUTPUT:
2247                                    ;
2248                                    ;       EXPMSG          BUFFER IS SET TO EXPD DATA
2249                                    ;       RECMSG          BUFFER IS SET TO RECV DATA
2250                                    ;       RCVHIADD        SET TO HIGH ORDER ADDRESS OF RECV
2251                                    ;       RCVLOADD        SET TO LOW ORDER ADDRESS OF RECV
2252                                    ;
2253                                    ;-
2254 011152                            CKMSG2::
2255 011152                                    SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
2256 011156  020327  000144                    CMP     R3,#RECMSG-EXPMSG;@@D IS COUNT ABOVE MAX ALLOWED?
2257 011162  003412                            BLE     5$                      ;@@D BR IF NO
2258 011164  012703  000144                    MOV     #RECMSG-EXPMSG,R3;@@D
2259 011170                                    PRINTF  #DEBUGMSG               ;@@D
     011170  012746  011304                    MOV     #DEBUGMSG,-(SP)
     011174  012746  000001                    MOV     #1,-(SP)
     011200  010600                            MOV     SP,R0
     011202  104417                            TRAP    C$PNTF
     011204  062706  000004                    ADD     #4,SP
2260 011210  010037  002250            5$:     MOV     R0,RCVHIADD             ;SAVE RECV HIGH ADDRESS
2261 011214  010137  002252                    MOV     R1,RCVLOAD              ;SAVE RECV LOW ADDRESS
2262 011220  005737  003102                    TST     KTENABLE                ;TESTING ABOVE 28K?
2263 011224  001403                            BEQ     10$                     ;BR IF NO
2264 011226  004737  020112                    JSR     PC,SETMAP               ;RETURN ADDRESS BIASED TO PAR6 IN R0
2265 011232  010001                            MOV     R0,R1                   ;GET RETURNED ADDRESS BIASED TO PAR6
2266 011234  005004                    10$:    CLR     R4                      ;WORD IN BUFFER
2267 011236  005005                            CLR     R5                      ;CLEAR ERROR SEEN FLAG
2268 011240  111274  002266            15$:    MOVB    (R2),EXPMSG(R4)         ;SAVE EXPD FOR ERROR REPORT
2269 011244  111164  002432                    MOVB    (R1),RECMSG(R4)         ;SAVE RECV FOR ERROR REPORT
2270 011250  122221                            CMPB    (R2)+,(R1)+             ;EXPD EQUAL RECV?
2271 011252  001401                            BEQ     25$                     ;BR IF YES
2272 011254  005205                            INC     R5                      ;SET ERROR SEEN FLAG
2273 011256  062704  000001            25$:    ADD     #1,R4                   ;POINT TO NEXT BYTE
2274 011262  020403                            CMP     R4,R3                   ;DONE ALL BYTES?
2275 011264  002001                            BGE     50$                     ;BR IF YES
2276 011266  000764                            BR      15$                     ;DO NEXT BYTE
2277 011270  005705                    50$:    TST     R5                      ;ANY ERRORS SEEN?
2278 011272  001402                            BEQ     55$                     ;BR IF NO
```

```
2279 011274  000241                        CLC                     ;SET FAILURE
2280 011276  000401                        BR      60$             ;
2281 011300  000261                55$:    SEC                     ;SET SUCCESS
2282 011302  000207                60$:    RTS     PC              ;RETURN
2283
2284 011304      120     122     117  DEBUGMSG:       .ASCIZ  'PROGRAM INTERNAL ERROR -CKMSG2 MESSAGE BUFFER EXCEEDED-';@@D
2285 011374      045     116     045  FERCM:  .ASCII  /%N%A  ***/
2286 011405      040     040     124  ERCM:   .ASCIZ  /  TSSR ERROR CODE REC'D = /
2287 011440      056     056     056  SIMSG:  .ASCIZ  /.... AFTER DOING SOFT INIT/
2288 011473      124     105     123  TINERR: .ASCIZ  /TEST: .../
2289                                    .EVEN
```

```
2291
2292
2293                                    ;+
2294                                    ;
2295                                    ;PRINT ROUTINE TO FATAL SOFT INIT ERRORS
2296                                    ;
2297                                    ;INPUT:
2298                                    ;
2299                                    ;       R1      CONTENTS OF TSSR AT ERROR
2300                                    ;
2301                                    ;SIDE EFFECTS:
2302                                    ;
2303                                    ;       EXECUTES DROP UNIT TO CEASE TESTING
2304                                    ;
2305                                    ;-
2306
2307 011506                                        BGNMSG  SFIMSG
     011506                             SFIMSG::
2308 011506  004737  005264                        JSR     PC,PRITSSR      ;PRINT CONTENTS OF TSSR REGISTER
2309 011512  004737  017776                        JSR     PC,CKDROP       ;DROP UNIT, IF ALLOWED
2310 011516                                        ENDMSG
     011516                             L10003:
     011516  104423                             TRAP    C$MSG
2311
2312                                    ;+
2313                                    ;PRINT ROUTINE TO PRINT THE CONTENTS OF
2314                                    ;TSSR AND A COMMAND PACKET OTHER THAN GET STATUS COMMAND PACKET.
2315                                    ;
2316                                    ;INPUTS:
2317                                    ;
2318                                    ;       R1      TSSR CONTENTS
2319                                    ;       R4      ADDRESS OF COMMAND PACKET
2320                                    ;
2321                                    ;-
2322
2323 011520                                        BGNMSG  PKTSSR
     011520                             PKTSSR::
2324 011520  004737  005264                        JSR     PC,PRITSSR      ;PRINT THE CONTENTS OF TSSR REGISTER
2325 011524  012700  000004                        MOV     #4,R0           ;NO. OF WORDS IN PACKET
2326 011530  004737  006712                        JSR     PC,PRIPKT       ;PRINT THE CONTENTS OF COMMAND PACKET
2327 011534  013700  002716                        MOV     MESBFA,R0       ;ADDRESS OF MESSAGE BUFFER
2328 011540  005001                               CLR     R1              ;ASSUME NO HIGH MEMORY
2329 011542  004737  013702                        JSR     PC,PRMESS       ;PRINT THE MESSAGE BUFFER ALSO
2330 011546                                        ENDMSG
     011546                             L10004:
     011546  104423                             TRAP    C$MSG
2331
2332                                    ;+
2333                                    ;PRINT ROUTINE TO PRINT THE CONTENTS OF
2334                                    ;TSSR AND A GET STATUS COMMAND PACKET.
2335                                    ;
2336                                    ;INPUTS:
2337                                    ;
2338                                    ;       R1      TSSR CONTENTS
2339                                    ;       R4      ADDRESS OF COMMAND PACKET
2340                                    ;
2341                                    ;-
```

```
2342
2343 011550                                    BGNMSG  PKTGETS
     011550                             PKTGETS::
2344 011550  004737  005264                    JSR     PC,PRITSSR      ;PRINT THE CONTENTS OF TSSR REGISTER
2345 011554  012700  000002                    MOV     #2,R0           ;NO. OF WORDS IN GET STATUS PACKET
2346 011560  004737  006712                    JSR     PC,PRIPKT       ;PRINT THE CONTENTS OF COMMAND PACKET
2347 011564                                    ENDMSG
     011564                             L10005:
     011564  104423                            TRAP    C$MSG
2348
2349
2350                                    ;+
2351                                    ;PRINT TSSR ERRORS FOR INITIALIZATION TESTS
2352                                    ;
2353                                    ;INPUTS:
2354                                    ;
2355                                    ;       R1      TSSR CONTENTS
2356                                    ;       R4      ADDRESS OF COMMAND PACKET
2357                                    ;-
2358
2359 011566                                    BGNMSG  SFFMSG
     011566                             SFFMSG::
2360 011566  004737  005264                    JSR     PC,PRITSSR      ;PRINT CONTENTS OF TSSR REGISTER
2361 011572                                    ENDMSG
     011572                             L10006:
     011572  104423                            TRAP    C$MSG
2362
2363
2364                                            .SBTTL  PKTMES  - PRINT TSSR AND MESSAGE BUFFER
2365                                    ;+
2366                                    ;
2367                                    ;PRINT ROUTINE TO PRINT THE CONTENTS OF TSSR AND MESSAGE
2368                                    ;BUFFER FOR ERROR REPORTS
2369                                    ;
2370                                    ;INPUTS:
2371                                    ;
2372                                    ;       R1      CONTENTS OF TSSR
2373                                    ;       R2      LOW ORDER MESSAGE BUFFER
2374                                    ;       R3      HIGH ORDER MESSAGE BUFFER ADDRESS
2375                                    ;       NOTE: R3 IS IGNORED IF KTENABLE FLAG IS CLEAR
2376                                    ;-
2377 011574                                    BGNMSG  PKTMES
     011574                             PKTMES::
2378 011574  004737  005264                    JSR     PC,PRITSSR      ;PRINT CONTENTS OF TSSR
2379 011600  010200                            MOV     R2,R0           ;LOW ORDER ADDRESS
2380 011602  010301                            MOV     R3,R1           ;HIGH ORDER ADDRESS
2381 011604  004737  013702                    JSR     PC,PRMESS       ;PRINT THE MESSAGE BUFFER
2382 011610                                    ENDMSG
     011610                             L10007:
     011610  104423                            TRAP    C$MSG
2383
```

```
                                        .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
                                ADDSSR::
011612  004737  007646          
011616  016501  000000          
011622  004737  005264          
                                        JSR     PC,PRITADD      ;PRINT MEMORY TEST ADDRESS
                                        MOV     TSSR(R5),R1     ;GET CURRENT TSSR
                                        JSR     PC,PRITSSR      ;PRINT THE CONTENTS OF TSSR REGISTER
                                        ENDMSG
                                L10010:
011626  104423                  
                                        TRAP    C$MSG
                                
                                
                                        .SBTTL  MSGEXP - PRINT WRITE CHAR. EXPD-RECV MESSAGE BUFFERS
                                ;+
                                ;PRINT ROUTINE TO PRINT WRITE CHARACTERISTIC MESSAGE BUFFER
                                ;
                                ;IMPLICIT INPUTS:
                                ;
                                ;       EXPMSG  - EXPECTED MESSAGE BUFFER
                                ;       RECMSG  - RECEIVED MESSAGE BUFFER
                                ;       RCVHIADD- RECEIVED MESSAGE BUFFER HIGH ORDER ADDRESS
                                ;       RCVLOADD- RECEIVED MESSAGE BUFFER LOW ORDER ADDRESS
                                ;-
                                        BGNMSG  MSGEXP
                                MSGEXP::
011630  012700  000007          
                                        MOV     #7,R0           ;ASSUME NO EXT FEATURES
011634  004737  015246          5$:     JSR     PC,PRMSGEXP     ;PRINT EXPD/RECV MESSAGE BUFFERS
                                        ENDMSG
                                L10011:
011640  104423                  
                                        TRAP    C$MSG
```

```
                                        .SBTTL  FIFEXP  - PRINT FIFO EXP/RECV DATA
                                ;+
                                ;
                                ;PRINT ROUTINE TO PRINT FIFO EXP/RECV DATA
                                ;
                                ;       R1      - BYTE COUNT
                                ;
                                ;IMPLICIT INPUTS:
                                ;
                                ;       EXPMSG  - EXPECTED MESSAGE BUFFER (CONTAINS FIFO DATA ONLY
                                ;       RECMSG  - RECEIVED MESSAGE BUFFER (CONTAINS FIFO DATA ONLY)
                                ;-
                                        BGNMSG  FIFEXP
                                FIFEXP::
                                        PRINTX  #FIF1MSG,R1     ;PRINT BYTES TRANSFERRED
011642  010146                          MOV     R1,-(SP)
011644  012746  011714                  MOV     #FIF1MSG,-(SP)
011650  012746  000002                  MOV     #2,-(SP)
011654  010600                          MOV     SP,R0
011656  104415                          TRAP    C$PNTX
011660  062706  000006                  ADD     #6,SP
                                        PRINTX  #FIF2MSG        ;PRINT HEADER MSG
011664  012746  011763                  MOV     #FIF2MSG,-(SP)
011670  012746  000001                  MOV     #1,-(SP)
011674  010600                          MOV     SP,R0
011676  104415                          TRAP    C$PNTX
011700  062706  000004                  ADD     #4,SP
                                        MOV     R1,R0           ;GET BYTE COUNT
                                        JSR     PC,PRBYTEXP     ;PRINT FIFO BYTES IN ERROR
                                        ENDMSG
011712                          L10012:
011712  104423                          TRAP    C$MSG
011714  045  116  045  FIF1MSG:         .ASCIZ  '#N#A NUMBER OF BYTES TRANSFERRED = #D2'
011763  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
                                ;-
                                        BGNMSG  MSGSTAT
012022                          MSGSTAT::
012022  012701  012064                  MOV     #STATCOD,R1     ;ASCII ADDRESS TABLE
012026  012100                  10$:    MOV     (R1)+,R0        ;DONE ALL MSG LINES?
012030  001410                          BEQ     20$             ;BR IF YES
012032                                  PRINTX  R0              ;PRINT STATUS BIT NAMES
012032  010046                          MOV     R0,-(SP)
012034  012746  000001                  MOV     #1,-(SP)
012040  010600                          MOV     SP,R0
012042  104415                          TRAP    C$PNTX
012044  062706  000004                  ADD     #4,SP
012050  000766                          BR      10$             ;DO ANOTHER MSG LINE
012052  012700  000012          20$:    MOV     #10.,R0         ;NUMBER OF WORDS IN A READ STATUS BUFFER
012056  004737  015246                  JSR     PC,PRMSGEXP     ;PRINT EXPD/RECV MESSAGE BUFFERS
012062                                  ENDMSG
012062                          L10013:
012062  104423                          TRAP    C$MSG

012064  012102  012144  012235  STATCOD:       .WORD   1$,2$,3$,4$,5$,6$,0
012102     045     116     045  1$:.ASCIZ  '<N><A Tape Bus Signals in Word #8:'
012144     045     116     045  2$:.ASCIZ  '<N><A       PARERR<15>  IEOT  <12>  IFMK  <9>  IRDY<6>  IRWD<2>'
012235     045     116     045  3$:.ASCIZ  '<N><A       IRESV2<14>  IIDENT<11>  IHER  <8>  IONL<5>  IFBY<1>'
012326     045     116     045  4$:.ASCIZ  '<N><A       IRESV1<13>  ICER  <10>  ISPEED<7>  ILDP<4>  IFPT<0>'
012417     045     116     045  5$:.ASCIZ  '<N><A Tape Bus Signals in Word #9:'
012461     045     116     045  6$:.ASCIZ  '<N><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
                                ;-
                                        BGNMSG  MSGLOOP
012536                          MSGLOOP::
012536  012701  012600                  MOV     #LOOPCOD,R1     ;ASCII ADDRESS TABLE
```

```
2494 012542  012100                  10$:    MOV     (R1)+,R0        ;DONE ALL MSG LINES?
2495 012544  001410                          BEQ     20$             ;BR IF YES
2496 012546                                  PRINTX  R0              ;PRINT STATUS BIT NAMES
     012546  010046                          MOV     R0,-(SP)
     012550  012746  000001                  MOV     #1,-(SP)
     012554  010600                          MOV     SP,R0
     012556  104415                          TRAP    C$PNTX
     012560  062706  000004                  ADD     #4,SP
2497 012564  000766                          BR      10$             ;DO ANOTHER MSG LINE
2498 012566  012700  000012          20$:    MOV     #10.,R0         ;NUMBER OF WORDS IN A READ STATUS BUFFER
2499 012572  004737  015246                  JSR     PC,PRMSGEXP     ;PRINT EXPD/RECV MESSAGE BUFFERS
2500 012576                                  ENDMSG
     012576                          L10014:
     012576  104423                          TRAP    C$MSG
2501
2502 012600  012620  012673  012772  LOOPCOD:        .WORD   1$,2$,3$,4$,5$,6$,7$,0
2503 012620     045     116     045  1$:.ASCIZ  '<N><A Tape Bus Loopback Signals in Word #8:'
2504 012673     045     116     045  2$:.ASCIZ  '<N><A      PARERR<15>          IRESV2<14>          IRESV1<13>'
2505 012772     045     116     045  3$:.ASCIZ  '<N><A IHISP=>IEOT<12>    IWRT=>IIDENT<11>    IREV  =>ICER  <10>'
2506 013071     045     116     045  4$:.ASCIZ  '<N><A IWFM =>IFMK<09>    IEDIT=>IHER <08>    IFAD  =>ISPEED<07>'
2507 013170     045     116     045  5$:.ASCIZ  '<N><A ITADO=>IRDY<06>    ITAD1=>IONL <05>    IERASE=>ILDP  <04>'
2508 013267     045     116     045  6$:.ASCIZ  '<N><A IREW =>IDBY<03>    IRWU =>IRWD <02>    IFEN  =>IFBY  <01>'
2509 013366     045     116     045  7$:.ASCIZ  '<N><A IGO  =>IFPT<00>'
2510                                          .EVEN
2511
```

J6


```
                                        .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
                                ;-
                                        BGNMSG  MSGSUB
013414                          MSGSUB::
013414  012700  000012                  MOV     #10.,R0         ;SIZE OF WRITE SUBSYSTEM BUFFER
013420  004737  015246                  JSR     PC,PRMSGEXP     ;PRINT EXPD/RECV MESSAGE BUFFERS
013424                                  ENDMSG
013424                          L10015:
013424  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
                                ;-
                                        BGNMSG  MEMADD
013426                          MEMADD::
013426  004737  007532                  JSR     PC,PRIADD       ;PRINT MEMORY ADDRESS IN ERROR
013432  013701  002176                  MOV     EXPD,R1         ;GET EXPD DATA
013436  013702  002200                  MOV     RECV,R2         ;GET RECEIVED DATA
013442  004737  007314                  JSR     PC,PRIXOR       ;PRINT EXPD/RECV
013446                                  ENDMSG
013446                          L10016:
013446  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
                                ;-
                                PRAMPKT:
                                        SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
013450  012701  002206                  MOV     #RAMDATA,R1             ;DATA FROM THE RAM
013454  005002                          CLR     R2                      ;INIT BYTE NUMBER
013456  122124                  5$:     CMPB    (R1)+,(R4)+             ;COMPARE EXPECTED, RECEIVED
013460  001000                          BNE     7$                      ;BR IF NO MATCH
013462  116105  177777          7$:     MOVB    -1(R1),R5               ;GET RECV RAM DATA
013466  116403  177777                  MOVB    -1(R4),R3               ;GET EXPD PACKET DATA
013472  040503                          XOR     R5,R3                   ;XOR EXPD/RECV
013476  042703  177400                  BIC     #177400,R3              ;LOW BYTE ONLY
013502  116137  177777  002200          MOVB    -1(R1),RECV             ;GET RECEIVED RAM DATA
013510  116437  177777  002176          MOVB    -1(R4),EXPD             ;GET EXPECTED RAM DATA
013516                                  PRINTB  #RAMASC,R2,RECV,EXPD,R3
013516  010346                          MOV     R3,-(SP)
013520  013746  002176                  MOV     EXPD,-(SP)
013524  013746  002200                  MOV     RECV,-(SP)
013530  010246                          MOV     R2,-(SP)
013532  012746  013616                  MOV     #RAMASC,-(SP)
013536  012746  000005                  MOV     #5,-(SP)
013542  010600                          MOV     SP,R0
013544  104414                          TRAP    C$PNTB
013546  062706  000014                  ADD     #14,SP
013552  005202                  10$:    INC     R2                      ;UPDATE BYTE COUNT
013554  005737  002246                  TST     RAMSIZ                  ;DEFAULT TO 8.?
013560  001404                          BEQ     15$                     ;BR IF YES
013562  020237  002246                  CMP     R2,RAMSIZ               ;DONE ALL BYTES?
013566  003731                          BLE     5$                      ;BR IF NO
013570  000403                          BR      25$                     ;
013572  020227  000010          15$:    CMP     R2,#8.                  ;DONE DEFAULT NUMBER OF BYTES?
013576  002725                  20$:    BLT     5$                      ;BR IF NO
013600  005037  002246          25$:    CLR     RAMSIZ                  ;SET DEFAULT RAMSIZ
013604  000207                          RTS     PC                      ;RETURN

013606      045     116     045 RAMASC: .ASCIZ  '%N%A  BYTE: %D2%A RAM: %O3%A Packet: %O3%A XOR:%O3'
                                        .EVEN
```

L6


```
                                        .SBTTL  PRMESS  - PRINT CONTENTS OF MESSAGE BUFFER
                                ;+
                                ;
                                ;THIS ROUTINE PRINTS THE CONTENTS OF
                                ;THE 7 WORD MESSAGE BUFFER RETURNED BY THE
                                ;TK-25.
                                ;
                                ;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
                                ;
                                ;-
                                PRMESS:
013702                                  SAVREG                  ;SAVE THE REGISTERS
013706  010537  010642                  MOV     R5,RAMR5H       ;SAVE DEVICE REGISTER POINTER
013712  010005                          MOV     R0,R5           ;SAVE LOW ORDER ADDRESS
013714  005737  003102                  TST     KTENABLE        ;ADDRESS ABOVE 28K?
013720  001001                          BNE     10$             ;BR IF YES
013722  005001                          CLR     R1              ;SET HIGH ORDER ADDRESS TO 0
013724  010103                  10$:    MOV     R1,R3           ;SAVE HIGH ORDER ADDRESS
013726  006100                          ROL     R0              ;SHIFT BIT15 TO C BIT
013730  006101                          ROL     R1              ;SHIFT TO HIGH ORDER FOR PRINTOUT
013732                                  PRINTX  #PROASC,R1,R5   ;PRINT MESSAGE BUFFER ADDRESS
013732  010546                          MOV     R5,-(SP)
013734  010146                          MOV     R1,-(SP)
013736  012746  014540                  MOV     #PROASC,-(SP)
013742  012746  000003                  MOV     #3,-(SP)
013746  010600                          MOV     SP,R0
013750  104415                          TRAP    C$PNTX
013752  062706  000010                  ADD     #10,SP
013756  022715  177777                  CMP     #177777,(R5)    ;MESSAGE BUFFER FULL OF ONES
013762  001010                          BNE     15$             ;BR IF BUFFER IS PROBABLY OKAY
013764                                  PRINTX  #MESBFN         ;"MESSAGE BUFFER PROBABLY NOT VALID"
013764  012746  014460                  MOV     #MESBFN,-(SP)
013770  012746  000001                  MOV     #1,-(SP)
013774  010600                          MOV     SP,R0
013776  104415                          TRAP    C$PNTX
014000  062706  000004                  ADD     #4,SP
014004                          15$:    PRINTX  #PR1ASC         ;PRINT HEADER FOR CONTENTS
014004  012746  014605                  MOV     #PR1ASC,-(SP)
014010  012746  000001                  MOV     #1,-(SP)
014014  010600                          MOV     SP,R0
014016  104415                          TRAP    C$PNTX
014020  062706  000004                  ADD     #4,SP
014024  005004                          CLR     R4              ;NUMBER OF THE NEXT WORD
014026  010501                          MOV     R5,R1           ;COPY LOW ORDER ADDRESS
014030  010300                          MOV     R3,R0           ;COPY HIGH ORDER ADDRESS
014032  001403                          BEQ     20$             ;BR IF NOT ABOVE 28K
014034  004737  020112                  JSR     PC,SETMAP       ;SETUP PAR ADDRESS IN R0
014040  010005                          MOV     R0,R5           ;GET PAR FORMAT ADDRESS ABOVE 28K
014042                          20$:
014042                                  PRINTX  #MESHEA,(R5)+   ;PRINT "MESSAGE BUFFER HEADER #"
```

```
        014042  012546                          MOV     (R5)+,-(SP)
        014044  012746  014643                  MOV     #MESHEA,-(SP)
        014050  012746  000002                  MOV     #2,-(SP)
        014054  010600                          MOV     SP,R0
        014056  104415                          TRAP    C$PNTX
        014060  062706  000006                  ADD     #6,SP
2643    014064                                  PRINTX  #DATAFL,(R5)+   ;PRINT "DATA FIELD LENGTH      ="
        014064  012546                          MOV     (R5)+,-(SP)
        014066  012746  014710                  MOV     #DATAFL,-(SP)
        014072  012746  000002                  MOV     #2,-(SP)
        014076  010600                          MOV     SP,R0
        014100  104415                          TRAP    C$PNTX
        014102  062706  000006                  ADD     #6,SP
2644    014106                                  PRINTX  #RBPCRA,(R5)+   ;PRINT "RESIDUAL BYTE COUNTER ="
        014106  012546                          MOV     (R5)+,-(SP)
        014110  012746  014755                  MOV     #RBPCRA,-(SP)
        014114  012746  000002                  MOV     #2,-(SP)
        014120  010600                          MOV     SP,R0
        014122  104415                          TRAP    C$PNTX
        014124  062706  000006                  ADD     #6,SP
2645    014130                                  PRINTX  #XSOCON,(R5)+   ;PRINT "XSTATO CONTENTS       ="
        014130  012546                          MOV     (R5)+,-(SP)
        014132  012746  015022                  MOV     #XSOCON,-(SP)
        014136  012746  000002                  MOV     #2,-(SP)
        014142  010600                          MOV     SP,R0
        014144  104415                          TRAP    C$PNTX
        014146  062706  000006                  ADD     #6,SP
2646    014152                                  PRINTX  #XS1CON,(R5)+   ;PRINT "XSTAT1 CONTENTS       ="
        014152  012546                          MOV     (R5)+,-(SP)
        014154  012746  015067                  MOV     #XS1CON,-(SP)
        014160  012746  000002                  MOV     #2,-(SP)
        014164  010600                          MOV     SP,R0
        014166  104415                          TRAP    C$PNTX
        014170  062706  000006                  ADD     #6,SP
2647    014174                                  PRINTX  #XS2CON,(R5)+   ;PRINT "XSTAT2 CONTENTS       ="
        014174  012546                          MOV     (R5)+,-(SP)
        014176  012746  015134                  MOV     #XS2CON,-(SP)
        014202  012746  000002                  MOV     #2,-(SP)
        014206  010600                          MOV     SP,R0
        014210  104415                          TRAP    C$PNTX
        014212  062706  000006                  ADD     #6,SP
2648    014216                                  PRINTX  #XS3CON,(R5)+   ;PRINT "XSTAT3 CONTENTS       ="
        014216  012546                          MOV     (R5)+,-(SP)
        014220  012746  015201                  MOV     #XS3CON,-(SP)
        014224  012746  000002                  MOV     #2,-(SP)
        014230  010600                          MOV     SP,R0
        014232  104415                          TRAP    C$PNTX
        014234  062706  000006                  ADD     #6,SP
2649    014240  022737  000001  002134          CMP     #1,TRANSTST     ;CHECK SOFTWARE P-TABLE
2650    014246  001402                          BEQ     40$             ;DO DUMP
2651    014250  000137  014360                  JMP     50$             ;DON'T DO THE DUMP
2652    014254                          40$:    PRINTX  #RAMFHR
        014254  012746  014362                  MOV     #RAMFHR,-(SP)
        014260  012746  000001                  MOV     #1,-(SP)
        014264  010600                          MOV     SP,R0
        014266  104415                          TRAP    C$PNTX
        014270  062706  000004                  ADD     #4,SP
```

PRMESS - PRINT CONTENTS OF MESSAGE BUFFER

```
2653 014274  012737  000010  002246          MOV     #6.,RAMSIZ      ;RAM FIELD IS 8 BYTES LONG
2654 014302  012737  000020  010640          MOV     #20,RAMHLD      ;FIELD STARTS AT 20 OCTAL (10 HEX)
2655 014310  004737  010456                  JSR     PC,RAMER        ;READ AND PRINT THEM
2656 014314  012737  000040  010640          MOV     #40,RAMHLD      ;FIELD STARTS AT 40 OCTAL (20 HEX)
2657 014322  004737  010456                  JSR     PC,RAMER        ;READ AND PRINT THEM
2658 014326  012737  000060  010640          MOV     #60,RAMHLD      ;FIELD STARTS AT 60 OCTAL (30 HEX)
2659 014334  004737  010456                  JSR     PC,RAMER        ;READ AND PRINT THEM
2660 014340  012737  000020  002246          MOV     #16.,RAMSIZ     ;RAM FIELD IS SIXTEEN BYTES LONG
2661 014346  012737  000100  010640          MOV     #100,RAMHLD     ;FIELD STARTS AT 100 OCTAL (40 HEX)
2662 014354  004737  010456                  JSR     PC,RAMER        ;READ AND PRINT THEM
2663 014360  000207                  50$:    RTS     PC              ;RETURN
2664 014362     045     116     045  RAMFHR: .ASCIZ  '%N%A ********** SPECIAL CONTROLLER RAM MEMORY DUMP **********'
2665 014460     045     116     045  MESBFN: .ASCIZ  '%N%A MESSAGE BUFFER CONTENTS PROBABLY NOT VALID'
2666 014540     045     116     045  PROASC: .ASCIZ  '%N%A Message Buffer Address - %01%05'
2667 014605     045     116     045  PR1ASC: .ASCIZ  '%N%A Message Buffer Contents:'
2668
2669 014643     045     116     045  MESHEA: .ASCIZ  '%N%A Message Buffer Header      = %06'
2670 014710     045     116     045  DATAFL: .ASCIZ  '%N%A Data Field Length         = %06'
2671 014755     045     116     045  RBPCRA: .ASCIZ  '%N%A Residual Byte Counter     = %06'
2672 015022     045     116     045  XS0CON: .ASCIZ  '%N%A XSTAT0 Contents           = %06'
2673 015067     045     116     045  XS1CON: .ASCIZ  '%N%A XSTAT1 Contents           = %06'
2674 015134     045     116     045  XS2CON: .ASCIZ  '%N%A XSTAT2 Contents           = %06'
2675 015201     045     116     045  XS3CON: .ASCIZ  '%N%A XSTAT3 Contents           = %06'
2676                                         .EVEN
```

```
                        .SBTTL  PRMSGEXP - PRINT EXPD/RECV MESSAGE BUFFERS
                ;+18
                ;
                ;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
                ;-
2692 015246     PRMSGEXP::
2693 015246             SAVREG                          ;SAVE R1-R5 UNTIL NEXT RETURN
2694 015252 010005      MOV     R0,R5                   ;SAVE NUMBER OF WORDS
2695 015254 013700 002252      MOV     RCVLOADD,R0     ;GET RECV LOW ADDRESS
2696 015260 010004      MOV     R0,R4                   ;COPY LOW ADDRESS
2697 015262 013701 002250      MOV     RCVHIADD,R1     ;GET RECV HIGH ADDRESS
2698 015266 006100      ROL     R0                      ;SHIFT BIT15 TO C BIT
2699 015270 006101      ROL     R1                      ;SHIFT TO HIGH ORDER FOR PRINTOUT
2700 015272             PRINTX  #PRMSG0,R1,R4           ;PRINT MESSAGE BUFFER ADDRESS
     015272 010446      MOV     R4,-(SP)
     015274 010146      MOV     R1,-(SP)
     015276 012746 015426       MOV     #PRMSG0,-(SP)
     015302 012746 000003       MOV     #3,-(SP)
     015306 010600      MOV     SP,R0
     015310 104415      TRAP    C$PNTX
     015312 062706 000010       ADD     #10,SP
2701 015316             PRINTX  #PRMSG1                 ;PRINT HEADER FOR CONTENTS
     015316 012746 015473       MOV     #PRMSG1,-(SP)
     015322 012746 000001       MOV     #1,-(SP)
     015326 010600      MOV     SP,R0
     015330 104415      TRAP    C$PNTX
     015332 062706 000004       ADD     #4,SP
2702 015336 005004      CLR     R4                      ;NUMBER OF THE CURRENT WORD
2703 015340 012701 002266      MOV     #EXPMSG,R1      ;GET EXPD BUFFER ADDRESS
2704 015344 012702 002432      MOV     #RECMSG,R2      ;GET RECV BUFFER ADDRESS
2705 015350 011100      20$:    MOV     (R1),R0         ;GET EXPD
2706 015352 011203      MOV     (R2),R3                 ;GET RECV
2707 015354             XOR     R0,R3                   ;XOR EXPD/RECV
2708 015364             PRINTX  #PRMSG2,R4,(R1)+,(R2)+,R3
     015364 010346      MOV     R3,-(SP)
     015366 012246      MOV     (R2)+,-(SP)
     015370 012146      MOV     (R1)+,-(SP)
     015372 010446      MOV     R4,-(SP)
     015374 012746 015531       MOV     #PRMSG2,-(SP)
     015400 012746 000005       MOV     #5,-(SP)
     015404 010600      MOV     SP,R0
     015406 104415      TRAP    C$PNTX
     015410 062706 000014       ADD     #14,SP
2709 015414 005204      INC     R4                      ;NUMBER OF THE NEXT
2710 015416 020405      CMP     R4,R5                   ;DONE ALL YET?
2711 015420 002001      BGE     50$                     ;BR IF YES
2712 015422 000752      BR      20$                     ;DO ANOTHER
2713 015424 000207      50$:    RTS     PC              ;RETURN
```

```
2714
2715 015426  045  116  045  PRMSG0: .ASCIZ  '%N%A Message Buffer Address - %01%05'
2716 015473  045  116  045  PRMSG1: .ASCIZ  '%N%A Message Buffer Contents:'
2717 015531  045  116  045  PRMSG2: .ASCIZ  '%N%A   WORD #%D2%A  EXPD: %06%A  RECV: %06%A  XOR: %06'
2718                         .EVEN
2719
```

```
                                        .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
                                ;-
015616                          PRBYTEXP::
                                        SAVREG                  ;SAVE R1-R5 UNTIL NEXT RETURN
015616 010005                           MOV     R0,R5           ;SAVE NUMBER OF BYTES
015622 005037  002264                   CLR     PRMNO           ;INIT ERROR COUNT
015624 005004                           CLR     R4              ;NUMBER OF THE CURRENT BYTE
015630 012701  002266                   MOV     #EXPMSG,R1      ;GET EXPD BUFFER ADDRESS
015632 012702  002432                   MOV     #RECMSG,R2      ;GET RECV BUFFER ADDRESS
015636 111100                   20$:    MOVB    (R1),R0         ;GET EXPD BYTE
015642 042700  177400                   BIC     #^C<377>,R0     ;CLEAR UPPER BYTE
015644 110037  016164                   MOVB    R0,PRBEXP       ;SAVE FOR ERROR REPORT
015650 111203                           MOVB    (R2),R3         ;GET RECV BYTE
015654 042703  177400                   BIC     #^C<377>,R3     ;CLEAR UPPER BYTE
015656 110337  016166                   MOVB    R3,PRBREC       ;FOR ERROR REPORT
015662 122122                           XOR     R0,R3           ;XOR EXPD/RECV
015666                                  CMPB    (R1)+,(R2)+     ;EXPD = RECV?
015676 001431                           BEQ     30$             ;BR IF YES
015700 005237  002264                   INC     PRMNO           ;UPDATE ERROR COUNT
015702 023727  002264  000010           CMP     PRMNO,#8.       ;PRINTED 8?
015706 101023                           BHI     30$             ;BR IF YES
015714                          27$:    PRINTX  #PRBMSG,R4,PRBEXP,PRBREC,R3
015716 010346                           MOV     R3,-(SP)
015716 013746  016166                   MOV     PRBREC,-(SP)
015720 013746  016164                   MOV     PRBEXP,-(SP)
015724 010446                           MOV     R4,-(SP)
015730 012746  016032                   MOV     #PRBMSG,-(SP)
015732 012746  000005                   MOV     #5,-(SP)
015736 010600                           MOV     SP,R0
015742 104415                           TRAP    C$PNTX
015744 062706  000014                   ADD     #14,SP
015746                                  FORCEXIT        50$     ;@@D
015752 000404                           BR      35$             ;@@D
015762                          30$:
015764                                  FORCERROR  27$,NOTSSR   ;@@D
015764                          35$:                            ;@@D
015774 005204                           INC     R4              ;NUMBER OF THE NEXT
015774 020405                           CMP     R4,R5           ;DONE ALL YET?
016000 002001                           BGE     50$             ;BR IF YES
016002 000717                           BR      20$             ;DO ANOTHER
016004                          50$:    PRINTX  #PRBTOT,PRMNO   ;PRINT TOTAL ERROR COUNT
016004 013746  002264                   MOV     PRMNO,-(SP)
016010 012746  016117                   MOV     #PRBTOT,-(SP)
016014 012746  000002                   MOV     #2,-(SP)
016020 010600                           MOV     SP,R0
016022 104415                           TRAP    C$PNTX
```

```
        016024  062706  000006                  ADD     #6,SP
2764    016030  000207                          RTS     PC              ;RETURN
2765
2766    016032     045     116     045  PRBMSG: .ASCIZ  '<N><A>   BYTE #<D2><A>  EXPD: #03<A>  RECV: #03<A>  XOR: #03'
2767    016117     045     116     045  PRBTOT: .ASCIZ  '<N><A> NUMBER OF BYTES IN ERROR = #D2'
2768                                            .EVEN
2769    016164  000000                  PRBEXP: .WORD   0               ;EXPD
2770    016166  000000                  PRBREC: .WORD   0               ;RECV
2771
```

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

016170                                  BGNMSG  EXPREC
016170                          EXPREC::
016170  004737  007314                  JSR     PC,PRIXOR       ;PRINT THE DATA
016174                                  ENDMSG
016174                          L10017:
016174  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
                                EXPBREC::
                                        JSR     PC,PRIBXOR      ;PRINT THE DATA
                                        ENDMSG
                                L10020:
                                        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
                                ;-

                                        BGNMSG  RAMERR
                                RAMERR::
                                        JSR     PC,PRAMPKT      ;PRINT RAM/PACKET DATA
                                        ENDMSG
                                L10021:
                                        TRAP    C$MSG


                                        .SBTTL  RAMTADD - PRINT TEST ADDRESS, RAM AND PACKET DATA
                                ;+
                                ;
                                ;PRINT ROUTINE TO DISPLAY RAM/PACKET DATA
                                ;
                                ;INPUTS:
```

```
                                ;
                                ;       R4      POINTER TO COMMAND PACKET
                                ;
                                ;IMPLICIT INPUTS:
                                ;
                                ;       RAMDATA         DATA AS READ FROM THE RAM
                                ;       RAMSIZ          NUMBER OF BYTES IN PACKET
                                ;                       IF RAMSIZ=0 THEN DEFAULT TO 8.
                                ;       ERRHI           HIGH ORDER TEST ADDRESS
                                ;       ERRLO           LOW ORDER TEST ADDRESS
                                ;
                                ;IMPLICIT OUTPUTS:
                                ;
                                ;       RAMSIZ  SET TO 0
                                ;-

                                        BGNMSG  RAMTADD
                                RAMTADD::
016212  004737  007646                  JSR     PC,PRITADD      ;PRINT TEST ADDRESS
016216  004737  013450                  JSR     PC,PRAMPKT      ;PRINT RAM/PACKET DATA
                                        ENDMSG
                                L10022:
016222  104423                          TRAP    C$MSG

                                        .SBTTL  RAMEXP  - PRINT RAM EXPD/RECV DATA
                                ;*
                                ;
                                ;PRINT ROUTINE TO DISPLAY EXPD/RECV DATA
                                ;
                                ;INPUTS:
                                ;
                                ;       R1      RECEIVED DATA
                                ;       R2      EXPECTED DATA
                                ;       R4      CONTROLLER RAM ADDRESS
                                ;-

                                        BGNMSG  RAMEXP
                                RAMEXP::
016224  042701  177400                  BIC     #^C<377>,R1     ;SAVE EXPD RAM DATA BYTE
016230  042702  177400                  BIC     #^C<377>,R2     ;SAVE EXPD RAM DATA BYTE
016234  004737  007440                  JSR     PC,PRIRAM       ;PRINT THE RAM ADDRESS
016240  004737  007314                  JSR     PC,PRIXOR       ;PRINT THE DATA
                                        ENDMSG
                                L10023:
016244  104423                          TRAP    C$MSG

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

```
                                        ;-
                                        
016246                                          BGNMSG  TIMEXP
016246                                  TIMEXP::
016246                                          PRINTX  #TIMSG0         ;PRINT HEADER
016246  012746  016274                          MOV     #TIMSG0,-(SP)
016252  012746  000001                          MOV     #1,-(SP)
016256  010600                                  MOV     SP,R0
016260  104415                                  TRAP    C$PNTX
016262  062706  000004                          ADD     #4,SP
016266  004737  007314                          JSR     PC,PRIXOR       ;PRINT THE DATA
016272                                          ENDMSG
016272                                  L10024:
016272  104423                                  TRAP    C$MSG
                                        
                                        
016274      045     116     045         TIMSG0: .ASCIZ  '%N%A TIMER A STATUS IS IN BIT 3%N%A TIMER B STATUS IS IN BIT 2'
                                                .EVEN
```

```
                                        .SBTTL  BADSSR - PRINT TSSR ERRORS ON DATA TRANSFERS

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

016374                                  BGNMSG  BADSSR
016374                          BADSSR::
016374  010246                          MOV     R2,-(SP)        ;SAVE DATA TRANSFERRED
016376  042702  177400                  BIC     #177400,R2      ;GET JUST ONE BYTE
016402                                  PRINTB  #XFERASC,R2
016402  010246                          MOV     R2,-(SP)
016404  012746  016434                  MOV     #XFERASC,-(SP)
016410  012746  000002                  MOV     #2,-(SP)
016414  010600                          MOV     SP,R0
016416  104414                          TRAP    C$PNTB
016420  062706  000006                  ADD     #6,SP
016424  012602                          MOV     (SP)+,R2        ;RESTORE R2
016426  004737  005264                  JSR     PC,PRITSSR      ;DECODE TSSR CONTENTS
016432                                  ENDMSG
016432                          L10025:
016432  104423                          TRAP    C$MSG
016434    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
                                ;
                                ;-

016470                          SOFINIT::
016470                                  SAVREG                  ; SAVE THE REGISTERS
016474  012765  000000  000000          MOV     #0,TSSR(R5)     ; DO THE INIT.
016502  004737  016744                  JSR     PC,WAITF        ; WAIT FOR SSR
016506  016500  000000                  MOV     TSSR(R5),R0     ;GET THE TSSR REGISTER
016512  010004                          MOV     R0,R4           ;START SETUP OF EXPECTED TSSR
016514  042704  176277                  BIC     #^C<HIADDR!OFL>,R4 ;CLEAR OUT UNUSED BITS
016520  052704  002200                  BIS     #SSR!NBA,R4     ;R4 HAS EXPECTED CONTENTS
016524  020400                          CMP     R4,R0           ;ONLY EXPECTED BITS SET ?
016526  001402                          BEQ     5$              ;BRANCH IF OKAY
016530  000241                          CLC                     ;CLEAR THE CARRY FOR ERROR
016532  000401                          BR      10$             ;GO TO EXIT
016534  000261                  5$:     SEC                     ;SET THE CARRY BIT
016536  000207                  10$:    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
                                ;
                                ;-

016540                          CHKAMB:
016540                                  SAVREG                  ;SAVE THE GENERAL REGISTERS
016544  010004                          MOV     R0,R4           ;CONTENTS OF TSSR
016546  032700  100000                  BIT     #SC,R0          ;IS BIT 15 SET ?
016552  001004                          BNE     5$              ;BRANCH IF YES
016554  032700  174077                  BIT     #^C<NBA!OFL!SSR!HIADDR>,R0      ;ANY OTHER BITS SET ?
016560  001023                          BNE     40$             ;MUST BE AN ERROR
016562  000424                          BR      45$             ;RETURN WITH SUCCESS
016564  032700  000200          5$:     BIT     #SSR,R0         ;IS READY BIT SET ?
016570  001011                          BNE     10$             ;BRANCH IF READY BIT IS SET.
016572  032700  000040                  BIT     #BIT5,R0        ;IS FATAL ERROR BIT SET ?
016576  001414                          BEQ     40$             ;ERROR IF NOT
016600  042704  177761                  BIC     #^CTERCLS,R4    ;CLEAR ALL BUT TERMINATION CODE
016604  020427  000016                  CMP     R4,#16          ;ALL THREE BITS MUST BE SET
016610  001007                          BNE     40$             ;ERROR IF NOT SET
016612  000410                          BR      45$             ;OK IF ALL ARE SET
016614  032700  000040          10$:    BIT     #BIT5,R0        ;IS FATAL ERROR BIT SET ?
016620  001405                          BEQ     45$             ;ERROR IF BIT IS SET WITH SSR
016622  032700  000006                  BIT     #BIT2!BIT1,R0   ;IS THIS A FUNCTION REJECT
016626  001002                          BNE     45$             ;BR, IF TSSR IS OK
016630  000241                  40$:    CLC                     ;AMBIGUOUS CONTENTS
016632  000401                          BR      50$
016634  000261                  45$:    SEC                     ;SHOW SUCCESS - NO AMBIGUITY
016636  000207                  50$:    RTS     PC              ;RETURN TO CALLER
```

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

                                ; BIT DEFINITIONS FOR "INTMASK" AND "INTFLAG" BYTES:
                                ;
  000200                                IOKCKIN=BIT7            ; DON'T CHECK FOR BAD INTERRUPTS -- TEST WILL.
  000001                                IOKSTP=BIT0             ; EXPECT "STOP" INTERRUPT.
                                ;
                                ;INTERRUPT MASK -- SAYS EXPECTING INTERRUPTS
016640      000               INTMASK:        .BYTE   0
                                ;INTERRUPT FLAG -- SAYS WE GOT ONE (IF POSITIVE)
016641      000               INTFLAG:        .BYTE   0

                                ;SAVED INTERRUPT VECTOR:
016642  000000                INTVEC: .WORD   0
                                ;SAVE CPU PC
016644  000000                INTCPC: .WORD   0

                                ;SUBROUTINE TO ENABLE INTERRUPTS:
016646  010046                ENAINT: MOV     R0,-(SP)        ;SAVE R0
016650  013700  002156                MOV     IVEC,R0         ;GET POINTER TO VECTORS
016654  012720  016712                MOV     #INTR,(R0)+     ;SET UP INTERRUPT VECTOR
016660  012720  000340                MOV     #PRI07,(R0)+
016664  012600                        MOV     (SP)+,R0        ;RESTORE R0
016666  011646                        MOV     (SP),-(SP)
016670  012766  000000  000002        MOV     #0,2(SP)        ;SET CPU TO LEVEL 0
016676  000002                        RTI

                                ;SUBROUTINE TO DISABLE INTERRUPTS (RAISE PRIORITY TO LEVEL 7)
016700  011646                DSBINT: MOV     (SP),-(SP)
016702  012766  000340  000002        MOV     #PRI07,2(SP)
016710  000002                        RTI
```

```
3059                                            .SBTTL  INTR    - INTERRUPT HANDLERS
3060
3061 016712                                     BGNSRV  INTR            ;DEFINE INTERRUPT ENTRY
     016712                             INTR::
3062 016712  012737  000001  002172             MOV     #1,INTRECV      ;SET FLAG TO SHOW INTERRUPT RECEIVED
3063 016720  105037  016641                     CLRB    INTFLAG         ;CLEAR FLAG TO SAY WE GOT INTERRUPT
3064 016724  132737  000001  016640             BITB    #IOKSTP,INTMASK ;EXPECTING STOP INTERRUPT?
3065 016732  001003                             BNE     1$              ;BR IF YES
3066 016734  152737  000001  016641             BISB    #IOKSTP,INTFLAG ;NO, SET THE ERROR FLAG.
3067
3068                                    ;SAVE REGISTERS, MSG BUFFER, ETC.
3069 016742                             1$:
3070 016742                                     ENDSRV
     016742                             L10026:
     016742  000002                             RTI
3071
3072
```

```
3074                                            .SBTTL  WAITF   - WAIT FOR SUBSYSTEM READY
3075                                    ;
3076                                    ; SUBROUTINE TO WAIT FOR THE SUBSYSTEM READY FLAG
3077                                    ;
3078                                    ;INPUTS:
3079                                    ;
3080                                    ;       R5      ADDRESS OF FIRST DEVICE REGISTER
3081                                    ;
3082                                    ;OUTPUTS:
3083                                    ;
3084                                    ;       R0      CONTENTS OF LAST TSSR READ
3085                                    ;       CARRY   SET - READY BIT SET
3086                                    ;               CLR - TIMEOUT WAITING FOR READY
3087                                    ;
3088 016744                            WAITF:: BREAK                   ; DO A SUPVSR BREAK FIRST.
     016744  104422                             TRAP    C$BRK
3089 016746  012746  010000                     MOV     #10000.,-(SP)   ;BIG MSEC TIMER
3090 016752                                     DELAY   1               ;DELAY 100US
     016752  012727  000001                     MOV     #1,(PC)+
     016756  000000                             .WORD   0
     016760  013727  002116                     MOV     L$DLY,(PC)+
     016764  000000                             .WORD   0
     016766  005367  177772                     DEC     -6(PC)
     016772  001375                             BNE     .-4
     016774  005367  177756                     DEC     -22(PC)
     017000  001367                             BNE     .-20
3091 017002  016500  000000            2$:     MOV     TSSR(R5),R0     ;READ THE TSSR REGISTER
3092 017006  105700                             TSTB    R0              ;TEST FOR READY BIT SET
3093
3094 017010  100420                             BMI     3$              ; EXIT ON STOP FLAG.
3095 017012                                     DELAY   1               ; WAIT 100 USEC
     017012  012727  000001                     MOV     #1,(PC)+
     017016  000000                             .WORD   0
     017020  013727  002116                     MOV     L$DLY,(PC)+
     017024  000000                             .WORD   0
     017026  005367  177772                     DEC     -6(PC)
     017032  001375                             BNE     .-4
     017034  005367  177756                     DEC     -22(PC)
     017040  001367                             BNE     .-20
3096 017042  005316                             DEC     (SP)            ;REDUCE DELAY COUNT
3097 017044  001356                             BNE     2$              ;RETRY UNTIL TIMER EXPIRES
3098 017046  000241                             CLC                     ; C = 0, CONTROLLER STILL RUNNING...
3099 017050  000401                             BR      4$              ;...OR HUNG-UP AFTER 300 MSEC.
3100 017052  000261                    3$:     SEC                     ; C = 1, CONTROLLER IS STOPPED.
3101 017054  005326                    4$:     DEC     (SP)+           ;RESTORE STACK WITHOUT CHANGING CARRY BIT
3102 017056  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
                        ;
                        ;-

                        CHKTSSR:
017060  004737  016744          JSR     PC,WAITF        ;WAIT FOR READY
017064  103014                  BCC     20$             ;BRANCH IF TIME OUT
017066  004737  016540          JSR     PC,CHKAMB       ;TSSR AMBIGOUS?
017072  103006                  BCC     10$             ;BR IF YES
017074  032700  100000          BIT     #SC,R0          ;SPECIAL CONDITION SET?
017100  001405                  BEQ     15$             ;BR IF NO
017102  032700  074000          BIT     #<SCE!BIE!RMR!NXM>,R0   ;ANY ERROR BITS SET?
017106  001402                  BEQ     15$             ;BR IF NO
017110  000241          10$:    CLC                     ;SET FAILURE
017112  000401                  BR      20$             ;
017114  000261          15$:    SEC                     ;SET SUCCESS
017116  000207          20$:    RTS     PC              ;RETURN TO CALLER
```

```
3137                                            .SBTTL  XNXM    - CHECK FOR NONEXISTENT MEMORY
3138                                    ;*
3139                                    ; ROUTINE TO TEST FOR A NEXM IN THE RANGE (R1) THRU (R2).
3140                                    ; ON RETURN, IF "C" = 1, (R1) = NEXM ADDRESS.
3141                                    ;               "C" = 0, ALL ADDRESSES OK.
3142                                    ;
3143                                    ;CALL:  MOV ADR1,R1
3144                                    ;       MOV ADR2,R2
3145                                    ;       JSR PC,NXM
3146                                    ;       RETURN                          ;TEST "C" AND PROCEED.
3147                                    ;
3148 017120  012737  017152  000004    XNXM:   MOV     #2$,@#4         ; SET BUSERR VECTOR.
3149 017126  012737  000200  000006            MOV     #PRI04,@#6
3150 017134  005003                            CLR     R3              ;FLAG.
3151 017136  005711                    1$:     TST     (R1)            ;TEST THE ADDRESS(ES).
3152                                                                    ;IF ANY TRAP, CONTINUE AT 2$.
3153 017140  020102                            CMP     R1,R2           ;OTHERWISE, CONTINUE HERE.
3154 017142  001407                            BEQ     3$              ;BR IF FINISHED (NO NEXM'S).
3155 017144  062701  000002                    ADD     #2,R1           ;SET NEXT ADDRESS...
3156 017150  000772                            BR      1$              ;...AND CONTINUE.
3157
3158 017152  005103                    2$:     COM     R3              ;GOT ONE, SET FLAG...
3159 017154  012716  017162                    MOV     #3$,(SP)
3160 017160  000002                            RTI                     ;...AND DISMISS INTERRUPT...
3161 017162                            3$:     CLRVEC  #4              ;...AND GIVE BACK THE VECTOR.
     017162  012700  000004                    MOV     #4,R0
     017166  104436                            TRAP    C$CVEC
3162 017170  005703                            TST     R3              ;DID WE CATCH ONE ??
3163 017172  001401                            BEQ     .+4             ;NO, "C" = 0, SKIP NEXT.
3164 017174  000261                            SEC                     ;YES, "C" = 1, (R1) = NEXM ADDR.
3165 017176  000207                            RTS     PC
3166
3167
3168
3169
3170                                            .SBTTL  TSTLOOP - CHECK ITERATION COUNT
3171                                    ;*
3172                                    ; SUBROUTINE TO EXECUTE TEST ITERATIONS.
3173                                    ; EXIT WITH "C" SET IF LOOPS ALLOWED AND LOOP COUNT NON-ZERO.
3174                                    ; LOOP COUNTER IS SET BY "BEGIN,TEST" MACRO.
3175                                    ;
3176                                    ; CALL: LOOPTO  ARG
3177                                    ;
3178 017200                            TSTLOOP::
3179 017200  005737  002136                    TST     NOITS           ; ITERATIONS INHIBITED?
3180 017204  001006                            BNE     1$              ; YES.
3181 017206  005737  002152                    TST     QVP             ; NO.
3182 017212  100403                            BMI     1$              ;LOOPS DISALLOWED IN QUICK PASS.
3183 017214  005337  002164                    DEC     LOOPCNT         ; BUMP LOOP COUNTER.
3184 017220  001002                            BNE     2$
3185 017222  000241                    1$:     CLC                     ;LOOP DISALLOWED, OR DONE.
3186 017224  000401                            BR      3$
3187 017226  000261                    2$:     SEC                     ;LOOP ENABLED.
3188 017230  000207                    3$:     RTS     PC
```

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

017232                  TSTSETUP::
017232  010046          MOV     R0,-(SP)        ;SAVE THE TEST ID MESSAGE
017234  005037  003106  CLR     SIFLAG          ; CLEAR "SOFT INIT" FLAG
017240  005037  017500  CLR     ERRK            ; CLEAR LOCAL ERROR COUNTER.
017244  005037  005232  CLR     EXTA            ; CLEAR ERROR EXTENSION FLAG.
017250  105037  016640  CLRB    INTMASK         ; CLEAR INTERRUPT MASK (CHECK ERROR)
017254  013700  002150  MOV     UNITN,R0        ; GET THE UNIT NUMBER.
017260  006300          ASL     R0              ; ... AND MAKE IT A WORD OFFSET.
017262  005737  003062  TST     NODEV           ; DID STARTUP FIND THE DEVICE?
017266  001430          BEQ     4$              ; BR IF YES
017270  100010          BPL     3$              ; BR IF NOT IDLE
017272  052760  160000  003130  BIS     #160000,ERTABL(R0) ; FLAG ERROR IN THE ERROR TABLE
017300                  ERRDF   1,NXR,NXRERR    ; NO DEVICE HERE -- PRINT IT
017300  104455          TRAP    C$ERDF
017302  000001          .WORD   1
017304  003636          .WORD   NXR
017306  005176          .WORD   NXRERR
017310  000407          BR      2$
017312  052760  160001  003130  3$:     BIS     #160001,ERTABL(R0) ; FLAG ERROR IN THE ERROR TABLE
017320                  ERRDF   2,NOINIT        ; DEVICE NOT IDLE
017320  104455          TRAP    C$ERDF
017322  000002          .WORD   2
017324  004233          .WORD   NOINIT
017326  000000          .WORD   0
017330  012737  177777  003060  2$:     MOV     #-1,DUFLG       ; DROP THE UNIT
017336                  DODU    UNITN
017336  013700  002150          MOV     UNITN,R0
017342  104451          TRAP    C$DODU
017344                  DOCLN                   ; ABORT THE PASS
```

```
     017344  104444                          TRAP    C$DCLN
3237 017346  000423                          BR      5$
3238
3239 017350                          4$:     RFLAGS  R0              ; GET THE OPERATOR FLAGS.
     017350  104421                          TRAP    C$RFLA
3240 017352  032700  001000                  BIT     #PNT,R0         ; PRINT THE TEST NUMBERS?
3241 017356  001412                          BEQ     1$              ; BR IF NO
3242 017360  011600                          MOV     (SP),R0         ;GET THE ID MESSAGE
3243 017362                                  PRINTF  #TNAM,R0        ;DISPLAY THE TEST ID
     017362  010046                          MOV     R0,-(SP)
     017364  012746  017426                  MOV     #TNAM,-(SP)
     017370  012746  000002                  MOV     #2,-(SP)
     017374  010600                          MOV     SP,R0
     017376  104417                          TRAP    C$PNTF
     017400  062706  000006                  ADD     #6,SP
3244 017404  005237  002162          1$:     INC     TSTCNT          ; BUMP TEST COUNTER.
3245 017410                                  SETPRI  IPRI            ;PRIORITY THAT OF DEVICE
     017410  013700  002160                  MOV     IPRI,R0
     017414  104441                          TRAP    C$SPRI
3246 017416  005726                  5$:     TST     (SP)+           ;FIX UP THE STACK
3247 017420  013705  002154                  MOV     CSRADDR,R5      ; ADDRESS OF TSV REGISTERS ON UNIBUS
3248 017424  000207                          RTS     PC
3249 017426     045     123     045  TNAM:   .ASCIZ  '%S%T%A Test'
3250                                          .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).
                                ;
017442                          TSTEND: RFLAGS  R0
017442  104421                         TRAP    C$RFLA
017444  030027  020000                 BIT     R0,#IER
017450  001412                         BEQ     1$                      ; BR IF "IER" NOT SET.
017452                                 PRINTF  #ESUM,ERRK              ; PRINT ERROR COUNT.
017452  013746  017500                 MOV     ERRK,-(SP)
017456  012746  017502                 MOV     #ESUM,-(SP)
017462  012746  000002                 MOV     #2,-(SP)
017466  010600                         MOV     SP,R0
017470  104417                         TRAP    C$PNTF
017472  062706  000006                 ADD     #6,SP
017476  000207                 1$:     RTS     PC

017500  000000                 ERRK:   0                               ; LOCAL ERROR COUNT.
017502     045     101     040 ESUM:   .ASCIZ  /%A %D%A ERRORS/
017521     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:
                                ;-
017566  005237  017500         INCERK: INC     ERRK                    ; INCREMENT LOCAL ERROR COUNT
017572  010046                         MOV     R0,-(SP)                ; SAVE R0
017574  013700  002150                 MOV     UNITN,R0                ; GET UNIT NUMBER,
017600  006300                         ASL     R0                      ; ... AND MAKE IT A WORD OFFSET.
017602  062700  003130                 ADD     #ERTABL,R0              ; R0 GETS ADDRESS OF ERROR TABLE ENTRY.
017606  005210                         INC     (R0)                    ; INCREMENT THE DEVICE ERROR COUNT
017610  032710  007777                 BIT     #7777,(R0)              ; DID WE OVERFLOW THE FIELD?
017614  001001                         BNE     1$                      ; BR IF NO.
017616  005310                         DEC     (R0)                    ; YES -- BACK IT UP TO 7777.
017620  012600                 1$:     MOV     (SP)+,R0                ; RESTORE R0
017622  000207                         RTS     PC                      ; RETURN TO CALLER.

017624  010046                 CKEMAX: MOV     R0,-(SP)                ; SAVE R0
017626  013700  002150                 MOV     UNITN,R0                ; GET UNIT NUMBER
017632  006300                         ASL     R0                      ; ... AND MAKE IT A WORD OFFSET
017634  016000  003130                 MOV     ERTABL(R0),R0           ; GET ERROR TABLE ENTRY
017640  042700  170000                 BIC     #170000,R0              ; EXTRACT ERROR COUNT FIELD
017644  020037  002142                 CMP     R0,GERRMAX              ; IS GLOBAL LIMIT EXCEEDED FOR THIS UNIT?
017650  103004                         BHIS    1$                      ; BR IF YES
017652  023737  017500  002140         CMP     ERRK,LERRMAX            ; IS LOCAL LIMIT EXCEEDED FOR THIS TEST?
017660  103417                         BLO     2$                      ; BR IF NO
017662                          1$:     RFLAGS  R0                      ; GET OPERATOR FLAGS
017662  104421                         TRAP    C$RFLA
017664  032700  000040                 BIT     #IDU,R0                 ; IS DROPPING INHIBITED?
017670  001013                         BNE     2$                      ; BR IF YES.
017672  012737  177777  003060         MOV     #-1,DUFLG               ; NO -- DROP THE UNIT
017700                                 ERRDF   4,EMAXDU
017700  104455                         TRAP    C$ERDF
017702  000004                         .WORD   4
017704  017521                         .WORD   EMAXDU
```

```
     017706  000000                          .WORD   0
3298 017710                                  DODU    UNITN
     017710  013700  002150                  MOV     UNITN,R0
     017714  104451                          TRAP    C$DODU
3299 017716                                  DOCLN
     017716  104444                          TRAP    C$DCLN
3300 017720  012600                  2$:     MOV     (SP)+,R0        ; RESTORE R0
3301 017722  000207                          RTS     PC              ; RETURN TO CALLER
3302                                         .SBTTL  FATCHK - INC FATAL ERRORS AND CHECK FOR LIMIT
3303                                 ;+
3304                                 ;
3305                                 ;       CHECK FATAL COUNTER, AFTER INC, FOR MORE THAN 25
3306                                 ;       ERRORS AND IF OVER CALL UNIT DROP ROUTINE
3307                                 ;
3308                                 ;-
3309 017724                          FATCHK:
3310 017724                                  SAVREG                  ;BETTER SAVE THE REGISTERS
3311 017730  013701  002150                  MOV     UNITN,R1        ;PICK UP THE UNIT NUMBER
3312 017734  006301                          ASL     R1              ;MAKE IT INTO A BYTE OFFSET
3313 017736  062761  000001  003130          ADD     #1,ERTABL(R1)   ;ADD 1 TO THE PROPER UNIT'S ERROR COUNTER
3314 017744  005237  002170                  INC     FATFLG          ;BUMP FATAL ERROR COUNTER
3315 017750  023727  002170  000031          CMP     FATFLG,#25.     ;CHECK AGAINST 25
3316 017756  002406                          BLT     9$              ;BR. IF LESS THAN 25 ERRORS
3317 017760                                  RFLAGS  R0              ;READ THE FLAGS INTO R0
     017760  104421                          TRAP    C$RFLA
3318 017762  032700  040000                  BIT     #BIT14,R0       ;BR. IF LOOP ON ERROR IS SET
3319 017766  001002                          BNE     9$              ;OTHERWISE NEVER BE ABLE TO SCOPE ETC.
3320 017770  004737  017776                  JSR     PC,CKDROP       ;DROP UNIT IF ALLOWED
3321 017774  000207                  9$:     RTS     PC              ;RETURN ETC.
3322                                 ;
3323                                 ;
3324                                 ;
```

```
                                        .SBTTL  CKDROP  - CHECK IF UNIT SHOULD BE DROPPED
                                ;+
                                ; CHECK IF UNIT SHOULD BE DROPPED
                                ;-
017776  010046                  CKDROP: MOV     R0,-(SP)
020000                                  FORCERROR       1$,NOTSSR
020010                                  RFLAGS  R0
020010  104421                          TRAP    C$RFLA
020012  032700  000040                  BIT     #IDU,R0
020016  001010                          BNE     1$
020020  011600                          MOV     (SP),R0
020022  012737  177777  003060          MOV     #-1,DUFLG
020030                                  DODU    UNITN
020030  013700  002150                  MOV     UNITN,R0
020034  104451                          TRAP    C$DODU
020036                                  DOCLN                   ;ABORT THE PASS
020036  104444                          TRAP    C$DCLN
020040  012600                  1$:     MOV     (SP)+,R0
020042  000207                          RTS     PC


                                        .SBTTL  CONFIG  - DETERMINE CONFIGURATION OF SYSTEM
                                ;
                                ; SUBROUTINE - DETERMINE CONFIGURATION OF TK-25 SYSTEM.
                                ;
020044                          CONFIG:
020044  004737  016470                  JSR     PC,SOFINIT
020050  000207                          RTS     PC
```

```
                                        .SBTTL  KTON,KTOFF      - ENABLE/DISABLE MEMORY MANAGEMENT
                                ;
                                ; SUBROUTINE - ENABLE MEM MGT.
                                ;
020052  005737  003100          KTON:   TST     KTFLG           ; GOT KT?
020056  001403                          BEQ     1$              ; NO.
020060  012737  000001  177572          MOV     #1,SR0          ; YES. ENABLE KT11.
020066  000207                  1$:     RTS     PC
                                ;
                                ; SUBROUTINE - DISABLE MEM MGT.
                                ;
020070  005737  003100          KTOFF:  TST     KTFLG           ; GOT KT11?
020074  001405                          BEQ     1$              ; NO.
020076  000240                          NOP
020100  000240                          NOP
020102  012737  000000  177572          MOV     #0,SR0          ; DISABLE KT.
020110  000207                  1$:     RTS     PC
```

```
3379                                    .SBTTL  SETMAP  - SETUP PAR6 MAPPING
3380
3381                                ;*
3382                                ;
3383                                ;THIS ROUTINE SETS UP KERNEL PAR6 TO HANDLE
3384                                ;AN 18 BIT ADDRESS. THE OFFSET INTO THE PAGE
3385                                ;IS RETURNED BIASED TO PAR6.
3386                                ;
3387                                ;INPUTS:
3388                                ;
3389                                ;       R0      HIGH ORDER ADDRESS BITS
3390                                ;       R1      LOW ORDER ADDRESS BITS
3391                                ;
3392                                ;OUTPUTS:
3393                                ;
3394                                ;       R0      OFFSET INTO BLOCK WITH PAR6 BIAS (I.E. THE ADDRESS)
3395                                ;       CARRY   SET IF SUCCESS
3396                                ;               CLR IF ERROR
3397                                ;-
3398 020112                        SETMAP:
3399 020112                                SAVREG                  ;SAVE R1-R4 UNTIL NEXT RETURN
3400 020116  005737  003100                TST     KTFLG           ;SYSTEM HAVE ABOVE 28K?
3401 020122  001433                        BEQ     10$             ;BR IF NO
3402 020124  010102                        MOV     R1,R2           ;SAVE LOW ORDER BITS
3403         000006                        .REPT   6
3404                                       ASR     R0              ;CONVERT WORD ADDRESS TO 32W BLOCKS
3405                                       ROR     R1              ;MAKE IT DOUBLE PRECISION
3406                                       .ENDR
3407 020156  042701  000177                BIC     #177,R1         ;ALINE FOR LOWER 4K BOUNDARY
3408 020162  020137  003100                CMP     R1,KTFLG        ;HIGHER THAN EXISTING MEMORY?
3409 020166  103011                        BHIS    10$             ;BR IF YES
3410 020170  010137  172354                MOV     R1,@#KIPAR6     ;SETUP MAPPING REGISTER PAR6
3411 020174  042702  160000                BIC     #160000,R2      ;SETUP DISPLACEMENT IN PAGE
3412 020200  062702  140000                ADD     #140000,R2      ;ADD IN PAR6 BIAS
3413 020204  010200                        MOV     R2,R0           ;RETURN IN R0
3414 020206  000261                        SEC                     ;SET SUCCESS
3415 020210  000401                        BR      15$             ;
3416 020212  000241                10$:    CLC                     ;SET FAILURE
3417 020214  000207                15$:    RTS     PC              ;RETURN
3418
```

```
                                        .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
                                ;-
                                ;
020216                          FILLMEM:
020216                                  SAVREG                  ;SAVE R1-R5 UNTIL NEXT RETURN
020222  004737  020070                  JSR     PC,KTOFF        ;DISABLE KT.
020226  010003                          MOV     R0,R3           ;COPY TEST PATTERN
020230  013701  003072                  MOV     FREE,R1         ;GET FIRST FREE LOCATION
020234  013702  003074                  MOV     FRESIZ,R2       ;SIZE OF FREE SPACE BELOW 28K.
020240  010321                  10$:    MOV     R3,(R1)+        ;STORE A BACKGROUND WORD
020242  005302                          DEC     R2              ;DONE ALL MEMORY IN FREE SPACE?
020244  003375                          BGT     10$             ;BR IF NO
020246  005737  003100                  TST     KTFLG           ; GOT KT?
020252  001452                          BEQ     55$             ; NO, GET OUT.
020254  004737  020052                  JSR     PC,KTON         ; YES. ENABLE KT.
020260  005000                          CLR     R0              ;HIGH ORDER ADDRESS START
020262  013701  003104                  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
020332  004737  020112                  JSR     PC,SETMAP       ;SETUP PAR6 MAPPING REGISTER
020336  010320                  30$:    MOV     R3,(R0)+        ;STORE TEST PATTERN IN >28K ADDRESS
020340  020027  160000                  CMP     R0,#160000      ;END OF PAR6 MAPPING AREA?
020344  103774                          BLO     30$             ;BR IF NO
020346  162700  020000                  SUB     #20000,R0       ;BACKUP INTO PAR6 MAPPING BEGIN
020352  062737  000200  172354          ADD     #200,@#KIPAR6   ;POINT TO NEXT 4K BLOCK >28K.
020360  023737  172354  003100          CMP     @#KIPAR6,KTFLG  ;END OF MEMORY?
020366  001402                          BEQ     50$             ;BR IF YES
020370  000137  020336                  JMP     30$             ;KEEP GOING ON ETC.
020374  004737  020070          50$:    JSR     PC,KTOFF        ; DISABLE KT.
020400  000207                  55$:    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
                                ;-
020402                          CMPMEM:
020402                                  SAVREG                  ;SAVE R1-R5 UNTIL NEXT RETURN
020406  010003                          MOV     R0,R3           ;COPY TEST PATTERN
020410  004737  020070                  JSR     PC,KTOFF        ;DISABLE KT.
020414  013701  003072                  MOV     FREE,R1         ;GET FIRST FREE LOCATION
020420  013702  003074                  MOV     FRESIZ,R2       ;SIZE OF FREE SPACE BELOW 28K.
020424  020311                  10$:    CMP     R3,(R1)         ;FREE SPACE LOCATION EQUAL TO EXPD?
020426  001411                          BEQ     15$             ;BR IF YES
020430  010137  002204                  MOV     R1,ERRLO        ;SAVE ADDRESS IN ERROR
020434  005037  002202                  CLR     ERRHI           ;NO HIGH ADDRESS
020440  010337  002176                  MOV     R3,EXPD         ;SAVE EXPD FOR ERROR REPORT
020444  011137  002200                  MOV     (R1),RECV       ;SAVE RECV FOR ERROR REPORT
020450  000474                          BR      50$             ;
020452  005721                  15$:    TST     (R1)+           ;POINT TO NEXT ADDRESS
020454  005302                          DEC     R2              ;DONE ALL MEMORY IN FREE SPACE?
020456  003362                          BGT     10$             ;BR IF NO
020460  005737  003100                  TST     KTFLG           ; GOT KT?
020464  001472                          BEQ     55$             ; NO, GET OUT.
020466  004737  020052                  JSR     PC,KTON         ; YES, ENABLE KT.
020472  005000                          CLR     R0              ;HIGH ORDER ADDRESS START
020474  013701  003104                  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
020530  042701  000177                  BIC     #177,R1         ;ALINE 1K BOUNDARY
020534  010046                          MOV     R0,-(SP)        ;SAVE HIGH ORDER
020536  010146                          MOV     R1,-(SP)        ;SAVE LOW ORDER
020540  004737  020112                  JSR     PC,SETMAP       ;SETUP PAR6 MAPPING REGISTER
020544  010004                          MOV     R0,R4           ;COPY ADDRESS BIASED TO PAR6
020546  012601                          MOV     (SP)+,R1        ;RESTORE LOW ORDER IN NON PAR6 FORMAT
020550  012600                          MOV     (SP)+,R0        ;RESTORE HIGH ORDER IN NON PAR6 FORMAT
020552  020314                  30$:    CMP     R3,(R4)         ;ABOVE 28K LOCATION EQUAL EXPD?
020554  001411                          BEQ     32$             ;BR IF YES
020556  010037  002202                  MOV     R0,ERRHI        ;SAVE HIGH ORDER IN ERROR
```

```
3525 020562  010137  002204                MOV     R1,ERRLO        ;SAVE LOW ORDER IN ERROR
3526 020566  010337  002176                MOV     R3,EXPD         ;SAVE EXPD FOR ERROR REPORT
3527 020572  011437  002200                MOV     (R4),RECV       ;SAVE RECV FOR ERROR REPORT
3528 020576  000421                        BR      50$             ;
3529 020600  062701  000002        32$:    ADD     #2,R1           ;UPDATE NON PAR6 ADDRESS
3530 020604  005500                        ADC     R0              ;MAKE IT DOUBLE PRECISION ADD
3531 020606  062704  000002                ADD     #2,R4           ;UPDATE PAR FORMAT ADDRESS
3532 020612  020427  160000                CMP     R4,#160000      ;END OF PAR6 MAPPING AREA?
3533 020616  103755                        BLO     30$             ;BR IF NO
3534 020620  162704  020000                SUB     #20000,R4       ;BACKUP INTO PAR6 MAPPING BEGIN
3535 020624  062737  000200  172354        ADD     #200,@#KIPAR6   ;POINT TO NEXT 4K BLOCK >28K.
3536 020632  023737  172354  003100        CMP     @#KIPAR6,KTFLG  ;END OF MEMORY?
3537 020640  101744                        BLOS    30$             ;BR IF NO
3538 020642  004737  020070        50$:    JSR     PC,KTOFF        ;TURN OFF MEMORY MAPPING
3539 020646  000241                        CLC                     ;SET FAILURE
3540 020650  000403                        BR      60$             ;
3541 020652  004737  020070        55$:    JSR     PC,KTOFF        ;TURN OFF MEMORY MAPPING
3542 020656  000261                        SEC                     ;SET SUCCESS
3543 020660  000207                60$:    RTS     PC
3544
```

```
                                .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
                        ;
                        ;-

020662                  REGSAV:
020662                          BREAK                   ;LOOK FOR CNTL C
020662  104422                  TRAP    C$BRK
020664  010446                  MOV     R4,-(SP)
020666  010346                  MOV     R3,-(SP)
020670  010246                  MOV     R2,-(SP)
020672  010146                  MOV     R1,-(SP)
020674  010546                  MOV     R5,-(SP)
020676  016605  000012          MOV     10.(SP),R5
020702  004736                  JSR     PC,@(SP)+
020704  012601                  MOV     (SP)+,R1
020706  012602                  MOV     (SP)+,R2
020710  012603                  MOV     (SP)+,R3
020712  012604                  MOV     (SP)+,R4
020714  012605                  MOV     (SP)+,R5
020716                          BREAK                   ;LOOK FOR CNTL C
020716  104422                  TRAP    C$BRK
020720  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
                                ;
                                ;-

020722                          GETPAT::
                                        SAVREG                          ;SAVE THE GENERAL REGISTERS
020722                          1$:     GMANID  DATASC,PATDAT,0,377,0,377,NO
020726  104443                          TRAP    C$GMAN
020730  000406                          BR      10000$
020732  020756                          .WORD   PATDAT
020734  000022                          .WORD   T$CODE
020736  020760                          .WORD   DATASC
020740  000377                          .WORD   377
020742  000000                          .WORD   T$LOLIM
020744  000377                          .WORD   T$HILIM
020746                          10000$:
020746                                  BNCOMPLETE      1$      ;RETRY IF ERROR
020746  103367                          BCC     1$
020750  013700  020756                  MOV     PATDAT,R0       ;DATA PATTERN FROM OPERATOR
020754  000207                          RTS     PC              ;RETURN TO CALLER

                                ;+
                                ;LOCAL DATA AREA
                                ;-

020756  000000                  PATDAT: .WORD   0               ;TEMPORARY STORAGE FOR DATA
020760  105     116     124     DATASC: .ASCIZ  'ENTER DATA PATTERN'
                                        .EVEN
```

GETSEL - ISSUE MENU AND GET OPERATOR RESPONSE

```
3618                                            .SBTTL  GETSEL  - ISSUE MENU AND GET OPERATOR RESPONSE
3619                                    ;+
3620                                    ;ROUTINE TO ISSUE A MENU AND GET
3621                                    ;THE OPERATOR'S RESPONSE.
3622                                    ;
3623                                    ;INPUTS:
3624                                    ;
3625                                    ;       R0      ADDRESS OF ASCIZ STRING OF MENU
3626                                    ;       R1      MAXIMUM ALLOWABLE OPERATOR RESPONSE
3627                                    ;
3628                                    ;OUTPUTS:
3629                                    ;
3630                                    ;       R0      NUMBER OF THE OPERATOR'S SELECTION
3631                                    ;-
3632 021004                            GETSEL::
3633 021004                                    SAVREG                  ;SAVE GENERAL REGISTERS
3634 021010  010002                            MOV     R0,R2           ;SAVE THE MENU ADDRESS
3635 021012  010203                    1$:     MOV     R2,R3           ;START OF MENU STRING
3636 021014  005713                    2$:     TST     (R3)            ;END OF ASCII ?
3637 021016  001412                            BEQ     3$              ;BRANCH IF ALL LINES DISPLAYED
3638 021020                                    PRINTF  #SELASC,(R3)+   ;DISPLAY THE MENU
     021020  012346                            MOV     (R3)+,-(SP)
     021022  012746  021170                    MOV     #SELASC,-(SP)
     021026  012746  000002                    MOV     #2,-(SP)
     021032  010600                            MOV     SP,R0
     021034  104417                            TRAP    C$PNTF
     021036  062706  000006                    ADD     #6,SP
3639 021042  000764                            BR      2$
3640 021044                            3$:     GMANID  MENASC,MENRES,D,-1,0,-1,NO
     021044  104443                            TRAP    C$GMAN
     021046  000406                            BR      10001$
     021050  021224                            .WORD   MENRES
     021052  000042                            .WORD   T$CODE
     021054  021175                            .WORD   MENASC
     021056  177777                            .WORD   -1
     021060  000000                            .WORD   T$LOLIM
     021062  177777                            .WORD   T$HILIM
     021064                            10001$:
3641 021064                                    BNCOMPLETE      1$      ;RETRY IF ERROR
     021064  103352                            BCC     1$
3642 021066  013700  021224                    MOV     MENRES,R0       ;GET THE OPERATOR'S REPLY
3643 021072  020001                            CMP     R0,R1           ;COMPARE TO MAXIMUM ALLOWED
3644 021074  101411                            BLOS    5$              ;BRANCH IF OK
3645 021076                                    PRINTF  #MENERR         ;DISPLAY ERROR MESSAGE
     021076  012746  021122                    MOV     #MENERR,-(SP)
     021102  012746  000001                    MOV     #1,-(SP)
     021106  010600                            MOV     SP,R0
     021110  104417                            TRAP    C$PNTF
     021112  062706  000004                    ADD     #4,SP
3646 021116  000735                            BR      1$              ;RETRY
3647 021120  000207                    5$:     RTS     PC              ;RETURN TO CALLER
3648 021122     045     116     045    MENERR: .ASCIZ  '%N%A *** Menu Selection Too Large ***'
3649 021170     045     116     045    SELASC: .ASCIZ  '%N%T'
3650 021175     105     156     164    MENASC: .ASCIZ  'Enter Menu Selection: '
3651                                            .EVEN
3652 021224  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.
                                ;
                                ;-

021226                          CHKMAN::
021226                                  SAVREG                  ;SAVE THE REGISTERS
021232                                  MANUAL                  ;SEE IF MANUAL INTERVENTION OK
021232  104450                          TRAP    C$MANI
021234                                  BCOMPLETE 1$            ;BRANCH IF ALLOWED
021234  103411                          BCS     1$
021236                                  PRINTF  @NOMAN          ;PRINT THE WARNING MESSAGE
021236  012746  021262                  MOV     @NOMAN,-(SP)
021242  012746  000001                  MOV     @1,-(SP)
021246  010600                          MOV     SP,R0
021250  104417                          TRAP    C$PNTF
021252  062706  000004                  ADD     @4,SP
021256  000241                          CLC                     ;CLEAR CARRY FOR ERROR
021260  000207                  1$:     RTS     PC              ;RETURN

021262      045     116     045 NOMAN:  .ASCIZ  '%N%A *** Manual Intervention not Allowed - Test Aborted ***'
                                        .even
```

```
                                        .SBTTL  ENVIRN  - SETUP FREE DIAGNOSTIC SPACE
                                ;
                                ; SUBROUTINE TO SET-UP VARIOUS ENVIRONMENTAL PARAMETERS.
                                ;
021356                  ENVIRN: MEMORY  R0
021356  104431                  TRAP    C$MEM
021360  010037  003072          MOV     R0,FREE         ; GET 1ST FREE ADDRESS...
021364  062737  000002  003072  ADD     #2,FREE
021372  011037  003074          MOV     (R0),FRESIZ     ;...AND WORD COUNT.
021376  162737  000004  003074  SUB     #4,FRESIZ
021404  013702  002012          MOV     L$UNIT,R2       ; GET NUMBER OF UNITS
021410  162737  000007  003074  10$:    SUB     #7,FRESIZ       ; TAKE AWAY 7 WORDS PER UNIT
021416  005302                  DEC     R2
021420  001373                  BNE     10$
021422  013700  003072          MOV     FREE,R0         ;GET FIRST FREE ADDRESS
021426  063700  003074          ADD     FRESIZ,R0       ;POINT TO LAST FREE ADDRESS
021432  162700  000002          SUB     #2,R0           ;BACKUP 1 WORD
021436  010037  003076          MOV     R0,FREEHI       ;STORE LAST FREE ADDRESS
021442  000207                  RTS     PC              ;RETURN
```

```
3707                                            .SBTTL  KTINIT  - SETUP KT11 MEMORY MANAGEMENT REGISTERS
3708                                    ;+
3709                                    ;
3710                                    ;ROUTINE TO INIT KT-11
3711                                    ;
3712                                    ;-
3713
3714 021444                             KTINIT:
3715 021444  005037  003100                        CLR     KTFLG           ; INIT >28K MEMORY FLAG
3716 021450  005037  003102                        CLR     KTENABLE        ; INIT TEST >28K FLAG
3717 021454  023727  002120  001577                CMP     L$HIME,#1577    ; GOT ENOUGH MEMORY (>28K)?
3718 021462  101444                               BLOS    9$              ; NO.
3719 021464  013700  000004                        MOV     @#ERRVEC,R0     ; SAVE OLD ERR VEC PTR.
3720 021470  012737  021562  000004                MOV     #2$,@#ERRVEC    ; SET ERR VEC PTR.
3721 021476  005737  177572                        TST     @#SR0           ; GOT KT11?
3722 021502  000240                               NOP                     ;  (TRAP IF NO).
3723 021504  013737  002120  003100                MOV     L$HIME,KTFLG    ; YES. SET KT FLAG.
3724 021512  042737  000177  003100                BIC     #177,KTFLG      ;
3725 021520  010037  000004                        MOV     R0,@#ERRVEC     ; RESTORE OLD ERR VEC PTR.
3726 021524  005000                               CLR     R0              ; R0 = AR DATA.
3727 021526  012701  172340                        MOV     #KIPAR0,R1      ; R1 = KI REGS PTR.
3728 021532  012761  077406  177740  1$:           MOV     #77406,-40(R1)  ; SET DESCRIPTOR REG.
3729 021540  010021                               MOV     R0,(R1)+        ; SET KIPAR REG.
3730 021542  062700  000200                        ADD     #200,R0         ; BUMP AR DATA BY "4K".
3731 021546  020027  002000                        CMP     R0,#2000        ; AT "I/O"?
3732 021552  001367                               BNE     1$              ; NO.
3733 021554  012741  177600                        MOV     #177600,-(R1)   ; YES. SET KTPAR7 FOR I/O.
3734 021560  000405                               BR      9$
3735
3736 021562  012716  021570            2$:        MOV     #6$,(SP)        ; SET UP RETURN
3737 021566  000002                               RTI                     ; RTI TO NEXT LOCATION
3738
3739 021570  010037  000004            6$:        MOV     R0,@#ERRVEC     ; RESTORE OLD ERR VEC PTR.
3740
3741 021574  000207                    9$:        RTS     PC
3742                                    ;       .IIF DF ONEFILE,        .PAGE
3751
3752
3758
```

PROTECTION TABLE

```
3760                                            .SBTTL  PROTECTION TABLE
3761 021576                                     BGNPROT
     021576                             L$PROT::
3762 021576  177777  177777  177777             .WORD   -1, -1, -1, -1  ;NO DEVICE PROTECTION REQUIRED.
3763 021606                                     ENDPROT
3764
```

```
                                        .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
                                ;-
                                        BGNINIT
021606                          L$INIT::
021606                          40$:
021606  012737  005672  002146          MOV     #EPRT1,EPRTSW   ;SET UP PRIMARY MESSAGE FOR REPLACEMENT
021614  005037  003106                  CLR     SIFLAG          ;CLEAR "SOFT INIT" FLAG
021620  005037  003102                  CLR     KTENABLE        ;CLEAR TEST ABOVE 28K FLAG
021624  005037  002246                  CLR     RAMSIZ          ;CLEAR RAM SIZE FOR RAMERR ROUTINE
021630                                  READEF  #EF.CONTINUE
021630  012700  000036                  MOV     #EF.CONTINUE,R0
021634  104447                          TRAP    C$REFG
021636                                  BNCOMPLETE 1$
021636  103023                          BCC     1$
021640  023737  002150  002012          CMP     UNITN,L$UNIT    ;UNIT IN RANGE?
021646  103064                          BHIS    4$              ;BR IF NO.
021650  005737  003060                  TST     DUFLG           ;DROPPED UNIT?
021654  100466                          BMI     NXTU            ;BR IF YES
021656  013701  002150                  MOV     UNITN,R1
021662  006301                          ASL     R1
021664  005761  003130                  TST     ERTABL(R1)
021670  001512                          BEQ     SETU
021672  032761  040000  003130          BIT     #BIT14,ERTABL(R1) ;DROPPED?
021700  001054                          BNE     NXTU
021702                                  EXIT    INIT            ;DO NOTHING IF "CONTINUE".
021702  104432                          TRAP    C$EXIT
021704  000412                          .WORD   L10030-.
021706                          1$:     READEF  #EF.NEW
021706  012700  000035                  MOV     #EF.NEW,R0
021712  104447                          TRAP    C$REFG
021714                                  BNCOMPLETE NXTU         ;TAKE NEXT UNIT IF NOT NEW PASS.
021714  103046                          BCC     NXTU
021716                                  READEF  #EF.START
021716  012700  000040                  MOV     #EF.START,R0
021722  104447                          TRAP    C$REFG
021724                                  BCOMPLETE 2$
021724  103404                          BCS     2$
021726                                  READEF  #EF.RESTART
021726  012700  000037                  MOV     #EF.RESTART,R0
021732  104447                          TRAP    C$REFG
021734                                  BNCOMPLETE 31$
021734  103025                          BCC     31$
021736                          2$:                             ;1ST PASS, BUS-INIT...
021736                                  BRESET                  ;BUS RESET.
021736  104433                          TRAP    C$RESET
021740  005037  002162                  CLR     TSTCNT          ;NUMBER OF TESTS RUN IN PASS
```

```
3807 021744  005037  002170                CLR     FATFLG          ;RESET FLAG TO ZERO "FATAL ERRORS"
3808 021750  005037  003332        19$:    CLR     SKIPT           ;CLEAR THE SUBTEST "SKIPPER"
3809 021754                        20$:
3810 021754  012737  177777  002152        MOV     #-1,QVP         ;...QUICK VERIFY...
3811 021762  004737  021356                JSR     PC,ENVIRN       ;SET ENVIRONMENT.
3812 021766  004737  021444                JSR     PC,KTINIT       ;INITIALIZE KT MEMORY MANAGEMENT
3813 021772  012700  003130                MOV     #ERTABL,R0
3814 021776  005020                30$:    CLR     (R0)+           ;CLEAR THE ERROR TABLE
3815 022000  020027  003330                CMP     R0,#ERTABE
3816 022004  103774                        BLO     30$
3817 022006  000404                        BR      4$
3818 022010  005037  002152        31$:    CLR     QVP
3819 022014  000137  022064                JMP     PASRPT          ;GO REPORT THE STATUS
3820
3821 022020                        4$:
3822 022020  012737  177777  002150 NEWPAS: MOV     #-1,UNITN       ;INIT UNIT NUMBER...
3823 022026  005037  002166                CLR     DEVCNT          ;CLEAR COUNT OF DEVICES RUNNING
3824 022032                        NXTU:   BREAK
     022032  104422                        TRAP    C$BRK
3825 022034  005237  002150                INC     UNITN           ;...AND SET NEXT UNIT NUMBER.
3826 022040  023737  002150  002012        CMP     UNITN,L$UNIT
3827 022046  103423                        BLO     SETU
3828 022050  012737  177777  003060        MOV     #-1,DUFLG
3829 022056  000401                        BR      11$
3830 022060                                DOCLN
     022060  104444                        TRAP    C$DCLN          ;ABORT, NO MORE UNITS.
3831 022062  000240                11$:    NOP
3832 022064                        PASRPT:
3833 022064  023727  002012  000001        CMP     L$UNIT,#1       ;HOW MANY UNITS SELECTED?
3834 022072  101752                        BLOS    NEWPAS          ;BR IF ONLY 1
3835 022074  005737  002166                TST     DEVCNT          ;ARE ANY STILL RUNNING?
3836 022100  001747                        BEQ     NEWPAS          ;BR IF NO
3837 022102                                RFLAGS  R0
     022102  104421                        TRAP    C$RFLA
3838 022104  032700  000100                BIT     #ISR,R0         ;SHOULD WE PRINT STATISTICS
3839 022110  001343                        BNE     NEWPAS          ;BR IF NO
3840
3841 022112                                DORPT
     022112  104424                        TRAP    C$DRPT
3842 022114  000741                        BR      NEWPAS
3843 022116                        10$:
3844
3845 022116                        SETU:   GPHARD  UNITN,R0        ;GET UNIT N P-TABLE POINTER.
     022116  013700  002150                MOV     UNITN,R0
     022122  104442                        TRAP    C$GPHRD
3846 022124                                BNCOMPLETE NXTU         ;BR IF UNIT NOT AVAILABLE.
     022124  103342                        BCC     NXTU
3847 022126  005037  003060                CLR     DUFLG           ;CLEAR "DROPPED" FLAG.
3848 022132  005237  002166                INC     DEVCNT
3849 022136  012001                        MOV     (R0)+,R1        ;GET 1ST REGISTER ADDRESS.
3850 022140  010137  002154                MOV     R1,CSRADDR      ;ADDRESS OF REGISTERS OF UNIT UNDER TEST
3851
3852 022144  012001                        MOV     (R0)+,R1        ;GET VECTOR ADDRESS.
3853 022146  011002                        MOV     (R0),R2         ;GET INTERRUPT PRIORITY
3854 022150  010237  002160                MOV     R2,IPRI         ;SET INTERRUPT PRIORITY.
3855 022154  010137  002156                MOV     R1,IVEC         ;SET INTERRUPT VECTOR POINTER...
3856 022160  012721  016712                MOV     #INTR,(R1)+     ;...VECTOR...
```

```
3857 022164  010221                        MOV     R2,(R1)+        ;...AND PRIORITY.
3858
3859 022166                          1$:
3860                                 ;       TST     QVP             ;1ST PASS ??
3861                                 ;       BEQ     5$              ;NO, SKIP THE PASS 1 STUFF.
3862
3863                                 ;
3864                                 ;1ST PASS, CHECK THAT DEVICE ADDRESSES ARE VALID, AND
3865                                 ;THAT THE DISPLAY STATUS IS PROPERLY INITIALIZED.
3866                                 ;
3867 022166  013701  002150                 MOV     UNITN,R1
3868 022172  006301                        ASL     R1
3869 022174  052761  100000  003130        BIS     #BIT15,ERTABL(R1) ;SAY DEVICE RUNNING
3870 022202  005037  005232                CLR     EXTA            ;CLEAR ERROR EXTENSION FLAG.
3871 022206  023727  002012  000001        CMP     L$UNIT,#1       ;ARE WE TESTING MULTIPLE UNITS?
3872 022214  101416                        BLOS    10$             ;BR IF NO.
3873 022216                                RFLAGS  R0              ;YES -- GET OPERATOR FLAGS.
     022216  104421                        TRAP    C$RFLA
3874 022220  032700  001000                BIT     #PNT,R0         ;SHOULD WE PRINT UNIT #?
3875 022224  001412                        BEQ     10$             ;BR IF NOT.
3876 022226                                PRINTF  #PUNIT,UNITN    ;PRINT THE UNIT #
     022226  013746  002150                MOV     UNITN,-(SP)
     022232  012746  022320                MOV     #PUNIT,-(SP)
     022236  012746  000002                MOV     #2,-(SP)
     022242  010600                        MOV     SP,R0
     022244  104417                        TRAP    C$PNTF
     022246  062706  000006                ADD     #6,SP
3877 022252                          10$:
3878 022252  005037  003062                CLR     NODEV
3879 022256  013701  002154                MOV     CSRADDR,R1      ;ADDRESS OF FIRST REGISTER
3880 022262  010102                        MOV     R1,R2           ;START OF REGISTERS
3881 022264  062702  000000                ADD     #TSSR,R2        ;ADDRESS OF TSSR REGISTER
3882 022270  004737  017120                JSR     PC,XNXM         ;TEST BOTH CONTROLLER REGISTERS...
3883 022274  103005                        BCC     2$              ;...AND BR IF ALL OK.
3884 022276  010137  003062                MOV     R1,NODEV        ;FLAG DEVICE AS NON-EXISTENT
3885 022302  012737  177777  003060        MOV     #-1,DUFLG       ;DROP THIS UNIT.
3886 022310                          2$:
3887                                 ;
3888                                 ;FINALLY, SET CPU PRIORITY AND WE'RE DONE.
3889                                 ;
3890 022310                          5$:    SETPRI  #PRI00          ;ENABLE INTERRUPTS.
     022310  012700  000000                MOV     #PRI00,R0
     022314  104441                        TRAP    C$SPRI
3891 022316                                ENDINIT
     022316                          L10030:
     022316  104411                        TRAP    C$INIT
3892
3893 022320     045     116     045  PUNIT:  .ASCIZ  /%N%N%A****** TESTING UNIT %D2%A ******/
3894                                        .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.
                                ;--
                                        BGNAU
                                L$AU::
                                        MOV     R0,R1           ; GET UNIT TO BE ADDED (R0)
                                        ASL     R1              ; MAKE IT A WORD INDEX
                                        BIS     #100000,ERTABL(R1) ; SET THE "ACTIVE" BIT
                                        BIC     #40000,ERTABL(R1)  ; CLEAR THE "DROPPED" BIT
                                        PRINTF  #1$,R0
                                        MOV     R0,-(SP)
                                        MOV     #1$,-(SP)
                                        MOV     #2,-(SP)
                                        MOV     SP,R0
                                        TRAP    C$PNTF
                                        ADD     #6,SP
                                        EXIT    AU
                                        .WORD   J$JMP
                                        .WORD   L10031-2-.
                                1$:     .ASCIZ  /%N%A  UNIT %D%A ADDED/
                                        .EVEN


                                        ENDAU                   ; UNUSED.
                                L10031:
                                        TRAP    C$PU

                                ;++
                                ; 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.


                                        BGNDU
                                L$DU::
                                        MOV     #-1,DUFLG
                                        MOV     R0,R1
                                        ASL     R1
                                        BIS     #140000,ERTABL(R1)      ; SAY DROPPED
                                        240,240,240                     ; ?????????
                                        PRINTF  #1$,R0
                                        MOV     R0,-(SP)
                                        MOV     #1$,-(SP)
                                        MOV     #2,-(SP)
                                        MOV     SP,R0
                                        TRAP    C$PNTF
                                        ADD     #6,SP
                                        EXIT    DU
                                        .WORD   J$JMP
                                        .WORD   L10032-2-.
```

```
3933 022540     045     116     045 1$:     .ASCIZ  /%N%A  UNIT %D%A DROPPED/
3934                                         .EVEN
3935 022570                                  ENDDU
     022570                             L10032:
     022570  104453                         TRAP    C$DU
3936                                       ;++
3937                                       ; AUTO-DROP CODE SECTION.
3938                                       ;--
3939 022572                                  BGNAUTO
     022572                             L$AUTO::
3940 022572  012703  000550                MOV     #360.,R3        ;ENOUGH TIME FOR 2400' REEL TO REWIND
3941 022576  004737  016744           10$:  JSR     PC,WAITF        ;WAIT FOR SSR TO SET
3942 022602  103420                       BCS     20$             ;LEAVE WHEN SSR IS SET
3943 022604                                DELAY   250.            ;WAIT FOR .25 SECONDS
     022604  012727  000372                MOV     #250.,(PC)+
     022610  000000                       .WORD   0
     022612  013727  002116                MOV     L$DLY,(PC)+
     022616  000000                       .WORD   0
     022620  005367  177772                DEC     -6(PC)
     022624  001375                       BNE     .-4
     022626  005367  177756                DEC     -22(PC)
     022632  001367                       BNE     .-20
3944 022634  005303                       DEC     R3              ;BUMP COUNTER DOWN
3945 022636  001357                       BNE     10$             ;KEEP GOING
3946 022640  004737  017776                JSR     PC,CKDROP       ;TRY AND DROP UNIT
3947 022644                           20$:
3948 022644                                ENDAUTO                 ; UNUSED.
     022644                             L10033:
     022644  104461                         TRAP    C$AUTO
```

```
3950                                            .SBTTL  CLEAN-UP AND REPORT CODING SECTIONS
3951
3952                                    ;++
3953                                    ; THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS
3954                                    ; EXECUTED AT THE END OF EACH PASS (OR SUB-PASS).
3955                                    ; USE TO RETURN DEVICE UNDER TEST TO A NEUTRAL STATE.
3956                                    ;--
3957 022646                                    BGNCLN
     022646                             L$CLEAN::
3958 022646  005737  003060                    TST     DUFLG           ;"DROPPED" FLAG IS SET ON...
3959 022652  100407                            BMI     1$              ;...AND GROSS CONTROLLER FAULT...
3960                                                                    ;...DON'T TRY TO XCT CLEANUP CODE.
3961
3962 022654  013705  002154                    MOV     CSRADDR,R5      ; ADDRESS OF TSV REGISTERS ON UNIBUS
3963 022660  012765  000000  000000            MOV     #0,TSSR(R5)     ;DO SOFT INIT
3964 022666  004737  016744                    JSR     PC,WAIT
3965 022672                             1$:
3966 022672                             2$:    ENDCLN
     022672                             L10034:
     022672  104412                            TRAP    C$CLEAN
3967                                    ;++
3968                                    ; THE REPORT CODING SECTION CONTAINS THE
3969                                    ; "PRINTS" CALLS THAT GENERATE STATISTICAL REPORTS.
3970                                    ;--
3971 022674                                    BGNRPT
     022674                             L$RPT::
3972 022674                                    PRINTS  #DEVSUM
     022674  012746  023136                    MOV     #DEVSUM,-(SP)
     022700  012746  000001                    MOV     #1,-(SP)
     022704  010600                            MOV     SP,R0
     022706  104416                            TRAP    C$PNTS
     022710  062706  000004                    ADD     #4,SP
3973 022714  010246                            MOV     R2,-(SP)
3974 022716  010346                            MOV     R3,-(SP)
3975 022720  010446                            MOV     R4,-(SP)
3976 022722  012704  003130                    MOV     #ERTABL,R4      ; GET START OF ERROR TABLE.
3977 022726  005003                            CLR     R3              ; CLEAR UNIT NUMBER
3978 022730  011402                     1$:    MOV     (R4),R2         ; GET ERROR TABLE ENTRY & TEST IT.
3979 022732  001467                            BEQ     4$              ; ZERO IF UNIT NOT RUN
3980 022734  100066                            BPL     4$
3981 022736  032702  040000                    BIT     #BIT14,R2       ; WAS UNIT DROPPED?
3982 022742  001015                            BNE     2$              ; BR IF YES
3983 022744  042702  170000                    BIC     #^C7777,R2      ; GET ERROR COUNT FIELD
3984 022750                                    PRINTS  #DEVONL,R3,R2   ; PRINT
     022750  010246                            MOV     R2,-(SP)
     022752  010346                            MOV     R3,-(SP)
     022754  012746  023173                    MOV     #DEVONL,-(SP)
     022760  012746  000003                    MOV     #3,-(SP)
     022764  010600                            MOV     SP,R0
     022766  104416                            TRAP    C$PNTS
     022770  062706  000010                    ADD     #10,SP
3985 022774  000446                            BR      4$
3986 022776  020227  160000             2$:    CMP     R2,#160000      ; WAS UNIT NON-EXISTENT?
3987 023002  001012                            BNE     3$              ; BR IF NO
3988 023004                                    PRINTS  #DEVNXR,R3
     023004  010346                            MOV     R3,-(SP)
     023006  012746  023255                    MOV     #DEVNXR,-(SP)
```

```
023012  012746  000002                    MOV     #2,-(SP)
023016  010600                            MOV     SP,R0
023020  104416                            TRAP    C$PNTS
023022  062706  000006                    ADD     #6,SP
023026  000431                            BR      4$
023030  020227  160001          3$:       CMP     R2,#160001        ; WAS UNIT NOT READY AT STARTUP?
023034  001012                            BNE     30$               ; BR IF NO.
023036                                    PRINTS  #DEVNRD,R3
023036  010346                            MOV     R3,-(SP)
023040  012746  023337                    MOV     #DEVNRD,-(SP)
023044  012746  000002                    MOV     #2,-(SP)
023050  010600                            MOV     SP,R0
023052  104416                            TRAP    C$PNTS
023054  062706  000006                    ADD     #6,SP
023060  000414                            BR      4$
023062  042702  170000          30$:      BIC     #^C7777,R2
023066                                    PRINTS  #DEVDRO,R3,R2
023066  010246                            MOV     R2,-(SP)
023070  010346                            MOV     R3,-(SP)
023072  012746  023420                    MOV     #DEVDRO,-(SP)
023076  012746  000003                    MOV     #3,-(SP)
023102  010600                            MOV     SP,R0
023104  104416                            TRAP    C$PNTS
023106  062706  000010                    ADD     #10,SP
023112  062704  000002          4$:       ADD     #2,R4
023116  005203                            INC     R3
023120  020427  003330                    CMP     R4,#ERTABE
023124  103701                            BLO     1$
023126  012604                            MOV     (SP)+,R4
023130  012603                            MOV     (SP)+,R3
023132  012602                            MOV     (SP)+,R2
023134                                    ENDRPT                    ; UNUSED.
023134                          L10035:
023134  104425                            TRAP    C$RPT


023136     045     116     045  DEVSUM:  .ASCIZ  /%N%ADEVICE STATUS SUMMARY:%N/
023173     045     101     040  DEVONL:  .ASCIZ  /%A  UNIT %D3%A   CONTROLLER READY,  ERRORS = %D%N/
023255     045     101     040  DEVNXR:  .ASCIZ  /%A  UNIT %D3%A   DROPPED, NON-EXISTENT REGISTER%N/
023337     045     101     040  DEVNRD:  .ASCIZ  /%A  UNIT %D3%A   DROPPED, NOT READY AT STARTUP%N/
023420     045     101     040  DEVDRO:  .ASCIZ  /%A  UNIT %D3%A   DROPPED, ERRORS = %D%N/
                                         .EVEN
```

```
                        .SBTTL  TEST  1: BUS RESET TEST

                ;       THIS TEST VERIFIES THAT THE 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 CONTROLLER.  IF THE CONTROLLER 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.
                ;

                        BGNTST
                                                                        T1::
023470  005037  002170        CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
023474  012737  005672  002146  MOV     #EPRT1,EPRTSW           ;SET UP ERROR MESSAGE SWITCH
023502  005037  003100        CLR     KTFLG           ;HOLD OFF KT11
023506  012700  023704        MOV     #TST1ID,R0              ;ASCII MESSAGE TO IDENTIFY TEST
023512  004737  017232        JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
023516  012737  000005  002164  MOV     #5.,LOOPCNT             ;PERFORM 5 ITERATIONS
023524                  T1LOOP:
023524  005003                CLR     R3                      ;USE R3 AS FATAL ERROR FLAG

                        BGNSUB                                  ;////////////// BEGIN SUBTEST ////////////
                                                                        T1.1:
023526  104402                                                          TRAP    C$BSUB

                        BRESET                                  ;ISSUE A BUS RESET
                                                                        TRAP    C$RESET
023532  004737  016744        JSR     PC,WAITF                ;WAIT FOR READY
```

```
4094 023536  016501  000000                MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
4095 023542  010102                        MOV     R1,R2           ;START SETUP OF EXPECTED TSSR
4096 023544  042702  176277                BIC     #↑C<HIADDR!OFL>,R2 ;CLEAR OUT UNUSED BITS
4097 023550  052702  002200                BIS     #SSR!NBA,R2     ;R4 HAS EXPECTED CONTENTS
4098 023554  020102                        CMP     R1,R2                   ;COMPARE EXPECTED TO RECEIVED
4099 023556  001405                        BEQ     10$                     ;BRANCH IF COMPARE
4103 023560                                ERRDF   ERRNO,SFHERR,SFFMSG     ;REPORT A FATAL ERROR
     023560  104455                                                                TRAP    C$ERDF
     023562  000145                                                                .WORD   101
     023564  003603                                                                .WORD   SFHERR
     023566  011566                                                                .WORD   SFFMSG
4104 023570  005203                        INC     R3                      ;SET THE FATAL ERROR FLAG
4105 023572                          10$:
4106 023572                                ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
     023572                                                                L10037:
     023572  104403                                                                TRAP    C$ESUB
4107
```

```
4109 023574  005703                    TST     R3                      ;DID WE HAVE FATAL ERROR ?
4110 023576  001402                    BEQ     20$                     ;BRANCH IF NOT
4111 023600  004737  017776            JSR     PC,CKDROP               ;GO DROP THIS UNIT, IF ALLOWED
4112 023604  005003              20$:  CLR     R3                      ;RESET FATAL ERROR FLAG
4113
4114
4115 023606                            BGNSUB                          ;////////////// BEGIN SUBTEST //////////////
     023606                                                                    T1.2:
     023606  104402                                                            TRAP    C$BSUB
4116
4117 023610  005065  000000            CLR     TSSR(R5)                ;WRITE TO ISSUE A SOFT RESET
4118 023614  004737  016744            JSR     PC,WAITF                ;WAIT FOR READY TO SET
4119 023620  016501  000000            MOV     TSSR(R5),R1             ;GET REGISTER TSSR DATA
4120 023624  010102                    MOV     R1,R2                   ;START SETUP OF EXPECTED TSSR
4121 023626  042702  176277            BIC     #^C<HIADDR!OFL>,R2      ;CLEAR OUT UNUSED BITS
4122 023632  052702  002200            BIS     #SSR!NBA,R2             ;R4 HAS EXPECTED CONTENTS
4123 023636  020102                    CMP     R1,R2                   ;COMPARE EXPECTED TO RECEIVED
4124 023640  001405                    BEQ     10$                     ;BRANCH IF COMPARE
4128 023642                            ERRDF   ERRNO,SFIERR,SFFMSG     ;REPORT A FATAL ERROR
     023642  104455                                                            TRAP    C$ERDF
     023644  000146                                                            .WORD   102
     023646  003550                                                            .WORD   SFIERR
     023650  011566                                                            .WORD   SFFMSG
4129 023652  005203                    INC     R3                      ;SET THE ERROR FLAG
4130 023654                      10$:
4131 023654                            ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
     023654                                                                    L10040:
     023654  104403                                                            TRAP    C$ESUB
4132
4133
4134 023656  005703                    TST     R3                      ;FATAL ERROR DETECTED ?
4135 023660  001402                    BEQ     20$                     ;BRANCH IF NOT
4136 023662  004737  017776            JSR     PC,CKDROP               ;SEE IF TIME TO DROP UNIT
4137 023666  004737  017200      20$:  JSR     PC,TSTLOOP              ;SHOULD WE DO ITERATIONS ?
4138 023672  103002                    BCC     40$                     ;BRANCH IF NOT
4139 023674  000137  023524            JMP     T1LOOP                  ;LOOP UNTIL COUNT EXPIRED
4140 023700                      40$:  EXIT    TST                     ;ALL DONE THIS TEST
     023700  104432                                                            TRAP    C$EXIT
     023702  000022                                                            .WORD   L10036-.
4141
4142                                   ;*
4143                                   ;LOCAL TEXT MESSAGES FOR TEST
4144                                   ;-
4145
4146 023704     111     156     151   TST1ID: .ASCIZ  'Initialization'
4147                                   .EVEN
4148 023724                            ENDTST
     023724                                                                L10036:
     023724  104401                                                            TRAP    C$ETST
4149
4150
```

```
                                .SBTTL  TEST  2: RAM TEST

                        ;       THIS TEST VERIFIES THAT ALL LOCATIONS OF THE RAM ON THE CONTROLLER
                        ;       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 2, SUBTEST 1: -
                        ;
                        ;       THIS SUBTEST VERIFIES EACH RAM LOCATION BY FIRST PLACING THE
                        ;       CONTROLLER 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
                        ;                T _ 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.
                        ;

023726                  BGNTST
023726                                                          T2::
023726  005037  002170  CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
023732  012737  005672  002146 MOV     #EPRT1,EPRTSW           ;SET UP ERROR MESSAGE SWITCH
023740  005037  003100  CLR     KTFLG           ;HOLD OFF KT11

023744                  BGNSUB                          ;////////////// BEGIN SUBTEST ////////////
023744                                                          T2.1:
023744  104402                                                          TRAP    C$BSUB
```

```
4211 023746  012700  024672                MOV     #TST2ID,R0          ;ASCII MESSAGE TO IDENTIFY TEST
4212 023752  004737  017232                JSR     PC,TSTSETUP         ;DO INITIAL TEST SETUP
4213 023756  012737  000002  002164        MOV     #2,LOOPCNT          ;PERFORM 2 ITERATIONS
4214 023764                        T2LOOP:
4215 023764  004737  016470                JSR     PC,SOFINIT          ;DO INITIALIZE ON CONTROLLER
4216 023770  103405                        BCS     20$                 ;BR IF INIT WAS OK
4220 023772  010001                        MOV     R0,R1               ;CONTENTS OF TSSR REGISTER
4221 023774                                ERRDF   ERRNO,SFIERR,SFIMSG ;FATAL ERROR TSSR WAS NOT OK
     023774  104455                                                            TRAP    C$ERDF
     023776  000311                                                            .WORD   201
     024000  003550                                                            .WORD   SFIERR
     024002  011506                                                            .WORD   SFIMSG
4222 024004  012704  000002        20$:    MOV     #2,R4               ;SET RAM ADDRESS AT TWO
4223 024010                        25$:
4224
4225 024010  110402                        MOVB    R4,R2               ;EXPECTED DATA FROM WRAP-AROUND
4226 024012  110465  177777                MOVB    R4,TSDBH(R5)        ;LOAD ADDRESS INTO TSDB
4227 024016  110265  177776                MOVB    R2,TSDBL(R5)        ;LOADS DATA INTO RAM LOCATION
4228 024022  116501  177776                MOVB    TSBAL(R5),R1        ;READS WRAP DATA
4229 024026  120102                        CMPB    R1,R2               ;DOES WRITTEN(WRAP) = READ
4230 024030  001404                        BEQ     30$                 ;BR IF OK, THEY ARE EQUAL
4234 024032                                ERRHRD  ERRNO,TSBAM2,EXPREC ;DATA NOT WRAPPED CORRECTLY
     024032  104456                                                            TRAP    C$ERHRD
     024034  000312                                                            .WORD   202
     024036  024530                                                            .WORD   TSBAM2
     024040  016170                                                            .WORD   EXPREC
4235 024042                        30$:
4236
4237 024042  005204                        INC     R4                  ;NEXT ADDRESS
4238 024044  020427  000400                CMP     R4,#400             ;END OF RAM MEMORY CHECK
4239 024050  001357                        BNE     25$                 ;LOOP TILL ALL RAM WRITTEN
4240 024052  005002                        CLR     R2                  ;CLEAR OUT R2 HIGH BITS
4241 024054  005304                        DEC     R4                  ;SET BACK TO 377
4242 024056  110402        40$:    MOVB    R4,R2               ;GET DATA PATTERN BACK IN SHAPE
4243 024060  110465  177777                MOVB    R4,TSDBH(R5)        ;LOAD UP RAM ADDRESS POINTER
4244 024064  116501  177776                MOVB    TSBAL(R5),R1        ;READ RAM CONTENTS BACK
4245 024070  120102                        CMPB    R1,R2               ;CHECK WITH DATA WRITTEN
4246 024072  001404                        BEQ     45$                 ;BR IF OK, DATA IN = DATA OUT
4250 024074                                ERRHRD  ERRNO,TSBAM2,EXPREC ;WRITTEN DATA NOT = TO READ
     024074  104456                                                            TRAP    C$ERHRD
     024076  000313                                                            .WORD   203
     024100  024530                                                            .WORD   TSBAM2
     024102  016170                                                            .WORD   EXPREC
4251 024104        45$:    CKLOOP                                      ;SCOPE LOOP
     024104  104406                                                            TRAP    C$CLP1
4252 024106  005304                        DEC     R4                  ;DROP DATA COUNTER (PATTERN)
4253 024110  022704  000002                CMP     #2,R4               ;AT LOC TWO YET
4254 024114  001360                        BNE     40$                 ;BR, IF NOT AT TWO YET
4255
4256 024116                                ENDSUB                      ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
     024116                                                                 L10042:
     024116  104403                                                            TRAP    C$ESUB
4257
```

```
4259
4260 024120                                 BGNSUB                          ;////////////// BEGIN SUBTEST //////////////
     024120                                                                                      T2.2:
     024120  104402                                                                                 TRAP    C$BSUB
4261                            ;           TEST 2, SUBTEST 2
4262
4263                            ;
4264                            ;           THIS SUBTEST WRITES RAM WITH ALL ZEROS
4265                            ;           THEN WALKS AN ALL ONES WORD DOWN THROUGH MEMORY
4266                            ;
4267 024122  004737  016470                JSR     PC,$OFINIT              ;DO INITIALIZE ON CONTROLLER
4268 024126  103405                        BCS     20$                     ;BR IF INIT WAS OK
4272 024130  010001                        MOV     R0,R1                   ;CONTENTS OF TSSR REGISTER
4273 024132                                ERRDF   ERRNO,SFIERR,SFIMSG     ;FATAL ERROR TSSR WAS NOT OK
     024132  104455                                                                             TRAP    C$ERDF
     024134  000314                                                                             .WORD   204
     024136  003550                                                                             .WORD   SFIERR
     024140  011506                                                                             .WORD   SFIMSG
4274 024142  005002                20$:     CLR     R2                      ;TEST DATA = 0
4275 024144  012704  000002                MOV     #2,R4                   ;STARTING RAM ADDRESS = 2
4276 024150                        25$:
4277
4278 024150  110465  177777                MOVB    R4,TSDBH(R5)            ;LOAD ADDRESS INTO TSDB
4279 024154  110265  177776                MOVB    R2,TSDBL(R5)            ;LOADS DATA INTO RAM LOCATION
4280 024160  116501  177776                MOVB    TSBAL(R5),R1            ;READS WRAP DATA
4281 024164  120102                        CMPB    R1,R2                   ;DOES WRITTEN(WRAP) = READ ?
4282 024166  001404                        BEQ     30$                     ;BR IF OK, THEY ARE EQUAL
4286 024170                                ERRHRD  ERRNO,TSBAM2,EXPREC     ;DATA NOT WRAPPED CORRECTLY
     024170  104456                                                                             TRAP    C$ERHRD
     024172  000315                                                                             .WORD   205
     024174  024530                                                                             .WORD   TSBAM2
     024176  016170                                                                             .WORD   EXPREC
4287 024200                        30$:
4288
4289 024200  005204                        INC     R4                      ;NEXT ADDRESS
4290 024202  020427  000400                CMP     R4,#400                 ;END OF RAM MEMORY CHECK
4291 024206  001360                        BNE     25$                     ;BR, MORE RAM TO GO
4292
4293 024210  005304                35$:     DEC     R4                      ;SET BACK TO 377
4294 024212  005002                        CLR     R2                      ;SET TO ALL ZEROS
4295 024214                        40$:
4296 024214  110465  177777                MOVB    R4,TSDBH(R5)            ;LOAD UP THE ADDRESS FOR RAM
4297 024220  116501  177776                MOVB    TSBAL(R5),R1            ;READ THE RAM CONTENTS BACK
4298 024224  005002                        CLR     R2                      ;LOOKING FOR 000000 (EXPECTED)
4299 024226  120102                        CMPB    R1,R2                   ;BOTH SHOULD BE 00000000 BINARY
4300 024230  001404                        BEQ     43$                     ;BR, IF DATA IS GOOD
4304 024232                                ERRHRD  ERRNO,TSBAM3,EXPREC     ;CHARACTERISTICS DATA NOT CORRECT
     024232  104456                                                                             TRAP    C$ERHRD
     024234  000316                                                                             .WORD   206
     024236  024612                                                                             .WORD   TSBAM3
     024240  016170                                                                             .WORD   EXPREC
4305 024242  012702  000377        43$:     MOV     #000377,R2              ;SET ALL ONES WORD
4306 024246  110465  177777                MOVB    R4,TSDBH(R5)            ;LOAD UP RAM ADDRESS POINTER
4307 024252  110265  177776                MOVB    R2,TSDBL(R5)            ;WRITE DATA INTO RAM
4308 024256  116501  177776                MOVB    TSBAL(R5),R1            ;READ RAM CONTENTS BACK
4309 024262  120102                        CMPB    R1,R2                   ;CHECK WITH DATA WRITTEN
4310 024264  001404                        BEQ     45$                     ;BR IF OK, DATA IN = DATA OUT
```

```
4314 024266                          ERRHRD  ERRNO,TSBAM2,EXPREC     ;WRITTEN DATA NOT = TO READ
     024266  104456                                                          TRAP    C$ERHRD
     024270  000317                                                          .WORD   207
     024272  024530                                                          .WORD   TSBAM2
     024274  016170                                                          .WORD   EXPREC
4315 024276                     45$: CKLOOP                                 ;SCOPE LOOP
     024276  104406                                                          TRAP    C$CLP1
4316 024300  005304                  DEC     R4                             ;DROP RAM ADDRESS POINTER
4317 024302  022704  000002          CMP     #2,R4                          ;AT LOC 2 YET
4318 024306  001342                  BNE     40$                            ;BR, IF NOT AT TWO YET
4319
4320 024310                          ENDSUB                                 ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
     024310                                                                  L10043:
     024310  104403                                                          TRAP    C$ESUB
4321
```

```
4323
4324 024312                                  BGNSUB                          ;////////////// BEGIN SUBTEST //////////////
     024312                                                                                    T2.3:
     024312  104402                                                                            TRAP    C$BSUB
4325
4326                                  ;       TEST 2, SUBTEST 3
4327                                  ;
4328                                  ;       THIS SUBTEST WRITES RAM WITH ALL ONES
4329                                  ;       THEN WALKS A ZERO WORD DOWN THROUGH MEMORY
4330                                  ;
4331 024314  004737  016470                   JSR     PC,SOFINIT              ;DO INITIALIZE ON CONTROLLER
4332 024320  103405                           BCS     20$                     ;BR IF INIT WAS OK
4336 024322  010001                           MOV     R0,R1                   ;CONTENTS OF TSSR REGISTER
4337 024324                                   ERRDF   ERRNO,SFIERR,SFIMSG     ;FATAL ERROR TSSR WAS NOT OK
     024324  104455                                                                            TRAP    C$ERDF
     024326  000320                                                                            .WORD   208
     024330  003550                                                                            .WORD   SFIERR
     024332  011506                                                                            .WORD   SFIMSG
4338 024334  012702  177777           20$:    MOV     #177777,R2              ;SET DATA AT ALL ONES
4339 024340  012704  000002                   MOV     #2,R4                   ;SET RAM ADDRESS AT TWO
4340 024344                           25$:
4341 024344                                   BGNSEG                          ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
     024344  104404                                                                            TRAP    C$BSEG
4342 024346  110465  177777                   MOVB    R4,TSDBH(R5)            ;LOAD ADDRESS INTO TSDB
4343 024352  110265  177776                   MOVB    R2,TSDBL(R5)            ;LOADS DATA INTO RAM LOCATION
4344 024356  116501  177776                   MOVB    TSBAL(R5),R1            ;READS WRAP DATA
4345 024362  120102                           CMPB    R1,R2                   ;DOES WRITTEN(WRAP) = READ ?
4346 024364  001404                           BEQ     30$                     ;BR IF OK, THEY ARE EQUAL
4350 024366                                   ERRHRD  ERRNO,TSBAM2,EXPREC     ;DATA NOT WRAPPED CORRECTLY
     024366  104456                                                                            TRAP    C$ERHRD
     024370  000321                                                                            .WORD   209
     024372  024530                                                                            .WORD   TSBAM2
     024374  016170                                                                            .WORD   EXPREC
4351 024376                           30$:
4352 024376                                   ENDSEG                          ;<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<
     024376                                                                                    10000$:
     024376  104405                                                                            TRAP    C$ESEG
4353
4354 024400  005204                           INC     R4                      ;NEXT ADDRESS
4355 024402  020427  000400                   CMP     R4,#400                 ;END OF RAM MEMORY CHECK
4356 024406  001356                           BNE     25$                     ;BR, MORE RAM TO GO
4357
4358 024410  005304                   35$:    DEC     R4                      ;SET BACK TO 377
4359 024412                           40$:
4360 024412  012702  000377                   MOV     #000377,R2              ;SET UP EXPECTED DATA REGISTER
4361 024416  005001                           CLR     R1                      ;CLEAN OUT REGISTER
4362 024420  110465  177777                   MOVB    R4,TSDBH(R5)            ;SELECT ADDRESS IN RAM
4363 024424  116501  177776                   MOVB    TSBAL(R5),R1            ;PICK UP RAM CONTENTS
4364 024430  120102                           CMPB    R1,R2                   ;IS MEMORY STILL ALL ONES
4365 024432  001404                           BEQ     43$                     ;BR, IF OK (ALL ONES)
4369 024434                                   ERRHRD  ERRNO,TSBAM3,EXPREC     ;MEMORY CHANGED AFTER ALL ONES WRITE
     024434  104456                                                                            TRAP    C$ERHRD
     024436  000322                                                                            .WORD   210
     024440  024612                                                                            .WORD   TSBAM3
     024442  016170                                                                            .WORD   EXPREC
4370 024444  005002                   43$:    CLR     R2                      ;SET UP NEW EXPECTED
4371 024446  110465  177777                   MOVB    R4,TSDBH(R5)            ;LOAD UP RAM ADDRESS POINTER
```

```
4372 024452  110265  177776                MOVB    R2,TSDBL(R5)          ;WRITE DATA INTO RAM
4373 024456  116501  177776                MOVB    TSBAL(R5),R1          ;READ RAM CONTENTS BACK
4374 024462  120102                        CMPB    R1,R2                 ;CHECK WITH DATA WRITTEN
4375 024464  001404                        BEQ     45$                   ;BR IF OK, DATA IN = DATA OUT
4379 024466                                ERRHRD  ERRNO,TSBAM2,EXPREC   ;WRITTEN DATA NOT = TO READ
     024466  104456                                                          TRAP    C$ERHRD
     024470  000323                                                          .WORD   211
     024472  024530                                                          .WORD   TSBAM2
     024474  016170                                                          .WORD   EXPREC
4380 024476                          45$:  CKLOOP                        ;SCOPE LOOP
     024476  104406                                                          TRAP    C$CLP1
4381 024500  005304                        DEC     R4                    ;DROP RAM ADDRESS POINTER
4382 024502  022704  000002                CMP     #2,R4                 ;CHECK LOC TWO
4383 024506  001341                        BNE     40$                   ;BR, IF NOT AT LOC 2 YET
4384
4385 024510                                ENDSUB                        ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
     024510                                                                L10044:
     024510  104403                                                          TRAP    C$ESUB
4386
4387 024512  004737  017200                JSR     PC,TSTLOOP            ;DO WE NEED TO ITERATE TEST ?
4388 024516  103002                        BCC     63$                   ;BRANCH IF NOT
4389 024520  000137  023764                JMP     T2LOOP                ;EXECUTE AGAIN
4390 024524                          63$:  EXIT    TST                   ;ALL DONE THIS TEST
     024524  104432                                                          TRAP    C$EXIT
     024526  000150                                                          .WORD   L10041-.
4391
4392                                       ;+
                                           ; LOCAL TEXT MESSAGES FOR TEST
4393                                       ;-
4394
4395 024530     040     127     162  TSBAM2: .ASCIZ  ' Write to TSDB Not Equal to Read of TSBA Low Byte'
4396 024612     127     162     151  TSBAM3: .ASCIZ  'Write To RAM Location Modified Another Location'
4397 024672     122     141     155  TST2ID: .ASCIZ  'Ram'
4398                                       .EVEN
4399 024676                                ENDTST
     024676                                                          L10041:
     024676  104401                                                          TRAP    C$ETST
```

```
4401                    .SBTTL  TEST  3: COMMAND REJECT
4402
4403
4404            ;       THIS TEST VERIFIES THAT ALL COMMANDS OTHER THAN WRITE
4405            ;       CHARACTERISTICS ARE REJECTED DUE TO THE NEED BUFFER ADDRESS
4406            ;       (NBA) BIT BEING SET IN TSSR, AND THAT THE TSBA AND TSSR
4407            ;       REGISTERS ARE LEFT IN THE PROPER STATE AFTER EACH COMMAND IS
4408            ;       REJECTED.  THIS TEST CHECKS MICROPROCESSOR SEQUENCING, BASIC
4409            ;       COMMAND DECODING AND DATI DMA HANDLING.  THIS TEST CONTAINS TWO
4410            ;       SUBTESTS:  SUBTEST 1 SEQUENCES THROUGH ALL COMMAND WORDS (OTHER
4411            ;       THAN WRITE CHARACTERISTICS) WITH THE INTERRUPT ENABLE (IE) BIT
4412            ;       CLEAR AND VERIFIES THAT AN INTERRUPT IS NOT GENERATED BY THE
4413            ;       REJECTED COMMAND;  SUBTEST 2 PERFORMS SIMILARLY TO SUBTEST 1 BUT
4414            ;       SETS THE IE BIT IN EACH COMMAND WORD AND VERIFIES THAT AN
4415            ;       INTERRUPT IS GENERATED WHEN THE COMMAND IS REJECTED.  SUBTEST 1
4416            ;       SETS UP THE INTERRUPT SERVICE ROUTINE TO FLAG UNEXPECTED
4417            ;       INTERRUPTS.  THE COMMAND WORD IN THE COMMAND BUFFER IS
4418            ;       INITIALIZED TO 100000 (OCTAL) AND THE REMAINING THREE WORDS IN
4419            ;       THE COMMAND BUFFER ARE SET TO KNOWN UNIQUE PATTERNS.  THEN THE
4420            ;       FOLLOWING SEQUENCE IS PERFORMED:
4421            ;
4422            ;
4423            ;            1.  INITIALIZE THE CONTROLLER BY WRITING INTO THE TSSR;
4424            ;                PROPER INITIAL CONDITIONS ARE VERIFIED.
4425            ;
4426            ;            2.  TSDB IS WRITTEN WITH ADDRESS OF THE COMMAND BUFFER TO
4427            ;                START PROCESSING.
4428            ;
4429            ;            3.  THE PROGRAM WAITS FOR SSR TO SET;  IF SSR DOES NOT SET,
4430            ;                AN ERROR REPORT IS ISSUED AND THE TEST IS ABORTED.
4431            ;
4432            ;            4.  THE CONTENTS OF TSSR ARE CHECKED.  TSSR IS CORRECT IF
4433            ;                IT CONTAINS EITHER OCTAL 102206 OR 102306 (BIT 6
4434            ;                DEPENDS UPON THE STATE OF THE TAPE TRANSPORT).
4435            ;
4436            ;            5.  THE CONTENTS OF TSBA ARE CHECKED.  TSBA SHOULD CONTAIN
4437            ;                THE INITIAL COMMAND BUFFER ADDRESS (LOADED IN STEP 2)
4438            ;                PLUS 10 (OCTAL);  I.E., TSBA SHOULD POINT TO THE WORD
4439            ;                JUST AFTER THE COMMAND PACKET (NOTE THAT 4 COMMAND
4440            ;                PACKET WORDS ARE ALWAYS FETCHED).
4441            ;
4442            ;            6.  USING THE MAINTENANCE MODE WRAPAROUND FUNCTIONS, THE
4443            ;                COMMAND IMAGE BLOCK IN THE CONTROLLER'S RAM (LOCATIONS
4444            ;                201-210 (OCTAL)) ARE CHECKED;  THE IMAGE SHOULD CONTAIN
4445            ;                A COPY OF THE FOUR COMMAND PACKET WORDS AS SET UP IN
4446            ;                CPU MEMORY.
4447            ;
4448            ;            7.  THE COMMAND WORD IN THE COMMAND BUFFER IS INCREMENTED
4449            ;                TO THE NEXT PATTERN NOT CONTAINING WRITE
4450            ;                CHARACTERISTICS OR IE.  THE REMAINING THREE WORD OF THE
4451            ;                COMMAND BUFFER ARE SEQUENCED WITH PSEUDO-RANDOM DATA.
4452            ;                IF THE COMMAND WORD HAS NOT REACHED ITS MAXIMUM VALUE
4453            ;                (177777+1), THE TEST SEQUENCE IS REPEATED.
4454            ;
4455            ;
4456            ;
4457            ;       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.
                                        ;
4461 024700                             BGNTST
     024700                                                                     T3::
4462 024700  005037  002170            CLR     FATFLG                          ;CLEAR FATAL ERROR FLAG
4463 024704  012737  005672  002146     MOV     #EPRT1,EPRTSW                   ;SET UP ERROR MESSAGE SWITCH
4464 024712  005037  003100            CLR     KTFLG           ;HOLD OFF KT11
4469 024716  012700  026143            MOV     #TST3ID,R0                      ;ASCII MESSAGE TO IDENTIFY TEST
4470 024722  004737  017232            JSR     PC,TSTSETUP                     ;DO INITIAL TEST SETUP
4471 024726  012737  000002  002164     MOV     #2.,LOOPCNT                     ;PERFORM 2 ITERATIONS
4472 024734                     T3LOOP:
4473 024734                             BGNSUB                                  ;////////////// BEGIN SUBTEST ////////////
     024734                                                                        T3.1:
     024734  104402                                                                    TRAP    C$BSUB
4474
4475 024736                             SETPRI  #PRI00                          ;LOWER PRIORITY TO ALLOW INTERRUPTS
     024736  012700  000000                                                             MOV     #PRI00,R0
     024742  104441                                                                    TRAP    C$SPRI
4476 024744  012704  025620            MOV     #T3PACKET,R4                    ;GET THE ADDRESS OF COMMAND PACKET
4477 024750  012703  002720            MOV     #TSTBLK,R3                      ;BLOCK OF TEST DATA
4478 024754  012314             5$:    MOV     (R3)+,(R4)                      ;INSERT THE NEXT TEST DATA WORD
4479 024756                             BGNSEG                                  ;>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
     024756  104404                                                                   TRAP    C$BSEG
4480 024760  004737  016470            JSR     PC,SOFINIT                      ;DO SOFT INIT OF CONTROLLER
4481 024764  103405                    BCS     10$                             ;BR IF SOFT INIT = OK
4485 024766  010001                    MOV     R0,R1                           ;SAVE CONTENTS OF TSSR
4486 024770                             ERRDF   ERRNO,SFIERR,SFIMSG             ;DEVICE FATAL ERROR DURING INIT
     024770  104455                                                                   TRAP    C$ERDF
     024772  000455                                                                   .WORD   301
     024774  003550                                                                   .WORD   SFIERR
     024776  011506                                                                   .WORD   SFIMSG
4487 025000  005037  002170     10$:   CLR     FATFLG                          ;CLEAR FATAL ERROR FLAG
4488 025004  005037  002172            CLR     INTRECV                         ;CLEAR INTERRUPT RECEIVED FLAG
4489 025010  004737  017060            JSR     PC,CHKTSSR                      ;WAIT FOR READY, NON-AMBIGUOUS
4490 025014  042714  000200            BIC     #BIT7,(R4)                      ;DISABLE INTERRUPTS
4491 025020  010465  177776            MOV     R4,TSDR(R5)                     ;SET THE PACKET ADDRESS
4492 025024  004737  016744            JSR     PC,WAITF                        ;WAIT FOR SSR TO SET
4493 025030  103407                    BCS     15$                             ;BR IF CARRY SET (GOOD RETURN)
4494 025032  010001                    MOV     R0,R1                           ;SAVE CONTENTS OF TSSR
4498 025034                             ERRDF   ERRNO,T3SSR,PKTSSR              ;DEVICE FATAL SSR FAILED TO SET
     025034  104455                                                                   TRAP    C$ERDF
     025036  000456                                                                   .WORD   302
     025040  025655                                                                   .WORD   T3SSR
     025042  011520                                                                   .WORD   PKTSSR
4499 025044  004737  017724            JSR     PC,FATCHK                       ;INC AND CHECK FOR MORE THAN 25 ERRORS
4500 025050                     15$:   CKLOOP                                  ;LOOP ON ERROR, IF FLAG SET
     025050  104406                                                                   TRAP    C$CLP1
4501 025052                             ESCAPE  SUB                             ;BY-PASS SUBTEST IF FATAL ERROR
     025052  104410                                                                   TRAP    C$ESCAPE
     025054  000164                                                                   .WORD   L10046-.
4502 025056  005737  002172            TST     INTRECV                         ;DID AN INTERRUPT OCCUR ?
4503 025062  001404                    BEQ     22$                             ;BRANCH IF NOT
4507 025064                             ERRHRD  ERRNO,T3INT,PKTSSR
     025064  104456                                                                   TRAP    C$ERHRD
     025066  000457                                                                   .WORD   303
     025070  025733                                                                   .WORD   T3INT
```

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      025072  011520                                                        .WORD   PKTSSR
4508  025074  012702  102206        22$:    MOV     #SC!NBA!SSR!TSREJ,R2    ;EXPECTED CONTENTS OF TSSR
4509  025100  004737  017060                JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
4510  025104  016501  000000                MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
4511  025110  032701  000100                BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
4512  025114  001402                        BEQ     25$                     ;BRANCH IF NOT OFF-LINE
4513  025116  052702  000100                BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
4514  025122  020201        25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
4515  025124  001404                        BEQ     30$                     ;DOES EXPECTED MATCH RECEIVED?
4519  025126                        ERRHRD  ERRNO,T3NBA,PKTSSR      ;NBA NOT SET TO REJECT
      025126  104456                                                        TRAP    C$ERHRD
      025130  000460                                                        .WORD   304
      025132  025630                                                        .WORD   T3NBA
      025134  011520                                                        .WORD   PKTSSR
4520  025136        30$:    CKLOOP                                  ;LOOP ON ERROR ?
      025136  104406                                                        TRAP    C$CLP1
4521  025140  004737  017060                JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
4522  025144  016501  177776                MOV     TSBA(R5),R1             ;GET TSBA REGISTER CONTENTS
4523  025150  010402                        MOV     R4,R2                   ;START OF THE PACKET
4524  025152  020102                        CMP     R1,R2                   ;COMPARE EXPECTED TO RECEIVED
4525  025154  001404                        BEQ     35$                     ;ERROR IF NOT EQUAL
4529  025156                        ERRHRD  ERRNO,T3TSBA,EXPREC     ;PRINT THE ERROP & EXPD/RECV
      025156  104456                                                        TRAP    C$ERHRD
      025160  000461                                                        .WORD   305
      025162  026071                                                        .WORD   T3TSBA
      025164  016170                                                        .WORD   EXPREC
4530
4531
4532  025166  004737  010354        35$:    JSR     PC,CKRAM                ;SEE IF DATA IN RAM IS CORRECT
4533  025172  103404                        BCS     40$                     ;BRANCH IF PACKET IN RAM IS CORRECT
4537  025174                        ERRHRD  ERRNO,PKTRAM,RAMERR     ;REPORT THE RAM ERROR(S)
      025174  104456                                                        TRAP    C$ERHRD
      025176  000462                                                        .WORD   306
      025200  004643                                                        .WORD   PKTRAM
      025202  016204                                                        .WORD   RAMERR
4538  025204        40$:    ENDSEG                                  ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
      025204                                                                10000$:
      025204  104405                                                        TRAP    C$ESEG
4539  025206  011300                        MOV     (R3),R0                 ;PACKET COMMAND WORD
4540  025210  042700  177740                BIC     #177740,R0              ;GET BITS 0-4
4541  025214  020027  000004                CMP     R0,#4                   ;DON'T TEST WRITE CHARACTERISTICS
4542  025220  001002                        BNE     45$                     ;BRANCH IF OK
4543  025222  062703  000002                ADD     #2,R3                   ;GET NEXT WORD FROM DATA TABLE
4544  025226  020327  003030        45$:    CMP     R3,#TBLEND              ;REACHED END OF TABLE ?
4545  025232  103002                        BHIS    50$                     ;BRANCH IF END OF TABLE
4546  025234  000137  024754                JMP     5$                      ;CONTINUE TEST WITH NEW DATA
4547
4548  025240        50$:    ENDSUB                                  ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
      025240                                                                L10046:
      025240  104403                                                        TRAP    C$ESUB
4549
4550  025242  005737  002170                TST     FATFLG                  ;ANY FATAL ERRORS ?
4551  025246  001402                        BEQ     60$                     ;BRANCH IF NOT
4552  025250  004737  017776                JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
```

```
4554 025254                          60$:   BGNSUB                          ;////////////// BEGIN SUBTEST //////////////
     025254                                                                                    T3.2:
     025254  104402                                                                                  TRAP    C$BSUB
4555
4556 025256                                 SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
     025256  012700  000000                                                                           MOV     #PRI00,R0
     025262  104441                                                                                   TRAP    C$SPRI
4557 025264  012704  025620                 MOV     #T3PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
4558 025270  012703  002720                 MOV     #TSTBLK,R3              ;START OF TEST DATA
4559 025274  012314                  5$:    MOV     (R3)+,(R4)              ;PLACE NEXT DATA WORD IN PACKET
4560 025276                                 BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
     025276  104404                                                                                   TRAP    C$BSEG
4561 025300  004737  016470                 JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
4562 025304  103405                         BCS     10$                     ;BR IF SOFT INIT = OK
4566 025306  010001                         MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
4567 025310                                 ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
     025310  104455                                                                                   TRAP    C$ERDF
     025312  000463                                                                                   .WORD   307
     025314  003550                                                                                   .WORD   SFIERR
     025316  011506                                                                                   .WORD   SFIMSG
4568 025320  005037  002170          10$:   CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
4569 025324  005037  002172                 CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
4570 025330  004737  017060                 JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
4571 025334  052714  000200                 BIS     #BIT7,(R4)              ;ENABLE INTERRUPTS
4572 025340  010465  177776                 MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
4573 025344  004737  016744                 JSR     PC,WAITF                ;WAIT FOR SSR TO SET
4574 025350  103407                         BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
4575 025352  010001                         MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
4579 025354                                 ERRDF   ERRNO,T3SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
     025354  104455                                                                                   TRAP    C$ERDF
     025356  000464                                                                                   .WORD   308
     025360  025655                                                                                   .WORD   T3SSR
     025362  011520                                                                                   .WORD   PKTSSR
4580 025364  004737  017724                 JSR     PC,FATCHK               ;INC AND CHECK FOR MORE THAN 25 ERRORS
4581 025370                          15$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     025370  104406                                                                                   TRAP    C$CLP1
4582 025372                                 ESCAPE  SUB                     ;BY-PASS SUBTEST IF FATAL ERROR
     025372  104410                                                                                   TRAP    C$ESCAPE
     025374  000164                                                                                   .WORD   L10047-.
4583 025376  005737  002172                 TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
4584 025402  001004                         BNE     22$                     ;BRANCH IF YES
4588 025404                                 ERRHRD  ERRNO,T3NINT,PKTSSR     ;REPORT ERROR IF NO INTERRUPT
     025404  104456                                                                                   TRAP    C$ERHRD
     025406  000465                                                                                   .WORD   309
     025410  026011                                                                                   .WORD   T3NINT
     025412  011520                                                                                   .WORD   PKTSSR
4589 025414  012702  102206          22$:   MOV     #SC!NBA!SSI!TSREJ,R2    ;EXPECTED CONTENTS OF TSSR
4590 025420  004737  017060                 JSR     PC,CHKTSSR              ;WAIT FOR READY, NON-AMBIGUOUS
4591 025424  016501  000000                 MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
4592 025430  032701  000100                 BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
4593 025434  001402                         BEQ     25$                     ;BRANCH IF NOT OFF-LINE
4594 025436  052702  000100                 BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
4595 025442  020201                  25$:   CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
4596 025444  001404                         BEQ     30$                     ;OKAY IF MATCH
4600 025446                                 ERRHRD  ERRNO,T3NBA,PKTSSR      ;NBA NOT SET TO REJECT
     025446  104456                                                                                   TRAP    C$ERHRD
     025450  000466                                                                                   .WORD   310
```

```
        025452  025630                                                          .WORD   T3NBA
        025454  011520                                                          .WORD   PKTSSR
4601    025456                  30$:    CKLOOP                  ;LOOP ON ERROR ?
        025456  104406                                                          TRAP    C$CLP1
4602    025460  004737  017060          JSR     PC,CHKTSSR      ;WAIT FOR READY, NON-AMBIGUOUS
4603    025464  016501  177776          MOV     TSBA(R5),R1     ;GET TSBA REGISTER CONTENTS
4604    025470  010402                  MOV     R4,R2           ;START OF THE PACKET
4605    025472  020102                  CMP     R1,R2           ;COMPARE EXPECTED TO RECEIVED
4606    025474  001404                  BEQ     35$             ;ERROR IF NOT EQUAL
4610    025476                          ERRHRD  ERRNO,T3TSBA,EXPREC     ;PRINT THE ERROR & EXPD/RECV
        025476  104456                                                          TRAP    C$ERHRD
        025500  000467                                                          .WORD   311
        025502  026071                                                          .WORD   T3TSBA
        025504  016170                                                          .WORD   EXPREC
4611
4612
4613    025506  004737  010354  35$:    JSR     PC,CKRAM        ;SEE IF DATA IN RAM IS CORRECT
4614    025512  103404                  BCS     40$             ;BRANCH IF PACKET IN RAM IS CORRECT
4618    025514                          ERRHRD  ERRNO,PKTRAM,RAMERR     ;REPORT THE RAM ERROR(S)
        025514  104456                                                          TRAP    C$ERHRD
        025516  000470                                                          .WORD   312
        025520  004643                                                          .WORD   PKTRAM
        025522  016204                                                          .WORD   RAMERR
4619    025524                  40$:    ENDSEG                  ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
        025524                                                  10000$:
        025524  104405                                                          TRAP    C$ESEG
4620    025526  011300                  MOV     (R3),R0         ;NEXT PACKET COMMAND WORD
4621    025530  042700  177740          BIC     #177740,R0      ;GET BITS 0-4
4622    025534  020027  000004          CMP     R0,#4           ;DON'T TEST WRITE CHARACTERISTICS
4623    025540  001002                  BNE     45$             ;BRANCH IF NOT WRITE CHARACTERISTICS
4624    025542  062703  000002          ADD     #2,R3           ;BY-PASS WRITE CHARACTERISTCS
4625    025546  020327  003030  45$:    CMP     R3,#TBLEND      ;HAVE WE COMPLETED DATA TABLE ?
4626    025552  103002                  BHIS    50$             ;BRANCH IF ALL TESTED
4627    025554  000137  025274          JMP     5$              ;TEST WITH NEXT DATA
4628
4629    025560                  50$:    ENDSUB                  ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\\
        025560                                                  L10047:
        025560  104403                                                          TRAP    C$ESUB
4630    025562  005737  002170          TST     FATFLG          ;ANY FATAL ERRORS ?
4631    025566  001402                  BEQ     60$             ;BRANCH IF NOT
4632    025570  004737  017776          JSR     PC,CKDROP       ;TRY TO DROP THE UNIT
4633    025574  004737  017200  60$:    JSR     PC,TSTLOOP      ;SHOULD WE DO ITERATIONS ?
4634    025600  103002                  BCC     62$             ;BRANCH IF NOT
4635    025602  000137  024734          JMP     T3LOOP          ;LOOP UNTIL COUNT EXPIRED
4636    025606                  62$:    EXIT    TST             ;ALL DONE THIS TEST
        025606  104432                                                          TRAP    C$EXIT
        025610  000352                                                          .WORD   L10045-.
4637
4638                            ;+
4639                            ;LOCAL STORAGE FOR THIS TEST
4640                            ;-
4641
4643    025612                          .BLKB   10-<.-TUV2A67>
4645    025620                  T3PACKET:
4646    025620  000000                  .WORD   0               ;COMMAND PACKET FOR TEST
4647    025622  052525                  .WORD   052525          ;WILL CONTAIN VARIABLE COMMANDS
4648    025624  125252                  .WORD   125252
```

```
4649 025626  052525                        .WORD   052525
4650
4651
4652                                ;+
4653                                ;LOCAL TEXT MESSAGES FOR TEST
4654                                ;-
4655
4656 025630      103      157      155  T3NBA:  .ASCIZ  'Command Not Rejected'
4657 025655      103      157      156  T3SSR:  .ASCIZ  'Contents of TSSR Incorrect After Write Packet'
4658 025733      125      156      145  T3INT:  .ASCIZ  'Unexpected Interrupt Received On Write Packet'
4659 026011      105      170      160  T3NINT: .ASCIZ  'Expected Interrupt Not Received On Write Packet'
4660 026071      111      156      143  T3TSBA: .ASCIZ  'Incorrect TSBA Address After Packet Write'
4661 026143      103      157      155  TST3ID: .ASCIZ  'Command Reject'
4662                                    .EVEN
4663 026162                            ENDTST
     026162                                                          L10045:
     026162  104401                                                        TRAP    C$ETST
```

```
                                .SBTTL  TEST  4: 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 CONTROLLER MODULE.
                        ;
                        ;
                        ;
                                BGNTST
 026164                                                                 T4::
 026164  005037  002170         CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
 026170  012737  005672  002146 MOV     @#EPRT1,EPRTSW          ;SET UP ERROR MESSAGE SWITCH
 026176  005037  003100         CLR     KTFLG           ;HOLD OFF KT11
 026202  012700  030117         MOV     #TST4ID,R0              ;ASCII MESSAGE TO IDENTIFY TEST
 026206  004737  017232         JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
 026212  012737  000002  002164 MOV     #2.,LOOPCNT             ;PERFORM 2 ITERATIONS
 026220                 T4LOOP:
 026220                         BGNSUB                          ;////////////// BEGIN SUBTEST ////////////
 026220                                                                 T4.1:
 026220  104402                                                                TRAP    C$BSUB
 026222  004737  030146         JSR     PC,T4REST               ;SET PACKET TO START-UP VALUES
                        ;
 026226                         SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
 026226  012700  000000                                                         MOV     #PRI00,R0
 026232  104441                                                                TRAP    C$SPRI
 026234  012703  002732         MOV     #TSTBLK+10.,R3          ;START OF TEST DATA
 026240  012704  027250         MOV     #T4PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
 026244  012764  000010  000006 MOV     #8.,PKBCNT(R4)          ;START WITH MINIMUM ALLOWABLE VALUE
 026252                 5$:
 026252                         BGNSEG                          ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
 026252  104404                                                                TRAP    C$BSEG
                        ;
 026254  004737  016470         JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
 026260  103405                 BCS     10$                     ;BR IF SOFT INIT = OK
 026262  010001                 MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 026264                         ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
 026264  104455                                                                TRAP    C$ERDF
```

```
                026266  000621                                                          .WORD   401
                026270  003550                                                          .WORD   SFIERR
                026272  011506                                                          .WORD   SFIMSG
4722            026274  005037  002170          10$:    CLR     FATFLG          ;CLEAR FATAL ERROR FLAG
4723            026300  005037  002172                  CLR     INTRECV         ;CLEAR INTERRUPT RECEIVED FLAG
4724            026304  010465  177776                  MOV     R4,TSDB(R5)     ;SET THE PACKET ADDRESS
4725            026310  004737  017060                  JSR     PC,CHKTSSR      ;WAIT FOR SSR TO SET
4726            026314  103407                          BCS     15$             ;BR IF CARRY SET (GOOD RETURN)
4727            026316  010001                          MOV     R0,R1           ;SAVE CONTENTS OF TSSR
4731            026320                                  ERRDF   ERRNO,T4SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
                026320  104455                                                          TRAP    C$ERDF
                026322  000622                                                          .WORD   402
                026324  027656                                                          .WORD   T4SSR
                026326  011520                                                          .WORD   PKTSSR
4732            026330  004737  017724                  JSR     PC,FATCHK       ;INC AND CHECK FOR MORE THAN 25 ERRORS
4733            026334          15$:    CKLOOP                  ;LOOP ON ERROR, IF FLAG SET
                026334  104406                                                          TRAP    C$CLP1
4734            026336                  ESCAPE  SEG             ;BY-PASS SUBTEST IF FATAL ERROR
                026336  104410                                                          TRAP    C$ESCAPE
                026340  000126                                                          .WORD   10000$-.
4735            026342  005737  002172                  TST     INTRECV         ;DID AN INTERRUPT OCCUR ?
4736            026346  001404                          BEQ     22$             ;BRANCH IF NOT
4740            026350                                  ERRHRD  ERRNO,T4INT,PKTSSR
                026350  104456                                                          TRAP    C$ERHRD
                026352  000623                                                          .WORD   403
                026354  027745                                                          .WORD   T4INT
                026356  011520                                                          .WORD   PKTSSR
4741            026360  016501  000000          22$:    MOV     TSSR(R5),R1     ;GET THE CONTENTS OF TSSR
4742            026364  012702  000200                  MOV     #SSR,R2         ;EXPECTED CONTENTS OF TSSR
4743            026370  032701  000100                  BIT     #OFL,R1         ;IS OFF-LINE BIT SET ?
4744            026374  001402                          BEQ     25$             ;BRANCH IF NOT OFF-LINE
4745            026376  052702  000100                  BIS     #OFL,R2         ;SET OFF-LINE IN EXPECTED DATA
4746            026402  020201          25$:    CMP     R2,R1           ;DOES EXPECTED MATCH RECEIVED ?
4747            026404  001404                          BEQ     30$             ;OKAY IF MATCH
4751            026406                                  ERRHRD  ERRNO,T4NBA,PKTSSR      ;NBA NOT ZERO
                026406  104456                                                          TRAP    C$ERHRD
                026410  000624                                                          .WORD   404
                026412  027406                                                          .WORD   T4NBA
                026414  011520                                                          .WORD   PKTSSR
4752            026416          30$:    CKLOOP                  ;LOOP ON ERROR ?
                026416  104406                                                          TRAP    C$CLP1
4753            026420  004737  017060                  JSR     PC,CHKTSSR      ;WAIT FOR READY, NON-AMBIGUOUS
4754            026424  016501  177776                  MOV     TSBA(R5),R1     ;GET TSBA REGISTER CONTENTS
4755            026430  012702  027250                  MOV     #T4PACKET,R2    ;START OF THE BUFFER
4756            026434  020102                          CMP     R1,R2           ;COMPARE EXPECTED TO RECEIVED
4757            026436  001404                          BEQ     35$             ;ERROR IF NOT EQUAL
4761            026440                                  ERRHRD  ERRNO,T4TSBA,EXPREC     ;PRINT THE ERROR & EXPD/RECV
                026440  104456                                                          TRAP    C$ERHRD
                026442  000625                                                          .WORD   405
                026444  030034                                                          .WORD   T4TSBA
                026446  016170                                                          .WORD   EXPREC
4762
4763
4764            026450  004737  010354          35$:    JSR     PC,CKRAM        ;SEE IF DATA IN RAM IS CORRECT
4765            026454  103404                          BCS     40$             ;BRANCH IF PACKET IN RAM IS CORRECT
4769            026456                                  ERRHRD  ERRNO,PKTRAM,RAMERR     ;REPORT THE RAM ERROR(S)
                026456  104456                                                          TRAP    C$ERHRD
```

```
      026460  000626                                                    .WORD   406
      026462  004643                                                    .WORD   PKTRAM
      026464  016204                                                    .WORD   RAMERR
 4770
 4771 026466                          40$:    ENDSEG                  ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
      026466                                                                  10000$:
      026466  104405                                                          TRAP    C$ESEG
 4772
 4773 026470  012364  000006                  MOV     (R3)+,PKBCNT(R4) ;SET THE TEST WORD
 4774 026474  020327  003030                  CMP     R3,#TBLEND      ;HAS ALL DATA BEEN TESTED ?
 4775 026500  103002                          BHIS    55$             ;BRANCH IF ALL DATA DONE
 4776 026502  000137  026252                  JMP     5$              ;BRANCH TILL BACK TO ZERO
 4777
 4778 026506                          55$:    ENDSUB                  ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
      026506                                                                  L10051:
      026506  104403                                                          TRAP    C$ESUB
 4779
 4780 026510  005737  002170                  TST     FATFLG          ;ANY FATAL ERRORS ?
 4781 026514  001402                          BEQ     60$             ;BRANCH IF NOT
 4782 026516  004737  017776                  JSR     PC,CKDROP       ;TRY TO DROP THE UNIT
 4783 026522                          60$:
```

```
                                ;+
                                ;
                                ;TEST 4, SUBTEST 2
                                ;
                                ;CHECK THAT UNUSED BITS BEING SET CAUSES
                                ;WRITE CHARACTERISTICS COMMAND TO BE REJECTED
                                ;
                                ;-

                                        BGNSUB                          ;////////////// BEGIN SUBTEST //////////////
                                                                                        T4.2:
                                                                                                TRAP    C$BSUB

                                        SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
                                                                                                MOV     #PRI00,R0
                                                                                                TRAP    C$SPRI
                                        MOV     #T42DATA,R3             ;START OF TEST DATA FOR SUBTEST
                                5$:     MOV     #T4PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
                                        JSR     PC,T4REST               ;RESTORE PACKET TO STARTING VALUES

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

                                        JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
                                        BCS     10$                     ;BR IF SOFT INIT = OK
                                        MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
                                        ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
                                                                                                TRAP    C$ERDF
                                                                                                .WORD   407
                                                                                                .WORD   SFIERR
                                                                                                .WORD   SFIMSG
                                10$:    CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
                                        MOV     R4,R0                   ;START OF THE COMMAND PACKET
                                        ADD     (R3),R0                 ;OFFSET TO THE DATA WORD TO TEST
                                        BIS     2(R3),(R0)              ;SET THE DATA BITS TO BE TESTED
                                        MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
                                        JSR     PC,WAITF                ;WAIT FOR SSR TO SET
                                        BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
                                        MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
                                        ERRDF   ERRNO,T4SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
                                                                                                TRAP    C$ERDF
                                                                                                .WORD   408
                                                                                                .WORD   T4SSR
                                                                                                .WORD   PKTSSR
                                15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
                                                                                                TRAP    C$CLP1
                                        ESCAPE  SEG                     ;BY-PASS CHECKS IF FATAL ERROR
                                                                                                TRAP    C$ESCAPE
                                                                                                .WORD   10000$-.
                                        TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
                                        BEQ     22$                     ;BRANCH IF NOT
                                        ERRHRD  ERRNO,T4INT,PKTSSR
                                                                                                TRAP    C$ERHRD
                                                                                                .WORD   409
                                                                                                .WORD   T4INT
                                                                                                .WORD   PKTSSR
                                22$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
```

```
4831 026660  012702  102206                MOV     #SC!SSR!TSREJ!NBA,R2    ;EXPECTED CONTENTS OF TSSR
4832 026664  032701  000100                BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
4833 026670  001402                        BEQ     25$                     ;BRANCH IF NOT OFF-LINE
4834 026672  052702  000100                BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
4835 026676  020201                25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
4836 026700  001414                        BEQ     30$                     ;OKAY IF MATCH
4837 026702  010100                        MOV     R1,R0                   ;DATA FROM TSSR
4838 026704                                XOR     R2,R0                   ;FIND BITS IN ERROR
4839 026714  020027  002000                CMP     R0,#NBA                 ;IS NBA ONLY BIT IN ERROR ?
4840 026720  001404                        BEQ     30$                     ;DON'T PRINT ERROR IF NBA ONLY BAD BIT
4844 026722                                ERRHRD  ERRNO,T42REJ,PKTSSR     ;COMMAND NOT REJECTED
     026722  104456                                                        TRAP    C$ERHRD
     026724  000632                                                        .WORD   410
     026726  027461                                                        .WORD   T42REJ
     026730  011520                                                        .WORD   PKTSSR
4845 026732                        30$:    CKLOOP                          ;LOOP ON ERROR ?
     026732  104406                                                        TRAP    C$CLP1
4846 026734  032701  002000                BIT     #NBA,R1                 ;IS NBA BIT SET ?
4847 026740  001004                        BNE     35$                     ;OKAY IF NBA SET
4851 026742                                ERRHRD  ERRNO,T42NBA,PKTSSR     ;NBA NOT SET
     026742  104456                                                        TRAP    C$ERHRD
     026744  000633                                                        .WORD   411
     026746  027330                                                        .WORD   T42NBA
     026750  011520                                                        .WORD   PKTSSR
4852 026752                        35$:
4853 026752                                ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
     026752                                                             10000$:
     026752  104405                                                        TRAP    C$ESEG
4854
4855 026754  062703  000004                ADD     #4,R3                   ;POINT TO NEXT DATA PAIR
4856 026760  020327  027330                CMP     R3,#T42DONE             ;COMPARE TO END OF TEST DATA
4857 026764  103002                        BHIS    57$                     ;BRANCH IF ALL DATA TESTED
4858 026766  000137  026536                JMP     5$                      ;BRANCH TILL BACK TO ZERO
4859
4860 026772                        57$:    ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
     026772                                                             L10052:
     026772  104403                                                        TRAP    C$ESUB
```

```
                                        ;+
                                        ;
                                        ;TEST 4, SUBTEST 3
                                        ;
                                        ;SUBTEST TO VERIFY THAT A WRITE CHARACTERISTICS COMMAND IS
                                        ;REJECTED IF AN ILLEGAL DATA BLOCK ADDRESS IS ISSUED.
                                        ;
                                        ;-

                        BGNSUB                          ;////////////// BEGIN SUBTEST ////////////
                                                                T4.3:
026774  104402                                                  TRAP    C$BSUB

                        SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
026776  012700  000000                                          MOV     #PRI00,R0
027002  104441                                                 TRAP    C$SPRI
027004  012703  027314          MOV     #T42DATA,R3     ;START OF TEST DATA FOR SUBTEST
027010  012704  027250  5$:     MOV     #T4PACKET,R4    ;GET THE ADDRESS OF COMMAND PACKET
027014  004737  030146          JSR     PC,T4REST       ;RESTORE PACKET TO STARTING VALUES

027020  004737  016470          JSR     PC,SOFTINIT     ;DO SOFT INIT OF CONTROLLER
027024  103405                  BCS     10$             ;BR IF SOFT INIT = OK
027026  010001                  MOV     R0,R1           ;SAVE CONTENTS OF TSSR
027030                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
027030  104455                                                  TRAP    C$ERDF
027032  000634                                                  .WORD   412
027034  003550                                                  .WORD   SFIERR
027036  011506                                                  .WORD   SFIMSG
027040  005037  002172          10$:    CLR     INTRECV         ;CLEAR INTERRUPT RECEIVED FLAG
027044  052737  000001  027260        BIS     #1,T4DATA       ;MAKE ADDRESS ODD
027052  010465  177776                MOV     R4,TSDB(R5)     ;SET THE PACKET ADDRESS
027056  004737  016744                JSR     PC,WAITF        ;WAIT FOR SSR TO SET
027062  103405                        BCS     15$             ;BR IF CARRY SET (GOOD RETURN)
027064  010001                        MOV     R0,R1           ;SAVE CONTENTS OF TSSR
027066                                ERRDF   ERRNO,T4SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
027066  104455                                                  TRAP    C$ERDF
027070  000635                                                  .WORD   413
027072  027656                                                  .WORD   T4SSR
027074  011520                                                  .WORD   PKTSSR
027076                  15$:    CKLOOP                  ;LOOP ON ERROR, IF FLAG SET
027076  104406                                                  TRAP    C$CLP1
027100                          ESCAPE  SUB             ;BY-PASS SUBTEST IF FATAL ERROR
027100  104410                                                  TRAP    C$ESCAPE
027102  000116                                                  .WORD   L10053-.
027104  005737  002172                TST     INTRECV         ;DID AN INTERRUPT OCCUR ?
027110  001404                        BEQ     22$             ;BRANCH IF NOT
027112                                ERRHRD  ERRNO,T4INT,PKTSSR
027112  104456                                                  TRAP    C$ERHRD
027114  000636                                                  .WORD   414
027116  027745                                                  .WORD   T4INT
027120  011520                                                  .WORD   PKTSSR
027122  016501  000000          22$:    MOV     TSSR(R5),R1     ;GET THE CONTENTS OF TSSR
027126  012702  102206                MOV     #SC!SSR!TSREJ!NBA,R2    ;EXPECTED CONTENTS OF TSSR
027132  032701  000100                BIT     #OFL,R1         ;IS OFF-LINE BIT SET ?
027136  001402                        BEQ     25$             ;BRANCH IF NOT OFF-LINE
```

```
4909 027140  052702  000100            BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
4910 027144  020201                25$: CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
4911 027146  001414                     BEQ     30$                     ;OKAY IF MATCH
4912 027150  010100                     MOV     R1,R0                   ;DATA FROM TSSR
4913 027152                              XOR     R2,R0                   ;FIND BITS IN ERROR
4914 027162  020027  002000              CMP     R0,#NBA                 ;IS NBA ONLY BIT IN ERROR ?
4915 027166  001404                     BEQ     30$                     ;DON'T PRINT ERROR IF NBA ONLY BAD BIT
4919 027170                              ERRHRD  ERRNO,T44REJ,PKTSSR     ;COMMAND NOT REJECTED
     027170  104456                                                                  TRAP    C$ERHRD
     027172  000637                                                                  .WORD   415
     027174  027560                                                                  .WORD   T44REJ
     027176  011520                                                                  .WORD   PKTSSR
4920 027200                        30$:  CKLOOP                          ;LOOP ON ERROR ?
     027200  104406                                                                  TRAP    C$CLP1
4921 027202  032701  002000              BIT     #NBA,R1                 ;IS NBA BIT SET ?
4922 027206  001004                     BNE     35$                     ;OKAY IF NBA SET
4926 027210                              ERRHRD  ERRNO,T42NBA,PKTSSR     ;NBA NOT SET
     027210  104456                                                                  TRAP    C$ERHRD
     027212  000640                                                                  .WORD   416
     027214  027330                                                                  .WORD   T42NBA
     027216  011520                                                                  .WORD   PKTSSR
4927
4928 027220                        35$:  ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
     027220                                                                       L10053:
     027220  104403                                                                  TRAP    C$ESUB
4929
4930 027222  005737  002170            TST     FATFLG                  ;ANY FATAL ERRORS ?
4931 027226  001402                     BEQ     60$                     ;BRANCH IF NOT
4932 027230  004737  017776              JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
4933 027234                        60$:
4934 027234                              EXIT    TST                     ;ALL DONE THIS TEST
     027234  104432                                                                  TRAP    C$EXIT
     027236  000756                                                                  .WORD   L10050-.
4935
4936                                    ;*
4937                                    ;LOCAL STORAGE FOR THIS TEST
4938                                    ;-
4939
4941 027240                                     .BLKB   10-<.-TUV2A67>
4943 027250                        T4PACKET:                            ;COMMAND PACKET FOR TEST
4944 027250  100004                             .WORD   100004          ;WRITE CHARACTERISTICS COMMAND, WITH ACK
4945 027252  027260                             .WORD   T4DATA          ;ADDRESS OF CHARACTERISTICS BLOCK
4946 027254  000000                             .WORD   0
4947 027256  000010                             .WORD   8.              ;STARTING VALUE OF BLOCK SIZE
4948
4949 027260                        T4DATA:                              ;CHARACTERISTICS DATA BLOCK
4950 027260  027274                             .WORD   T4BFR           ;ADDRESS OF MESSAGE BUFFER
4951 027262  000000                             .WORD   0
4952 027264  000016                             .WORD   14.             ;LENGTH OF MESSAGE BUFFER
4953 027266  000000                             .WORD   0
4954 027270                        T4SP:
4955
4956 027270  000000  000000                     .WORD   0,0             ;SPACE
4957 027274                        T4BFR:       .BLKW   8.              ;MESSAGE BUFFER
4958
4959                                    ;*
4960                                    ;
```

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

027314                                  T42DATA:
027314  000000  037140                          .WORD   0,BIT5!BIT6!BIT9!BIT10!BIT11!BIT12!BIT13
027320  000002  000001                          .WORD   2,BIT0
027324  000004  100100                          .WORD   4,BIT6!BIT15
        027330                          T42DONE=.


                                        ;*
                                        ;LOCAL TEXT MESSAGES FOR TEST
                                        ;-

027330      116     102     101  T42NBA: .ASCIZ  'NBA Not Set On Rejected WRITE CHARACTERISTICS'
027406      127     122     111  T4NBA:  .ASCIZ  'WRITE CHARACTERISTICS Command Not Accepted'
027461      127     122     111  T42REJ: .ASCIZ  'WRITE CHARACTERISTICS Not Rejected With Non-Zero Unused Fields'
027560      127     122     111  T44REJ: .ASCIZ  'WRITE CHARACTERISTICS Not Rejected With Invalid Block Address'
027656      103     157     156  T4SSR:  .ASCIZ  'Contents of TSSR Incorrect After WRITE CHARACTERISTICS'
027745      125     156     145  T4INT:  .ASCIZ  'Unexpected Interrupt Received On WRITE CHARACTERISTICS'
030034      111     156     143  T4TSBA: .ASCIZ  'Incorrect TSBA Address After WRITE CHARACTERISTICS'
030117      127     162     151  TST4ID: .ASCIZ  'Write Characteristics'
                                        .EVEN
```

```
4992
4993                                    ;+
4994                                    ;
4995                                    ;ROUTINE TO RESTORE COMMAND PACKET TO START-UP (DEFAULT) VALUES
4996                                    ;
4997                                    ;-
4998
4999 030146                             T4REST:
5000 030146                                     SAVREG                          ;SAVE THE REGISTERS
5001 030152  012701  027250                       MOV     #T4PACKET,R1          ;START OF THE PACKET
5002 030156  012721  100004                       MOV     #100004,(R1)+         ;WRITE CHARACTERISTICS WITH ACK
5003 030162  012721  027260                       MOV     #T4DATA,(R1)+         ;ADDRESS OF CHAR DATA BLOCK
5004 030166  005021                               CLR     (R1)+                 ;EXTENDED ADDRESS
5005 030170  012721  000010                       MOV     #8.,(R1)+             ;SIZE OF DATA BLOCK IN BYTES
5006 030174  012721  027274                       MOV     #T4BFR,(R1)+          ;ADDRESS OF MESSAGE BUFFER
5007 030200  005021                               CLR     (R1)+
5008 030202  012721  000020                       MOV     #16.,(R1)+            ;LENGTH OF MESSAGE BUFFER
5009 030206  005021                               CLR     (R1)+
5010 030210  005011                               CLR     (R1)
5011 030212  000207                               RTS     PC                    ;RETURN
5012 030214                                     ENDTST
     030214                                                                      L10050:
     030214  104401                                                                    TRAP    C$ETST
5013
```

```
                        .SBTTL  TEST  5: VOLUME CHECK


                ;       THIS TEST VERIFIES THAT THE VOLUME CHECK (VCK) BIT, A FLAG HELD
                ;       WITHIN THE CONTROLLER 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).
                ;
                ;
030216                          BGNTST
030216                                                                  T5::
005037  002170                  CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
012737  005672  002146          MOV     #EPRT1,EPRTSW           ;SET UP ERROR MESSAGE SWITCH
005037  003100                  CLR     KTFLG           ;HOLD OFF KT11
012700  031407                  MOV     #T5T5ID,R0              ;ASCII MESSAGE TO IDENTIFY TEST
004737  017232                  JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
012737  000002  002164          MOV     #2.,LOOPCNT             ;PERFORM 2 ITERATIONS
030252                  T5LOOP:
030252  012704  030720          MOV     #T5PACKET,R4            ;PACKET FOR WRITE CHARACTERISTICS
030256  012702  030742          MOV     #T5BFR,R2               ;ADDRESS OF THE MESSAGE BUFFER
030262  012762  052525  000006  MOV     #052525,XSTO(R2)        ;SET XSTATO TO KNOWN VALUE
030270  004737  016470          5$:     JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
030274  103405                  BCS     10$                     ;BR IF SOFT INIT = OK
030276  010001                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
030300                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
030300  104455                                                                  TRAP    C$ERDF
030302  000765                                                                  .WORD   501
030304  003550                                                                  .WORD   SFIERR
030306  011506                                                                  .WORD   SFIMSG
030310  042714  040000          10$:    BIC     #BIT14,(R4)             ;CLEAR THE CVC BIT
030314  010465  177776          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS FOR WRITE CHAR
```

```
 5074 030320  004737  017060                JSR     PC,CHKTSSR          ;WAIT FOR SSR TO SET
 5075 030324  103405                        BCS     15$                 ;BR IF CARRY SET (GOOD RETURN)
 5076 030326  010001                        MOV     R0,R1               ;SAVE CONTENTS OF TSSR
 5080 030330                                ERRDF   ERRNO,T5SSR,PKTSSR  ;DEVICE FATAL SSR FAILED TO SET
      030330  104455                                                            TRAP    C$ERDF
      030332  000766                                                            .WORD   502
      030334  031221                                                            .WORD   T5SSR
      030336  011520                                                            .WORD   PKTSSR
 5081 030340                        15$:    CKLOOP                      ;LOOP ON ERROR, IF FLAG SET
      030340  104406                                                            TRAP    C$CLP1
 5082 030342                                ESCAPE  TST                 ;EXIT IF FATAL ERROR
      030342  104410                                                            TRAP    C$ESCAPE
      030344  001060                                                            .WORD   L10054-.
 5083 030346  016203  000006                MOV     XSTO(R2),R3         ;STORE STATUS FOR A WHILE
 5084 030352  020327  052525                CMP     R3,#052525          ;CHECK FOR XSTATO OVER WRITTEN (GOOD!)
 5085 030356  001006                        BNE     20$                 ;BR, IF XSTATO HAS BEEN UPDATED
 5086 030360  016501  000000                MOV     TSSR(R5),R1         ;PICK UP TSSR FOR ERROR PRINTOUT
 5090 030364                                ERRHRD  ERRNO,T5NMSG,PKTSSR ;"NO MESSAGE PACKET RETURNED"
      030364  104456                                                            TRAP    C$ERHRD
      030366  000767                                                            .WORD   503
      030370  031310                                                            .WORD   T5NMSG
      030372  011520                                                            .WORD   PKTSSR
 5091 030374  032762  000020  000006  20$:    BIT     #XSOVCK,XSTO(R2)    ;IS VOLUME CHECK CLEAR IN XSTO ?
 5092 030402  001006                        BNE     23$                 ;OKAY IF VOLUME CHECK IS CLEARED
 5096 030404  016501  000000                MOV     TSSR(R5),R1         ;CONTENTS OF TSSR FOR ERROR REPORT
 5097 030410                                ERRHRD  ERRNO,T5VCK2,PKTMES ;VOLUME CHECK NOT SET
      030410  104456                                                            TRAP    C$ERHRD
      030412  000770                                                            .WORD   504
      030414  031055                                                            .WORD   T5VCK2
      030416  011574                                                            .WORD   PKTMES
 5098 030420                        23$:    CKLOOP                      ;LOOP ON ERROR ?
      030420  104406                                                            TRAP    C$CLP1
 5099 030422  010465  177776                MOV     R4,TSDB(R5)         ;SET THE PACKET ADDRESS FOR WRITE CHAR
 5100 030426  004737  017060                JSR     PC,CHKTSSR          ;WAIT FOR SSR TO SET
 5101 030432  103405                        BCS     25$                 ;BR IF CARRY SET (GOOD RETURN)
 5102 030434  010001                        MOV     R0,R1               ;SAVE CONTENTS OF TSSR
 5106 030436                                ERRDF   ERRNO,T5SSR,PKTSSR  ;DEVICE FATAL SSR FAILED TO SET
      030436  104455                                                            TRAP    C$ERDF
      030440  000771                                                            .WORD   505
      030442  031221                                                            .WORD   T5SSR
      030444  011520                                                            .WORD   PKTSSR
 5107 030446                        25$:    CKLOOP                      ;LOOP ON ERROR, IF FLAG SET
      030446  104406                                                            TRAP    C$CLP1
 5108 030450                                ESCAPE  TST                 ;EXIT IF FATAL ERROR
      030450  104410                                                            TRAP    C$ESCAPE
      030452  000752                                                            .WORD   L10054-.
 5109 030454  026203  000006                CMP     XSTO(R2),R3         ;THE XSTO SHOULD NOT HAVE CHANGED
 5110 030460  001406                        BEQ     27$                 ;OKAY IF VOLUME CHECK IS SET
 5114 030462  016501  000000                MOV     TSSR(R5),R1         ;CONTENTS OF TSSR FOR ERROR REPORT
 5115 030466                                ERRHRD  ERRNO,T5NVCK,PKTMES ;VOLUME CHECK NOT SET
      030466  104456                                                            TRAP    C$ERHRD
      030470  000772                                                            .WORD   506
      030472  031131                                                            .WORD   T5NVCK
      030474  011574                                                            .WORD   PKTMES
 5116 030476                        27$:    CKLOOP                      ;LOOP ON ERROR ?
      030476  104406                                                            TRAP    C$CLP1
 5117 030500  032762  000020  000006  30$:    BIT     #XSOVCK,XSTO(R2)    ;IS VOLUME CHECK SET IN XSTO ?
```

```
5118 030506  001006                    BNE     33$                     ;OKAY IF VOLUME CHECK IS SET
5122 030510  016501  000000            MOV     TSSR(R5),R1             ;CONTENTS OF TSSR FOR ERROR REPORT
5123 030514                            ERRHRD  ERRNO,T5VCK2,PKTMES     ;VOLUME CHECK NOT SET
     030514  104456                                                    TRAP    C$ERHRD
     030516  000773                                                    .WORD   507
     030520  031055                                                    .WORD   T5VCK2
     030522  011574                                                    .WORD   PKTMES
5124 030524                    33$:    CKLOOP                          ;LOOP ON ERROR ?
     030524  104406                                                    TRAP    C$CLP1
5125 030526  052714  040000            BIS     #BIT14,(R4)             ;SET THE CVC BIT
5126 030532  010465  177776            MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS FOR WRITE CHAR
5127 030536  004737  017060            JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
5128 030542  103405                    BCS     35$                     ;BR IF CARRY SET (GOOD RETURN)
5129 030544  010001                    MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
5133 030546                            ERRDF   ERRNO,T5SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
     030546  104455                                                    TRAP    C$ERDF
     030550  000774                                                    .WORD   508
     030552  031221                                                    .WORD   T5SSR
     030554  011520                                                    .WORD   PKTSSR
5134 030556                    35$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     030556  104406                                                    TRAP    C$CLP1
5135 030560                            ESCAPE  TST                     ;EXIT IF FATAL ERROR
     030560  104410                                                    TRAP    C$ESCAPE
     030562  000642                                                    .WORD   L10054-.
5136 030564  032762  000020  000006    BIT     #XSOVCK,XSTO(R2)        ;IS VOLUME CHECK CLEAR IN XSTO ?
5137 030572  001406                    BEQ     40$                     ;OKAY IF VOLUME CHECK IS CLEARED
5141 030574  016501  000000            MOV     TSSR(R5),R1             ;CONTENTS OF TSSR FOR ERROR REPORT
5142 030600                            ERRHRD  ERRNO,T5VCK,PKTMES      ;VOLUME CHECK NOT CLEARED
     030600  104456                                                    TRAP    C$ERHRD
     030602  000775                                                    .WORD   509
     030604  030762                                                    .WORD   T5VCK
     030606  011574                                                    .WORD   PKTMES
5143 030610                    40$:    CKLOOP                          ;LOOP ON ERROR ?
     030610  104406                                                    TRAP    C$CLP1
5144 030612  042714  040000            BIC     #BIT14,(R4)             ;CLEAR THE CVC BIT
5145 030616  010465  177776            MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS FOR WRITE CHAR
5146 030622  004737  017060            JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
5147 030626  103405                    BCS     45$                     ;BR IF CARRY SET (GOOD RETURN)
5148 030630  010001                    MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
5152 030632                            ERRDF   ERRNO,T5SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
     030632  104455                                                    TRAP    C$ERDF
     030634  000776                                                    .WORD   510
     030636  031221                                                    .WORD   T5SSR
     030640  011520                                                    .WORD   PKTSSR
5153 030642                    45$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     030642  104406                                                    TRAP    C$CLP1
5154 030644                            ESCAPE  TST                     ;EXIT IF FATAL ERROR
     030644  104410                                                    TRAP    C$ESCAPE
     030646  000556                                                    .WORD   L10054-.
5155 030650  032762  000020  000006    BIT     #XSOVCK,XSTO(R2)        ;IS VOLUME CHECK CLEAR IN XSTO ?
5156 030656  001406                    BEQ     50$                     ;OKAY IF VOLUME CHECK IS CLEARED
5160 030660  016501  000000            MOV     TSSR(R5),R1             ;CONTENTS OF TSSR FOR ERROR REPORT
5161 030664                            ERRHRD  ERRNO,T5NVCK,PKTMES     ;VOLUME CHECK NOT CLEARED
     030664  104456                                                    TRAP    C$ERHRD
     030666  000777                                                    .WORD   511
     030670  031131                                                    .WORD   T5NVCK
     030672  011574                                                    .WORD   PKTMES
```

```
5162 030674                          50$:    CKLOOP                          ;LOOP ON ERROR ?
     030674  104406                                                                  TRAP    C$CLP1
5163 030676  004737  017200          60$:    JSR     PC,TSTLOOP              ;SHOULD WE DO ITERATIONS ?
5164 030702  103002                          BCC     62$                     ;BRANCH IF NOT
5165 030704  000137  030252                  JMP     T5LOOP                  ;LOOP UNTIL COUNT EXPIRED
5166 030710                          62$:    EXIT    TST                     ;ALL DONE THIS TEST
     030710  104432                                                                  TRAP    C$EXIT
     030712  000512                                                                  .WORD   L10054-.
5167
5168                                 ;+
5169                                 ;LOCAL STORAGE FOR THIS TEST
5170                                 ;-
5171
5173 030714                                  .BLKB   10-<.-TUV2A&7>
5175 030720                          T5PACKET:
5176 030720  100004                          .WORD   100004                  ;COMMAND PACKET FOR TEST
5177 030722  030730                          .WORD   T5DATA                  ;WRITE CHARACTERISTICS COMMAND
5178 030724  000000                          .WORD   0                       ;ADDRESS OF CHARACTERISTICS BLOCK
5179 030726  000010                          .WORD   10                      ;STARTING VALUE OF COUNTER
5180
5181 030730                          T5DATA:                                 ;CHARACTERISTICS DATA BLOCK
5182 030730  030742                          .WORD   T58FR                   ;ADDRESS OF MESSAGE BUFFER
5183 030732  000000                          .WORD   0
5184 030734  000020                          .WORD   16.                     ;LENGTH OF MESSAGE BUFFER
5185 030736  000000  000000                  .WORD   0,0
5186
5187 030742                          T58FR:  .BLKW   8.                      ;MESSAGE BUFFER
5188
5189
5190                                 ;+
5191                                 ;LOCAL TEXT MESSAGES FOR TEST
5192                                 ;-
5193
5194 030762     126     103     113  T5VCK:  .ASCIZ  'VCK Bit NOT Cleared After WRITE CHARACTERISTICS With CVC=1'
5195 031055     126     103     113  T5VCK2: .ASCIZ  'VCK Bit NOT Set After INITIALIZE With CVC=0'
5196 031131     126     103     113  T5NVCK: .ASCIZ  'VCK Bit Modified After WRITE CHARACTERISTICS With CVC=0'
5197 031221     103     157     156  T5SSR:  .ASCIZ  'Contents of TSSR Incorrect After Write Characteristics'
5198 031310     116     157     040  T5NMSG: .ASCIZ  'No Message Packet Returned To Host After WRITE CHARACTERISTICS'
5199 031407     126     157     154  TST5ID: .ASCIZ  'Volume Check'
5200                                         .EVEN
5201 031424                                  ENDTST
     031424                                                          L10054:
     031424  104401                                                          TRAP    C$ETST
```

```
                                        .SBTTL  TEST  6: 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.
                                ;
                                        BGNTST
                                                                                T6::
                                        CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
                                        MOV     #EPRT1,EPRTSW           ;SET UP ERROR MESSAGE SWITCH
                                        CLR     KTFLG           ;HOLD OFF KT11
                                        MOV     #TST6ID,R0              ;ASCII MESSAGE TO IDENTIFY TEST
                                        JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
                                        MOV     #2.,LOOPCNT             ;PERFORM 2 ITERATIONS
                                T6LOOP:
                                        BGNSUB                          ;////////////// BEGIN SUBTEST ////////////
                                                                                T6.1:
                                                                                TRAP    C$BSUB

                                        JSR     PC,T6REST               ;SET PACKET TO INITIAL VALUES
                                        SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
                                                                                MOV     #PRI00,R0
                                                                                TRAP    C$SPRI
                                        MOV     #TSTBLK+10.,R3          ;START OF TEST DATA
                                        MOV     #T6PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
                                        MOV     #8.,PKBCNT(R4)          ;START WITH MINIMUM ALLOWABLE VALUE
                                5$:
                                        BGNSEG                          ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
                                                                                TRAP    C$BSEG

                                        JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
                                        BCS     10$                     ;BR IF SOFT INIT = OK
                                        MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
                                        ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
                                                                                TRAP    C$ERDF
                                                                                .WORD   601
                                                                                .WORD   SFIERR
                                                                                .WORD   SFIMSG
                                10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
                                        CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
                                        MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
                                        JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
                                        BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
                                        MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
```

```
5260 031562                          ERRDF   ERRNO,T6SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
     031562  104455                                                          TRAP    C$ERDF
     031564  001132                                                          .WORD   602
     031566  033047                                                          .WORD   T6SSR
     031570  011520                                                          .WORD   PKTSSR
5261 031572  004737  017724          JSR     PC,FATCHK               ;INC AND CHECK FOR MORE THAN 25 ERRORS
5262 031576                  15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     031576  104406                                                          TRAP    C$CLP1
5263 031600                          ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
     031600  104410                                                          TRAP    C$ESCAPE
     031602  000056                                                          .WORD   10000$-.
5264 031604  005737  002172          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
5265 031610  001004                  BNE     22$                     ;BRANCH IF YES
5269 031612                          ERRHRD  ERRNO,T6NINT,PKTSSR
     031612  104456                                                          TRAP    C$ERHRD
     031614  001133                                                          .WORD   603
     031616  033136                                                          .WORD   T6NINT
     031620  011520                                                          .WORD   PKTSSR
5270 031622  016501  000000  22$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
5271 031626  012702  000200          MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
5272 031632  032701  000100          BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
5273 031636  001402                  BEQ     25$                     ;BRANCH IF NOT OFF-LINE
5274 031640  052702  000100          BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
5275 031644  020201          25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
5276 031646  001404                  BEQ     30$                     ;OKAY IF MATCH
5280 031650                          ERRHRD  ERRNO,T6NBA,PKTSSR      ;NBA NOT ZERO
     031650  104456                                                          TRAP    C$ERHRD
     031652  001134                                                          .WORD   604
     031654  032406                                                          .WORD   T6NBA
     031656  011520                                                          .WORD   PKTSSR
5281 031660                  30$:
5282 031660                          ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
     031660                                                                 10000$:
     031660  104405                                                          TRAP    C$ESEG
5283
5284 031662  012364  000006          MOV     (R3)+,PKBCNT(R4)        ;SET THE TEST WORD
5285 031666  020327  003030          CMP     R3,#TBLEND              ;HAS ALL DATA BEEN TESTED ?
5286 031672  103002                  BHIS    55$                     ;BRANCH IF ALL DATA DONE
5287 031674  000137  031514          JMP     5$                      ;BRANCH TILL BACK TO ZERO
5288
5289 031700                  55$:    ENDSUB                          ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\\
     031700                                                                 L10056:
     031700  104403                                                          TRAP    C$ESUB
5290
5291 031702  005737  002170          TST     FATFLG                  ;ANY FATAL ERRORS ?
5292 031706  001402                  BEQ     70$                     ;BRANCH IF NOT
5293 031710  004737  017776          JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
5294 031714                  70$:
```

```
                                        ;+
                                        ;
                                        ;TEST 6, SUBTEST 2
                                        ;
                                        ;CHECK THAT UNUSED BITS BEING SET CAUSES
                                        ;WRITE CHARACTERISTICS COMMAND TO BE REJECTED
                                        ;
                                        ;-

                                                BGNSUB                          ;////////////// BEGIN SUBTEST //////////////
                                                                                                        T6.2:
031714  104402                                                                                                  TRAP    C$BSUB

                                                SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
031716  012700  000000                                                                                          MOV     #PRI00,R0
031722  104441                                                                                                  TRAP    C$SPRI
031724  012703  032372                        MOV     #T62DATA,R3             ;START OF TEST DATA FOR SUBTEST
031730  012704  032330                5$:     MOV     #T6PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
031734  004737  033426                        JSR     PC,T6REST               ;RESTORE PACKET TO STARTING VALUES

                                                BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
031740  104404                                                                                                  TRAP    C$BSEG

031742  004737  016470                        JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
031746  103405                                BCS     10$                     ;BR IF SOFT INIT = OK
031750  010001                                MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
031752                                        ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
031752  104455                                                                                                  TRAP    C$ERDF
031754  001135                                                                                                  .WORD   605
031756  003550                                                                                                  .WORD   SFIERR
031760  011506                                                                                                  .WORD   SFIMSG
031762  005037  002172                10$:     CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
031766  010400                                MOV     R4,R0                   ;START OF THE COMMAND PACKET
031770  061300                                ADD     (R3),R0                 ;OFFSET TO THE DATA WORD TO TEST
031772  056310  000002                        BIS     2(R3),(R0)              ;SET THE DATA BITS TO BE TESTED
031776  010465  177776                        MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
032002  004737  016744                        JSR     PC,WAITF                ;WAIT FOR SSR TO SET
032006  103405                                BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
032010  010001                                MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
032012                                        ERRDF   ERRNO,T6SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
032012  104455                                                                                                  TRAP    C$ERDF
032014  001136                                                                                                  .WORD   606
032016  033047                                                                                                  .WORD   T6SSR
032020  011520                                                                                                  .WORD   PKTSSR
032022                                  15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
032022  104406                                                                                                  TRAP    C$CLP1
032024                                          ESCAPE  SEG                     ;BY-PASS CHECKS IF FATAL ERROR
032024  104410                                                                                                  TRAP    C$ESCAPE
032026  000056                                                                                                  .WORD   10000$-.
032030  005737  002172                        TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
032034  001004                                BNE     22$                     ;BRANCH IF YES
032036                                        ERRHRD  ERRNO,T6NINT,PKTSSR
032036  104456                                                                                                  TRAP    C$ERHRD
032040  001137                                                                                                  .WORD   607
032042  033136                                                                                                  .WORD   T6NINT
032044  011520                                                                                                  .WORD   PKTSSR
032046  016501  000000                22$:     MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
```

```
5342 032052  012702  102206                MOV     #SC!SSR!TSREJ!NBA,R2    ;EXPECTED CONTENTS OF TSSR
5343 032056  032701  000100                BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
5344 032062  001402                        BEQ     25$                     ;BRANCH IF NOT OFF-LINE
5345 032064  052702  000100                BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
5346 032070  020201                25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
5347 032072  001404                        BEQ     30$                     ;OKAY IF MATCH
5351 032074                                ERRHRD  ERRNO,T62REJ,PKTSSR     ;COMMAND NOT REJECTED
     032074  104456                                                                TRAP    C$ERHRD
     032076  001140                                                                .WORD   608
     032100  032461                                                                .WORD   T62REJ
     032102  011520                                                                .WORD   PKTSSR
5352 032104                        30$:
5353 032104                                ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
     032104                                                                   10000$:
     032104  104405                                                                TRAP    C$ESEG
5354
5355 032106  062703  000004                ADD     #4,R3                   ;POINT TO NEXT DATA PAIR
5356 032112  020327  032406                CMP     R3,#T62DONE             ;COMPARE TO END OF TEST DATA
5357 032116  103002                        BHIS    59$                     ;BRANCH IF ALL DATA TESTED
5358 032120  000137  031730                JMP     5$                      ;BRANCH TILL BACK TO ZERO
5359
5360 032124                        59$:    ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
     032124                                                                   L10057:
     032124  104403                                                                TRAP    C$ESUB
```

```
                                ;*
                                ;
                                ;TEST 6, SUBTEST 3
                                ;
                                ;SUBTEST TO VERIFY THAT A WRITE CHARACTERISTICS COMMAND IS
                                ;REJECTED IF AN ILLEGAL DATA BLOCK ADDRESS IS ISSUED.
                                ;
                                ;-

                                        BGNSUB                          ;////////////// BEGIN SUBTEST ////////////
                                                                                        T6.3:
032126                                                                                          TRAP    C$BSUB
032126  104402
                                        SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
032130                                                                                          MOV     #PRI00,R0
032130  012700  000000                                                                        TRAP    C$SPRI
032134  104441
                                        MOV     #T62DATA,R3             ;START OF TEST DATA FOR SUBTEST
032136  012703  032372          5$:     MOV     #T6PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
032142  012704  032330          JSR     PC,T6REST               ;RESTORE PACKET TO STARTING VALUES
032146  004737  033426
                                ;
                                ;
                                        JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
032152  004737  016470          BCS     10$                     ;BR IF SOFT INIT = OK
032156  103405                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
032160  010001                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
032162                                                                                          TRAP    C$ERDF
032162  104455                                                                                  .WORD   609
032164  001141                                                                                  .WORD   SFIERR
032166  005550                                                                                  .WORD   SFIMSG
032170  011506
032172  005037  002172          10$:    CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
032176  052737  000001  032340          BIS     #1,T6DATA               ;MAKE ADDRESS ODD
032204  010465  177776                  MOV     R4,TSD6(R5)             ;SET THE PACKET ADDRESS
032210  004737  016744                  JSR     PC,WAITF                ;WAIT FOR SSR TO SET
032214  103405                  BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
032216  010001                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
032220                          ERRDF   ERRNO,T6SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
032220  104455                                                                                  TRAP    C$ERDF
032222  001142                                                                                  .WORD   610
032224  033047                                                                                  .WORD   T6SSR
032226  011520                                                                                  .WORD   PKTSSR
032230                          15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
032230  104406                                                                                  TRAP    C$CLP1
032232                          ESCAPE  SUB                     ;BY-PASS SUBTEST IF FATAL ERROR
032232  104410                                                                                  TRAP    C$ESCAPE
032234  000056                                                                                  .WORD   L10060-.
032236  005737  002172                  TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
032242  001004                  BNE     22$                     ;BRANCH IF YES
032244                          ERRHRD  ERRNO,T6NINT,PKTSSR
032244  104456                                                                                  TRAP    C$ERHRD
032246  001143                                                                                  .WORD   611
032250  033136                                                                                  .WORD   T6NINT
032252  011520                                                                                  .WORD   PKTSSR
032254  016501  000000          22$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
032260  012702  102206                  MOV     #SC!SSR!TSREJ!NBA,R2    ;EXPECTED CONTENTS OF TSSR
032264  032701  000100                  BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
032270  001402                  BEQ     25$                     ;BRANCH IF NOT OFF-LINE
032272  052702  000100                  BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
```

```
5409 032276  020201          25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
5410 032300  001404                  BEQ     30$                     ;OKAY IF MATCH
5414 032302                          ERRHRD  ERRNO,T64REJ,PKTSSR     ;COMMAND NOT REJECTED
     032302  104456                                                          TRAP    C$ERHRD
     032304  001144                                                          .WORD   612
     032306  032653                                                          .WORD   T64REJ
     032310  011520                                                          .WORD   PKTSSR
5415 032312                  30$:
5416
5417 032312                          ENDSUB                          ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
     032312                                                                L10060:
     032312  104403                                                          TRAP    C$ESUB
5418
```

```
                                        EXIT    TST                     ;ALL DONE THIS TEST
032314  104432                                                                  TRAP    C$EXIT
032316  001162                                                                  .WORD   L10055-.

                                ;+
                                ;LOCAL STORAGE FOR THIS TEST
                                ;-

                                        .BLKB   10-<.-TUV2A67>
                                T6PACKET:
032330  100204                          .WORD   100204                  ;COMMAND PACKET FOR TEST
032332  032340                          .WORD   T6DATA                  ;WRITE CHAR COMMAND, WITH IE, ACK
032334  000000                          .WORD   0                       ;ADDRESS OF CHARACTERISTICS BLOCK
032336  000010                          .WORD   8.                      ;STARTING VALUE OF BLOCK SIZE

                                T6DATA:                                 ;CHARACTERISTICS DATA BLOCK
032340  032352                          .WORD   T6BFR                   ;ADDRESS OF MESSAGE BUFFER
032342  000000                          .WORD   0
032344  000016                          .WORD   14.                     ;LENGTH OF MESSAGE BUFFER
032346  000000  000000                  .WORD   0,0

032352                          T6BFR:  .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
                                ;
                                ;-

032372                          T62DATA:
032372  000000  036140                  .WORD   0,BIT5!BIT6!BIT6!BIT10!BIT11!BIT12!BIT13
032376  000002  000001                  .WORD   2,BIT0
032402  000004  100100                  .WORD   4,BIT6!BIT15
        032406                  T62DONE=.

                                ;+
                                ;LOCAL TEXT MESSAGES FOR TEST
                                ;-

032406    127     122     111   T6NBA:  .ASCIZ  'WRITE CHARACTERISTICS Command Not Accepted'
032461    127     122     111   T62REJ: .ASCIZ  'WRITE CHARACTERISTICS Not Rejected With Non-Zero Unused Fields'
032560    127     122     111   T63REJ: .ASCIZ  'WRITE CHARACTERISTICS Not Rejected With Invalid Data Count'
032653    127     122     111   T64REJ: .ASCIZ  'WRITE CHARACTERISTICS Not Rejected With Invalid Block Address'
032751    127     122     111   T65REJ: .ASCIZ  'WRITE CHARACTERISTICS Not Rejected With Invalid Buffer Length'
033047    103     157     156   T6SSR:  .ASCIZ  'Contents of TSSR Incorrect After WRITE CHARACTERISTICS'
033136    105     170     160   T6NINT: .ASCIZ  'Expected Interrupt Not Received On WRITE CHARACTERISTICS'
033227    125     156     145   T6INT:  .ASCIZ  'Unexpected Interrupt Received On WRITE CHARACTERISTICS'
033316    111     156     143   T6TSBA: .ASCIZ  'Incorrect TSBA Address After WRITE CHARACTERISTICS'
033401    103     157     155   TST6ID: .ASCIZ  'Completion Interrupt'
                                        .EVEN
```

```
5478
5479                                    ;+
5480                                    ;
5481                                    ;ROUTINE TO RESTORE COMMAND PACKET TO START-UP (DEFAULT) VALUES
5482                                    ;
5483                                    ;-
5484
5485 033426                            T6REST:
5486 033426                                    SAVREG                          ;SAVE THE REGISTERS
5487 033432  012701  032330                     MOV     #T6PACKET,R1            ;START OF THE PACKET
5488 033436  012721  100204                     MOV     #100204,(R1)+           ;WRITE CHARACTERISTICS WITH ACK, IE
5489 033442  012721  032340                     MOV     #T6DATA,(R1)+           ;ADDRESS OF CHAR DATA BLOCK
5490 033446  005021                             CLR     (R1)+                   ;EXTENDED ADDRESS
5491 033450  012721  000010                     MOV     #8.,(R1)+               ;SIZE OF DATA BLOCK IN BYTES
5492 033454  012721  032352                     MOV     #T6BFR,(R1)+            ;ADDRESS OF MESSAGE BUFFER
5493 033460  005021                             CLR     (R1)+
5494 033462  012721  000016                     MOV     #14.,(R1)+              ;LENGTH OF MESSAGE BUFFER
5495 033466  005021                             CLR     (R1)+
5496 033470  005011                             CLR     (R1)
5497 033472  005037  032352                     CLR     T6BFR                   ;CLEAR 1ST LOC IN MESSAGE BUFFER
5498 033476  000207                             RTS     PC                      ;RETURN
5499 033500                                     ENDTST
     033500                                                                             L10055:
     033500  104401                                                                             TRAP    C$ETST
```

```
                                        .SBTTL  TEST  7: 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 7, 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
                                ;
                                ;-
033502                                  BGNTST
033502                                                                  T7::
033502  005037  002170                 CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
033506  012737  005672  002146         MOV     #EPRT1,EPRTSW           ;SET UP ERROR MESSAGE SWITCH
033514  005037  003100                 CLR     KTFLG           ;HOLD OFF KT11
033520  012700  036537                 MOV     #TST7ID,R0              ;ASCII MESSAGE TO IDENTIFY TEST
033524  004737  017232                 JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
033530  012737  000002  002164         MOV     #2.,LOOPCNT             ;PERFORM 2 ITERATIONS
033536                          T7LOOP:
                                ;
033536                                  BGNSUB                          ;////////////// BEGIN SUBTEST ////////////
033536                                                                          T7.1:
033536  104402                                                                  TRAP    C$BSUB
                                ;
033540  004737  036566                 JSR     PC,T7RST                ;SET PACKET TO INITIAL VALUES
033544                                  SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
033544  012700  000000                                                          MOV     #PRI00,R0
033550  104441                                                                  TRAP    C$SPRI
033552  012704  035640                 MOV     #T7PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
033556  012764  000010  000006         MOV     #8.,PKBCNT(R4)          ;START WITH MINIMUM ALLOWABLE VALUE
033564                          5$:
033564                                  BGNSEG                          ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
033564  104404                                                                  TRAP    C$BSEG
                                ;
033566  004737  016470                 JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
033572  103405                          BCS     10$                     ;BR IF SOFT INIT = OK
033574  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
033576                                  ERRDF   ERRNU,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
033576  104455                                                                  TRAP    C$ERDF
033600  001275                                                                  .WORD   701
033602  003550                                                                  .WORD   SFIERR
033604  011506                                                                  .WORD   SFIMSG
033606  005037  002170          10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
033612  005037  002172                  CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
033616  010465  177776                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
033622  004737  017060                 JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
033626  103407                          BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
033630  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
033632                                  ERRDF   ERRNU,T7SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
033632  104455                                                                  TRAP    C$ERDF
033634  001276                                                                  .WORD   702
033636  036270                                                                  .WORD   T7SSR
```

```
      033640  011520                                                                .WORD   PKTSSR
5555  033642  004737  017724                JSR     PC,FATCHK           ;INC AND CHECK FOR MORE THAN 25 ERRORS
5556  033646                        15$:    CKLOOP                      ;LOOP ON ERROR, IF FLAG SET
      033646  104406                                                                TRAP    C$CLP1
5557  033650                        ESCAPE  SEG                         ;BY-PASS SUBTEST IF FATAL ERROR
      033650  104410                                                                TRAP    C$ESCAPE
      033652  000056                                                                .WORD   10000$-.
5558  033654  005737  002172                TST     INTRECV             ;DID AN INTERRUPT OCCUR ?
5559  033660  001004                        BNE     22$                 ;BRANCH IF YES
5563  033662                                ERRHRD  ERRNO,T7NINT,PKTSSR
      033662  104456                                                                TRAP    C$ERHRD
      033664  001277                                                                .WORD   703
      033666  036357                                                                .WORD   T7NINT
      033670  011520                                                                .WORD   PKTSSR
5564  033672  016501  000000        22$:    MOV     TSSR(R5),R1         ;GET THE CONTENTS OF TSSR
5565  033676  012702  000200                MOV     #SSR,R2             ;EXPECTED CONTENTS OF TSSR
5566  033702  032701  000100                BIT     #OFL,R1             ;IS OFF-LINE BIT SET ?
5567  033706  001402                        BEQ     25$                 ;BRANCH IF NOT OFF-LINE
5568  033710  052702  000100                BIS     #OFL,R2             ;SET OFF-LINE IN EXPECTED DATA
5569  033714  020201        25$:    CMP     R2,R1               ;DOES EXPECTED MATCH RECEIVED ?
5570  033716  001404                        BEQ     30$                 ;OKAY IF MATCH
5574  033720                                ERRHRD  ERRNO,T7SSR,PKTSSR  ;NBA NOT ZERO
      033720  104456                                                                TRAP    C$ERHRD
      033722  001300                                                                .WORD   704
      033724  036270                                                                .WORD   T7SSR
      033726  011520                                                                .WORD   PKTSSR
5575  033730        30$:
5576  033730                                ENDSEG                      ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
      033730                                                                10000$:
      033730  104405                                                                TRAP    C$ESEG
5577  033732                                BGNSEG                      ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
      033732  104404                                                                TRAP    C$BSEG
5578
5579  033734  005037  002172                CLR     INTRECV             ;CLEAR INTERRUPT RECEIVED FLAG
5580  033740  012737  025252  035662        MOV     #025252,T7BFR       ;WIPE OUT MESSAGE BUFFER AREA
5581  033746  012714  100212                MOV     #100212,(R4)        ;SET COMMAND PACKET TO MESS BUF REL
5582  033752  010465  177776                MOV     R4,TSDB(R5)         ;SET THE PACKET ADDRESS
5583  033756  004737  017060                JSR     PC,CHKTSSR          ;WAIT FOR SSR TO SET
5584  033762  103407                        BCS     45$                 ;BR IF CARRY SET (GOOD RETURN)
5585  033764  010001                        MOV     R0,R1               ;SAVE CONTENTS OF TSSR
5589  033766                                ERRDF   ERRNO,T7SSR,PKTSSR  ;DEVICE FATAL SSR FAILED TO SET
      033766  104455                                                                TRAP    C$ERDF
      033770  001301                                                                .WORD   705
      033772  036270                                                                .WORD   T7SSR
      033774  011520                                                                .WORD   PKTSSR
5590  033776  004737  017724                JSR     PC,FATCHK           ;INC AND CHECK FOR MORE THAN 25 ERRORS
5591  034002                        45$:    CKLOOP                      ;LOOP ON ERROR, IF FLAG SET
      034002  104406                                                                TRAP    C$CLP1
5592  034004  005737  002172                TST     INTRECV             ;DID AN INTERRUPT OCCUR ?
5593  034010  001404                        BEQ     52$                 ;BRANCH IF N
5597  034012                                ERRHRD  ERRNO,T7INT,PKTSSR
      034012  104456                                                                TRAP    C$ERHRD
      034014  001302                                                                .WORD   706
      034016  036450                                                                .WORD   T7INT
      034020  011520                                                                .WORD   PKTSSR
5598  034022  016501  000000        52$:    MOV     TSSR(R5),R1         ;GET THE CONTENTS OF TSSR
5599  034026  012702  000200                MOV     #SSR,R2             ;EXPECTED CONTENTS OF TSSR
```

```
5600 034032  032701  000100              BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
5601 034036  001402                      BEQ     55$                     ;BRANCH IF NOT OFF-LINE
5602 034040  052702  000100              BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
5603 034044  020201                55$:   CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
5604 034046  001404                      BEQ     60$                     ;OKAY IF MATCH
5608 034050                              ERRHRD  ERRNO,T7SSR,PKTSSR      ;"TSSR INCORRECT AFTER WRT CHARA."
     034050  104436                                                              TRAP    C$ERHRD
     034052  001303                                                              .WORD   707
     034054  036270                                                              .WORD   T7SSR
     034056  011520                                                              .WORD   PKTSSR
5609 034060                        60$:
5610 034060  013701  035662              MOV     T78FR,R1                ;PICK UP THE 1ST WORD OF MESSAGE BUFFER
5611 034064  012702  025252              MOV     #025252,R2              ;SET UP EXPECTED DATA
5612 034070  020102                      CMP     R1,R2                   ;WAS ANY MESSAGE REC'D
5613 034072  001404                      BEQ     70$                     ;BR, IF OK (EQUAL)
5617 034074                              ERRHRD  ERRNO,T7MBF,EXPREC      ;MESSAGE BUFFER WAS MODIFIED
     034074  104456                                                              TRAP    C$ERHRD
     034076  001304                                                              .WORD   708
     034100  035744                                                              .WORD   T7MBF
     034102  016170                                                              .WORD   EXPREC
5618 034104                        70$:
5619 034104  005737  002170              TST     FATFLG                  ;ANY FATAL ERRORS
5620 034110  001403                      BEQ     80$                     ;BR, IF NO FATAL ERRORS
5621 034112  004737  017776              JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
5622 034116                              ENDSEG                          ;<<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<<
     034116                                                                     10001$:
     034116  104405                                                              TRAP    C$ESEG
5623 034120                        80$:
5624 034120                              ENDSUB                          ;////////////// END SUBTEST //////////////
     034120                                                                     L10062:
     034120  104403                                                              TRAP    C$ESUB
5625
```

```
                                        ;
                                        ;TEST 7, 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
                                        ;
                                        ;-
034122                                          BGNSUB                          ;////////////// BEGIN SUBTEST ////////////
034122                                                                                  T7.2:
034122  104402                                                                          TRAP    C$BSUB

034124  004737  036566                          JSR     PC,T7RST                ;SET PACKET TO INITIAL VALUES
034130                                          SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
034130  012700  000000                                                                  MOV     #PRI00,R0
034134  104441                                                                          TRAP    C$SPRI
034136  012704  035640                          MOV     #T7PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
034142  012764  000010  000006                  MOV     #8.,PKBCNT(R4)          ;START WITH MINIMUM ALLOWABLE VALUE
034150                                  5$:
034150                                          BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
034150  104404                                                                          TRAP    C$BSEG

034152  004737  016470                          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
034156  103405                                  BCS     10$                     ;BR IF SOFT INIT = OK
034160  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
034162                                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
034162  104455                                                                          TRAP    C$ERDF
034164  001305                                                                          .WORD   709
034166  003550                                                                          .WORD   SFIERR
034170  011506                                                                          .WORD   SFIMSG
034172  005037  002170          10$:            CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
034176  005037  002172                          CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
034202  012737  000020  035656                  MOV     #000020,T7DATA+6        ;SET ERI IN CHARACTERISTICS DATA
034210  010465  177776                          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
034214  004737  017060                          JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
034220  103407                                  BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
034222  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
034224                                          ERRDF   ERRNO,T7SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
034224  104455                                                                          TRAP    C$ERDF
034226  001306                                                                          .WORD   710
034230  036270                                                                          .WORD   T7SSR
034232  011520                                                                          .WORD   PKTSSR
034234  004737  017724                          JSR     PC,FATCHK               ;INC AND CHECK FOR MORE THAN 25 ERRORS
034240                          15$:            CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
034240  104406                                                                          TRAP    C$CLP1
034242                                          ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
034242  104410                                                                          TRAP    C$ESCAPE
034244  000056                                                                          .WORD   10000$-.
034246  005737  002172                          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
034252  001004                                  BNE     22$                     ;BRANCH IF YES
034254                                          ERRHRD  ERRNO,T7NINT,PKTSSR
034254  104456                                                                          TRAP    C$ERHRD
034256  001307                                                                          .WORD   711
034260  036357                                                                          .WORD   T7NINT
034262  011520                                                                          .WORD   PKTSSR
034264  016501  000000          22$:            MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
```

```
5673 034270  012702  000200            MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
5674 034274  032701  000100            BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
5675 034300  001402                    BEQ     25$                     ;BRANCH IF NOT OFF LINE
5676 034302  052702  000100            BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
5677 034306  020201              25$:  CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
5678 034310  001404                    BEQ     30$                     ;OKAY IF MATCH
5682 034312                            ERRHRD  ERRNO,T7SSR,PKTSSR      ;NBA NOT ZERO
     034312  104456                                                            TRAP    C$ERHRD
     034314  001310                                                            .WORD   712
     034316  036270                                                            .WORD   T7SSR
     034320  011520                                                            .WORD   PKTSSR
5683 034322                      30$:
5684 034322                            ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
     034322                                                                  10000$:
     034322  104405                                                            TRAP    C$ESEG
5685 034324                            BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>
     034324  104404                                                            TRAP    C$BSEG
5686
5687 034326  005037  002172            CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
5688 034332  012737  025252  035662    MOV     #025252,T7BFR           ;WIPE OUT MESSAGE BUFFER AREA
5689 034340  012714  100212            MOV     #100212,(R4)            ;SET COMMAND PACKET TO MESS BUF REL
5690 034344  010465  177776            MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
5691 034350  004737  017060            JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
5692 034354  103407                    BCS     45$                     ;BR IF CARRY SET (GOOD RETURN)
5693 034356  010001                    MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
5697 034360                            ERRDF   ERRNO,T7SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
     034360  104455                                                            TRAP    C$ERDF
     034362  001311                                                            .WORD   713
     034364  036270                                                            .WORD   T7SSR
     034366  011520                                                            .WORD   PKTSSR
5698 034370  004737  017724            JSR     PC,FATCHK               ;INC AND CHECK FOR MORE THAN 25 ERRORS
5699 034374                      45$:  CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     034374  104406                                                            TRAP    C$CLP1
5700 034376  005737  002172            TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
5701 034402  001004                    BNE     52$                     ;BRANCH IF YES
5705 034404                            ERRHRD  ERRNO,T7INT,PKTSSR
     034404  104456                                                            TRAP    C$ERHRD
     034406  001312                                                            .WORD   714
     034410  036450                                                            .WORD   T7INT
     034412  011520                                                            .WORD   PKTSSR
5706 034414  016501  000000      52$:  MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
5707 034420  012702  000200            MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
5708 034424  032701  000100            BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
5709 034430  001402                    BEQ     55$                     ;BRANCH IF NOT OFF-LINE
5710 034432  052702  000100            BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
5711 034436  020201              55$:  CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
5712 034440  001404                    BEQ     60$                     ;OKAY IF MATCH
5716 034442                            ERRHRD  ERRNO,T7SSR,PKTSSR      ;NBA NOT SET
     034442  104456                                                            TRAP    C$ERHRD
     034444  001313                                                            .WORD   715
     034446  036270                                                            .WORD   T7SSR
     034450  011520                                                            .WORD   PKTSSR
5717 034452                      60$:
5718 034452  013701  035662            MOV     T7BFR,R1                ;PICK UP THE 1ST WORD OF MESSAGE BUFFER
5719 034456  012702  025252            MOV     #025252,R2              ;SET UP EXPECTED DATA
5720 034462  020102                    CMP     R1,R2                   ;WAS ANY MESSAGE REC'D
5721 034464  001404                    BEQ     70$                     ;BR, IF OK (EQUAL)
```

```
5725 034466                                ERRHRD  ERRNO,T7MBF,EXPREC      ;MESSAGE BUFFER WAS MODIFIED
     034466  104456                                                                TRAP    C$ERHRD
     034470  001314                                                                .WORD   716
     034472  035744                                                                .WORD   T7MBF
     034474  016170                                                                .WORD   EXPREC
5726
5727 034476                           70$:
5728 034476  005737  002170                 TST     FATFLG                  ;ANY FATAL ERRORS
5729 034502  001402                         BEQ     80$                     ;BR, IF NO FATAL ERRORS
5730 034504  004737  017776                 JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
5731 034510                           80$:
5732 034510                                ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
     034510                                                                   10001$:
     034510  104405                                                                TRAP    C$ESEG
5733 034512                                ENDSUB                          ;////////////// END SUBTEST ////////////
     034512                                                                   L10063:
     034512  104403                                                                TRAP    C$ESUB
```

```
                                        ;+
                                        ;TEST 7, SUBTEST 3
                                        ;
                                        ;CHECKS THAT THE CPU GIVES UP OWNERSHIP OF THE MESSAGE BUFFER
                                        ;AFTER THE MESSAGE BUFFER RELEASE, AND THAT FOLLOWING COMMANDS
                                        ;WORK CORRECTLY
                                        ;
                                        ;-
034514                                          BGNSUB                          ;////////////// BEGIN SUBTEST ////////////
                                                                                                T7.3:
034514  104402                                                                                    TRAP    C$BSUB

034516  004737  036566                          JSR     PC,T7RST                ;SET PACKET TO INITIAL VALUES
034522                                          SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
034522  012700  000000                                                                          MOV     #PRI00,R0
034526  104441                                                                                  TRAP    C$SPRI
034530  012704  035640                          MOV     #T7PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
034534  012764  000010  000006                  MOV     #8.,PKBCNT(R4)          ;START WITH MINIMUM ALLOWABLE VALUE
034542                                  5$:
034542                                          BGNSEG                          ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
034542  104404                                                                                  TRAP    C$BSEG

034544  004737  016470                          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
034550  103405                                  BCS     10$                     ;BR IF SOFT INIT = OK
034552  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
034554                                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
034554  104455                                                                                  TRAP    C$ERDF
034556  001315                                                                                  .WORD   717
034560  003550                                                                                  .WORD   SFIERR
034562  011506                                                                                  .WORD   SFIMSG
034564  005037  002170          10$:            CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
034570  005037  002172                          CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
034574  010465  177776                          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
034600  004737  017060                          JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
034604  103407                                  BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
034606  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
034610                                          ERRDF   ERRNO,T7SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
034610  104455                                                                                  TRAP    C$ERDF
034612  001316                                                                                  .WORD   718
034614  036270                                                                                  .WORD   T7SSR
034616  011520                                                                                  .WORD   PKTSSR
034620  004737  017724                          JSR     PC,FATCHK               ;INC AND CHECK FOR MORE THAN 25 ERRORS
034624                                  15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
034624  104406                                                                                  TRAP    C$CLP1
034626                                          ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
034626  104410                                                                                  TRAP    C$ESCAPE
034630  000056                                                                                  .WORD   10000$-.
034632  005737  002172                          TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
034636  001004                                  BNE     22$                     ;BRANCH IF YES
034640                                          ERRHRD  ERRNO,T7NINT,PKTSSR
034640  104456                                                                                  TRAP    C$ERHRD
034642  001317                                                                                  .WORD   719
034644  036357                                                                                  .WORD   T7NINT
034646  011520                                                                                  .WORD   PKTSSR
034650  016501  000000          22$:            MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
034654  012702  000200                          MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
034660  032701  000100                          BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
```

```
 5781 034664  001402                        BEQ     25$                     ;BRANCH IF NOT OFF-LINE
 5782 034666  052702  000100                BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
 5783 034672  020201              25$:      CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
 5784 034674  001404                        BEQ     30$                     ;OKAY IF MATCH
 5788 034676                                ERRHRD  ERRNO,T7SSR,PKTSSR      ;NBA NOT ZERO
      034676  104456                                                                TRAP    C$ERHRD
      034700  001320                                                                .WORD   720
      034702  036270                                                                .WORD   T7SSR
      034704  011520                                                                .WORD   PKTSSR
 5789 034706                              30$:
 5790 034706                                ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
      034706                                                                     10000$:
      034706  104405                                                              TRAP    C$ESEG
 5791 034710                                BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
      034710  104404                                                              TRAP    C$BSEG
 5792 034712  004737  036566                JSR     PC,T7RST                ;RESET PACKETS AND COMMANDS
 5793 034716  005037  002172                CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
 5794 034722  012737  025252  035662        MOV     #025252,T7BFR           ;WIPE OUT MESSAGE BUFFER AREA
 5795 034730  012714  100212                MOV     #100212,(R4)            ;SET COMMAND PACKET TO MESS BUF REL
 5796 034734  010465  177776                MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
 5797 034740  004737  017060                JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
 5798 034744  103407                        BCS     45$                     ;BR IF CARRY SET (GOOD RETURN)
 5799 034746  010001                        MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 5803 034750                                ERRDF   ERRNO,T7SSRM,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
      034750  104455                                                              TRAP    C$ERDF
      034752  001321                                                              .WORD   721
      034754  036200                                                              .WORD   T7SSRM
      034756  011520                                                              .WORD   PKTSSR
 5804 034760  004737  017724                JSR     PC,FATCHK               ;INC AND CHECK FOR MORE THAN 25 ERRORS
 5805 034764                        45$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
      034764  104406                                                              TRAP    C$CLP1
 5806 034766  005737  002172                TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
 5807 034772  001404                        BEQ     52$                     ;BRANCH IF NO
 5811 034774                                ERRHRD  ERRNO,T7INT,PKTSSR
      034774  104456                                                              TRAP    C$ERHRD
      034776  001322                                                              .WORD   722
      035000  036450                                                              .WORD   T7INT
      035002  011520                                                              .WORD   PKTSSR
 5812 035004  016501  000000        52$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
 5813 035010  012702  000200                MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
 5814 035014  032701  000100                BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
 5815 035020  001402                        BEQ     55$                     ;BRANCH IF NOT OFF-LINE
 5816 035022  052702  000100                BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
 5817 035026  020201              55$:      CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
 5818 035030  001404                        BEQ     60$                     ;OKAY IF MATCH
 5822 035032                                ERRHRD  ERRNO,T7SSR,PKTSSR      ;NBA NOT SET
      035032  104456                                                              TRAP    C$ERHRD
      035034  001323                                                              .WORD   723
      035036  036270                                                              .WORD   T7SSR
      035040  011520                                                              .WORD   PKTSSR
 5823 035042                              60$:
 5824 035042  013701  035662                MOV     T7BFR,R1                ;PICK UP THE 1ST WORD OF MESSAGE BUFFER
 5825 035046  012702  025252                MOV     #025252,R2              ;SET UP EXPECTED DATA
 5826 035052  020102                        CMP     R1,R2                   ;WAS ANY MESSAGE REC'D
 5827 035054  001404                        BEQ     70$                     ;BR, IF OK (EQUAL)
 5831 035056                                ERRHRD  ERRNO,T7MBF,EXPREC      ;MESSAGE BUFFER WAS MODIFIED
      035056  104456                                                              TRAP    C$ERHRD
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      035060  001324                                                    .WORD   724
      035062  035744                                                    .WORD   T7MBF
      035064  016170                                                    .WORD   EXPREC
 5832
 5833 035066                          70$:    CKLOOP                  ;LOOP ON ERROR IF FLAG SET
      035066  104406                                                    TRAP    C$CLP1
 5834
 5835 035070  005037  002172                  CLR     INTRECV         ;CLEAR INTERRUPT RECEIVED FLAG
 5836 035074  004737  036566                  JSR     PC,T7RST        ;RESET THE PACKETS AND COMMANDS
 5837 035100  042714  100000                  BIC     #100000,(R4)    ;CLEAR THE ACK BIT
 5838 035104  010465  177776                  MOV     R4,TSDB(R5)     ;SET THE PACKET ADDRESS
 5839 035110  004737  017060                  JSR     PC,CHKTSSR      ;WAIT FOR SSR TO SET
 5840 035114  103407                          BCS     75$             ;BR IF CARRY SET (GOOD RETURN)
 5841 035116  010001                          MOV     R0,R1           ;SAVE CONTENTS OF TSSR
 5845 035120                                  ERRDF   ERRNO,T7SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
      035120  104475                                                    TRAP    C$ERDF
      035122  001325                                                    .WORD   725
      035124  036270                                                    .WORD   T7SSR
      035126  011520                                                    .WORD   PKTSSR
 5846 035130  004737  017724                  JSR     PC,FATCHK       ;INC AND CHECK FOR MORE THAN 25 ERRORS
 5847 035134                          75$:    CKLOOP                  ;LOOP ON ERROR, IF FLAG SET
      035134  104406                                                    TRAP    C$CLP1
 5848 035136                                  ESCAPE  SEG             ;BY-PASS SUBTEST IF FATAL ERROR
      035136  104410                                                    TRAP    C$ESCAPE
      035140  000062                                                    .WORD   10001$-.
 5849 035142  005737  002172                  TST     INTRECV         ;DID AN INTERRUPT OCCUR ?
 5850 035146  001006                          BNE     82$             ;BRANCH IF YES
 5854 035150  016500  000000                  MOV     TSSR(R5),R0     ;GET TSSR FOR ERROR REPORT
 5855 035154                                  ERRHRD  ERRNO,T7NINT,PKTSSR
      035154  104456                                                    TRAP    C$ERHRD
      035156  001326                                                    .WORD   726
      035160  036357                                                    .WORD   T7NINT
      035162  011520                                                    .WORD   PKTSSR
 5856 035164  016501  000000          82$:    MOV     TSSR(R5),R1     ;GET THE CONTENTS OF TSSR
 5857 035170  012702  000200                  MOV     #SSR,R2         ;EXPECTED CONTENTS OF TSSR
 5858 035174  032701  000100                  BIT     #OFL,R1         ;IS OFF-LINE BIT SET ?
 5859 035200  001402                          BEQ     85$             ;BRANCH IF NOT OFF-LINE
 5860 035202  052702  000100                  BIS     #OFL,R2         ;SET OFF-LINE IN EXPECTED DATA
 5861 035206  020201                  85$:    CMP     R2,R1           ;DOES EXPECTED MATCH RECEIVED ?
 5862 035210  001404                          BEQ     90$             ;OKAY IF MATCH
 5866 035212                                  ERRHRD  ERRNO,T7SSR,PKTSSR      ;NBA NOT ZERO
      035212  104456                                                    TRAP    C$ERHRD
      035214  001327                                                    .WORD   727
      035216  036270                                                    .WORD   T7SSR
      035220  011520                                                    .WORD   PKTSSR
 5867 035222                          90$:
 5868 035222                                  ENDSEG                  ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
      035222                                                          10001$:
      035222  104405                                                    TRAP    C$ESEG
 5869 035224  005737  002170                  TST     FATFLG          ;ANY FATAL ERRORS
 5870 035230  001403                          BEQ     95$             ;BR, IF NO FATAL ERRORS
 5871 035232  004737  017776                  JSR     PC,CKDROP       ;TRY TO DROP THE UNIT
 5872
 5873 035236                                  BGNSEG                  ;<<<<<<<<<<<<< BGN SEGMENT <<<<<<<<<<<<<
      035236  104404                                                    TRAP    C$BSEG
 5874 035240  005037  002172          95$:    CLR     INTRECV         ;CLEAR INTERRUPT RECEIVED FLAG
 5875 035244  004737  036566                  JSR     PC,T7RST        ;RESET THE PACKETS AND COMMANDS
```

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 5876 035250  010465  177776                 MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
 5877 035254  004737  017060                 JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
 5878 035260  103407                         BCS     100$                    ;BR IF CARRY SET (GOOD RETURN)
 5879 035262  010001                         MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
 5883 035264                                 ERRDF   ERRNO,T7SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
      035264  104455                                                                 TRAP    C$ERDF
      035266  001330                                                                .WORD   728
      035270  036270                                                                .WORD   T7SSR
      035272  011520                                                                .WORD   PKTSSR
 5884 035274  004737  017724                 JSR     PC,FATCHK               ;INC AND CHECK FOR MORE THAN 25 ERRORS
 5885 035300                         100$:   CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
      035300  104406                                                                TRAP    C$CLP1
 5886 035302                                 ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
      035302  104410                                                                TRAP    C$ESCAPE
      035304  000062                                                                .WORD   10002$-.
 5887 035306  005737  002172                 TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
 5888 035312  001006                         BNE     112$                    ;BRANCH IF YES
 5892 035314  016500  000000                 MOV     TSSR(R5),R0             ;GET TSSR FOR ERROR REPORT
 5893 035320                                 ERRHRD  ERRNO,T7NINT,PKTSSR
      035320  104456                                                                TRAP    C$ERHRD
      035322  001331                                                                .WORD   729
      035324  036357                                                                .WORD   T7NINT
      035326  011520                                                                .WORD   PKTSSR
 5894 035330  016501  000000         112$:   MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
 5895 035334  012702  000200                 MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
 5896 035340  032701  000100                 BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
 5897 035344  001402                         BEQ     125$                    ;BRANCH IF NOT OFF-LINE
 5898 035346  052702  000100                 BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
 5899 035352  020201         125$:   CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
 5900 035354  001405                         BEQ     130$                    ;OKAY IF MATCH
 5904 035356                                 ERRHRD  ERRNO,T7SSR,PKTSSR      ;NBA NOT ZERO
      035356  104456                                                                TRAP    C$ERHRD
      035360  001332                                                                .WORD   730
      035362  036270                                                                .WORD   T7SSR
      035364  011520                                                                .WORD   PKTSSR
 5905 035366                                 ENDSEG                          ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
      035366                                                                     10002$:
      035366  104405                                                                TRAP    C$ESEG
 5906 035370  005737  002170         130$:   TST     FATFLG                  ;CHECK FATAL FLAG FOR SET
 5907 035374  001402                         BEQ     140$                    ;BR, IF NOT SET (OK)
 5908 035376  004737  017776                 JSR     PC,CKDROP               ;DROP DEVICE IF INDICATED
 5909 035402                         140$:
 5910 035402                                 ENDSUB                          ;////////////// END SUBTEST ////////////
      035402                                                                     L10064:
      035402  104403                                                                TRAP    C$ESUB
 5911 035404                         30$:
```

```
5913                                    ;+
5914                                    ;TEST 7, SUBTEST 4
5915                                    ;
5916                                    ;CHECKS THAT THE REGISTER MODIFICATION REFUSED (RMR) BIT IN
5917                                    ;THE TSSR WILL BE SET IF A WRITE CHARACTERISTICS COMMAND
5918                                    ;BEING EXECUTED AND ANOTHER "WC" COMMAND IS ATTEMPTED
5919                                    ;
5920                                    ;-
5921
5922 035404                                     $GNSUB                          ;////////////// BEGIN SUBTEST //////////////
      035404                                                                                  T7.4:
      035404  104402                                                                           TRAP    C$BSUB
5923
5924 035406  004737  036640                     JSR     PC,T7RT2                ;SET SECOND PACKET UP
5925 035412  004737  036566                     JSR     PC,T7RST                ;SET PACKET TO INITIAL VALUES
5926 035416                                     SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
      035416  012700  000000                                                                  MOV     #PRI00,R0
      035422  104441                                                                          TRAP    C$SPRI
5927 035424  012704  035640                     MOV     #T7PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
5928 035430  012703  035702                     MOV     #T7PKT,R3               ;GET THE ADDRESS OF 2ND CMD PACKET
5929 035434  012764  000010  000006             MOV     #8.,PKBCNT(R4)          ;START WITH MINIMUM ALLOWABLE VALUE
5930 035442  012763  000010  000006             MOV     #8.,PKBCNT(R3)          ;START WITH MINIMUM ALLOWABLE VALUE
5931 035450                             5$:
5932 035450                                     BGNSEG                          ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
      035450  104404                                                                          TRAP    C$BSEG
5933 035452  004737  016470                     JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
5934 035456  103405                             BCS     10$                     ;BR IF SOFT INIT = OK
5938 035460  010001                             MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
5939 035462                                     ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
      035462  104455                                                                          TRAP    C$ERDF
      035464  001333                                                                          .WORD   731
      035466  003550                                                                          .WORD   SFIERR
      035470  011506                                                                          .WORD   SFIMSG
5940 035472  005037  002170             10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
5941 035476  005037  002172                     CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
5942 035502  010465  177776                     MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
5943 035506  010365  177776                     MOV     R3,TSDB(R5)             ;SECOND COMMAND PACKET
5944 035512  004737  016744                     JSR     PC,WAITF                ;WAIT FOR SSR TO SET
5945 035516  016501  000000                     MOV     TSSR(R5),R1             ;GET CONTENTS OF TSSR REGISTER
5946 035522  032701  000200                     BIT     #SSR,R1                 ;CHECK FOR SSR (TSSR) SET
5947 035526  001006                             BNE     15$                     ;BR, IF SSR SET (GOOD)
5951 035530                                     ERRDF   ERRNO,T7SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
      035530  104455                                                                          TRAP    C$ERDF
      035532  001334                                                                          .WORD   732
      035534  036270                                                                          .WORD   T7SSR
      035536  011520                                                                          .WORD   PKTSSR
5952 035540  004737  017724                     JSR     PC,FATCHK               ;INC AND CHECK FOR MORE THAN 25 ERRORS
5953 035544                             15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
      035544  104406                                                                          TRAP    C$CLP1
5954 035546                                     ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
      035546  104410                                                                          TRAP    C$ESCAPE
      035550  000056                                                                          .WORD   10000$-.
5955 035552  005737  002172                     TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
5956 035556  001004                             BNE     22$                     ;BRANCH IF YES
5957
5958
5962 035560                                     ERRHRD  ERRNO,T7NINT,PKTSSR
```

```
        035560  104456                                                          TRAP    C$ERHRD
        035562  001335                                                          .WORD   733
        035564  036357                                                          .WORD   T7NINT
        035566  011520                                                          .WORD   PKTSSR
  5963  035570  016501  000000          22$:    MOV     TSSR(R5),R1           ;GET THE CONTENTS OF TSSR
  5964  035574  012702  110200                  MOV     #SSR!RMR!SC,R2        ;EXPECTED CONTENTS OF TSSR
  5965  035600  032701  000100                  BIT     #OFL,R1               ;IS OFF-LINE BIT SET ?
  5966  035604  001402                          BEQ     25$                   ;BRANCH IF NOT OFF-LINE
  5967  035606  052702  000100                  BIS     #OFL,R2               ;SET OFF-LINE IN EXPECTED DATA
  5968  035612  020201                  25$:    CMP     R2,R1                 ;DOES EXPECTED MATCH RECEIVED ?
  5969  035614  001404                          BEQ     30$                   ;OKAY IF MATCH
  5973  035616                                  ERRHRD  ERRNO,T7SSR,PKTSSR    ;NBA NOT ZERO
        035616  104456                                                          TRAP    C$ERHRD
        035620  001336                                                          .WORD   734
        035622  036270                                                          .WORD   T7SSR
        035624  011520                                                          .WORD   PKTSSR
  5974  035626                  30$:
  5975  035626                          ENDSEG                                ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
        035626                                                                10000$:
        035626  104405                                                          TRAP    C$ESEG
  5976  035630                          ENDSUB                                ;////////////// END SUBTEST //////////////
        035630                                                                L10065:
        035630  104403                                                          TRAP    C$ESUB
  5977  035632                          EXIT    TST                           ;ALL DONE WITH THIS TEST
        035632  104432                                                          TRAP    C$EXIT
        035634  001056                                                          .WORD   L10061-.
```

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

                                        .BLKB   10-<.-TUV2A&7>
                                T7PACKET:
                                        .WORD   100204          ;COMMAND PACKET FOR TEST
                                        .WORD   T7DATA          ;WRITE CHAR COMMAND, WITH IE, ACK
                                        .WORD   0               ;ADDRESS OF CHARACTERISTICS BLOCK
                                        .WORD   8.              ;STARTING VALUE OF BLOCK SIZE

                                T7DATA:                         ;CHARACTERISTICS DATA BLOCK
                                        .WORD   T7BFR           ;ADDRESS OF MESSAGE BUFFER
                                        .WORD   0
                                        .WORD   14.             ;LENGTH OF MESSAGE BUFFER
                                        .WORD   0,0

                                T7BFR:  .BLKW   8.              ;MESSAGE BUFFER

                                        ;*
                                        ;
                                        ;TEST DATA FOR SUBTEST FOUR
                                        ;
                                T7PKT:                          ;COMMAND PACKET FOR TEST
                                        .WORD   100204          ;WRITE CHAR COMMAND, WITH IE, ACK
                                        .WORD   T7DTA           ;ADDRESS OF CHARACTERISTICS BLOCK
                                        .WORD   0               ;STARTING VALUE OF BLOCK SIZE
                                        .WORD   8.

                                T7DTA:                          ;CHARACTERISTICS DATA BLOCK
                                        .WORD   T7BUFR          ;ADDRESS OF MESSAGE BUFFER
                                        .WORD   0
                                        .WORD   14.             ;LENGTH OF MESSAGE BUFFER
                                        .WORD   0,0

                                T7BUFR:.BLKW    8.              ;MESSAGE BUFFER

                                        ;*
                                        ;LOCAL TEXT MESSAGES FOR TEST
                                        ;-


                                T7MBF:  .ASCIZ  'Message Buffer Modified after MESSAGE BUFFER RELEASE Command'
                                T7NBA:  .ASCIZ  'NBA Not Clear After WRITE CHARACTERISTICS Command'
                                T7NNBA: .ASCIZ  'NBA Set After MESSAGE BUFFER RELEASE Command'

                                T7SSRM: .ASCIZ  'Contents Of TSSR Incorrect After Message Buffer Release'
                                T7SSR:  .ASCIZ  'Contents of TSSR Incorrect After WRITE CHARACTERISTICS'
                                T7NINT: .ASCIZ  'Expected Interrupt Not Received On WRITE CHARACTERISTICS'
                                T7INT:  .ASCIZ  'Unexpected Interrupt Received On WRITE CHARACTERISTICS'
                                TST7ID: .ASCIZ  'Basic Packet Protocol'
                                        .EVEN
```

```
6035
6036                                    ;+
6037                                    ;
6038                                    ;ROUTINE TO RESTORE COMMAND PACKET TO START-UP (DEFAULT) VALUES
6039                                    ;
6040                                    ;-
6041
6042 036566                             T7RST:
6043 036566                                     SAVREG                          ;SAVE THE REGISTERS
6044 036572  012701  035640                      MOV     #T7PACKET,R1            ;START OF THE PACKET
6045 036576  012721  100204                      MOV     #100204,(R1)+           ;WRITE CHARACTERISTICS WITH ACK, IE
6046 036602  012721  035650                      MOV     #T7DATA,(R1)+           ;ADDRESS OF CHAR DATA BLOCK
6047 036606  005021                              CLR     (R1)+                   ;EXTENDED ADDRESS
6048 036610  012721  000010                      MOV     #8.,(R1)+               ;SIZE OF DATA BLOCK IN BYTES
6049 036614  012721  035662                      MOV     #T7BFR,(R1)+            ;ADDRESS OF MESSAGE BUFFER
6050 036620  005021                              CLR     (R1)+
6051 036622  012721  000016                      MOV     #14.,(R1)+              ;LENGTH OF MESSAGE BUFFER
6052 036626  005021                              CLR     (R1)+
6053 036630  005011                              CLR     (R1)
6054 036632  005037  035662                      CLR     T7BFR                   ;CLEAR 1ST LOC IN MESSAGE BUFFER
6055 036636  000207                              RTS     PC                      ;RETURN
6056                                    ;+
6057                                    ;
6058                                    ;ROUTINE TO RESTORE COMMAND PACKET #2 TO START-UP (DEFAULT) VALUES
6059                                    ;
6060                                    ;-
6061
6062 036640                             T7RT2:
6063 036640                                     SAVREG                          ;SAVE THE REGISTERS
6064 036644  012701  035702                      MOV     #T7PKT,R1               ;START OF THE PACKET
6065 036650  012721  100204                      MOV     #100204,(R1)+           ;WRITE CHARACTERISTICS WITH ACK, IE
6066 036654  012721  035712                      MOV     #T7DTA,(R1)+            ;ADDRESS OF CHAR DATA BLOCK
6067 036660  005021                              CLR     (R1)+                   ;EXTENDED ADDRESS
6068 036662  012721  000010                      MOV     #8.,(R1)+               ;SIZE OF DATA BLOCK IN BYTES
6069 036666  012721  035724                      MOV     #T7BUFR,(R1)+           ;ADDRESS OF MESSAGE BUFFER
6070 036672  005021                              CLR     (R1)+
6071 036674  012721  000016                      MOV     #14.,(R1)+              ;LENGTH OF MESSAGE BUFFER
6072 036700  005021                              CLR     (R1)+
6073 036702  005011                              CLR     (R1)
6074 036704  005037  035724                      CLR     T7BUFR                  ;CLEAR 1ST LOC IN MESSAGE BUFFER
6075 036710  000207                              RTS     PC                      ;RETURN
6076 036712                                     ENDTST
     036712
     036712  104401                                                    L10061:
                                                                              TRAP    C$ETST
```

```
                                        .SBTTL  TEST  8: 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.
                                ;
                                ;-

                                        BGNTST
                                                                                T8::
                                        CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
                                        MOV     #EPRT1,EPRTSW           ;SET UP ERROR MESSAGE SWITCH
                                        CLR     KTFLG           ;HOLD OFF KT11
                                        MOV     #TST8ID,R0              ;ASCII MESSAGE TO IDENTIFY TEST
                                        JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
                                        MOV     #2.,LOOPCNT             ;PERFORM 2 ITERATIONS
                                T8LOOP:
                                        BGNSUB                          ;////////////// BEGIN SUBTEST //////////////
                                                                                T8.1:
                                                                                        TRAP    C$BSUB
                                        SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
                                                                                        MOV     #PRI00,R0
                                                                                        TRAP    C$SPRI
                                        JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
                                        BCS     3$                      ;BR IF SOFT INIT - OK
                                        MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
                                        ERRDF   ERRNO,SFTIERR,SFIMSG    ;DEVICE FATAL ERROR DURING INIT
                                                                                        TRAP    C$ERDF
                                                                                        .WORD   801
                                                                                        .WORD   SFIERR
                                                                                        .WORD   SFIMSG
                                3$:
                                        MOV     #T8PK2,R4               ;WRITE CHARACTERISTICS PACKET
                                        JSR     PC,WRTCHR               ;ISSUE WRITE CHARACTERISTICS
                                        BCS     4$                      ;BR, IF COMMAND ISSUED OK
                                        ERRHRD  ERRNO,WRTMSG,SFIMSG     ;WRITE CHARACTERISTISC FAILED
                                                                                        TRAP    C$ERHRD
                                                                                        .WORD   802
                                                                                        .WORD   WRTMSG
                                                                                        .WORD   SFIMSG
                                4$:
                                        JSR     PC,T8REST               ;SET UP PACKET FOR COMMAND
                                        MOV     #T8PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
                                5$:
                                        BGNSEG                          ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
                                                                                        TRAP    C$BSEG

                                10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
                                        CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
                                        MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
                                        JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
                                        BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
```

```
6132 037056  010001                        MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
6136 037060                                 ERRDF   ERRNO,T8SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
     037060  104455                                                                 TRAP    C$ERDF
     037062  001443                                                                 .WORD   803
     037064  040014                                                                 .WORD   T8SSR
     037066  011520                                                                 .WORD   PKTSSR
6137 037070  004737  017724                    JSR     PC,FATCHK               ;INC AND CHECK FOR MORE THAN 25 ERRORS
6138 037074                         15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     037074  104406                                                                 TRAP    C$CLP1
6139 037076                                 ESCAPE  SEG                     ;BY-PASS SUBTEST IF FATAL ERROR
     037076  104410                                                                 TRAP    C$ESCAPE
     037100  000074                                                                 .WORD   10000$-.
6140 037102  005737  002172                    TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
6141 037106  001004                        BNE     22$                     ;BRANCH IF YES
6145 037110                                 ERRHRD  ERRNO,T8NINT,PKTSSR
     037110  104456                                                                 TRAP    C$ERHRD
     037112  001444                                                                 .WORD   804
     037114  040144                                                                 .WORD   T8NINT
     037116  011520                                                                 .WORD   PKTSSR
6146 037120  016501  000000            22$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
6147 037124  012702  000200                    MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
6148 037130  032701  000100                    BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
6149 037134  001402                        BEQ     25$                     ;BRANCH IF NOT OFF-LINE
6150 037136  052702  000100                    BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
6151 037142  020201                25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
6152 037144  001404                        BEQ     30$                     ;OKAY IF MATCH
6156 037146                                 ERRHRD  ERRNO,T8NBA,PKTSSR      ;NBA NOT ZERO
     037146  104456                                                                 TRAP    C$ERHRD
     037150  001445                                                                 .WORD   805
     037152  037562                                                                 .WORD   T8NBA
     037154  011520                                                                 .WORD   PKTSSR
6157 037156                         30$:
6158 037156  004737  010354            35$:    JSR     PC,CKRAM                ;CHECK RAM TO MEMORY
6159 037162  103405                        BCS     59$                     ;RAM OK GO ON
6163 037164                                 ERRHRD  ERRNO,PKTRAM,RAMERR     ;THEY DON'T MATCH
     037164  104456                                                                 TRAP    C$ERHRD
     037166  001446                                                                 .WORD   806
     037170  004643                                                                 .WORD   PKTRAM
     037172  016204                                                                 .WORD   RAMERR
6164 037174                                 ENDSEG                          ;<<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<<
     037174                                                                     10000$:
     037174  104405                                                                 TRAP    C$ESEG
6165
6166
6167 037176                         59$:    ENDSUB                          ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\\
     037176                                                                     L10067:
     037176  104403                                                                 TRAP    C$ESUB
6168
6169 037200  005737  002170                    TST     FATFLG                  ;ANY FATAL ERRORS ?
6170 037204  001402                        BEQ     60$                     ;BRANCH IF NOT
6171 037206  004737  017776                    JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
6172 037212                         60$:
```

```
                                        ;*
                                        ;
                                        ;TEST 8, SUBTEST 2
                                        ;
                                        ;CHECK THAT NON-ZERO MODE BITS BEING SET CAUSES
                                        ;INITIALIZE COMMAND TO BE REJECTED
                                        ;
                                        ;*

037212                                          BGNSUB                          ;////////////// BEGIN SUBTEST ////////////
                                                                                                T8.2:
037212  104402                                                                                    TRAP    C$BSUB

037214                                          SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
037214  012700  000000                                                                            MOV     #PRI00,R0
037220  104441                                                                                    TRAP    C$SPRI
037222                                          BGNSEG                          ;>>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>>
037222  104404                                                                                    TRAP    C$BSEG

037224  004737  016470                          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
037230  103405                                  BCS     3$                      ;BR IF SOFT INIT = OK
037232  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
037234                                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
037234  104455                                                                                    TRAP    C$ERDF
037236  001447                                                                                  .WORD   807
037240  003550                                                                                  .WORD   SFIERR
037242  011506                                                                                  .WORD   SFIMSG
037244                                  3$:
037244  012704  037520                          MOV     #T8PK2,R4               ;WRITE CHARACTERISTICS PACKET
037250  004737  010152                          JSR     PC,WRTCHR               ;ISSUE WRITE CHARACTERISTICS
037254  103404                                  BCS     4$                      ;BR, IF COMMAND ISSUED OK
037256                                          ERRHRD  ERRNO,WRTMSG,SFIMSG     ;WRITE CHARACTERISTISC FAILED
037256  104456                                                                                    TRAP    C$ERHRD
037260  001450                                                                                  .WORD   808
037262  004754                                                                                  .WORD   WRTMSG
037264  011506                                                                                  .WORD   SFIMSG
037266                                  4$:
037266  004737  040324                          JSR     PC,T8REST               ;SET UP PACKET FOR COMMAND
037272  012704  037450                          MOV     #T8PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
037276                                  5$:
037276  005037  002172                  10$:    CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
037302  052714  007400                          BIS     #P.MODE,(R4)            ;NON-ZERO COMMAND MODE BITS
037306  010465  177776                          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
037312  004737  017060                          JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
037316  103405                                  BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
037320  010001                                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
037322                                          ERRDF   ERRNO,T8SSR,PKTSSR      ;DEVICE FATAL SSR FAILED TO SET
037322  104455                                                                                    TRAP    C$ERDF
037324  001451                                                                                  .WORD   809
037326  040014                                                                                  .WORD   T8SSR
037330  011520                                                                                  .WORD   PKTSSR
037332                                  15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
037332  104406                                                                                    TRAP    C$CLP1
037334                                          ESCAPE  SEG                     ;BY PASS CHECKS IF FATAL ERROR
037334  104410                                                                                    TRAP    C$ESCAPE
037336  000074                                                                                  .WORD   10000$-.
```

```
6220 037340  005737  002172            TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
6221 037344  001004                    BNE     22$                     ;BRANCH IF YES
6225 037346                            ERRHRD  ERRNO,T8NINT,PKTSSR
     037346  104456                                                    TRAP    C$ERHRD
     037350  001452                                                    .WORD   810
     037352  040144                                                    .WORD   T8NINT
     037354  011520                                                    .WORD   PKTSSR
6226 037356  016501  000000    22$:    MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
6227 037362  012702  100206            MOV     #SC!SSR!TSREJ,R2        ;EXPECTED CONTENTS OF TSSR
6228 037366  032701  000100            BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
6229 037372  001402                    BEQ     25$                     ;BRANCH IF NOT OFF-LINE
6230 037374  052702  000100            BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
6231 037400  020201    25$:    CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
6232 037402  001404                    BEQ     30$                     ;OKAY IF MATCH
6236 037404                            ERRHRD  ERRNO,T82REJ,PKTSSR     ;COMMAND NOT REJECTED
     037404  104456                                                    TRAP    C$ERHRD
     037406  001453                                                    .WORD   811
     037410  037622                                                    .WORD   T82REJ
     037412  011520                                                    .WORD   PKTSSR
6237 037414                    30$:
6238 037414  004737  010354    35$:    JSR     PC,CKRAM                ;CHECK RAM TO MEMORY
6239 037420  103405                    BCS     59$                     ;RAM OK GO ON
6243 037422                            ERRHRD  ERRNO,PKTRAM,RAMERR     ;THEY DON'T MATCH
     037422  104456                                                    TRAP    C$ERHRD
     037424  001454                                                    .WORD   812
     037426  004643                                                    .WORD   PKTRAM
     037430  016204                                                    .WORD   RAMERR
6244 037432                            ENDSEG                  ;<<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<<
     037432                                                             10000$:
     037432  104405                                                    TRAP    C$ESEG
6245
6246 037434                    59$:    ENDSUB                  ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\\
     037434                                                             L10070:
     037434  104403                                                    TRAP    C$ESUB
```

```
6248 037436                             EXIT    TST                     ;ALL DONE THIS TEST
     037436  104432                                                                TRAP    C$EXIT
     037440  000770                                                                .WORD   L10066-.
6249
6250                                    ;+
6251                                    ;LOCAL STORAGE FOR THIS TEST
6252                                    ;-
6253
6255 037442                             .BLKB   10-<.-TUV2A&7>
6257 037450                             T8PACKET:                       ;COMMAND PACKET FOR TEST
6258 037450  100204                     .WORD   100204                  ;WRITE CHAR COMMAND, WITH IE, ACK
6259 037452  037460                     .WORD   T8DATA                  ;ADDRESS OF CHARACTERISTICS BLOCK
6260 037454  000000                     .WORD   0
6261 037456  000010                     .WORD   8.                      ;STARTING VALUE OF BLOCK SIZE
6262
6263 037460                             T8DATA:                         ;CHARACTERISTICS DATA BLOCK
6264 037460  037472                     .WORD   T8BFR                   ;ADDRESS OF MESSAGE BUFFER
6265 037462  000000                     .WORD   0
6266 037464  000016                     .WORD   14.                     ;LENGTH OF MESSAGE BUFFER
6267 037466  000000  000000             .WORD   0,0
6268
6269 037472                             T8BFR:  .BLKW   8.              ;MESSAGE BUFFER
6270
6271
6273 037512                             .BLKB   10-<.-TUV2A&7>
6275 037520                             T8PK2:                          ;COMMAND PACKET FOR TEST
6276 037520  100204                     .WORD   100204                  ;WRITE CHAR COMMAND, WITH IE, ACK
6277 037522  037530                     .WORD   T8DTA                   ;ADDRESS OF CHARACTERISTICS BLOCK
6278 037524  000000                     .WORD   0
6279 037526  000010                     .WORD   8.                      ;STARTING VALUE OF BLOCK SIZE
6280
6281 037530                             T8DTA:                          ;CHARACTERISTICS DATA BLOCK
6282 037530  037542                     .WORD   T8BF2                   ;ADDRESS OF MESSAGE BUFFER
6283 037532  000000                     .WORD   0
6284 037534  000016                     .WORD   14.                     ;LENGTH OF MESSAGE BUFFER
6285 037536  000000  000000             .WORD   0,0
6286
6287 037542                             T8BF2:  .BLKW   8.              ;MESSAGE BUFFER
6288
6289
6290
6291                                    ;+
6292                                    ;LOCAL TEXT MESSAGES FOR TEST
6293                                    ;-
6294
6295 037562      111     116     111    T8NBA:  .ASCIZ  'INITIALIZE Command Not Accepted'
6296 037622      111     116     111    T82REJ: .ASCIZ  'INITIALIZE Not Rejected With Non-Zero Mode Field'
6297 037703      107     105     124    T83REJ: .ASCIZ  'GET STATUS Not Accepted'
6298 037733      107     105     124    T84REJ: .ASCIZ  'GET STATUS Not Rejected With Non-Zero Mode Field'
6299 040014      103     157     156    T8SSR:  .ASCIZ  'Contents of TSSR Incorrect After INITIALIZE'
6300 040070      103     157     156    T8SR2:  .ASCIZ  'Contents of TSSR Incorrect After GET STATUS'
6301 040144      105     170     160    T8NINT: .ASCIZ  'Expected Interrupt Not Received On INITIALIZE'
6302 040222      111     156     143    T8TSBA: .ASCIZ  'Incorrect TSBA Address After INITIALIZE'
6303 040272      116     157     156    TST8ID: .ASCIZ  'Non-Tape Motion Commands'
6304                                            .EVEN
6305
```

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

040324                          T8REST:
040324                                  SAVREG                          ;SAVE THE REGISTERS
040330  012701  037450                  MOV     #T8PACKET,R1            ;START OF THE PACKET
040334  012721  100213                  MOV     #100213,(R1)+           ;INITIALIZE WITH ACK, IE
040340  005021                          CLR     (R1)+                   ;ADDRESS OF CHAR DATA BLOCK
040342  005021                          CLR     (R1)+                   ;EXTENDED ADDRESS
040344  005021                          CLR     (R1)+                   ;SIZE OF DATA BLOCK IN BYTES
040346  005021                          CLR     (R1)+                   ;ADDRESS OF MESSAGE BUFFER
040350  005021                          CLR     (R1)+
040352  005021                          CLR     (R1)+                   ;LENGTH OF MESSAGE BUFFER
040354  005021                          CLR     (R1)+
040356  005011                          CLR     (R1)
040360  005037  037472                  CLR     T8BFR                   ;CLEAR 1ST LOC IN MESSAGE BUFFER
040364  000207                          RTS     PC                      ;RETURN
                                ;+
                                ;
                                ;ROUTINE TO RESTORE COMMAND PACKET TO START-UP (DEFAULT) VALUES
                                ;GET STATUS COMMAND
                                ;
                                ;-

040366                          T8RT2:
040366                                  SAVREG                          ;SAVE THE REGISTERS
040372  012701  037450                  MOV     #T8PACKET,R1            ;START OF THE PACKET
040376  012721  100217                  MOV     #100217,(R1)+           ;GET STATUS WITH ACK, IE
040402  005021                          CLR     (R1)+                   ;ADDRESS OF CHAR DATA BLOCK
040404  005021                          CLR     (R1)+                   ;EXTENDED ADDRESS
040406  005021                          CLR     (R1)+                   ;SIZE OF DATA BLOCK IN BYTES
040410  005021                          CLR     (R1)+                   ;ADDRESS OF MESSAGE BUFFER
040412  005021                          CLR     (R1)+
040414  005021                          CLR     (R1)+                   ;LENGTH OF MESSAGE BUFFER
040416  005021                          CLR     (R1)+
040420  005011                          CLR     (R1)
040422  005037  037472                  CLR     T8BFR                   ;CLEAR 1ST LOC IN MESSAGE BUFFER
040426  000207                          RTS     PC                      ;RETURN
040430                                  ENDTST
040430                                                          L10066:
040430  104401                                                          TRAP    C$ETST
```

```
                        .SBTTL  TEST  9: DMA MEMORY ADDRESSING

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

040432                          BGNTST
040432                                                          T9::
040432  005037  002170                  CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
040436  012737  005672  002146          MOV     #EPRT1,EPRTSW           ;SET UP ERROR MESSAGE SWITCH
040444  005037  003100                  CLR     KTFLG           ;HOLD OFF KT11
040450  012700  042100                  MOV     #TST9ID,R0              ;ASCII MESSAGE TO IDENTIFY TEST
040454  004737  017232                  JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
040460  012737  000002  002164          MOV     #2.,LOOPCNT             ;PERFORM 2 ITERATIONS
040466                          T9LOOP:                         ;LOOP ON TEST LABEL
```

```
                                        .SBTTL  TEST 9: SUBTEST 1: GET STATUS SELECTED LOCATIONS
                                ;++
                                ; TEST 9: SUBTEST 1:
                                ;
                                ; SUBTEST DESCRIPTION:
                                ;
                                ;       This subtest verifies the controller can fetch a get status
                                ;       command from all available memory locations.
                                ;       Two word blocks are tested one at a time by first setting
                                ;       all available memory to a background pattern of 125252.
                                ;       A Get Status command is then executed to various addresses in
                                ;       each available memory 4k word block. The various addresses
                                ;       are determined by floating a 1 then a 0 through the address bits.
                                ;
                                ; TEST STEPS:
                                ;
                                ;    BEGIN
                                ;       Fill Memory with background pattern of 125252
                                ;       Write to TSSR to soft initialize
                                ;       Do a WRITE CHARACTERISTICS to setup a message buffer
                                ;
                                ;       REPEAT FOR SELECTED VALID ADDRESSES IN DIAGNOSTIC FREE SPACE AND ABOVE 32K
                                ;         BEGIN
                                ;               Get a valid modulo-4 test address
                                ;               Do a GET STATUS command from the test address
                                ;         END
                                ;    END
                                ;--

040466                          BGNSUB                          ;////////////// BEGIN SUBTEST //////////
040466                                                                  T9.1:
040466  104402                                                          TRAP    C$BSUB

                                ;Fill Memory with background pattern of 125252
040470  012700  125252          MOV     #125252,R0              ;BACKGROUND DATA
040474  004737  020216          JSR     PC,FILLMEM              ;FILL MEMORY WITH BACKGROUND DATA

                                ;Write to TSSR to soft initialize
040500  004737  016470          JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
040504  103405                  BCS     15$                     ;BR IF SOFT INIT = OK
040506                          NEXT.ERRNO
040506  010001                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
040510                          ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
040510  104455                                                          TRAP    C$ERDF
040512  001605                                                          .WORD   901
040514  003550                                                          .WORD   SFIERR
04051E  011506                                                          .WORD   SFIMSG

                                ;Do a WRITE CHARACTERISTICS to setup a message buffer
040520                          15$:
040520  012704  041670          MOV     #T9PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
040524  004737  043436          JSR     PC,T9SWRT               ;RESTORE PACKET TO STARTING VALUES
040530  005037  003102          CLR     KTENABLE                ;TURN OFF KT-11
040534  010465  177776          MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
040540  004737  017060          JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
040544                          FORCERROR       17$
040560  103405                  BCS     20$                     ;BR IF SSR SET IN CHKTSSR
```

```
040562  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
040564                                  NEXT,ERRNO
040564                          17$:    ERRDF   ERRNO,T9WRTSSR,PKTSSR   ;DEVICE FATAL SSR FAILED TO SET
040564  104455                                                                  TRAP    C$ERDF
040566  001606                                                                  .WORD   902
040570  042202                                                                  .WORD   T9WRTSSR
040572  011520                                                                  .WORD   PKTSSR

                                ;Verify a Get Status can be fetched from each address
                                ;Get a valid modulo-4 test address
                                ;Do a GET STATUS command from the test address
040574  005037  002170          20$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
040600  005037  041740                  CLR     T9KT                    ;TEST ABOVE 28K SWITCH
040604  012702  041744                  MOV     #T9BLK,R2               ;POINT TO TEST PATTERN TABLE
040610                          T91LOOP:
040610  005037  003102                  CLR     KTENABLE                ;TURN OFF ABOVE 28K TEST FLAG
040614  012201                          MOV     (R2)+,R1                ;GET TEST PATTERN ADDRESS
040616  005000                          CLR     R0                      ;ASSUME NO TEST ABOVE 28K
040620  005737  041740                  TST     T9KT                    ;TEST ABOVE 28K THIS TIME?
040624  001407                          BEQ     25$                     ;BR IF NO
040626  016200  177776                  MOV     -2(R2),R0               ;GET TEST PATTERN AGAIN
040632  042700  177774                  BIC     #^C<A1716>,R0           ;SAVE 18 BIT ADDRESS ONLY
040636  012737  000001  003102          MOV     #1,KTENABLE             ;TURN ON ABOVE 28K TEST FLAG
040644  004737  042746          25$:    JSR     PC,T9CONVERT            ;CONVERT TEST PATTERN TO TEST ADDRESS
040650  103034                          BCC     65$                     ;BR IF INVALID PACKET ADDRESS
040652  013704  041734                  MOV     T9LOADD,R4              ;COPY CURRENT PACKET LOW ADDRESS
040656  013703  041732                  MOV     T9HIADD,R3              ;COPY CURRENT PACKET HIGH ADDRESS
040662  004737  043504                  JSR     PC,T9SETGET             ;SETUP CURRENT PACKET TO GET STATUS
040666  042703  177774                  BIC     #^C<A1716>,R3           ;SAVE ADDRESS BITS 17:16
040672  050304                          BIS     R3,R4                   ;SETUP 18 BIT PACKET ADDRESS
040674  004737  020070                  JSR     PC,KTOFF                ;TURN OFF KT-11
040700  010465  177776                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
040704  004737  017060                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
040710                                  FORCERROR       32$
040724  103405                          BCS     40$                     ;BR IF SSR SET IN CHKTSSR
040726  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
040730                                  NEXT,ERRNO
040730                          32$:    ERRDF   ERRNO,T9GETSSR,PKTGETS  ;DEVICE FATAL SSR FAILED TO SET
040730  104455                                                                  TRAP    C$ERDF
040732  001607                                                                  .WORD   903
040734  042126                                                                  .WORD   T9GETSSR
040736  011550                                                                  .WORD   PKTGETS
040740                          40$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
040740  104406                                                                  TRAP    C$CLP1
040742                          65$:
040742                                  FORCEXIT        80$
040752  020227  042076                  CMP     R2,#T9TBE               ;DONE ALL TSTBLK TEST PATTERNS?
040756  103002                          BHIS    70$                     ;BR IF YES
040760  000137  040610                  JMP     T91LOOP         ;DO ANOTHER MODULO-4 ADDRESS
040764  005737  041740          70$:    TST     T9KT                    ;DONE ABOVE 28K TESTING TOO?
040770  003012                          BGT     80$                     ;BR IF YES
040772  005737  003100                  TST     KTFLG                   ;ANY MEMORY ABOVE 28K ON SYSTEM?
040776  001407                          BEQ     80$                     ;BR IF NO
041000  012737  000001  041740          MOV     #1,T9KT         ;SET SWITCH
041006  012702  041744                  MOV     #T9BLK,R2               ;RESET TEST PATTERN TABLE
041012  000137  040610                  JMP     T91LOOP         ;DO ABOVE 28K TESTING
041016  004737  020070          80$:    JSR     PC,KTOFF                ;TURN OFF KT11
```

```
 6492 041022                                ENDSUB                  ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\\
      041022                                                                L10072:
      041022  104403                                                          TRAP    C$ESUB
 6493 041024  005737  002170                TST     FATFLG          ;ANY FATAL ERRORS ?
 6494 041030  001402                        BEQ     100$            ;BRANCH IF NOT
 6495 041032  004737  017776                JSR     PC,CKDROP       ;TRY TO DROP THE UNIT
 6496 041036                        100$:
 6497
```

```
                                        .SBTTL  TEST 9: SUBTEST 2: MESSAGE PACKETS TO SELECTED LOCATIONS
                                ;**
                                ; TEST 9: SUBTEST 2:
                                ;
                                ; SUBTEST DESCRIPTION:
                                ;
                                ;       This subtest verifies the controller can deposit message packets
                                ;       to all available memory locations.
                                ;       First all available memory is set to a background pattern
                                ;       of 125252.
                                ;       Write Characteristics commands are then executed with message
                                ;       buffer addresses set to various addresses in each available
                                ;       memory location.
                                ;       The various addresses are determined by floating a 1 then a 0
                                ;       through the address bits.
                                ;
                                ; TEST STEPS:
                                ;
                                ;    BEGIN
                                ;       Fill Memory with background pattern of 125252
                                ;       Write to ISSR to soft initialize
                                ;       Do a WRITE CHARACTERISTICS to setup a message buffer to compare
                                ;       REPEAT FOR SELECTED ADDRESSES IN DIAGNOSTIC FREE SPACE AND ABOVE 32K
                                ;         BEGIN
                                ;               Get a valid modulo-4 test address
                                ;               Set the packet message buffer to the TEST ADDRESS
                                ;               Do a WRITE CHARACTERISTICS
                                ;               Restore the test message buffer to background pattern
                                ;         END
                                ;    END
                                ;--

041036                                  BGNSUB                          ;////////////// BEGIN SUBTEST //////////
041036                                                                                  T9.2:
041036  104402                                                                          TRAP    C$BSUB

                                ;Fill Memory with background pattern of 125252
041040  012700  125252                  MOV     #125252,R0              ;BACKGROUND DATA
041044  004737  020216                  JSR     PC,FILLMEM              ;FILL MEMORY WITH BACKGROUND DATA

                                ;Write to ISSR to soft initialize
041050  004737  016470                  JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
041054  103405                          BCS     15$                     ;BR IF SOFT INIT = OK
041056                                  NEXT.ERRNO
041056  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF ISSR
041060                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
041060  104455                                                                          TRAP    C$ERDF
041062  001610                                                                          .WORD   904
041064  003550                                                                          .WORD   SFIERR
041066  011506                                                                          .WORD   SFIMSG

                                ;Do a WRITE CHARACTERISTICS to setup a message buffer to compare
041070                          15$:
041070  012704  041670                  MOV     #T9PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
041074  004737  043436                  JSR     PC,T9SWRT               ;SET PACKET TO WRITE CHARACTERISTICS
041100  004737  020070                  JSR     PC,KTOFF                ;TURN OFF KT-11
```

```
6550 041104  010465  177776                MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
6551 041110  004737  017060                JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
6552 041114                                FORCERROR       17$
6553 041130  103405                        BCS     20$                     ;BR IF SSR SET IN CHKTSSR
6554 041132  010001                        MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
6555 041134                                NEXT.ERRNO
6556 041134                        17$:    ERRDF   ERRNO,T9WRTSSR,PKTSSR   ;DEVICE FATAL SSR FAILED TO SET
     041134  104455                                                                 TRAP    C$ERDF
     041136  001611                                                                 .WORD   905
     041140  042202                                                                 .WORD   T9WRTSSR
     041142  011520                                                                 .WORD   PKTSSR
6557
6558                                       ;Get a valid modulo-4 test address
6559                                       ;Set the packet message buffer to the test address
6560                                       ;Do a WRITE CHARACTERISTICS
6561 041144  005037  002170          20$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
6562 041150  012703  041744                MOV     #T9BLK,R3               ;POINT TO TEST PATTERN TABLE
6563 041154                        T92LOOP:
6564 041154  012301                        MOV     (R3)+,R1                ;GET TEST PATTERN ADDRESS
6565 041156  010100                        MOV     R1,R0                   ;GET ADDRESS ALL "18 BITS"
6566 041160  042700  177774                BIC     #177774,R0              ;LEAVE ONLY A17 AND A16
6567 041164  042701  000001                BIC     #1,R1                   ;ALWAYS ON A WORD BOUNDRY
6568 041170  004737  043140                JSR     PC,T9CT2                ;CONVERT TEST PATTERN TO TEST ADDRESS
6569 041174  103402                        BCS     25$                     ;BR IF VALID MESSAGE BUFFER ADDRESS
6570 041176  000137  041274                JMP     150$                    ;GET ANOTHER TEST PATTERN TO TRY
6571 041202  012704  041670          25$:    MOV     #T9PACKET,R4            ;SET THE COMMAND PACKET ADDRESS
6572 041206  004737  043436                JSR     PC,T9SWRT               ;SETUP T9PACKET TO WRITE CHAR.
6573 041212  013737  041734  041700        MOV     T9LOADD,T9DATA  ;SETUP LOW ORDER MESSAGE BUFFER ADD.
6574 041220  013737  041732  041702        MOV     T9HIADD,T9DATA+2        ;SETUP HIGH ORDER MESSAGE BUFFER ADD.
6575 041226  004737  020070                JSR     PC,KTOFF                ;TURN OFF KT-11
6576 041232  010465  177776                MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
6577 041236  004737  017060                JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
6578 041242                                FORCERROR       32$
6579 041256  103405                        BCS     50$                     ;BR IF SSR SET IN CHKTSSR
6580 041260  010001                        MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
6581 041262                                NEXT.ERRNO
6582 041262                        32$:    ERRDF   ERRNO,T9WRTSSR,PKTSSR   ;DEVICE FATAL SSR FAILED TO SET
     041262  104455                                                                 TRAP    C$ERDF
     041264  001612                                                                 .WORD   906
     041266  042202                                                                 .WORD   T9WRTSSR
     041270  011520                                                                 .WORD   PKTSSR
6583 041272                        50$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     041272  104406                                                                 TRAP    C$CLP1
6584 041274                        150$:
6585 041274                                FORCEXIT        160$
6586 041304  020327  C*2076                CMP     R3,#T9TBE               ;DONE ALL TST9BLK TEST PATTERNS?
6587 041310  103002                        BHIS    160$                    ;BR IF YES
6588 041312  000137  041154                JMP     T92LOOP         ;DO ANOTHER MODULO- 4 ADDRESS
6589 041316  004737  020070          160$:   JSR     PC,KTOFF                ;TURN OFF KT11
6590 041322                                ENDSUB                          ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\\
     041322                                                                 L10073:
     041322  104403                                                                 TRAP    C$ESUB
6591 041324  005737  002170                TST     FATFLG                  ;ANY FATAL ERRORS ?
6592 041330  001402                        BEQ     180$                    ;BRANCH IF NOT
6593 041332  004737  017776                JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
6594 041336                        180$:
```

```
                                        .SBTTL  TEST 9: SUBTEST 3: CHARACTERISTIC DATA SELECTED LOCATIONS
                                ;++
                                ; TEST 9: SUBTEST 3:
                                ;
                                ; SUBTEST DESCRIPTION:
                                ;
                                ;       This subtest verifies the controller can fetch a
                                ;       Write Characteristics data block from all available
                                ;       memory locations.
                                ;       First all available memory is set to a background
                                ;       pattern of 125252.
                                ;       Then Write Characteristics commands are executed with
                                ;       characteristic data blocks at various memory addresses.
                                ;       The various memory addresses are determined by floating
                                ;       a 1 then a 0 through the address bits.
                                ;
                                ; TEST STEPS:
                                ;
                                ;    BEGIN
                                ;       Fill Memory with background pattern of 125252
                                ;       Write to TSSR to soft initialize
                                ;
                                ;       REPEAT FOR SELECTED VALID ADDRESSES IN DIAGNOSTIC FREE SPACE AND ABOVE 32K
                                ;         BEGIN
                                ;               Get a valid test address
                                ;               Set the test packet characteristics data pointer to the
                                ;                 test address.
                                ;               Store expected characteristic data in test address block
                                ;               Do a WRITE CHARACTERISTIC command
                                ;         END
                                ;    END
                                ;--
041336                                  BGNSUB                          ;////////////// BEGIN SUBTEST //////////
041336                                                                                  T9.3:
041336  104402                                                                          TRAP    C$BSUB

                                ;Fill Memory with background pattern of 125252
041340  012700  125252                  MOV     #125252,R0              ;BACKGROUND DATA
041344  004737  020216                  JSR     PC,FILLMEM              ;FILL MEMORY WITH BACKGROUND DATA

                                ;Write to TSSR to soft initialize
041350  004737  016470                  JSR     PC,SOFTNIT              ;DO SOFT INIT OF CONTROLLER
041354  103405                          BCS     20$                     ;BR IF SOFT INIT = OK
041356                                  NEXT.ERRNO
041356  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
041360                                  ERRDF   ERRNO,SFTERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
041360  104455                                                                          TRAP    C$ERDF
041362  001613                                                                          .WORD   907
041364  003550                                                                          .WORD   SFIERR
041366  011506                                                                          .WORD   SFIMSG

                                ;Get a valid test address
041370  005037  002170          20$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
041374  005037  041740                  CLR     T9KT                    ;TEST ABOVE 28K SWITCH
041400  012703  041744                  MOV     #T9BLK,R3               ;POINT TO TEST PATTERN TABLE
041404                          T93LOOP:
```

```
6647 041404  005037  003102                CLR     KTENABLE                ;TURN OFF ABOVE 28K TEST FLAG
6648 041410  012301                        MOV     (R3)+,R1                ;GET TEST PATTERN ADDRESS
6649 041412  010100                        MOV     R1,R0                   ;GET ADDRESS ALL "18 BITS"
6650 041414  042700  177774                BIC     #177774,R0              ;LEAVE ONLY A17 AND A16
6651 041420  042701  000003                BIC     #3,R1                   ;GET RID OF A17 AND A16
6652 041424  005737  041740                TST     T9KT                    ;TEST ABOVE 28K THIS TIME?
6653 041430  001407                        BEQ     25$                     ;BR IF NO
6654 041432  016300  177776                MOV     -2(R3),R0               ;GET TEST PATTERN AGAIN
6655 041436  042700  177774                BIC     #^C<A1715>,R0           ;SAVE 18 BIT ADDRESS ONLY
6656 041442  012737  000001  003102        MOV     #1,KTENABLE             ;TURN ON ABOVE 28K TEST FLAG
6657 041450  004737  042746          25$:  JSR     PC,T9CONVERT            ;CONVERT TEST PATTERN TO TEST ADDRESS
6658 041454  103402                        BCS     30$                     ;BR IF VALID TEST ADDRESS
6659 041456  000137  041560                JMP     60$                     ;GET NEXT TEST PATTERN
6660                                  ;Set the test packet characteristics data pointer to the test address
6661 041462  012704  041670          30$:  MOV     #T9PACKET,R4            ;GET THE ADDRESS OF COMMAND PACKET
6662 041466  004737  043436                JSR     PC,T9SWRT               ;RESTORE PACKET TO STARTING VALUES
6663 041472  013764  041734  000002        MOV     T9LOADD,PKLOW(R4)       ;STORE CHAR. DATA PTR LOW ADDRESS
6664 041500  013764  041732  000004        MOV     T9HIADD,PKHI(R4)        ;STORE CHAR. DATA PTR HIGH ADDRESS
6665 041506  004737  043546                JSR     PC,T9CHAR               ;STORE EXPECTED DATA IN DATA BLOCK
6666                                  ;Do a WRITE CHARACTERISTIC command
6667 041512  004737  020070                JSR     PC,KTOFF                ;TURN OFF KT-11
6668 041516  010465  177776                MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
6669 041522  004737  017060                JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
6670 041526                                FORCERROR       32$
6671 041542  103405                        BCS     40$                     ;BR IF SSR SET IN CHKTSSR
6672 041544  010001                        MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
6673 041546                                NEXT.ERRNO
6674 041546                          32$:  ERRDF   ERRNO,T9WRTSSR,PKTSSR   ;DEVICE FATAL SSR FAILED TO SET
     041546  104455                                                                TRAP    C$ERDF
     041550  001614                                                                .WORD   908
     041552  042202                                                                .WORD   T9WRTSSR
     041554  011520                                                                .WORD   PKTSSR
6675 041556                          40$:  CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     041556  104406                                                                TRAP    C$CLP1
6676 041560                          60$:
6677 041560  020327  042076                CMP     R3,#T9TBE               ;DONE ALL TSTBLK TEST PATTERNS?
6678 041564  103002                        BHIS    65$                     ;BR IF YES
6679 041566  000137  041404                JMP     T93LOOP         ;DO ANOTHER MODULO-4 ADDRESS
6680 041572  005737  041740          65$:  TST     T9KT                    ;DONE ABOVE 28K TESTING TOO?
6681 041576  003012                        BGT     70$                     ;BR IF YES
6682 041600  005737  003100                TST     KTFLG                   ;ANY MEMORY ABOVE 28K ON SYSTEM?
6683 041604  001407                        BEQ     70$                     ;BR IF NO
6684 041606  012737  000001  041740        MOV     #1,T9KT         ;SET SWITCH
6685 041614  012703  041744                MOV     #T98LK,R3               ;RESET TEST PATTERN TABLE
6686 041620  000137  041404                JMP     T93LOOP         ;DO ABOVE 28K TESTING
6687 041624  004737  020070          70$:  JSR     PC,KTOFF                ;TURN OFF KT11
6688 041630                                ENDSUB                          ;\\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\
     041630                                                                L10074:
     041630  104403                                                                TRAP    C$ESUB
6689 041632  005737  002170                TST     FATFLG                  ;ANY FATAL ERRORS ?
6690 041636  001402                        BEQ     75$                     ;BRANCH IF NOT
6691 041640  004737  017776                JSR     PC,CKDROP               ;TRY TO DROP THE UNIT
6692 041644                          75$:
6693 041644  004737  017200          100$: JSR     PC,TSTLOOP              ;SHOULD WE DO ITERATIONS?
6694 041650  103002                        BCC     105$                    ;BR IF NO
6695 041652  000137  040466                JMP     T9LOOP                  ;LOOP UNTIL ITERATION COUNT DONE
6696 041656                          105$:
```

```
6697 041656  004737  020070                  JSR     PC,KTOFF                ;TURN OFF MEMORY MANAGEMENT
6698 041662                                  EXIT    TST                     ;ALL DONE THIS TEST
     041662  104432                                                                  TRAP    C$EXIT
     041664  001724                                                                  .WORD   L10071-.
6699
6700
6701                                 ;*
6702                                 ;LOCAL STORAGE FOR THIS TEST
6703                                 ;*
6704
6706 041666                                  .BLKB   10.*.TUV2A87>
6708 041670                          T9PACKET:                               ;COMMAND PACKET FOR TEST
6709 041670  100004                          .WORD   100004                  ;WRITE CHARACTERISTICS COMMAND, WITH ACK
6710 041672  041700                          .WORD   T9DATA                  ;ADDRESS OF CHARACTERISTICS BLOCK
6711 041674  000000                          .WORD   0
6712 041676  000010                          .WORD   8.                      ;STARTING VALUE OF BLOCK SIZE
6713
6714 041700                          T9DATA:                         ;CHARACTERISTICS DATA BLOCK
6715 041700  041712                          .WORD   T98FR                   ;LOW ADDRESS OF MESSAGE BUFFER
6716 041702  000000                          .WORD   0                       ;HIGH ORDER OF MESSAGE BUFFER
6717 041704  000016                          .WORD   14.                     ;LENGTH OF MESSAGE BUFFER
6718 041706  000000  000000                  .WORD   0,0
6719
6720 041712                          T98FR:  .BLKW   8.                      ;MESSAGE BUFFER
6721
6722 041732  000000                  T9HIADD:        .WORD   0               ;HIGH ADDRESS
6723 041734  000000                  T9LOADD:        .WORD   0               ;LOW ADDRESS
6724 041736  000000                  T9PAR6: .WORD   0               ;ADDRESS IN PAR FORMAT
6725 041740  000000                  T9KT:           .WORD   0               ;TEST ABOVE 28K SWITCH
6726 041742  000000                  T94TST: .WORD   0               ;ADDRESS TEST BIT
6727                                 ;*
6728                                 ;
6729                                 ;TABLE OF ADDRESSES
6730                                 ;
6731                                 ;
6732 041744  000001                  T98LK:  .WORD   000001
6733 041746  000002                          .WORD   000002
6734 041750  000003                          .WORD   000003
6735 041752  000005                          .WORD   000005
6736 041754  000006                          .WORD   000006
6737 041756  000007                          .WORD   000007
6738 041760  000011                          .WORD   000011
6739 041762  000012                          .WORD   000012
6740 041764  000013                          .WORD   000013
6741 041766  000021                          .WORD   000021
6742 041770  000022                          .WORD   000022
6743 041772  000023                          .WORD   000023
6744 041774  000041                          .WORD   000041
6745 041776  000042                          .WORD   000042
6746 042000  000043                          .WORD   000043
6747 042002  000101                          .WORD   000101
6748 042004  000102                          .WORD   000102
6749 042006  000103                          .WORD   000103
6750 042010  000201                          .WORD   000201
6751 042012  000202                          .WORD   000202
6752 042014  000203                          .WORD   000203
6753 042016  000401                          .WORD   000401
```

```
 6754 042020  000402                        .WORD   000402
 6755 042022  000403                        .WORD   000403
 6756 042024  001001                        .WORD   001001
 6757 042026  001002                        .WORD   001002
 6758 042030  001003                        .WORD   001003
 6759 042032  002001                        .WORD   002001
 6760 042034  002002                        .WORD   002002
 6761 042036  002003                        .WORD   002003
 6762 042040  004001                        .WORD   004001
 6763 042042  004002                        .WORD   004002
 6764 042044  004003                        .WORD   004003
 6765 042046  010001                        .WORD   010001
 6766 042050  010002                        .WORD   010002
 6767 042052  010003                        .WORD   010003
 6768 042054  020001                        .WORD   020001
 6769 042056  020002                        .WORD   020002
 6770 042060  020003                        .WORD   020003
 6771 042062  040001                        .WORD   040001
 6772 042064  040002                        .WORD   040002
 6773 042066  040003                        .WORD   040003
 6774 042070  100001                        .WORD   100001
 6775 042072  100002                        .WORD   100002
 6776 042074  100003                        .WORD   100003
 6777 042076  177777            T9TBE:      .WORD           177777
 6778                                       ;*
 6779                                       ;LOCAL TEXT MESSAGES FOR TEST
 6780                                       ;-
 6781
 6782 042100      104     115     101  TST9ID: .ASCIZ  'DMA Memory Addressing'
 6783 042126      103     157     156  T9GETSSR:       .ASCIZ  'Contents of TSSR Incorrect After GET STATUS'
 6784 042202      103     157     156  T9WRTSSR:       .ASCIZ  'Contents of TSSR Incorrect After WRITE CHARACTERISTICS'
 6785 042271      115     145     163  T9MSGBUF:       .ASCIZ  'Message Buffer Contents Incorrect After WRITE CHARACTERISTICS'
 6786 042367      102     141     143  T9BKGND:        .ASCIZ  'Background Pattern Disturbed By WRITE CHARACTERISTICS'
 6787 042455      105     170     160  T9NINT: .ASCIZ  'Expected Interrupt Not Received On WRITE CHARACTERISTICS'
 6788 042546      122     162     151  T9DPR:          .ASCIZ  'Write Characteristic data in ram does not match expected'
 6789 042637      124     123     123  T9NXM:          .ASCIZ  'TSSR NXM bit failed to set when non-existent memory address specifi
ed'
 6790                                               .EVEN
 6791
```

```
                                ;+
                                ;ROUTINE TO CONVERT A TEST PATTERN TO A VALID ADDRESS IN DIAGNOSTIC FREE SPACE
                                ;       DIAGNOSTIC FREE SPACE IS BETWEEN THE END OF THE DIAGNOSTIC AND THE
                                ;       BEGINNING OF THE SUPERVISOR. THIS IS ALWAYS BELOW 24K.
                                ;       IF MEMORY ABOVE 28K SPECIFIED (VIA R1) THEN PAR 6 IS SET
                                ;       TO THE RELOCATION BASE.
                                ;
                                ; INPUTS:
                                ;
                                ;       R0      HIGH ORDER ADDRESS BITS
                                ;       R1      LOW ORDER ADDRESS BITS
                                ;
                                ; OUPTUTS:
                                ;       T9PAR6 - ADDRESS BIASED TO PAR6 IF >28K UNDER TEST
                                ;       T9HIADD - HIGH ORDER ADDRESS IN NON PAR6 FORMAT
                                ;       T9LOADD - LOW ORDER ADDRESS IN NON PAR6 FORMAT
                                ;       C BIT = 1 IF GOOD ADDRESS RETURNED
                                ;       C BIT = 0 IF TEST PATTERN DID NOT YIELD A VALID ADDRESS
                                ;-
042746                          T9CONVERT:
042746                                  SAVREG                  ;SAVE R1-R5 UNTIL NEXT RETURN
042752  005037  041734                  CLR     T9LOADD ;CLEAR LOW ADDRESS
042756  005037  041732                  CLR     T9HIADD ;CLEAR HIGH ADDRESS
042762  005037  041736                  CLR     T9PAR6          ;CLEAR PAR6 BIASED ADDRESS
042766  042701  170000                  BIC     #^C<7777>,R1    ;FORCE TO LOWER 12 BITS OF ADDRESS
042772  010005                          MOV     R0,R5           ;SAVE HIGH ORDER ADDRESS BITS
042774  004737  020070                  JSR     PC,KTOFF        ;SHUTOFF MEMORY MANAGEMENT
043000  013702  003072                  MOV     FREE,R2         ;GET FIRST FREE ADDRESS
043004  062702  000020                  ADD     #16.,R2         ;IN CASE TEST PATTERN=0
043010  060102                          ADD     R1,R2           ;ADD IN TEST PATTERN
043012  042702  000003                  BIC     #3,R2           ;MAKE IT MODULO-4
043016  013703  003076          25$:    MOV     FREEHI,R3       ;GET LAST FREE ADDRESS
043022  162703  000020                  SUB     #16.,R3         ;SAVE AT LEAST 8 WORDS (IN CASE MESSAGE BUFFER)
043026  010237  041734                  MOV     R2,T9LOADD      ;SAVE POSSIBLE LOW ADDRESS
043032  010237  041736                  MOV     R2,T9PAR6       ;SAVE IT IN PAR6 BIASED TOO
043036  020203                          CMP     R2,R3           ;IS THIS ADDRESS ABOVE FREE SPACE?
043040  101007                          BHI     35$             ;BR IF YES
043042  020237  003072                  CMP     R2,FREE         ;IS IT IN FREE SPACE?
043046  103007                          BHIS    50$             ;BR IF YES- ITS GOOD
043050  005737  003102                  TST     KTENABLE        ;TESTING ABOVE 28K?
043054  001004                          BNE     50$             ;BR IF YES
043056  000424                          BR      90$             ;BR IF NOT IN FREE SPACE
043060  162702  000020          35$:    SUB     #16.,R2         ;FORCE FIT THE TEST PATTERN
043064  000754                          BR      25$             ;TRY THIS TEST PATTERN ADDRESS
043066                          50$:
043066  005737  003102                  TST     KTENABLE        ;TESTING ABOVE 28K?
043072  001420                          BEQ     100$            ;BR IF NO
043074  005737  003100                  TST     KTFLG           ;ANY MEMORY ABOVE 28K?
043100  001413                          BEQ     90$             ;BR IF NO
043102  004737  020052                  JSR     PC,KTON         ;TURN ON MEMORY MANAGEMENT
043106  010500                          MOV     R5,R0           ;GET HIGH ORDER ADDRESS
043110  010037  041732                  MOV     R0,T9HIADD      ;SAVE POSSIBLE HIGH ADDRESS
043114  010201                          MOV     R2,R1           ;GET COMPUTED LOW ORDER ADDRESS
043116  004737  020112                  JSR     PC,SETMAP       ;RETURN PAR6 BIASED ADDRESS IN R0
043122  010037  041736                  MOV     R0,T9PAR6       ;COPY PAR6 BIASED ADDRESS
043126  103403                          BCS     105$            ;BR IF VALID ADDRESS
```

```
 6850 043130  000241            90$:    CLC                     ;CLR C BIT FOR FAILURE
 6851 043132  000401                    BR      105$            ;
 6852 043134  000261            100$:   SEC                     ;SET SUCCESS
 6853 043136  000207            105$:   RTS     PC              ;RETURN
 6854
 6855
```

```
                                        ;*
                                        ;ONLY FOR MESSAGE BUFFER ADDRESSES
                                        ;ROUTINE TO CONVERT A TEST PATTERN TO A VALID ADDRESS IN DIAGNOSTIC FREE SPACE
                                        ;       DIAGNOSTIC FREE SPACE IS BETWEEN THE END OF THE DIAGNOSTIC AND THE
                                        ;       BEGINNING OF THE SUPERVISOR. THIS IS ALWAYS BELOW 24K.
                                        ;       IF MEMORY ABOVE 28K SPECIFIED (VIA R1) THEN PAR 6 IS SET
                                        ;       TO THE RELOCATION BASE.
                                        ;
                                        ; INPUTS:
                                        ;
                                        ;       R0      HIGH ORDER ADDRESS BITS
                                        ;       R1      LOW ORDER ADDRESS BITS
                                        ;
                                        ; OUPTUTS:
                                        ;       T9PAR6 - ADDRESS BIASED TO PAR6 IF >28K UNDER TEST
                                        ;       T9HIADD - HIGH ORDER ADDRESS IN NON PAR6 FORMAT
                                        ;       T9LOADD - LOW ORDER ADDRESS IN NON PAR6 FORMAT
                                        ;       C BIT = 1 IF GOOD ADDRESS RETURNED
                                        ;       C BIT = 0 IF TEST PATTERN DID NOT YIELD A VALID ADDRESS
                                        ;
6878 043140                             T9CT2:
6879 043140                                     SAVREG                  ;SAVE R1-R5 UNTIL NEXT RETURN
6880 043144  005037  041734                     CLR     T9LOADD ;CLEAR LOW ADDRESS
6881 043150  005037  041732                     CLR     T9HIADD ;CLEAR HIGH ADDRESS
6882 043154  005037  041736                     CLR     T9PAR6          ;CLEAR PAR6 BIASED ADDRESS
6883 043160  042701  170000                     BIC     #^C<7777>,R1    ;FORCE TO LOWER 12 BITS OF ADDRESS
6884 043164  010005                             MOV     R0,R5           ;SAVE HIGH ORDER ADDRESS BITS
6885 043166  004737  020070                     JSR     PC,KTOFF        ;SHUTOFF MEMORY MANAGEMENT
6886 043172  013702  003072                     MOV     FREE,R2         ;GET FIRST FREE ADDRESS
6887 043176  062702  000020                     ADD     #16.,R2         ;IN CASE TEST PATTERN=0
6888 043202  060102                             ADD     R1,R2           ;ADD IN TEST PATTERN
6889 043204  013703  003076        25$:        MOV     FREEHI,R3       ;GET LAST FREE ADDRESS
6890 043210  162703  000020                     SUB     #16.,R3         ;SAVE AT LEAST 8 WORDS (IN CASE MESSAGE BUFFER)
6891 043214  010237  041734                     MOV     R2,T9LOADD      ;SAVE POSSIBLE LOW ADDRESS
6892 043220  010237  041736                     MOV     R2,T9PAR6       ;SAVE IT IN PAR6 BIASED TOO
6893 043224  020203                             CMP     R2,R3           ;IS THIS ADDRESS ABOVE FREE SPACE?
6894 043226  101007                             BHI     35$             ;BR IF YES
6895 043230  020237  003072                     CMP     R2,FREE         ;IS IT IN FREE SPACE?
6896 043234  103007                             BHIS    50$             ;BR IF YES- ITS GOOD
6897 043236  005737  003102                     TST     KTENABLE        ;TESTING ABOVE 28K?
6898 043242  001004                             BNE     50$             ;BR IF YES
6899 043244  000424                             BR      90$             ;BR IF NOT IN FREE SPACE
6900 043246  162702  000020        35$:        SUB     #16.,R2         ;FORCE FIT THE TEST PATTERN
6901 043252  000754                             BR      25$             ;TRY THIS TEST PATTERN ADDRESS
6902 043254                         50$:
6903 043254  005737  003102                     TST     KTENABLE        ;TESTING ABOVE 28K?
6904 043260  001420                             BEQ     100$            ;BR IF NO
6905 043262  005737  003100                     TST     KTFLG           ;ANY MEMORY ABOVE 28K?
6906 043266  001413                             BEQ     90$             ;BR IF NO
6907 043270  004737  020052                     JSR     PC,KTON         ;TURN ON MEMORY MANAGEMENT
6908 043274  010500                             MOV     R5,R0           ;GET HIGH ORDER ADDRESS
6909 043276  010037  041732                     MOV     R0,T9HIADD      ;SAVE POSSIBLE HIGH ADDRESS
6910 043302  010201                             MOV     R2,R1           ;GET COMPUTED LOW ORDER ADDRESS
6911 043304  004737  020112                     JSR     PC,SETMAP       ;RETURN PAR6 BIASED ADDRESS IN R0
6912 043310  010037  041736                     MOV     R0,T9PAR6       ;COPY PAR6 BIASED ADDRESS
6913 043314  103403                             BCS     105$            ;BR IF VALID ADDRESS
```

```
6914 043316  000241          90$:    CLC             ;CLR C BIT FOR FAILURE
6915 043320  000401                  BR      105$    ;
6916 043322  000261          100$:   SEC             ;SET SUCCESS
6917 043324  000207          105$:   RTS     PC      ;RETURN
6918
```

```
                                ;*
                                ;
                                ;ROUTINE TO READ THE FIRST 2 BYTES FROM RAM
                                ;MEMORY AND COMPARE THIS DATA TO A COMMAND PACKET.
                                ;
                                ;INPUT:
                                ;
                                ;       R4      ADDRESS OF THE COMMAND PACKET
                                ;       R5      FIRST DEVICE UNIBUS ADDRESS
                                ;
                                ;OUTPUT:
                                ;
                                ;       CARRY   SET - RAM MATCHES PACKET
                                ;               CLR - RAM DOES NOT MATCH PACKET
                                ;
                                ;IMPLICIT OUTPUT:
                                ;
                                ;       THE TABLE RAMDATA IS FILLED WITH THE
                                ;       DATA HELD IN RAM.
                                ;       RAMSIZ  SET TO 2 FOR PRAMPKT ROUTINE
                                ;
                                ;SIDE EFFECTS:
                                ;
                                ;       THE SUBSYSTEM IS LEFT IN MAINTENANCE MODE
                                ;
                                ;
043326                          T9CKRAM::
043326                                  SAVREG                  ;SAVE THE GENERAL REGISTERS
043332  012701  002206                  MOV     #RAMDATA,R1     ;ADDRESS TO SAVE THE RAM DATA
043336  012702  000020                  MOV     #RMPKTBEG,R2    ;BYTE ADDRESS OF FIRST RAM DATA
043342  005003                          CLR     R3              ;CLEAR THE ERROR FLAG
043344  004737  017060                  JSR     PC,CHKTSSR      ;WAIT FOR SSR
043350  112765  000000  177776          MOVB    #0,TSDB(R5)     ;SET MAINTENANCE MODE
043356  004737  017060          10$:    JSR     PC,CHKTSSR      ;WAIT FOR SSR TO SET
043362  010265  177776                  MOV     R2,TSDB(R5)     ;SELECT NEXT RAM ADDRESS
043366  004737  017060                  JSR     PC,CHKTSSR      ;WAIT FOR SSR TO SET
043372  116511  177776                  MOVB    TSBA(R5),(R1)   ;READ THE RAM DATA
043376  122124                          CMPB    (R1)+,(R4)+     ;COMPARE TO EXPECTED
043400  001401                          BEQ     20$             ;BRANCH IF OK
043402  005203                          INC     R3              ;SET ERROR FLAG
043404  005202                  20$:    INC     R2              ;ADDRESS OF NEXT RAM LOCATION
043406  020227  000022                  CMP     R2,#RMPKTBEG+2  ;DONE 2 BYTES?
043412  002761                          BLT     10$             ;BR IF NO
043414  005703                          TST     R3              ;WAS AN ERROR FOUND ?
043416  001402                          BEQ     30$             ;BRANCH IF NOT
043420  000241                          CLC                     ;CLEAR CARRY TO SHOW ERROR
043422  000401                          BR      50$             ;AND EXIT
043424  000261                  30$:    SEC                     ;SHOW GOOD COMPARE
043426  012737  000002  002246  50$:    MOV     #2,RAMSIZ       ;SETUP RAMSIZ
043434  000207                          RTS     PC              ;RETURN
                                ;*
                                ;
                                ;ROUTINE TO SETUP PACKET TO WRITE CHARACTERISTICS
                                ;
                                ;
043436                          T9SWRT:
043436                                  SAVREG                  ;SAVE THE REGISTERS
```

```
6977 043442  012701  041670                  MOV     #T9PACKET,R1    ;START OF THE PACKET
6978 043446  012721  100004                  MOV     #100004,(R1)+   ;WRITE CHARACTERISTICS WITH ACK
6979 043452  012721  041700                  MOV     #T9DATA,(R1)+   ;ADDRESS OF CHAR DATA BLOCK
6980 043456  005021                          CLR     (R1)+           ;EXTENDED ADDRESS
6981 043460  012721  000010                  MOV     #8.,(R1)+       ;SIZE OF DATA BLOCK IN BYTES
6982 043464  012721  041712                  MOV     #T9BFR,(R1)+    ;ADDRESS OF MESSAGE BUFFER
6983 043470  005021                          CLR     (R1)+
6984 043472  012721  000016                  MOV     #14.,(R1)+      ;LENGTH OF MESSAGE BUFFER
6985 043476  005021                          CLR     (R1)+
6986 043500  005011                          CLR     (R1)
6987 043502  000207                          RTS     PC              ;RETURN
6988                                ;+
6989                                ;
6990                                ;ROUTINE TO SETUP A GET STATUS COMMAND PACKET AT CURRENT PACKET ADDRESS
6991                                ;
6992                                ;       R3      HIGH ORDER PACKET ADDRESS
6993                                ;       R4      LOW ORDER PACKET ADDRESS
6994                                ;       NOTE: R3 IS IGNORED IF KTENABLE FLAG CLEAR
6995                                ;
6996                                ;-
6997
6998 043504                        T9SETGET:
6999 043504                              SAVREG                  ;SAVE THE REGISTERS
7000 043510  010401                      MOV     R4,R1           ;GET LOW ORDER ADDRESS
7001 043512  005737  003102              TST     KTENABLE        ;TESTING ABOVE 28K?
7002 043516  001404                      BEQ     10$             ;BR IF NO
7003 043520  010300                      MOV     R3,R0           ;GET HIGH ORDER ADDRESS
7004 043522  004737  020112              JSR     PC,SETMAP       ;RETURN ADDRESS BIASED TO PAR6 IN R0
7005 043526  010001                      MOV     R0,R1           ;GET ADDRESS
7006 043530  012700  000017      10$:    MOV     #P.GETSTATUS,R0 ;GET STATUS COMMAND CODE NO IE
7007 043534  052700  100000              BIS     #P.ACK,R0       ;SET ACK
7008 043540  010021                      MOV     R0,(R1)+        ;STORE GET STATUS IN PACKET
7009 043542  005021                      CLR     (R1)+           ;CLEAR UNUSED WORD
7010 043544  000207                      RTS     PC              ;RETURN
7011                                ;+
7012                                ;
7013                                ;ROUTINE TO SETUP A CHARACTERISTIC DATA BLOCK AT A TEST ADDRESS
7014                                ;
7015                                ;-
7016 043546                        T9CHAR:
7017 043546                              SAVREG                  ;SAVE R1-R5 UNTIL NEXT RETURN
7018 043552  012700  041700              MOV     #T9DATA,R0      ;GET T9PACKET DATA POINTER
7019 043556  013701  041734              MOV     T9LOADD,R1      ;ASSUME NOT ABOVE 28K
7020 043562  005737  003102              TST     KTENABLE        ;TESTING ABOVE 28K?
7021 043566  001402                      BEQ     10$             ;BR IF NO
7022 043570  013701  041736              MOV     T9PAR6,R1       ;SET TEST ADDRESS ABOVE 28K
7023 043574  012021              10$:    MOV     (R0)+,(R1)+     ;STORE DATA WORD 1
7024 043576  012021                      MOV     (R0)+,(R1)+     ;STORE DATA WORD 2
7025 043600  012021                      MOV     (R0)+,(R1)+     ;STORE DATA WORD 3
7026 043602  012021                      MOV     (R0)+,(R1)+     ;STORE DATA WORD 4
7027 043604  012021                      MOV     (R0)+,(R1)+     ;STORE DATA WORD 5
7028 043606  000207                      RTS     PC              ;RETURN
7029 043610                              ENDTST
     043610                                                                  L10071:
     043610  104401                                                                  TRAP    C$ETST
```

```
                                        .SBTTL  TEST  10: INITIALIZE AFTER WRITE CHARACTERISTICS
                                ;+
                                ; TEST DESCRIPTION:
                                ;
                                ;       This test verifies that a Hardware Initialize command
                                ;       invoked after a Write Characteristics command sets up
                                ;       the Command, Message and Characteristic image blocks
                                ;       in the controller ram correctly.
                                ;
                                ; TEST STEPS:
                                ;
                                ;       REPEAT FOR LOOPCNT
                                ;         BEGIN
                                ;               Do WRITE CHARACTERISTICS command.
                                ;               If the NBA bit in the TSSR register is NOT=0 then Print Error.
                                ;               Write to TSSR register to soft initialize the controller
                                ;               If controller RAM 310-377 NOT=0 then Print Error
                                ;         END
                                ;--


043612                                  BGNTST
043612                                                                          T10::
043612  005037  002170                  CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
043616  012737  005672  002146          MOV     #EPRT1,EPRTSW           ;SET UP ERROR MESSAGE SWITCH
043624  005037  003100                  CLR     KTFLG           ;HOLD OFF KT11
043630  012700  044262                  MOV     #TST10ID,R0             ;ASCII MESSAGE TO IDENTIFY TEST
043634  004737  017232                  JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
043640  012737  000002  002164          MOV     #2.,LOOPCNT             ;PERFORM 2 ITERATIONS
043646                          T10LOOP:
043646  004737  044536                  JSR     PC,T10REST              ;SET PACKET TO START-UP VALUES

043652  012703  002732                  MOV     #TSTBLK+10.,R3          ;START OF TEST DATA
043656  012704  044220                  MOV     #T10PACKET,R4           ;GET THE ADDRESS OF COMMAND PACKET
043662  012764  000010  000006          MOV     #8.,PKBCNT(R4)          ;START WITH MINIMUM ALLOWABLE VALUE
043670                          5$:
043670  004737  016470                  JSR     PC,SOFINIT              ;WRITE TO TSSR TO SOFT INITIALIZE
043674  103405                          BCS     10$                     ;BR IF SOFT INIT OKAY
043676  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
043700                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL DURING INIT
043700  104455                                                                  TRAP    C$ERDF
043702  001750                                                                  .WORD   1000
043704  003550                                                                  .WORD   SFIERR
043706  011506                                                                  .WORD   SFIMSG

                                ;Do WRITE CHARACTERISTICS command.
043710  005037  002170          10$:    CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
043714  010465  177776                  MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS TO EXECUTE
043720  004737  017060                  JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
043724                                  FORCERROR       12$                     ;BBOFORCE ERROR IF FORCER=1
043740  103407                          BCS     15$                     ;BR IF CARRY SET (GOOD RETURN)
043742  010001                          MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
043744                                  NEXT,ERRNO
043744                          12$:    ERRDF   ERRNO,T10SSR,PKTSSR     ;DEVICE FATAL SSR FAILED TO SET
043744  104455                                                                  TRAP    C$ERDF
043746  001751                                                                  .WORD   1001
043750  044447                                                                  .WORD   T10SSR
```

```
     043752  011520                                                                  .WORD   PKTSSR
7085 043754  004737  017724          JSR     PC,FATCHK               ;INC AND CHECK FOR MORE THAN 25 ERRORS
7086 043760                  15$:    CKLOOP                          ;LOOP ON ERROR, IF FLAG SET
     043760  104406                                                                  TRAP    C$CLP1
7087 043762  016501  000000          MOV     TSSR(R5),R1             ;GET THE CONTENTS OF TSSR
7088 043766  012702  000200          MOV     #SSR,R2                 ;EXPECTED CONTENTS OF TSSR
7089 043772  032701  000100          BIT     #OFL,R1                 ;IS OFF-LINE BIT SET ?
7090 043776  001402                  BEQ     25$                     ;BRANCH IF NOT OFF-LINE
7091 044000  052702  000100          BIS     #OFL,R2                 ;SET OFF-LINE IN EXPECTED DATA
7092
7093                                ;If the NBA bit in the TSSR register is NOT=0 then Print Error.
7094 044004                  25$:
7095 044004                          FORCERROR       27$                     ;&&0
7096 044020  020201                  CMP     R2,R1                   ;DOES EXPECTED MATCH RECEIVED ?
7097 044022  001404                  BEQ     30$                     ;OKAY IF MATCH
7098 044024                          NEXT.ERRNO
7099 044024                  27$:    ERRHRD  ERRNO,T10NBA,PKTSSR     ;NBA NOT ZERO
     044024  104456                                                                  TRAP    C$ERHRD
     044026  001752                                                                  .WORD   1002
     044030  044374                                                                  .WORD   T10NBA
     044032  011520                                                                  .WORD   PKTSSR
7100 044034                  30$:    CKLOOP                          ;LOOP ON ERROR ?
     044034  104406                                                                  TRAP    C$CLP1
7101
7102                               ;Write to TSSR register to soft initialize the controller
7103 044036                  40$:
7104 044036  004737  016470          JSR     PC,SOFINIT              ;WRITE TO TSSR TO SOFT INITIALIZE
7105 044042                          FORCERROR       42$                     ;&&0
7106 044056  103405                  BCS     50$                     ;BR IF SOFT INIT OKAY
7107 044060  010001                  MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
7108 044062                          NEXT.ERRNO
7109 044062                  42$:    ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL DURING INIT
     044062  104455                                                                  TRAP    C$ERDF
     044064  001753                                                                  .WORD   1003
     044066  003550                                                                  .WORD   SFIERR
     044070  011506                                                                  .WORD   SFIMSG
7110
7111                               ;If controller RAM 310-377 NOT=0 then Print Error
7112 044072  012704  000310  50$:    MOV     #310,R4                 ;START WITH LOC 310
7113 044076  005002                  CLR     R2                      ;MEMORY EXPECTED SHOULD BE 000000
7114 044100  004737  017060          JSR     PC,CHKTSSR              ;WAIT FOR SSR READY
7115 044104  110465  177777  60$:    MOVB    R4,TSDBH(R5)            ;SELECT RAM ADDRESS
7116 044110  116501  177776          MOVB    TSBAL(R5),R1            ;READ LOC CONTENTS
7117 044114                          FORCERROR       62$,NOTSSR              ;&&0
7118 044124  120102                  CMPB    R1,R2                   ;CHECK MEMORY FOR 000000
7119 044126  001406                  BEQ     70$                     ;BRANCH IF DATA OKAY
7120 044130                          NEXT.ERRNO
7121 044130                  62$:    ERRDF   ERRNO,T10MEM,RAMEXP     ;MEMORY NOT ZERO AFTER INIT.
     044130  104455                                                                  TRAP    C$ERDF
     044132  001754                                                                  .WORD   1004
     044134  044335                                                                  .WORD   T10MEM
     044136  016223                                                                  .WORD   RAMEXP
7122 044140  004737  017724          JSR     PC,FATCHK               ;INC AND CHECK FOR MORE THAN 25 ERRORS
7123 044144                  70$:    CKLOOP
     044144  104406                                                                  TRAP    C$CLP1
7124 044146                          ESCAPE  TST                     ;EXIT ON FATAL ERROR
     044146  104410                                                                  TRAP    C$ESCAPE
```

```
     044150  000434                                                          .WORD   L10075-.
7125
7126 044152  005204                 82$:    INC     R4              ;LOOK AT NEXT RAM LOC.
7127 044154  020427  000377                 CMP     R4,#377         ;AT TOP OF RAM ADDRESS SPACE
7128 044160  001351                         BNE     60$             ;BRANCH TILL ALL MEMORY TESTED
7129
7130
7131 044162  005737  002170                 TST     FATFLG          ;ANY FATAL ERRORS ?
7132 044166  001402                         BEQ     160$            ;BRANCH IF NOT
7133 044170  004737  017776                 JSR     PC,CKDROP       ;TRY TO DROP THE UNIT
7134 044174  004737  017200         160$:   JSR     PC,TSTLOOP      ;DONE ALL ITERATIONS?
7135 044200  103002                         BCC     165$            ;BR IF YES
7136 044202  000137  043646                 JMP     T10LOOP         ;LOOP UNTIL ITERATION COUNT DONE
7137 044206                         165$:
7138 044206                         EXIT    TST
     044206  104432                                                          TRAP    C$EXIT
     044210  000374                                                          .WORD   L10075-.
7139
7140
```

```
7142                                    ;*
7143                                    ;LOCAL STORAGE FOR THIS TEST
7144                                    ;-
7145
7147 044212                                     .BLKB   10-<.-TUV2A&7>
7149 044220                             T10PACKET:
7150 044220  100004                             .WORD   100004                  ;COMMAND PACKET FOR TEST
7151 044222  044230                             .WORD   T10DATA                 ;WRITE CHARACTERISTICS COMMAND, WITH ACK
7152 044224  000000                             .WORD   0                       ;ADDRESS OF CHARACTERISTICS BLOCK
7153 044226  000010                             .WORD   8.                      ;STARTING VALUE OF BLOCK SIZE
7154
7155 044230                             T10DATA:                                        ;CHARACTERISTICS DATA BLOCK
7156 044230  044242                             .WORD   T10BFR                  ;ADDRESS OF MESSAGE BUFFER
7157 044232  000000                             .WORD   0
7158 044234  000016                             .WORD   14.                     ;LENGTH OF MESSAGE BUFFER
7159 044236  000000  000000                     .WORD   0,0
7160
7161 044242                             T10BFR: .BLKW   8.                      ;MESSAGE BUFFER
7162                                    ;LOCAL TEXT MESSAGES FOR TEST
7163                                    ;-
7164
7165 044262    111    156    151  TST10ID:        .ASCIZ  'Initialization After WRITE CHARACTERISTICS'
7166 044335    111    156    143  T10MEM: .ASCIZ  'Incorrect RAM Data After Init'
7167                                            .EVEN
7168 044374    127    122    111  T10NBA: .ASCIZ  'WRITE CHARACTERISTICS Command Not Accepted'
7169 044447    103    157    156  T10SSR: .ASCIZ  'Contents of iSSR Incorrect After WRITE CHARACTERISTICS'
7170
```

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

                                .EVEN

                                T10REST:
                                        SAVREG                          ;SAVE THE REGISTERS
044536  012701  044220                  MOV     #T10PACKET,R1           ;START OF THE PACKET
044542  012721  100004                  MOV     #100004,(R1)+           ;WRITE CHARACTERISTICS WITH ACK
044546  012721  044230                  MOV     #T10DATA,(R1)+          ;ADDRESS OF CHAR DATA BLOCK
044552  005021                          CLR     (R1)+                   ;EXTENDED ADDRESS
044556  012721  000010                  MOV     #8.,(R1)+               ;SIZE OF DATA BLOCK IN BYTES
044560  012721  044242                  MOV     #T10BFR,(R1)+           ;ADDRESS OF MESSAGE BUFFER
044564  005021                          CLR     (R1)+
044570  012721  000016                  MOV     #14.,(R1)+              ;LENGTH OF MESSAGE BUFFER
044572  005021                          CLR     (R1)+
044576  005011                          CLR     (R1)
044600  000207                          RTS     PC                      ;RETURN
044602                                  ENDTST
044604                                                                  L10075:
044604  104401                                                                  TRAP    C$ETST
```

```
                                        .SBTTL  TEST 11: BASIC WRITE SUBSYSTEM MEMORY COMMAND
                                ;*
                                ;
                                ;THIS TEST VERIFIES THAT THE WRITE SUBSYSTEM MEMORY COMMAND WITH A
                                ;BSELO SELECT CODE OF 0 (NO-OP) EXECUTES CORRECTLY. IT ALSO
                                ;VERIFIES THAT A WRITE SUBSYSTEM MEMORY COMMAND WITH A NON-ZERO
                                ;MODE FIELD IS REJECTED. THE TEST FURTHER VERIFIES MICROPROGRAM
                                ;COMMAND DECODING AND HANDLING SEQUENCES.
                                ;
                                ;-
                                        BGNTST
                                                                                        T11::
044606  005037  002170                   CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
044612  012737  005672  002146           MOV     #EPRT1,EPRTSW           ;SET UP ERROR MESSAGE SWITCH
044620  005037  003100                   CLR     KTFLG           ;HOLD OFF KT11
044624  012700  045670                   MOV     #TST11ID,R0             ;ASCII MESSAGE TO IDENTIFY TEST
044630  004737  017232                   JSR     PC,TSTSETUP             ;DO INITIAL TEST SETUP
044634  012737  000002  002164           MOV     #2.,LOOPCNT             ;PERFORM 2 ITERATIONS
044642                          T11LOOP:
044642                                  BGNSUB                          ;////////////// BEGIN SUBTEST ////////////
                                                                                T11.1:
044642  104402                                                                    TRAP    C$BSUB
044644  004737  045736                   JSR     PC,T11REST              ;SET PACKET TO INITIAL VALUES
044650  004737  045774                   JSR     PC,T11RST               ;SET PACKET TO INITIAL VALUES
044654                                  SETPRI  #PRI00                  ;LOWER PRIORITY TO ALLOW INTERRUPTS
044654  012700  000000                                                            MOV     #PRI00,R0
044660  104441                                                                    TRAP    C$SPRI
044662                          5$:
044662                                  BGNSEG                          ;>>>>>>>>>>>> BEGIN SEGMENT >>>>>>>>>>>>
044662  104404                                                                    TRAP    C$BSEG
044664  004737  016470                   JSR     PC,SOFINIT              ;DO SOFT INIT OF CONTROLLER
044670  103405                           BCS     10$                     ;BR IF SOFT INIT = OK
044672  010001                           MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
044674                                  ERRDF   ERRNO,SFIERR,SFIMSG     ;DEVICE FATAL ERROR DURING INIT
044674  104455                                                                    TRAP    C$ERDF
044676  002115                                                                    .WORD   1101
044700  003550                                                                    .WORD   SFIERR
044702  011506                                                                    .WORD   SFIMSG
044704                          10$:
044704  012704  045500                   MOV     #T11PK2,R4              ;SUBROUTINE NEEDS PACKET ADDRESS
044710  004737  010152                   JSR     PC,WRTCHR               ;ISSUE WRITE CHARACTERISTICS
044714  103405                           BCS     11$                     ;BR, IF COMMAND ISSUED OK
044716  010001                           MOV     R0,R1                   ;SAVE CONTENTS OF TSSR
044720                                  ERRHRD  ERRNO,WRTMSG,SFIMSG     ;WRITE CHARACTERISTISC FAILED
044720  104456                                                                    TRAP    C$ERHRD
044722  002116                                                                    .WORD   1102
044724  004754                                                                    .WORD   WRTMSG
044726  011506                                                                    .WORD   SFIMSG
044730                          11$:
044730  005037  002170                   CLR     FATFLG                  ;CLEAR FATAL ERROR FLAG
044734  005037  002172                   CLR     INTRECV                 ;CLEAR INTERRUPT RECEIVED FLAG
044740  012704  045060                   MOV     #T11PACKET,R4           ;SET UP NEW WRT. SUBSYS MEM. COMMAND
044744  010465  177776                   MOV     R4,TSDB(R5)             ;SET THE PACKET ADDRESS
044750  004737  017060                   JSR     PC,CHKTSSR              ;WAIT FOR SSR TO SET
044754  005737  002172                   TST     INTRECV                 ;DID AN INTERRUPT OCCUR ?
044760  001004                           BNE     22$                     ;BRANCH IF YES
```

```
7252 044762                                    ERRHRD  ERRNO,T11NINT,PKTSSR
     044762  104456                                                        TRAP    C$ERHRD
     044764  002117                                                        .WORD   1103
     044766  045576                                                        .WORD   T11NINT
     044770  011520                                                        .WORD   PKTSSR
7253 044772  016501  000000          22$:      MOV     TSSR(R5),R1         ;GET THE CONTENTS OF TSSR
7254 044776  012702  000200                    MOV     #SSR,R2             ;EXPECTED CONTENTS OF TSSR
7255 045002  032701  000100                    BIT     #OFL,R1             ;IS OFF-LINE BIT SET ?
7256 045006  001402                            BEQ     25$                 ;BRANCH IF NOT OFF-LINE
7257 045010  052702  000100                    BIS     #OFL,R2             ;SET OFF-LINE IN EXPECTED DATA
7258 045014  020201                  25$:      CMP     R2,R1               ;DOES EXPECTED MATCH RECEIVED ?
7259 045016  001404                            BEQ     30$                 ;OKAY IF MATCH
7263 045020                                    ERRHRD  ERRNO,T11NBA,PKTSSR ;NBA NOT ZERO
     045020  104456                                                        TRAP    C$ERHRD
     045022  002120                                                        .WORD   1104
     045024  045522                                                        .WORD   T11NBA
     045026  011520                                                        .WORD   PKTSSR
7264 045030                          30$:
7265 045030                                    ENDSEG                      ;<<<<<<<<<<<<< END SEGMENT <<<<<<<<<<<<<
     045030                                                                10000$:
     045030  104405                                                        TRAP    C$ESEG
7266
7267
7268 045032                          59$:      ENDSUB                      ;\\\\\\\\\\\\\ END SUBTEST \\\\\\\\\\\\\
     045032                                                                L10077:
     045032  104403                                                        TRAP    C$ESUB
7269
7270 045034  005737  002170                    TST     FATFLG              ;ANY FATAL ERRORS ?
7271 045040  001402                            BEQ     60$                 ;BRANCH IF NOT
7272 045042  004737  017776                    JSR     PC,CKDROP           ;TRY TO DROP THE UNIT
7273 045046                          60$:
7274 045046                                    EXIT    TST                 ;ALL DONE THIS TEST
     045046  104432                                                        TRAP    C$EXIT
     045050  000776                                                        .WORD   L10076-.
7275
7276                                           ;+
7277                                           ;LOCAL STORAGE FOR THIS TEST
7278                                           ;-
7279
7281 045052                                    .BLKB   10.*.TUV2A67>
7283 045060                          T11PACKET:                            ;COMMAND PACKET FOR TEST
7284 045060  100206                            .WORD   100206              ;WRITE SUBSYSTEM MEM. COMMAND, WITH IE, ACK
7285 045062  045070                            .WORD   T11DATA             ;ADDRESS OF CHARACTERISTICS BLOCK
7286 045064  000000                            .WORD   0
7287 045066  000006                            .WORD   6.                  ;STARTING VALUE OF BLOCK SIZE
7288 045070                          T11DATA:                              ;CHARACTERISTICS DATA BLOCK
7289 045070     000                  T11BS0:   .BYTE   0                   ;BSEL0 BYTE
7290 045071     000                  T11BS1:   .BYTE   0                   ;BSEL1 BYTE
7291 045072  000000                  T11BS2:   .WORD   0                   ;BSEL1 WORD
7292 045074  000000                            .WORD   0                   ;DATA
7293 045076                          T11BFR:   .BLKW   128.                ;MESSAGE BUFFER
7294
7295
7297 045476                                    .BLKB   10.*.TUV2A67>
7299 045500                          T11PK2:                               ;COMMAND PACKET FOR TEST
7300 045500  100204                            .WORD   100204              ;WRITE CHARA. MEM. CMND., WITH IE, ACK
7301 045502  045510                            .WORD   T11DTA              ;ADDRESS OF SELECT DATA BLOCK
```

```
7302 045504  000000                          .WORD   0
7303 045506  000010                          .WORD   8.                      ;STARTING VALUE OF BLOCK SIZE
7304
7305
7306 045510                          T11DTA:                                 ;SELECT DATA BLOCK
7307 045510  045076                          .WORD   T11BFR                  ;ADDRESS OF MESSAGE BUFFER
7308 045512  000000                          .WORD   0
7309 045514  000400                          .WORD   256.                    ;LENGTH OF MESSAGE BUFFER
7310 045516  000000  000000                  .WORD   0,0
7311
7312
7313                                 ;+
7314                                 ;LOCAL TEXT MESSAGES FOR TEST
7315                                 ;-
7316
7317 045522  127  122  111  T11NBA: .ASCIZ  'WRITE SUBSYSTEM MEMORY Command Not Accepted'
7318 045576  105  170  160  T11NINI:        .ASCIZ  'Expected Interrupt Not Received On WRITE SUBSYSTEM MEMORY'
7319 045670  102  141  163  TST11ID:        .ASCIZ  'Basic WRITE SUBSYSTEM MEMORY Command'
7320                                 .EVEN
7321
```

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

045736                          T11REST:
045736                                  SAVREG                          ;SAVE THE REGISTERS
045742  012701  045060                  MOV     #T11PACKET,R1           ;START OF THE PACKET
045746  012721  100206                  MOV     #100206,(R1)+           ;WRITE SUBSYSTEM MEM. WITH ACK, IE
045752  012721  045070                  MOV     #T11DATA,(R1)+          ;ADDRESS OF DATA BLOCK
045756  005021                          CLR     (R1)+                   ;EXTENDED ADDRESS
045760  012721  000006                  MOV     #6.,(R1)+               ;SIZE OF DATA BLOCK IN BYTES
045764  005021                          CLR     (R1)+                   ;CLEAR BSEL0 AND BSEL1
045766  005021                          CLR     (R1)+                   ;CLEAR SEL2
045770  005011                          CLR     (R1)                    ;CLEAR DATA AREA
045772  000207                          RTS     PC                      ;RETURN

045774                          T11RST:
045774                                  SAVREG                          ;SAVE THE REGISTERS
046000  012701  045500                  MOV     #T11PK2,R1              ;START OF THE PACKET
046004  012721  100204                  MOV     #100204,(R1)+           ;WRITE CHARA. WITH ACK, IE
046010  012721  045510                  MOV     #T11DTA,(R1)+           ;ADDRESS OF CHARAISTICS DATA BLOCK
046014  005021                          CLR     (R1)+                   ;EXTENDED ADDRESS
046016  012721  000010                  MOV     #8.,(R1)+               ;SIZE OF DATA BLOCK IN BYTES
046022  012721  045076                  MOV     #T11BFR,(R1)+           ;MESSAGE BUFFER ADDRESS
046026  005021                          CLR     (R1)+
046030  012721  000400                  MOV     #256.,(R1)+             ;LENGTH OF MESSAGE BUFFER
046034  005021                          CLR     (R1)+
046036  005011                          CLR     (R1)
046040  005037  045076                  CLR     T11BFR                  ;CLEAR 1ST LOC IN MESSAGE BUFFER
046044  000207                          RTS     PC                      ;RETURN
046046                                  ENDTST
046046
046046  104401                                          L10076:
                                                                TRAP    C$ETST
```

```
                                        .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.
                                ;--
                                        BGNHRD
046050                                                                  .WORD L10100-L$HARD/2
046050  000015
046052                                                          L$HARD::
                                        GPRMA   HPM1,0,0,160000,177776,YES      ;GET TSBA/TSDB REGISTER ADDRESS.
046052  000031                                                        .WORD   T$CODE
046054  046104                                                      .WORD   HPM1
046056  160000                                                      .WORD   T$LOLIM
046060  177776                                                      .WORD   T$HILIM
046062                          GPRMA   HPM2,2,0,0,776,YES          ;GET VECTOR ADDRESS.
046062  001031                                                      .WORD   T$CODE
046064  046133                                                      .WORD   HPM2
046066  000000                                                      .WORD   T$LOLIM
046070  000776                                                      .WORD   T$HILIM
046072                  GPRMD   HPM3,4,0,340,0,7,YES        ;GET INTERRUPT PRIORITY.
046072  002032                                                      .WORD   T$CODE
046074  046157                                                      .WORD   HPM3
046076  000340                                                      .WORD   340
046100  000000                                                      .WORD   T$LOLIM
046102  000007                                                      .WORD   T$HILIM
046104                  ENDHRD
                                                                    .EVEN
046104                                                      L10100:
046104      104 105 126 HPM1:   .ASCIZ  'DEVICE ADDRESS (TSSR) '
046133      111 116 124 HPM2:   .ASCIZ  'INTERRUPT VECTOR    '
046157      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.
                                ;--
046210                                  BGNSFT
046210  000006                                                                  .WORD L10101-L$SOFT/2
046212                                                                  L$SOFT::
046212                                  GPRML   SPM1,0,-1,YES           ;GET RAM DUMP TEST FLAG
046212  000130                                                                  .WORD   T$CODE
046214  046226                                                                  .WORD   SPM1
046216  177777                                                                  .WORD   -1
046220                                  GPRML   SPM4,2,-1,YES           ; GET ITERATION CONTROL.
046220  001130                                                                  .WORD   T$CODE
046222  046272                                                                  .WORD   SPM4
046224  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
046226                                  ENDSFT                                  .EVEN
                                                                        L10101:
                                ;
                                ;
046226  105     116     101     SPM1:   .ASCIZ  'ENABLE CONTROLLER RAM DUMP ON ERROR'
046272  111     116     110     SPM4:   .ASCIZ  'INHIBIT ITERATIONS     '
046322  120     105     122     SPM6:   .ASCIZ  'PER TEST ERROR LIMIT   '
046352  120     105     122     SPM7:   .ASCIZ  'PER UNIT ERROR LIMIT   '
                                        .EVEN
                                        .SBTTL  PATCH AREA
                                ;++
                                ;DISPATCH TABLE
                                ;
                                ; *** MOVE TO FRONT OF PROGRAM FOR RELEASE ***
                                ;--
046402                                  DISPATCH        TESTNO
046402  000013                                                                  .WORD   11
046404                                                                  L$DISPATCH::
046404  023470                                                                  .WORD   T1
046406  023726                                                                  .WORD   T2
046410  024700                                                                  .WORD   T3
046412  026164                                                                  .WORD   T4
046414  030216                                                                  .WORD   T5
046416  031426                                                                  .WORD   T6
046420  033502                                                                  .WORD   T7
046422  036714                                                                  .WORD   T8
046424  040432                                                                  .WORD   T9
046426  043612                                                                  .WORD   T10
046430  044606                                                                  .WORD   T11
                                ;
                                ; FINALLY A GENEROUS PATCH AREA.
```

```
                        ;
                        ; AND AN ADJUSTMENT TO ACCOUNT FOR THE "LASTAD BIT7" HACK
                        ; DESCRIBED IN "SUPPRG.MEM" (FOR REV C).
                        ;
                        PATCH::
                        ;       .IF     NZ,.&377
                        ;       .=.!377+1
                        ;       .ENDC
                                LASTAD          ;SET LAST USED ADDRESS.
                                                                        .EVEN
046432  046450                                                         .WORD T$FREE
046434  000005                                                         .WORD T$SIZE
046436                  L$LAST::
                                .SBTTL  HARD CODED P-TABLE
                        ;++
                        ;       DIAGNOSTIC IS PRE PARAMETERIZED PER THIS TABLE
                        ;--
                                BGNSETUP        1
                                BGNPTAB
046456  000000                                                         .WORD   0
046440  000003                                                         .WORD   L10104-./2-1
046442                                                          L10102:
046442  172522                  .WORD           172522
046444  000224                  .WORD           224
046446  000240                  .WORD           PRIO5
046450                  ENDPTAB
046450                                                          L10104:
046450                  ENDSETUP
                        ;
000001                  .END
```

SYMBOL TABLE

```
ADDSSR  011612 G      C$AU   = 000052      DEBUGM  011304        FATERR= 000060        HIADLR= 001400
ADR     = 000020 G    C$AUTO= 000061      DEVCNT  002166 G      FATFLG  002170 G     HIMEM = 007776
AMBTSS  006156        C$BRK  = 000022      DEVDRO  023420        FERCM   011374        HOE   = 100000 G
ASSEMB= 000010        C$BSEG= 000004      DEVNRD  023337        FIFEXP  011642 G     HPM1    046104
A1716 = 000003        C$BSUB= 000002      DEVNXR  023255        FIF1MS  011714        HPM2    046133
BADDAT  003110 G      C$CEFG= 000045      DEVONL  023173        FIF2MS  011763        HPM3    046157
BADSSR  016374 G      C$CLCK= 000062      DEVSUM  023136        FILLME  020216        IBE   = 010000 G
BAR     = 174402      C$CLEA= 000012      DFPTBL  002124 G      FNOINT  004113        IDU   = 000040 G
BENASW  002174 G      C$CLOS= 000035      DIAGMC= 000000        FORCER  002144 G      IER   = 020000 G
BIE     = 040000      C$CLP1= 000006      DICEA  = 000001       FREE    003072 G      IFAULT  004154
BIT0    = 000001 G    C$CVEC= 000036      DLCYL  = 000177       FREEHI  003076        INCERK  017566
BIT00   = 000001 G    C$DCLN= 000044      DLDNER= 100200        FRESIZ  003074 G      INTCPC  016644
BIT01   = 000002 G    C$DODU= 000051      DLERR  = 177730       FUSI    004015        INTFLA  016641
BIT02   = 000004 G    C$DRPT= 000024      DLGETS= 000004        F$AU   = 000015       INTMAS  016640
BIT03   = 000010 G    C$DU   = 000053     DLRDHD= 000010        F$AUTO= 000020        INTR    016712 G
BIT04   = 000020 G    C$EDIT= 000003      DLRDNH= 000016        F$BGN  = 000040       INTREC  002172 G
BIT05   = 000040 G    C$ERDF= 000055      DLSR   = 000013       F$CLEA= 000007        INTVEC  016642
BIT06   = 000100 G    C$ERHR= 000056      DLUN   = 000006       F$DU   = 000016       INTX    004176
BIT07   = 000200 G    C$ERRO= 000060      DSBINT  016700        F$END  = 000041       IOKCKI= 000200
BIT08   = 000400 G    C$ERSF= 000054      DUAD12  004541        F$HARD= 000004        IOKSTP= 000001
BIT09   = 001000 G    C$ERSO= 000057      DUFLG   003060 G      F$HW   = 000013       IPRI    002160 G
BIT1    = 000002 G    C$ESCA= 000010      DUMMY   003030        F$INIT= 000006        ISR   = 000100 G
BIT10   = 002000 G    C$ESEG= 000005      EF.CON= 000036 G      F$JMP  = 000050       IVEC    002156 G
BIT11   = 004000 G    C$ESUB= 000003      EF.NEW= 000035 G      F$MOD  = 000000       IXE   = 004000 G
BIT12   = 010000 G    C$ETST= 000001      EF.PWR= 000034 G      F$MSG  = 000011       I$AU   = 000041
BIT13   = 020000 G    C$EXIT= 000032      EF.RES= 000037 G      F$PROT= 000021        I$AUTO= 000041
BIT14   = 040000 G    C$GETB= 000026      EF.STA= 000040 G      F$PWR  = 000017       I$CLN  = 000041
BIT15   = 100000 G    C$GETW= 000027      EMAXDU  017521        F$RPT  = 000012       I$DU   = 000041
BIT2    = 000004 G    C$GMAN= 000043      EN     = 000000       F$SEG  = 000003       I$HRD  = 000041
BIT3    = 000010 G    C$GPHR= 000042      ENAINT  016646        F$SOFT= 000005        I$INIT= 000041
BIT4    = 000020 G    C$GPLO= 000030      ENVIRN  021356        F$SRV  = 000010       I$MOD  = 000040
BIT5    = 000040 G    C$GPRI= 000040      EPRTSW  002146 G      F$SUB  = 000002       I$MSG  = 000041
BIT6    = 000100 G    C$INIT= 000011      EPRT1   005672        F$SW   = 000014       I$PROT= 000040
BIT7    = 000200 G    C$INLP= 000020      EPRT2   005672        F$TEST= 000001        I$PTAB= 000041
BIT8    = 000400 G    C$MANI= 000050      EPRT3   005672        GDDAT   003112 G      I$PWR  = 000041
BIT9    = 001000 G    C$MEM  = 000031     ERCM    011405        GERRMA  002142 G      I$RPT  = 000041
BOE     = 000400 G    C$MSG  = 000023     ERRHI   002202 G      GETPAT  020722 G      I$SEG  = 000041
BRINIT  004355        C$OPEN= 000034      ERRK    017500        GETSEL  021004 G      I$SETU= 000041
BSEL0 = 000000        C$PNTB= 000014      ERRLO   002204 G      G$CNTO= 000200        I$SFT  = 000041
BSEL1 = 000001        C$PNTF= 000017      ERRNO  = 002120       G$DELM= 000372        I$SRV  = 000041
CHKAMB  016540        C$PNTS= 000016      ERRVEC= 000004 G      G$DISP= 000003        I$SUB  = 000041
CHKMAN  021226 G      C$PNTX= 000015      ERTABE  003330        G$EXCP= 000400        I$TST  = 000041
CHKTSS  017060        C$QIO  = 000377     ERTABL  003130        G$HILI= 000002        J$JMP  = 000167
CKDROP  017776        C$RDBU= 000007      ESUM    017502        G$LOLI= 000001        KIPAR0= 172340
CKEMAX  017624        C$REFG= 000047      EVL    = 000004 G     G$NO   = 000000       KIPAR1= 172342
CKMSG   011032 G      C$RESE= 000033      EXBCNT= 000010        G$OFFS= 000400        KIPAR2= 172344
CKMSG2  011152 G      C$REVI= 000003      EXPBRE  016176 G      G$OFSI= 000376        KIPAR3= 172346
CKRAM   010354 G      C$RFLA= 000021      EXPD    002176 G      G$PRMA= 000001        KIPAR4= 172350
CKRAM2  010730 G      C$RPT  = 000025     EXPGOT  004431        G$PRMD= 000002        KIPAR5= 172352
CMPMEM  020402        C$SEFG= 000046      EXPGT2  004465        G$PRML= 000000        KIPAR6= 172354
CONFIG  020044        C$SPRI= 000041      EXPMSG  002266 G      G$RADA= 000140        KIPAR7= 172356
COUNT   002254 G      C$SVEC= 000037      EXPREC  016170 G      G$RADB= 000000        KIPDR0= 172300
CSR     = 174400      C$TPRI= 000013      EXTA    005232        G$RADD= 000040        KIPDR1= 172302
CSRADD  002154 G      DAR    = 174404     EXTEND  005230        G$RADL= 000120        KIPDR2= 172304
CTAB    003116 G      DATA    002256 G    F$END  = 002100       G$RADO= 000020        KIPDR3= 172306
CTABB   003130 G      DATAFL  014710      E$LOAD= 000035        G$XFER= 000004        KIPDR4= 172310
CTABM   003116 G      DATASC  020760      FATCHK  017724        G$YES  = 000010        KIPDR5= 172312
```

SYMBOL TABLE

```
KIPDR6= 172314          L$REV   002010 G        L10057  032124          NULCR   004426          PRI04 = 000200 G
KIPDR7= 172316          L$RPT   022674 G        L10060  032312          NXM   = 004000          PRI05 = 000240 G
KTENAB  003102 G        L$SOFT  046212 G        L10061  036712          NXR     003636          PRI06 = 000300 G
KTFLG   003100 G        L$SPC   002056 G        L10062  034120          NXRERR  005176 G        PRI07 = 000340 G
KTINIT  021444          L$SPCP  002020 G        L10063  034512          NXRX    003675          PRMESS  013702
KTOFF   020070          L$SPTP  002024 G        L10064  035402          NXTU    022032          PRMNO   002264 G
KTON    020052          L$STA   002030 G        L10065  035630          OFL   = 000100          PRMSGE  015246 G
LERRMA  002140 G        L$SW    002134 G        L10066  040430          ONEFIL= 000000          PRMSG0  015426
LERRNO= 000000          L$TEST  002114 G        L10067  037176          O$APTS= 000000          PRMSG1  015473
LISTAL= 000001          L$TIML  002014 G        L10070  037434          O$AU  = 000001          PRMSG2  015531
LOE   = 040000 G        L$UNIT  002012 G        L10071  043610          O$BGNR= 000001          PROASC  014540
LOOPCN  002164 G        L10000  002132          L10072  041022          O$BGNS= 000001          PR1ASC  014605
LOOPCO  012600          L10001  002144          L10073  041322          O$DU  = 000001          PST32W  003104 G
LOOPFL  003114 G        L10002  005226          L10074  041630          O$ERRT= 000000          PUNIT   022320
LOT   = 000010 G        L10003  011516          L10075  044604          O$GNSW= 000001          PW.D11= 000021
L$ACP   002110 G        L10004  011546          L10076  046046          O$POIN= 000001          PW.D13= 000022
L$APT   002036 G        L10005  011564          L10077  045032          O$SETU= 000001          PW.D22= 000020
L$AU    022366 G        L10006  011572          L10100  046104          PASRPT  022064          PW.NOP= 000000
L$AUT   002070 G        L10007  011610          L10101  046226          PATCH   046432 G        PW.NO1= 000023
L$AUTO  022572 G        L10010  011626          L10102  046442          PATDAT  020756          PW.RDE= 000024
L$CCP   002106 G        L10011  011640          L10104  046450          PC.ERA= 002400          PW.RDR= 000001
L$CLEA  022646 G        L10012  011712          MEMADD  013426 G        PC.IER= 002000          PW.RDS= 000005
L$CO    002032 G        L10013  012062          MENASC  021175          PC.NOO= 001000          PW.RFI= 000003
L$DEPO  002011 G        L10014  012576          MENERR  021122          PC.REL= 000000          PW.WCT= 000006
L$DESC  003342 G        L10015  013424          MENRES  021224          PC.REW= 000400          PW.WFI= 000004
L$DESP  002076 G        L10016  013446          MESBFA  002716 G        PKBCNT= 000006          PW.WFM= 000007
L$DEVP  002060 G        L10017  016174          MESBFN  014460          PKHI  = 000004          PW.WMI= 000010
L$DISP  046404 G        L10020  016202          MESHEA  014643          PKLOW = 000002          PW.WNP= 000011
L$DLY   002116 G        L10021  016210          MMVEC = 000250          PKTADD  007116          PW.WTR= 000002
L$DTP   002040 G        L10022  016222          MPR   = 174406          PKTFRM  007060          P.ACK = 100000
L$DTYP  002034 G        L10023  016244          MSA.FR= 000006          PKTGET  011550 G        P.CMD = 000037
L$DU    022464 G        L10024  016272          MSA.NO= 000000          PKTMES  011574 G        P.CONT= 000012
L$DUT   002072 G        L10025  016432          MSA.NR= 000004          PKTNEW  007153          P.CVC = 040000
L$DVTY  003334 G        L10026  016742          MSA.VO= 000002          PKTRAM  004645 G        P.FMT = 000140
L$EF    002052 G        L10030  022316          MSGEXP  011630 G        PKTSSR  011520 G        P.FORM= 000011
L$ENVI  002044 G        L10031  022462          MSGLOO  012536 G        PNT   = 001000 G        P.GETS= 000017
L$ETP   002102 G        L10032  022570          MSGSTA  012022 G        PRAMPK  013450          P.IE  = 000200
L$EXP1  002046 G        L10033  022644          MSGSUB  013414 G        PRBEXP  016164          P.INIT= 000013
L$EXP4  002064 G        L10034  022672          MS.ATT= 000006          PRBMSG  016032          P.MODE= 007400
L$EXP5  002066 G        L10035  023134          MS.EXT= 000200          PRBREC  016166          P.OPP = 020000
L$HARD  046052 G        L10036  023724          MS.RSD= 000001          PRBTOT  016117          P.POSI= 000010
L$HIME  002120 G        L10037  023572          MS.RSF= 000020          PRBYTE  015616 G        P.READ= 000001
L$HPCP  002016 G        L10040  023654          MS.RST= 000010          PRI   = 002000 G        P.SWB = 010000
L$HPTP  002022 G        L10041  024676          NBA   = 002000          PRIADD  007532          P.WRIT= 000005
L$HW    002124 G        L10042  024116          NEWPAS  022020          PRIAO   007602          P.WRTC= 000004
L$ICP   002104 G        L10043  024310          NODEV   003062 G        PRIBXO  007164 G        P.WRTS= 000006
L$INIT  021606 G        L10044  024510          NOINIT  004233          PRIEQU  007432          QVP     002152 G
L$LADP  002026 G        L10045  026162          NOINTR  004117          PRIPKT  006712 G        RAMASC  013616
L$LAST  046436 G        L10046  025240          NOITS   002136 G        PRIRAM  007440          RAMDAT  002206 G
L$LOAD  002100 G        L10047  025550          NOMAN   021262          PRITAD  007646          RAMER   010456 G
L$LUN   002074 G        L10050  030214          NP.IR = 000200          PRITSS  005264          RAMERR  016204 G
L$MREV  002050 G        L10051  026506          NP.LOO= 000040          PRITO   007716          RAMEXP  016224 G
L$NAME  002000 G        L10052  026772          NP.OUT= 000100          PRIXOR  007314 G        RAMFHR  014362
L$PRIO  002042 G        L10053  027220          NP.WRP= 000020          PRI00 = 000000 G        RAMFOR  007470
L$PROT  021576 G        L10054  031424          NSI     004050          PRI01 = 000040 G        RAMHLD  010640
L$PRT   002112 G        L10055  033500          NSINIT  004305          PRI02 = 000100 G        RAMIOP  010644
L$REPP  002062 G        L10056  031700          NUL     004425          PRI03 = 000140 G        RAMPD   010715
```

K16

SYMBOL TABLE

```
RAMR5H  010642          S0.IDB= 000010          TSSX    003716          T$$AU = 010031          T3PACK  025620
RAMSIZ  002246 G        S0.IFB= 000002          TSTBLK  002720 G        T$$AUT= 010033          T3SSR   025655
RAMTAD  016212 G        S0.IFP= 000001          TSTCNT  002162 G        T$$CLE= 010034          T3TSBA  026071
RBPCRA  014755          S0.ILD= 000020          TSTEND  017442          T$$DAT= 010104          T3.1    024734
RCVHIA  002250 G        S0.ION= 000040          TSTFLA  002260 G        T$$DU = 010032          T3.2    025254
RCVLOA  002252 G        S0.IRD= 000100          TSTLOO  017200 G        T$$HAR= 010100          T4      026164 G
RDERR   005104          S0.IRW= 000004          TSTPTR  002262 G        T$$HW = 010000          T4BFR   027274
READ    = 000010        S0.ISP= 000200          TSTSET  017232 G        T$$INI= 010030          T4DATA  027260
READY   = 000001        S1.ICE= 000400          TST1ID  023704          T$$MSG= 010025          T4INT   027745
RECMSG  002432 G        S1.IEO= 010000          TST1OI  044262          T$$PC = 000001          T4LOOP  026220
RECV    002200 G        S1.IFM= 001000          TST11I  045670          T$$PRO= 010027          T4NBA   027406
REGSAV  020662          S1.IHE= 000400          TST2ID  024672          T$$PTA= 010103          T4PACK  027250
REWIND  010254 G        S1.IID= 004000          TST3ID  026143          T$$RPT= 010035          T4REST  030146
RMCHBE= 000167          S1.I1R= 020000          TST4ID  030117          T$$SEG= 010000          T4SP    027270
RMCHEN= 000200          S1.I2R= 040000          TST5ID  031407          T$$SOF= 010101          T4SSR   027656
RMMSGB= 000104          S1.PAR= 100000          TST6ID  033401          T$$SRV= 010026          T4TSBA  030034
RMMSGE= 000117          S2.ATI= 000010          TST7ID  036537          T$$SUB= 010077          T4.1    026220
RMPKTB= 000020          S2.BTI= 000004          TST8ID  040272          T$$SW = 010001          T4.2    026522
RMPKTE= 000027          S2.DIM= 000200          TST9ID  042100          T$$TES= 010076          T4.3    026774
RMR     = 010000        S2.ILW= 000100          TTIBFR= 177562 G        T1      023470 G        T42DAT  027314
RWPACK  010350          S2.INR= 000020          TTICSR= 177560 G        T1LOOP  023524          T42DON= 027330
SC      = 100000        S2.OUT= 000040          TTIVEC= 000060 G        T1.1    023526          T42NBA  027330
SCE     = 020000        S2.UND= 000003          TTOBFR= 177566          T1.2    023606          T42REJ  027461
SCME    004711          TBLEND= 003030 G        TTOCSR= 177564          T10     043612 G        T44REJ  027560
SDELAY  010150          TCOASC  006017          TUV2A   002000 G        T10BFR  044242          T5      030216 G
SEEK    = 000006        TCOCOD  006220          T$ARGC= 000003          T10DAT  044230          T5BFR   030742
SELASC  021170          TEMP1   003064 G        T$CODE= 001130          T10LOO  043646          T5DATA  030730
SELDAT= 000004          TEMP2   003066 G        T$ERRN= 002120          T10MEM  044335          T5LOOP  030252
SEL2    = 000002        TERCLS= 000016          T$EXCP= 000000          T10NBA  044374          T5NMSG  031310
SETMAP  020112          TESTNO= 000013          T$FLAG= 000040          T10PAC  044220          T5NVCK  031131
SETU    022116          TEXASC  005756          T$FREE= 046450          T10RES  044536          T5PACK  030720
SFFMSG  011566 G        TFCASC  006060          T$GMAN= 000000          T10SSR  044447          T5SSR   031221
SFHERR  003603          TIMEXP  016246 G        T$HILI= 000007          T11     044606 G        T5VCK   030762
SFIERR  003550          TIMSGO  016274          T$LAST= 000001          T11BFR  045076          T5VCK2  031055
SFIMSG  011506 G        TINERR  011473          T$LOLI= 000000          T11BSC  045070          T6      031426 G
SFPTBL  002134 G        TKB     = 177562        T$LSYM= 010000          T11BS1  045071          T6BFR   032352
SIFLAG  003106 G        TKS     = 177560        T$LTNO= 000013          T11BS2  045072          T6DATA  032340
SIMSG   011440          TMPBFR  002576 G        T$NEST= 000000          T11DAT  045070          T6INT   033227
SKIPT   003332          TNAM    017426          T$NSO = 000000          T11DTA  045510          T6LOOP  031462
SOFINI  016470 G        TPB     = 177566        T$NS1 = 000005          T11LOO  044642          T6NBA   032406
SPACE   007760 G        TPS     = 177564        T$NS2 = 000002          T11NBA  045522          T6NINT  033136
SPM1    046226          TRANST  002134 G        T$NS3 = 000003          T11NIN  045576          T6PACK  032330
SPM4    046272          TSBA    = 177776 G      T$PCNT= 000000          T11PAC  045060          T6REST  033426
SPM6    046322          TSBAH   = 177777 G      T$PTAB= 010103          T11PK2  045500          T6SSR   033047
SPM7    046352          TSBAL   = 177776 G      T$PTHV= 000001          T11RES  045736          T6TSBA  033316
SR0     = 177572        TSBAM2  024530          T$PTNU= 000001          T11RST  045774          T6.1    031462
SR1     = 177574        TSBAM3  024612          T$SAVL= 177777          T11.1   044642          T6.2    031714
SR2     = 177576        TSDB    = 177776 G      T$SEGL= 177777          T2      023726 G        T6.3    032126
SR3     = 172516        TSDBH   = 177777 G      T$SEKO= 010000          T2LOOP  023764          T62DAT  032372
SSR     = 000200        TSDBL   = 177776 G      T$SIZE= 000005          T2.1    023744          T62DON= 032406
STATCO  012064          TSFCOD  006560          T$SUBN= 000001          T2.2    024120          T62REJ  032461
SVCGBL= 000000          TSREJ   = 000006        T$TAGL= 177777          T2.3    024312          T63REJ  032560
SVCINS= 000001          TSSDEF  006127          T$TAGN= 010105          T3      024700 G        T64REJ  032653
SVCSUB= 000001          TSSR    = 000000 G      T$TERM= 000014          T3INT   025733          T65REJ  032751
SVCTAG= 000001          TSSRBI  003400 G        T$TEST= 000013          T3LOOP  024734          T7      033502 G
SVCTST= 000001          TSSRFO  005736          T$TSTM= 177777          T3NBA   025630          T7BFR   035662
S$LSYM= 010000          TSSRH   = 000001 G      T$TSTS= 000001          T3NINT  026011          T7BUFR  035724
```

SYMBOL TABLE

```
T7DATA  035650          T8SSR   040014          T9.1    040466          XFERAS  016434          X$FALS= 000040
T7DTA   035712          T8TSBA  040222          T9.2    041036          XNXM    017120          X$OFFS= 000400
T7INT   036450          T8.1    036750          T9.3    041336          XORBFO  007246          X$TRUE= 000020
T7LOOP  033536          T8.2    037212          T91LOO  040610          XORFOR  007364          X1.COR= 020000
T7MBF   035744          T82REJ  037622          T92LOO  041154          XST0  = 000006 G        X1.DLT= 100000
T7NBA   036041          T83REJ  037703          T93LOO  041404          XST1  = 000010 G        X1.MBZ= 017375
T7NINT  036357          T84REJ  037733          T94TST  041742          XST2  = 000012 G        X1.RBP= 000400
T7NNBA  036123          T9      040432 G        UAM   = 000020 G        XST3  = 000014 G        X1.SPA= 040000
T7PACK  035640          T98FR   041712          UNITN   002150 G        XST4  = 000016 G        X1.UNC= 000002
T7PKT   035702          T98KGN  042367          UNREC = 000006          XSOBOT= 000002          X2.BUF= 000100
T7RST   036566          T98LK   041744          USI     004021          XSOCON  015022          X2.EXT= 000200
T7RT2   036640          T9CHAR  043546          WAITF   016744 G        XSOEOT= 000001          X2.OPM= 100000
T7SSR   036270          T9CKRA  043326 G        WC.IFA= 000200          XSOIE = 000040          X2.RCE= 040000
T7SSRM  036200          T9CONV  042746          WC.IFE= 000002          XSOILA= 000400          X2.REV= 000077
T7.1    033536          T9CT2   043140          WC.IGO= 000001          XSOILC= 001000          X2.SPA= 035400
T7.2    034122          T9DATA  041700          WC.IRE= 000010          XSOLET= 020000          X2.UNI= 000007
T7.3    034514          T9DPR   042546          WC.IRW= 000004          XSOMOT= 000200          X2.WCF= 002000
T7.4    035404          T9GETS  042126          WC.IOT= 000100          XSONEF= 002000          X3.DCK= 000010
T8      036714 G        T9HIAD  041732          WC.I1T= 000040          XSOONL= 000100          X3.MBZ= 000006
T8BFR   037472          T9KT    041740          WC.I5R= 000020          XSOPED= 000010          X3.MDE= 177400
T8BF2   037542          T9LOAD  041734          WF.IED= 000010          XSORLL= 010000          X3.OPI= 000100
T8DATA  037460          T9LOOP  040466          WF.IER= 000004          XSORLS= 040000          X3.REV= 000040
T8DTA   037530          T9MSGB  042271          WF.IHI= 000200          XSOTMK= 100000          X3.RIB= 000001
T8LOOP  036750          T9NINT  042455          WF.IRE= 000040          XSOVCK= 000020          X3.SPA= 000200
T8NBA   037562          T9NXM   042637          WF.IWF= 000020          XSOWLE= 004000          X3.TRF= 000020
T8NINT  040144          T9PACK  041670          WF.IWR= 000100          XSOWLK= 000004          X4.HSP= 100000
T8PACK  037450          T9PAR6  041736          WF.I3R= 000002          XS1CON  015067          X4.MBZ= 017400
T8PK2   037520          T9SETG  043504          WF.I4R= 000001          XS2CON  015134          X4.RCE= 040000
T8REST  040324          T9SWRT  043436          WRTCHR  010152 G        XS3CON  015201          X4.TSM= 020000
T8RT2   040366          T9TBE   042076          WRTERR  005011          XXCOMM  003070 G        X4.WRC= 000377
T8SR2   040070          T9WRTS  042202          WRTMSG  004754          X$ALWA= 000000

. ABS.  046450      000
        000000      001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  31240 WORDS  ( 123 PAGES)
DYNAMIC MEMORY:  20060 WORDS  ( 77 PAGES)
ELAPSED TIME:  00:30:00
CZTKEA,BIC,CZTKEA/-SP=SVC/ML,CZTKEA
```