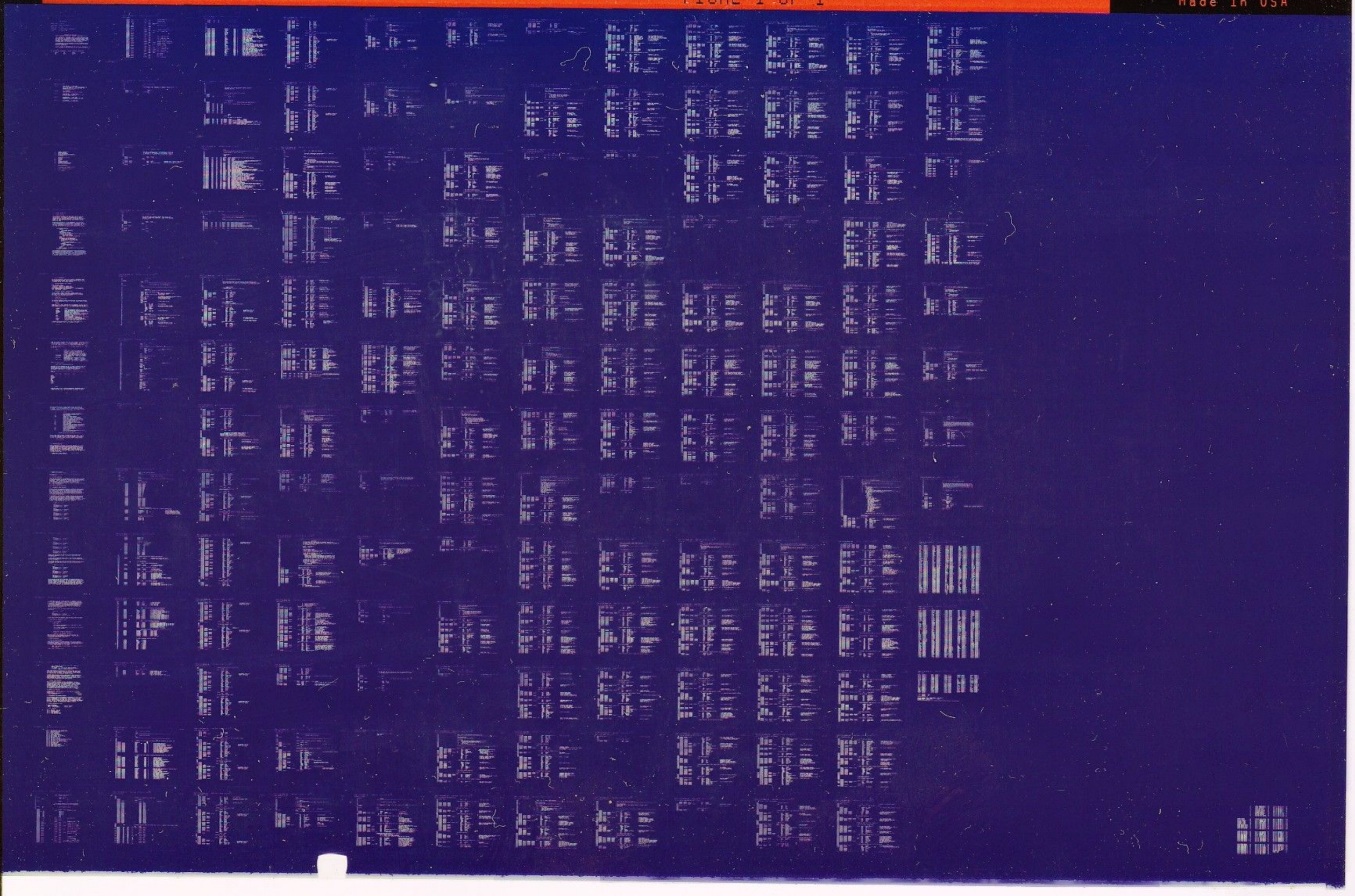
FEPCM

CTRL BRIDGE LINK
CZFPBAO

AH-T861A-MC
FICHE 1 OF 1

APR 1984
digital
Made In USA



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IDENTIFICATION

PRODUCT CODE: AC T860A MC

PRODUCT NAME: CZFPBA0 CTRL BRIDGE LINK

PRODUCT DATE: MAY 1982

MAINTAINER: CSS GNG DIAGNOSTIC ENGINEERING

AUTHOR: DALE PROCTOR

MODIFICATION HISTORY:

CZFPB-A.0	DALE PROCTOR 22 DEC-1983 CHANGED THE NAME TO CZFPB-A0 AND RELEASED TO SDC. ALSO UPDATED ALL THE DOCUMENTATION, AND REMOVED THE HELP FILE QUESTIONS FROM THE INITIALIZATION SECTION.
Z0792-B.0	PAUL HOLSINGER MODIFIED TO RUN WITH THE 11/24 BOARD
Z0792-B.1	DALE PROCTOR 1-JUNE-1983 CORRECTED TEST 18 TO NOT TIMEOUT SO EARLY ON THE WATCHDOG TIMER TEST.
Z0792-B.2	DALE PROCTOR 7-JUNE 1983 INSERTED A NEW TEST 16 AND 17 TO ALLOW CHECKING OF THE VAX BUFFERED DATA PATH.
Z0792-C.0	DALE PROCTOR 15-JUNE-1983 UPDATED REVISION FOR ARCHIVING

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1.0 GENERAL INFORMATION

1 1 PROGRAM ABSTRACT

THIS DIAGNOSTIC CONTAINS LINK MODE TESTS FOR THE FEPCM ON THE PDP SIDE OF THE BRIDGE. THIS PROGRAM MUST BE RUN IN CONJUNCTION WITH THE LINK MODE TESTS FOR THE VAX SIDE OF THE BRIDGE. THE VAX DIAGNOSTIC CONTROLS THE OPERATION OF THIS DIAGNOSTIC. ONCE THE DIAGNOSTIC HAS BEEN STARTED, NOTHING NEEDS TO BE DONE.

BECAUSE OF THE NATURE OF A LINK DIAGNOSTIC, THE STRUCTURE OF THE DIAGNOSTIC IS A LITTLE DIFFERENT FROM NORMAL. BASICLY, THERE IS A MAINLINE TEST CONTROL MODULE, WHICH DOES THE INITIAL AND FINAL HANDSHAKING WITH THE THE VAX, AND CONTROLS THE SELECTION OF THE TEST. THE BASIC LOGIC DESIGN IS AS FOLLOWS:

```
BEGIN MODULE MAINLINE
:    REPEAT
:    :    INPUT QINT REGISTER
:    :  UNTIL CMDPRS BIT IS SET
:    ENDREPEAT
:    READ COMMAND REGISTER
:    CALCULATE TEST # FROM DATA FIELD IN QCMD REGISTER
:    IF TEST # IS TOO LARGE
:    :    PRINT ERROR MESSAGE
:    :    ABORT TEST, RETURN TO SUPERVISOR
:    ENDIF
:    SET CMDACK TO HANDSHAKE WITH VAX
:    GO PERFORM TEST AS SUBROUTINE
:    IF RETURN FROM TEST NOT ABORT CODE
:    :  SET VNTPRS BIT IN QVNT REGISTER
:    :  REPEAT
:    :  :    INPUT QINT REGISTER
:    :  : UNTIL VNTACK SET OR TIMEOUT OCCURS
:    :  ENDREPEAT
:    :  IF TIMEOUT OCCURRED
:    :  :  PRINT TIMEOUT MESSAGE
:    :  ENDIF
:    ENDIF
:    RESTART MODULE  ('NO NORMAL EXIT OUT OF MODULE)
ENDMODULE MAINLINE
```

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

1.2 SYSTEM REQUIREMENTS

LSI OR PDP CPU WITH AT LEAST 16K OF MEMORY, (PREFREABLY MORE FOR CONVERSATION MODE DMA TEST), CONSOLE DEVICE AND TU-58 OR OTHER LOAD MEDIUM. NORMAL CONFIGURATION FOR THE CONSOLE DEVICE IS THROUGH THE VAX AS A VERTUAL TERMINAL.

1.3 RELATED DOCUMENTS AND STANDARDS

FEPCM TECHNICAL MANUAL
AC-T858A-MC CZFPAAO CTRL BRIDGE INTFC
AC-T866A-MC CXFPCAO CTRL BRIDGE DEC/X11
EVDTE COMMAND BRIDGE INTERFACE DIAGNOSTIC. (VAX DIAGNOSTIC)
EVDTC COMMAND BRIDGE LINK DIAGNOSTIC. (VAX DIAGNOSTIC)
XXDP+ USERS MANUAL - CHQUS??.

1.4 DIAGNOSTIC HIERARCY PREREQUISITES

THE CPU, MEMORY, MEMORY MANAGEMENT, CONSOLE DEVICE AND LOAD MEDIUM ARE ASSUMED TO BE FUNCTIONING PRIOR TO RUNNING THIS TEST. ALSO, THE STAND-ALONE DIAGNOSTICS ON BOTH SIDES ARE ASSUMED TO BE RUNNING SUCCESSFULLY.

1.5 ASSUMPTIONS

2.0 OPERATING INSTRUCTIONS

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

2.1 COMMANDS

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

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

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

2 2 SWITCHES

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

** FOR THIS DIAGNOSTIC ONLY!!! - THE SWITCHES MARKED WITH A ** SHOULD
NOT BE USED.

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

EXAMPLE OF SWITCH USAGE:

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

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

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

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

2.3 FLAGS

FLAGS ARE USED TO SET UP CERTAIN OPERATIONAL PARAMETERS SUCH AS
LOOPING ON ERROR. ALL FLAGS ARE CLEARED AT STARTUP AND REMAIN
CLEARED UNTIL EXPLICITLY SET USING THE FLAGS SWITCH. FLAGS

ARE ALSO CLEARED AFTER A START COMMAND UNLESS SET USING THE FLAG SWITCH. THE ZFLAGS COMMAND MAY ALSO BE USED TO CLEAR ALL FLAGS. WITH THE EXCEPTION OF THE START AND ZFLAGS COMMANDS, NO COMMANDS AFFECT THE STATE OF THE FLAGS; THEY REMAIN SET OR CLEARED AS SPECIFIED BY THE LAST FLAG SWITCH.

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

*ERROR MESSAGES ARE DESCRIBED IN SECTION 3.1

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

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

2.4 HARDWARE QUESTIONS

WHEN A DIAGNOSTIC IS STARTED, THE RUNTIME SERVICES WILL PROMPT THE USER FOR HARDWARE INFORMATION BY TYPING "CHANGE HW (L) ?" YOU MUST ANSWER "Y" AFTER A START COMMAND UNLESS THE HARDWARE INFORMATION HAS BEEN "PRELOADED" USING THE SETUP UTILITY (SEE CHAPTER 6 OF THE XXDP+ USER'S MANUAL). WHEN YOU ANSWER THIS QUESTION WITH A "Y", THE RUNTIME SERVICES WILL ASK FOR THE NUMBER OF UNITS (IN DECIMAL). YOU WILL THEN BE ASKED THE FOLLOWING QUESTIONS FOR EACH UNIT.

```
LSI BRIDGE MODULE BASE ADDRESS?          DEFAULT=160500
    ADDRESS OF Q-COMMAND REGISTER
```

```
LSI BRIDGE MODULE VECTOR                    DEFAULT=500
    ADDRESS OF INTERRUPT VECTOR

THE DEFAULTS WILL AUTOMATICALLY BE USED IF YOU ANSWER NO
TO CHANGE HW?
```

2.5 SOFTWARE QUESTIONS

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

THERE ARE NO SOFTWARE QUESTIONS.

2.6 EXTENDED P-TABLE DIALOGUE

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

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

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

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

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

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

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

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

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

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

UNIT 8
CSR ADDRESS (0)  160000<CR>
SUB-DEVICE # (0) ?  7<CR>
Q-FACTOR (0) 1 ?  <CR>
```

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

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

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

```
# UNITS (0) ?  8<CR>

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

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

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

AS YOU CAN SEE IN THE ABOVE DIALOGUE, THE RUNTIME SERVICES WILL BUILD AS MANY ENTRIES AS IT CAN WITH THE INFORMATION GIVEN IN ANY ONE PASS THROUGH THE QUESTIONS. IN THE FIRST PASS, TWO ENTRIES ARE BUILT SINCE TWO SUB-DEVICES AND Q-FACTORS WERE SPECIFIED. THE SERVICES ASSUME THAT THE CSR ADDRESS IS 160000 FOR BOTH SINCE IT WAS SPECIFIED ONLY ONCE. IN THE SECOND PASS, FOUR ENTRIES WERE BUILT. THIS IS BECAUSE FOUR SUB-DEVICES WERE SPECIFIED. THE

"-" CONSTRUCT TELLS THE RUNTIME SERVICES TO INCREMENT THE DATA FROM THE FIRST NUMBER TO THE SECOND. IN THIS CASE, SUB-DEVICES 2, 3, 4 AND 5 WERE SPECIFIED. (IF THE SUB-DEVICE WERE SPECIFIED BY ADDRESSES, THE INCREMENT WOULD BE BY 2 SINCE ADDRESSES MUST BE ON AN EVEN BOUNDARY.) THE CSR ADDRESSES AND Q-FACTORS FOR THE FOUR ENTRIES ARE ASSUMED TO BE 160000 AND 0 RESPECTIVELY SINCE THEY WERE ONLY SPECIFIED ONCE. THE LAST TWO UNITS ARE SPECIFIED IN THE THIRD PASS.

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

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

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

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

2.7 QUICK START-UP PROCEDURE (XXDP+)

TO START-UP THIS PROGRAM:

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

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

3.0 ERROR INFORMATION

3.1 TYPES OF ERROR MESSAGES

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

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

.WHERE; NAME = DIAGNOSTIC NAME

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

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

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

3.2 SPECIFIC ERROR MESSAGES

MOST OF THE ERROR MESSAGES ARE SELF EXPLAINATORY. THE ONLY THING TO WATCH OUT FOR WITH THE ERROR MESSAGES IS IF AN ERROR IS GENERATED ON ONE SIDE, THE OTHER SIDE WILL ALMOST CERTAINLLY GENERATE AN ERROR, USUALLY A TIME-OUT. ALSO, THE FIRST LINE OF AN ERROR MESSAGE WILL SAY THAT THE FAULTING TEST IS TEST 1. THIS IS BECAUSE THE SUPERVISOR THINKS IT IS ALWAYS IN TEST 1, AND THE TESTS ARE ACTUALLY SUBROUTINES OF TEST 1. USUALLY THE SECOND OR THIRD LINE PRINTS OUT THE ACTUAL TEST NUMBER.

AN EXAMPLE IS AS FOLLOWS:

```
CZFPBA0 HRD ERR  00001 ON UNIT 00 TST 001 SUB 001 PC: 015334
LSI-TEST 04
TIMEOUT WAITING FOR CMDPRS SET
****TEST ABORTED****
```

4.0 PERFORMANCE AND PROGRESS REPORTS

THIS DIAGNOSTIC TRICKS THE DIAGNOSTIC SUPERVISOR, BY ALWAYS BEING IN TEST 1 ACCORDING TO THE SUPERVISOR. THE DIFFERENT TESTS ARE ACTUALLY SUBROUTINES OF TEST ONE. AS A RESULT, IT NEVER LEAVES TEST ONE AND WILL NORMALLY NEVER PRINT OUT PERFORMANCE AND PROGRESS REPORTS. IF FACT, IF AN END OF PASS MESSAGE IS PRINTED, SOMETHING WENT WRONG. HOWEVER, THE PROGRAM WILL NORMALLY RESTART.

5.0 DEVICE INFORMATION TABLES

P-TABLE DEFINITION-

WORD 1- CSR ADDRESS	(DEFAULT 160500)
WORD 2- VECTOR ADDRESS	(DEFAULT 500)

6.0 TEST SUMMARIES

TEST 1: CMD PRS - CMD ACK
TEST 2: COMMAND REGISTER
TEST 3: EVENT REGISTER
TEST 4: VIEW REGISTER READ
TEST 5: VIEW REGISTER WRITE

TEST 6: VIEW REGISTER COMPLIMENTED READ
TEST 7: VIEW REGISTER COMPLIMENTED WRITE
TEST 8: COMMAND INTERRUPTS
TEST 9: EVENT INTERRUPTS
TEST 10: VIEW CONTENTION
TEST 11: PDP-11 NXM INTERRUPT
TEST 12: DMA 2 WORDS, VAX TO PDP-11
TEST 13: DMA 2 WORDS, PDP 11 TO VAX
TEST 14: DMA VAX TO PDP-11
TEST 15: DMA PDP-11 TO VAX
TEST 16: DMA VAX (BUFFERED DATA PATH) TO PDP-11
TEST 17: DMA PDP-11 TO VAX (BUFFERED DATA PATH)
TEST 18: DMA PDP-11 HI MEMORY TO VAX
TEST 19: DMA VAX TO PDP-11 (32K BOUNDARY)
TEST 20: WATCHDOG TIMER
TEST 21: DMA THROTTLE
TEST 22: CONVERSATION MODE
TEST 23: CHECK QHALT (MANUAL)
TEST 24: CHEK Q POWER FAIL (MANUAL)
TEST 25: CHECK QBOOT (MANUAL)

```
                                .TITLE CZFPB-A.0 CTRL BRIDGE LINK
                                .SBTTL  PROGRAM HEADER

000000                                  .ENABL  ABS,AMA
                                        .DSABL  GBL
002000                                  .       =       2000

002000                                  BGNMOD

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

002000                                  POINTER BGNSETUP,BGNRPT


002000                                  HEADER  CZFPB,A,0,0,1
002000                          L$NAME::                ;DIAGNOSTIC NAME
002000  103                             .ASCII /C/
002001  132                             .ASCII /Z/
002002  106                             .ASCII /F/
002003  120                             .ASCII /P/
002004  102                             .ASCII /B/
002005  000                             .BYTE   0
002006  000                             .BYTE   0
002007  000                             .BYTE   0
002010                          L$REV::                 ;REVISION LEVEL
002010  101                             .ASCII  /A/
002011                          L$DEPO::                ;0
002011  060                             .ASCII  /0/
002012                          L$UNIT:.                ;NUMBER OF UNITS
002012  000001                          .WORD   T$PTHV
002014                          L$TIML::                ;LONGEST TEST TIME
002014  000000                          .WORD   0
002016                          L$HPCP::                ;POINTER TO H.W. QUES.
002016  034256                          .WORD   L$HARD
002020                          L$SPCP::                ;POINTER TO S.W. QUES.
002020  000000                          .WORD   0
002022                          L$HPTP::                ;PTR. TO DEF. H.W. PTABLE
002022  002130                          .WORD   L$HW
002024                          L$SPTP::                ;PTR. TO S.W. PTABLE
002024  000000                          .WORD   0
002026                          L$LADP::                ;DIAG. END ADDRESS
002026  034570                          .WORD   L$LAST
002030                          L$STA::                 ;RESERVED FOR APT STATS
002030  000000                          .WORD   0
002032                          L$CO::
002032  000000                          .WORD   0
002034                          L$DTYP::                ;DIAGNOSTIC TYPE
002034  000001                          .WORD   1
002036                          L$APT::                 ;APT EXPANSION
002036  000000                          .WORD   0
002040                          L$DTP::                 ;PTR. TO DISPATCH TABLE
002040  002124                          .WORD   L$DISPATCH
002042                          L$PRIO::                ;DIAGNOSTIC RUN PRIORITY
002042  000000                          .WORD   0
```

PROGRAM HEADER

```
002044                          L$ENVI::                ;FLAGS DESCRIBE HOW IT WAS SETUP
002044  000000                          .WORD   0
002046                          L$EXP1::                ;EXPANSION WORD
002046  000000                          .WORD   0
002050                          L$MREV::                ;SVC REV AND EDIT #
002050     003                          .BYTE   C$REVISION
002051     003                          .BYTE   C$EDIT
002052                          L$EF::                  ;DIAG. EVENT FLAGS
002052  000000                          .WORD   0
002054  000000                          .WORD   0
002056                          L$SPC::
002056  000000                          .WORD   0
002060                          L$DEVP::                ; POINTER TO DEVICE TYPE LIST
002060  002534                          .WORD   L$DVTYP
002062                          L$REPP::                ;PTR. TO REPORT CODE
002062  013170                          .WORD   L$RPT
002064                          L$EXP4::
002064  000000                          .WORD   0
002066                          L$EXP5::
002066  000000                          .WORD   0
002070                          L$AUT::                 ;PTR. TO ADD UNIT CODE
002070  000000                          .WORD   0
002072                          L$DUT::                 ;PTR. TO DROP UNIT CODE
002072  000000                          .WORD   0
002074                          L$LUN::                 ;LUN FOR EXERCISERS TO FILL
002074  000000                          .WORD   0
002076                          L$DESP::                ;POINTER TO DIAG. DESCRIPTION
002076  002540                          .WORD   L$DESC
002100                          L$LOAD::                ;GENERATE SPECIAL AUTOLOAD EMT
002100  104035                          EMT     E$LOAD
002102                          L$ETP::                 ;POINTER TO ERRTBL
002102  000000                          .WORD   0
002104                          L$ICP::                 ;PTR. TO INIT CODE
002104  013210                          .WORD   L$INIT
002106                          L$CCP::                 ;PTR. TO CLEAN-UP CODE
002106  013640                          .WORD   L$CLEAN
002110                          L$ACP::                 ;PTR. TO AUTO CODE
002110  013634                          .WORD   L$AUTO
002112                          L$PRT::                 ;PTR. TO PROTECT TABLE
002112  013202                          .WORD   L$PROT
002114                          L$TEST::                ;TEST NUMBER
002114  000000                          .WORD   0
002116                          L$DLY::                 ;DELAY COUNT
002116  000000                          .WORD   0
002120                          L$HIME::                ;PTR. TO HIGH MEM
002120  000000                          .WORD   0
```

DISPATCH TABLE

```
                                .SBTTL  DISPATCH TABLE

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

002122                                  DISPATCH 1
002122  000001                         .WORD   1
002124                          L$DISPATCH::
002124  013740                          .WORD   T1
```

DEFAULT HARDWARE P TABLE

```
 99                                     .SBTTL  DEFAULT HARDWARE P-TABLE
100
101                                     ;++
102                                     ; THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
103                                     ; THE TEST-DEVICE PARAMETERS.  THE STRUCTURE OF THIS TABLE
104                                     ; IS IDENTICAL TO THE STRUCTURE OF THE HARDWARE P TABLES,
105                                     ; AND IS USED AS A "TEMPLATE" FOR BUILDING THE P-TABLES.
106                                     ;--
107
108 002126                                       BGNHW   DFPTBL
    002126  000003                      .WORD   L10000-L$HW/2
    002130                          L$HW::
    002130                          DFPTBL::
109
110 002130  160500                      .WORD   QCMDAD                  ;HARDWARE UNIT 0 DEFAULT BASE ADDRESS
111 002132  000500                      .WORD   VEC                     ;HARDWARE UNIT 0 DEFAULT VECTOR
112 002134  000200                      .WORD   ^B0000000010000000      ;DEFAULT BR INTERRUPT LEVEL 4
122
123 002136                                       ENDHW
    002136                          L10000:
```

SOFTWARE P TABLE

```
                                .SBTTL  SOFTWARE P-TABLE

                                ;++
                                ; THE SOFTWARE TABLE CONTAINS VARIOUS DATA USED BY THE
                                ; PROGRAM AS OPERATIONAL PARAMETERS.  THESE PARAMETERS ARE
                                ; SET UP AT ASSEMBLY TIME AND MAY BE VARIED BY THE OPERATOR
                                ; AT RUN TIME.
                                ; -

002136                                  BGNSW   SFPTBL
002136  000001                         .WORD   L10001-L$SW/2
002140                          L$SW::
002140                          SFPTBL::

002140  000240                          NOP


002142                                  ENDSW
002142                          L10001:

002142                                  ENDMOD
```

```
                                .ENABL  AMA

                                BGNMOD
                        STARS
                        ;;*****************************************************************
                        ;*
                        ;*              MACROS DEFINED ONLY FOR THIS DIAGNOSTIC
                        ;*
                        STARS
                        ;;*****************************************************************

                        ;
                        ;       MACRO SET
                        ;       USED TO CALL ROUTINE TO PRINT OUT REGISTER BIT NAMES
                        ;
                        .MACRO  SETBITS NAME,POINTER,VALUE
                        .NARG   TE$                     ;GET NUMBER OF ARGUMENTS PASSED
                        .IF NE  TE$-3                   ;SEE IF RIGHT NUMBER
                        .ERROR  ;SETBITS MACRO REQUIRES 3 PARAMETERS
                        .ENDC
                        .NCHR   $L1 NAME                ;GET NUMBER OF CHARACTERS IN NAME PARAMETER
                        $L1 = $L1+1                     ;ALLOW FOR ZERO BYTE IN ASCIZ
                        $TEMP = $L1 & 1                 ;CHECK FOR ODD OR EVEN
                        .IF EQ $TEMP                    ;IF EVEN LENGTH OF NAME
                        $LEN = 4+$L1
                        .ENDC
                        .IF NE $TEMP                    ;IF ODD LENGTH OF NME
                        $LEN = 5+$L1
                        .ENDC
                                MOV     R1,-(SP)        ;SAVE REGISTERS
                                MOV     R5,-(SP)
                                MOV     VALUE,R1        ;GET VALUE REGISTER TO READ
                                JSR     R5,BITS$        ;SUBROUTINE TO OUTPUT VALUES
                                .WORD   $LEN
                                .WORD   POINTER
                                .ASCIZ  /NAME/
                                .EVEN
                                MOV     (SP)+,R5        ;RESTORE REGISTERS
                                MOV     (SP)+,R1
                        .ENDM
                        ;
                        ;       MACRO S$BITS
                        ;       USED TO CALL ROUTINE TO FORMAT PRINT BUFFER OF REGISTER BIT NAMES
                        ;
                        .MACRO  S$BITS  POINTER,VALUE
                        .NARG   TE$                     ;GET NUMBER OF ARGUMENTS PASSED
                        .IF NE  TE$-2                   ;SEE IF RIGHT NUMBER
                        .ERROR  ;S$BITS MACRO REQUIRES 2 PARAMETERS
                        .ENDC
                                MOV     R1,-(SP)        ;SAVE REGISTERS
                                MOV     R5,-(SP)
                                MOV     VALUE,R1        ;GET VALUE REGISTER TO READ
                                JSR     R5,BIT$         ;SUBROUTINE TO OUTPUT VALUES
                                .WORD   POINTER
                                .EVEN
                                MOV     (SP)+,R5        ;RESTORE REGISTERS
```

```
                        MOV     (SP)+,R1
                .ENDM
                .MACRO  HLPMAC  N
                ;
                ;MACRO TO INTERFACE WITH THIS SUBROUTINE TO PRINT OUT TEXT FILE
                ;
                .NCHR   $SYM,N
                        JSR     R5,$HLP                 ;JUMP TO SUBROUTINE
                        .ASCII  /N/                     ;NAME OF FILE
                        $TEMP = 10.-$SYM
                        .REPT   $TEMP
                        .BYTE   0
                        .ENDR
                .ENDM
                ;
                ;MACRO TO BUILD THE TEST TABLE
                ;
                .MACRO TESTNM N
                        .WORD   TEST'N
                .ENDM
                .MACRO  NUMTESTS N
                .LIST
                NUM$TST::
                        .WORD   N                       ;NUMBER OF TESTS
                TESTS::
                .NLIST
                .LIST MEB
                $TNUM = 1
                .RADIX  10
                .REPT   N
                        TESTNM \$TNUM
                $TNUM = $TNUM + 1
                .ENDR
                .RADIX 8
                .ENDM
                ;
                ;MACRO TO NAME TESTS
                ;
000000          $NUM == 0
                .MACRO TEST N
                .LIST
                TEST'N::
                        MOV     #N,L$TEST               ;TEST NUMBER FOR ERROR MESSAGES
                .NLIST
                .ENDM

                .MACRO STATST N$
                .RADIX 10
                .NARG $TEMP
                .IF EQ $TEMP
                $NUM = $NUM +1
                .ENDC
                .IF NE $TEMP
                $NUM = N$
                .ENDC
                        TEST \$NUM
                        CALL    BMSG                    ;CHECK FOR PNT FLAG
```

SOFTWARE P TABLE

```
159                             .RADIX 8
160                             .ENDM
```

```
                                .SBTTL  GLOBAL EQUATES SECTION
002142                          STARS
                                ;;*****************************************************************
                                ;*
                                ;*                      GLOBAL EQUATE SECTION
                                ;*
002142                          STARS
                                ;;*****************************************************************

002142                          EQUALS
                                ;
                                ; 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
```

GLOBAL EQUATES SECTION

```
                000140          PRIO3== 140
                000100          PRIO2== 100
                000040          PRIO1== 40
                000000          PRIO0== 0
                                ;
                                ;OPERATOR FLAG BITS
                                ;
                000004          EVL==     4
                000010          LOT==    10
                000020          ADR==    20
                000040          IDU==    40
                000100          ISR==   100
                000200          UAM==   200
                000400          BOE==   400
                001000          PNT==  1000
                002000          PRI==  2000
                004000          IXE==  4000
                010000          IBE== 10000
                020000          IER== 20000
                040000          LOE== 40000
                100000          HOE== 100000
    170                         ;
    171                         ; STANDARD REGISTER BASE ADDRESS CONFIGURATION
    172                         ;
    173         160500          QCMDAD  == 160500       ;STANDARD BASE ADDRESS FOR UNIT 0
    174         000500          VEC     == 500          ;STANDARD VECTOR ADDRESS FOR UNIT 0
    175
    176                         ;
    177                         ;BIT DEFINITIONS
    178                         ;
    179                         ;       QCMD - Q-BUS COMMAND REGISTER
    180                         ;
    181         000001          CMDACK  == BIT00        ; WO COMMAND ACKNOWLDEGE
    182         000100          PRSIE   == BIT06        ; R/W INTERRUPT ENABLE
    183                         ;
    184                         ;       QVNT - Q-BUS EVENT REGISTER
    185                         ;
    186         000001          VNTPRS  == BIT00        ; WO EVENT PRESENT
    187         000100          ACKIE   == BIT06        ; R/W INTERRUPT ENABLE
    188                         ;
    189                         ;       QINT - Q-BUS INTERRUPT SUMMARY REGISTER
    190                         ;
    191         000100          ERRIE   == BIT06        ; R/W INTERRUPT ENABLE
    192         001000          MRDY    == BIT09        ; RO MIRROR OF QDMA-07, READY
    193         002000          VNTACK  == BIT10        ; RO EVENT ACKNOWLEDGE
    194         004000          CMDPRS  == BIT11        ; RO COMMAND PRESENT
    195         010000          UPWRFL  == BIT12        ; RO UNIBUS POWER FAIL
    196         020000          QNEX    == BIT13        ; RO Q-BUS NON EXISTENT MEMORY ADDRESS
    197         040000          UNEX    == BIT14        ; RO UNIBUS NON EXISTENT MEMORY ADDRESS
    198         100000          ERR     == BIT15        ; RO ERROR
    199                         ;
    200                         ;       QCTL - Q-BUS CONTROL REGISTER
    201                         ;
    202         000001          WDTRST  == BIT00        ; WO WATCHDOG TIMER RESET
    203         000002          TMRENB  == BIT01        ; R/W TIMER ENABLE
    204         000004          WDT0    == BIT02        ; WO WATCHDOG TIMER TIME-OUT BIT (1 OF 2)
    205         000010          WDT1    == BIT03        ; WO WATCHDOG TIMER TIME-OUT BIT (2 OF 2)
```

```
000020          QVREN   == BIT04        ; Q-VIEW READ ENABLE
000000          TIME.5  == 0            ;1/2 SEC TIME CODE
000004          TIME1   == WDT0         ;1 SEC TIME CODE
000010          TIME2   == WDT1         ;2 SEC TIME CODE
000014          TIME4   == WDT0!WDT1    ;4 SEC TIME CODE
                ;
                ;
                ;       QDMA - Q-BUS DMA CONTROL AND STATUS REGISTER
                ;
000001          GO      == BIT00        ; WO INITIATES DMA TRANSFER
000002          DMAWT   == BIT01        ; R/W DIRECTION FLOW OF DMA
000020          UXAD16  == BIT04        ; R/W UNIBUS EXTENDED ADDRESS BIT 16
000040          UXAD17  == BIT05        ; R/W UNIBUS EXTENDED ADDRESS BIT 17
000100          RDYIE   == BIT06        ; R/W INTERRUPT ENABLE
000200          RDY     == BIT07        ; RO READY (CLEARED BY GO)
000400          QXAD16  == BIT08        ; R/W Q-BUS EXTENDED ADDRESS BIT 16
001000          QXAD17  == BIT09        ; R/W Q-BUS EXTENDED ADDRESS BIT 17
002000          QXAD18  == BIT10        ; R/W Q-BUS EXTENDED ADDRESS BIT 18
004000          QXAD19  == BIT11        ; R/W Q-BUS EXTENDED ADDRESS BIT 19
010000          QXAD20  == BIT12        ; R/W Q-BUS EXTENDED ADDRESS BIT 20
020000          QXAD21  == BIT13        ; R/W Q-BUS EXTENDED ADDRESS BIT 21
                ;
                ;       QMT1 - Q-BUS MAINTENANCE REGISTER 1
                ;
000002          MVADR   == BIT01        ; R/W MAINTENANCE VIEW ADDRESS
000004          FUNC0   == BIT02        ; R/W SELECT MAINTENANCE MODE BIT 02 FOR QMT0
000010          FUNC1   == BIT03        ; R/W SELECT MAINTENANCE MODE BIT 03 FOR QMT0
000020          FUNC2   == BIT04        ; R/W SELECT MAINTENANCE MODE BIT 04 FOR QMT0
000040          MQPFL   == BIT05        ; R/W MAINTENANCE Q-BUS POWER FAIL
000100          MQHALT  == BIT06        ; WO MAINTENANCE Q-BUS HALT
000200          MIODIS  == BIT07        ; R/W MAINTENANCE I/O DISABLE
                ;
                ;       MAINTENANCE FUNCTION, BIT IN QMT1 TO DEFINE USE OF QMT0
                ;
000004          SELQEVENT == 000004     ; SELECT QEVENT
000010          SELQCMD   == 000010     ; SELECT QCMD
000014          SELUVADR  == 000014     ; SELECT UVADR
000020          SELUBAR   == 000020     ; SELECT UBAR
000024          SELDMADAT == 000024     ; SELECT DMADAT
000030          SELUVDAT  == 000030     ; SELECT UVDAT
000034          SELRDDMA  == 000034     ; SELECT DMA READ
                ;
                ; MEMORY MANAGEMENT MAPPING ADDRESSES
                ;
177572          MMR0    == 177572
172516          MMR3    == 172516
172300          KISDR0  == 172300
172340          KISAR0  == 172340
170370          MIUBM   == 170370
172340          APR0    == KISAR0
172342          APR1    == APR0+2
172344          APR2    == APR1+2
172346          APR3    == APR2+2
172350          APR4    == APR3+2
172352          APR5    == APR4+2
172354          APR6    == APR5+2
```

GLOBAL EQUATES SECTION

```
263         172356              APR7     == APR6+2
264
265                             ;
266                             ;       MISC. EQUATES
267                             ;
268         000010              MAXUNITS == 8.          ; MAXIMUM NUMBER OF UNITS ALLOWED
269         000000              NO       == 0           ; LOGICAL VALUE FOR NO
270         000001              YES      == 1           ; LOGICAL VALUE FOR YES
271         020040              WSPACE   == 20040       ; WORD OF ASCII SPACES
272         026000              TIMOUT   == 26000       ; TIME OUT LOOP VALUE FOR 1 SEC
273         000013              MILLI    == 11.         ; TIMEOUT VALUE FOR ABOUT 1 MILLISECOND
274
275
290
```

M2

GLOBAL DATA SECTION

```
                                .SBTTL  GLOBAL DATA SECTION

002142                          STARS
                                ;;*****************************************************************
                                ;*
                                ;*      GLOBAL DATA SECTION
                                ;*
002142                          STARS
                                ;;*****************************************************************

                                ;
                                ; CURRENT UNIT Q-BUS BRIDGE INTERFACE REGISTERS ADDRESSES ARE STORED HERE
                                ;
002142                          ADDRESSES::
002142  000000                  QCMD::          .WORD   0       ; Q-BUS COMMAND REGISTER
002144  000000                  QVNT::          .WORD   0       ; Q-BUS EVENT REGISTER
002146  000000                  QINT::          .WORD   0       ; Q-BUS INTERRUPT SUMMARY REGISTER
002150  000000                  QCTL::          .WORD   0       ; Q-BUS CONTROL REGISTER
002152  000000                  QDMA::          .WORD   0       ; Q-BUS DMA CONTROL & STATUS REGISTER
002154  000000                  QUBA::          .WORD   0       ; Q-BUS BUS ADDRESS UNIBUS REGISTER
002156  000000                  QBA::           .WORD   0       ; Q-BUS BUS ADDRESS Q-BUS REGISTER
002160  000000                  QWC::           .WORD   0       ; Q-BUS WORD COUNT REGISTER
002162  000000                  QMT0::          .WORD   0       ; Q-BUS MAINTENANCE REGISTER 0
002164  000000                  QMT1::          .WORD   0       ; Q-BUS MAINTENANCE REGISTER 1
002166  000000                  QVAD::          .WORD   0       ; Q-BUS VIEW ADDRESS REGISTER
002170  000000                  QVDA::          .WORD   0       ; Q-BUS DATA REGISTER

                                ;
                                ; CURRENT UNIT Q-BUS BRIDGE INTERFACE REGISTERS VALUES ARE STORED HERE
                                ;
002172                          VALUES::
002172  000000                  SQCMD::         .WORD   0       ; COMMAND REGISTER
002174  000000                  SQVNT::         .WORD   0       ; EVENT REGISTER
002176  000000                  SQINT::         .WORD   0       ; INTERRUPT SUMMARY REGISTER
002200  000000                  SQCTL::         .WORD   0       ; CONTROL REGISTER
002202  000000                  SQDMA::         .WORD   0       ; DMA CONTROL & STATUS REGISTER
002204  000000                  SQUBA::         .WORD   0       ; BUS ADDRESS UNIBUS REGISTER
002206  000000                  SQBA::          .WORD   0       ; BUS ADDRESS REGISTER
002210  000000                  SQWC::          .WORD   0       ; WORD COUNT REGISTER
002212  000000                  SQMT0::         .WORD   0       ; MAINTENANCE REGISTER 0
002214  000000                  SQMT1::         .WORD   0       ; MAINTENANCE REGISTER 1
002216  000000                  SQVAD::         .WORD   0       ; VIEW ADDRESS REGISTER
002220  000000                  SQVDA::         .WORD   0       ; DATA REGISTER

002222                          EXPECTED::                      ;USED FOR TABLE PROCESSING OF EXPECTED RESULTS
002222  000000                  EXQCMD::        .WORD   0       ; COMMAND REGISTER
002224  000000                  EXQVNT::        .WORD   0       ; EVENT REGISTER
002226  000000                  EXQINT::        .WORD   0       ; INTERRUPT SUMMARY REGISTER
002230  000000                  EXQCTL::        .WORD   0       ; CONTROL REGISTER
002232  000000                  EXQDMA::        .WORD   0       ; DMA CONTROL & STATUS REGISTER
002234  000000                  EXQUBA::        .WORD   0       ; BUS ADDRESS UNIBUS REGISTER
002236  000000                  EXQBA::         .WORD   0       ; BUS ADDRESS REGISTER
002240  000000                  EXQWC::         .WORD   0       ; WORD COUNT REGISTER
002242  000000                  EXQMT0::        .WORD   0       ; MAINTENANCE REGISTER 0
002244  000000                  EXQMT1::        .WORD   0       ; MAINTENANCE REGISTER 1
002246  000000                  EXQVAD::        .WORD   0       ; VIEW ADDRESS REGISTER
002250  000000                  EXQVDA::        .WORD   0       ; DATA REGISTER
```

GLOBAL DATA SECTION

```
347
348                                     ;
349                                     ;INTERNAL TEST NUMBERS ARE STORED HERE
350                                     ;
351 002252                                      NUMTESTS        25.                                     ;V8.2
    002252                              NUM$TST::
    002252  000031                              .WORD   25.                     ;NUMBER OF TESTS
    002254                              TESTS::
    002254  014220                              .WORD   TEST1
    002256  014240                              .WORD   TEST2
    002260  014474                              .WORD   TEST3
    002262  014730                              .WORD   TEST4
    002264  015274                              .WORD   TEST5
    002266  015436                              .WORD   TEST6
    002270  016004                              .WORD   TEST7
    002272  016146                              .WORD   TEST8
    002274  016476                              .WORD   TEST9
    002276  017030                              .WORD   TEST10
    002300  020132                              .WORD   TEST11
    002302  020734                              .WORD   TEST12
    002304  021756                              .WORD   TEST13
    002306  022536                              .WORD   TEST14
    002310  023522                              .WORD   TEST15
    002312  024302                              .WORD   TEST16
    002314  025266                              .WORD   TEST17
    002316  026046                              .WORD   TEST18
    002320  026756                              .WORD   TEST19
    002322  030116                              .WORD   TEST20
    002324  030422                              .WORD   TEST21
    002326  031506                              .WORD   TEST22
    002330  033440                              .WORD   TEST23
    002332  034010                              .WORD   TEST24
    002334  034202                              .WORD   TEST25
352                                     ;
353                                     ;Q-BRIDGE REGISTER NAMES ARE STORED HERE. ACCESS IS INDEXED, EACH TAKING 2 WORDS
354                                     ;
355                                             .EVEN
356 002336      121     103     115     NAMES:: .ASCIZ  /QCMD/
    002341      104     000
357 002343      121     126     116             .ASCIZ  /QVNT/
    002346      124     000
358 002350      121     111     116             .ASCIZ  /QINT/
    002353      124     000
359 002355      121     103     124             .ASCIZ  /QCTL/
    002360      114     000
360 002362      121     104     115             .ASCIZ  /QDMA/
    002365      101     000
361 002367      121     125     102             .ASCIZ  /QUBA/
    002372      101     000
362 002374      121     102     101             .ASCIZ  /QBA /
    002377      040     000
363 002401      121     127     103             .ASCIZ  /QWC /
    002404      040     000
364 002406      121     115     124             .ASCIZ  /QMTO/
    002411      060     000
365 002413      121     115     124             .ASCIZ  /QMT1/
    002416      061     000
```

```
366 002420  121 126 101          .ASCIZ  /QVAD/
    002423  104 000
367 002425  121 126 104          .ASCIZ  /QVDA/
    002430  101 000
368                         .EVEN
369
370                         ;
371                         ;       MISC STORAGE AREAS
372                         ;
373
374 002432  000000          BRIDGETYPE::    .WORD   0       ;BRIDGE TYPE (0=Q BRIDGE 1=U BRIDGE)
375 002434  000000          BRDGFLG::       .WORD   0       ;BRIDGE CONFIGURED FLAG
376 002436  000000          LOGUNIT::       .WORD   0       ;USED TO STORE CURRENT LOGICAL UNIT
377 002440  000000          PLOC::          .WORD   0       ;POINTER TO CURRENT HARDWARE P TABLE
378 002442  000000          BASEADD::       .WORD   0       ;STORES BASE ADDRESS
379 002444  000000          VECTOR::        .WORD   0       ;STORES VECTOR ADDRESS
380 002446  000000          BRLEVEL::       .WORD   0       ;STORES BR LEVEL
381 002450  000000          TRPFLG::        .WORD   0       ;TRAP FLAG INDICATOR
382 002452  000000          ADD::           .WORD   0       ;STORES ADDRESS OF REGISTER FOR MESSAGES
383 002454  000000          VAL::           .WORD   0       ;STORES VALUE OF REGISTER FOR MESSAGES
384 002456  000000          EXP::           .WORD   0       ;STORES EXPECTED VALUE OF TEST FOR MESSAGES
385 002460  000000          TNUM::          .WORD   0       ;STORES TEST NUMBER
386 002462  000000          ERROR1::        .WORD   0       ;STORES ERROR COUNTS
387 002464  000000          ERROR2::        .WORD   0       ;STORES ERROR COUNTS
388 002466  000000          RAM::           .WORD   0       ;TELLS WHETHER RAM MESSAGE WAS PRINTED OUT
389 002470  000000          VALUE::         .WORD   0       ;STORES CURRENT CPU PRIORITY LEVEL
390 002472  000000          INTFLG::        .WORD   0       ;INTERRUPT FLAG
391 002474  000000          COUNTER::       .WORD   0       ;LOOP COUNTER STORAGE
392 002476  000000          HP1::           .WORD   0       ;TELLS WHETHER DRS HELP MESSAGE ALREADY PRINTED
393 002500  000000          HP2::           .WORD   0       ;TELLS WHETHER DIA HELP MESSAGE ALREADY PRINTED
394 002502  000000          FREMEM::        .WORD   0       ;STORES STARTING ADDRESS OF FREE MEMORY
395 002504  000000          MEMSIZ::        .WORD   0       ;STORE SIZE OF FREE MEMORY IN # OF WORDS
396 002506  000000          DIR::           .WORD   0       ;DIRECTION BIT FOR DMA
397 002510  000000          PATTERN::       .WORD   0       ;STORES CODE FOR DMA PATTERN
398 002512  000000          WORD.COUNT::    .WORD   0       ;STORE WORD COUNT FOR DMA IN 2'S COMPLIMENT FORM
399 002514  000000          LOW16::         .WORD   0       ;LOW 16 BITS OF UNIBUS ADDRESS FOR DMA
400 002516  000000          HI2::           .WORD   0       ;HIGH 2 BITS OF UNIBUS ADDRESS FOR DMA
401 002520  000000          MAPPING::       .WORD   NO      ;FLAG TO USE MAPPING REGISTERS
402 002522  000000          APR::           .WORD   0       ;STORES CURRENT VALUE OF APR UNDER USE
403 002524  000000          LOOPS::         .WORD   0       ;STORES CURRENT LOOP VALUE
404 002526  000000          DLY1:           .WORD   0       ;STORE WRITE DELAY VALUE FOR CONTENTIONS TEST
405 002530  000000          DLY2:           .WORD   0       ;STORE READ DELAY VALUE FOR CONTENTIONS TEST
406 002532  000000          DEFAULT::       .WORD   0       ;STORE DEFAULT TIMEOUT VALUE
```

GLOBAL TEXT SECTION

```
                                        .SBTTL  GLOBAL TEXT SECTION

                                        ;++
                                        ; THE GLOBAL TEXT SECTION CONTAINS FORMAT STATEMENTS,
                                        ; MESSAGES, AND ASCII INFORMATION THAT ARE USED IN
                                        ; MORE THAN ONE TEST.
                                        ;--

                                        ;
                                        ; NAMES OF DEVICES SUPPORTED BY PROGRAM
                                        ;
002534                                          DEVTYP  <FEP>
002534                                  L$DVTYP::
002534  106     105     120                     .ASCIZ  /FEP/
002537  000
                                                .EVEN

                                        ; TEST DESCRIPTION
                                        ;
002540                                          DESCRIPT        <COMMAND BRIDGE LINK MODE DIAGNOSTIC>
002540                                  L$DESC::
002540  103     117     115                     .ASCIZ  /COMMAND BRIDGE LINK MODE DIAGNOSTIC/
002543  115     101     116
002546  104     040     102
002551  122     111     104
002554  107     105     040
002557  114     111     116
002562  113     040     115
002565  117     104     105
002570  040     104     111
002573  101     107     116
002576  117     123     124
002601  111     103     000
                                                .EVEN
                                                .EVEN
                                        .NLIST  TEX
                                        ;
                                        ;       BIT NAMES IN THE REGISTERS
                                        ;
002604  054     054     054     CMDBIT:: .ASCIZ /.........PRSIE......CMDACK/
002637  054     054     054     VNTBIT:: .ASCIZ /.........ACKIE......VNTPRS/
002672  105     122     122     INTBIT:: .ASCIZ /ERR,UNEX,QNEX,UPWRFL,CMDPRS,VNTACK,RDY...ERRIE/
002751  054     054     054     CTLBIT:: .ASCIZ /............,WDT1,WDT0,TMRENB,WDTRST/
003015  054     054     121     DMABIT:: .ASCII /,,QXAD21,QXAD20,QXAD19,QXAD18,QXAD17,QXAD16,FDY,RDYIE/
003102  054     125     130              .ASCIZ /,UXAD17,UXAD16,,,DMAWT,GO/
003134  054     054     054     MT1BIT:: .ASCIZ /........,MIODIS,MQHLT,MQPFL,FUNC2,FUNC1,FUNC0,MVADR/
```

GLOBAL TEXT SECTION

```
                                        STARS
                                        ;;*****************************************************************
                                        ;
                                        ; FORMAT STATEMENTS USED IN PRINT CALLS
                                        ;
                                        ;.IF NDF ONEFILE
                                        .NLIST  BEX
                                        ;.ENDC

003217  045  116  061  CONFIG:: .ASCIZ /%N1%ACONFIGURED FOR %T%A BRIDGE MODULE%N1/
003271  121  055  102  QBUS::   .ASCIZ  /Q-BUS/
003277  125  116  111  UBUS::   .ASCIZ  /UNIBUS/
003306  045  116  061  FOR0::    .ASCIZ  /%N1/                          ;LINE FEED CARRIAGE RETURN ONLY
003312  045  116  061  FOR1::   .ASCII  /%N1%ANAME%S4%AADDRESS%S4%ACONTENTS%S4%AEXPECTED/
003371  040  050  125             .ASCIZ  / (UNDETERMINED BITS ARE ZERO)/
003427  045  116  061  FOR2::   .ASCIZ  /%N1%T%S5%O6%S5%O6%S6%O6/
003457  045  101  105  FOR3::   .ASCIZ  /%AEVENT SYNC TIMEOUT OCCURED AFTER TEST %Z2%A COMPLETED/
003547  045  101  124  FOR4::   .ASCIZ  /%ATEST %Z2%A TIMEOUT/
003574  045  116  061  FOR5::   .ASCIZ  /%N1%S4%O4%S9%O6%S7%O6/
003622  045  116  061  FOR6::   .ASCIZ  /%N1%ATOTAL RAM CHECK ERRORS %D5/
003662  045  101  122  FOR7::   .ASCIZ  /%ARAM ADDRESS     CONTENTS     EXPECTED/
003732  045  101  114  FOR8::   .ASCIZ  /%ALSI-TEST %Z2%N1/
003754  045  101  116  FOR9::   .ASCII  /%ANOT ENOUGH MEMORY AVAILABLE FOR DMA TRANSFER;/
004033  045  116  061  FOR9.1:: .ASCIZ /%N1%D5%A MAXIMUM WORDS AVAILABLE IN LOW MEMORY/
004112  045  116  061  FOR9.2:: .ASCIZ /%N1%D5%A MAXIMUM WORDS AVAILABLE IN HI MEMORY WITH MAPPING/
004205  045  116  061  FOR9.3:: .ASCIZ /%N1%D5%A REQUESTED/
004230  045  116  061  FOR10:: .ASCIZ  /%N1%Z5%S3%O6%S4%O6/
004253  045  116  061  FOR11:: .ASCIZ  /%N1%A TOTAL DMA ERRORS = %Z5/
004310  045  101  124  FOR12:: .ASCIZ  /%ATIMEOUT WAITING FOR QINT CMDPRS INTERRUPT/
004364  045  101  124  FOR13:: .ASCIZ  /%ATIMEOUT WAITING FOR QDMA RDY INTERRUPT/
004435  045  101  111  FOR14:: .ASCIZ  /%AINVALID DATA AFTER DMA TRANSFER/
004477  045  116  062  FOR14.1:: .ASCIZ /%N2%AWORD#   VALUE    EXPECTED/
004536  045  101  124  FOR15:: .ASCIZ  /%ATIMEOUT WAITING FOR QINT VNTACK INTERRUPT/
004612  045  101  124  FOR16:: .ASCIZ  /%ATIMEOUT WAITING FOR QINT CMDPRS SET%N1/
004663  045  101  124  FOR17:: .ASCIZ  /%ATIMEOUT WAITING FOR QINT VNTACK SET%N1/
004734  045  101  127  FOR18:: .ASCIZ  /%AWAITING FOR PATTERN # %Z2/
004770  045  101  117  FOR19:: .ASCII  /%AONLY BITS 4 AND 5 SHOULD BE SET FOR HIGH UNIBUS ADDRESS/
005061  045  116  045             .ASCIZ  /%N%ACONTENTS = %O6/
005104  045  101  105  FOR20:: .ASCIZ  /%AERR INTERRUPT OCCURED/
005134  045  101  124  FOR21:: .ASCIZ  /%ATIMEOUT WAITING FOR QDMA RDY OR QINT ERR INTERRUPT/
005221  045  101  121  FOR22:: .ASCIZ  /%AQINT QNEX BIT 13 Q-BUS NON EXISTENT MEMORY SHOULD BE SET/
005314  045  116  061  FOR23:: .ASCIZ  /%N1%ALOOP NUMBER = %Z3/
005343  045  116  061  FOR24:: .ASCIZ  /%N1%ADMA THROTTLE TEST WAITING FOR LOOP %D1/
005417  045  116  061  FOR25:: .ASCIZ  /%N1%AERROR IN QBOOT, NO BOOT OCCURED/
005464  045  101  124  FOR26:: .ASCIZ  /%ATIMEOUT WAITING FOR QINT VNTACK CLEAR/
005534  045  116  061  ABO::    .ASCIZ  /%N1%A****TEST ABORTED****/
005566  045  116  061  FORERR:: .ASCIZ /%N1%A/<7>/UNEXPECTED INTERRUPT IN TEST %Z2%A PC=%O6%A/<7>/%N1/
```

GLOBAL TEXT SECTION

```
    487 005654                          STARS
                                        ;;*****************************************************************
    488                                 ;
    489                                 ; ASCII MESSAGES USED IN ERROR REPORTING
    490                                 ;
    491 005654                          STARS
                                        ;;*****************************************************************
    492
    493
    494 005654      120     122     111 HELP1:: .ASCIZ  /PRINT DIAGNOSTIC SUPERVISOR HELP FILE?/
    495 005723      120     122     111 HELP2:: .ASCIZ  /PRINT Z0792 DIAGNOSTIC HELP FILE?/
    496 005765      102     122     111 MSG1::  .ASCIZ  /BRIDGE TIMEOUT ERROR/
    497 006012      102     122     111 MSG2::  .ASCIZ  /BRIDGE QCMD ROTATING BITS 1-5 IN ERROR/
    498 006061      102     122     111 MSG3::  .ASCIZ  /BRIDGE QVNT ROTATING BITS 1-5 IN ERROR/
    499 006130      102     122     111 MSG4::  .ASCIZ  /BRIDGE QVDA VIEW REGISTER RAM CHECK ERROR/
    500
    501 006202      102     122     111 MSG6::  .ASCIZ  /BRIDGE WRONG INTERRUPT BIT, CHECK QINT FOR WHICH ONE/
    502
    503                                 .EVEN
    504
```

GLOBAL ERROR REPORT SECTION

```
                                        .SBTTL  GLOBAL ERROR REPORT SECTION

                                        ;++
                                        ; THE GLOBAL ERROR REPORT SECTION CONTAINS MESSAGE PRINTING AREAS
                                        ; USED BY MORE THAN TEST TO OUTPUT ADDITIONAL ERROR INFORMATION.  PRINTB
                                        ; (BASIC) AND PRINTX (EXTENDED) CALLS ARE USED TO CALL PRINT SERVICES.
                                        ;--


                                        ;       TIME OUT ERROR
                                        ; BASIC FORMAT IS
                                        ;   TIMEOUT OCCURED AFTER TEST ? COMPLETED

006270                                          BGNMSG  ERR0
006270                                  ERR0::
006270                                          PRINTB  #FOR3,TNUM
006270  013746  002460                          MOV     TNUM,-(SP)
006274  012746  003457                          MOV     #FOR3,-(SP)
006300  012746  000002                          MOV     #2,-(SP)
006304  010600                                  MOV     SP,R0
006306  104414                                  TRAP    C$PNTB
006310  062706  000006                          ADD     #6,SP
006314                                          ENDMSG
006314                                  L10002:
006314  104423                                  TRAP    C$MSG

                                        ;       TIME OUT ERROR
                                        ; BASIC FORMAT IS-
                                        ;       LSI-TEST XX TIMEOUT
                                        ; R1 EXPECTED TO CONTAIN REGISTER NUMBER

006316                                          BGNMSG  ERR1
006316                                  ERR1::
006316                                          RFLAGS  FLAG
006316  104421                                  TRAP    C$RFLA
006320  010037  011710                          MOV     R0,FLAG
006324  032737  020000  011710                  BIT     #IER,FLAG               ;IS INHIBIT FLAGS SET?
006332  001012                                  BNE     1$                      ;BRANCH OVER IF SET
006334                                          PRINTF  #FOR8,L$TEST            ;PRINT TEST NUMBER
006334  013746  002114                          MOV     L$TEST,-(SP)
006340  012746  003732                          MOV     #FOR8,-(SP)
006344  012746  000002                          MOV     #2,-(SP)
006350  010600                                  MOV     SP,R0
006352  104417                                  TRAP    C$PNTF
006354  062706  000006                          ADD     #6,SP
006360  022701  000000                  1$:     CMP     #0,R1                   ;SEE WHICH REGISTER
006364  001404                                  BEQ     10$                     ;IF COMMAND REGISTER, BRANCH
006366  022701  000001                          CMP     #1,R1
006372  001412                                  BEQ     20$                     ;BRANCH IF QVENT REGISTER
006374  000421                                  BR      30$                     ;JUST PRINT ABORT MESSAGE
                                        ;COMMAND REGISTER TIMEOUT
006376                                  10$:
006376                                          PRINTX  #FOR16
006376  012746  004612                          MOV     #FOR16,-(SP)
006402  012746  000001                          MOV     #1,-(SP)
006406  010600                                  MOV     SP,R0
006410  104415                                  TRAP    C$PNTX
```

GLOBAL ERROR REPORT SECTION

```
                006412  062706  000004                  ADD     #4,SP
            544 006416  000410                          BR      30$
            545                             ;EVENT REGISTER TIMEOUT
            546 006420                      20$:
            547 006420                              PRINTX  #FOR17
                006420  012746  004663              MOV     #FOR17,-(SP)
                006424  012746  000001              MOV     #1,-(SP)
                006430  010600                      MOV     SP,R0
                006432  104415                      TRAP    C$PNTX
                006434  062706  000004              ADD     #4,SP
            548                             ;COMMON
            549 006440                      30$:    PRINTX  #FOR18,COUNTER
                006440  013746  002474              MOV     COUNTER,-(SP)
                006444  012746  004734              MOV     #FOR18,-(SP)
                006450  012746  000002              MOV     #2,-(SP)
                006454  010600                      MOV     SP,R0
                006456  104415                      TRAP    C$PNTX
                006460  062706  000006              ADD     #6,SP
            550 006464                              PRINTB  #ABO
                006464  012746  005534              MOV     #ABO,-(SP)
                006470  012746  000001              MOV     #1,-(SP)
                006474  010600                      MOV     SP,R0
                006476  104414                      TRAP    C$PNTB
                006500  062706  000004              ADD     #4,SP
            551 006504                              ENDMSG
                006504                          L10003:
                006504  104423                      TRAP    C$MSG
            552                             ;       TIME OUT ERROR
            553                             ; BASIC FORMAT IS-
            554                             ;       LSI-TEST XX TIMEOUT WAITING FOR QINT CMDPRS SET
            555                             ;       ****TEST ABORTED***
            556                             ;
            557                             ; INPUTS:
            558                             ;       R1 CONTAINS REGISTER NUMBER
            559                             ;
            560
            561
            562
            563 006506                              BGNMSG  ERR2
                006506                          ERR2::
            564 006506                              RFLAGS  FLAG
                006506  104421                      TRAP    C$RFLA
                006510  010037  011710              MOV     R0,FLAG
            565 006514  032737  020000  011710      BIT     #IER,FLAG               ;IS INHIBIT FLAGS SET?
            566 006522  001012                      BNE     1$                      ;BRANCH OVER IF SET
            567 006524                              PRINTF  #FOR8,L$TEST            ;PRINT TEST NUMBER
                006524  013746  002114              MOV     L$TEST,-(SP)
                006530  012746  003732              MOV     #FOR8,-(SP)
                006534  012746  000002              MOV     #2,-(SP)
                006540  010600                      MOV     SP,R0
                006542  104417                      TRAP    C$PNTF
                006544  062706  000006              ADD     #6,SP
            568 006550  022701  000000      1$:     CMP     #0,R1                   ;SEE WHICH REGISTER
            569 006554  001404                      BEQ     10$                     ;IF COMMAND REGISTER, BRANCH
            570 006556  022701  000001              CMP     #1,R1
            571 006562  001412                      BEQ     20$                     ;BRANCH IF QVENT REGISTER
            572 006564  000421                      BR      30$                     ;JUST PRINT ABORT MESSAGE
```

GLOBAL ERROR REPORT SECTION

```
573
574 006566
575 006566
    006566  012746  004612          ;COMMAND REGISTER TIMEOUT
    006572  012746  000001  10$:     PRINTX  #FOR16
    006576  010600                  MOV     #FOR16,(SP)
    006600  104415                  MOV     #1,-(SP)
    006602  062706  000004          MOV     SP,R0
576 006606  000410                  TRAP    C$PNTX
577                                 ADD     #4,SP
578 006610                          BR      30$             ;SKIP OVER EVENT REGISTER PRINTING
579 006610                  ;EVENT REGISTER TIMEOUT
    006610  012746  004663  20$:     PRINTX  #FOR17
    006614  012746  000001          MOV     #FOR17,-(SP)
    006620  010600                  MOV     #1,-(SP)
    006622  104415                  MOV     SP,R0
    006624  062706  000004          TRAP    C$PNTX
580 006630                          ADD     #4,SP
    006630  012746  005534  30$:     PRINTB  #ABO
    006634  012746  000001          MOV     #ABO,-(SP)
    006640  010600                  MOV     #1,-(SP)
    006642  104414                  MOV     SP,R0
    006644  062706  000004          TRAP    C$PNTB
581 006650                          ADD     #4,SP
    006650                          ENDMSG
    006650  104423          L10004:
                                    TRAP    C$MSG
582
583
584                         ;       BAD REGISTER VALUE ERROR (SINGLE REGISTER TEST)
585                         ;REGISTER NUMBER (0-11.) EXPECTED TO BE IN R1
586                         ;REGISTER ADDRESS EXPECTED TO BE IN LOCATION ADD
587                         ;REGISTER VALUE EXPECTED TO BE IN LOCATION VAL
588                         ;REGISTER EXPECTED VALUE EXPECTED TO BE IN LOCATION EXP
589
590 006652                          BGNMSG  ERR3
    006652                  ERR3::
591 006652  010146                  MOV     R1,-(SP)        ;SAVE REGISTERS USED IN ROUTINES
592 006654  010246                  MOV     R2,-(SP)
593 006656  005002                  CLR     R2              ;CLEAR ACCUMULATOR
594 006660  060102                  ADD     R1,R2           ;MULTIPLY REGISTER POINTER TIME 5
595 006662  060102                  ADD     R1,R2
596 006664  060102                  ADD     R1,R2
597 006666  060102                  ADD     R1,R2
598 006670  060102                  ADD     R1,R2
599 006672  062702  002336          ADD     #NAMES,R2       ;GET REGISTER NAME ADDRESS IN R2
600 006676  006301                  ASL     R1              ;REGISTER POINTER TIMES 2
601 006700  016137  002142  002452  MOV     ADDRESSES(R1),ADD ;MOVE CURRENT ADDRESS TO MESSAGE AREA
602 006706                          PRINTB  #FOR1           ;PRINT HEADER LINE
    006706  012746  003312          MOV     #FOR1,-(SP)
    006712  012746  000001          MOV     #1,-(SP)
    006716  010600                  MOV     SP,R0
    006720  104414                  TRAP    C$PNTB
    006722  062706  000004          ADD     #4,SP
603 006726                          PRINTB  #FOR2,R2,ADD,VAL,EXP ;PRINT FULL ERROR DETAILS
    006726  013746  002456          MOV     EXP,-(SP)
    006732  013746  002454          MOV     VAL,-(SP)
    006736  013746  002452          MOV     ADD,-(SP)
```

GLOBAL ERROR REPORT SECTION

```
                006742  010246                          MOV     R2,-(SP)
                006744  012746  003427                  MOV     #FOR2,-(SP)
                006750  012746  000005                  MOV     #5, (SP)
                006754  010600                          MOV     SP,R0
                006756  104414                          TRAP    C$PNTB
                006760  062706  000014                  ADD     #14,SP
            604 006764                                  PRINTB  #FOR0                   ;INSERT LINE FEED CARRIAGE RETURN
                006764  012746  003306                  MOV     #FOR0, (SP)
                006770  012746  000001                  MOV     #1,-(SP)
                006774  010600                          MOV     SP,R0
                006776  104414                          TRAP    C$PNTB
                007000  062706  000004                  ADD     #4,SP
            605 007004  010226                          MOV     R2,(SP)+                ;RESTORE REGISTERS
            606 007006  010126                          MOV     R1,(SP)+
            607 007010                                  ENDMSG
                007010                          L10005:
                007010  104423                          TRAP    C$MSG
            608
            609                                 ;BAD VIEW REGISTER RAM ERROR
            610                                 ;PRINTS HEADER ONLY
            611
            612 007012                                   BGNMSG  ERR4
                007012                          ERR4::
            613 007012                                   RFLAGS  FLAG
                007012  104421                          TRAP    C$RFLA
                007014  010037  011710                  MOV     R0,FLAG
            614 007020  032737  020000  011710          BIT     #IER,FLAG               ;IS INHIBIT FLAGS SET?
            615 007026  001012                          BNE     1$                      ;BRANCH OVER IF SET
            616 007030                                  PRINTF  #FOR8,L$TEST            ;PRINT TEST NUMBER
                007030  013746  002114                  MOV     L$TEST,-(SP)
                007034  012746  003732                  MOV     #FOR8,-(SP)
                007040  012746  000002                  MOV     #2,-(SP)
                007044  010600                          MOV     SP,R0
                007046  104417                          TRAP    C$PNTF
                007050  062706  000006                  ADD     #6,SP
            617 007054                          1$:     PRINTX  #FOR7                   ;PRINT HEADER
                007054  012746  003662                  MOV     #FOR7,-(SP)
                007060  012746  000001                  MOV     #1,-(SP)
                007064  010600                          MOV     SP,R0
                007066  104415                          TRAP    C$PNTX
                007070  062706  000004                  ADD     #4,SP
            618 007074                                  ENDMSG
                007074                          L10006:
                007074  104423                          TRAP    C$MSG
            619
            620                                 ;NOT ENOUGH MEMORY IN BUFFER TO TRANSFER REQUESTED DMA BYTE COUNT
            621
            622 007076                                   BGNMSG  ERR5
                007076                          ERR5::
            623 007076  013702  002512                  MOV     WORD.COUNT,R2
            624 007102  005402                          NEG     R2                      ;CONVERT WORD COUNT FROM 2'S COMPL
            625 007104  013703  002454                  MOV     VAL,R3
            626 007110  005203                          INC     R3
            627 007112  006303                          ASL     R3                      ;CONVERT PAR FORMAT TO WORDS
            628 007114  006303                          ASL     R3
            629 007116  006303                          ASL     R3
            630 007120  006303                          ASL     R3
```

GLOBAL ERROR REPORT SECTION

```
    631 007122  006303                        ASL     R3
    632 007124                                RFLAGS  FLAG
        007124  104421                        TRAP    C$RFLA
        007126  010037  011710                MOV     R0,FLAG
    633 007132  032737  020000  011710        BIT     #IER,FLAG           ;IS INHIBIT FLAGS SET?
    634 007140  001012                        BNE     1$                  ;BRANCH OVER IF SET
    635 007142                                PRINTF  #FOR8,L$TEST        ;PRINT TEST NUMBER
        007142  013746  002114                MOV     L$TEST,-(SP)
        007146  012746  003732                MOV     #FOR8,-(SP)
        007152  012746  000002                MOV     #2,-(SP)
        007156  010600                        MOV     SP,R0
        007160  104417                        TRAP    C$PNTF
        007162  062706  000006                ADD     #6,SP
    636 007166                          1$:   PRINTB  #FOR9
        007166  012746  003754                MOV     #FOR9,-(SP)
        007172  012746  000001                MOV     #1,-(SP)
        007176  010600                        MOV     SP,R0
        007200  104414                        TRAP    C$PNTB
        007202  062706  000004                ADD     #4,SP
    637 007206                                PRINTX  #FOR9.1,MEMSIZ
        007206  013746  002504                MOV     MEMSIZ,-(SP)
        007212  012746  004033                MOV     #FOR9.1,-(SP)
        007216  012746  000002                MOV     #2,-(SP)
        007222  010600                        MOV     SP,R0
        007224  104415                        TRAP    C$PNTX
        007226  062706  000006                ADD     #6,SP
    638 007232                                PRINTX  #FOR9.2,R3
        007232  010346                        MOV     R3,-(SP)
        007234  012746  004112                MOV     #FOR9.2,-(SP)
        007240  012746  000002                MOV     #2,-(SP)
        007244  010600                        MOV     SP,R0
        007246  104415                        TRAP    C$PNTX
        007250  062706  000006                ADD     #6,SP
    639 007254                                PRINTX  #FOR9.3,R2
        007254  010246                        MOV     R2,-(SP)
        007256  012746  004205                MOV     #FOR9.3,-(SP)
        007262  012746  000002                MOV     #2,-(SP)
        007266  010600                        MOV     SP,R0
        007270  104415                        TRAP    C$PNTX
        007272  062706  000006                ADD     #6,SP
    640 007276                                PRINTB  #ABO
        007276  012746  005534                MOV     #ABO,-(SP)
        007302  012746  000001                MOV     #1,-(SP)
        007306  010600                        MOV     SP,R0
        007310  104414                        TRAP    C$PNTB
        007312  062706  000004                ADD     #4,SP
    641 007316                                ENDMSG
        007316                          L10007:
        007316  104423                        TRAP    C$MSG
    642
    643                                 ;NO CMDPRS INTERRUPT ERROR
    644
    645 007320                                BGNMSG  ERR6
        007320                          ERR6::
    646 007320                                RFLAGS  FLAG
        007320  104421                        TRAP    C$RFLA
        007322  010037  011710                MOV     R0,FLAG
```

GLOBAL ERROR REPORT SECTION

```
    647 007326  032737  020000  011710          BIT     @IER,FLAG               ;IS INHIBIT FLAGS SET?
    648 007334  001012                          BNE     1$                      ;BRANCH OVER IF SET
    649 007336                                  PRINTF  @FOR8,L$TEST            ;PRINT TEST NUMBER
        007336  013746  002114                  MOV     L$TEST,-(SP)
        007342  012746  003732                  MOV     @FOR8,-(SP)
        007346  012746  000002                  MOV     @2,-(SP)
        007352  010600                          MOV     SP,R0
        007354  104417                          TRAP    C$PNTF
        007356  062706  000006                  ADD     @6,SP
    650 007362                          1$:     PRINTX  @FOR12
        007362  012746  004310                  MOV     @FOR12,-(SP)
        007366  012746  000001                  MOV     @1,-(SP)
        007372  010600                          MOV     SP,R0
        007374  104415                          TRAP    C$PNTX
        007376  062706  000004                  ADD     @4,SP
    651 007402                                  PRINTB  @AB0
        007402  012746  005534                  MOV     @AB0,-(SP)
        007406  012746  000001                  MOV     @1,-(SP)
        007412  010600                          MOV     SP,R0
        007414  104414                          TRAP    C$PNTB
        007416  062706  000004                  ADD     @4,SP
    652 007422                                  ENDMSG
        007422                          L10010:
        007422  104423                          TRAP    C$MSG
    653
    654                                 ;NO QDMA RDY INTERRUPT ERROR
    655
    656 007424                                  BGNMSG  ERR7
        007424                          ERR7::
    657 007424                                  RFLAGS  FLAG
        007424  104421                          TRAP    C$RFLA
        007426  010037  011710                  MOV     R0,FLAG
    658 007432  032737  020000  011710          BIT     @IER,FLAG               ;IS INHIBIT FLAGS SET?
    659 007440  001012                          BNE     1$                      ;BRANCH OVER IF SET
    660 007442                                  PRINTF  @FOR8,L$TEST            ;PRINT TEST NUMBER
        007442  013746  002114                  MOV     L$TEST,-(SP)
        007446  012746  003732                  MOV     @FOR8,-(SP)
        007452  012746  000002                  MOV     @2,-(SP)
        007456  010600                          MOV     SP,R0
        007460  104417                          TRAP    C$PNTF
        007462  062706  000006                  ADD     @6,SP
    661 007466                          1$:     PRINTX  @FOR13
        007466  012746  004364                  MOV     @FOR13,-(SP)
        007472  012746  000001                  MOV     @1,-(SP)
        007476  010600                          MOV     SP,R0
        007500  104415                          TRAP    C$PNTX
        007502  062706  000004                  ADD     @4,SP
    662 007506                                  PRINTB  @AB0
        007506  012746  005534                  MOV     @AB0,-(SP)
        007512  012746  000001                  MOV     @1,-(SP)
        007516  010600                          MOV     SP,R0
        007520  104414                          TRAP    C$PNTB
        007522  062706  000004                  ADD     @4,SP
    663 007526                                  ENDMSG
        007526                          L10011:
        007526  104423                          TRAP    C$MSG
    664
```

GLOBAL ERROR REPORT SECTION

```
665                                     ;UNEXPECTED DATA AFTER DMA TRANSFER ERROR
666
667 007530                              BGNMSG  ERR8
    007530                      ERR8::
668 007530                              RFLAGS  FLAG
    007530  104421                     TRAP    C$RFLA
    007532  010037  011710              MOV     R0,FLAG
669 007536  032737  020000  011710      BIT     #IER,FLAG               ;IS INHIBIT FLAGS SET?
670 007544  001012                      BNE     1$                      ;BRANCH OVER IF SET
671 007546                              PRINTF  #FOR8,L$TEST            ;PRINT TEST NUMBER
    007546  013746  002114              MOV     L$TEST,-(SP)
    007552  012746  003732              MOV     #FOR8,-(SP)
    007556  012746  000002              MOV     #2,-(SP)
    007562  010600                      MOV     SP,R0
    007564  104417                      TRAP    C$PNTF
    007566  062706  000006              ADD     #6,SP
672 007572                      1$:     PRINTB  #FOR14
    007572  012746  004435              MOV     #FOR14,-(SP)
    007576  012746  000001              MOV     #1,-(SP)
    007602  010600                      MOV     SP,R0
    007604  104414                      TRAP    C$PNTB
    007606  062706  000004              ADD     #4,SP
673 007612                              PRINTX  #FOR14.1
    007612  012746  004477              MOV     #FOR14.1,-(SP)
    007616  012746  000001              MOV     #1,-(SP)
    007622  010600                      MOV     SP,R0
    007624  104415                      TRAP    C$PNTX
    007626  062706  000004              ADD     #4,SP
674 007632                              ENDMSG
    007632                      L10012:
    007632  104423                      TRAP    C$MSG
675
676                                     ;NO QINT VNTACK INTERRUPT ERROR
677
678 007634                              BGNMSG  ERR9
    007634                      ERR9::
679 007634                              RFLAGS  FLAG
    007634  104421                     TRAP    C$RFLA
    007636  010037  011710              MOV     R0,FLAG
680 007642  032737  020000  011710      BIT     #IER,FLAG               ;IS INHIBIT FLAGS SET?
681 007650  001012                      BNE     1$                      ;BRANCH OVER IF SET
682 007652                              PRINTF  #FOR8,L$TEST            ;PRINT TEST NUMBER
    007652  013746  002114              MOV     L$TEST,-(SP)
    007656  012746  003732              MOV     #FOR8,-(SP)
    007662  012746  000002              MOV     #2,-(SP)
    007666  010600                      MOV     SP,R0
    007670  104417                      TRAP    C$PNTF
    007672  062706  000006              ADD     #6,SP
683 007676                      1$:     PRINTX  #FOR15
    007676  012746  004536              MOV     #FOR15,-(SP)
    007702  012746  000001              MOV     #1,-(SP)
    007706  010600                      MOV     SP,R0
    007710  104415                      TRAP    C$PNTX
    007712  062706  000004              ADD     #4,SP
684 007716                              PRINTB  #ABO
    007716  012746  005534              MOV     #ABO,-(SP)
    007722  012746  000001              MOV     #1,-(SP)
```

GLOBAL ERROR REPORT SECTION

```
                007726  010600                          MOV     SP,R0
                007730  104414                          TRAP    C$PNTB
                007732  062706  000004                  ADD     #4,SP
    685         007736                                  ENDMSG
                007736                          L10013:
                007736  104423                          TRAP    C$MSG
    686
    687                                         ;MORE THAN BITS 4 AND 5 SET FOR HIGH UNIBUS ADDRESS
    688
    689         007740                                  BGNMSG  ERR10
                007740                          ERR10::
    690         007740                                  RFLAGS  FLAG
                007740  104421                          TRAP    C$RFLA
                007742  010037  011710                  MOV     R0,FLAG
    691         007746  032737  020000  011710          BIT     #IER,FLAG               ;IS INHIBIT FLAGS SET?
    692         007754  001012                          BNE     1$                      ;BRANCH OVER IF SET
    693         007756                                  PRINTF  #FOR8,L$TEST            ;PRINT TEST NUMBER
                007756  013746  002114                  MOV     L$TEST,-(SP)
                007762  012746  003732                  MOV     #FOR8,-(SP)
                007766  012746  000002                  MOV     #2,-(SP)
                007772  010600                          MOV     SP,R0
                007774  104417                          TRAP    C$PNTF
                007776  062706  000006                  ADD     #6,SP
    694         010002                          1$:     PRINTX  #FOR19,HI2
                010002  013746  002516                  MOV     HI2,-(SP)
                010006  012746  004770                  MOV     #FOR19,-(SP)
                010012  012746  000002                  MOV     #2,-(SP)
                010016  010600                          MOV     SP,R0
                010020  104415                          TRAP    C$PNTX
                010022  062706  000006                  ADD     #6,SP
    695         010026                                  ENDMSG
                010026                          L10014:
                010026  104423                          TRAP    C$MSG
    696
    697                                         ;ERR INTERRUPT OCCURRED ERROR
    698
    699         010030                                  BGNMSG  ERR11
                010030                          ERR11::
    700         010030                                  RFLAGS  FLAG
                010030  104421                          TRAP    C$RFLA
                010032  010037  011710                  MOV     R0,FLAG
    701         010036  032737  020000  011710          BIT     #IER,FLAG               ;IS INHIBIT FLAGS SET?
    702         010044  001012                          BNE     1$                      ;BRANCH OVER IF SET
    703         010046                                  PRINTF  #FOR8,L$TEST            ;PRINT TEST NUMBER
                010046  013746  002114                  MOV     L$TEST,-(SP)
                010052  012746  003732                  MOV     #FOR8,-(SP)
                010056  012746  000002                  MOV     #2,-(SP)
                010062  010600                          MOV     SP,R0
                010064  104417                          TRAP    C$PNTF
                010066  062706  000006                  ADD     #6,SP
    704         010072                          1$:     PRINTX  #FOR20
                010072  012746  005104                  MOV     #FOR20,-(SP)
                010076  012746  000001                  MOV     #1,-(SP)
                010102  010600                          MOV     SP,R0
                010104  104415                          TRAP    C$PNTX
                010106  062706  000004                  ADD     #4,SP
    705         010112                                  SETBITS QINT,INTBIT,@QINT
```

GLOBAL ERROR REPORT SECTION

```
        010112  010146                          MOV     R1,-(SP)        ;SAVE REGISTERS
        010114  010546                          MOV     R5,-(SP)
        010116  017701  172024                  MOV     @QINT,R1        ;GET @QINT REGISTER TO READ
        010122  004537  012130                  JSR     R5,BITS$        ;SUBROUTINE TO OUTPUT VALUES
        010126  000012                          .WORD   $LEN
        010130  002672                          .WORD   INTBIT
        010132     121     111     116          .ASCIZ  /QINT/
        010140  012605                          MOV     (SP)+,R5        ;RESTORE REGISTERS
        010142  012601                          MOV     (SP)+,R1
    706 010144                                  ENDMSG
        010144                          L10015:
        010144  104423                          TRAP    C$MSG
    707
    708                                 ;NO QDMA RDY OR ERR INTERRUPT ERROR
    709
    710 010146                                  BGNMSG  ERR12
        010146                          ERR12::
    711 010146                                  RFLAGS  FLAG
        010146  104421                          TRAP    C$RFLA
        010150  010037  011710                  MOV     R0,FLAG
    712 010154  032737  020000  011710          BIT     #IER,FLAG               ;IS INHIBIT FLAGS SET?
    713 010162  001012                          BNE     1$                      ;BRANCH OVER IF SET
    714 010164                                  PRINTF  #FOR8,L$TEST            ;PRINT TEST NUMBER
        010164  013746  002114                  MOV     L$TEST,-(SP)
        010170  012746  003732                  MOV     #FOR8,-(SP)
        010174  012746  000002                  MOV     #2,-(SP)
        010200  010600                          MOV     SP,R0
        010202  104417                          TRAP    C$PNTF
        010204  062706  000006                  ADD     #6,SP
    715 010210                          1$:     PRINTX  #FOR21
        010210  012746  005134                  MOV     #FOR21,-(SP)
        010214  012746  000001                  MOV     #1,-(SP)
        010220  010600                          MOV     SP,R0
        010222  104415                          TRAP    C$PNTX
        010224  062706  000004                  ADD     #4,SP
    716 010230                                  PRINTB  #ABO
        010230  012746  005534                  MOV     #ABO,-(SP)
        010234  012746  000001                  MOV     #1,-(SP)
        010240  010600                          MOV     SP,R0
        010242  104414                          TRAP    C$PNTB
        010244  062706  000004                  ADD     #4,SP
    717 010250                                  ENDMSG
        010250                          L10016:
        010250  104423                          TRAP    C$MSG
    718
    719                                 ;QNEX NOT SET ERROR
    720
    721 010252                                  BGNMSG  ERR13
        010252                          ERR13::
    722 010252                                  RFLAGS  FLAG
        010252  104421                          TRAP    C$RFLA
        010254  010037  011710                  MOV     R0,FLAG
    723 010260  032737  020000  011710          BIT     #IER,FLAG               ;IS INHIBIT FLAGS SET?
    724 010266  001012                          BNE     1$                      ;BRANCH OVER IF SET
    725 010270                                  PRINTF  #FOR8,L$TEST            ;PRINT TEST NUMBER
        010270  013746  002114                  MOV     L$TEST,-(SP)
        010274  012746  003732                  MOV     #FOR8,-(SP)
```

GLOBAL ERROR REPORT SECTION

```
                010300  012746  000002                  MOV     #2.,(SP)
                010304  010600                          MOV     SP,R0
                010306  104417                          TRAP    C$PNTF
                010310  062706  000006                  ADD     #6.,SP
        726     010314                          1$:     PRINTX  #FOR22
                010314  012746  005221                  MOV     #FOR22.,(SP)
                010320  012746  000001                  MOV     #1.,(SP)
                010324  010600                          MOV     SP,R0
                010326  104415                          TRAP    C$PNTX
                010330  062706  000004                  ADD     #4.,SP
        727     010334                                  ENDMSG
                010334                          L10017:
                010334  104423                          TRAP    C$MSG
        728
        729                                     ;UNEXPECTED DATA AFTER DMA TRANSFER ERROR IN THROTTLE TEST
        730
        731     010336                                  BGNMSG  ERR14
                010336                          ERR14::
        732     010336                                  RFLAGS  FLAG
                010336  104421                          TRAP    C$RFLA
                010340  010037  011710                  MOV     R0,FLAG
        733     010344  032737  020000  011710          BIT     #IER,FLAG               ;IS INHIBIT FLAGS SET?
        734     010352  001012                          BNE     1$                      ;BRANCH OVER IF SET
        735     010354                                  PRINTF  #FOR8,L$TEST            ;PRINT TEST NUMBER
                010354  013746  002114                  MOV     L$TEST,-(SP)
                010360  012746  003732                  MOV     #FOR8.,(SP)
                010364  012746  000002                  MOV     #2.,(SP)
                010370  010600                          MOV     SP,R0
                010372  104417                          TRAP    C$PNTF
                010374  062706  000006                  ADD     #6.,SP
        736     010400                          1$:     PRINTB  #FOR14
                010400  012746  004435                  MOV     #FOR14.,-(SP)
                010404  012746  000001                  MOV     #1.,-(SP)
                010410  010600                          MOV     SP,R0
                010412  104414                          TRAP    C$PNTB
                010414  062706  000004                  ADD     #4.,SP
        737     010420                                  PRINTX  #FOR24,LOOPS
                010420  013746  002524                  MOV     LOOPS,-(SP)
                010424  012746  005343                  MOV     #FOR24.,-(SP)
                010430  012746  000002                  MOV     #2.,-(SP)
                010434  010600                          MOV     SP,R0
                010436  104415                          TRAP    C$PNTX
                010440  062706  000006                  ADD     #6.,SP
        738     010444                                  PRINTX  #FOR14.1
                010444  012746  004477                  MOV     #FOR14.1,-(SP)
                010450  012746  000001                  MOV     #1.,-(SP)
                010454  010600                          MOV     SP,R0
                010456  104415                          TRAP    C$PNTX
                010460  062706  000004                  ADD     #4.,SP
        739     010464                                  ENDMSG
                010464                          L10020:
                010464  104423                          TRAP    C$MSG
        740
        741                                     ;NO QBOOT ERROR
        742
        743     010466                                  BGNMSG  ERR15
                010466                          ERR15::
```

```
744 010466                                          RFLAGS  FLAG
    010466  104421                                  TRAP    C$RFLA
    010470  010037  011710                         MOV     R0,FLAG
745 010474  032737  020000  011710                  BIT     #IER,FLAG               ;IS INHIBIT FLAGS SET?
746 010502  001012                                  BNE     1$                      ;BRANCH OVER IF SET
747 010504                                          PRINTF  #FOR8,L$TEST            ;PRINT TEST NUMBER
    010504  013746  002114                         MOV     L$TEST,-(SP)
    010510  012746  003732                         MOV     #FOR8, (SP)
    010514  012746  000002                         MOV     #2, (SP)
    010520  010600                                 MOV     SP,R0
    010522  104417                                 TRAP    C$PNTF
    010524  062706  000006                         ADD     #6,SP
748 010530                                  1$:     PRINTX  #FOR25
    010530  012746  005417                         MOV     #FOR25,-(SP)
    010534  012746  000001                         MOV     #1,-(SP)
    010540  010600                                 MOV     SP,R0
    010542  104415                                 TRAP    C$PNTX
    010544  062706  000004                         ADD     #4,SP
749 010550                                          ENDMSG
    010550                                  L10021:
    010550  104423                                 TRAP    C$MSG
750
751                                         ;       TIME OUT ERROR
752                                         ; BASIC FORMAT IS-
753                                         ;       LSI-TEST XX TIMEOUT WAITING FOR QINT VNTACK CLEAR
754                                         ;
755
756 010552                                          BGNMSG  ERR16
    010552                                  ERR16::
757 010552                                          RFLAGS  FLAG
    010552  104421                                 TRAP    C$RFLA
    010554  010037  011710                         MOV     R0,FLAG
758 010560  032737  020000  011710                  BIT     #IER,FLAG               ;IS INHIBIT FLAGS SET?
759 010566  001012                                  BNE     1$                      ;BRANCH OVER IF SET
760 010570                                          PRINTF  #FOR8,L$TEST            ;PRINT TEST NUMBER
    010570  013746  002114                         MOV     L$TEST,-(SP)
    010574  012746  003732                         MOV     #FOR8,-(SP)
    010600  012746  000002                         MOV     #2,-(SP)
    010604  010600                                 MOV     SP,R0
    010606  104417                                 TRAP    C$PNTF
    010610  062706  000006                         ADD     #6,SP
761 010614                                  1$:     PRINTX  #FOR26
    010614  012746  005464                         MOV     #FOR26,-(SP)
    010620  012746  000001                         MOV     #1,-(SP)
    010624  010600                                 MOV     SP,R0
    010626  104415                                 TRAP    C$PNTX
    010630  062706  000004                         ADD     #4,SP
762 010634                                          PRINTB  #AB0
    010634  012746  005534                         MOV     #AB0,-(SP)
    010640  012746  000001                         MOV     #1,-(SP)
    010644  010600                                 MOV     SP,R0
    010646  104414                                 TRAP    C$PNTB
    010650  062706  000004                         ADD     #4,SP
763 010654                                          ENDMSG
    010654                                  L10022:
    010654  104423                                 TRAP    C$MSG
764
```

```
                        .SBTTL  GLOBAL SUBROUTINES SECTION

                        ;**
                        ; THE GLOBAL SUBROUTINES SECTION CONTAINS THE SUBROUTINES
                        ; THAT ARE USED IN MORE THAN ONE TEST.
                        ;
                        ;
010656                  STARS
                        ;;*****************************************************************
                        ;**
                        ;       SUBROUTINE DUMP-
                        ; FUNCTIONAL DESCRIPTION:
                        ;    SUBROUTINE TO PRINT THE CONTENTS OF ALL THE REGISTERS
                        ;    IT USES THE PRINTX PRINT EXTENDED FORMAT AND CAN BE DISABLED
                        ;    BY THE OPERATOR BY /FLAG:IXE, INHIBIT EXTENDED ERROR REPORTS
                        ; INPUTS:
                        ;       NONE
                        ; OUTPUT:
                        ;       DEVICE REGISTER DUMP PRINTED IF EXTENDED ERROR REPORTS ENABLED
                        ; CALLING SEQUENCE:
                        ;       JSR     PC,DUMP
010656                  STARS
                        ;;*****************************************************************

010656                  DUMP::
                        ;FIRST CHECK FOR INHIBIT EXTENDED ERROR REPORTS FLAG SET
010656                          RFLAGS  FLAG
010656  104421                  TRAP    C$RFLA
010660  010037  011710          MOV     R0,FLAG
010664  032737  004000  011710  BIT     #BIT11,FLAG             ;IS INHIBIT FLAGS SET?
010672  001135                  BNE     EDUMP                   ;EXIT ROUTINE IF SET
010674  010146                  MOV     R1,-(SP)                ;SAVE CPU REGISTERS
010676  010246                  MOV     R2,-(SP)
010700  010346                  MOV     R3,-(SP)
010702  010446                  MOV     R4,-(SP)
010704  010546                  MOV     R5,-(SP)
                        ;FIRST READ THE REGISTERS
010706  012701  000014          MOV     #12.,R1                 ;NUMBER OF REGISTERS TO READ
010712  013702  002142          MOV     QCMD,R2                 ;BASE REGISTER ADDRESS TO R2
010716  012703  002172          MOV     #VALUES,R3              ;RECEIVING STORAGE
010722  022701  000007  E10$:   CMP     #7,R1                   ;IS IT QUBA REGISTER?
010726  001002                  BNE     11$
010730  000137  011410          JMP     P1                      ;BRANCH IF QUBA
010734  022701  000002  11$:    CMP     #2,R1                   ;IS IT QVAD REGISTER?
010740  001002                  BNE     12$                     ;BRANCH IF QVAD
010742  000137  011476          JMP     P2
010746  012223          12$:    MOV     (R2)+,(R3)+             ;STORE REGISTER VALUE
010750  005301          E5$:    DEC     R1                      ;DECREMENT LOOP COUNTER
010752  001363                  BNE     E10$                    ;IF NOT DONE, LOOP
                        ;END READ, NOW PRINT THE RESULTS
010754                          PRINTX  #RP1                    ;PRINT FIRST LINE OF MESSAGE
010754  012746  011570          MOV     #RP1,-(SP)
010760  012746  000001          MOV     #1,-(SP)
010764  010600                  MOV     SP,R0
010766  104415                  TRAP    C$PNTX
010770  062706  000004          ADD     #4,SP
010774  012704  002331          MOV     #NAMES-5,R4             ;POINT R4 TO REGISTER NAMES TABLE
```

```
 814 011000  005002                        CLR     R2                      ;CLEAR POINTER REGISTER
 815 011002  012703  000014                MOV     #12.,R3                 ;LOAD R3 AS LOOP COUNTER
 816 011006  062704  000005          E6$:  ADD     #5,R4                   ;POINT R4 TO NEXT REGISTER NAME
 817 011012  016237  002142  002452      MOV     ADDRESSES(R2),ADD       ;GET ADDRESS OF REGISTER READY TO PRINT
 818 011020  016237  002172  002454      MOV     VALUES(R2),VAL          ;GET VALUE OF REGISTER READY TO PRINT
 819 011026                              PRINTX  #RP2,R4,ADD,VAL         ;PRINT REGISTER NAME, ADDRESS, VALUE
     011026  013746  002454              MOV     VAL, (SP)
     011032  013746  002452              MOV     ADD, (SP)
     011036  010446                      MOV     R4,-(SP)
     011040  012746  011660              MOV     #RP2,-(SP)
     011044  012746  000004              MOV     #4,-(SP)
     011050  010600                      MOV     SP,R0
     011052  104415                      TRAP    C$PNTX
     011054  062706  000012              ADD     #12,SP
 820                                ;CHECK TO SEE IF ONE OF THE BIT DEFINED REGISTERS, IF YES, BRANCH
 821 011060  022703  000014              CMP     #12.,R3                 ;IS IT CMD REG
 822 011064  001441                      BEQ     CMDB
 823 011066  022703  000013              CMP     #11.,R3                 ;IS IT VNT REG
 824 011072  001450                      BEQ     VNTB
 825 011074  022703  000012              CMP     #10.,R3                 ;IS IT INT REG
 826 011100  001457                      BEQ     INTB
 827 011102  022703  000011              CMP     #9.,R3                  ;IS IT CTL REG
 828 011106  001466                      BEQ     CTLB
 829 011110  022703  000010              CMP     #8.,R3                  ;IS IT DMA REG
 830 011114  001475                      BEQ     DMAB
 831 011116  022703  000003              CMP     #3.,R3                  ;IS IT MT1 REG
 832 011122  001504                      BEQ     MT1B
 833 011124  062702  000002          X$:  ADD     #2,R2                   ;POINT R2 TO NEXT REGISTER DATA
 834 011130  005303                      DEC     R3                      ;DECREMENT LOOP COUNTER
 835 011132  001325                      BNE     E6$                     ;GO DO NEXT REGISTER IF NOT DONE
 836 011134                              PRINTX  #RP0                    ;INSERT LINE FEED CARRIAGE RETURN
     011134  012746  011564              MOV     #RP0,-(SP)
     011140  012746  000001              MOV     #1,-(SP)
     011144  010600                      MOV     SP,R0
     011146  104415                      TRAP    C$PNTX
     011150  062706  000004              ADD     #4,SP
 837 011154  012605                      MOV     (SP)+,R5
 838 011156  012604                      MOV     (SP)+,R4
 839 011160  012603                      MOV     (SP)+,R3                ;RESTORE REGISTERS
 840 011162  012602                      MOV     (SP)+,R2
 841 011164  012601                      MOV     (SP)+,R1
 842 011166  000207              EDUMP:  RTS     PC                      ;RETURN
 843
 844                                ;PROCESS PRINTING SET BIT DEFINITIONS
 845 011170                          CMDB:   S$BITS  CMDBIT,VAL
     011170  010146                      MOV     R1,-(SP)        ;SAVE REGISTERS
     011172  010546                      MOV     R5,-(SP)
     011174  013701  002454              MOV     VAL,R1  ;GET VAL REGISTER TO READ
     011200  004537  012110              JSR     R5,BIT$         ;SUBROUTINE TO OUTPUT VALUES
     011204  002604                      .WORD   CMDBIT
     011206  012605                      MOV     (SP)+,R5        ;RESTORE REGISTERS
     011210  012601                      MOV     (SP)+,R1
 846 011212  000461                      BR      PRINTIT
 847
 848 011214                          VNTB:   S$BITS  VNTBIT,VAL
     011214  010146                      MOV     R1,-(SP)        ;SAVE REGISTERS
     011216  010546                      MOV     R5, (SP)
```

GLOBAL SUBROUTINES SECTION

```
        011220  013701  002454                  MOV     VAL,R1  ;GET VAL REGISTER TO READ
        011224  004537  012110                  JSR     R5,BIT$         ;SUBROUTINE TO OUTPUT VALUES
        011230  002637                           .WORD   VNTBIT
        011232  012605                          MOV     (SP)+,R5        ;RESTORE REGISTERS
        011234  012601                          MOV     (SP)+,R1
    849 011236  000447                          BR      PRINTIT
    850
    851 011240                          INTB:   S$BITS  INTBIT,VAL
        011240  010146                          MOV     R1,-(SP)        ;SAVE REGISTERS
        011242  010546                          MOV     R5,-(SP)
        011244  013701  002454                  MOV     VAL,R1  ;GET VAL REGISTER TO READ
        011250  004537  012110                  JSR     R5,BIT$         ;SUBROUTINE TO OUTPUT VALUES
        011254  002672                          .WORD   INTBIT
        011256  012605                          MOV     (SP)+,R5        ;RESTORE REGISTERS
        011260  012601                          MOV     (SP)+,R1
    852 011262  000435                          BR      PRINTIT
    853
    854 011264                          CTLB:   S$BITS  CTLBIT,VAL
        011264  010146                          MOV     R1,-(SP)        ;SAVE REGISTERS
        011266  010546                          MOV     R5,-(SP)
        011270  013701  002454                  MOV     VAL,R1  ;GET VAL REGISTER TO READ
        011274  004537  012110                  JSR     R5,BIT$         ;SUBROUTINE TO OUTPUT VALUES
        011300  002751                          .WORD   CTLBIT
        011302  012605                          MOV     (SP)+,R5        ;RESTORE REGISTERS
        011304  012601                          MOV     (SP)+,R1
    855 011306  000423                          BR      PRINTIT
    856
    857 011310                          DMAB:   S$BITS  DMABIT,VAL
        011310  010146                          MOV     R1,-(SP)        ;SAVE REGISTERS
        011312  010546                          MOV     R5,-(SP)
        011314  013701  002454                  MOV     VAL,R1  ;GET VAL REGISTER TO READ
        011320  004537  012110                  JSR     R5,BIT$         ;SUBROUTINE TO OUTPUT VALUES
        011324  003015                          .WORD   DMABIT
        011326  012605                          MOV     (SP)+,R5        ;RESTORE REGISTERS
        011330  012601                          MOV     (SP)+,R1
    858 011332  000411                          BR      PRINTIT
    859
    860 011334                          MT1B:   S$BITS  MT1BIT,VAL
        011334  010146                          MOV     R1,-(SP)        ;SAVE REGISTERS
        011336  010546                          MOV     R5,-(SP)
        011340  013701  002454                  MOV     VAL,R1  ;GET VAL REGISTER TO READ
        011344  004537  012110                  JSR     R5,BIT$         ;SUBROUTINE TO OUTPUT VALUES
        011350  003134                          .WORD   MT1BIT
        011352  012605                          MOV     (SP)+,R5        ;RESTORE REGISTERS
        011354  012601                          MOV     (SP)+,R1
    861
    862                                 ;PRINT BIT DEFINITION LINE
    863 011356                          PRINTIT:
    864 011356  010005                          MOV     R0,R5                   ;MOVE ADDRESS TO R5
    865 011360  105715                          TSTB    (R5)                    ;IS IT A BLANK
    866 011362  001660                          BEQ     X$                      ;BRANCH IF NOTHING TO PRINT
    867 011364                                  PRINTB  @RP4,R5                 ;PRINT LINE
        011364  010546                          MOV     R5,-(SP)
        011366  012746  011705                  MOV     @RP4,-(SP)
        011372  012746  000002                  MOV     #2,-(SP)
        011376  010600                          MOV     SP,R0
        011400  104414                          TRAP    C$PNTB
```

GLOBAL SUBROUTINES SECTION

```
                011402  062706  000006                  ADD     #6,SP
    868         011406  000646                          BR      X$                      ;RETURN TO MAINLINE
    869
    870
    871                                         ;PROCESS QUBA REGISTER (NOT NORMAL REGISTER READ
    872         011410  017746  170550          P1:     MOV     @QMT1,-(SP)             ;SAVE CURRENT QMT1
    873         011414  017746  170526                  MOV     @QINT,-(SP)             ;SAVE QINT
    874         011420  005077  170522                  CLR     @QINT                   ;CLEAR QINT REGISTER
    875         011424  052777  000200  170532          BIS     #MIODIS,@QMT1           ;ENABLE INTERNAL LOOPBACK
    876         011432  052777  000020  170524          BIS     #BIT4,@QMT1             ;SELECT UBAR FUNCTION
    877         011440  017723  170516                  MOV     @QMT0,(R3)+             ;READ QUBA
    878         011444  005722                          TST     (R2)+                   ;CORRECT R2
    879         011446  042777  000200  170510          BIC     #MIODIS,@QMT1           ;DISABLE INTERNAL LOOPBACK
    880         011454  042777  000020  170502          BIC     #BIT4,@QMT1             ;DESELECT UBAR FUNCTION
    881         011462  012677  170460                  MOV     (SP)+,@QINT             ;RESTORE QINT
    882         011466  012677  170472                  MOV     (SP)+,@QMT1             ;RESTORE QMT1
    883         011472  000137  010750                  JMP     E5$                     ;BRANCH BACK
    884
    885                                         ;PROCESS QVAD REGISTER READ (NOT NORMAL REGISTER READ)
    886         011476  017746  170462          P2:     MOV     @QMT1,-(SP)             ;SAVE CURRENT QMT1
    887         011502  017746  170440                  MOV     @QINT,-(SP)             ;SAVE QINT
    888         011506  005077  170434                  CLR     @QINT                   ;CLEAR QINT REGISTER
    889         011512  052777  000200  170444          BIS     #MIODIS,@QMT1           ;ENABLE INTERNAL LOOPBACK
    890         011520  052777  000002  170436          BIS     #MVADR,@QMT1            ;ENABLE ADDRESS REGISTER READ
    891         011526  017723  170434                  MOV     @QVAD,(R3)+             ;READ ADDRESS REGISTER
    892         011532  005722                          TST     (R2)+                   ;CORRECT R2
    893         011534  042777  000200  170422          BIC     #MIODIS,@QMT1           ;DISABLE INTERNAL LOOPBACK
    894         011542  042777  000002  170414          BIC     #MVADR,@QMT1            ;DISABLE ADDRESS REGISTER READ
    895         011550  012677  170372                  MOV     (SP)+,@QINT             ;RESTORE QINT
    896         011554  012677  170404                  MOV     (SP)+,@QMT1             ;RESTORE QMT1
    897         011560  000137  010750                  JMP     E5$                     ;BRANCH BACK
    898
    899                                         ;FORMATS USED IN REGISTER DUMP PRINTING
    900
    901 011564      045     116     061  RP0::   .ASCIZ  /<N1/                          ;LINE FEED CARRIAGE RETURN ONLY
    902 011570      045     116     061  RP1::   .ASCIZ  /<N1<S7<AREGISTER DUMP<N1<ANAME<S4<AADDRESS<S4<ACONTENTS/
    903                                         .EVEN
    904 011660      045     116     061  RP2::   .ASCIZ  /<N1<T<S5<O6<S5<O6<S3/
    905 011705      045     124     000  RP4::   .ASCIZ  /<T/
    906                                         .EVEN
    907 011710  000000                  FLAG:   .WORD   0                               ;STORES RETURNED FLAG SETTINGS
    908
```

GLOBAL SUBROUTINES SECTION

```
                        ;*****************************************************************************
                        ;**
                        ; FUNCTIONAL DESCRIPTION:
                        ;       SUBROUTINE TO PRINT OUT A TEXT OR HELP FILE
                        ; INPUTS:
                        ;       NONE
                        ; OUTPUTS:
                        ;       CONTENTS OF EITHER DRS.HLP OR DIAGNOSTIC DEVICE HELP FILE
                        ;       PRINTED ON CONSOLE.
                        ;       CONTENTS OF R1 AND R2 ARE DESTROYED.
                        ; CALLING SEQUENCE:
                        ;       USES MACRO HLPMAC; FORMAT IS HLPMAC 'FILENAME.EXT'
                        ;       MACRO IS DEFINED AT END OF SUBROUTINE.
                        ;       MACRO USES FORMAT JSR R5,HLP.
                        ; -
                        ;*****************************************************************************

011712  010537  012106  $HLP::  MOV     R5,$STORE               ;SAVE RETURN ADDRESS
011716                          OPEN    R5                      ;OPEN FILE NAME
011716  010500                  MOV     R5,R0
011720  104434                  TRAP    C$OPEN
                        ;FIRST PRINT CR/LF
011722  012702  000015          MOV     #15,R2                  ;CARRIAGE RETURN TO R2
011726  004537  012010          JSR     R5,60$                  ;GO PRINT IT
011732  012702  000012          MOV     #12,R2                  ;LINE FEED TO R2
011736  004537  012010          JSR     R5,60$                  ;GO PRINT IT
011742  005001                  CLR     R1                      ;CLEAR POSITION COUNTER
011744                  10$:    GETBYTE R2                      ;GET BYTE COUNT OF RECORD
011744  104426                  TRAP    C$GETB
011746  110002                  MOVB    R0,R2
011750                          BNCOMPLETE 50$                  ;BRANCH IF END OF FILE
011750  103011                  BCC     50$
011752  022702  000000          CMP     #0,R2                   ;END OF RECORDS?
011756  001406                  BEQ     50$                     ;BRANCH IF END
011760  022702  000011  30$:    CMP     #11,R2                  ;IS IT TAB CHARACTER?
011764  001437                  BEQ     80$                     ;IF YES HANDLE TAB
011766  004537  012010  40$:    JSR     R5,60$                  ;GO PRINT IT
011772  000764                  BR      10$                     ;GO PROCESS NEXT CHARACTER
                        ;END OF FILE OR LAST RECORD
011774                  50$:    CLOSE                           ;CLOSE FILE
011774  104435                  TRAP    C$CLOS
011776  013705  012106          MOV     $STORE,R5               ;RESTORE RETURN ADDRESS
012002  062705  000012          ADD     #10.,R5                 ;SKIP PAST FILE NAME
012006  000205                  RTS     R5
                        ;PRINT AND COUNT ROUTINE
012010  010237  012104  60$:    MOV     R2,$MESLNE              ;GET CHARACTER TO PRINT IN R2
012014                          PRINTB  #$HLPFOR                ;GO PRINT LINE
012014  012746  012102          MOV     #$HLPFOR,-(SP)
012020  012746  000001          MOV     #1,-(SP)
012024  010600                  MOV     SP,R0
012026  104414                  TRAP    C$PNTB
012030  062706  000004          ADD     #4,SP
012034  005201                  INC     R1                      ;INCREMENT POSITION COUNTER
012036  022701  000010          CMP     #8.,R1                  ;IS IT MAXIMUM?
012042  001406                  BEQ     65$                     ;IF MAXIMUM, BRANCH
012044  022702  000012          CMP     #12,R2                  ;IS IT A LINE FEED?
```

GLOBAL SUBROUTINES SECTION

```
956 012050  001403                  BEQ     65$                 ;IF LINE FEED, BRANCH
957 012052  022702  000015          CMP     #15,R2              ;IS IT A CARRIAGE RETURN?
958 012056  001001                  BNE     70$                 ;IF NOT, BRANCH
959 012060  005001              65$:CLR     R1                  ;CLEAR POSITION COUNTER
960 012062  000205              70$:RTS     R5                  ;FROM PRINT AND COUNT ROUTINE
961                             ;TAB ROUTINE
962 012064  012702  000040      80$:MOV     #40,R2              ;MOVE SPACE CHARACTERS
963 012070  004537  012010          JSR     R5,60$              ;GO PRINT SPACE
964 012074  005701                  TST     R1                  ;DONE YET?
965 012076  001372                  BNE     80$                 ;IF NOT DONE, AGAIN
966 012100  000721                  BR      10$                 ;RETURN FROM TAB ROUTINE
967                             ;
968                             ;STORAGE, FORMAT  AND MESSAGE LINE
969                             ;
970 012102                      $HLPFOR::
971 012102      045     101             .ASCII  /%A/
972 012104                      $MESLNE:
973 012104      000                     .BYTE   0                   ;RESERVED FOR MESSAGE LINE
974 012105      000                     .BYTE   0
975                                     .EVEN
976 012106  000000              $STORE: .WORD   0                   ;STORES MAIN SUBROUTINE RETURN ADDRESS
```

```
                        ;*******************************************************************************
                        ;**
                        ;                       BITS.MAC
                        ;       PROVIDES CODE FOR A SUBROUTINE TO INTERPRET THE BITS SET
                        ;       IN A WORD (OR REGISTER), AND OPTIONALLY FOR EVERY BIT SET PRINT OUT
                        ;       THE NAME OF THAT BIT IF DEFINED IN AN ASCIZ STATEMENT, AND ALWAYS
                        ;       PUT THE NAMES IN A BUFFER.
                        ;
                        ;       AUTHOR:  DALE PROCTOR
                        ;       DATE:    12/23/81
                        ;       VERSION: 1.00
                        ;
                        ;       ASCIZ STATEMENT FORMAT -
                        ;         LABEL: .ASCIZ /BIT15,BIT14,...,BIT10,..BIT7/
                        ;       MAXIMUM NUMBER OF DEFINITIONS IS 16
                        ;
                        ;       TO USE THE FULL ROUTINE, CALL BY USING THE MACRO SETBITS.
                        ;       SETBITS IS IN THE FORMAT-
                        ;         SETBITS       NAME,POINTER,VALUE
                        ;           WHERE NAME IS AN ASCII NAME THAT WILL BE PRINTED IN THE
                        ;           MESSAGE LINE, POINTER IS AN ADDRESS THAT POINTS TO THE
                        ;           ASCIZ FORMAT STATEMENT THAT CONTAINS THE BIT NAMES, AND
                        ;           VALUE IS THE WORD TO INTERPRET AND CONVERT TO BIT NAMES.
                        ;
                        ;       TO CREATE ONLY A PRINT BUFFER WITH THE SET BIT NAMES CALL
                        ;       THIS ROUTINE WITH THE MACRO S$BITS.
                        ;       S$BITS IS IN THE FORMAT-
                        ;         S$BITS        POINTER,VALUE
                        ;           ON RETURN FROM S$BITS ROUTINE R0 CONTAINS THE ADDRESS
                        ;           OF THE BUFFER.
                        ;--
                        ;*******************************************************************************
                        ;
                        ;CALL BY S$BITS MACRO, NO PRINTING
012110                  BIT$::
                        ;SAVE SOME REGISTERS
012110  010246                MOV     R2,-(SP)
012112  010346                MOV     R3,-(SP)
012114  010446                MOV     R4,-(SP)
012116  012503                MOV     (R5)+,R3        ;GET POINTER OF FORMAT IN R3
012120  012737  177777  012642        MOV     #-1,STATU$      ;TELL ROUTINE THAT THE S$BITS MACRO CALLED
012126  000411                BR      BUILD$          ;BRANCH OVER SETBITS STUFF
                        ;CALL BY SETBITS MACRO, PRINT LINE IF SOMETHING TO PRINT
012130                  BITS$::
012130  005037  012642        CLR     STATU$          ;TELL ROUTINE THAT THE SETBITS MACRO CALLED
                        ;SAVE SOME REGISTERS
012134  010246                MOV     R2,-(SP)
012136  010346                MOV     R3,-(SP)
012140  010446                MOV     R4,-(SP)
012142  010502                MOV     R5,R2           ;GET ADDRESS IN R2
012144  061505                ADD     (R5),R5         ;ADD LENGTH OF DATA TO RETURN PC
012146  005722                TST     (R2)+           ;SKIP PAST LENGTH
012150  012203                MOV     (R2)+,R3        ;GET POINTER OF FORMAT IN R3
                        ;REGISTER USAGE
                        ;       R0 = LOOP COUNTER
                        ;       R1 = CONTAINS REGISTER CONTENTS
                        ;       R2 = POINTS TOWARD REGISTER NAME
```

```
                                        ;       R3 = POINTS TO DEFINITION FORMAT
                                        ;       R4 = POINTS TO BUFFER
                                        ;       R5 = CONTAINS RETURN ADDRESS
                                        ;NOW BUILD BIT NAME BUFFER
                                        BUILD$:
012152  012704  012431                          MOV     #MES2$,R4       ;POINT R4 TO BUFFER
                                        ;ZERO OUT BUFFER
012156  012700  000204                          MOV     #132.,R0
012162  105024                          1$:     CLRB    (R4)+           ;CLEAR BYTE
012164  005300                                  DEC     R0
012166  001375                                  BNE     1$
012170  012704  012431                          MOV     #MES2$,R4       ;POINT R4 BACK TO BUFFER
012174  012700  000020                          MOV     #16.,R0         ;NUMBER OF LOOPS TO LOOP COUNTER R1
012200  010137  012636                          MOV     R1,STORE$       ;SAVE ORIGINAL BIT PATTERN
012204  005037  012640                          CLR     NO$CHAR         ;CLEAR CHARACTER MOVED FLAG
012210  105037  012641                  10$:    CLRB    NO$CHAR+1       ;CLEAR BIT DEFINED AND MOVED FLAG
012214  006101                                  ROL     R1              ;CHECK BIT
012216  103410                                  BCS     20$             ;IF BITS SET, GO MOVE BIT NAME
                                        ;BIT WAS NOT SET, FIND NEXT COMMA
012220  122713  000000                  5$:     CMPB    #0,(R3)         ;END OF DEFINITION?
012224  001433                                  BEQ     40$             ;IF END, GO PRINT MESSAGE
012226  122713  000054                          CMPB    #',,(R3)        ;IS IT A COMMA?
012232  001425                                  BEQ     35$             ;IF COMMA, CONTINUE TO PROCESS
012234  005203                                  INC     R3              ;POINT TO NEXT CHARACTER IN DEFINITION
012236  000770                                  BR      5$              ;CHECK NEXT CHARACTER IF NOT A COMMA
                                        ;BIT WAS SET, MOVE BIT NAME IF THERE
012240                                  20$:
012240  122713  000000                          CMPB    #0,(R3)         ;IS IT END OF FORMAT?
012244  001425                                  BEQ     45$             ;IF END, GO PRINT MESSAGE
012246  122713  000054                          CMPB    #',,(R3)        ;IS IT A COMMA?
012252  001406                                  BEQ     30$             ;IF IT WAS A COMMA, GO
                                        ;SHOULD BE A VALID CHARACTER, MOVE TO PRINT BUFFER
012254  112324                                  MOVB    (R3)+,(R4)+     ;MOVE CHARACTER
012256  105237  012640                          INCB    NO$CHAR         ;INCREMENT CHARACTER FLAG
012262  105237  012641                          INCB    NO$CHAR+1       ;INCREMENT BIT DEFINED AND MOVED FLAG
012266  000764                                  BR      20$             ;GO PROCESS NEXT CHAR
                                        ;END OF CHARACTER MOVE, ADVANCE POINTER TO PUT COMMA AFTER NAME
012270                                  30$:
012270  105737  012641                          TSTB    NO$CHAR+1       ;WAS THE LAST BIT DEFINED
012274  001404                                  BEQ     35$             ;IF LAST BIT NOT DEFINED, BRANCH
012276  112724  000054                          MOVB    #',,(R4)+       ;PUT COMMA AFTER BIT NAME
012302  112724  000040                          MOVB    #40,(R4)+       ;PUT SPACE AFTER COMMA
012306  005203                          35$:    INC     R3              ;POINT TO NEXT CHARACTER IN DEFINITION
012310  005300                                  DEC     R0              ;DECREMENT LOOP COUNTER
012312  001336                                  BNE     10$             ;IF NOT DONE, GO PROCESS NEXT BIT
                                        ;NOW SET UP TO PRINT THE MESSAGE
012314                                  40$:
012314  005304                                  DEC     R4              ;POINT BACK TO LAST COMMA AND SPACE
012316  005304                                  DEC     R4
012320  112714  000000                  45$:    MOVB    #0,(R4)         ;PUT ZERO AS TERMINATOR IN BUFFER
012324  005000                                  CLR     R0              ;DEFAULT RETURN CODE = NOTHING PRINTED
012326  005737  012642                          TST     STATU$          ;SEE WHICH MACRO CALLED ROUTINE
012332  001015                                  BNE     50$             ;BRANCH IF S$BITS MACRO CALLED
                                        ;       TST     NO$CHAR         ;SEE IF NOTHING PUT IN PRINT BUFFER
                                        ;       BEQ     50$             ;IF NOTHING THERE, DON'T PRINT IT
012334                                          PRINTB  #MES1$,R2,STORE$,#MES2$         ;PRINT LINE
012334  012746  012431                          MOV     #MES2$,-(SP)
```

```
        012340  013746  012636                 MOV     STORE$, (SP)
        012344  010246                          MOV     R2, (SP)
        012346  012746  012402                 MOV     #MES1$,-(SP)
        012352  012746  000004                 MOV     #4,-(SP)
        012356  010600                          MOV     SP,R0
        012360  104414                          TRAP    C$PNTB
        012362  062706  000012                 ADD     #12,SP
  1091                              ;RESTORE AND GO BACK
  1092 012366                       50$:
  1093 012366  012700  012431                 MOV     #MES2$,R0       ;RETURN WITH R0 POINTING TO BUFFER
  1094 012372  012604                          MOV     (SP)+,R4
  1095 012374  012603                          MOV     (SP)+,R3
  1096 012376  012602                          MOV     (SP)+,R2
  1097 012400  000205                          RTS     R5
  1098
  1099 012402     045     116     061  MES1$:: .ASCIZ  /%N1%T%A - %06%A; %T%N1/
  1100 012431                       MES2$:: .BLKB   132.             ;SAVE ALL KINDS OF SPACE FOR MESSAGE LINE
  1101                                      .EVEN
  1102 012636  000000                 STORE$: .WORD   0               ;STORES ORIGINAL BIT PATTERN
  1103 012640  000000                 NO$CHAR: .WORD  0               ;FLAG IF CHARACTERS WERE MOVED TO BUFFER
  1104 012642  000000                 STATU$: .WORD   0               ;STORE WHICH MACRO CALLED
```

GLOBAL SUBROUTINES SECTION

```
1106 012644                                S'ARS
                                           ;;*'*****************************************************************
1107                                       ;**
1108                                       ;               INTERRUPT SERVICE ROUTINE
1109                                       ;;--
1110 012644                                STARS
                                           ;;*************.***************************************************************

1111
1112                                       ;
1113                                       ;GENERAL PURPOSE INTERRUPT ROUTINE TO INCREMENT A FLAG
1114                                       ;
1115 012644                                        BGNSRV  TRAP4
     012644                                TRAP4::
1116 012644  005237  002450                        INC     TRPFLG                          ;SET TRAP FLAG
1117 012650                                        ENDSRV
     012650                                L10023:
     012650  000002                             RTI
1118                                       ;
1119                                       ;UNKNOWN ERR INTERRUPT OCCURRED, TELL OPERATOR
1120                                       ;
1121 012652                                        BGNSRV  ERRINT
     012652                                ERRINT::
1122 012652  011637  002454                        MOV     (SP),VAL                        ;SAVE RETURN ADDRESS FOR MESS.
1123 012656                                        PRINTF  #FORERR,L$TEST,VAL
     012656  013746  002454                        MOV     VAL,-(SP)
     012662  013746  002114                        MOV     L$TEST,-(SP)
     012666  012746  005566                        MOV     #FORERR,-(SP)
     012672  012746  000003                        MOV     #3,-(SP)
     012676  010600                             MOV     SP,R0
     012700  104417                             TRAP    C$PNTF
     012702  062706  000010                     ADD     #10,SP
1124 012706                                     SETBITS QINT,INTBIT,@QINT
     012706  010146                             MOV     R1,-(SP)        ;SAVE REGISTERS
     012710  010546                             MOV     R5,-(SP)
     012712  017701  167230                     MOV     @QINT,R1        ;GET @QINT REGISTER TO READ
     012716  004537  012130                     JSR     R5,BITS$        ;SUBROUTINE TO OUTPUT VALUES
     012722  000012                             .WORD   $LEN
     012724  002672                             .WORD   INTBIT
     012726     121     111     116             .ASCIZ  /QINT/
     012734  012605                             MOV     (SP)+,R5        ;RESTORE REGISTERS
     012736  012601                             MOV     (SP)+,R1
1125 012740  005077  167202                     CLR     @QINT                           ;CLEAR ENTIRE REGISTER
1126 012744  052777  000100  167174             BIS     #ERRIE,@QINT                    ;INABLE ERR INTERRUPT
1127 012752                                     ENDSRV
     012752                                L10024:
     012752  000002                             RTI
1128
```

```
                                STARS
                                ;;*****************************************************************
                                ;++
                                ;       MMINIT
                                ; FUNCTIONAL DESCRIPTION-
                                ;       SUBROUTINE TO INITIALIZE MEMORY MANAGEMENT REGISTERS
                                ; INPUTS-
                                ;       NONE
                                ; OUTPUT-
                                ;       NONE
                                ; CALLING SEQUENCE-
                                ;       JSR     PC,MMINIT
                                ;
                                ; TO ENABLE MEMORY MAPPING,     MOV     #BIT0,MMR0
                                ;--
                                STARS
                                ;;*****************************************************************

                                MMINIT::
012754  010146                          MOV     R1,-(SP)                ;SAVE REGISTERS
012756  010246                          MOV     R2,-(SP)
012760  005001                          CLR     R1
012762  012702  172300                  MOV     #KISDR0,R2              ;GET DESCRIPTOR REGISTER ADDRESS
012766  012703  000007                  MOV     #7,R3                   ;DO 7 REGISTERS
012772  012712  077406          1$:     MOV     #77406,(R2)             ;SET 4K, R/W UP
012776  010162  000040                  MOV     R1,40(R2)               ;SET ADDRESS REGISTER
013002  005722                          TST     (R2)+                   ;SET TO NEXT REGISTER ADDRESS
013004  062701  000200                  ADD     #200,R1
013010  005303                          DEC     R3                      ;DONE?
013012  001367                          BNE     1$                      ;IF NOT DONE
013014  012712  077406                  MOV     #77406,(R2)             ;SET I/O PAGE
013020  012762  177600  000040          MOV     #177600,40(R2)
013026  012602                          MOV     (SP)+,R2                ;RESTORE REGISTERS
013030  012601                          MOV     (SP)+,R1
013032  000207                          RTS     PC
```

GLOBAL SUBROUTINES SECTION

```
1165 013034                            STARS
                                       ;;*****************************************************************
1166                                   ;**
1167                                   ;       BMSG
1168                                   ; FUNCTIONAL DESCRIPTION
1169                                   ;       SUBROUTINE TO SIMULATE THE PNT FLAG IF SET
1170                                   ; INPUTS
1171                                   ;       NONE
1172                                   ; OUTPUT
1173                                   ;       NONE, REGISTER R5 ALTERED
1174                                   ; CALLING SEQUENCE
1175                                   ;       JSR     PC,BMSG
1176                                   ;
1177                                   ;
1178 013034                            STARS
                                       ;;*****************************************************************
1179
1180 013034                            BMSG::
1181 013034                                    RFLAGS  R5
     013034  104421                            TRAP    C$RFLA
     013036  010005                            MOV     R0,R5
1182 013040  032705  001000                    BIT     #PNT,R5                 ;IS PNT FLAG SET
1183 013044  001412                            BEQ     10$                     ;BRANCH IF NOT SET
1184 013046                                    PRINTF  #PNTMSG,L$TEST          ;PRINT MESSAGE
     013046  013746  002114                    MOV     L$TEST,-(SP)
     013052  012746  013074                    MOV     #PNTMSG, (SP)
     013056  012746  000002                    MOV     #2, (SP)
     013062  010600                            MOV     SP,R0
     013064  104417                            TRAP    C$PNTF
     013066  062706  000006                    ADD     #6,SP
1185 013072  000207                    10$:    RETURN                          ;FROM SUBROUTINE
1186
1187 013074      045      116      061  PNTMSG:: .ASCIZ /%N1%ATEST %Z2%A/<26>    ;PNT FLAG MESSAGE
1188                                           .EVEN
```

```
1190 013116                                STARS
                                           ;;*****************************************************************
1191                                       ;**
1192                                       ;       ENDERR
1193                                       ; FUNCTIONAL DESCRIPTION
1194                                       ;       SUBROUTINE TO PRINT OUT CONTROL CODE 26 IF MESSAGE PRINTED
1195                                       ; INPUTS-
1196                                       ;       NONE
1197                                       ; OUTPUT-
1198                                       ;       NONE
1199                                       ; CALLING SEQUENCE-
1200                                       ;       JSR     PC,ENDERR
1201                                       ;
1202                                       ;--
1203 013116                                STARS
                                           ;;*****************************************************************
1204
1205 013116                                ENDERR::
1206 013116  010446                                MOV     R4,-(SP)                ;SAVE R4
1207 013120                                        RFLAGS  R4                      ;READ FLAGS
     013120  104421                                TRAP    C$RFLA
     013122  010004                                MOV     R0,R4
1208 013124  032704  020000                        BIT     #IER,R4                 ;INHIBIT ERROR REPORTING FLAG SET?
1209 013130  001010                                BNE     10$                     ;BRANCH IF YES
1210 013132                                        PRINTF  #FERR                   ;PRINT TERMINATING CHARACTER
     013132  012746  013156                        MOV     #FERR,-(SP)
     013136  012746  000001                        MOV     #1,-(SP)
     013142  010600                                MOV     SP,R0
     013144  104417                                TRAP    C$PNTF
     013146  062706  000004                        ADD     #4,SP
1211 013152  012604                        10$:    MOV     (SP)+,R4                ;RESTORE R4
1212 013154  000207                                RETURN                          ;FROM SUBROUTINE
1213
1214 013156     045     116     061       FERR::  .ASCIZ  /%N1%A/<26>             ;TERMINATING FORMAT
1215                                               .EVEN
1216 013166                                        ENDMOD
1217
```

GLOBAL SUBROUTINES SECTION

```
                                .ENABL  AMA
                        .SBTTL  REPORT CODING SECTION

                                BGNMOD

                        ;**
                        ; THE REPORT CODING SECTION CONTAINS THE
                        ; "PRINTS' CALLS THAT GENERATE STATISTICAL REPORTS.
                        ;-

                                BGNRPT
                        L$RPT::
                                JSR     PC,DUMP                 ;PRINT OUT REGISTER DUMP

                                EXIT    RPT
                                .WORD   J$JMP
                                .WORD   L10025 2 .

                                .EVEN

                                ENDRPT
                        L10025:
                                TRAP    C$RPT
```

PROTECTION TABLE

```
                                .SBTTL  PROTECTION TABLE
                                ;**
                                ; THIS TABLE IS USED BY THE RUNTIME SERVICES
                                ; TO PROTECT THE LOAD MEDIA.
                                ; -
                                        BGNPROT
                                L$PROT::
                                        -1              ;OFFSET INTO P TABLE FOR CSR ADDRESS
                                        -1              ;OFFSET INTO P TABLE FOR MASSBUS ADDRESS
                                         1              ;OFFSET INTO P-TABLE FOR DRIVE NUMBER
                                        ENDPROT
```

INITIALIZE SECTION

```
                                        .SBTTL  INITIALIZE SECTION

                                        ;++
                                        ; THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
                                        ; AT THE BEGINNING OF EACH PASS.
                                        ;-

                                                BGNINIT
                                        L$INIT::
013210                                  INIT0:  BRESET                          ;RESET BUS
013210  104433                                  TRAP    C$RESET
013212  005077  166746                          CLR     @QMT1                   ;MAKE SURE QMT1 IS REALLY CLEAR
013216                                          SETPRI  #PRI00                  ;INITIALIZE WITH CPI ZERO PRIORITY
013216  012700  000000                          MOV     #PRI00,R0
013222  104441                                  TRAP    C$SPRI
013224                                          READEF  #EF.CONTINUE            ; WAS THERE A CONTINUE COMMAND
013224  012700  000036                          MOV     #EF.CONTINUE,R0
013230  104447                                  TRAP    C$REFG
013232                                          BNCOMPLETE INIT1                ;IF NO, CONTINUE
013232  103002                                  BCC     INIT1
013234  000137  013546                          JMP     ENDI                    ;YES, SKIP INITIALIZATION
013240                                  INIT1:  READEF  #EF.NEW                 ;NEW PASS OR SUB PASS?
013240  012700  000035                          MOV     #EF.NEW,R0
013244  104447                                  TRAP    C$REFG
013246                                          BNCOMPLETE NEXT                 ;IF NOT NEW PASS, SKIP SETUP
013246  103035                                  BCC     NEXT
013250  005737  002434                  INIT2:  TST     BRDGFLG                 ;HAS BRIDGE TYPE BEEN DETERMINED?
013254  001026                                  BNE     INIT3                   ;IF NE YES
013256  005237  002434                          INC     BRDGFLG                 ;SET FLAG
013262  005037  002432                          CLR     BRIDGETYPE              ;CLEAR BRIDGE TYPE FLAG (Q-BRIDGE)
013266  012702  003271                          MOV     #QBUS,R2                ;LOAD BRIDGE TYPE PTR (Q-BRIDGE)
013272                                          READBUS                         ;DETERMINE BRIDGE TYPE
013272  104407                                  TRAP    C$RDBU
013274                                          BCOMPLETE 10$                   ;IF COMPLETE THEN Q-BRIDGE
013274  103405                                  BCS     10$
013276  012737  177777  002432                  MOV     #-1,BRIDGETYPE          ;SET BRIDGE TYPE FLAG (U-BRIDGE)
013304  012702  003277                          MOV     #UBUS,R2                ;LOAD BRIDGE TYPE PTR (U-BRIDGE)
013310                                  10$:    PRINTB  #CONFIG,R2              ;IDENTIFY BRIDGE TYPE
013310  010246                                  MOV     R2,-(SP)
013312  012746  003217                          MOV     #CONFIG,-(SP)
013316  012746  000002                          MOV     #2,-(SP)
013322  010600                                  MOV     SP,R0
013324  104414                                  TRAP    C$PNTB
013326  062706  000006                          ADD     #6,SP
```

INITIALIZE SECTION

```
141 013332  000240                        INIT3:  NOP
158 013334  012737  177777  002436  SETUP:  MOV     #-1,LOGUNIT             ;INITIALIZE LOGICAL UNIT COUNTER
159 013342  005237  002436          NEXT:   INC     LOGUNIT                 ;POINT TO NEXT LOGICAL UNIT
160 013346  023737  002436  002012        CMP     LOGUNIT,L$UNIT          ;HAVE WE PASSED MAXIMUM
161 013354  001525                        BEQ     ABORT                   ;GO IF MAXIMUM PASSED
162 013356                                GPHARD  LOGUNIT,PLOC            ;GET P TABLE ADDRESS
    013356  013700  002436                MOV     LOGUNIT,R0
    013362  104442                        TRAP    C$GPHRD
    013364  010037  002440                MOV     R0,PLOC
163 013370                                BNCOMPLETE NEXT                 ;IF NOT AVAILABLE, GET NEXT UNIT
    013370  103364                        BCC     NEXT
164 013372  013737  002436  002074        MOV     LOGUNIT,L$LUN           ;STORE CURRENT LOGICAL UNIT IN HEADER
165                                 ;GET ALL HARDWARE TABLE ENTRIES IN STORAGE
166 013400  013700  002440                MOV     PLOC,R0                 ;PLACE HEADER POINTER IN R0
167 013404  016037  000000  002442        MOV     0(R0),BASEADD           ;BASE ADDRESS OF BOARD
168 013412  016037  000002  002444        MOV     2(R0),VECTOR            ;VECTOR ADDRESS OF BOARD
169 013420  016037  000004  002446        MOV     4(R0),BRLEVEL           ;BR INTERRUPT LEVEL ON THE BOARD
170                                 ;FILL IN BRIDGE INTERFACE REGISTER TABLE
171 013426  013701  002442                MOV     BASEADD,R1              ;GET BASE ADDRESS IN R1
172 013432  012702  002142                MOV     #QCMD,R2                ;POINT TO REGISTER TABLE ADDRESS
173 013436  012703  000014                MOV     #12.,R3                 ;# OF REGISTERS IN TABLE
174 013442  010122                  10$:   MOV     R1,(R2)+                ;PLACE REGISTER ADDRESS IN TABLE
175 013444  062701  000002                ADD     #2,R1                   ;ADJUST R1 TO NEXT REGISTER ADDRESS
176 013450  005303                        DEC     R3                      ;ARE WE DONE?
177 013452  001373                        BNE     10$                     ;IF NOT DONE, GO AGAIN
178                                 ;GET FREE MEMORY ADDRESS AND SIZE
179 013454                                MEMORY  FREMEM                  ;GET MEMORY ADDRESS
    013454  104431                        TRAP    C$MEM
    013456  010037  002502                MOV     R0,FREMEM
180 013462  017737  167014  002504        MOV     @FREMEM,MEMSIZ          ;GET FREE MEMORY SIZE
181                                 ;CHECK MEMORY SIZE
182 013470  022737  007577  002120        CMP     #7577,L$MIME            ;COMPARE 128K TO MEMORY SIZE
183 013476  100003                        BPL     25$                     ;OK IF SIZE <= 128K
184 013500  012737  007577  002120        MOV     #7577,L$MIME            ;RESET MEMORY SIZE TO 128K
185                                 ;SET UP FOR UNEXPECTED INTERRUPTS
186 013506                          25$:  SETVEC  VECTOR,#ERRINT,#PRIO7   ;SET UP INTERRUPT VECTOR
    013506  012746  000340                MOV     #PRIO7,-(SP)
    013512  012746  012652                MOV     #ERRINT,-(SP)
    013516  013746  002444                MOV     VECTOR,-(SP)
    013522  012746  000003                MOV     #3,-(SP)
    013526  104437                        TRAP    C$SVEC
    013530  062706  000010                ADD     #10,SP
187 013534  052777  000100  166404        BIS     #ERRIE,@QINT            ;ENABLE ERROR INTERRUPT
188                                 ;SET UP AND ENABLE MEMORY MANAGEMENT
189 013542  004737  012754                JSR     PC,MMINIT               ;SET UP MM REGISTERS
190                                 ;SET UP FOR UNEXPECTED INTERRUPTS
191 013546                          ENDI:   SETVEC  VECTOR,#ERRINT,#PRIO7   ;SET UP INTERRUPT VECTOR
    013546  012746  000340                MOV     #PRIO7,-(SP)
    013552  012746  012652                MOV     #ERRINT,-(SP)
    013556  013746  002444                MOV     VECTOR,-(SP)
    013562  012746  000003                MOV     #3,-(SP)
    013566  104437                        TRAP    C$SVEC
    013570  062706  000010                ADD     #10,SP
192 013574  052777  000100  166344        BIS     #ERRIE,@QINT            ;ENABLE ERROR INTERRUPT
193                                 ;SET UP DEFAULT TIMEOUT VALUE
194 013602  012737  000003  002532        MOV     #3,DEFAULT              ;3 SECOND DEFAULT TIMEOUT FOR 11/23
195 013610  005737  002432                TST     BRIDGETYPE              ;TEST FOR Q-BRIDGE
```

INITIALIZE SECTION

```
    196 013614  001403                      BEQ     30$                     ;IF EQ THEN YES:  CONTINUE
    197 013616  012737  000005  002532       MOV     #5.DEFAULT              ;5 SEC DEFAULT TIMEOUT FOR 11/24
    198 013624                      30$:     EXIT    INIT                    ;THAT'S ALL TO INITIALIZE PASS
        013624  104432                       TRAP    C$EXIT
        013626  000004                       .WORD   L10027 .
    199 013630                      ABORT:   DOCLN                           ;DO CLEANUP AND ABORT THE PASS
        013630  104444                       TRAP    C$DCLN
    200
    224
    225
    237
    238                                      .EVEN
    239
    240 013632                               ENDINIT
        013632                      L10027:
        013632  104411                       TRAP    C$INIT
```

AUTODROP SECTION

```
                                .SBTTL  AUTODROP SECTION

                                ;++
                                ; THIS CODE IS EXECUTED IMMEDIATELY AFTER THE INITIALIZE CODE IF
                                ; THE "ADR" FLAG WAS SET.  THE UNIT(S) UNDER TEST ARE CHECKED TO
                                ; SEE IF THEY WILL RESPOND.  THOSE THAT DON'T ARE IMMEDIATELY
                                ; DROPPED FROM TESTING.
                                ;

                                        BGNAUTO
                                L$AUTO::
                                        NOP             ; NO ON LINE SIGNAL PROVIDED TO USER FOR AUTODROP

                                        ENDAUTO
                                L10030:
013636  104461                         TRAP    C$AUTO
```

CLEANUP CODING SECTION

```
                                        .SBTTL  CLEANUP CODING SECTION

                                        ;++
                                        ; THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
                                        ; AFTER THE HARDWARE TESTS HAVE BEEN PERFORMED.
                                        ;--

013640                                          BGNCLN
013640                                  L$CLEAN::

                                        ;START BY READING AND STORING THE REGISTER VALUES FOR DEBUG
013640  013701  002142                          MOV     @QCMD,R1        ;POINT R1 TO Q COMMAND REGISTER
013644  012702  002172                          MOV     #VALUES,R2      ;POINT R2 TO STORAGE AREA
013650  012703  000014                          MOV     #12.,R3         ;# OF REGISTER TO READ TO R3
013654  012122                          10$:    MOV     (R1)+,(R2)+     ;READ AND SAVE REGISTER
013656  077302                          SOB     R3,10$          ;SEE IF DONE, BRANCH IF NOT
                                        ;CLEAR INTERRUPT ENABLES IN ALL THE REGISTERS
013660  042777  000100  166254                  BIC     #PRSIE,@QCMD
013666  042777  000100  166250                  BIC     #ACKIE,@QVNT
013674  042777  000100  166244                  BIC     #ERRIE,@QINT
013702  042777  000100  166242                  BIC     #RDYIE,@QDMA
013710                                          CLRVEC  VECTOR          ;CLEAR INTERRUPT VECTOR
013710  013700  002444                          MOV     VECTOR,R0
013714  104436                                  TRAP    C$CVEC


                                        .EVEN

                                        ENDCLN
013716                                  L10031:
013716
013716  104412                                  TRAP    C$CLEAN
```

DROP UNIT SECTION

```
                                .SBTTL  DROP UNIT SECTION

                                ;**
                                ; THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
                                ; TO NO LONGER BE TESTED.
                                ;-

013720                                  BGNDU
013720                          L$DU::
013720  000240                          NOP             ;NO SPECIAL DROP UNIT CODING NEEDED

013722                                  EXIT    DU
013722  000167                          .WORD   J$JMP
013724  000000                          .WORD   L10032-2-.

                                        .EVEN

013726                                  ENDDU
013726                          L10032:
013726  104453                          TRAP    C$DU
```

ADD UNIT SECTION

```
                                .SBTTL  ADD UNIT SECTION

                                ;++
                                ; THE ADD-UNIT SECTION CONTAINS ANY CODE THE PROGRAMMER WISHES
                                ;  TO BE EXECUTED IN CONJUNCTION WITH THE ADDING OF A UNIT BACK
                                ;  TO THE TEST CYCLE.
                                ;--

013730                                  BGNAU
013730                          L$AU::

013730  000240                            NOP             ;NO SPECIAL ADD UNIT CODING NEEDED

013732                                  EXIT    AU
013732  000167                          .WORD   J$JMP
013734  000000                          .WORD   L10033 2 .

                                        .EVEN

013736                                  ENDAU
013736                          L10033:
013736  104452                          TRAP    C$AU

013740                                  ENDMOD
```

MAINLINE TEST CONTROL

```
      1                         .SBTTL MAINLINE TEST CONTROL
      2                         .ENABL AMA
     14                         .DSABL GBL
```

```
                                        BGNMOD
                                    ;;**********************************************************************
                                    ;**
                                    ;
                                    ;        MAINLINE TEST CONTROL MODULE
                                    ;
                                    ;--
                                    ;;**********************************************************************
                                        BGNTST
                                    T1::

                                    START:
                                    ;
                                    ; FIRST TEST QINT CMDPRS AND LOOP UNTIL SET
                                    ;
013740                              2$:     BREAK                           ; ALLOW CONTROL C
013740  104422                              TRAP    C$BRK
013742  032777  004000  166176              BIT     #CMDPRS,@QINT           ; IS CMDPRS SET
013750  001773                             BEQ     2$                      ; IF NOT, TRY AGAIN
                                    ;
                                    ; GET FUNCTION NUMBER AND SET READY TO SEND BACK
                                    ;
013752  017701  166164                      MOV     @QCMD,R1                ; READ QCMD
013756  042701  177701                      BIC     #177701,R1              ; GET RID OF UNWANTED BITS
013762  006201                              ASR     R1                      ; PUT IN PROPER PLACE
013764  010137  002460                      MOV     R1,TNUM                 ; STORE ORIGINAL VALUE
013770  000301                              SWAB    R1                      ; TEST NUMBER TO ECHO BACK
013772  010177  166144                      MOV     R1,@QCMD                ; PUT PATTERN BACK IN QCMD
                                    ;
                                    ; CALCULATE TEST NUMBER AND GO DO IT AS A SUBROUTINE
                                    ;
013776  013701  002460                      MOV     TNUM,R1                 ; GET TEST NUMBER BACK IN R1
014002  005237  002460                      INC     TNUM                    ; INCREMENT TNUM TO REAL TEST NUMBER
014006  023737  002460  002252              CMP     TNUM,NUM$TST            ; TEST # TOO LARGE
014014  003051                              BGT     BAD                     ; BRANCH IF TOO LARGE
014016  006301                              ASL     R1                      ; MULTIPLY BY 2 TO GET WORD VALUE
014020  022771  051506  002254              CMP     #CONVERSATION,@TESTS(R1) ; IS IT CONVERSATION TEST
014026  001403                              BEQ     5$                      ; IF CONVERSION TEST, SKIP CMDACK SET
014030  052777  000001  166104              BIS     #CMDACK,@QCMD           ; TELL UBRIDGE WHAT WAS SENT
014036  004771  002254              5$:     JSR     PC,@TESTS(R1)           ; GO EXECUTE TEST AS SUBROUTINE
                                    ;
                                    ; PROGRAM RETURNS HERE AFTER TEST IS COMPLETE
                                    ; R1 RETURNS A CODE AS FOLLOWS:
                                    ;       IF R1 = ABORT, SKIP EVENT HANDSHAKE
                                    ;       R1 = ANYTHING ELSE, NUMBER OF SECONDS FOR THE TIME OUT
                                    ;
014042  012737  000001  002114              MOV     #1,L$TEST               ; RESTORE REAL DRS TEST NUMBER
014050  020127  013630                      CMP     R1,#ABORT               ; ABORT RETURNED FROM TEST?
014054  001731                              BEQ     START                   ; IF ABORT, SKIP EVENT HANDSHAKE
014056  052777  000001  166060              BIS     #VNTPRS,@QVNT           ; SET VNTPRS, EVENT COMPLETE
014064  005701                              TST     R1                      ; CHECK TO SEE IF ZERO (DEFAULT)
014066  001002                              BNE     10$                     ; IF NOT ZERO, BRANCH
014070  013701  002532                      MOV     DEFAULT,R1              ; DEFAULT VALUE FOR TIMEOUT
014074  012702  026000              10$:    MOV     #TIMOUT,R2              ; SET UP FOR TIME OUT
014100  032777  002000  166040      30$:    BIT     #VNTACK,@QINT           ; IS EVENT ACKNOWLEDGE SET
014106  001314                              BNE     START                   ; IF SET, GO BACK TO START
014110                                      BREAK                           ; ALLOW CONTROL C
```

MAINLINE TEST CONTROL

```
     014110  104422                          TRAP    C$BRW
107  014112  005302                          DEC     R2                      ; DECREMENT TIME OUT COUNTER
108  014114  001371                          BNE     30$                     ; IF NOT TIME OUT, TRY AGAIN
109  014116  005301                          DEC     R1                      ; DECREMENT SECOND COUNT
110  014120  001365                          BNE     10$                     ; GO WAIT ANOTHER SECOND
111                                  ;
112                                  ; ERROR CONDITION, VNTACT TIME OUT
113                                  ;
114  014122                          ERRHRD  1,,ERRO                         ; TELL OPERATOR VNTACT TIME OUT
     014122  104456                  TRAP    C$ERHRD
     014124  000001                  .WORD   1
     014126  000000                  .WORD   0
     014130  006270                  .WORD   ERRO
115  014132  004737  013116          CALL    ENDERR                          ; GO PRINT OUT ENDING TERMINATOR
116  014136  000700                  BR      START                           ; GO TO START ANYWAY
117  014140                  BAD:    PRINTB  #BADMSG                         ; TELL OPERATOR TOO LARGE TEST NUMBER
     014140  012746  014170          MOV     #BADMSG,-(SP)
     014144  012746  000001          MOV     #1,-(SP)
     014150  010600                  MOV     SP,R0
     014152  104414                  TRAP    C$PNTB
     014154  062706  000004          ADD     #4,SP
118  014160  004737  013116          CALL    ENDERR                          ; GO PRINT OUT ENDING TERMINATOR
119  014164                          EXIT    TST
     014164  104432                  TRAP    C$EXIT
     014166  000030                  .WORD   L10034
120  014170     045     116     061  BADMSG: .ASCIZ   /%N1%ATEST # TOO LARGE/
121                                  .EVEN
122  014216                          ENDTST
     014216                  L10034:
     014216  104401                  TRAP    C$ETST
```

TEST 1: CMD PRS CMD ACK

```
                                .SBTTL  TEST 1: CMD PRS  CMD ACK
                                ;;*****************************************************************
                                ;;
                                ;TEST DESCRIPTION
                                ; CHECKS CMD PRS  CMD ACK
                                ;TEST STEPS
                                ; U CMD QIO
                                ; Q SET CMD CMD ACK
                                ;
                                ; THIS TEST IS DONE IN THE INITIAL HANDSHAKE BEFORE THE TESTS ARE EXECUTED.
                                ; THIS ROUTINE IS JUST A DUMMY.
                                ;
                                ;;*****************************************************************

                                        STATST
                                TEST1::
014220  012737  000001  002114          MOV     #1,L$TEST               ;TEST NUMBER FOR ERROR MESSAGES
014226  004737  013034                  CALL    BMSG                    ;CHECK FOR PNT FLAG
014232  012701  013630                  MOV     #ABORT,R1               ; FORCE ABORT
014236  000207                          RTS     PC                      ; RETURN TO MAINLINE
```

TEST 2: COMMAND REGISTER

```
                                        .SBTTL  TEST 2: COMMAND REGISTER
                                        ;;******************************************************************
                                        ;:
                                        ;TEST DESCRIPTION-
                                        ; CHECKS CMDPRS - CMDACK
                                        ; CHECKS ALL REGISTER DATA BITS
                                        ;TEST STEPS-
                                        ; U     CMD QIO WITH MOVING BIT IN CMD REGISTER
                                        ; Q     CHECK BITS AND RETURN THEM IN BITS 8-15
                                        ; Q     SET CMDACK
                                        ; U     REPEAT FOR ALL BITS
                                        ; -
                                        ;;******************************************************************

                                                STATST
                                        TEST2::
014240  012737  000002  002114                  MOV     #2,L$TEST               ;TEST NUMBER FOR ERROR MESSAGES
014246  004737  013034                          CALL    BMSG                    ;CHECK FOR PNT FLAG
014252  012737  000002  002456                  MOV     #2,EXP                  ; EXPECTED INITIAL PATTERN TO EXP
014260  005037  002474                          CLR     COUNTER                 ; CLEAR LOOP COUNTER
014264  013701  002532          5$:             MOV     DEFAULT,R1              ; NUMBER OF SECONDS TO TIMEOUT
014270  005237  002474                          INC     COUNTER                 ; INCREMENT LOOP COUNTER
014274  012702  026000          10$:            MOV     #TIMOUT,R2              ; TIME OUT VALUE TO R2
014300                          12$:            BREAK                           ; ALLOW CONTROL C
014300  104422                                  TRAP    C$BRK
014302  032777  004000  165636                  BIT     #CMDPRS,@QINT           ; COMMAND PRESENT?
014310  001017                                  BNE     20$                     ; IF COMMAND PRESENT, BRANCH
014312  005302                                  DEC     R2                      ; DECREMENT TIMEOUT REGISTER
014314  001371                                  BNE     12$                     ; IF NOT IN TIMEOUT, TRY AGAIN
014316  005301                                  DEC     R1                      ; DECREMENT SECOND TIMER
014320  001365                                  BNE     10$                     ; IF NOT TIMEOUT, TRY AGAIN
                                        ;
                                        ; TIMEOUT ERROR CONDITION
                                        ;
014322  012701  000000                          MOV     #0,R1                   ; REGISTER NUMBER TO R1
014326                                          ERRHRD  2,,ERR1                 ; TELL OPERATOR TIMEOUT
014326  104456                                  TRAP    C$ERHRD
014330  000002                                  .WORD   2
014332  000000                                  .WORD   0
014334  006316                                  .WORD   ERR1
014336  012701  013630                          MOV     #ABORT,R1               ; ABORT CODE TO R1
014342  004737  013116                          CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
014346  000451                                  BR      100$                    ; ABORT TEST
                                        ;
                                        ; END TIMEOUT ERROR CONDITION
                                        ;
                                        ; READ QCMD BITS 1-5 FOR BIT PATTERN AND CHECK
                                        ;
014350                                  20$:
014350  017737  165566  002454                  MOV     @QCMD,VAL               ; READ COMMAND REGISTER
014356  042737  177701  002454                  BIC     #177701,VAL             ; CLEAR OUT UNWANTED BITS
014364  023737  002454  002456                  CMP     VAL,EXP                 ; COMPARE EXPECTED WITH VALUE
014372  001410                                  BEQ     30$                     ; BRANCH IF OK
                                        ;
                                        ; ERROR CONDITION, DATA NOT WHAT EXPECTED
                                        ;
014374  012701  000000                          MOV     #0,R1                   ; REGISTER NUMBER TO R1
```

TEST 2: COMMAND REGISTER

```
    191 014400                                  ERRMRD  3.,MSG2,ERR3            ; TELL OPERATOR DATA ERROR
        014400  104456                          TRAP    C$ERMRD
        014402  000003                          .WORD   3
        014404  006012                          .WORD   MSG2
        014406  006652                          .WORD   ERR3
    192 014410  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
    193                                 ;
    194                                 ; END ERROR CONDITION
    195                                 ;
    196                                 ; ECHO PATTERN BACK TO MASTER
    197                                 ;
    198 014414                          30$:
    199 014414  013702  002456                  MOV     EXP,R2                  ; SET UP TO OUTPUT EXPECTED VALUE
    200 014420  006202                          ASR     R2                      ; MOVE OVER 1 BIT
    201 014422  000302                          SWAB    R2                      ; GET INTO HIGH BYTE
    202 014424  010204                          MOV     R2,R4                   ; STORE THIS VALUE
    203 014426  012703  000005                  MOV     #5,R3                   ; LOOP 5 TIMES TO EXERCISE HI BITS
    204 014432  006302                  40$:    ASL     R2                      ; MOVE BIT LEFT
    205 014434  005303                          DEC     R3                      ; DECREMENT COUNTER
    206 014436  001375                          BNE     40$                     ; BRANCH BACK IF NOT DONE
    207 014440  050402                          BIS     R4,R2                   ; SET LOW BIT BACK ON
    208 014442  010277  165474                  MOV     R2,@QCMD                ; SEND TO QCMD
    209 014446  052777  000001  165466          BIS     #CMDACK,@QCMD           ; TELL MASTER WHAT WAS
    210                                 ;
    211                                 ; CHECK FOR END OF TEST, IF NOT END, NEW EXPECTED PATTERN
    212                                 ;
    213 014454                          50$:
    214 014454  006337  002456                  ASL     EXP                     ; SHIFT EXPECTED PATTERN LEFT
    215 014460  032737  000100  002456          BIT     #BIT06,EXP              ; ALREADY IN LAST POSITION?
    216 014466  001676                          BEQ     5$                      ; GO TRY WITH NEXT PATTERN
    217                                 ;
    218                                 ; EXIT TEST ROUTINE
    219                                 ;
    220 014470  005001                  90$:    CLR     R1                      ; TEST END NORMALLY FLAG
    221 014472                          100$:
    222 014472  000207                          RTS     PC                      ; EXIT TEST TO MAINLINE
```

```
                                .SBTTL  TEST 3: EVENT REGISTER
                                ;;**********************************************************************
                                ;;
                                ;TEST DESCRIPTION-
                                ; CHECKS VNT PRS - VNT ACK
                                ; CHECKS ALL REGISTER DATA BITS
                                ;
                                ;TEST STEPS-
                                ; U     VNT QIO WITH MOVING BIT IN VNT REGISTER
                                ; Q       SET BITS 8-15 AND VNT PRS
                                ; Q       CHECK BITS
                                ; U     CHECK BITS 8-15 IN IOSB
                                ; REPEAT FOR ALL BITS
                                ;--
                                ;;**********************************************************************

                                        STATST
                                TEST3::
014474  012737  000003  002114          MOV     #3,L$TEST               ;TEST NUMBER FOR ERROR MESSAGES
014502  004737  013034                  CALL    BMSG                    ;CHECK FOR PNT FLAG
014506  005037  002474                  CLR     COUNTER                 ; CLEAR LOOP COUNTER
014512  012737  000002  002456          MOV     #2,EXP                  ; INITIAL PATTERN TO EXP
                                ;
                                ; FIRST SEND PATTERN TO MASTER
                                ;
                                10$:
014520  013702  002456                  MOV     EXP,R2                  ; SET UP TO OUTPUT RECEIVED VALUE
014524  006202                          ASR     R2                      ; MOVE OVER 1 BIT
014526  000302                          SWAB    R2                      ; GET INTO HIGH BYTE
014530  010204                          MOV     R2,R4                   ; STORE THIS VALUE
014532  012703  000005                  MOV     #5,R3                   ; LOOP 5 TIMES TO EXERCISE HI BITS
014536  006302                  20$:    ASL     R2                      ; MOVE BIT LEFT
014540  005303                          DEC     R3                      ; DECREMENT COUNTER
014542  001375                          BNE     20$                     ; BRANCH BACK IF NOT DONE
014544  050402                          BIS     R4,R2                   ; SET LOW BIT BACK ON
014546  010277  165372                  MOV     R2,@QVNT                ; SEND TO QVNT
014552  052777  000001  165364          BIS     #VNTPRS,@QVNT           ; TELL MASTER WHAT WAS
                                ;
                                ; NOW WAIT FOR EVENT ACKNOWLEDGED
                                ;
014560  005237  002474                  INC     COUNTER                 ; INCREMENT LOOP COUNTER
014564  013701  002532                  MOV     DEFAULT,R1              ; NUMBER OF SECONDS TO TIME OUT
014570  012702  026000          30$:    MOV     #TIMOUT,R2              ; TIME OUT VALUE TO R2
014574                          40$:    BREAK                           ; ALLOW CONTROL C
014574  104422                          TRAP    C$BRK
014576  032777  002000  165342          BIT     #VNTACK,@QINT           ; EVENT PRESENT?
014604  001017                          BNE     50$                     ; IF EVENT PRESENT, BRANCH
014606  005302                          DEC     R2                      ; DECREMENT TIMEOUT REGISTER
014610  001371                          BNE     40$                     ; IF NOT IN TIMEOUT, TRY AGAIN
014612  005301                          DEC     R1                      ; DECREMENT SECOND TIMER
014614  001365                          BNE     30$                     ; IF NOT TIMEOUT, AGAIN
                                ;
                                ; TIMEOUT ERROR CONDITION
                                ;
014616  012701  000001                  MOV     #1,R1                   ; REGISTER NUMBER TO R1
014622                                  ERRHRD  4,,ERR1                 ; TELL OPERATOR TIMEOUT
014622  104456                          TRAP    C$ERHRD
```

TEST 3: EVENT REGISTER

```
                014624  000004                          .WORD   4
                014626  000000                          .WORD   0
                014630  006316                          .WORD   ERR1
    276         014632  012701  013630                  MOV     #ABORT,R1               ; ABORT CODE TO R1
    277         014636  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
    278         014642  000431                          BR      100$                    ; ABORT TEST
    279                                                 ;
    280                                                 ; END TIMEOUT ERROR CONDITION
    281                                                 ;
    282                                                 ; READ QVNT BITS 1 5 FOR BIT PATTERN AND CHECK
    283                                                 ;
    284         014644                                  50$:
    285         014644  017737  165274  002454          MOV     @QVNT,VAL               ; READ QVNT
    286         014652  042737  177701  002454          BIC     #177701,VAL             ; CLEAR OUT UNWANTED BITS
    287         014660  023737  002454  002456          CMP     VAL,EXP                 ; COMPARE EXPECTED WITH VALUE
    288         014666  001410                          BEQ     60$                     ; BRANCH IF OK
    289                                                 ;
    290                                                 ; ERROR CONDITION, DATA NOT WHAT EXPECTED
    291                                                 ;
    292         014670  012701  000001                  MOV     #1,R1                   ; REGISTER NUMBER TO R1
    293         014674                                  ERRHRD  5.,MSG3,ERR3            ; TELL OPERATOR DATA ERROR
                014674  104456                          TRAP    C$ERHRD
                014676  000005                          .WORD   5
                014700  006061                          .WORD   MSG3
                014702  006652                          .WORD   ERR3
    294         014704  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
    295                                                 ;
    296                                                 ; END ERROR CONDITION
    297                                                 ;
    298                                                 ; CHECK FOR END OF TEST, IF NOT END, NEW EXPECTED PATTERN
    299                                                 ;
    300         014710                                  60$:
    301         014710  006337  002456                  ASL     EXP                     ; SHIFT EXPECTED PATTERN LEFT
    302         014714  032737  000100  002456          BIT     #BIT06,EXP              ; ALREADY IN LAST POSITION?
    303         014722  001676                          BEQ     10$                     ; GO TRY WITH NEXT PATTERN
    304                                                 ;
    305                                                 ; EXIT TEST ROUTINE
    306                                                 ;
    307         014724  005001                  90$:    CLR     R1                      ; TEST END NORMALLY FLAG
    308         014726                          100$:
    309         014726  000207                          RTS     PC                      ; EXIT TEST TO MAINLINE
```

```
                                .SBTTL  TEST 4: VIEW REGISTER READ
                                ;;******************************************************************************
                                ;;
                                ;TEST DESCRIPTION
                                ; WRITES DATA TO VIEW REGISTER
                                ; READS DATA FROM VIEW REGISTER
                                ;
                                ;TEST STEPS-
                                ; U     LOAD ADDRESS VALUES IN VIEW BUFFER
                                ; U     CMD QIO USING VIEW REGISTER BUFFER
                                ; Q       READ ALL VIEW REGISTER LOCATIONS AND CHECK
                                ; Q       LOAD ADDRESS VALUES IN VIEW REGISTER
                                ; U     VNT QIO USING VIEW REGISTER BUFFER
                                ; Q      SET UNT PRS
                                ; U     CHECK VIEW REGISTER BUFFER
                                ;--
                                ;;******************************************************************************

                                        STATST
                                TEST4::
014730  012737  000004  002114          MOV     #4,L$TEST               ;TEST NUMBER FOR ERROR MESSAGES
014736  004737  013034                  CALL    BMSG                    ;CHECK FOR PNT FLAG
014742  013701  002532                  MOV     DEFAULT,R1              ; SECONDS OF TIME OUT
014746  012702  026000          8$:     MOV     #TIMOUT,R2              ; TIME OUT VALUE TO R2
014752                          10$:    BREAK
014752  104422                          TRAP    C$BRK
014754  032777  004000  165164          BIT     #CMDPRS,@QINT           ; COMMAND PRESENT?
014762  001017                          BNE     20$                     ; IF COMMAND PRESENT, BRANCH
014764  005302                          DEC     R2                      ; DECREMENT TIMEOUT REGISTER
014766  001371                          BNE     10$                     ; IF NOT IN TIMEOUT, TRY AGAIN
014770  005301                          DEC     R1                      ; DECREMENT SECOND TIMER
014772  001365                          BNE     8$                      ; IF NOT TIMEOUT, AGAIN
                                ;
                                ; TIMEOUT ERROR CONDITION
                                ;
014774  012701  000000                  MOV     #0,R1                   ; REGISTER # TO R1
015000                                  ERRHRD  6,,ERR2                 ; TELL OPERATOR TIMEOUT¢
015000  104456                          TRAP    C$ERHRD
015002  000006                          .WORD   6
015004  000000                          .WORD   0
015006  006506                          .WORD   ERR2
015010  012701  013630                  MOV     #ABORT,R1               ; ABORT CODE TO R1
015014  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
015020  000524                          BR      100$                    ; ABORT TEST
                                ;
                                ; END TIMEOUT ERROR CONDITION
                                ;
015022                          20$:
                                ;
                                ; SET UP TO READ VIEW RAM
                                ;
015022  052777  000020  165120          BIS     #QVREN,@QCTL            ; READ ENABLE
015030  012777  000000  165130          MOV     #0,@QVAD                ; SET READ RAM INITIAL ADD. TO ZERO
015036  013701  002502                  MOV     FREMEM,R1               ; START OF BUFFER TO R1
015042  012702  002000                  MOV     #2000,R2                ; LOOP COUNTER TO R2
                                ;
                                ; READ 1K VIEW RAM, PLACE CONTENTS IN BUFFER
```

TEST 4: VIEW REGISTER READ

```
                                        ;
                                30$:
015046                                  MOV     @QVDA,(R1)+             ; READ AND PLACE IN BUFFER
015046  017721  165116                  DEC     R2                      ; DECREMENT LOOP COUNTER
015052  005302                          BNE     30$                     ; IF NOT DONE, AGAIN
015054  001374                          ;
                                        ; DONE READING RAM, NOW SET UP TO CHECK IT
                                        ;
                                        CLR     ERROR1                  ; INITIAL ERROR COUNT
015056  005037  002462                  MOV     #0,EXP                  ; INITIAL EXPECTED DATA VALUE
015062  012737  000000  002456          MOV     FREMEM,R1               ; START OF BUFFER TO R1
015070  013701  002502                  MOV     #0,EXP                  ; LOOP COUNTER AND ADDRESS VALUE
015074  012737  000000  002456          ;
                                        ; NOW CHECK THE VALUES
                                        ;
                                40$:
015102                                  MOV     (R1)+,VAL               ; MOVE READ VALUE TO VAL
015102  012137  002454                  CMP     EXP,VAL                 ; COMPARE EXPECTED WITH VALUE
015106  023737  002456  002454          F_Q     60$                     ; BRANCH IF OK
015114  001434                          ;
                                        ; ERROR CONDITION, BAD RAM VALUE
                                        ;
                                        INC     ERROR1                  ; INCREMENT ERROR COUNTER
015116  005237  002462                  CMP     #1,ERROR1               ; IS IT THE FIRST ERROR?
015122  022737  000001  002462          BNE     50$                     ; IF NOT FIRST ERROR, BRANCH PRINT HEADER
015130  001004                          ERRHRD  7.,MSG4,ERR4            ; PRINT ERROR HEADER ONLY
015132                                  TRAP    C$ERHRD
015132  104456                          .WORD   7
015134  000007                          .WORD   MSG4
015136  006130                          .WORD   ERR4
015140  007012                  50$:    CMP     #9.,ERROR1              ; SEE IF TOO MANY ERRORS TO PRINT
015142  022737  000011  002462          BMI     60$                     ; BRANCH IF TOO MANY ERRORS TO PRINT
015150  100416                          PRINTX  #FOR5,EXP,VAL,EXP       ; PRINT DATA MESSAGE
015152                                  MOV     EXP,-(SP)
015152  013746  002456                  MOV     VAL,-(SP)
015156  013746  002454                  MOV     EXP,-(SP)
015162  013746  002456                  MOV     #FOR5,-(SP)
015166  012746  003574                  MOV     #4,-(SP)
015172  012746  000004                  MOV     SP,R0
015176  010600                          TRAP    C$PNTX
015200  104415                          ADD     #12,SP
015202  062706  000012                  ;
                                        ; END ERROR CONDITION
                                        ;
                                60$:
015206                                  INC     EXP                     ; INCREMENT ADDRESS VALUE AND LOOP COUNTER
015206  005237  002456                  CMP     EXP,#2000               ; IS IT DONE YET
015212  023727  002456  002000          BNE     40$                     ; IF NOT DONE, GO CHECK NEXT VALUE
015220  001330                          ;
                                        ; TEST DONE, PRINT FINAL ERROR TOTALS IF ANY
                                        ;
                                        TST     ERROR1                  ; ANY ERRORS
015222  005737  002462                  BEQ     70$                     ; BRANCH IF NO ERRORS
015226  001414                          ;
                                        ; PRINT FINAL ERROR TOTALS
                                        ;
                                        PRINTB  #FOR6,ERROR1            ; PRINT # OF ERRORS
015230
```

TEST 4: VIEW REGISTER READ

```
        015230  013746  002462                  MOV     ERROR1, (SP)
        015234  012746  003622                  MOV     #FOR6,-(SP)
        015240  012746  000002                  MOV     #2, (SP)
        015244  010600                          MOV     SP,R0
        015246  104414                          TRAP    C$PNTB
        015250  062706  000006                  ADD     #6,SP
    405 015254  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
    406                                 ;
    407                                 ; SET QCMD CMDACK TO COMPLETE HANDSHAKE
    408                                 ;
    409 015260  052777  000001  164654  70$:    BIS     #CMDACK,@QCMD           ; SET CMDACK
    410 015266  012701  000005                  MOV     #5.,R1                  ; TEST END NORMALLY WITH 5 SEC DELAY
    411 015272                          100$:
    412 015272  000207                          RTS     PC                      ; EXIT TEST TO MAINLINE
```

TEST 5: VIEW REGISTER WRITE

```
                                .SBTTL  TEST 5: VIEW REGISTER WRITE
                                ;;*****************************************************************************
                                ;++
                                ;TEST DESCRIPTION-
                                ; WRITES DATA TO VIEW REGISTER
                                ;
                                ;TEST STEPS-
                                ; U     CMD QIO USING VIEW REGISTER BUFFER
                                ; Q       LOAD ADDRESS VALUES IN VIEW REGISTER
                                ; U     VNT QIO USING VIEW REGISTER BUFFER
                                ; Q      SET VNT PRS
                                ; U     CHECK VIEW REGISTER BUFFER
                                ;--
                                ;;*****************************************************************************

015274                                  STATST
015274                          TEST5::
015274  012737  000005  002114          MOV     #5,L$TEST               ;TEST NUMBER FOR ERROR MESSAGES
015302  004737  013034                  CALL    BMSG                    ;CHECK FOR PNT FLAG
                                ;
                                ; SET UP TO WRITE TO RAM ON VAX SIDE
                                ;
015306  042777  000020  164634          BIC     #QVREN,@QCTL            ; CLEAR READ ENABLE
015314  012777  000000  164644          MOV     #0,@QVAD                ; STARTING ADDRESS
015322  012701  000000                  MOV     #0,R1                   ; STARTING VALUE TO WRITE
                                ;
                                ; WRITE TO U-RAM
                                ;
015326  010177  164636          10$:    MOV     R1,@QVDA                ; WRITE TO RAM
015332  005201                          INC     R1                      ; INCREMENT VALUE
015334  022701  002000                  CMP     #2000,R1                ; IS IT DONE YET?
015340  001372                          BNE     10$                     ; IF NOT DONE, BRANCH
                                ;
                                ; TELL VAX RAM DATA WAS WRITTEN
                                ;
015342  052777  000001  164574          BIS     #VNTPRS,@QVNT           ; SET EVENT PRESENT
015350  013701  002532                  MOV     DEFAULT,R1              ; NUMBER OF SECONDS TO TIMEOUT
015354  012702  026000          15$:    MOV     #TIMOUT,R2              ; TIME OUT VALUE TO R2
015360  032777  002000  164560  20$:    BIT     #VNTACK,@QINT           ; EVENT ACKNOWLEDGE?
015366  001020                          BNE     30$                     ; IF COMMAND PRESENT, BRANCH
015370                                  BREAK
015370  104422                          TRAP    C$BRK
015372  005302                          DEC     R2                      ; DECREMENT TIMEOUT REGISTER
015374  001371                          BNE     20$                     ; IF NOT IN TIMEOUT, TRY AGAIN
015376  005301                          DEC     R1                      ; DECREMENT SECOND COUNTER
015400  001365                          BNE     15$                     ; IF NOT DONE, AGAIN
                                ;
                                ; TIMEOUT ERROR CONDITION
                                ;
015402  012701  000001                  MOV     #1,R1                   ; REGISTER # TO R1
015406                                  ERRHRD  8.,,ERR2                ; TELL OPERATOR TIMEOUT
015406  104456                          TRAP    C$ERHRD
015410  000010                          .WORD   8
015412  000000                          .WORD   0
015414  006506                          .WORD   ERR2
015416  012701  013630                  MOV     #ABORT,R1               ; ABORT CODE TO R1
015422  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
```

TEST 5: VIEW REGISTER WRITE

```
015426  000402                  BR      100$                    ; ABORT TEST
                        ;
                        ; END TIMEOUT ERROR CONDITION
                        ;
015430  012701  000005  30$:     MOV     #5.,R1                  ; TEST END NORMALLY FLAG FOR 5 SECS
015434                  100$:
015434  000207                  RTS     PC                      ; EXIT TEST TO MAINLINE
```

TEST 6: VIEW REGISTER COMPLIMENTED READ

```
                                        .SBTTL  TEST 6: VIEW REGISTER COMPLIMENTED READ
                                        ;;**************************************************************************
                                        ;**
                                        ;TEST DESCRIPTION-
                                        ; READS DATA FROM VIEW REGISTER
                                        ;
                                        ;TEST STEPS-
                                        ; U     LOAD COMPLIMENTED ADDRESS VALUES IN VIEW BUFFER
                                        ; U     CMD QIO USING VIEW REGISTER BUFFER
                                        ; Q       READ ALL VIEW REGISTER LOCATIONS AND CHECK
                                        ; Q      SET VNT PRS
                                        ; U     CHECK VIEW REGISTER BUFFER
                                        ;--
                                        ;;**************************************************************************

                                                STATST
015436                                  TEST6::
015436  012737  000006  002114                  MOV     #6,L$TEST               ;TEST NUMBER FOR ERROR MESSAGES
015444  004737  013034                          CALL    BMSG                    ;CHECK FOR PNT FLAG
015450  013701  002532                          MOV     DEFAULT,R1              ; NUMBER OF SECONDS TO TIME OUT
015454  012702  026000                  5$:     MOV     #TIMOUT,R2              ; TIME OUT VALUE TO R2
015460  032777  004000  164460          10$:    BIT     #CMDPRS,@QINT           ; COMMAND PRESENT?
015466  001020                                  BNE     20$                     ; IF COMMAND PRESENT, BRANCH
015470                                          BREAK
015470  104422                                  TRAP    C$BRK
015472  005302                                  DEC     R2                      ; DECREMENT TIMEOUT REGISTER
015474  001371                                  BNE     10$                     ; IF NOT IN TIMEOUT, TRY AGAIN
015476  005301                                  DEC     R1                      ; DECREMENT SECOND TIMER
015500  001365                                  BNE     5$                      ; IF NOT DONE, AGAIN
                                        ;
                                        ; TIMEOUT ERROR CONDITION
                                        ;
015502  012701  000000                          MOV     #0,R1                   ; REGISTER # TO R1
015506                                          ERRHRD  9,,ERR2                 ; TELL OPERATOR TIMEOUT
015506  104456                                  TRAP    C$ERHRD
015510  000011                                  .WORD   9
015512  000000                                  .WORD   0
015514  006506                                  .WORD   ERR2
015516  012701  013630                          MOV     #ABORT,R1               ; ABORT CODE TO R1
015522  004737  013116                          CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
015526  000525                                  BR      100$                    ; ABORT TEST
                                        ;
                                        ; END TIMEOUT ERROR CONDITION
                                        ;
                                        ; SET UP TO READ VIEW RAM
                                        ;
015530                                  20$:
015530  052777  000020  164412                  BIS     #QVREN,@QCTL            ; READ ENABLE
015536  012777  000000  164422                  MOV     #0,@QVAD                ; SET READ RAM INITIAL ADD. TO ZERO
015544  013701  002502                          MOV     FREMEM,R1               ; START OF BUFFER TO R1
015550  012702  002000                          MOV     #2000,R2                ; LOOP COUNTER TO R2
                                        ;
                                        ; READ 1K VIEW RAM, PLACE CONTENTS IN BUFFER
                                        ;
015554                                  30$:
015554  017721  164410                          MOV     @QVDA,(R1)+             ; READ AND PLACE IN BUFFER
015560  005302                                  DEC     R2                      ; DECREMENT LOOP COUNTER
```

TEST 6: VIEW REGISTER COMPLIMENTED READ

```
    521 015562  001374                        BNE     30$                     ; IF NOT DONE, AGAIN
    522                                 ;
    523                                 ; DONE READING RAM, NOW SET UP TO CHECK IT
    524                                 ;
    525 015564  005037  002462                  CLR     ERROR1                  ; INITIAL ERROR COUNT
    526 015570  013701  002502                  MOV     FREMEM,R1               ; START OF BUFFER TO R1
    527 015574  012702  000000                  MOV     #0,R2                   ; LOOP COUNTER
    528 015600  010237  002456                  MOV     R2,EXP                  ; MOVE VALUE TO EXPECTED STORAGE
    529 015604  005137  002456                  COM     EXP                     ; COMPLIMENT EXPECTED
    530                                 ;
    531                                 ; NOW CHECK THE VALUES
    532                                 ;
    533 015610                          40$:
    534 015610  012137  002454                  MOV     (R1)+,VAL               ; MOVE READ VALUE TO VAL
    535 015614  023737  002456  002454          CMP     EXP,VAL                 ; COMPARE EXPECTED WITH VALUE
    536 015622  001433                          BEQ     60$                     ; BRANCH IF OK
    537                                 ;
    538                                 ; ERROR CONDITION, BAD RAM VALUE
    539                                 ;
    540 015624  005237  002462                  INC     ERROR1                  ; INCREMENT ERROR COUNTER
    541 015630  022737  000001  002462          CMP     #1,ERROR1               ; IS IT THE FIRST ERROR?
    542 015636  001004                          BNE     50$                     ; IF NOT FIRST ERROR, BRANCH PRINT HEADER
    543 015640                                  ERRHRD  10.,MSG4,ERR4           ; PRINT ERROR HEADER ONLY
        015640  104456                          TRAP    C$ERHRD
        015642  000012                          .WORD   10
        015644  006130                          .WORD   MSG4
        015646  007012                          .WORD   ERR4
    544 015650  022737  000011  002462  50$:    CMP     #9.,ERROR1              ; SEE IF TOO MANY ERRORS TO PRINT
    545 015656  100415                          BMI     60$                     ; BRANCH IF TOO MANY ERRORS TO PRINT
    546 015660                                  PRINTX  #FOR5,R2,VAL,EXP        ; PRINT DATA MESSAGE
        015660  013746  002456                  MOV     EXP,-(SP)
        015664  013746  002454                  MOV     VAL,-(SP)
        015670  010246                          MOV     R2,-(SP)
        015672  012746  003574                  MOV     #FOR5,-(SP)
        015676  012746  000004                  MOV     #4,-(SP)
        015702  010600                          MOV     SP,R0
        015704  104415                          TRAP    C$PNTX
        015706  062706  000012                  ADD     #12,SP
    547                                 ;
    548                                 ; END ERROR CONDITION
    549                                 ;
    550 015712                          60$:
    551 015712  005202                          INC     R2                      ; INCREMENT ADDRESS VALUE AND LOOP COUNTER
    552 015714  010237  002456                  MOV     R2,EXP                  ; MOVE VALUE TO EXPECTED STORAGE
    553 015720  005137  002456                  COM     EXP                     ; COMPLIMENT EXPECTED
    554 015724  020227  002000                  CMP     R2,#2000                ; IS IT DONE YET
    555 015730  001327                          BNE     40$                     ; IF NOT DONE, GO CHECK NEXT VALUE
    556                                 ;
    557                                 ; TEST DONE, PRINT FINAL ERROR TOTALS IF ANY
    558                                 ;
    559 015732  005737  002462                  TST     ERROR1                  ; ANY ERRORS
    560 015736  001414                          BEQ     70$                     ; BRANCH IF NO ERRORS
    561                                 ;
    562                                 ; PRINT FINAL ERROR TOTALS
    563                                 ;
    564 015740                                  PRINTB  #FOR6,ERROR1            ; PRINT # OF ERRORS
        015740  013746  002462                  MOV     ERROR1,-(SP)
```

TEST 6: VIEW REGISTER COMPLIMENTED READ

```
        015744  012746  003622                  MOV     @#OR6, (SP)
        015750  012746  000002                  MOV     #2, (SP)
        015754  010600                          MOV     SP,R0
        015756  104414                          TRAP    C$PNTB
        015760  062706  000006                  ADD     #6,SP
    565 015764  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
    566                             ;
    567                             ; SET QCMD CMDACK TO COMPLETE HANDSHAKE
    568                             ;
    569 015770  052777  000001  164144  70$:    BIS     #CMDACK,@QCMD           ; SET CMDACK
    570 015776  012701  000005                  MOV     #5.,R1                  ; TEST END NORMALLY FLAG FOR 5 SECS
    571 016002                      100$:
    572 016002  000207                          RTS     PC                      ; EXIT TEST TO MAINLINE
```

TEST 7: VIEW REGISTER COMPLIMENTED WRITE

```
                                        .SBTTL  TEST 7: VIEW REGISTER COMPLIMENTED WRITE
                                        ;;*****************************************************************
                                        ;;
                                        ;TEST DESCRIPTION
                                        ; WRITES COMPLIMENTED DATA TO VAX VIEW REGISTER
                                        ;
                                        ;TEST STEPS
                                        ; U     CMD QIO USING VIEW REGISTER BUFFER
                                        ; Q       LOAD ADDRESS VALUES IN VIEW REGISTER
                                        ; U     VNT QIO USING VIEW REGISTER BUFFER
                                        ; Q      SET VNT PRS
                                        ; U     CHECK VIEW REGISTER BUFFER
                                        ; -
                                        ;;*****************************************************************

016004                                          STATST
016004                                  TEST7::
016004  012737  000007  002114                  MOV     #7,L$TEST               ;TEST NUMBER FOR ERROR MESSAGES
016012  004737  013034                          CALL    BMSG                    ;CHECK FOR PNT FLAG
                                        ;
                                        ; SET UP TO WRITE TO RAM ON VAX SIDE
                                        ;
016016  042777  000020  164124                  BIC     #QVREN,@QCTL            ; CLEAR READ ENABLE
016024  012777  000000  164134                  MOV     #0,@QVAD                ; STARTING ADDRESS
016032  012701  177777                          MOV     #-1,R1                  ; STARTING VALUE TO WRITE
                                        ;
                                        ; WRITE TO U-RAM
                                        ;
016036  010177  164126                  10$:    MOV     R1,@QVDA                ; WRITE TO RAM
016042  005301                                  DEC     R1                      ; DECREMENT VALUE
016044  022701  175777                          CMP     #^C2000,R1              ; IS IT DONE YET?
016050  001372                                  BNE     10$                     ; IF NOT DONE, BRANCH
                                        ;
                                        ; TELL VAX RAM DATA WAS WRITTEN
                                        ;
016052  052777  000001  164064                  BIS     #VNTPRS,@QVNT           ; SET EVENT PRESENT
016060  013701  002532                          MOV     DEFAULT,R1              ; NUMBER OF SECONDS TO TIME OUT
016064  012702  026000                  15$:    MOV     #TIMOUT,R2              ; TIME OUT VALUE TO R2
016070  032777  002000  164050          20$:    BIT     #VNTACK,@QINT           ; COMMAND PRESENT?
016076  001020                                  BNE     30$                     ; IF COMMAND PRESENT, BRANCH
016100                                          BREAK                           ; ALLOW CONTROL C
016100  104422                                  TRAP    C$BRK
016102  005302                                  DEC     R2                      ; DECREMENT TIMEOUT REGISTER
016104  001371                                  BNE     20$                     ; IF NOT IN TIMEOUT, TRY AGAIN
016106  005301                                  DEC     R1                      ; DECREMENT SECOND TIMER
016110  001365                                  BNE     15$                     ; BRANCH IF NOT DONE
                                        ;
                                        ; TIMEOUT ERROR CONDITION
                                        ;
016112  012701  000001                          MOV     #1,R1                   ; REGISTER # TO R1
016116                                          ERRHRD  11.,,ERR2               ; TELL OPERATOR TIMEOUT
016116  104456                                  TRAP    C$ERHRD
016120  000013                                  .WORD   11
016122  000000                                  .WORD   0
016124  006506                                  .WORD   ERR2
016126  012701  013630                          MOV     #ABORT,R1               ; ABORT CODE TO R1
016132  004737  013116                          CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
```

TEST 7: VIEW REGISTER COMPLIMENTED WRITE

```
623 016136  000402                        BR      100$                    ; ABORT TEST
624                                 ;
625                                 ; END TIMEOUT ERROR CONDITION
626                                 ;
627                                 ;
628 016140  012701  000005          30$:    MOV     #5.,R1                  ; TEST END NORMALLY WITH 5 SEC DELAY
629 016144                          100$:
630 016144  000207                          RTS     PC                      ; EXIT TEST TO MAINLINE
```

```
                                .SBTTL  TEST 8: COMMAND INTERRUPTS
                                ;;******************************************************************************
                                ;**
                                ;TEST DESCRIPTION-
                                ; SETS CMD PRS, CKD ACK INTERRUPTS
                                ;
                                ;TEST STEPS-
                                ; U     CMD QIO WITH INTERRUPT
                                ; Q       WAIT FOR INTERRUPT ON TIME-OUT
                                ; Q       SET CMD ACK
                                ; U     WAIT FOR INTERRUPT ON TIME-OUT
                                ;--
                                ;;******************************************************************************

                                        STATST
016146                          TEST8::
016146  012737  000010  002114          MOV     #8,L$TEST               ;TEST NUMBER FOR ERROR MESSAGES
016154  004737  013034                  CALL    BMSG                    ;CHECK FOR PNT FLAG
016160  005037  002450                  CLR     TRPFLG                  ; CLEAR INTERRUPT FLAG
016164                                  CLRVEC  VECTOR                  ; CLEAR ERR VECTOR
016164  013700  002444                  MOV     VECTOR,R0
016170  104436                          TRAP    C$CVEC
016172                                  SETVEC  VECTOR,#TRAP4,#PRI07    ; SET UP FOR INTERRUPT
016172  012746  000340                  MOV     #PRI07,-(SP)
016176  012746  012644                  MOV     #TRAP4,-(SP)
016202  013746  002444                  MOV     VECTOR,-(SP)
016206  012746  000003                  MOV     #3,-(SP)
016212  104437                          TRAP    C$SVEC
016214  062706  000010                  ADD     #10,SP
016220  052777  000100  163714          BIS     #PRSIE,@QCMD            ; ENABLE COMMAND INTERRUPT
016226  013701  002532                  MOV     DEFAULT,R1              ; # OF SECONDS TO WAIT
016232  012702  026000          10$:    MOV     #TIMOUT,R2              ; TIME OUT DELAY TO R2
016236                          20$:    BREAK                           ; ALLOW CONTROL C
016236  104422                          TRAP    C$BRK
016240  005737  002450                  TST     TRPFLG                  ; DID INTERRUPT OCCUR
016244  001020                          BNE     30$                     ; IF YES INTERRUPT, BRANCH
016246  005302                          DEC     R2                      ; DECREMENT TIMEOUT
016250  001372                          BNE     20$                     ; IF NOT DONE LOOP
016252  005301                          DEC     R1                      ; DECREMENT SECOND COUNTER
016254  001366                          BNE     10$                     ; IF NOT DONE, LOOP
                                ;
                                ; ERROR CONDITION, TIMEOUT OCCURED WAITING FOR INTERRUPT
                                ;
016256  052777  000001  163656          BIS     #CMDACK,@QCMD           ; SET COMMAND ACKNOWLEDGE INTERRUPT
016264                                  ERRHRD  12.,,ERR6               ; TELL OPERATOR TIMEOUT
016264  104456                          TRAP    C$ERHRD
016266  000014                          .WORD   12
016270  000000                          .WORD   0
016272  007320                          .WORD   ERR6
016274  012701  013630                  MOV     #ABORT,R1               ; ABORT CODE TO R1
016300  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
016304  000447                          BR      100$                    ; BRANCH TO END OF TEST
                                ;
                                ; END ERROR CONDITION
                                ;
                                ; INTERRUPT OCCURRED, FIND OUT WHICH ONE
                                ;
```

TEST 8: COMMAND INTERRUPTS

```
673 016306                                  30$:
674 016306  017737  163634  002454                  MOV     @QINT,VAL                       ; READ Q INTERRUPT REGISTER
675 016314  042737  000677  002454                  BIC     #^B0000000110111111,VAL ; GET RID OF UNWANTED BITS
676 016322  012737  004000  002456                  MOV     #BIT11,EXP                      ; EXPECTED VALUE TO EXP
677 016330  033737  002456  002454                  BIT     EXP,VAL                         ; COMPARE EXPECTED WITH VALUE
678 016336  001025                                  BNE     40$
679                                         ;
680                                         ; ERROR CONDITION, WRONG INTERRUPT BIT SET
681                                         ;
682 016340  012701  000002                          MOV     #2,R1                           ; REGISTER # TO R1
683 016344                                          ERRHRD  13.,MSG6,ERR3           ; TELL OPERATOR ERROR
    016344  104456                                  TRAP    C$ERHRD
    016346  000015                                  .WORD   13
    016350  006202                                  .WORD   MSG6
    016352  006652                                  .WORD   ERR3
684 016354                                          SETBITS QINT,INTBIT,VAL
    016354  010146                                  MOV     R1,-(SP)        ;SAVE REGISTERS
    016356  010546                                  MOV     R5,-(SP)
    016360  013701  002454                          MOV     VAL,R1  ;GET VAL REGISTER TO READ
    016364  004537  012130                          JSR     R5,BITS$        ;SUBROUTINE TO OUTPUT VALUES
    016370  000012                                  .WORD   $LEN
    016372  002672                                  .WORD   INTBIT
    016374     121     111     116                  .ASCIZ  /QINT/
    016402  012605                                  MOV     (SP)+,R5        ;RESTORE REGISTERS
    016404  012601                                  MOV     (SP)+,R1
685 016406  004737  013116                          CALL    ENDERR                          ; GO PRINT OUT ENDING TERMINATOR
686                                         ;
687                                         ; END ERROR CONDITION, SEND INTERRUPT BACK
688                                         ;
689 016412                                  40$:
690 016412  052777  000001  163522                  BIS     @CMDACK,@QCMD           ; SET COMMAND ACKNOWLEDGE INTERRUPT
691 016420  012701  000000                          MOV     @0.,R1                          ; TEST END NORMALLY WITH DEFAULT DELAY
692 016424  042777  000100  163510  100$:   BIC     @PRSIE,@QCMD            ; DISABLE COMMAND INTERRUPT
693 016432                                          CLRVEC  VECTOR                  ; RESTORE INTERRUPT VECTOR
    016432  013700  002444                          MOV     VECTOR,R0
    016436  104436                                  TRAP    C$CVEC
694 016440                                          SETVEC  VECTOR,@ERRINT,@PRIO7   ; SET UP FOR ERROR INTERRUPT
    016440  012746  000340                          MOV     @PRIO7,-(SP)
    016444  012746  012652                          MOV     @ERRINT,-(SP)
    016450  013746  002444                          MOV     VECTOR,-(SP)
    016454  012746  000003                          MOV     #3,-(SP)
    016460  104437                                  TRAP    C$SVEC
    016462  062706  000010                          ADD     #10,SP
695 016466  052777  000100  163452                  BIS     @ERRIE,@QINT                    ; MAKE SURE ERROR INTERRUPT IS ENABLED
696
697 016474  000207                                  RTS     PC                              ; EXIT TEST TO MAINLINE
```

TEST 9: EVENT INTERRUPTS

```
                                .SBTTL  TEST 9: EVENT INTERRUPTS
                                ;;**********************************************************************
                                ;;
                                ;TEST DESCRIPTION
                                ; SETS VNT PRS, VNT ACK INTERRUPTS
                                ;
                                ;TEST STEPS-
                                ; Q       SET VNT PRS
                                ; U     WAIT FOR INTERRUPT ON TIME-OUT
                                ; U     VNT QIO WITH INTERRUPT
                                ; Q       WAIT FOR INTERRUPT ON TIME-OUT
                                ; -
                                ;;**********************************************************************

                                        STATST
016476                          TEST9::
016476  012737  000011  002114          MOV     #9,L$TEST               ;TEST NUMBER FOR ERROR MESSAGES
016504  004737  013034                  CALL    BMSG                    ;CHECK FOR PNT FLAG
016510  005037  002450                  CLR     TRPFLG                  ; CLEAR INTERRUPT FLAG
016514                                  CLRVEC  VECTOR                  ; CLEAR ERR VECTOR
016514  013700  002444                  MOV     VECTOR,R0
016520  104436                          TRAP    C$CVEC
016522                                  SETVEC  VECTOR,#TRAP4,#PRI07    ; SET UP FOR INTERRUPT
016522  012746  000340                  MOV     #PRI07,-(SP)
016526  012746  012644                  MOV     #TRAP4,-(SP)
016532  013746  002444                  MOV     VECTOR,-(SP)
016536  012746  000003                  MOV     #3,-(SP)
016542  104437                          TRAP    C$SVEC
016544  062706  000010                  ADD     #10,SP
016550  052777  000100  163366          BIS     #ACKIE,@QVNT            ; ENABLE EVENT INTERRUPT
016556  052777  000001  163360          BIS     #VNTPRS,@QVNT           ; SET EVENT PRESENT
016564  013701  002532                  MOV     DEFAULT,R1              ; # OF SECONDS TO WAIT
016570  012702  026000          10$:    MOV     #TIMOUT,R2              ; TIME OUT DELAY TO R2
016574                          20$:    BREAK                           ; ALLOW CONTROL C
016574  104422                          TRAP    C$BRK
016576  005737  002450                  TST     TRPFLG                  ; DID INTERRUPT OCCUR
016602  001015                          BNE     30$                     ; IF YES INTERRUPT, BRANCH
016604  005302                          DEC     R2                      ; DECREMENT TIMEOUT
016606  001372                          BNE     20$                     ; IF NOT DONE LOOP
016610  005301                          DEC     R1                      ; DECREMENT SECOND COUNTER
016612  001366                          BNE     10$                     ; IF NOT DONE, LOOP
                                ;
                                ; ERROR CONDITION, TIMEOUT OCCURED WAITING FOR INTERRUPT
                                ;
016614                                  ERRHRD  14.,ERR9                ; TELL OPERATOR TIMEOUT
016614  104456                          TRAP    C$ERHRD
016616  000016                          .WORD   14
016620  000000                          .WORD   0
016622  007634                          .WORD   ERR9
016624  012701  013630                  MOV     #ABORT,R1               ; ABORT CODE TO R1
016630  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
016634  000450                          BR      100$                    ; BRANCH TO END OF TEST
                                ;
                                ; END ERROR CONDITION
                                ;
                                ; INTERRUPT OCCURRED, FIND OUT WHICH ONE
                                ;
```

TEST 9: EVENT INTERRUPTS

```
740 016636                                  30$:
741 016636  017737  163304  002454          MOV     @QINT,VAL                   ; READ Q INTERRUPT REGISTER
742 016644  042737  000677  002454          BIC     #^B0000000110111111,VAL     ; GET RID OF UNWANTED BITS
743 016652  032737  100000  002454          BIT     #ERR,VAL                    ; ERR INTERRUPT?
744 016660  001007                          BNE     35$                         ; BRANCH IF ERROR INTERRUPT
745 016662  012737  002000  002456          MOV     #BIT10,EXP                  ; EXPECTED VALUE TO EXP
746 016670  033737  002456  002454          BIT     EXP,VAL                     ; COMPARE EXPECTED WITH VALUE
747 016676  001025                          BNE     40$                         ; BRANCH IF OK
748                                         ;
749                                         ; ERROR CONDITION, WRONG INTERRUPT BIT SET
750                                         ;
751 016700  012701  000002          35$:    MOV     #2,R1                       ; REGISTER # TO R1
752 016704                                  ERRHRD  15.,MSG6,ERR3               ; TELL OPERATOR ERROR
    016704  104456                          TRAP    C$ERHRD
    016706  000017                          .WORD   15
    016710  006202                          .WORD   MSG6
    016712  006652                          .WORD   ERR3
753 016714                                  SETBITS QINT,INTBIT,VAL
    016714  010146                          MOV     R1,-(SP)            ;SAVE REGISTERS
    016716  010546                          MOV     R5,-(SP)
    016720  013701  002454                  MOV     VAL,R1  ;GET VAL REGISTER TO READ
    016724  004537  012130                  JSR     R5,BITS$            ;SUBROUTINE TO OUTPUT VALUES
    016730  000012                          .WORD   $LEN
    016732  002672                          .WORD   INTBIT
    016734     121     111     116          .ASCIZ  /QINT/
    016742  012605                          MOV     (SP)+,R5            ;RESTORE REGISTERS
    016744  012601                          MOV     (SP)+,R1
754 016746  004737  013116                  CALL    ENDERR                      ; GO PRINT OUT ENDING TERMINATOR
755                                         ;
756                                         ; END ERROR CONDITION
757                                         ;
758 016752  012701  000000          40$:    MOV     #0,R1                       ; TEST END NORMALLY WITH DEFAULT DELAY
759 016756  042777  000100  163160  100$:   BIC     #ACKIE,@QVNT                ; DISABLE EVENT INTERRUPT
760 016764                                  CLRVEC  VECTOR                      ; RESTORE INTERRUPT VECTOR
    016764  013700  002444                  MOV     VECTOR,R0
    016770  104436                          TRAP    C$CVEC
761 016772                                  SETVEC  VECTOR,#ERRINT,#PRI07       ; SET UP FOR ERROR INTERRUPT
    016772  012746  000340                  MOV     #PRI07,-(SP)
    016776  012746  012652                  MOV     #ERRINT,-(SP)
    017002  013746  002444                  MOV     VECTOR,-(SP)
    017006  012746  000003                  MOV     #3,-(SP)
    017012  104437                          TRAP    C$SVEC
    017014  062706  000010                  ADD     #10,SP
762 017020  052777  000100  163120          BIS     #ERRIE,@QINT                ; MAKE SURE ERROR INTERRUPT IS ENABLED
763
764 017026  000207                          RTS     PC                          ; EXIT TEST TO MAINLINE
```

TEST 10: VIEW CONTENTION

```
                                .SBTTL  TEST 10: VIEW CONTENTION
                                ;;*****************************************************************************
                                ;**
                                ;TEST DESCRIPTION
                                ; CHECK VIEW FOR CONTENTION WITH SIMULTANEOUS WRITES AND READS
                                ;
                                ;TEST STEPS-
                                ; LOAD BUFFER WITH DECREMENTING VALUE STARTING AT 1777
                                ; WAIT FOR CMDPRS ON TIME OUT
                                ; START VARIABLE DELAY LOOP
                                ; LOAD VIEW PAM (MINUS LAST ADDRESS) WITH BUFFER
                                ; WAIT FOR CMDPRS ON TIME OUT
                                ; CLEAR READ BUFFER
                                ; SET VNTPRS
                                ; START VARIABLE DELAY LOOP
                                ; READ VIEW INTO BUFFER
                                ; WAIT FOR VNTACK ON TIME OUT
                                ; CHECK DATA
                                ; INCREMENT VARIABLE DELAY LOOP VALUE
                                ; LOOP 101. TIMES
                                ;
                                ;;*****************************************************************************
                                        STATST
017030                          TEST10::
017030  012737  000012  002114          MOV     #10,L$TEST              ;TEST NUMBER FOR ERROR MESSAGES
017036  004737  013034                  CALL    BMSG                    ;CHECK FOR PNT FLAG
017042  012737  000001  002526          MOV     #1.,DLY1                ; INITIAL WRITE DELAY LOOP VALUE
017050  012737  000001  002530          MOV     #1.,DLY2                ; INITIAL READ DELAY LOOP VALUE
017056  012737  000145  002524          MOV     #101.,LOOPS             ; STORE NUMBER OF LOOPS
017064  005037  002474                  CLR     COUNTER                 ; CLEAR LOOP COUNTER
                                ;
                                ; FIRST LOAD BUFFER WITH DECREMENT VALUE
                                ;
017070  013701  002502                  MOV     FREMEM,R1               ; POINT R1 TO BUFFER
017074  012702  001777                  MOV     #1777,R2                ; VALUE IN R2
017100  010221                  10$:    MOV     R2,(R1)+                ; PLACE VALUE IN BUFFER
017102  005302                          DEC     R2                      ; DECREMENT VALUE
017104  100375                          BPL     10$                     ; BRANCH IF NOT DONE
                                ;
                                ; NOW DO A COMMAND SYNC (POLLED)
                                ;
017106                          DLYST:
017106  013701  002532                  MOV     DEFAULT,R1              ; NUMBER OF SECONDS TO TIMEOUT
017112  005237  002474                  INC     COUNTER                 ; INCREMENT LOOP COUNTER
017116  012702  026000          11$:    MOV     #TIMOUT,R2              ; TIME OUT VALUE TO R2
017122                          12$:    BREAK                           ; ALLOW CONTROL C
017122  104422                          TRAP    C$BRK
017124  032777  004000  163014          BIT     #CMDPRS,@QINT           ; COMMAND PRESENT?
017132  001032                          BNE     15$                     ; IF COMMAND PRESENT, BRANCH
017134  005302                          DEC     R2                      ; DECREMENT TIMEOUT REGISTER
017136  001371                          BNE     12$                     ; IF NOT IN TIMEOUT, TRY AGAIN
017140  005301                          DEC     R1                      ; DECREMENT SECOND TIMER
017142  001365                          BNE     11$                     ; IF NOT TIMEOUT, TRY AGAIN
                                ;
                                ; TIMEOUT ERROR CONDITION
                                ;
017144  012701  000000                  MOV     #0,R1                   ; REGISTER NUMBER TO R1
```

TEST 10: VIEW CONTENTION

```
819 017150                                      ERRHRD  16.,ERR2            ; TELL OPERATOR TIMEOUT
    017150  104456                              TRAP    C$ERHRD
    017152  000020                              .WORD   16
    017154  000000                              .WORD   0
    017156  006506                              .WORD   ERR2
820 017160                                      PRINTX  #FOR23,COUNTER      ; TELL WHICH LOOP NUMBER
    017160  013746  002474                      MOV     COUNTER,-(SP)
    017164  012746  005314                      MOV     #FOR23,-(SP)
    017170  012746  000002                      MOV     #2,-(SP)
    017174  010600                              MOV     SP,R0
    017176  104415                              TRAP    C$PNTX
    017200  062706  000006                      ADD     #6,SP
821 017204  012701  013630                      MOV     #ABORT,R1           ; ABORT CODE TO R1
822 017210  004737  013116                      CALL    ENDERR              ; GO PRINT OUT ENDING TERMINATOR
823 017214  000137  020130                      JMP     ECONT               ; ABORT TEST
824                                     ;
825                                     ; END TIMEOUT ERROR CONDITION
826                                     ;
827                                     ; VARIABLE DELAY LOOP
828                                     ;
829 017220  012777  000001  162714  15$:     MOV     #CMDACK,@QCMD       ; SEND COMMAND ACK
830 017226  013701  002526                  MOV     DLY1,R1             ; DELAY VALUE INTO R1
831 017232                              20$:     BREAK                       ; ALLOW CONTROL C
    017232  104422                              TRAP    C$BRK
832 017234  077102                              SOB     R1,20$              ; DECREMENT
833                                     ;
834                                     ; LOAD VIEW RAM
835                                     ;
836 017236  042777  000020  162704              BIC     #QVREN,@QCTL        ; CLEAR READ ENABLE
837 017244  012777  000000  162714              MOV     #0,@QVAD            ; ZERO ADDRESS
838 017252  012701  001777                      MOV     #1777,R1            ; LOOP COUNTER TO R1
839 017256  013702  002170                      MOV     QVDA,R2             ; ADDRESS OF QVDA TO R2
840 017262  013703  002502                      MOV     FREMEM,R3           ; BUFFER TO R3
841 017266  012312                      30$:    MOV     (R3)+,(R2)          ; LOAD VIEW
842 017270  077102                              SOB     R1,30$              ; DEC AND BRANCH IF NOT DONE
843                                     ;
844                                     ; WAIT FOR CMDPRS ON TIMEOUT
845                                     ;
846 017272  013701  002532                      MOV     DEFAULT,R1          ; NUMBER OF SECONDS TO TIMEOUT
847 017276  012702  026000              40$:    MOV     #TIMOUT,R2          ; TIME OUT VALUE TO R2
848 017302                              50$:    BREAK                       ; ALLOW CONTROL C
    017302  104422                              TRAP    C$BRK
849 017304  032777  004000  162634              BIT     #CMDPRS,@QINT       ; COMMAND PRESENT?
850 017312  001032                              BNE     60$                 ; IF COMMAND PRESENT, BRANCH
851 017314  005302                              DEC     R2                  ; DECREMENT TIMEOUT REGISTER
852 017316  001371                              BNE     50$                 ; IF NOT IN TIMEOUT, TRY AGAIN
853 017320  005301                              DEC     R1                  ; DECREMENT SECOND TIMER
854 017322  001365                              BNE     40$                 ; IF NOT TIMEOUT, TRY AGAIN
855                                     ;
856                                     ; TIMEOUT ERROR CONDITION
857                                     ;
858 017324  012701  000000                      MOV     #0,R1               ; REGISTER NUMBER TO R1
859 017330                                      ERRHRD  17.,ERR2            ; TELL OPERATOR TIMEOUT
    017330  104456                              TRAP    C$ERHRD
    017332  000021                              .WORD   17
    017334  000000                              .WORD   0
    017336  006506                              .WORD   ERR2
```

TEST 10: VIEW CONTENTION

```
860 017340                                      PRINTX  #FOR23,COUNTER          ; TELL WHICH LOOP NUMBER
    017340  013746  002474                      MOV     COUNTER,-(SP)
    017344  012746  005314                      MOV     #FOR23,-(SP)
    017350  012746  000002                      MOV     #2,-(SP)
    017354  010600                              MOV     SP,R0
    017356  104415                              TRAP    C$PNTX
    017360  062706  000006                      ADD     #6,SP
861 017364  004737  013116                      CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
862 017370  012701  013630                      MOV     #ABORT,R1               ; ABORT CODE TO R1
863 017374  000137  020130                      JMP     ECONT                   ; ABORT TEST
864                                         ;
865                                         ; END TIMEOUT ERROR CONDITION
866                                         ;
867 017400  052777  000001  162534  60$:     BIS     #CMDACK,@QCMD           ; ACKNOWLEDGE COMMAND
868                                         ;
869                                         ; CLEAR READ BUFFER
870                                         ;
871 017406  013701  002502                  MOV     FREMEM,R1               ; POINT TO FREE MEMORY
872 017412  062701  004000                  ADD     #4000,R1                ; POINT TO READ BUFFER
873 017416  012702  001777                  MOV     #1777,R2                ; SIZE OF BUFFER
874 017422  005021                  65$:    CLR     (R1)+                   ; CLEAR BUFFER
875 017424  077202                          SOB     R2,65$                  ; LOOP IF NOT DONE
876                                         ;
877                                         ; TELL VAX READY
878                                         ;
879 017426  052777  000001  162510          BIS     #VNTPRS,@QVNT           ; TELL VAX READY TO START VIEW READ
880                                         ;
881                                         ; VARIABLE DELAY LOOP
882                                         ;
883 017434  013701  002530                  MOV     DLY2,R1                 ; DELAY VALUE INTO R1
884 017440                          70$:    BREAK                           ; ALLOW CONTROL C
    017440  104422                          TRAP    C$BRK
885 017442  077102                          SOB     R1,70$                  ; DECREMENT
886                                         ;
887                                         ; NOW READ VIEW
888                                         ;
889 017444  052777  000020  162476          BIS     #QVREN,@QCTL            ; READ ENABLE
890 017452  012777  000000  162506          MOV     #0,@QVAD                ; ZERO VIEW ADDRESS REGISTER
891 017460  013701  002502                  MOV     FREMEM,R1               ; POINT TO START OF WORK BUFFER
892 017464  062701  004000                  ADD     #4000,R1                ; POINT TO READ BUFFER
893 017470  013702  002170                  MOV     QVDA,R2                 ; POINT R2 TO DATA REGISTER
894 017474  012703  001777                  MOV     #1777,R3                ; LOOP COUNTER TO R3
895 017500  011221                  80$:    MOV     (R2),(R1)+              ; READ VIEW DATA
896 017502  077302                          SOB     R3,80$                  ; DEC AND BRANCH IF NOT DONE
897                                         ;
898                                         ; WAIT FOR EVENTACK ON TIMEOUT
899                                         ;
900 017504  013701  002532                  MOV     DEFAULT,R1              ; NUMBER OF SECONDS TO TIMEOUT
901 017510  012702  026000          90$:    MOV     #TIMOUT,R2              ; TIME OUT VALUE TO R2
902 017514                          100$:   BREAK                           ; ALLOW CONTROL C
    017514  104422                          TRAP    C$BRK
903 017516  032777  002000  162422          BIT     #VNTACK,@QINT           ; EVENT ACKNOWLEDGE PRESENT?
904 017524  001032                          BNE     110$                    ; IF PRESENT, BRANCH
905 017526  005302                          DEC     R2                      ; DECREMENT TIMEOUT REGISTER
906 017530  001371                          BNE     100$                    ; IF NOT IN TIMEOUT, TRY AGAIN
907 017532  005301                          DEC     R1                      ; DECREMENT SECOND TIMER
908 017534  001365                          BNE     90$                     ; IF NOT TIMEOUT, TRY AGAIN
```

TEST 10: VIEW CONTENTION

```
                                        ;
                                        ; TIMEOUT ERROR CONDITION
                                        ;
                        MOV     #1,R1                   ; REGISTER NUMBER TO R1
                        ERRHRD  18.,,ERR2               ; TELL OPERATOR TIMEOUT
017542  104456          TRAP    C$ERHRD
017544  000022          .WORD   18
017546  000000          .WORD   0
017550  006506          .WORD   ERR2
                        PRINTX  #FOR23,COUNTER          ; TELL WHICH LOOP NUMBER
017552  013746  002474  MOV     COUNTER,-(SP)
017556  012746  005314  MOV     #FOR23,-(SP)
017562  012746  000002  MOV     #2,-(SP)
017566  010600          MOV     SP,R0
017570  104415          TRAP    C$PNTX
017572  062706  000006  ADD     #6,SP
017576  004737  013116  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
017602  012701  013630  MOV     #ABORT,R1               ; ABORT CODE TO R1
017606  000137  020130  JMP     ECONT                   ; ABORT TEST
                                        ;
                                        ; END TIMEOUT ERROR CONDITION
                                        ;
                                        ; NOW CHECK DATA
                                        ;
                                        110$:
                        CLR     ERROR1                  ; INITIAL ERROR COUNT
017616  012737  000000  002452  MOV     #0,ADD          ; INITIAL RAM ADDRESS
017624  013701  002502          MOV     FREMEM,R1       ; START OF BUFFER TO R1
017630  062701  004000          ADD     #4000,R1        ; ADJUST TO POINT TO READ BUFFER
017634  012737  000001  002456  MOV     #1,EXP          ; LOOP COUNTER AND EXPECTED VALUE
                                        ;
                                        ; NOW CHECK THE VALUES
                                        ;
                                        120$:
017642  012137  002454          MOV     (R1)+,VAL       ; MOVE READ VALUE TO VAL
017646  023737  002456  002454  CMP     EXP,VAL         ; COMPARE EXPECTED WITH VALUE
017654  001446          BEQ     140$                    ; BRANCH IF OK
                                        ;
                                        ; ERROR CONDITION, BAD RAM VALUE
                                        ;
017656  005237  002462          INC     ERROR1          ; INCREMENT ERROR COUNTER
017662  022737  000001  002462  CMP     #1,ERROR1       ; IS IT THE FIRST ERROR?
017670  001016          BNE     130$                    ; IF NOT FIRST ERROR, BRANCH PRINT HEADER
017672                  ERRHRD  19.,MSG4,ERR4           ; PRINT ERROR HEADER ONLY
017672  104456          TRAP    C$ERHRD
017674  000023          .WORD   19
017676  006130          .WORD   MSG4
017700  007012          .WORD   ERR4
017702                  PRINTB  #FOR23,COUNTER          ; PRINT LOOP NUMBER
017702  013746  002474  MOV     COUNTER,-(SP)
017706  012746  005314  MOV     #FOR23,-(SP)
017712  012746  000002  MOV     #2,-(SP)
017716  010600          MOV     SP,R0
017720  104414          TRAP    C$PNTB
017722  062706  000006  ADD     #6,SP
017726  022737  000011  002462  130$:  CMP     #9.,ERROR1      ; SEE IF TOO MANY ERRORS TO PRINT
017734  100416          BMI     140$                    ; BRANCH IF TOO MANY ERRORS TO PRINT
```

TEST 10: VIEW CONTENTION

```
946 017736                                      PRINTX  #FOR5,ADD,VAL,EXP       ; PRINT DATA MESSAGE
    017736  013746  002456                      MOV     EXP,-(SP)
    017742  013746  002454                      MOV     VAL,-(SP)
    017746  013746  002452                      MOV     ADD,-(SP)
    017752  012746  003574                      MOV     #FOR5,-(SP)
    017756  012746  000004                      MOV     #4,-(SP)
    017762  010600                              MOV     SP,R0
    017764  104415                              TRAP    C$PNTX
    017766  062706  000012                      ADD     #12,SP
947                                     ;
948                                     ; END ERROR CONDITION
949                                     ;
950 017772                              140$:
951 017772  005237  002452                      INC     ADD                     ; INCREMENT ADDRESS
952 017776  005237  002456                      INC     EXP                     ; INCREMENT EXPECTED VALUE AND LOOP COUNTER
953 020002  023727  002456  002000              CMP     EXP,#2000               ; IS IT DONE YET
954 020010  001314                              BNE     120$                    ; IF NOT DONE, GO CHECK NEXT VALUE
955                                     ;
956                                     ; TEST DONE, PRINT FINAL ERROR TOTALS IF ANY
957                                     ;
958 020012  005737  002462                      TST     ERROR1                  ; ANY ERRORS
959 020016  001427                              BEQ     150$                    ; BRANCH IF NO ERRORS
960                                     ;
961                                     ; PRINT FINAL ERROR TOTALS
962                                     ;
963 020020                                      PRINTB  #FOR6,ERROR1            ; PRINT # OF ERRORS
    020020  013746  002462                      MOV     ERROR1,-(SP)
    020024  012746  003622                      MOV     #FOR6,-(SP)
    020030  012746  000002                      MOV     #2,-(SP)
    020034  010600                              MOV     SP,R0
    020036  104414                              TRAP    C$PNTB
    020040  062706  000006                      ADD     #6,SP
964 020044                                      PRINTB  #ABO                    ; PRINT ABORT MESSAGE
    020044  012746  005534                      MOV     #ABO,-(SP)
    020050  012746  000001                      MOV     #1,-(SP)
    020054  010600                              MOV     SP,R0
    020056  104414                              TRAP    C$PNTB
    020060  062706  000004                      ADD     #4,SP
965 020064  004737  013116                      CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
966 020070  012701  013630                      MOV     #ABORT,R1               ; ABORT CODE TO R1
967 020074  000415                              BR      ECONT
968                                     ;
969                                     ; ADJUST DELAY LOOP VALUE.
970                                     ;
971 020076  062737  000001  002526      150$:   ADD     #1,DLY1                 ; INCREMENT WRITE DELAY VALUE
972 020104  062737  000001  002530              ADD     #1,DLY2                 ; INCREMENT READ DELAY VALUE
973 020112  005337  002524                      DEC     LOOPS                   ; DECRMENT LOOP VALUE
974 020116  001402                              BEQ     160$                    ; BRANCH IF DONE TO END OF TEST
975 020120  000137  017106                      JMP     DLYST                   ; GO DO IT AGAIN
976 020124  012701  000000              160$:   MOV     #0,R1                   ; OK RETURN CODE
977 020130                              ECONT:
978 020130  000207                              RETURN
```

TEST 11: PDP 11 NXM INTERRUPT

```
                                        .SBTTL  TEST 11: PDP-11 NXM INTERRUPT
                                        ;;*****************************************************************************
                                        ;++
                                        ;TEST DESCRIPTION-
                                        ; STARTS DMA WITH NON-EXISTENT PDP-11 ADDRESS
                                        ;
                                        ;TEST STEPS-
                                        ; U     SET READ QIO WITH LEGAL VAX ADDRESS
                                        ; Q       SET CMD ACK
                                        ; Q       START DMA WITH PDP-11 ADDRESS = 760000
                                        ; Q       CHECK FOR QNEX ERROR
                                        ; Q       SEND VNT PRS WITH ERROR CONDITION
                                        ; U     CHECK ERROR STATUS
                                        ;--
                                        ;;*****************************************************************************

                                                STATST
                                        TEST11::
020132  012737  000013  002114          MOV     #11,L$TEST              ;TEST NUMBER FOR ERROR MESSAGES
020140  004737  013034                  CALL    BMSG                    ;CHECK FOR PNT FLAG
020144  013701  002532                  MOV     DEFAULT,R1              ; SECONDS OF TIME OUT
020150  012702  026000          8$:     MOV     #TIMOUT,R2              ; TIME OUT VALUE TO R2
020154                          10$:    BREAK
020154  104422                          TRAP    C$BRK
020156  032777  004000  161762          BIT     #CMDPRS,@QINT           ; COMMAND PRESENT?
020164  001020                          BNE     20$                     ; IF COMMAND PRESENT, BRANCH
020166  005302                          DEC     R2                      ; DECREMENT TIMEOUT REGISTER
020170  001371                          BNE     10$                     ; IF NOT IN TIMEOUT, TRY AGAIN
020172  005301                          DEC     R1                      ; DECREMENT SECOND TIMER
020174  001365                          BNE     8$                      ; IF NOT TIMEOUT, AGAIN
                                        ;
                                        ; TIMEOUT ERROR CONDITION
                                        ;
020176  012701  000000                  MOV     #0,R1                   ; REGISTER # TO R1
020202                                  ERRHRD  20$,ERR2                ; TELL OPERATOR TIMEOUT
020202  104456                          TRAP    C$ERHRD
020204  000024                          .WORD   20
020206  000000                          .WORD   0
020210  006506                          .WORD   ERR2
020212  012701  013630                  MOV     #ABORT,R1               ; ABORT CODE TO R1
020216  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
020222  000137  020664                  JMP     ENXM                    ; ABORT TEST
                                        ;
                                        ; END TIMEOUT ERHOR CONDITION
                                        ;
                                        ; COMMAND PRESENT WAS REALLY THERE
                                        ;
020226                                  20$:
020226  052777  000020  161714          BIS     #QVREN,@QCTL            ; READ ENABLE
020234  012777  000000  161724          MOV     #0,@QVAD                ; CLEAR VIEW REGISTER
020242  017737  161722  002514          MOV     @QVDA,LOW16             ; READ LOW 16 BITS OF UNIBUS ADDRESS
020250  013777  002514  161676          MOV     LOW16,@QUBA             ; LOAD LOW 16 BITS OF UNIBUS ADDRESS
020256  017737  161706  002516          MOV     @QVDA,HI2               ; READ HI 2 BITS OF UNIBUS ADDRESS
020264  032737  177757  002516          BIT     #^CBIT4!BIT5,HI2        ; SEE IF ONLY BITS 4 AND 5 ARE SET
020272  001412                          BEQ     30$                     ; BRANCH IF OK
                                        ;
                                        ; ERROR CONDITION, MORE THAN BITS 4 OR 5 SET FOR EXTENDED ADDRESS ON UNIBUS
```

TEST 11: PDP 11 NXM INTERRUPT

```
1029                                    ;
1030 020274                             ERRMRD  21.,.ERR10              ; TELL OPERATOR ERROR
     020274  104456                     TRAP    C$ERMRD
     020276  000025                     .WORD   21
     020300  000000                     .WORD   0
     020302  007740                     .WORD   ERR10
1031 020304  012701  013630             MOV     #ABORT,R1               ; ABORT CODE TO R1
1032 020310  004737  013116             CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
1033 020314  000137  020664             JMP     ENXM                    ; END TEST
1034                                    ;
1035                                    ; END ERROR CONDITION
1036                                    ;
1037 020320                             30$:
1038 020320  053777  002516  161624     BIS     MI2,@QDMA               ; SET UP EXTENDED BITS IN EXP
1039 020326  017737  161636  002512     MOV     @QVDA,WORD.COUNT        ; READ WORD COUNT FROM VIEW
1040 020334  013777  002512  161616     MOV     WORD.COUNT,@QWC         ; MOVE WORD COUNT INTO QWC REGISTER
1041 020342  012777  160000  161606     MOV     #160000,@QBA            ; SET UP LOW 16 BITS OF Q-BUS ADDRESS
1042 020350  052777  001400  161574     BIS     #BIT8!BIT9,@QDMA        ; SET UP EXTENDED BITS
1043 020356  042777  000002  161566     BIC     #DMAWT,@QDMA            ; SET DMA UP TO WRITE
1044 020364                             CLRVEC  VECTOR                  ; CLEAR ERR VECTOR
     020364  013700  002444             MOV     VECTOR,R0
     020370  104436                     TRAP    C$CVEC
1045 020372                             SETVEC  VECTOR,#CONT3,#PRI07    ; SET UP INTERRUPT VECTOR
     020372  012746  000340             MOV     #PRI07,-(SP)
     020376  012746  020552             MOV     #CONT3,-(SP)
     020402  013746  002444             MOV     VECTOR,-(SP)
     020406  012746  000003             MOV     #3,-(SP)
     020412  104437                     TRAP    C$SVEC
     020414  062706  000010             ADD     #10,SP
1046 020420  052777  000100  161524     BIS     #RDYIE,@QDMA            ; SET UP TO ALLOW DMA RDY INTERRUPT
1047 020426  052777  000100  161512     BIS     #ERRIE,@QINT            ; MAKE SURE ERR ENABLE IS SET
1048 020434  052777  000001  161510     BIS     #GO,@QDMA               ; START UP DMA
1049                                    ;
1050                                    ; WAIT FOR RDY OR ERR INTERRUPT ON TIMEOUT
1051                                    ;
1052 020442  013701  002532             MOV     DEFAULT,R1              ; SECONDS OF TIME OUT
1053 020446  012702  026000             40$:    MOV     #TIMOUT,R2      ; TIME OUT VALUE TO R2
1054 020452                             50$:    BREAK
     020452  104422                     TRAP    C$BRK
1055 020454  005302                     DEC     R2                      ; DECREMENT TIMEOUT REGISTER
1056 020456  001375                     BNE     50$                     ; IF NOT IN TIMEOUT, TRY AGAIN
1057 020460  005301                     DEC     R1                      ; DECREMENT SECOND TIMER
1058 020462  001371                     BNE     40$                     ; IF NOT TIMEOUT, AGAIN
1059                                    ;
1060                                    ; TIMEOUT ERROR CONDITION
1061                                    ;
1062 020464                             ERRMRD  22.,.ERR12              ; TELL OPERATOR TIMEOUT
     020464  104456                     TRAP    C$ERMRD
     020466  000026                     .WORD   22
     020470  000000                     .WORD   0
     020472  010146                     .WORD   ERR12
1063 020474  012701  013630             MOV     #ABORT,R1               ; ABORT CODE TO R1
1064 020500                             SETBITS @QINT,INTBIT,@QINT
     020500  010146                     MOV     R1,-(SP)        ;SAVE REGISTERS
     020502  010546                     MOV     R5,-(SP)
     020504  017701  161436             MOV     @QINT,R1        ;GET @QINT REGISTER TO READ
     020510  004537  012130             JSR     R5,BITS$        ;SUBROUTINE TO OUTPUT VALUES
```

TEST 11: PDP 11 NXM INTERRUPT

```
020514  000012                          .WORD   $LEN
020516  002672                          .WORD   INTBIT
020520     121     111     116          .ASCIZ  /QINT/
020526  012605                          MOV     (SP)+,R5        ;RESTORE REGISTERS
020530  012601                          MOV     (SP)+,R1
1065 020532  004737  013116             CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
1066 020536  042777  000100  161406     BIC     @RDYIE,@QDMA            ; DISABLE RDY INTERRUPT
1067 020544  012701  013630             MOV     @ABORT,R1
1068 020550  000445                     BR      ENXM                    ; ABORT TEST
1069                                 ;
1070                                 ; END TIMEOUT ERROR CONDITION
1071                                 ;
1072                                 ; INTERRUPT WAS RECEIVED, CHECK FOR WHICH QNEX
1073                                 ;
1074 020552                             BGNSRV  CONT3
020552                               CONT3::
1075 020552  042777  000100  161372     BIC     @RDYIE,@QDMA            ; DISABLE RDY INTERRUPT
1076 020560  052777  000001  161354     BIS     @CMDACK,@QCMD           ; SEND COMMAND ACK TO MASTER
1077 020566  012716  020574             MOV     @CONT4,(SP)             ; CORRECT STACK
1078 020572                             ENDSRV
020572                               L10035:
020572  000002                         RTI
1079 020574  017737  161346  002454  CONT4:  MOV     @QINT,VAL               ; READ INTERRUPT REGISTER
1080 020602  032737  020000  002454     BIT     @QNEX,VAL               ; CHECK FOR QNEX
1081 020610  001023                     BNE     60$                     ; BRANCH IF OK
1082                                 ;
1083                                 ; ERROR CONDITION, QNEX BIT NOT SET
1084                                 ;
1085 020612                             ERRHRD  23,,ERR13               ; TELL OPERATOR ERROR
020612  104456                         TRAP    C$ERHRD
020614  000027                         .WORD   23
020616  000000                         .WORD   0
020620  010252                         .WORD   ERR13
1086 020622                             SETBITS QINT,INTBIT,VAL         ; SHOW WHAT WAS SET IN QINT REGISTER
020622  010146                         MOV     R1,-(SP)        ;SAVE REGISTERS
020624  010546                         MOV     R5,-(SP)
020626  013701  002454                 MOV     VAL,R1  ;GET VAL REGISTER TO READ
020632  004537  012130                 JSR     R5,BITS$        ;SUBROUTINE TO OUTPUT VALUES
020636  000012                         .WORD   $LEN
020640  002672                         .WORD   INTBIT
020642     121     111     116          .ASCIZ  /QINT/
020650  012605                         MOV     (SP)+,R5        ;RESTORE REGISTERS
020652  012601                         MOV     (SP)+,R1
1087 020654  004737  013116             CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
1088                                 ;
1089                                 ; END ERROR CONDITION
1090                                 ;
1091 020660                          60$:
1092 020660  012701  000000             MOV     @0,R1                   ; EXIT NORMALLY CODE
1093 020664  005077  161256          ENXM:  CLR     @QINT                   ; CLEAR INTERRUPT REGISTER
1094 020670                             CLRVEC  VECTOR
020670  013700  002444                 MOV     VECTOR,R0
020674  104436                         TRAP    C$CVEC
1095 020676                             SETVEC  VECTOR,@ERRINT,@PRIO7   ; SET UP INTERRUPT VECTOR
020676  012746  000340                 MOV     @PRIO7,-(SP)
020702  012746  012652                 MOV     @ERRINT,-(SP)
020706  013746  002444                 MOV     VECTOR,-(SP)
```

TEST 11: PDP 11 NXM INTERRUPT

```
        020712  012746  000003                  MOV     #3, (SP)
        020716  104437                          TRAP    C$SVEC
        020720  062706  000010                  ADD     #10,SP
   1096 020724  052777  000100  161214          BIS     #ERRIE,@QINT            ; ENABLE ERROR INTERRUPT
   1097
   1098 020732  000207                          RTS     PC
```

TEST 12: DMA 2 WORDS, VAX TO PDP 11

```
                                        .SBTTL  TEST 12: DMA 2 WORDS, VAX TO PDP-11
                                        ;;*****************************************************************************
                                        ;++
                                        ;TEST DESCRIPTION
                                        ; WRITE 2 WORDS FROM COMMAND BRIDGE TO CONTROL
                                        ; CHECK DATA
                                        ;TEST STEPS-
                                        ;
                                        ;--
                                        ;;*****************************************************************************

                                                STATST
                                        TEST12::
020734  012737  000014  002114                  MOV     #12,L$TEST              ;TEST NUMBER FOR ERROR MESSAGES
020742  004737  013034                          CALL    BMSG                    ;CHECK FOR PNT FLAG
020746  013701  002532                          MOV     DEFAULT,R1              ; SECONDS OF TIME OUT
020752  012702  026000                  8$:     MOV     #TIMOUT,R2              ; TIME OUT VALUE TO R2
020756                                  10$:    BREAK
020756  104422                                  TRAP    C$BRK
020760  032777  004000  161160                  BIT     #CMDPRS,@QINT           ; COMMAND PRESENT?
020766  001020                                  BNE     20$                     ; IF COMMAND PRESENT, BRANCH
020770  005302                                  DEC     R2                      ; DECREMENT TIMEOUT REGISTER
020772  001371                                  BNE     10$                     ; IF NOT IN TIMEOUT, TRY AGAIN
020774  005301                                  DEC     R1                      ; DECREMENT SECOND TIMER
020776  001365                                  BNE     8$                      ; IF NOT TIMEOUT, AGAIN
                                        ;
                                        ; TIMEOUT ERROR CONDITION
                                        ;
021000  012701  000000                          MOV     #0,R1                   ; REGISTER # TO R1
021004                                          ERRHRD  24.,,ERR2               ; TELL OPERATOR TIMEOUT#
021004  104456                                  TRAP    C$ERHRD
021006  000030                                  .WORD   24
021010  000000                                  .WORD   0
021012  006506                                  .WORD   ERR2
021014  004737  013116                          CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
021020  012701  013630                          MOV     #ABORT,R1               ; ABORT CODE TO R1
021024  000137  021706                          JMP     EN                      ; ABORT TEST
                                        ;
                                        ; END TIMEOUT ERROR CONDITION
                                        ;
                                        ; COMMAND PRESENT WAS REALLY THERE
                                        ;
021030                                  20$:
021030  052777  000020  161112                  BIS     #QVREN,@QCTL            ; READ ENABLE
021036  012777  000000  161122                  MOV     #0,@QVAD                ; CLEAR VIEW REGISTER
021044  017737  161120  002514                  MOV     @QVDA,LOW16             ; READ LOW 16 BITS OF UNIBUS ADDRESS
021052  013777  002514  161074                  MOV     LOW16,@QUBA             ; LOAD LOW 16 BITS OF UNIBUS ADDRESS
021060  017737  161104  002516                  MOV     @QVDA,HI2               ; READ HI 2 BITS OF UNIBUS ADDRESS
021066  032737  177757  002516                  BIT     #^CBIT4!BIT5,HI2        ; SEE IF ONLY BITS 4 AND 5 ARE SET
021074  001412                                  BEQ     30$                     ; BRANCH IF OK
                                        ;
                                        ; ERROR CONDITION, MORE THAN BITS 4 OR 5 SET FOR EXTENDED ADDRESS ON UNIBUS
                                        ;
021076                                          ERRHRD  25.,,ERR10              ; TELL OPERATOR ERROR
021076  104456                                  TRAP    C$ERHRD
021100  000031                                  .WORD   25
021102  000000                                  .WORD   0
```

TEST 12: DMA 2 WORDS, VAX TO PDP 11

```
      021104  007740                          .WORD   ERR10
1146  021106  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
1147  021112  012701  013630                  MOV     @ABORT,R1               ; ABORT CODE TO R1
1148  021116  000137  021706                  JMP     EN                      ; END TEST
1149                                          ;
1150                                          ; END ERROR CONDITION
1151                                          ;
1152  021122                                  30$:
1153  021122  053777  002516  161022          BIS     MI2,@QDMA               ; SET UP EXTENDED BITS IN EXP
1154  021130  017737  161034  002512          MOV     @QVDA,WORD.COUNT        ; READ WORD COUNT FROM VIEW
1155                                          ;
1156                                          ; CLEAR BUFFER
1157                                          ;
1158  021136  013701  002512                  MOV     WORD.COUNT,R1           ; GET WORD.COUNT IN R1
1159  021142  005401                          NEG     R1                      ; CHANGE FROM 2'S COMP
1160  021144  013702  002502                  MOV     FREMEM,R2               ; STARTING ADDRESS OF BUFFER
1161  021150  005022                  35$:    CLR     (R2)+                   ; CLEAR BYTE IN BUFFER
1162  021152  005301                          DEC     R1                      ; DECREMENT COUNTER
1163  021154  001375                          BNE     35$                     ; BRANCH BACK IF NOT DONE
1164                                          ;
1165                                          ; BUFFER CLEARED, SET UP FOR DMA
1166                                          ;
1167  021156  013777  002512  160774          MOV     WORD.COUNT,@QWC         ; MOVE WORD COUNT INTO QWC REGISTER
1168  021164  013777  002502  160764          MOV     FREMEM,@QBA             ; START ADDRESS OF BUFFER TO QBA
1169  021172  042777  037400  160752          BIC     #37400,@QDMA            ; MAKE SURE Q-BUS EXTENDED BITS ARE ZERO
1170  021200  042777  000002  160744          BIC     #DMAWT,@QCMA            ; SET UP FOR VAX TO PDP DMA TRANSFER
1171  021206                                  CLRVEC  VECTOR
      021206  013700  002444                  MOV     VECTOR,R0
      021212  104436                          TRAP    C$CVEC
1172  021214                                  SETVEC  VECTOR,#C01,#PRI07      ; SET UP NEW INTERRUPT VECTOR
      021214  012746  000340                  MOV     #PRI07,-(SP)
      021220  012746  021340                  MOV     #C01,-(SP)
      021224  013746  002444                  MOV     VECTOR,-(SP)
      021230  012746  000003                  MOV     #3,-(SP)
      021234  104437                          TRAP    C$SVEC
      021236  062706  000010                  ADD     #10,SP
1173  021242  052777  000100  160676          BIS     #ERRIE,@QINT            ; ENABLE ERROR INTERRUPT
1174  021250  052777  000100  160674          BIS     #RDYIE,@QDMA            ; ENABLE RDY INTERRUPT
1175  021256  052777  000001  160666          BIS     #GO,@QDMA               ; INITIATE DMA TRANSFER
1176                                          ;
1177                                          ; WAIT FOR INTERRUPT
1178                                          ;
1179  021264  013701  002532                  MOV     DEFAULT,R1              ; NUMBER OF SECONDS OF TIMEOUT
1180  021270  012702  026000          40$:    MOV     #TIMOUT,R2              ; TIME OUT DELAY TO R2
1181  021274                          45$:    BREAK                           ; ALLOW CONTROL C
      021274  104422                          TRAP    C$BRK
1182  021276  005302                          DEC     R2                      ; DECREMENT TIMEOUT
1183  021300  001375                          BNE     45$                     ; IF NOT DONE LOOP
1184  021302  005301                          DEC     R1                      ; DECREMENT SECOND COUNTER
1185  021304  001371                          BNE     40$                     ; IF NOT DONE, LOOP
1186                                          ;
1187                                          ; ERROR CONDITION, TIMEOUT OCCURED WAITING FOR INTERRUPT
1188                                          ;
1189  021306                                  ERRHRD  26.,,ERR7               ; TELL OPERATOR TIMEOUT
      021306  104456                          TRAP    C$ERHRD
      021310  000032                          .WORD   26
      021312  000000                          .WORD   0
```

TEST 12: DMA 2 WORDS, VAX TO PDP 11

```
      021314  007424                          .WORD   ERR7
1190  021316  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
1191  021322  042777  000100  160622          BIC     #RDYIE,@QDMA            ; CLEAR INTERRUPT BIT
1192  021330  012701  013630                  MOV     #ABORT,R1               ; ABORT CODE TO R1
1193  021334  000137  021706                  JMP     .                       ; BRANCH TO END OF TEST
1194                                          ;
1195                                          ; END ERROR CONDITION
1196                                          ;
1197                                          ; DMA INTERRUPT SHOULD GO HERE
1198                                          ;
1199  021340                                  BGNSRV  C01
      021340                                  C01::
1200  021340  042777  000100  160604          BIC     #RDYIE,@QDMA            ; CLEAR INTERRUPT BIT
1201  021346  012716  021354                  MOV     #C02,(SP)               ; CORRECT STACK
1202  021352                                  ENDSRV
      021352                                  L10036:
      021352  000002                          RTI
1203  021354                                  C02:
1204  021354  032777  100000  160564          BIT     #ERR,@QINT              ; ERROR INTERRUPT?
1205  021362  001412                          BEQ     50$                     ; BRANCH IF NO ERROR INTERRUPT
1206                                          ;
1207                                          ; ERROR CONDITION, ERROR INTERRUPT OCCURED
1208                                          ;
1209  021364                                  ERRHRD  27.,ERR11               ; TELL OPERATOR ERROR INTERRUPT OCCURED
      021364  104456                          TRAP    C$ERHRD
      021366  000033                          .WORD   27
      021370  000000                          .WORD   0
      021372  010030                          .WORD   ERR11
1210  021374  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
1211  021400  012701  013630                  MOV     #ABORT,R1               ; ABORT CODE TO R1
1212  021404  000137  021706                  JMP     EN                      ; BRANCH TO END OF TEST
1213                                          ;
1214                                          ; END ERROR CONDITION
1215                                          ;
1216  021410                                  50$:
1217  021410  052777  000001  160524          BIS     #CMDACK,@QCMD           ; TELL MASTER DAM DONE
1218  021416                                  CLRVEC  VECTOR                  ; CLEAR VECTOR
      021416  013700  002444                  MOV     VECTOR,R0
      021422  104436                          TRAP    C$CVEC
1219  021424                                  SETVEC  VECTOR,#ERRINT,#PRI07   ; SET UP INTERRUPT VECTOR
      021424  012746  000340                  MOV     #PRI07,-(SP)
      021430  012746  012652                  MOV     #ERRINT,-(SP)
      021434  013746  002444                  MOV     VECTOR,-(SP)
      021440  012746  000003                  MOV     #3,-(SP)
      021444  104437                          TRAP    C$SVEC
      021446  062706  000010                  ADD     #10,SP
1220  021452  052777  000100  160466          BIS     #ERRIE,@QINT            ; ENABLE ERROR INTERRUPT
1221                                          ;
1222                                          ; NOW CHECK DATA
1223                                          ;
1224  021460  013701  002502                  MOV     FREMEM,R1               ; R1 TO START OF BUFFER
1225  021464  013702  002512                  MOV     WORD.COUNT,R2           ; R2 GETS WORD COUNT
1226  021470  005402                          NEG     R2                      ; CHANGE WORD COUNT FROM 2'S COMP
1227                                          ;
1228                                          ; NOW CHECK BUFFER AGAINST PATTERN
1229                                          ;
1230  021472  005037  002462                  CLR     ERROR1                  ; CLEAR ERROR COUNTER
```

TEST 12: DMA 2 WORDS, VAX TO PDP 11

```
1231 021476  012704  000002          100$:   MOV     #2,R4                   ; # OF WORDS IN PATTERN
1232 021502  012703  021752                  MOV     #DP1,R3                 ; R3 GETS PATTERN ADDRESS
1233 021506  012137  002454          110$:   MOV     (R1)+,VAL               ; GET WORD FROM BUFFER
1234 021512  012337  002456                  MOV     (R3)+,EXP               ; GET EXPECTED PATTERN IN EXP
1235 021516  023737  002454  002456          CMP     VAL,EXP                 ; COMPARE VALUE WITH EXPECTED
1236 021524  001442                         BEQ     130$                    ; IF OK, BRANCH
1237                                        ;
1238                                        ; ERROR CONDITION, NOT WHAT EXPECTED IN BUFFER
1239                                        ;
1240 021526  005737  002462                 TST     ERROR1                  ; ANY OTHER ERRORS OCCURED
1241 021532  001004                         BNE     120$                    ; SKIP HEADER ERROR IF ALREADY PRINTED
1242 021534                                 ERRHRD  28.,ERR8                ; PRINT ERROR HARD MESSAGE
     021534  104456                         TRAP    C$ERHRD
     021536  000034                         .WORD   28
     021540  000000                         .WORD   0
     021542  007530                         .WORD   ERR8
1243 021544  005237  002462          120$:   INC     ERROR1                  ; INCREMENT ERROR COUNTER
1244 021550  022737  000012  002462          CMP     #10.,ERROR1             ; SEE IF TOO MANY MESSAGES PRINTED
1245 021556  103425                         BCS     130$                    ; IF TOO MANY, BRANCH
1246 021560  013737  002512  002474          MOV     WORD.COUNT,COUNTER      ; CALCULATE WORD NUMBER
1247 021566  005437  002474                 NEG     COUNTER                 ; CHANGE WORD COUNT FROM 2'S COMP
1248 021572  160237  002474                 SUB     R2,COUNTER
1249 021576                                 PRINTX  #FOR10,COUNTER,VAL,EXP  ; PRINT DETAIL LINE
     021576  013746  002456                 MOV     EXP,-(SP)
     021602  013746  002454                 MOV     VAL,-(SP)
     021606  013746  002474                 MOV     COUNTER,-(SP)
     021612  012746  004230                 MOV     #FOR10,-(SP)
     021616  012746  000004                 MOV     #4,-(SP)
     021622  010600                         MOV     SP,R0
     021624  104415                         TRAP    C$PNTX
     021626  062706  000012                 ADD     #12,SP
1250                                        ;
1251                                        ; END ERROR CONDITION
1252                                        ;
1253 021632                         130$:
1254 021632  005302                         DEC     R2                      ; DECREMENT WORD COUNT
1255 021634  001403                         BEQ     140$                    ; BRANCH OUT IF DONE
1256 021636  005304                         DEC     R4                      ; DECREMENT PATTERN WORD COUNT
1257 021640  001322                         BNE     110$                    ; BRANCH IF NOT DONE WITH PATTERN
1258 021642  000715                         BR      100$                    ; BRANCH IF DONE WITH PATTERN
1259                                        ;
1260                                        ; BUFFER CHECKED, PRINT TOTAL ERROR COUNT IF NECESSARY
1261                                        ;
1262 021644                         140$:
1263 021644  005737  002462                 TST     ERROR1                    ANY ERRORS
1264 021650  001414                         BEQ     150$                    . IF NO ERRORS, BRANCH
1265 021652                                 PRINTB  #FOR11,ERROR1           ; TELL TOTAL ERROR COUNT
     021652  013746  002462                 MOV     ERROR1,-(SP)
     021656  012746  004253                 MOV     #FOR11,-(SP)
     021662  012746  000002                 MOV     #2,-(SP)
     021666  010600                         MOV     SP,R0
     021670  104414                         TRAP    C$PNTB
     021672  062706  000006                 ADD     #6,SP
1266 021676  004737  013116                 CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
1267                                        ;
1268                                        ; END OF TEST
1269                                        ;
```

TEST 12: DMA 2 WORDS, VAX TO PDP 11

```
1270 021702  012701  000000          150$:   MOV     #0,R1                   ; END TEST NORMALLY
1271 021706                          EN:     CLRVEC  VECTOR                  ; CLEAR VECTOR
     021706  013700  002444                  MOV     VECTOR,R0
     021712  104436                          TRAP    C$CVEC
1272 021714                                  SETVEC  VECTOR,#ERRINT,#PRI07   ; SET UP INTERRUPT VECTOR
     021714  012746  000340                  MOV     #PRI07,-(SP)
     021720  012746  012652                  MOV     #ERRINT,-(SP)
     021724  013746  002444                  MOV     VECTOR,-(SP)
     021730  012746  000003                  MOV     #3, (SP)
     021734  104437                          TRAP    C$SVEC
     021736  062706  000010                  ADD     #10,SP
1273 021742  052777  000100  160176         BIS     #ERRIE,@QINT            ; ENABLE ERROR INTERRUPT
1274
1275 021750  000207                         RTS     PC                      ; RETURN TO MAINLINE
1276                                 ;
1277                                 ; DATA PATTERN FOR TEST
1278                                 ;
1279 021752  055132                  DP1:    .WORD   55132
1280 021754  122645                          .WORD   122645
1281
```

TEST 13: DMA 2 WORDS, PDP 11 TO VAX

```
1283                                    .SBTTL  TEST 13: DMA 2 WORDS, PDP 11 TO VAX
1284                                    ;;**********************************************************************
1285                                    ;++
1286                                    ;TEST DESCRIPTION
1287                                    ; WRITE 2 WORDS FROM CONTROL BRIDGE TO COMMAND BRIDGE
1288                                    ;TEST STEPS
1289                                    ;
1290                                    ;--
1291                                    ;;**********************************************************************
1292
1293 021756                                     STATST
     021756                             TEST13::
     021756  012737  000015  002114             MOV     #13,L$TEST              ;TEST NUMBER FOR ERROR MESSAGES
     021764  004737  013034                     CALL    BMSG                    ;CHECK FOR PNT FLAG
1294 021770  013701  002532                     MOV     DEFAULT,R1              ; SECONDS OF TIME OUT
1295 021774  012702  026000             8$:     MOV     #TIMOUT,R2              ; TIME OUT VALUE TO R2
1296 022000                             10$:    BREAK
     022000  104422                             TRAP    C$BRK
1297 022002  032777  004000  160136             BIT     #CMDPRS,@QINT           ; COMMAND PRESENT?
1298 022010  001020                             BNE     20$                     ; IF COMMAND PRESENT, BRANCH
1299 022012  005302                             DEC     R2                      ; DECREMENT TIMEOUT REGISTER
1300 022014  001371                             BNE     10$                     ; IF NOT IN TIMEOUT, TRY AGAIN
1301 022016  005301                             DEC     R1                      ; DECREMENT SECOND TIMER
1302 022020  001365                             BNE     8$                      ; IF NOT TIMEOUT, AGAIN
1303                                    ;
1304                                    ; TIMEOUT ERROR CONDITION
1305                                    ;
1306 022022  012701  000000                     MOV     #0,R1                   ; REGISTER # TO R1
1307 022026                                     ERRHRD  29.,,ERR2               ; TELL OPERATOR TIMEOUT
     022026  104456                             TRAP    C$ERHRD
     022030  000035                             .WORD   29
     022032  000000                             .WORD   0
     022034  006506                             .WORD   ERR2
1308 022036  004737  013116                     CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
1309 022042  012701  013630                     MOV     #ABORT,R1               ; ABORT CODE TO R1
1310 022046  000137  022530                     JMP     EQ                      ; ABORT TEST
1311                                    ;
1312                                    ; END TIMEOUT ERROR CONDITION
1313                                    ;
1314                                    ; COMMAND PRESENT WAS REALLY THERE
1315                                    ;
1316 022052                             20$:
1317 022052  052777  000020  160070             BIS     #QVREN,@QCTL            ; READ ENABLE
1318 022060  012777  000000  160100             MOV     #0,@QVAD                ; CLEAR VIEW REGISTER
1319 022066  017737  160076  002514             MOV     @QVDA,LOW16             ; READ LOW 16 BITS OF UNIBUS ADDRESS
1320 022074  013777  002514  160052             MOV     LOW16,@QUBA             ; LOAD LOW 16 BITS OF UNIBUS ADDRESS
1321 022102  017737  160062  002516             MOV     @QVDA,HI2               ; READ HI 2 BITS OF UNIBUS ADDRESS
1322 022110  032737  177757  002516             BIT     #^CBIT4!BIT5,HI2        ; SEE IF ONLY BITS 4 AND 5 ARE SET
1323 022116  001412                             BEQ     30$                     ; BRANCH IF OK
1324                                    ;
1325                                    ; ERROR CONDITION, MORE THAN BITS 4 OR 5 SET FOR EXTENDED ADDRESS ON UNIBUS
1326                                    ;
1327 022120                                     ERRHRD  30.,,ERR10              ; TELL OPERATOR ERROR
     022120  104456                             TRAP    C$ERHRD
     022122  000036                             .WORD   30
     022124  000000                             .WORD   0
     022126  007740                             .WORD   ERR10
```

TEST 13: DMA 2 WORDS, PDP-11 TO VAX

```
1328 022130  004737  013116                CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
1329 022134  012701  013630                MOV     #ABORT,R1               ; ABORT CODE TO R1
1330 022140  000137  022530                JMP     EQ                      ; END TEST
1331                                    ;
1332                                    ; END ERROR CONDITION
1333                                    ;
1334 022144                             30$:
1335 022144  053777  002516  160000        BIS     MI2,@QDMA               ; SET UP EXTENDED BITS IN EXP
1336 022152  017737  160012  002512        MOV     @QVDA,WORD.COUNT        ; READ WORD COUNT FROM VIEW
1337                                    ;
1338                                    ; MOVE DATA PATTERN TO BUFFER
1339                                    ;
1340 022160  013703  002502                MOV     FREMEM,R3               ; GET STARTING ADDRESS OF BUFFER IN R3
1341 022164  013702  002512                MOV     WORD.COUNT,R2           ; GET WORD COUNT TO R2
1342 022170  005402                        NEG     R2                      ; CHANGE WORD COUNT FROM 2'S COMP
1343 022172  012704  000002            40$:MOV     #2,R4                   ; # OF WORDS IN PATTERN
1344 022176  012701  022532                MOV     #DP2,R1                 ; POINT TO PATTERN
1345 022202  012123                    50$:MOV     (R1)+,(R3)+             ; MOVE PATTERN WORD TO BUFFER
1346 022204  005302                        DEC     R2                      ; DECREMENT WORD COUNT
1347 022206  001403                        BEQ     55$                     ; BRANCH IF DONE
1348 022210  005304                        DEC     R4                      ; DECREMENT PATTERN WORD COUNT
1349 022212  001373                        BNE     50$                     ; IF NOT LAST PATTERN WORD, LOOP
1350 022214  000766                        BR      40$                     ; START ALL OVER AGAIN
1351                                    ;
1352                                    ; BUFFER TAKEN CARE OF, SET AND WAIT FOR INTERRUPT
1353                                    ;
1354 022216                             55$:CLRVEC  VECTOR                  ; CLEAR ERR INTERRUPT VECTOR
     022216  013700  002444                MOV     VECTOR,R0
     022222  104436                        TRAP    C$CVEC
1355 022224                                SETVEC  VECTOR,#C001,#PRI07     ; SET UP INTERRUPT VECTOR
     022224  012746  000340                MOV     #PRI07,-(SP)
     022230  012746  022400                MOV     #C001,-(SP)
     022234  013746  002444                MOV     VECTOR,-(SP)
     022240  012746  000003                MOV     #3,-(SP)
     022244  104437                        TRAP    C$SVEC
     022246  062706  000010                ADD     #10,SP
1356 022252  013777  002512  157700        MOV     WORD.COUNT,@QWC         ; MOVE WORD COUNT INTO QWC REGISTER
1357 022260  013777  002502  157670        MOV     FREMEM,@QBA             ; START ADDRESS OF BUFFER TO QBA
1358 022266  042777  037400  157656        BIC     #37400,@QDMA            ; MAKE SURE Q-BUS EXTENDED BITS ARE ZERO
1359 022274  052777  000002  157650        BIS     #DMAWT,@QDMA            ; SET UP FOR PDP TO VAX DMA TRANSFER
1360 022302  052777  000100  157642        BIS     #RDYIE,@QDMA            ; SET RDY ENABLE BIT
1361 022310  052777  000100  157630        BIS     #ERRIE,@QINT            ; MAKE SURE ERR INTERRUPT IS ENABLED
1362 022316  052777  000001  157626        BIS     #GO,@QDMA               ; INITIATE DMA TRANSFER
1363                                    ;
1364                                    ; WAIT FOR INTERRUPT
1365                                    ;
1366 022324  013701  002532                MOV     DEFAULT,R1              ; NUMBER OF SECONDS OF TIMEOUT
1367 022330  012702  026000            60$:MOV     #TIMOUT,R2              ; TIME OUT DELAY TO R2
1368 022334                            65$:BREAK                           ; ALLOW CONTROL C
     022334  104422                        TRAP    C$BRK
1369 022336  005302                        DEC     R2                      ; DECREMENT TIMEOUT
1370 022340  001375                        BNE     65$                     ; IF NOT DONE LOOP
1371 022342  005301                        DEC     R1                      ; DECREMENT SECOND COUNTER
1372 022344  001371                        BNE     60$                     ; IF NOT DONE, LOOP
1373                                    ;
1374                                    ; ERROR CONDITION, TIMEOUT OCCURED WAITING FOR INTERRUPT
1375                                    ;
```

TEST 13: DMA 2 WORDS, PDP-11 TO VAX

```
1376 022346                                    ERRHRD  31.,,ERR7              ; TELL OPERATOR TIMEOUT
     022346  104456                            TRAP    C$ERHRD
     022350  000037                            .WORD   31
     022352  000000                            .WORD   0
     022354  007424                            .WORD   ERR7
1377 022356  004737  013116                    CALL    ENDERR                 ; GO PRINT OUT ENDING TERMINATOR
1378 022362  042777  000100  157562            BIC     #RDYIE,@QDMA           ; CLEAR INTERRUPT BIT
1379 022370  012701  013630                    MOV     #ABORT,R1              ; ABORT CODE TO R1
1380 022374  000137  022530                    JMP     EQ                     ; BRANCH TO END OF TEST
1381                                    ;
1382                                    ; END ERROR CONDITION
1383                                    ;
1384                                    ; DMA INTERRUPT SHOULD GO HERE
1385                                    ;
1386 022400                                    BGNSRV  C001
     022400                            C001::
1387 022400  042777  000100  157544            BIC     #RDYIE,@QDMA           ; CLEAR INTERRUPT BIT
1388 022406  012716  022414                    MOV     #C002,(SP)             ; CORRECT STACK
1389 022412                                    ENDSRV
     022412                            L10037:
     022412  000002                            RTI
1390 022414                            C002:
1391 022414  032777  100000  157524            BIT     #ERR,@QINT             ; ERROR INTERRUPT?
1392 022422  001414                            BEQ     70$                    ; BRANCH IF NO ERROR INTERRUPT
1393                                    ;
1394                                    ; ERROR CONDITION, ERROR INTERRUPT OCCURED
1395                                    ;
1396 022424                                    ERRHRD  32.,,ERR11             ; TELL OPERATOR ERROR INTERRUPT OCCURED
     022424  104456                            TRAP    C$ERHRD
     022426  000040                            .WORD   32
     022430  000000                            .WORD   0
     022432  010030                            .WORD   ERR11
1397 022434  004737  013116                    CALL    ENDERR                 ; GO PRINT OUT ENDING TERMINATOR
1398 022440  005077  157502                    CLR     @QINT                  ; CLEAR INTERRUPT REGISTER
1399 022444  012701  013630                    MOV     #ABORT,R1              ; ABORT CODE TO R1
1400 022450  000137  022530                    JMP     EQ                     ; BRANCH TO END OF TEST
1401                                    ;
1402                                    ; END ERROR CONDITION
1403                                    ;
1404 022454                            70$:
1405 022454  052777  000001  157460            BIS     #CMDACK,@QCMD          ; TELL MASTER DAM DONE
1406 022462                                    CLRVEC  VECTOR                 ; CLEAR VECTOR
     022462  013700  002444                    MOV     VECTOR,R0
     022466  104436                            TRAP    C$CVEC
1407 022470                                    SETVEC  VECTOR,#ERRINT,#PRI07  ; SET UP INTERRUPT VECTOR
     022470  012746  000340                    MOV     #PRI07,-(SP)
     022474  012746  012652                    MOV     #ERRINT,-(SP)
     022500  013746  002444                    MOV     VECTOR,-(SP)
     022504  012746  000003                    MOV     #3,-(SP)
     022510  104437                            TRAP    C$SVEC
     022512  062706  000010                    ADD     #10,SP
1408 022516  052777  000100  157422            BIS     #ERRIE,@QINT           ; ENABLE ERROR INTERRUPT
1409                                    ;
1410                                    ; END OF TEST
1411                                    ;
1412 022524  012701  000000                    MOV     #0,R1                  ; END TEST NORMALLY
1413 022530                            EQ:
```

TEST 13: DMA 2 WORDS, PDP 11 TO VAX

```
1414 022530  000207                        RTS     PC              ; RETURN TO MAINLINE
1415
1416                                    ;
1417                                    ; DATA PATTERN FOR TEST
1418                                    ;
1419 022532  055132                    DP2:     .WORD   55132
1420 022534  122645                             .WORD   122645
```

TEST 14: DMA VAX TO PDP-11

```
                                .SBTTL  TEST 14: DMA VAX TO PDP-11
                                ;;******************************************************************************
                                ;++
                                ;TEST DESCRIPTION-
                                ; WRITE LARGE BUFFER FROM COMMAND BRIDGE TO CONTROL BRIDGE
                                ; CHECK DATA
                                ;TEST STEPS-
                                ;
                                ;--
                                ;;******************************************************************************

                                        STATST
                                TEST14::
022536  012737  000016  002114          MOV     #14,L$TEST              ;TEST NUMBER FOR ERROR MESSAGES
022544  004737  013034                  CALL    BMSG                    ;CHECK FOR PNT FI AG
022550  013701  002532                  MOV     DEFAULT,R1              ; SECONDS OF TIME OUT
022554  012702  026000          8$:     MOV     #TIMOUT,R2              ; TIME OUT VALUE TO R2
022560          104422          10$:    BREAK
                                        TRAP    C$BRK
022562  032777  004000  157356          BIT     #CMDPRS,@QINT           ; COMMAND PRESENT?
022570  001020                          BNE     20$                     ; IF COMMAND PRESENT, BRANCH
022572  005302                          DEC     R2                      ; DECREMENT TIMEOUT REGISTER
022574  001371                          BNE     10$                     ; IF NOT IN TIMEOUT, TRY AGAIN
022576  005301                          DEC     R1                      ; DECREMENT SECOND TIMER
022600  001365                          BNE     8$                      ; IF NOT TIMEOUT, AGAIN
                                ;
                                ; TIMEOUT ERROR CONDITION
                                ;
022602  012701  000000                  MOV     #0,R1                   ; REGISTER # TO R1
022606                                  ERRHRD  33.,,ERR2               ; TELL OPERATOR TIMEOUT¢
022606  104456                          TRAP    C$ERHRD
022610  000041                          .WORD   33
022612  000000                          .WORD   0
022614  006506                          .WORD   ERR2
022616  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
022622  012701  013630                  MOV     #ABORT,R1               ; ABORT CODE TO R1
022626  000137  023452                  JMP     EW                      ; ABORT TEST
                                ;
                                ; END TIMEOUT ERROR CONDITION
                                ;
                                ; COMMAND PRESENT WAS REALLY THERE
                                ;
022632                          20$:
022632  052777  000020  157310          BIS     #GVREN,@QCTL            ; READ ENABLE
022640  012777  000000  157320          MOV     #0,@QVAD                ; CLEAR VIEW REGISTER
022646  017737  157316  002514          MOV     @QVDA,LOW16             ; READ LOW 16 BITS OF UNIBUS ADDRESS
022654  013777  002514  157272          MOV     LOW16,@QUBA             ; LOAD LOW 16 BITS OF UNIBUS ADDRESS
022662  017737  157302  002516          MOV     @QVDA,HI2               ; READ HI 2 BITS OF UNIBUS ADDRESS
022670  032737  177757  002516          BIT     #^CBIT4!BIT5,HI2        ; SEE IF ONLY BITS 4 AND 5 ARE SET
022676  001412                          BEQ     30$                     ; BRANCH IF OK
                                ;
                                ; ERROR CONDITION, MORE THAN BITS 4 OR 5 SET FOR EXTENDED ADDRESS ON UNIBUS
                                ;
022700                                  ERRHRD  34.,,ERR10              ; TELL OPERATOR ERROR
022700  104456                          TRAP    C$ERHRD
022702  000042                          .WORD   34
022704  000000                          .WORD   0
```

TEST 14: DMA VAX TO PDP 11

```
      022706  007740                          .WORD   ERR10
1468  022710  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
1469  022714  012701  013630                  MOV     #ABORT,R1               ; ABORT CODE TO R1
1470  022720  000137  023452                  JMP     EW                      ; END TEST
1471                                  ;
1472                                  ; END ERROR CONDITION
1473                                  ;
1474  022724                          30$:
1475  022724  053777  002516  157220          BIS     MI2,@QDMA               ; SET UP EXTENDED BITS IN EXP
1476  022732  017737  157232  002512          MOV     @QVDA,WORD.COUNT        ; READ WORD FROM VIEW
1477                                  ;
1478                                  ; CLEAR BUFFER
1479                                  ;
1480  022740  013701  002512                  MOV     WORD.COUNT,R1           ; GET WORD.COUNT IN R1
1481  022744  005401                          NEG     R1                      ; CONVERT WORD COUNT FROM 2'S COMP
1482  022746  013702  002502                  MOV     FREMEM,R2               ; STARTING ADDRESS OF BUFFER
1483  022752  005022                  35$:    CLR     (R2)+                   ; CLEAR WORD IN BUFFER
1484  022754  005301                          DEC     R1                      ; DECREMENT COUNTER
1485  022756  001375                          BNE     35$                     ; BRANCH BACK IF NOT DONE
1486                                  ;
1487                                  ; BUFFER CLEARED, SET UP FOR DMA
1488                                  ;
1489  022760  013777  002512  157172          MOV     WORD.COUNT,@QWC         ; MOVE WORD COUNT INTO QWC REGISTER
1490  022766  013777  002502  157162          MOV     FREMEM,@QBA             ; START ADDRESS OF BUFFER TO QBA
1491  022774  042777  037400  157150          BIC     #37400,@QDMA            ; MAKE SURE Q-BUS EXTENDED BITS ARE ZERO
1492  023002  042777  000002  157142          BIC     #DMAWT,@QDMA            ; SET UP FOR VAX TO PDP DMA TRANSFER
1493  023010                                  CLRVEC  VECTOR
      023010  013700  002444                  MOV     VECTOR,R0
      023014  104436                          TRAP    C$CVEC
1494  023016                                  SETVEC  VECTOR,#COP1,#PRIO7     ; SET UP NEW INTERRUPT VECTOR
      023016  012746  000340                  MOV     #PRIO7,-(SP)
      023022  012746  023142                  MOV     #COP1,-(SP)
      023026  013746  002444                  MOV     VECTOR,-(SP)
      023032  012746  000003                  MOV     #3,-(SP)
      023036  104437                          TRAP    C$SVEC
      023040  062706  000010                  ADD     #10,SP
1495  023044  052777  000100  157074          BIS     #ERRIE,@QINT            ; ENABLE ERROR INTERRUPT
1496  023052  052777  000100  157072          BIS     #RDYIE,@QDMA            ; ENABLE RDY INTERRUPT
1497  023060  052777  000001  157064          BIS     #GO,@QDMA               ; INITIATE DMA TRANSFER
1498                                  ;
1499                                  ; WAIT FOR INTERRUPT
1500                                  ;
1501  023066  013701  002532                  MOV     DEFAULT,R1              ; NUMBER OF SECONDS OF TIMEOUT
1502  023072  012702  026000          40$:    MOV     #TIMOUT,R2              ; TIME OUT DELAY TO R2
1503  023076                          45$:    BREAK                           ; ALLOW CONTROL C
      023076  104422                          TRAP    C$BRK
1504  023100  005302                          DEC     R2                      ; DECREMENT TIMEOUT
1505  023102  001375                          BNE     45$                     ; IF NOT DONE LOOP
1506  023104  005301                          DEC     R1                      ; DECREMENT SECOND COUNTER
1507  023106  001371                          BNE     40$                     ; IF NOT DONE, LOOP
1508                                  ;
1509                                  ; ERROR CONDITION, TIMEOUT OCCURED WAITING FOR INTERRUPT
1510                                  ;
1511  023110                                  ERRHRD  35.,,ERR7               ; TELL OPERATOR TIMEOUT
      023110  104456                          TRAP    C$ERHRD
      023112  000043                          .WORD   35
      023114  000000                          .WORD   0
```

TEST 14: DMA VAX TO PDP 11

```
      023116  007424                          .WORD   ERR7
1512  023120  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
1513  023124  042777  000100  157020          BIC     #RDYIE,@QDMA            ; CLEAR INTERRUPT BIT
1514  023132  012701  013630                  MOV     #ABORT,R1               ; ABORT CODE TO R1
1515  023136  000137  023452                  JMP     EW                      ; BRANCH TO END OF TEST
1516                                          ;
1517                                          ; END ERROR CONDITION
1518                                          ;
1519                                          ; DMA INTERRUPT SHOULD GO HERE
1520                                          ;
1521  023142                                  BGNSRV  COP1
      023142                                  COP1::
1522  023142  042777  000100  157002          BIC     #RDYIE,@QDMA            ; CLEAR INTERRUPT BIT
1523  023150  012716  023156                  MOV     #COP2,(SP)              ; CORRECT STACK
1524  023154                                  ENDSRV
      023154                                  L10040:
      023154  000002                          RTI
1525  023156                                  COP2:
1526  023156  032777  100000  156762          BIT     #ERR,@QINT              ; ERROR INTERRUPT?
1527  023164  001414                          BEQ     50$                     ; BRANCH IF NO ERROR INTERRUPT
1528                                          ;
1529                                          ; ERROR CONDITION, ERROR INTERRUPT OCCURED
1530                                          ;
1531  023166                                  ERRMRD  36.,,ERR11              ; TELL OPERATOR ERROR INTERRUPT OCCURED
      023166  104456                          TRAP    C$ERMRD
      023170  000044                          .WORD   36
      023172  000000                          .WORD   0
      023174  010030                          .WORD   ERR11
1532  023176  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
1533  023202  005077  156740                  CLR     @QINT                   ; CLEAR INTERRUPT REGISTER
1534  023206  012701  013630                  MOV     #ABORT,R1               ; ABORT CODE TO R1
1535  023212  000137  023452                  JMP     EW                      ; BRANCH TO END OF TEST
1536                                          ;
1537                                          ; END ERROR CONDITION
1538                                          ;
1539  023216                                  50$:
1540  023216  052777  000001  156716          BIS     #CMDACK,@QCMD           ; TELL MASTER DAM DONE
1541                                          ;
1542                                          ; NOW CHECK DATA
1543                                          ;
1544  023224  013701  002502                  MOV     FREMEM,R1               ; R1 TO START OF BUFFER
1545  023230  013702  002512                  MOV     WORD.COUNT,R2           ; R2 GETS WORD COUNT
1546  023234  005402                          NEG     R2                      ; CONVERT WORD COUNT FROM 2'S COMP.
1547                                          ;
1548                                          ; NOW CHECK BUFFER AGAINST PATTERN
1549                                          ;
1550  023236  005037  002462                  CLR     ERROR1                  ; CLEAR ERROR COUNTER
1551  023242  012704  000002          100$:   MOV     #2,R4                   ; # OF WORDS IN PATTERN
1552  023246  012703  023516                  MOV     #DP3,R3                 ; R3 GETS PATTERN ADDRESS
1553  023252  012137  002454          110$:   MOV     (R1)+,VAL               ; GET WORD FROM BUFFER
1554  023256  012337  002456                  MOV     (R3)+,EXP               ; GET EXPECTED PATTERN IN EXP
1555  023262  023737  002454  002456          CMP     VAL,EXP                 ; COMPARE VALUE WITH EXPECTED
1556  023270  001442                          BEQ     130$                    ; IF OK, BRANCH
1557                                          ;
1558                                          ; ERROR CONDITION, NOT WHAT EXPECTED IN BUFFER
1559                                          ;
1560  023272  005737  002462                  TST     ERROR1                  ; ANY OTHER ERRORS OCCURED
```

TEST 14: DMA VAX TO PDP 11

```
1561 023276  001004                        BNE     120$                    ; SKIP HEADER ERROR IF ALREADY PRINTED
1562 023300                                 ERRHRD  37.,,ERR8                       ; PRINT ERROR HARD MESSAGE
     023300  104456                         TRAP    C$ERHRD
     023302  000045                         .WORD   37
     023304  000000                         .WORD   0
     023306  007530                         .WORD   ERR8
1563 023310  005237  002462          120$:  INC     ERROR1                  ; INCREMENT ERROR COUNTER
1564 023314  022737  000012  002462        CMP     #10.,ERROR1             ; SEE IF TOO MANY MESSAGES PRINTED
1565 023322  103425                         BCS     130$                    ; IF TOO MANY, BRANCH
1566 023324  013737  002512  002474        MOV     WORD.COUNT,COUNTER      ; CALCULATE WORD NUMBER
1567 023332  005437  002474                NEG     COUNTER                 ; CONVERT WORD COUNT FROM 2'S COMP
1568 023336  160237  002474                SUB     R2,COUNTER
1569 023342                                 PRINTX  #FOR10,COUNTER,VAL,EXP  ; PRINT DETAIL LINE
     023342  013746  002456                MOV     EXP,-(SP)
     023346  013746  002454                MOV     VAL,-(SP)
     023352  013746  002474                MOV     COUNTER,-(SP)
     023356  012746  004230                MOV     #FOR10,-(SP)
     023362  012746  000004                MOV     #4,-(SP)
     023366  010600                        MOV     SP,R0
     023370  104415                        TRAP    C$PNTX
     023372  062706  000012                ADD     #12,SP
1570                                    ;
1571                                    ; END ERROR CONDITION
1572                                    ;
1573 023376                             130$:
1574 023376  005302                            DEC     R2                      ; DECREMENT WORD COUNT
1575 023400  001403                            BEQ     140$                    ; BRANCH OUT IF DONE
1576 023402  005304                            DEC     R4                      ; DECREMENT PATTERN WORD COUNT
1577 023404  001322                            BNE     110$                    ; BRANCH IF NOT DONE WITH PATTERN
1578 023406  000715                            BR      100$                    ; BRANCH IF DONE WITH PATTERN
1579                                    ;
1580                                    ; BUFFER CHECKED, PRINT TOTAL ERROR COUNT IF NECESSARY
1581                                    ;
1582 023410                             140$:
1583 023410  005737  002462                    TST     ERROR1                  ; ANY ERRORS
1584 023414  001414                            BEQ     150$                    ; IF NO ERRORS, BRANCH
1585 023416                                    PRINTB  #FOR11,ERROR1           ; TELL TOTAL ERROR COUNT
     023416  013746  002462                    MOV     ERROR1,-(SP)
     023422  012746  004253                    MOV     #FOR11,-(SP)
     023426  012746  000002                    MOV     #2,-(SP)
     023432  010600                            MOV     SP,R0
     023434  104414                            TRAP    C$PNTB
     023436  062706  000006                    ADD     #6,SP
1586 023442  004737  013116                    CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
1587                                    ;
1588                                    ; END OF TEST
1589                                    ;
1590 023446  012701  000000            150$:   MOV     #0,R1                   ; END TEST NORMALLY
1591 023452                             EW:    CLRVEC  VECTOR                  ; CLEAR VECTOR
     023452  013700  002444                    MOV     VECTOR,R0
     023456  104436                            TRAP    C$CVEC
1592 023460                                    SETVEC  VECTOR,#ERRINT,#PRI07   ; SET UP INTERRUPT VECTOR
     023460  012746  000340                    MOV     #PRI07,-(SP)
     023464  012746  012652                    MOV     #ERRINT,-(SP)
     023470  013746  002444                    MOV     VECTOR,-(SP)
     023474  012746  000003                    MOV     #3,-(SP)
     023500  104437                            TRAP    C$SVEC
```

TEST 14: DMA VAX TO PDP 11

```
        023502  062706  000010                  ADD     #10,SP
   1593 023506  052777  000100  156432          BIS     #ERRIE,@QINT            ; ENABLE ERROR INTERRUPT
   1594
   1595 023514  000207                          RTS     PC                      ; RETURN TO MAINLINE
   1596
   1597                                 ;
   1598                                 ; DATA PATTERN FOR TEST
   1599                                 ;
   1600 023516  000000                  DP3:    .WORD   0
   1601 023520  177777                          .WORD   177777
   1602
```

TEST 15: DMA PDP 11 TO VAX

```
                                .SBTTL  TEST 15: DMA PDP-11 TO VAX
                                ;;******************************************************************************
                                ;++
                                ;TEST DESCRIPTION
                                ; WRITE LARGE BUFFER FROM CONTROL BRIDGE TO COMMAND BRIDGE.
                                ; CHECK DATA
                                ;TEST STEPS-
                                ;
                                ;--
                                ;;******************************************************************************

                                        STATST
                                TEST15::
023522  012737  000017  002114          MOV     #15,L$TEST              ;TEST NUMBER FOR ERROR MESSAGES
023530  004737  013034                  CALL    BMSG                    ;CHECK FOR PNT FLAG
023534  013701  002532                  MOV     DEFAULT,R1              ; SECONDS OF TIME OUT
023540  012702  026000          8$:     MOV     #TIMOUT,R2              ; TIME OUT VALUE TO R2
023544          104422          10$:    BREAK
                                        TRAP    C$BRK
023546  032777  004000  156372          BIT     #CMDPRS,@QINT           ; COMMAND PRESENT?
023554  001020                          BNE     20$                     ; IF COMMAND PRESENT, BRANCH
023556  005302                          DEC     R2                      ; DECREMENT TIMEOUT REGISTER
023560  001371                          BNE     10$                     ; IF NOT IN TIMEOUT, TRY AGAIN
023562  005301                          DEC     R1                      ; DECREMENT SECOND TIMER
023564  001365                          BNE     8$                      ; IF NOT TIMEOUT, AGAIN
                                ;
                                ; TIMEOUT ERROR CONDITION
                                ;
023566  012701  000000                  MOV     #0,R1                   ; REGISTER # TO R1
023572          104456                  ERRHRD  38...ERR2               ; TELL OPERATOR TIMEOUT¢
                                        TRAP    C$ERHRD
023574  000046                          .WORD   38
023576  000000                          .WORD   0
023600  006506                          .WORD   ERR2
023602  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
023606  012701  013630                  MOV     #ABORT,R1               ; ABORT CODE TO R1
023612  000137  024232                  JMP     EZ                      ; ABORT TEST
                                ;
                                ; END TIMEOUT ERROR CONDITION
                                ;
                                ; COMMAND PRESENT WAS REALLY THERE
                                ;
023616                          20$:
023616  052777  000020  156324          BIS     #QVREN,@QCTL            ; READ ENABLE
023624  012777  000000  156334          MOV     #0,@QVAD                ; CLEAR VIEW REGISTER
023632  017737  156332  002514          MOV     @QVDA,LOW16             ; READ LOW 16 BITS OF UNIBUS ADDRESS
023640  013777  002514  156306          MOV     LOW16,@QUBA             ; LOAD LOW 16 BITS OF UNIBUS ADDRESS
023646  017737  156316  002516          MOV     @QVUA,HI2               ; READ HI 2 BITS OF UNIBUS ADDRESS
023654  032737  177757  002516          BIT     #^CBIT4!BIT5,HI2        ; SEE IF ONLY BITS 4 AND 5 ARE SET
023662  001412                          BEQ     30$                     ; BRANCH IF OK
                                ;
                                ; ERROR CONDITION, MORE THAN BITS 4 OR 5 SET FOR EXTENDED ADDRESS ON UNIBUS
                                ;
023664                                  ERRHRD  39...ERR10              ; TELL OPERATOR ERROR
023664  104456                          TRAP    C$ERHRD
023666  000047                          .WORD   39
023670  000000                          .WORD   0
```

TEST 15: DMA PDP-11 TO VAX

```
      023672  007740                          .WORD   ERR10
 1650 023674  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
 1651 023700  012701  013630                  MOV     #ABORT,R1               ; ABORT CODE TO R1
 1652 023704  000137  024232                  JMP     EZ                      ; END TEST
 1653                                 ;
 1654                                 ; END ERROR CONDITION
 1655                                 ;
 1656 023710                          30$:
 1657 023710  053777  002516  156234          BIS     MI2,@QDMA               ; SET UP EXTENDED BITS IN EXP
 1658 023716  017737  156246  002512          MOV     @QVDA,WORD.COUNT        ; READ WORD FROM VIEW
 1659                                 ;
 1660                                 ; MOVE DATA PATTERN TO BUFFER
 1661                                 ;
 1662 023724  013703  002502                  MOV     FREMEM,R3               ; GET STARTING ADDRESS OF BUFFER IN R3
 1663 023730  013702  002512                  MOV     WORD.COUNT,R2           ; GET WORD COUNT TO R2
 1664 023734  005402                          NEG     R2                      ; CONVERT WORD COUNT FROM 2'S COMP
 1665 023736  012704  000002          40$:    MOV     #2,R4                   ; # OF WORDS IN PATTERN
 1666 023742  012701  024276                  MOV     #DP4,R1                 ; POINT TO PATTERN
 1667 023746  012123                  50$:    MOV     (R1)+,(R3)+             ; MOVE PATTERN WORD TO BUFFER
 1668 023750  005302                          DEC     R2                      ; DECREMENT WORD COUNT
 1669 023752  001403                          BEQ     55$                     ; BRANCH IF DONE
 1670 023754  005304                          DEC     R4                      ; DECREMENT PATTERN WORD COUNT
 1671 023756  001373                          BNE     50$                     ; IF NOT LAST PATTERN WORD, LOOP
 1672 023760  000766                          BR      40$                     ; START ALL OVER AGAIN
 1673                                 ;
 1674                                 ; BUFFER TAKEN CARE OF, SET AND WAIT FOR INTERRUPT
 1675                                 ;
 1676 023762  013777  002512  156170  55$:    MOV     WORD.COUNT,@QWC         ; MOVE WORD COUNT INTO QWC REGISTER
 1677 023770  013777  002502  156160          MOV     FREMEM,@QBA             ; START ADDRESS OF BUFFER TO QBA
 1678 023776  042777  037400  156146          BIC     #37400,@QDMA            ; MAKE SURE Q-BUS EXTENDED BITS ARE ZERO
 1679 024004  052777  000002  156140          BIS     #DMAWT,@QDMA            ; SET UP FOR PDP TO VAX DMA TRANSFER
 1680 024012                                  CLRVEC  VECTOR
      024012  013700  002444                  MOV     VECTOR,R0
      024016  104436                          TRAP    C$CVEC
 1681 024020                                  SETVEC  VECTOR,#COX1,#PRI07     ; SET UP NEW INTERRUPT VECTOR
      024020  012746  000340                  MOV     #PRI07,-(SP)
      024024  012746  024144                  MOV     #COX1,-(SP)
      024030  013746  002444                  MOV     VECTOR,-(SP)
      024034  012746  000003                  MOV     #3,-(SP)
      024040  104437                          TRAP    C$SVEC
      024042  062706  000010                  ADD     #10,SP
 1682 024046  052777  000100  156072          BIS     #ERRIE,@QINT            ; ENABLE ERROR INTERRUPT
 1683 024054  052777  000100  156070          BIS     #RDYIE,@QDMA            ; ENABLE RDY INTERRUPT
 1684 024062  052777  000001  156062          BIS     #GO,@QDMA               ; INITIATE DMA TRANSFER
 1685                                 ;
 1686                                 ; WAIT FOR INTERRUPT
 1687                                 ;
 1688 024070  013701  002532                  MOV     DEFAULT,R1              ; NUMBER OF SECONDS OF TIMEOUT
 1689 024074  012702  026000          60$:    MOV     #TIMOUT,R2              ; TIME OUT DELAY TO R2
 1690 024100                          65$:    BREAK                           ; ALLOW CONTROL C
      024100  104422                          TRAP    C$BRK
 1691 024102  005302                          DEC     R2                      ; DECREMENT TIMEOUT
 1692 024104  001375                          BNE     65$                     ; IF NOT DONE LOOP
 1693 024106  005301                          DEC     R1                      ; DECREMENT SECOND COUNTER
 1694 024110  001371                          BNE     60$                     ; IF NOT DONE, LOOP
 1695                                 ;
 1696                                 ; ERROR CONDITION, TIMEOUT OCCURED WAITING FOR INTERRUPT
```

TEST 15: DMA PDP 11 TO VAX

```
1697                                        ;
1698 024112                                         ERRHRD  40.,,ERR7               ; TELL OPERATOR TIMEOUT
     024112  104456                                 TRAP    C$ERHRD
     024114  000050                                 .WORD   40
     024116  000000                                 .WORD   0
     024120  007424                                 .WORD   ERR7
1699 024122  004737  013116                        CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
1700 024126  042777  000100  156016                BIC     #RDYIE,@QDMA            ; CLEAR INTERRUPT BIT
1701 024134  012701  013630                        MOV     #ABORT,R1               ; ABORT CODE TO R1
1702 024140  000137  024232                        JMP     EZ                      ; BRANCH TO END OF TEST
1703                                        ;
1704                                        ; END ERROR CONDITION
1705                                        ;
1706                                        ; DMA INTERRUPT SHOULD GO HERE
1707                                        ;
1708 024144                                         BGNSRV  COX1
     024144                                 COX1::
1709 024144  042777  000100  156000                BIC     #RDYIE,@QDMA            ; CLEAR INTERRUPT BIT
1710 024152  012716  024160                        MOV     #COX2,(SP)              ; CORRECT STACK
1711 024156                                         ENDSRV
     024156                                 L10041:
     024156  000002                                 RTI
1712 024160                                 COX2:
1713 024160  032777  100000  155760                BIT     #ERR,@QINT              ; ERROR INTERRUPT?
1714 024166  001414                                BEQ     70$                     ; BRANCH IF NO ERROR INTERRUPT
1715                                        ;
1716                                        ; ERROR CONDITION, ERROR INTERRUPT OCCURED
1717                                        ;
1718 024170                                         ERRHRD  41.,,ERR11              ; TELL OPERATOR ERROR INTERRUPT OCCURED
     024170  104456                                 TRAP    C$ERHRD
     024172  000051                                 .WORD   41
     024174  000000                                 .WORD   0
     024176  010030                                 .WORD   ERR11
1719 024200  004737  013116                        CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
1720 024204  005077  155736                        CLR     @QINT                   ; CLEAR INTERRUPT REGISTER
1721 024210  012701  013630                        MOV     #ABORT,R1               ; ABORT CODE TO R1
1722 024214  000137  024232                        JMP     EZ                      ; BRANCH TO END OF TEST
1723                                        ;
1724                                        ; END ERROR CONDITION
1725                                        ;
1726 024220                                 70$:
1727 024220  052777  000001  155714                BIS     #CMDACK,@QCMD           ; TELL MASTER DAM DONE
1728                                        ;
1729                                        ; END OF TEST
1730                                        ;
1731 024226  012701  000000                        MOV     #0,R1                   ; END TEST NORMALLY
1732 024232                                 EZ:     CLRVEC  VECTOR                  ; CLEAR VECTOR
     024232  013700  002444                         MOV     VECTOR,R0
     024236  104436                                 TRAP    C$CVEC
1733 024240                                         SETVEC  VECTOR,#ERRINT,#PRI07   ; SET UP INTERRUPT VECTOR
     024240  012746  000340                         MOV     #PRI07,-(SP)
     024244  012746  012652                         MOV     #ERRINT,-(SP)
     024250  013746  002444                         MOV     VECTOR,-(SP)
     024254  012746  000003                         MOV     #3,-(SP)
     024260  104437                                 TRAP    C$SVEC
     024262  062706  000010                         ADD     #10,SP
1734 024266  052777  000100  155652                BIS     #ERRIE,@QINT            ; ENABLE ERROR INTERRUPT
```

TEST 15: DMA PDP-11 TO VAX

```
1735
1736 024274  000207                    RTS     PC              ; RETURN TO MAINLINE
1737
1738                                ;
1739                                ; DATA PATTERN FOR TEST
1740                                ;
1741 024276  000000                DP4:     .WORD   0
1742 024300  177777                         .WORD   177777
1743
```

TEST 16: DMA VAX (BUFFERED DATA PATH) TO PDP-11

```
                                        .SBTTL  TEST 16: DMA VAX (BUFFERED DATA PATH) TO PDP-11
                                        ;;*************************************************************************
                                        ;++
                                        ;TEST DESCRIPTION-
                                        ; WRITE LARGE BUFFER FROM COMMAND BRIDGE TO CONTROL BRIDGE
                                        ; THE VAX USES A BUFFERED DATA PATH
                                        ; CHECK DATA
                                        ;TEST STEPS-
                                        ;
                                        ;--
                                        ;;*************************************************************************

                                                STATST
                                        TEST16::
 024302  012737  000020  002114                 MOV     #16,L$TEST              ;TEST NUMBER FOR ERROR MESSAGES
 024310  004737  013034                         CALL    BMSG                    ;CHECK FOR PNT FLAG
 024314  013701  002532                         MOV     DEFAULT,R1              ; SECONDS OF TIME OUT
 024320  012702  026000         8$:             MOV     #TIMOUT,R2              ; TIME OUT VALUE TO R2
 024324                         10$:            BREAK
 024324  104422                                 TRAP    C$BRK
 024326  032777  004000  155612                 BIT     #CMDPRS,@QINT           ; COMMAND PRESENT?
 024334  001020                                 BNE     20$                     ; IF COMMAND PRESENT, BRANCH
 024336  005302                                 DEC     R2                      ; DECREMENT TIMEOUT REGISTER
 024340  001371                                 BNE     10$                     ; IF NOT IN TIMEOUT, TRY AGAIN
 024342  005301                                 DEC     R1                      ; DECREMENT SECOND TIMER
 024344  001365                                 BNE     8$                      ; IF NOT TIMEOUT, AGAIN
                                        ;
                                        ; TIMEOUT ERROR CONDITION
                                        ;
 024346  012701  000000                         MOV     #0,R1                   ; REGISTER # TO R1
 024352                                         ERRHRD  41.,,ERR2               ; TELL OPERATOR TIMEOUT
 024352  104456                                 TRAP    C$ERHRD
 024354  000051                                 .WORD   41
 024356  000000                                 .WORD   0
 024360  006506                                 .WORD   ERR2
 024362  004737  013116                         CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
 024366  012701  013630                         MOV     #ABORT,R1               ; ABORT CODE TO R1
 024372  000137  025216                         JMP     EXW                     ; ABORT TEST
                                        ;
                                        ; END TIMEOUT ERROR CONDITION
                                        ;
                                        ; COMMAND PRESENT WAS REALLY THERE
                                        ;
 024376                                 20$:
 024376  052777  000020  155544                 BIS     #QVREN,@QCTL            ; READ ENABLE
 024404  012777  000000  155554                 MOV     #0,@QVAD                ; CLEAR VIEW REGISTER
 024412  017737  155552  002514                 MOV     @QVDA,LOW16             ; READ LOW 16 BITS OF UNIBUS ADDRESS
 024420  013777  002514  155526                 MOV     LOW16,@QUBA             ; LOAD LOW 16 BITS OF UNIBUS ADDRESS
 024426  017737  155536  002516                 MOV     @QVDA,HI2               ; READ HI 2 BITS OF UNIBUS ADDRESS
 024434  032737  177757  002516                 BIT     #^CBIT4!BIT5,HI2        ; SEE IF ONLY BITS 4 AND 5 ARE SET
 024442  001412                                 BEQ     30$                     ; BRANCH IF OK
                                        ;
                                        ; ERROR CONDITION, MORE THAN BITS 4 OR 5 SET FOR EXTENDED ADDRESS ON UNIBUS
                                        ;
 024444                                         ERRHRD  43.,,ERR10              ; TELL OPERATOR ERROR
 024444  104456                                 TRAP    C$ERHRD
 024446  000053                                 .WORD   43
```

TEST 16: DMA VAX (BUFFERED DATA PATH) TO PDP-11

```
                024450  000000                          .WORD   0
                024452  007740                          .WORD   ERR10
     1792       024454  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
     1793       024460  012701  013630                  MOV     #ABORT,R1               ; ABORT CODE TO R1
     1794       024464  000137  025216                  JMP     EXW                     ; END TEST
     1795                                        ;
     1796                                        ; END ERROR CONDITION
     1797                                        ;
     1798       024470                           30$:
     1799       024470  053777  002516  155454          BIS     MI2,@QDMA               ; SET UP EXTENDED BITS IN EXP
     1800       024476  017737  155466  002512          MOV     @QVDA,WORD.COUNT        ; READ WORD FROM VIEW
     1801                                        ;
     1802                                        ; CLEAR BUFFER
     1803                                        ;
     1804       024504  013701  002512          MOV     WORD.COUNT,R1           ; GET WORD.COUNT IN R1
     1805       024510  005401                  NEG     R1                      ; CONVERT WORD COUNT FROM 2'S COMP
     1806       024512  013702  002502          MOV     FREMEM,R2               ; STARTING ADDRESS OF BUFFER
     1807       024516  005022                  35$:    CLR     (R2)+           ; CLEAR WORD IN BUFFER
     1808       024520  005301                  DEC     R1                      ; DECREMENT COUNTER
     1809       024522  001375                  BNE     35$                     ; BRANCH BACK IF NOT DONE
     1810                                        ;
     1811                                        ; BUFFER CLEARED, SET UP FOR DMA
     1812                                        ;
     1813       024524  013777  002512  155426  MOV     WORD.COUNT,@QWC         ; MOVE WORD COUNT INTO QWC REGISTER
     1814       024532  013777  002502  155416  MOV     FREMEM,@QBA             ; START ADDRESS OF BUFFER TO QBA
     1815       024540  042777  037400  155404  BIC     #37400,@QDMA            ; MAKE SURE Q-BUS EXTENDED BITS ARE ZERO
     1816       024546  042777  000002  155376  BIC     #DMAWT,@QDMA            ; SET UP FOR VAX TO PDP DMA TRANSFER
     1817       024554                          CLRVEC  VECTOR
                024554  013700  002444          MOV     VECTOR,R0
                024560  104436                  TRAP    C$CVEC
     1818       024562                          SETVEC  VECTOR,#CXP1,#PRI07     ; SET UP NEW INTERRUPT VECTOR
                024562  012746  000340          MOV     #PRI07,-(SP)
                024566  012746  024706          MOV     #CXP1,-(SP)
                024572  013746  002444          MOV     VECTOR,-(SP)
                024576  012746  000003          MOV     #3,-(SP)
                024602  104437                  TRAP    C$SVEC
                024604  062706  000010          ADD     #10,SP
     1819       024610  052777  000100  155330  BIS     #ERRIE,@QINT            ; ENABLE ERROR INTERRUPT
     1820       024616  052777  000100  155326  BIS     #RDYIE,@QDMA            ; ENABLE RDY INTERRUPT
     1821       024624  052777  000001  155320  BIS     #GO,@QDMA               ; INITIATE DMA TRANSFER
     1822                                        ;
     1823                                        ; WAIT FOR INTERRUPT
     1824                                        ;
     1825       024632  013701  002532          MOV     DEFAULT,R1              ; NUMBER OF SECONDS OF TIMEOUT
     1826       024636  012702  026000          40$:    MOV     #TIMOUT,R2      ; TIME OUT DELAY TO R2
     1827       024642                          45$:    BREAK                   ; ALLOW CONTROL C
                024642  104422                  TRAP    C$BRK
     1828       024644  005302                  DEC     R2                      ; DECREMENT TIMEOUT
     1829       024646  001375                  BNE     45$                     ; IF NOT DONE LOOP
     1830       024650  005301                  DEC     R1                      ; DECREMENT SECOND COUNTER
     1831       024652  001371                  BNE     40$                     ; IF NOT DONE, LOOP
     1832                                        ;
     1833                                        ; ERROR CONDITION, TIMEOUT OCCURED WAITING FOR INTERRUPT
     1834                                        ;
     1835       024654                          ERRHRD  44.,,ERR7               ; TELL OPERATOR TIMEOUT
                024654  104456                  TRAP    C$ERHRD
                024656  000054                  .WORD   44
```

TEST 16: DMA VAX (BUFFERED DATA PATH) TO PDP-11

```
        024660  000000                          .WORD   0
        024662  007424                          .WORD   ERR7
  1836  024664  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
  1837  024670  042777  000100  155254          BIC     #RDYIE,@QDMA            ; CLEAR INTERRUPT BIT
  1838  024676  012701  013630                  MOV     #ABORT,R1               ; ABORT CODE TO R1
  1839  024702  000137  025216                  JMP     EXW                     ; BRANCH TO END OF TEST
  1840                                  ;
  1841                                  ; END ERROR CONDITION
  1842                                  ;
  1843                                  ; DMA INTERRUPT SHOULD GO HERE
  1844                                  ;
  1845  024706                          BGNSRV  CXP1
        024706                          CXP1::
  1846  024706  042777  000100  155236          BIC     #RDYIE,@QDMA            ; CLEAR INTERRUPT BIT
  1847  024714  012716  024722                  MOV     #CXP2,(SP)              ; CORRECT STACK
  1848  024720                          ENDSRV
        024720                          L10042:
        024720  000002                          RTI
  1849  024722                          CXP2:
  1850  024722  032777  100000  155216          BIT     #ERR,@QINT              ; ERROR INTERRUPT?
  1851  024730  001414                          BEQ     50$                     ; BRANCH IF NO ERROR INTERRUPT
  1852                                  ;
  1853                                  ; ERROR CONDITION, ERROR INTERRUPT OCCURED
  1854                                  ;
  1855  024732                          ERRHRD  45.,,ERR11              ; TELL OPERATOR ERROR INTERRUPT OCCURED
        024732  104456                  TRAP    C$ERHRD
        024734  000055                  .WORD   45
        024736  000000                  .WORD   0
        024740  010030                  .WORD   ERR11
  1856  024742  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
  1857  024746  005077  155174                  CLR     @QINT                   ; CLEAR INTERRUPT REGISTER
  1858  024752  012701  013630                  MOV     #ABORT,R1               ; ABORT CODE TO R1
  1859  024756  000137  025216                  JMP     EXW                     ; BRANCH TO END OF TEST
  1860                                  ;
  1861                                  ; END ERROR CONDITION
  1862                                  ;
  1863  024762                          50$:
  1864  024762  052777  000001  155152          BIS     #CMDACK,@QCMD           ; TELL MASTER DAM DONE
  1865                                  ;
  1866                                  ; NOW CHECK DATA
  1867                                  ;
  1868  024770  013701  002502                  MOV     FREMEM,R1               ; R1 TO START OF BUFFER
  1869  024774  013702  002512                  MOV     WORD.COUNT,R2           ; R2 GETS WORD COUNT
  1870  025000  005402                          NEG     R2                      ; CONVERT WORD COUNT FROM 2'S COMP.
  1871                                  ;
  1872                                  ; NOW CHECK BUFFER AGAINST PATTERN
  1873                                  ;
  1874  025002  005037  002462                  CLR     ERROR1                  ; CLEAR ERROR COUNTER
  1875  025006  012704  000002          100$:   MOV     #2,R4                   ; # OF WORDS IN PATTERN
  1876  025012  012703  025262                  MOV     #DPX3,R3                ; R3 GETS PATTERN ADDRESS
  1877  025016  012137  002454          110$:   MOV     (R1)+,VAL               ; GET WORD FROM BUFFER
  1878  025022  012337  002456                  MOV     (R3)+,EXP               ; GET EXPECTED PATTERN IN EXP
  1879  025026  023737  002454  002456          CMP     VAL,EXP                 ; COMPARE VALUE WITH EXPECTED
  1880  025034  001442                          BEQ     130$                    ; IF OK, BRANCH
  1881                                  ;
  1882                                  ; ERROR CONDITION, NOT WHAT EXPECTED IN BUFFER
  1883                                  ;
```

TEST 16: DMA VAX (BUFFERED DATA PATH) TO PDP-11

```
1884 025036  005737  002462                    TST     ERROR1                  ; ANY OTHER ERRORS OCCURED
1885 025042  001004                            BNE     120$                    ; SKIP HEADER ERROR IF ALREADY PRINTED
1886 025044                                    ERRHRD  46.,,ERR8                       ; PRINT ERROR HARD MESSAGE
     025044  104456                            TRAP    C$ERHRD
     025046  000056                            .WORD   46
     025050  000000                            .WORD   0
     025052  007530                            .WORD   ERR8
1887 025054  005237  002462          120$:     INC     ERROR1                  ; INCREMENT ERROR COUNTER
1888 025060  022737  000012  002462            CMP     #10.,ERROR1             ; SEE IF TOO MANY MESSAGES PRINTED
1889 025066  103425                            BCS     130$                    ; IF TOO MANY, BRANCH
1890 025070  013737  002512  002474            MOV     WORD.COUNT,COUNTER      ; CALCULATE WORD NUMBER
1891 025076  005437  002474                    NEG     COUNTER                 ; CONVERT WORD COUNT FROM 2'S COMP
1892 025102  160237  002474                    SUB     R2,COUNTER
1893 025106                                    PRINTX  #FOR10,COUNTER,VAL,EXP  ; PRINT DETAIL LINE
     025106  013746  002456                    MOV     EXP,-(SP)
     025112  013746  002454                    MOV     VAL,-(SP)
     025116  013746  002474                    MOV     COUNTER,-(SP)
     025122  012746  004230                    MOV     #FOR10,-(SP)
     025126  012746  000004                    MOV     #4,-(SP)
     025132  010600                            MOV     SP,R0
     025134  104415                            TRAP    C$PNTX
     025136  062706  000012                    ADD     #12,SP
1894                                   ;
1895                                   ; END ERROR CONDITION
1896                                   ;
1897 025142                            130$:
1898 025142  005302                            DEC     R2                      ; DECREMENT WORD COUNT
1899 025144  001403                            BEQ     140$                    ; BRANCH OUT IF DONE
1900 025146  005304                            DEC     R4                      ; DECREMENT PATTERN WORD COUNT
1901 025150  001322                            BNE     110$                    ; BRANCH IF NOT DONE WITH PATTERN
1902 025152  000715                            BR      100$                    ; BRANCH IF DONE WITH PATTERN
1903                                   ;
1904                                   ; BUFFER CHECKED, PRINT TOTAL ERROR COUNT IF NECESSARY
1905                                   ;
1906 025154                            140$:
1907 025154  005737  002462                    TST     ERROR1                  ; ANY ERRORS
1908 025160  001414                            BEQ     150$                    ; IF NO ERRORS, BRANCH
1909 025162                                    PRINTB  #FOR11,ERROR1           ; TELL TOTAL ERROR COUNT
     025162  013746  002462                    MOV     ERROR1,-(SP)
     025166  012746  004253                    MOV     #FOR11,-(SP)
     025172  012746  000002                    MOV     #2,-(SP)
     025176  010600                            MOV     SP,R0
     025200  104414                            TRAP    C$PNTB
     025202  062706  000006                    ADD     #6,SP
1910 025206  004737  013116                    CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
1911                                   ;
1912                                   ; END OF TEST
1913                                   ;
1914 025212  012701  000000            150$:   MOV     #0,R1                   ; END TEST NORMALLY
1915 025216                            EXW:    CLRVEC  VECTOR                  ; CLEAR VECTOR
     025216  013700  002444                    MOV     VECTOR,R0
     025222  104436                            TRAP    C$CVEC
1916 025224                                    SETVEC  VECTOR,#ERRINT,#PRI07   ; SET UP INTERRUPT VECTOR
     025224  012746  000340                    MOV     #PRI07,-(SP)
     025230  012746  012652                    MOV     #ERRINT,-(SP)
     025234  013746  002444                    MOV     VECTOR,-(SP)
     025240  012746  000003                    MOV     #3,-(SP)
```

TEST 16: DMA VAX (BUFFERED DATA PATH) TO PDP-11

```
        025244  104437                          TRAP    C$SVEC
        025246  062706  000010                  ADD     #10,SP
   1917 025252  052777  000100  154666          BIS     #ERRIE,@QINT            ; ENABLE ERROR INTERRUPT
   1918
   1919 025260  000207                          RTS     PC                      ; RETURN TO MAINLINE
   1920
   1921                                 ;
   1922                                 ; DATA PATTERN FOR TEST
   1923                                 ;
   1924 025262  000000                  DPX3:   .WORD   0
   1925 025264  177777                          .WORD   177777
```

```
                                        .SBTTL  TEST 17: DMA PDP-11 TO VAX (BUFFERED DATA PATH)
                                        ;;*****************************************************************
                                        ;;
                                        ;TEST DESCRIPTION:
                                        ; WRITE LARGE BUFFER FROM CONTROL BRIDGE TO COMMAND BRIDGE.
                                        ; THE VAX USES A BUFFERED DATA PATH
                                        ; CHECK DATA
                                        ;TEST STEPS
                                        ;
                                        ;
                                        ;;*****************************************************************

                                                STATST
025266                                  TEST17::
025266  012737  000021  002114                  MOV     #17,L$TEST              ;TEST NUMBER FOR ERROR MESSAGES
025274  004737  013034                          CALL    BMSG                    ;CHECK FOR PNT FLAG
025300  013701  002532                          MOV     DEFAULT,R1              ; SECONDS OF TIME OUT
025304  012702  026000          8$:             MOV     #TIMOUT,R2              ; TIME OUT VALUE TO R2
025310                          10$:            BREAK
025310  104422                                  TRAP    C$BRK
025312  032777  004000  154626                  BIT     #CMDPRS,@QINT           ; COMMAND PRESENT?
025320  001020                                  BNE     20$                     ; IF COMMAND PRESENT, BRANCH
025322  005302                                  DEC     R2                      ; DECREMENT TIMEOUT REGISTER
025324  001371                                  BNE     10$                     ; IF NOT IN TIMEOUT, TRY AGAIN
025326  005301                                  DEC     R1                      ; DECREMENT SECOND TIMER
025330  001365                                  BNE     8$                      ; IF NOT TIMEOUT, AGAIN
                                        ;
                                        ; TIMEOUT ERROR CONDITION
                                        ;
025332  012701  000000                          MOV     #0,R1                   ; REGISTER # TO R1
025336                                  .       ERRHRD  47,,ERR2                ; TELL OPERATOR TIMEOUT#
025336  104456                                  TRAP    C$ERHRD
025340  000057                                  .WORD   47
025342  000000                                  .WORD   0
025344  006506                                  .WORD   ERR2
025346  004737  013116                          CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
025352  012701  013630                          MOV     #ABORT,R1               ; ABORT CODE TO R1
025356  000137  025776                          JMP     EQZ                     ; ABORT TEST
                                        ;
                                        ; END TIMEOUT ERROR CONDITION
                                        ;
                                        ; COMMAND PRESENT WAS REALLY THERE
                                        ;
025362                                  20$:
025362  052777  000020  154560                  BIS     #QVREN,@QCTL            ; READ ENABLE
025370  012777  000000  154570                  MOV     #0,@QVAD                ; CLEAR VIEW REGISTER
025376  017737  154566  002514                  MOV     @QVDA,LOW16             ; READ LOW 16 BITS OF UNIBUS ADDRESS
025404  013777  002514  154542                  MOV     LOW16,@QUBA             ; LOAD LOW 16 BITS OF UNIBUS ADDRESS
025412  017737  154552  002516                  MOV     @QVDA,HI2               ; READ HI 2 BITS OF UNIBUS ADDRESS
025420  032737  177757  002516                  BIT     #^CBIT4!BIT5,HI2        ; SEE IF ONLY BITS 4 AND 5 ARE SET
025426  001412                                  BEQ     30$                     ; BRANCH IF OK
                                        ;
                                        ; ERROR CONDITION, MORE THAN BITS 4 OR 5 SET FOR EXTENDED ADDRESS ON UNIBUS
                                        ;
025430                                  .       ERRHRD  48,,ERR10               ; TELL OPERATOR ERROR
025430  104456                                  TRAP    C$ERHRD
025432  000060                                  .WORD   48
```

TEST 17: DMA PDP 11 TO VAX (BUFFERED DATA PATH)

```
        025434  000000                          .WORD   0
        025436  007740                          .WORD   ERR10
  1974  025440  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
  1975  025444  012701  013630                  MOV     #ABORT,R1               ; ABORT CODE TO R1
  1976  025450  000137  025776                  JMP     EOZ                     ; END TEST
  1977                                  ;
  1978                                  ; END ERROR CONDITION
  1979                                  ;
  1980  025454                          30$:
  1981  025454  053777  002516  154470          BIS     MI2,@QDMA               ; SET UP EXTENDED BITS IN EXP
  1982  025462  017737  154502  002512          MOV     @QVDA,WORD.COUNT        ; READ WORD FROM VIEW
  1983                                  ;
  1984                                  ; MOVE DATA PATTERN TO BUFFER
  1985                                  ;
  1986  025470  013703  002502                  MOV     FREMEM,R3               ; GET STARTING ADDRESS OF BUFFER IN R3
  1987  025474  013702  002512                  MOV     WORD.COUNT,R2           ; GET WORD COUNT TO R2
  1988  025500  005402                          NEG     R2                      ; CONVERT WORD COUNT FROM 2'S COMP
  1989  025502  012704  000002          40$:    MOV     #2,R4                   ; # OF WORDS IN PATTERN
  1990  025506  012701  026042                  MOV     #DPX4,R1                ; POINT TO PATTERN
  1991  025512  012123                  50$:    MOV     (R1)+,(R3)+             ; MOVE PATTERN WORD TO BUFFER
  1992  025514  005302                          DEC     R2                      ; DECREMENT WORD COUNT
  1993  025516  001403                          BEQ     55$                     ; BRANCH IF DONE
  1994  025520  005304                          DEC     R4                      ; DECREMENT PATTERN WORD COUNT
  1995  025522  001373                          BNE     50$                     ; IF NOT LAST PATTERN WORD, LOOP
  1996  025524  000766                          BR      40$                     ; START ALL OVER AGAIN
  1997                                  ;
  1998                                  ; BUFFER TAKEN CARE OF, SET AND WAIT FOR INTERRUPT
  1999                                  ;
  2000  025526  013777  002512  154424  55$:    MOV     WORD.COUNT,@QWC         ; MOVE WORD COUNT INTO QWC REGISTER
  2001  025534  013777  002502  154414          MOV     FREMEM,@QBA             ; START ADDRESS OF BUFFER TO QBA
  2002  025542  042777  037400  154402          BIC     #37400,@QDMA            ; MAKE SURE Q BUS EXTENDED BITS ARE ZERO
  2003  025550  052777  000002  154374          BIS     #DMAWT,@QDMA            ; SET UP FOR PDP TO VAX DMA TRANSFER
  2004  025556                                  CLRVEC  VECTOR
        025556  013700  002444                  MOV     VECTOR,R0
        025562  104436                          TRAP    C$CVEC
  2005  025564                                  SETVEC  VECTOR,#CXX1,#PRI07     ; SET UP NEW INTERRUPT VECTOR
        025564  012746  000340                  MOV     #PRI07,-(SP)
        025570  012746  025710                  MOV     #CXX1,-(SP)
        025574  013746  002444                  MOV     VECTOR,-(SP)
        025600  012746  000003                  MOV     #3,-(SP)
        025604  104437                          TRAP    C$SVEC
        025606  062706  000010                  ADD     #10,SP
  2006  025612  052777  000100  154326          BIS     #ERRIE,@QINT            ; ENABLE ERROR INTERRUPT
  2007  025620  052777  000100  154324          BIS     #RDYIE,@QDMA            ; ENABLE RDY INTERRUPT
  2008  025626  052777  000001  154316          BIS     #GO,@QDMA               ; INITIATE DMA TRANSFER
  2009                                  ;
  2010                                  ; WAIT FOR INTERRUPT
  2011                                  ;
  2012  025634  013701  002532                  MOV     DEFAULT,R1              ; NUMBER OF SECONDS OF TIMEOUT
  2013  025640  012702  026000          60$:    MOV     #TIMOUT,R2              ; TIME OUT DELAY TO R2
  2014  025644                          65$:    BREAK                           ; ALLOW CONTROL C
        025644  104422                          TRAP    C$BRK
  2015  025646  005302                          DEC     R2                      ; DECREMENT TIMEOUT
  2016  025650  001375                          BNE     65$                     ; IF NOT DONE LOOP
  2017  025652  005301                          DEC     R1                      ; DECREMENT SECOND COUNTER
  2018  025654  001371                          BNE     60$                     ; IF NOT DONE, LOOP
  2019                                  ;
```

TEST 17: DMA PDP 11 TO VAX (BUFFERED DATA PATH)

```
                                        ; ERROR CONDITION, TIMEOUT OCCURED WAITING FOR INTERRUPT
                                        ;
                                                ERRHRD  49.,,ERR7               ; TELL OPERATOR TIMEOUT
025656  104456                                    TRAP    C$ERHRD
025660  000061                                    .WORD   49
025662  000000                                    .WORD   0
025664  007424                                    .WORD   ERR7
025666  004737  013116                            CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
025672  042777  000100  154252                    BIC     #RDYIE,@QDMA            ; CLEAR INTERRUPT BIT
025700  012701  013630                            MOV     #ABORT,R1               ; ABORT CODE TO R1
025704  000137  025776                            JMP     EQZ                     ; BRANCH TO END OF TEST
                                        ;
                                        ; END ERROR CONDITION
                                        ;
                                        ; DMA INTERRUPT SHOULD GO HERE
                                        ;
025710                                          BGNSRV  CXX1
025710                                  CXX1::
025710  042777  000100  154234                    BIC     #RDYIE,@QDMA            ; CLEAR INTERRUPT BIT
025716  012716  025724                            MOV     #CXX2,(SP)              ; CORRECT STACK
025722                                          ENDSRV
025722                                  L10043:
025722  000002                                    RTI
025724                                  CXX2:
025724  032777  100000  154214                    BIT     #ERR,@QINT              ; ERROR INTERRUPT?
025732  001414                                    BEQ     70$                     ; BRANCH IF NO ERROR INTERRUPT
                                        ;
                                        ; ERROR CONDITION, ERROR INTERRUPT OCCURED
                                        ;
025734                                          ERRHRD  50.,,ERR11              ; TELL OPERATOR ERROR INTERRUPT OCCURED
025734  104456                                    TRAP    C$ERHRD
025736  000062                                    .WORD   50
025740  000000                                    .WORD   0
025742  010030                                    .WORD   ERR11
025744  004737  013116                            CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
025750  005077  154172                            CLR     @QINT                   ; CLEAR INTERRUPT REGISTER
025754  012701  013630                            MOV     #ABORT,R1               ; ABORT CODE TO R1
025760  000137  025776                            JMP     EQZ                     ; BRANCH TO END OF TEST
                                        ;
                                        ; END ERROR CONDITION
                                        ;
025764                                  70$:
025764  052777  000001  154150                    BIS     #CMDACK,@QCMD           ; TELL MASTER DAM DONE
                                        ;
                                        ; END OF TEST
                                        ;
025772  012701  000000                            MOV     #0,R1                   ; END TEST NORMALLY
025776                                  EQZ:    CLRVEC  VECTOR                  ; CLEAR VECTOR
025776  013700  002444                            MOV     VECTOR,R0
026002  104436                                    TRAP    C$CVEC
026004                                          SETVEC  VECTOR,#ERRINT,#PRI07   ; SET UP INTERRUPT VECTOR
026004  012746  000340                            MOV     #PRI07,-(SP)
026010  012746  012652                            MOV     #ERRINT,-(SP)
026014  013746  002444                            MOV     VECTOR,-(SP)
026020  012746  000003                            MOV     #3,-(SP)
026024  104437                                    TRAP    C$SVEC
026026  062706  000010                            ADD     #10,SP
```

TEST 17: DMA PDP-11 TO VAX (BUFFERED DATA PATH)

```
2058 026032  052777  000100  154106          BIS     #ERRIE,@QINT            ; ENABLE ERROR INTERRUPT
2059
2060 026040  000207                          RTS     PC                      ; RETURN TO MAINLINE
2061
2062                                 ;
2063                                 ; DATA PATTERN FOR TEST
2064                                 ;
2065 026042  000000                  DPX4:   .WORD   0
2066 026044  177777                          .WORD   177777
```

TEST 18: DMA PDP 11 HI MEMORY TO VAX

```
                                        .SBTTL  TEST 18: DMA PDP-11 HI MEMORY TO VAX
                                        ;;*****************************************************************************
                                        ;**
                                        ;TEST DESCRIPTION-
                                        ; WRITE 2 WORD BUFFER FROM PDP-AA MAX MEMORY TO VAX
                                        ; CHECK DATA
                                        ;TEST STEPS-
                                        ;
                                        ;--
                                        ;;*****************************************************************************

                                                STATST
                                        TEST18::
026046  012737  000022  002114                  MOV     #18,L$TEST              ;TEST NUMBER FOR ERROR MESSAGES
026054  004737  013034                          CALL    BMSG                    ;CHECK FOR PNT FLAG
026060  013701  002532                          MOV     DEFAULT,R1              ; SECONDS OF TIME OUT
026064  012702  026000          8$:             MOV     #TIMOUT,R2              ; TIME OUT VALUE TO R2
026070                          10$:            BREAK
026070  104422                                  TRAP    C$BRK
026072  032777  004000  154046                  BIT     #CMDPRS,@QINT           ; COMMAND PRESENT?
026100  001020                                  BNE     20$                     ; IF COMMAND PRESENT, BRANCH
026102  005302                                  DEC     R2                      ; DECREMENT TIMEOUT REGISTER
026104  001371                                  BNE     10$                     ; IF NOT IN TIMEOUT, TRY AGAIN
026106  005301                                  DEC     R1                      ; DECREMENT SECOND TIMER
026110  001365                                  BNE     8$                      ; IF NOT TIMEOUT, AGAIN
                                        ;
                                        ; TIMEOUT ERROR CONDITION
                                        ;
026112  012701  000000                          MOV     #0,R1                   ; REGISTER # TO R1
026116                                          ERRHRD  51..,ERR2               ; TELL OPERATOR TIMEOUT¢
026116  104456                                  TRAP    C$ERHRD
026120  000063                                  .WORD   51
026122  000000                                  .WORD   0
026124  006506                                  .WORD   ERR2
026126  004737  013116                          CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
026132  012701  013630                          MOV     #ABORT,R1               ; ABORT CODE TO R1
026136  000137  026706                          JMP     EXZ                     ; ABORT TEST
                                        ;
                                        ; END TIMEOUT ERROR CONDITION
                                        ;
                                        ; COMMAND PRESENT WAS REALLY THERE
                                        ;
026142                                  20$:
026142  052777  000020  154000                  BIS     #QVREN,@QCTL            ; READ ENABLE
026150  012777  000000  154010                  MOV     #0,@QVAD                ; CLEAR VIEW REGISTER
026156  017737  154006  002514                  MOV     @QVDA,LOW16             ; READ LOW 16 BITS OF UNIBUS ADDRESS
026164  013777  002514  153762                  MOV     LOW16,@QUBA             ; LOAD LOW 16 BITS OF UNIBUS ADDRESS
026172  017737  153772  002516                  MOV     @QVDA,HI2               ; READ HI 2 BITS OF UNIBUS ADDRESS
026200  032737  177757  002516                  BIT     #^CBIT4!BIT5,HI2        ; SEE IF ONLY BITS 4 AND 5 ARE SET
026206  001412                                  BEQ     30$                     ; BRANCH IF OK
                                        ;
                                        ; ERROR CONDITION, MORE THAN BITS 4 OR 5 SET FOR EXTENDED ADDRESS ON UNIBUS
                                        ;
026210                                          ERRHRD  52..,ERR10              ; TELL OPERATOR ERROR
026210  104456                                  TRAP    C$ERHRD
026212  000064                                  .WORD   52
026214  000000                                  .WORD   0
```

TEST 18: DMA PDP 11 HI MEMORY TO VAX

```
                026216  007740                          .WORD   ERR10
2114            026220  004737  013116                  CALL    ENDERR          ; GO PRINT OUT ENDING TERMINATOR
2115            026224  012701  013630                  MOV     #ABORT,R1       ; ABORT CODE TO R1
2116            026230  000137  026706                  JMP     EXZ             ; END TEST
2117                                            ;
2118                                            ; END ERROR CONDITION
2119                                            ;
2120            026234                          30$:
2121            026234  053777  002516  153710          BIS     HI2,@QDMA       ; SET UP EXTENDED BITS IN EXP
2122            026242  017737  153722  002512          MOV     @QVDA,WORD.COUNT ; READ WORD FROM VIEW
2123                                            ;
2124                                            ; SET UP MEMORY MANAGEMENT
2125                                            ;
2126            026250  012737  000000  002520          MOV     #NO,MAPPING     ; DEFAULT IS NO MAPPING IN FLAG
2127            026256  013701  002120                  MOV     L$HIMEM,R1      ; GET PAR FORMAT MEM SIZE IN R1
2128            026262  020127  001600                  CMP     R1,#1600        ; SEE IF THERE IS A HI MEMORY
2129            026266  100415                          BMI     35$             ; BRANCH IF NO HI MEMORY
2130            026270  012737  000001  002520          MOV     #YES,MAPPING    ; SET MAPPING FLAG
2131            026276  004737  012754                  JSR     PC,MMINIT       ; INITIALIZE MEMORY MANAGEMENT
2132            026302  010137  172350                  MOV     R1,APR4         ; SET UP HI MEMORY IN APR4
2133            026306  012703  100000                  MOV     #100000,R3      ; SET UP BUFFER ADDRESS
2134            026312  012737  000001  177572          MOV     #BIT0,MMR0      ; TURN ON MEMORY MANAGEMENT
2135            026320  000402                          BR      38$             ; GO MOVE DATA PATTERN
2136                                            ;
2137                                            ; MOVE DATA PATTERN TO BUFFER
2138                                            ;
2139            026322  013703  002502          35$:    MOV     FREMEM,R3       ; GET STARTING ADDRESS OF BUFFER IN R3
2140            026326  013702  002512          38$:    MOV     WORD.COUNT,R2   ; GET WORD COUNT TO R2
2141            026332  005402                          NEG     R2              ; CONVERT WORD COUNT FROM 2'S COMP
2142            026334  012704  000002          40$:    MOV     #2,R4           ; # OF WORDS IN PATTERN
2143            026340  012701  026752                  MOV     #DP5,R1         ; POINT TO PATTERN
2144            026344  012123                  50$:    MOV     (R1)+,(R3)+     ; MOVE PATTERN WORD TO BUFFER
2145            026346  005302                          DEC     R2              ; DECREMENT WORD COUNT
2146            026350  001403                          BEQ     52$             ; BRANCH IF DONE
2147            026352  005304                          DEC     R4              ; DECREMENT PATTERN WORD COUNT
2148            026354  001373                          BNE     50$             ; IF NOT LAST PATTERN WORD, LOOP
2149            026356  000766                          BR      40$             ; START ALL OVER AGAIN
2150                                            ;
2151                                            ; BUFFER TAKEN CARE OF, SET AND WAIT FOR INTERRUPT
2152                                            ;
2153            026360  013777  002512  153572  52$:    MOV     WORD.COUNT,@QWC ; GET WORD.COUNT INTO QWC REGISTER
2154            026366  022737  000001  002520          CMP     #YES,MAPPING    ; ARE WE MAPPING
2155            026374  001407                          BEQ     55$             ; BRANCH IF YES
2156            026376  013777  002502  153552          MOV     FREMEM,@QBA     ; START ADDRESS OF BUFFER TO QBA
2157            026404  042777  037400  153540          BIC     #37400,@QDMA    ; MAKE SURE Q-BUS EXTENDED BITS ARE ZERO
2158            026412  000422                          BR      58$
2159                                            ;
2160                                            ; SET UP PDP ADDRESS WITH MAPPING ENABLED
2161                                            ;
2162                                            ; FIRST SET UP HIGH BITS 16 & 17
2163                                            ;
2164            026414  013703  002120          55$:    MOV     L$HIMEM,R3      ; GET PAR VALUE IN R3
2165            026420  006203                          ASR     R3              ; SET UP TO PUT IN QDMA
2166            026422  006203                          ASR     R3
2167            026424  042703  176377                  BIC     #^C1400,R3      ; MASK OUT UNWANTED BITS
2168            026430  050377  153516                  BIS     R3,@QDMA        ; SET UP QBUS EXTENDED BITS
2169                                            ;
```

```
2170                                    ; NOW SET UP LOW 16 BITS
2171                                    ;
2172 026434  013703  002120                    MOV     L$HIMEM,R3              ; GET PAR VALUE IN R3
2173 026440  006303                            ASL     R3                      ; MOVE OVER INTO PLACE
2174 026442  006303                            ASL     R3
2175 026444  006303                            ASL     R3
2176 026446  006303                            ASL     R3
2177 026450  006303                            ASL     R3
2178 026452  006303                            ASL     R3
2179 026454  010377  153476                    MOV     R3,@QBA                 ; LOAD LOW 16 BITS INTO QBA
2180                                    ;
2181                                    ; NOW SET DIRECTION BIT AND GO
2182                                    ;
2183 026460  052777  000002  153464  58$:     BIS     #DMAWT,@QDMA            ; SET UP FOR PDP TO VAX DMA TRANSFER
2184 026466                                    CLRVEC  VECTOR
     026466  013700  002444                    MOV     VECTOR,R0
     026472  104436                            TRAP    C$CVEC
2185 026474                                    SETVEC  VECTOR,#COL1,#PRI07     ; SET UP NEW INTERRUPT VECTOR
     026474  012746  000340                    MOV     #PRI07,-(SP)
     026500  012746  026620                    MOV     #COL1,-(SP)
     026504  013746  002444                    MOV     VECTOR,-(SP)
     026510  012746  000003                    MOV     #3,-(SP)
     026514  104437                            TRAP    C$SVEC
     026516  062706  000010                    ADD     #10,SP
2186 026522  052777  000100  153416            BIS     #ERRIE,@QINT            ; ENABLE ERROR INTERRUPT
2187 026530  052777  000100  153414            BIS     #RDYIE,@QDMA            ; ENABLE RDY INTERRUPT
2188 026536  052777  000001  153406            BIS     #GO,@QDMA               ; INITIATE DMA TRANSFER
2189                                    ;
2190                                    ; WAIT FOR INTERRUPT
2191                                    ;
2192 026544  013701  002532                    MOV     DEFAULT,R1              ; NUMBER OF SECONDS OF TIMEOUT
2193 026550  012702  026000            60$:    MOV     #TIMOUT,R2              ; TIME OUT DELAY TO R2
2194 026554                            65$:    BREAK                           ; ALLOW CONTROL C
     026554  104422                            TRAP    C$BRK
2195 026556  005302                            DEC     R2                      ; DECREMENT TIMEOUT
2196 026560  001375                            BNE     65$                     ; IF NOT DONE LOOP
2197 026562  005301                            DEC     R1                      ; DECREMENT SECOND COUNTER
2198 026564  001371                            BNE     60$                     ; IF NOT DONE, LOOP
2199                                    ;
2200                                    ; ERROR CONDITION, TIMEOUT OCCURED WAITING FOR INTERRUPT
2201                                    ;
2202 026566                                    ERRHRD  53.,,ERR7               ; TELL OPERATOR TIMEOUT
     026566  104456                            TRAP    C$ERHRD
     026570  000065                            .WORD   53
     026572  000000                            .WORD   0
     026574  007424                            .WORD   ERR7
2203 026576  004737  013116                    CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
2204 026602  042777  000100  153342            BIC     #RDYIE,@QDMA            ; CLEAR INTERRUPT BIT
2205 026610  012701  013630                    MOV     #ABORT,R1               ; ABORT CODE TO R1
2206 026614  000137  026706                    JMP     EXZ                     ; BRANCH TO END OF TEST
2207                                    ;
2208                                    ; END ERROR CONDITION
2209                                    ;
2210                                    ; DMA INTERRUPT SHOULD GO HERE
2211                                    ;
2212 026620                                    BGNSRV  COL1
     026620                            COL1::
```

TEST 18: DMA PDP 11 HI MEMORY TO VAX

```
2213 026620  042777  000100  153324          BIC     #RDYIE,@QDMA            ; CLEAR INTERRUPT BIT
2214 026626  012716  026634                  MOV     #COL2,(SP)              ; CORRECT STACK
2215 026632                                  ENDSRV
     026632                          L10044:
     026632  000002                          RTI
2216 026634                          COL2:
2217 026634  032777  100000  153304          BIT     #ERR,@QINT              ; ERROR INTERRUPT?
2218 026642  001414                          BEQ     70$                     ; BRANCH IF NO ERROR INTERRUPT
2219                                 ;
2220                                 ; ERROR CONDITION, ERROR INTERRUPT OCCURED
2221                                 ;
2222 026644                                  ERRMRD  54.,,ERR11              ; TELL OPERATOR ERROR INTERRUPT OCCURED
     026644  104456                          TRAP    C$ERMRD
     026646  000066                          .WORD   54
     026650  000000                          .WORD   0
     026652  010030                          .WORD   ERR11
2223 026654  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
2224 026660  005077  153262                  CLR     @QINT                   ; CLEAR INTERRUPT REGISTER
2225 026664  012701  013630                  MOV     #ABORT,R1               ; ABORT CODE TO R1
2226 026670  000137  026706                  JMP     EXZ                     ; BRANCH TO END OF TEST
2227                                 ;
2228                                 ; END ERROR CONDITION
2229                                 ;
2230 026674                          70$:
2231 026674  052777  000001  153240          BIS     #CMDACK,@QCMD           ; TELL MASTER DAM DONE
2232                                 ;
2233                                 ; END OF TEST
2234                                 ;
2235 026702  012701  000000                  MOV     #0,R1                   ; END TEST NORMALLY
2236 026706                          EXZ:    CLRVEC  VECTOR                  ; CLEAR VECTOR
     026706  013700  002444                  MOV     VECTOR,R0
     026712  104436                          TRAP    C$CVEC
2237 026714                                  SETVEC  VECTOR,#ERRINT,#PRI07   ; SET UP INTERRUPT VECTOR
     026714  012746  000340                  MOV     #PRI07,-(SP)
     026720  012746  012652                  MOV     #ERRINT,-(SP)
     026724  013746  002444                  MOV     VECTOR,-(SP)
     026730  012746  000003                  MOV     #3,-(SP)
     026734  104437                          TRAP    C$SVEC
     026736  062706  000010                  ADD     #10,SP
2238 026742  052777  000100  153176          BIS     #ERRIE,@QINT            ; ENABLE ERROR INTERRUPT
2239
2240 026750  000207                          RTS     PC                      ; RETURN TO MAINLINE
2241
2242                                 ;
2243                                 ; DATA PATTERN FOR TEST
2244                                 ;
2245 026752  055132                  DP5:    .WORD   055132
2246 026754  122645                          .WORD   122645
```

TEST 19: DMA VAX TO PDP 11 (32K BOUNDARY)

```
                                        .SBTTL  TEST 19: DMA VAX TO PDP 11 (32K BOUNDARY)
                                        ;;******************************************************************************
                                        ;**
                                        ;TEST DESCRIPTION-
                                        ; WRITE 2 WORD BUFFER FROM VAX COMMAND BRIDGE TO PDP CONTROL BRIDGE
                                        ; USING PDP-11 ADDRESS VALUES 177776-20000
                                        ; CHECK DATA
                                        ;TEST STEPS-
                                        ;
                                        ;--
                                        ;;******************************************************************************

                                                STATST
                                        TEST19::
                026756  012737  000023  002114          MOV     #19,L$TEST              ;TEST NUMBER FOR ERROR MESSAGES
                026764  004737  013034                  CALL    BMSG                    ;CHECK FOR PNT FLAG
                026770  013701  002532                  MOV     DEFAULT,R1              ; SECONDS OF TIME OUT
                026774  012702  026000          8$:     MOV     #TIMOUT,R2              ; TIME OUT VALUE TO R2
                027000                          10$:    BREAK
                027000  104422                          TRAP    C$BRK
                027002  032777  004000  153136          BIT     #CMDPRS,BQINT           ; COMMAND PRESENT?
                027010  001020                          BNE     20$                     ; IF COMMAND PRESENT, BRANCH
                027012  005302                          DEC     R2                      ; DECREMENT TIMEOUT REGISTER
                027014  001371                          BNE     10$                     ; IF NOT IN TIMEOUT, TRY AGAIN
                027016  005301                          DEC     R1                      ; DECREMENT SECOND TIMER
                027020  001365                          BNE     8$                      ; IF NOT TIMEOUT, AGAIN
                                        ;
                                        ; TIMEOUT ERROR CONDITION
                                        ;
                027022  012701  000000                  MOV     #0,R1                   ; REGISTER # TO R1
                027026                                  ERRHRD  55...ERR2               ; TELL OPERATOR TIMEOUT¢
                027026  104456                          TRAP    C$ERHRD
                027030  000067                          .WORD   55
                027032  000000                          .WORD   0
                027034  006506                          .WORD   ERR2
                027036  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
                027042  012701  013630                  MOV     #ABORT,R1               ; ABORT CODE TO R1
                027046  000137  030026                  JMP     EWW                     ; ABORT TEST
                                        ;
                                        ; END TIMEOUT ERROR CONDITION
                                        ;
                                        ; COMMAND PRESENT WAS REALLY THERE
                                        ;
                027052                  20$:
                027052  052777  000020  153070          BIS     #QVREN,BQCTL            ; READ ENABLE
                027060  012777  000000  153100          MOV     #0,BQVAD                ; CLEAR VIEW REGISTER
                027066  017737  153076  002514          MOV     BQVDA,LOW16             ; READ LOW 16 BITS OF UNIBUS ADDRESS
                027074  013777  002514  153052          MOV     LOW16,BQUBA             ; LOAD LOW 16 BITS OF UNIBUS ADDRESS
                027102  017737  153062  002516          MOV     BQVDA,HI2               ; READ HI 2 BITS OF UNIBUS ADDRESS
                027110  032737  177757  002516          BIT     #^CBIT4!BIT5,HI2        ; SEE IF ONLY BITS 4 AND 5 ARE SET
                027116  001412                          BEQ     30$                     ; BRANCH IF OK
                                        ;
                                        ; ERROR CONDITION, MORE THAN BITS 4 OR 5 SET FOR EXTENDED ADDRESS ON UNIBUS
                                        ;
                027120                                  ERRHRD  56...ERR10              ; TELL OPERATOR ERROR
                027120  104456                          TRAP    C$ERHRD
                027122  000070                          .WORD   56
```

TEST 19: DMA VAX TO PDP-11 (32K BOUNDARY)

```
        027124  000000                          .WORD   0
        027126  007740                          .WORD   ERR10
  2295  027130  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
  2296  027134  012701  013630                  MOV     #ABORT,R1               ; ABORT CODE TO R1
  2297  027140  000137  030026                  JMP     EWW                     ; END TEST
  2298                                  ;
  2299                                  ; END ERROR CONDITION
  2300                                  ;
  2301  027144                          30$:
  2302  027144  053777  002516  153000          BIS     HI2,@QDMA               ; SET UP EXTENDED BITS IN EXP
  2303  027152  017737  153012  002512          MOV     @QVDA,WORD.COUNT        ; READ WORD FROM VIEW
  2304                                  ;
  2305                                  ; MAKE SURE ENOUGH MEMORY IN
  2306                                  ;
  2307  027160  012737  000000  002520          MOV     #NO,MAPPING             ; DEFAULT NO MAPPING
  2308  027166  023727  002120  002000          CMP     L$HIMEM,#2000           ; CHECK FOR MEMORY SIZE
  2309  027174  100420                          BMI     33$                     ; IF NOT ENOUGH MEMORY, BRANCH
  2310                                  ;
  2311                                  ; THERE IS MEMORY AT THE 32KW BOUNDRY, SET UP MEMORY MANAGEMENT
  2312                                  ;
  2313  027176  012737  000001  002520          MOV     #YES,MAPPING            ; SET MAPPING FLAG
  2314  027204  004737  012754                  CALL    MMINIT                  ; INITIALIZE MEMORY MANAGEMENT
  2315  027210  012737  001777  172350          MOV     #1777,APR4              ; SET UP APR4 TO 177700
  2316  027216  012702  100076                  MOV     #100076,R2              ; POINT R2 TO ADDRESS
  2317  027222  012705  177776                  MOV     #177776,R5              ; PUT PHYSICAL ADDRESS IN R5
  2318  027226  012737  000001  177572          MOV     #BIT0,MMR0              ; TURN ON MEMORY MANAGEMENT
  2319  027234  000403                          BR      34$                     ; GO CLEAR BUFFER
  2320                                  ;
  2321                                  ; CLEAR BUFFER
  2322                                  ;
  2323  027236  013702  002502          33$:    MOV     FREMEM,R2               ; STARTING ADDRESS OF BUFFER
  2324  027242  010205                          MOV     R2,R5                   ; SAVE STARTING PHYSICAL ADDRESS
  2325  027244  013701  002512          34$:    MOV     WORD.COUNT,R1           ; GET WORD.COUNT IN R1
  2326  027250  005401                          NEG     R1                      ; CONVERT WORD COUNT FROM 2'S COMP
  2327  027252  005022                  35$:    CLR     (R2)+                   ; CLEAR WORD IN BUFFER
  2328  027254  005301                          DEC     R1                      ; DECREMENT COUNTER
  2329  027256  001375                          BNE     35$                     ; BRANCH BACK IF NOT DONE
  2330                                  ;
  2331                                  ; BUFFER CLEARED, SET UP FOR DMA
  2332                                  ;
  2333  027260  013777  002512  152672          MOV     WORD.COUNT,@QWC         ; MOVE WORD COUNT INTO QWC REGISTER
  2334  027266  010577  152664                  MOV     R5,@QBA                 ; START ADDRESS OF BUFFER TO QBA
  2335  027272  042777  037400  152652          BIC     #37400,@QDMA            ; MAKE SURE Q-BUS EXTENDED BITS ARE ZERO
  2336  027300  042777  000002  152644          BIC     #DMAWT,@QDMA            ; SET UP FOR VAX TO PDP DMA TRANSFER
  2337  027306                                  CLRVEC  VECTOR
        027306  013700  002444                  MOV     VECTOR,R0
        027312  104436                          TRAP    C$CVEC
  2338  027314                                  SETVEC  VECTOR,#COY1,#PRIO7     ; SET UP NEW INTERRUPT VECTOR
        027314  012746  000340                  MOV     #PRIO7,-(SP)
        027320  012746  027440                  MOV     #COY1,-(SP)
        027324  013746  002444                  MOV     VECTOR,-(SP)
        027330  012746  000003                  MOV     #3,-(SP)
        027334  104437                          TRAP    C$SVEC
        027336  062706  000010                  ADD     #10,SP
  2339  027342  052777  000100  152576          BIS     #ERRIE,@QINT            ; ENABLE ERROR INTERRUPT
  2340  027350  052777  000100  152574          BIS     #RDYIE,@QDMA            ; ENABLE RDY INTERRUPT
  2341  027356  052777  000001  152566          BIS     #GO,@QDMA               ; INITIATE DMA TRANSFER
```

```
2342                                    ;
2343                                    ; WAIT FOR INTERRUPT
2344                                    ;
2345 027364  013701  002532            40$:    MOV     DEFAULT,R1              ; NUMBER OF SECONDS OF TIMEOUT
2346 027370  012702  026000                    MOV     #TIMOUT,R2              ; TIME OUT DELAY TO R2
2347 027374                            45$:    BREAK                           ; ALLOW CONTROL C
     027374  104422                            TRAP    C$BRK
2348 027376  005302                            DEC     R2                      ; DECREMENT TIMEOUT
2349 027400  001375                            BNE     45$                     ; IF NOT DONE LOOP
2350 027402  005301                            DEC     R1                      ; DECREMENT SECOND COUNTER
2351 027404  001371                            BNE     40$                     ; IF NOT DONE, LOOP
2352                                    ;
2353                                    ; ERROR CONDITION, TIMEOUT OCCURED WAITING FOR INTERRUPT
2354                                    ;
2355 027406                                    ERRHRD  57,,ERR7                ; TELL OPERATOR TIMEOUT
     027406  104456                            TRAP    C$ERHRD
     027410  000071                            .WORD   57
     027412  000000                            .WORD   0
     027414  007424                            .WORD   ERR7
2356 027416  004737  013116                    CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
2357 027422  042777  000100  152522            BIC     #RDYIE,@QDMA            ; CLEAR INTERRUPT BIT
2358 027430  012701  013630                    MOV     #ABORT,R1               ; ABORT CODE TO R1
2359 027434  000137  030026                    JMP     EWW                     ; BRANCH TO END OF TEST
2360                                    ;
2361                                    ; END ERROR CONDITION
2362                                    ;
2363                                    ; DMA INTERRUPT SHOULD GO HERE
2364                                    ;
2365 027440                                    BGNSRV  COY1
     027440                            COY1::
2366 027440  042777  000100  152504            BIC     #RDYIE,@QDMA            ; CLEAR INTERRUPT BIT
2367 027446  012716  027454                    MOV     #COY2,(SP)              ; CORRECT STACK
2368 027452                                    ENDSRV
     027452                            L10045:
     027452  000002                            RTI
2369 027454                            COY2:
2370 027454  032777  100000  152464            BIT     #ERR,@QINT              ; ERROR INTERRUPT?
2371 027462  001414                            BEQ     50$                     ; BRANCH IF NO ERROR INTERRUPT
2372                                    ;
2373                                    ; ERROR CONDITION, ERROR INTERRUPT OCCURED
2374                                    ;
2375 027464                                    ERRHRD  58,,ERR11               ; TELL OPERATOR ERROR INTERRUPT OCCURED
     027464  104456                            TRAP    C$ERHRD
     027466  000072                            .WORD   58
     027470  000000                            .WORD   0
     027472  010030                            .WORD   ERR11
2376 027474  004737  013116                    CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
2377 027500  005077  152442                    CLR     @QINT                   ; CLEAR INTERRUPT REGISTER
2378 027504  012701  013630                    MOV     #ABORT,R1               ; ABORT CODE TO R1
2379 027510  000137  030026                    JMP     EWW                     ; BRANCH TO END OF TEST
2380                                    ;
2381                                    ; END ERROR CONDITION
2382                                    ;
2383 027514                            50$:
2384 027514  052777  000001  152420            BIS     #CMDACK,@QCMD           ; TELL MASTER DAM DONE
2385 027522                                    CLRVEC  VECTOR                  ; CLEAR VECTOR
     027522  013700  002444                    MOV     VECTOR,R0
```

TEST 19: DMA VAX TO PDP-11 (32K BOUNDARY)

```
        027526  104436                          TRAP    C$CVEC
   2386 027530                                  SETVEC  VECTOR,#ERRINT,#PRIO7   ; SET UP INTERRUPT VECTOR
        027530  012746  000340                  MOV     #PRIO7,-(SP)
        027534  012746  012652                  MOV     #ERRINT,-(SP)
        027540  013746  002444                  MOV     VECTOR,-(SP)
        027544  012746  000003                  MOV     #3,-(SP)
        027550  104437                          TRAP    C$SVEC
        027552  062706  000010                  ADD     #10,SP
   2387 027556  052777  000100  152362         BIS     #ERRIE,@QINT            ; ENABLE ERROR INTERRUPT
   2388                                 ;
   2389                                 ; NOW CHECK DATA
   2390                                 ;
   2391 027564  013701  002502                  MOV     FREMEM,R1               ; R1 TO START OF BUFFER
   2392 027570  022737  000000  002520         CMP     #NO,MAPPING             ; WAS MAPPING USED?
   2393 027576  001402                          BEQ     60$                     ; BRANCH IF NO MAPPING
   2394                                 ;
   2395                                 ; MAPPING WAS USED
   2396                                 ;
   2397 027600  012701  100076                  MOV     #100076,R1
   2398 027604  013702  002512          60$:    MOV     WORD.COUNT,R2           ; R2 GETS WORD COUNT
   2399 027610  005402                          NEG     R2                      ; CONVERT WORD COUNT FROM 2'S COMP.
   2400                                 ;
   2401                                 ; NOW CHECK BUFFER AGAINST PATTERN
   2402                                 ;
   2403 027612  005037  002462                  CLR     ERROR1                  ; CLEAR ERROR COUNTER
   2404 027616  012704  000002          100$:   MOV     #2,R4                   ; # OF WORDS IN PATTERN
   2405 027622  012703  030112                  MOV     #DP6,R3                 ; R3 GETS PATTERN ADDRESS
   2406 027626  012137  002454          110$:   MOV     (R1)+,VAL               ; GET WORD FROM BUFFER
   2407 027632  012337  002456                  MOV     (R3)+,EXP               ; GET EXPECTED PATTERN IN EXP
   2408 027636  023737  002454  002456         CMP     VAL,EXP                 ; COMPARE VALUE WITH EXPECTED
   2409 027644  001442                          BEQ     130$                    ; IF OK, BRANCH
   2410                                 ;
   2411                                 ; ERROR CONDITION, NOT WHAT EXPECTED IN BUFFER
   2412                                 ;
   2413 027646  005737  002462                  TST     ERROR1                  ; ANY OTHER ERRORS OCCURED
   2414 027652  001004                          BNE     120$                    ; SKIP HEADER ERROR IF ALREADY PRINTED
   2415 027654                                  ERRHRD  59.,,ERR8               ; PRINT ERROR HARD MESSAGE
        027654  104456                          TRAP    C$ERHRD
        027656  000073                          .WORD   59
        027660  000000                          .WORD   0
        027662  007530                          .WORD   ERR8
   2416 027664  005237  002462          120$:   INC     ERROR1                  ; INCREMENT ERROR COUNTER
   2417 027670  022737  000012  002462         CMP     #10.,ERROR1             ; SEE IF TOO MANY MESSAGES PRINTED
   2418 027676  103425                          BCS     130$                    ; IF TOO MANY, BRANCH
   2419 027700  013737  002512  002474         MOV     WORD.COUNT,COUNTER      ; CALCULATE WORD NUMBER
   2420 027706  005437  002474                  NEG     COUNTER                 ; CONVERT WORD COUNT FROM 2'S COMP
   2421 027712  160237  002474                  SUB     R2,COUNTER
   2422 027716                                  PRINTX  #FOR10,COUNTER,VAL,EXP  ; PRINT DETAIL LINE
        027716  013746  002456                  MOV     EXP,-(SP)
        027722  013746  002454                  MOV     VAL,-(SP)
        027726  013746  002474                  MOV     COUNTER,-(SP)
        027732  012746  004230                  MOV     #FOR10,-(SP)
        027736  012746  000004                  MOV     #4,-(SP)
        027742  010600                          MOV     SP,R0
        027744  104415                          TRAP    C$PNTX
        027746  062706  000012                  ADD     #12,SP
   2423                                 ;
```

```
                                        ; END ERROR CONDITION
                                        ;
027752                                  130$:
027752  005302                                  DEC     R2                      ; DECREMENT WORD COUNT
027754  001403                                  BEQ     140$                    ; BRANCH OUT IF DONE
027756  005304                                  DEC     R4                      ; DECREMENT PATTERN WORD COUNT
027760  001322                                  BNE     110$                    ; BRANCH IF NOT DONE WITH PATTERN
027762  000715                                  BR      100$                    ; BRANCH IF DONE WITH PATTERN
                                        ;
                                        ; BUFFER CHECKED, PRINT TOTAL ERROR COUNT IF NECESSARY
                                        ;
027764                                  140$:
027764  005737  002462                          TST     ERROR1                  ; ANY ERRORS
027770  001414                                  BEQ     150$                    ; IF NO ERRORS, BRANCH
027772                                          PRINTB  #FOR11,ERROR1           ; TELL TOTAL ERROR COUNT
027772  013746  002462                          MOV     ERROR1,-(SP)
027776  012746  004253                          MOV     #FOR11,-(SP)
030002  012746  000002                          MOV     #2,-(SP)
030006  010600                                  MOV     SP,R0
030010  104414                                  TRAP    C$PNTB
030012  062706  000006                          ADD     #6,SP
030016  004737  013116                          CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
                                        ;
                                        ; END OF TEST
                                        ;
030022  012701  0[illegible]00          150$:   MOV     #0,R1                   ; END TEST NORMALLY
030026                                  EWW:    CLRVEC  VECTOR                  ; CLEAR VECTOR
030026  013700  002444                          MOV     VECTOR,R0
030032  104436                                  TRAP    C$CVEC
030034                                          SETVEC  VECTOR,#ERRINT,#PRI07   ; SET UP INTERRUPT VECTOR
030034  012746  000340                          MOV     #PRI07,-(SP)
030040  012746  012652                          MOV     #ERRINT,-(SP)
030044  013746  002444                          MOV     VECTOR,-(SP)
030050  012746  000003                          MOV     #3,-(SP)
030054  104437                                  TRAP    C$SVEC
030056  062706  000010                          ADD     #10,SP
030062  052777  000100  152056                  BIS     #ERRIE,@QINT            ; ENABLE ERROR INTERRUPT
030070  022737  000000  002520                  CMP     #NO,MAPPING             ; WAS MAPPING USED?
030076  001404                                  BEQ     160$                    ; BRANCH IF NO MAPPING
                                        ;
                                        ; MAPPING WAS USED, RESTORE MAPPING REGISTERS AND TURN OFF MAPPING
                                        ;
030100  004737  012754                          JSR     PC,MMINIT               ; RESTORE MM TO NORMAL
030104  005037  177572                          CLR     MMR0                    ; DISABLE MEMORY MANAGEMENT
030110                                  160$:
030110  000207                                  RTS     PC                      ; RETURN TO MAINLINE
                                        ;
                                        ; DATA PATTERN FOR TEST
                                        ;
030112  055132                          DP6:    .WORD   055132
030114  122645                                  .WORD   122645
```

```
                                .SBTTL  TEST 20: WATCHDOG TIMER
                                ;;******************************************************************************
                                ;:
                                ;TEST DESCRIPTION:
                                ; ENABLE WATCHDOG TIMER AND CHECKS FOR INTERRUPT
                                ; REPEATS FOR ALL TIMER INTERRUPTS
                                ;
                                ;TEST STEPS:
                                ; 1)    CMD QIO WITH INTERRUPT ENABLED; WAIT WITH TIME OUT
                                ; 2)      SET UP INTERVAL AND ENABLE TIMER
                                ; 3)    REPEAT FOR ALL TIMER INTERVALS
                                ;
                                ;;******************************************************************************
                                        STATST
030116                          TEST20::
030116  012737  000024  002114          MOV     #20,L$TEST              ;TEST NUMBER FOR ERROR MESSAGES
030124  004737  013034                  CALL    BMSG                    ;CHECK FOR PNT FLAG
                                ;
                                ; SET UP STARTING VALUES
                                ;
030130  012705  030412                  MOV     #WDTBUF,R5              ; POINT TO FIRST TIME PATTERN
030134  005037  002524                  CLR     LOOPS                   ; INITIALIZE LOOP COUNTER
                                ;
                                ; SET UP AND ENABLE WATCHDOG TIMER
                                ;
030140  005237  002524          10$:    INC     LOOPS                   ; INCREMENT LOOP COUNTER
030144  012577  152000                  MOV     (R5)+,@QCTL             ; SET UP TIMER CODE
030150  052777  000002  151772          BIS     #TMRENB,@QCTL           ; HIT TIMER ENABLE
                                ;
                                ; NOW WAIT FOR EVENT ACK
                                ;
030156  012701  000005                  MOV     #5.,R1                  ; NUMBER OF SECONDS TO TIME OUT ! VB1 DFP
030162  012702  026000          30$:    MOV     #TIMOUT,R2              ; TIME OUT VALUE TO R2
030166                          40$:    BREAK                           ; ALLOW CONTROL C
030166  104422                          TRAP    C$BRK
030170  032777  002000  151750          BIT     #VNTACK,@QINT           ; EVENT PRESENT?
030176  001033                          BNE     50$                     ; IF EVENT PRESENT, BRANCH
030200  005302                          DEC     R2                      ; DECREMENT TIMEOUT REGISTER
030202  001371                          BNE     40$                     ; IF NOT IN TIMEOUT, TRY AGAIN
030204  005301                          DEC     R1                      ; DECREMENT SECOND TIMER
030206  001365                          BNE     30$                     ; IF NOT TIMEOUT, AGAIN
                                ;
                                ; TIMEOUT ERROR CONDITION
                                ;
030210  012701  000001                  MOV     #1,R1                   ; REGISTER NUMBER TO R1
030214                                  ERRHRD  60.,,ERR2               ; TELL OPERATOR TIMEOUT
030214  104456                          TRAP    C$ERHRD
030216  000074                          .WORD   60
030220  000000                          .WORD   0
030222  006506                          .WORD   ERR2
030224                                  PRINTX  #FOR23,LOOPS            ; TELL OPERATOR LOOP #
030224  013746  002524                  MOV     LOOPS,-(SP)
030230  012746  005314                  MOV     #FOR23,-(SP)
030234  012746  000002                  MOV     #2,-(SP)
030240  010600                          MOV     SP,R0
030242  104415                          TRAP    C$PNTX
030244  062706  000006                  ADD     #6,SP
```

TEST 20: WATCHDOG TIMER

```
2506 030250  004737  013116                    CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
2507 030254  012701  013630                    MOV     #ABORT,R1               ; ABORT CODE TO R1
2508 030260  005077  151664                    CLR     @QCTL                   ; CLEAR THE CONTROL REGISTER
2509 030264  000451                            BR      100$                    ; ABORT TEST
2510                                           ;
2511                                           ; END TIMEOUT ERROR CONDITION
2512                                           ;
2513                                           ;EVENT ACK RECEIVED, WAIT FOR VNTACK CLEAR
2514                                           ;
2515 030266                                    50$:
2516 030266  013701  002532                    MOV     DEFAULT,R1              ; NUMBER OF SECONDS TO TIME OUT
2517 030272  012702  026000                    60$:    MOV     #TIMOUT,R2      ; TIME OUT VALUE TO R2
2518 030276                                    70$:    BREAK                   ; ALLOW CONTROL C
     030276  104422                                    TRAP    C$BRK
2519 030300  032777  002000  151640                    BIT     #VNTACK,@QINT   ; EVENT PRESENT CLEAR?
2520 030306  001431                            BEQ     80$                     ; IF EVENT PRESENT, BRANCH
2521 030310  005302                            DEC     R2                      ; DECREMENT TIMEOUT REGISTER
2522 030312  001371                            BNE     70$                     ; IF NOT IN TIMEOUT, TRY AGAIN
2523 030314  005301                            DEC     R1                      ; DECREMENT SECOND TIMER
2524 030316  001365                            BNE     60$                     ; IF NOT TIMEOUT, AGAIN
2525                                           ;
2526                                           ; TIMEOUT ERROR CONDITION
2527                                           ;
2528 030320                                    ERRHRD  61.,,ERR16              ; TELL OPERATOR TIMEOUT
     030320  104456                            TRAP    C$ERHRD
     030322  000075                            .WORD   61
     030324  000000                            .WORD   0
     030326  010552                            .WORD   ERR16
2529 030330                                    PRINTX  #FOR23,COUNTER          ; TELL OPERATOR LOOP #
     030330  013746  002474                    MOV     COUNTER,-(SP)
     030334  012746  005314                    MOV     #FOR23,-(SP)
     030340  012746  000002                    MOV     #2,-(SP)
     030344  010600                            MOV     SP,R0
     030346  104415                            TRAP    C$PNTX
     030350  062706  000006                    ADD     #6,SP
2530 030354  004737  013116                    CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
2531 030360  012701  013630                    MOV     #ABORT,R1               ; ABORT CODE TO R1
2532 030364  005077  151560                    CLR     @QCTL                   ; CLEAR THE CONTROL REGISTER
2533 030370  000407                            BR      100$                    ; ABORT TEST
2534                                           ;
2535                                           ; END TIMEOUT ERROR CONDITION, SET UP NEXT TIME OR EXIT
2536                                           ;
2537 030372                                    80$:
2538 030372  005077  151552                    CLR     @QCTL                   ; CLEAR THE CONTROL REGISTER
2539 030376  022737  000004  002524            CMP     #4,LOOPS                ; IS LOOP COUNTER AT MAXIMUM?
2540 030404  001255                            BNE     10$                     ; BRANCH BACK IF NOT DONE
2541 030406  005000                            CLR     R0                      ; END OK CODE
2542 030410                                    100$:
2543 030410  000207                            RETURN
2544                                           ;
2545                                           ; WATCH DOG TIMER TIME PATTERNS
2546                                           ;
2547 030412  000014                            WDTBUF: TIME4
2548 030414  000010                                    TIME2
2549 030416  000004                                    TIME1
2550 030420  000000                                    TIME.5
```

```
                                .SBTTL  TEST 21: DMA THROTTLE
                                ;;******************************************************************************
                                ;+
                                ;TEST DESCRIPTION-
                                ; SETS DMA THROTTLE
                                ; DMA'S TO PDP-11
                                ; CHECKS DATA
                                ;
                                ;TEST STEPS-
                                ; U     CTL QIO TO SET THROTTLE
                                ; Q       WAIT FOR INTERRUPT
                                ; U     WRITE QIO WITH 256 WORDS
                                ; Q       CHECK DATA
                                ;       REPEAT FOR ALL THROTTLE VALUES
                                ;-
                                ;;******************************************************************************
                                        STATST
                                TEST21::
030422  012737  000025  002114          MOV     #21,L$TEST              ;TEST NUMBER FOR ERROR MESSAGES
030430  004737  013034                  CALL    BMSG                    ;CHECK FOR PNT FLAG
030434  005037  002524                  CLR     LOOPS                   ; # OF PASSES COUNTER
030440                          TST19:
030440  005237  002524                  INC     LOOPS                   ; INCREMENT PASS COUNTER
030444  013701  002532                  MOV     DEFAULT..1              ; SECONDS OF TIME OUT
030450  012702  026000          8$:     MOV     #TIMOUT,R2              ; TIME OUT VALUE TO R2
030454                          10$:    BREAK
030454  104422                          TRAP    C$BRK
030456  032777  004000  151462          BIT     #CMDPRS,@QINT           ; COMMAND PRESENT?
030464  001032                          BNE     20$                     ; IF COMMAND PRESENT, BRANCH
030466  005302                          DEC     R2                      ; DECREMENT TIMEOUT REGISTER
030470  001371                          BNE     10$                     ; IF NOT IN TIMEOUT, TRY AGAIN
030472  005301                          DEC     R1                      ; DECREMENT SECOND TIMER
030474  001365                          BNE     8$                      ; IF NOT TIMEOUT, AGAIN
                                ;
                                ; TIMEOUT ERROR CONDITION
                                ;
030476  012701  000000                  MOV     #0,R1                   ; REGISTER # TO R1
030502                                  ERRHRD  62,,ERR2                ; TELL OPERATOR TIMEOUT
030502  104456                          TRAP    C$ERHRD
030504  000076                          .WORD   62
030506  000000                          .WORD   0
030510  006506                          .WORD   ERR2
030512                                  PRINTX  #FOR24,LOOPS            ; TELL OPERATOR WHICH LOOP
030512  013746  002524                  MOV     LOOPS,-(SP)
030516  012746  005343                  MOV     #FOR24,-(SP)
030522  012746  000002                  MOV     #2,-(SP)
030526  010600                          MOV     SP,R0
030530  104415                          TRAP    C$PNTX
030532  062706  000006                  ADD     #6,SP
030536  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
030542  012701  013630                  MOV     #ABORT,R1               ; ABORT CODE TO R1
030546  000137  031436                  JMP     E19                     ; ABORT TEST
                                ;
                                ; END TIMEOUT ERROR CONDITION
                                ;
                                ; COMMAND PRESENT WAS REALLY THERE
                                ;
```

```
2595 030552                                    20$:
2596 030552  052777  000020  151370                    BIS     #QVREN,@QCTL            ; READ ENABLE
2597 030560  012777  000000  151400                    MOV     #0,@QVAD                ; CLEAR VIEW REGISTER
2598 030566  017737  151376  002514                    MOV     @QVDA,LOW16             ; READ LOW 16 BITS OF UNIBUS ADDRESS
2599 030574  013777  002514  151352                    MOV     LOW16,@QUBA             ; LOAD LOW 16 BITS OF UNIBUS ADDRESS
2600 030602  017737  151362  002516                    MOV     @QVDA,HI2               ; READ HI 2 BITS OF UNIBUS ADDRESS
2601 030610  032737  177757  002516                    BIT     #^CBIT4!BIT5,HI2        ; SEE IF ONLY BITS 4 AND 5 ARE SET
2602 030616  001412                                    BEQ     30$                     ; BRANCH IF OK
2603                                           ;
2604                                           ; ERROR CONDITION, MORE THAN BITS 4 OR 5 SET FOR EXTENDED ADDRESS ON UNIBUS
2605                                           ;
2606 030620                                            ERRHRD  63.,,ERR10              ; TELL OPERATOR ERROR
     030620  104456                                    TRAP    C$ERHRD
     030622  000077                                    .WORD   63
     030624  000000                                    .WORD   0
     030626  007740                                    .WORD   ERR10
2607 030630  004737  013116                            CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
2608 030634  012701  013630                            MOV     #ABORT,R1               ; ABORT CODE TO R1
2609 030640  000137  031436                            JMP     E19                     ; END TEST
2610                                           ;
2611                                           ; END ERROR CONDITION
2612                                           ;
2613 030644                                    30$:
2614 030644  053777  002516  151300                    BIS     HI2,@QDMA               ; SET UP EXTENDED BITS IN EXP
2615 030652  017737  151312  002512                    MOV     @QVDA,WORD.COUNT        ; READ WORD COUNT FROM VIEW
2616                                           ;
2617                                           ; CLEAR BUFFER
2618                                           ;
2619 030660  013701  002512                            MOV     WORD.COUNT,R1           ; GET WORD.COUNT IN R1
2620 030664  005401                                    NEG     R1                      ; CHANGE FROM 2'S COMP
2621 030666  013702  002502                            MOV     FREMEM,R2               ; STARTING ADDRESS OF BUFFER
2622 030672  005022                            35$:    CLR     (R2)+                   ; CLEAR BYTE IN BUFFER
2623 030674  005301                                    DEC     R1                      ; DECREMENT COUNTER
2624 030676  001375                                    BNE     35$                     ; BRANCH BACK IF NOT DONE
2625                                           ;
2626                                           ; BUFFER CLEARED, SET UP FOR DMA
2627                                           ;
2628 030700  013777  002512  151252                    MOV     WORD.COUNT,@QWC         ; MOVE WORD COUNT INTO QWC REGISTER
2629 030706  013777  002502  151242                    MOV     FREMEM,@QBA             ; START ADDRESS OF BUFFER TO QBA
2630 030714  042777  037400  151230                    BIC     #37400,@QDMA            ; MAKE SURE Q-BUS EXTENDED BITS ARE ZERO
2631 030722  042777  000002  151222                    BIC     #DMAWT,@QDMA            ; SET UP FOR VAX TO PDP DMA TRANSFER
2632 030730                                            CLRVEC  VECTOR
     030730  013700  002444                            MOV     VECTOR,R0
     030734  104436                                    TRAP    C$CVEC
2633 030736                                            SETVEC  VECTOR,#C19.1,#PRI07    ; SET UP NEW INTERRUPT VECTOR
     030736  012746  000340                            MOV     #PRI07,-(SP)
     030742  012746  031062                            MOV     #C19.1,-(SP)
     030746  013746  002444                            MOV     VECTOR,-(SP)
     030752  012746  000003                            MOV     #3,-(SP)
     030756  104437                                    TRAP    C$SVEC
     030760  062706  000010                            ADD     #10,SP
2634 030764  052777  000100  151154                    BIS     #ERRIE,@QINT            ; ENABLE ERROR INTERRUPT
2635 030772  052777  000100  151152                    BIS     #RDYIE,@QDMA            ; ENABLE RDY INTERPUPT
2636 031000  052777  000001  151144                    BIS     #GO,@QDMA               ; INITIATE DMA TRANSFER
2637                                           ;
2638                                           ; WAIT FOR INTERRUPT
2639                                           ;
```

TEST 21: DMA THROTTLE

```
2640 031006  013701  002532                MOV     DEFAULT,R1              ; NUMBER OF SECONDS OF TIMEOUT
2641 031012  012702  026000          40$:  MOV     #TIMOUT,R2              ; TIME OUT DELAY TO R2
2642 031016                          45$:  BREAK                           ; ALLOW CONTROL C
     031016  104422                       TRAP    C$BRK
2643 031020  005302                       DEC     R2                      ; DECREMENT TIMEOUT
2644 031022  001375                       BNE     45$                     ; IF NOT DONE LOOP
2645 031024  005301                       DEC     R1                      ; DECREMENT SECOND COUNTER
2646 031026  001371                       BNE     40$                     ; IF NOT DONE, LOOP
2647                                      ;
2648                                      ; ERROR CONDITION, TIMEOUT OCCURED WAITING FOR INTERRUPT
2649                                      ;
2650 031030                               ERRHRD  64.,,ERR7               ; TELL OPERATOR TIMEOUT
     031030  104456                       TRAP    C$ERHRD
     031032  000100                       .WORD   64
     031034  000000                       .WORD   0
     031036  007424                       .WORD   ERR7
2651 031040  004737  013116               CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
2652 031044  042777  000100  151100       BIC     #RDYIE,@QDMA            ; CLEAR INTERRUPT BIT
2653 031052  012701  013630               MOV     #ABORT,R1               ; ABORT CODE TO R1
2654 031056  000137  031436               JMP     E19                     ; BRANCH TO END OF TEST
2655                                      ;
2656                                      ; END ERROR CONDITION
2657                                      ;
2658                                      ; DMA INTERRUPT SHOULD GO HERE
2659                                      ;
2660 031062                               BGNSRV  C19.1
     031062                           C19.1::
2661 031062  042777  000100  151062       BIC     #RDYIE,@QDMA            ; CLEAR INTERRUPT BIT
2662 031070  012716  031076               MOV     #C19.2,(SP)             ; CORRECT STACK
2663 031074                               ENDSRV
     031074                           L10046:
     031074  000002                       RTI
2664 031076                          C19.2:
2665 031076  032777  100000  151042       BIT     #ERR,@QINT              ; ERROR INTERRUPT?
2666 031104  001412                       BEQ     50$                     ; BRANCH IF NO ERROR INTERRUPT
2667                                      ;
2668                                      ; ERROR CONDITION, ERROR INTERRUPT OCCURED
2669                                      ;
2670 031106                               ERRHRD  65.,,ERR11              ; TELL OPERATOR ERROR INTERRUPT OCCURED
     031106  104456                       TRAP    C$ERHRD
     031110  000101                       .WORD   65
     031112  000000                       .WORD   0
     031114  010030                       .WORD   ERR11
2671 031116  004737  013116               CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
2672 031122  012701  013630               MOV     #ABORT,R1               ; ABORT CODE TO R1
2673 031126  000137  031436               JMP     E19                     ; BRANCH TO END OF TEST
2674                                      ;
2675                                      ; END ERROR CONDITION
2676                                      ;
2677 031132                          50$:
2678 031132  052777  000001  151002       BIS     #CMDACK,@QCMD           ; TELL MASTER DAM DONE
2679 031140                               CLRVEC  VECTOR                  ; CLEAR VECTOR
     031140  013700  002444               MOV     VECTOR,R0
     031144  104436                       TRAP    C$CVEC
2680 031146                               SETVEC  VECTOR,#ERRINT,#PRI07   ; SET UP INTERRUPT VECTOR
     031146  012746  000340               MOV     #PRI07,-(SP)
     031152  012746  012652               MOV     #ERRINT,-(SP)
```

TEST 21: DMA THROTTLE

```
                031156  013746  002444                  MOV     VECTOR, (SP)
                031162  012746  000003                  MOV     #3, (SP)
                031166  104437                          TRAP    C$SVEC
                031170  062706  000010                  ADD     #10,SP
2681            031174  052777  000100  150744          BIS     #ERRIE,@QINT            ; ENABLE ERROR INTERRUPT
2682                                                    ;
2683                                                    ; NOW CHECK DATA
2684                                                    ;
2685            031202  013701  002502                  MOV     FREMEM,R1               ; R1 TO START OF BUFFER
2686            031206  013702  002512                  MOV     WORD.COUNT,R2           ; R2 GETS WORD COUNT
2687            031212  0054 )2                         NEG     R2                      ; CHANGE WORD COUNT FROM 2'S COMP
2688                                                    ;
2689                                                    ; NOW CHECK BUFFER AGAINST PATTERN
2690                                                    ;
2691            031214  005037  002462                  CLR     ERROR1                  ; CLEAR ERROR COUNTER
2692            031220  005037  002474                  CLR     COUNTER                 ; CLEAR COUNTER
2693            031224  012704  000002          100$:   MOV     #2,R4                   ; # OF WORDS IN PATTERN
2694            031230  012703  031502                  MOV     #DP19,R3                ; R3 GETS PATTERN ADDRESS
2695            031234  012137  002454          110$:   MOV     (R1)+,VAL               ; GET WORD FROM BUFFER
2696            031240  012337  002456                  MOV     (R3)+,EXP               ; GET EXPECTED PATTERN IN EXP
2697            031244  005237  002474                  INC     COUNTER                 ; INCREMENT ADDRESS COUNTER
2698            031250  023737  002454  002456          CMP     VAL,EXP                 ; COMPARE VALUE WITH EXPECTED
2699            031256  001433                          BEQ     130$                    ; IF OK, BRANCH
2700                                                    ;
2701                                                    ; ERROR CONDITION, NOT WHAT EXPECTED IN BUFFER
2702                                                    ;
2703            031260  005737  002462                  TST     ERROR1                  ; ANY OTHER ERRORS OCCURED
2704            031264  001004                          BNE     120$                    ; SKIP HEADER ERROR IF ALREADY PRINTED
2705            031266                                  ERRHRD  66...ERR14              ; PRINT ERROR HARD MESSAGE
                031266  104456                          TRAP    C$ERHRD
                031270  000102                          .WORD   66
                031272  000000                          .WORD   0
                031274  010336                          .WORD   ERR14
2706            031276  005237  002462          120$:   INC     ERROR1                  ; INCREMENT ERROR COUNTER
2707            031302  022737  000012  002462          CMP     #10.,ERROR1             ; SEE IF TOO MANY MESSAGES PRINTED
2708            031310  103416                          BCS     130$                    ; IF TOO MANY, BRANCH
2709            031312                                  PRINTX  #FOR10,COUNTER,VAL,EXP  ; PRINT DETAIL LINE
                031312  013746  002456                  MOV     EXP,-(SP)
                031316  013746  002454                  MOV     VAL,-(SP)
                031322  013746  002474                  MOV     COUNTER,-(SP)
                031326  012746  004230                  MOV     #FOR10,-(SP)
                031332  012746  000004                  MOV     #4,-(SP)
                031336  010600                          MOV     SP,R0
                031340  104415                          TRAP    C$PNTX
                031342  062706  000012                  ADD     #12,SP
2710                                                    ;
2711                                                    ; END ERROR CONDITION
2712                                                    ;
2713            031346                          130$:
2714            031346  005302                          DEC     R2                      ; DECREMENT WORD COUNT
2715            031350  001403                          BEQ     140$                    ; BRANCH OUT IF DONE
2716            031352  005304                          DEC     R4                      ; DECREMENT PATTERN WORD COUNT
2717            031354  001327                          BNE     110$                    ; BRANCH IF NOT DONE WITH PATTERN
2718            031356  000722                          BR      100$                    ; BRANCH IF DONE WITH PATTERN
2719                                                    ;
2720                                                    ; BUFFER CHECKED, PRINT TOTAL ERROR COUNT IF NECESSARY
2721                                                    ;
```

TEST 21: DMA THROTTLE

```
2722 031360                                  140$:
2723 031360  005737  002462                         TST     ERROR1                  ; ANY ERRORS
2724 031364  001414                                 BEQ     150$                    ; IF NO ERRORS, BRANCH
2725 031366                                         PRINTB  #FOR11,ERROR1           ; TELL TOTAL ERROR COUNT
     031366  013746  002462                         MOV     ERROR1,-(SP)
     031372  012746  004253                         MOV     #FOR11,-(SP)
     031376  012746  000002                         MOV     #2,-(SP)
     031402  010600                                 MOV     SP,R0
     031404  104414                                 TRAP    C$PNTB
     031406  062706  000006                         ADD     #6,SP
2726 031412  004737  013116                         CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
2727                                         ;
2728                                         ; END OF TEST
2729                                         ;
2730 031416  022737  000004  002524  150$:   CMP     #4,LOOPS                ; IS IT DONE
2731 031424  001402                                 BEQ     160$                    ; IF DONE, BRANCH
2732 031426  000137  030440                         JMP     TST19                   ; IF NOT DONE, AGAIN
2733 031432  012701  000000          160$:   MOV     #0,R1                   ; END NORMALLY CODE
2734 031436                          E19:    CLRVEC  VECTOR                  ; CLEAR VECTOR
     031436  013700  002444                         MOV     VECTOR,R0
     031442  104436                                 TRAP    C$CVEC
2735 031444                                         SETVEC  VECTOR,#ERRINT,#PRI07   ; SET UP INTERRUPT VECTOR
     031444  012746  000340                         MOV     #PRI07,-(SP)
     031450  012746  012652                         MOV     #ERRINT,-(SP)
     031454  013746  002444                         MOV     VECTOR,-(SP)
     031460  012746  000003                         MOV     #3,-(SP)
     031464  104437                                 TRAP    C$SVEC
     031466  062706  000010                         ADD     #10,SP
2736 031472  052777  000100  150446                 BIS     #ERRIE,@QINT            ; ENABLE ERROR INTERRUPT
2737
2738 031500  000207                                 RTS     PC                      ; RETURN TO MAINLINE
2739                                         ;
2740                                         ; DATA PATTERN FOR TEST
2741                                         ;
2742 031502  000000                  DP19:   .WORD   0
2743 031504  177777                          .WORD   -1
```

TEST 22: CONVERSATION MODE

```
                                .SBTTL  TEST 22: CONVERSATION MODE
                                ;;**********************************************************************
                                ;;
                                ;TEST DESCRIPTION-
                                ; GETS WORD COUNT, DIRECTION, AND DATA PATTERN FROM OPERATOR
                                ; DOES DMA
                                ;
                                ;TEST STEPS-
                                ; U     PUT DIRECTION, AND DATA PATTERN CODE AND WORD COUNT IN VIEW RAM
                                ; U     COMMAND QIO
                                ; Q       READ VIEW RAM
                                ; Q       SET CMDACK
                                ; U     PUT LOW 16 BIT UNIBUS ADDRESS IN VIEW RAM ADDRESS 0
                                ; U     PUT EXTENDED UNIBUS ADDRESS BITS IN VIEW RAM BITS 4 & 5 ADDRESS 1
                                ; U     PUB WORD COUNT IN VIEW RAM ADDRESS 2
                                ; U     IF WRITE-
                                ;         LOAD BUFFER
                                ;         WRITE QIO
                                ;       IF READ-
                                ;         CLEAR BUFFER
                                ;         READ QIO
                                ; Q       IF WRITE (FROM VAX)-
                                ;           CLEAR BUFFER
                                ;           WAIT FOR CMDPRS INTERRUPT
                                ;           READ VIEW FOR ADDRESS
                                ;           LOAD ADDRESS FOR DMA
                                ;           INITIATE DMA
                                ;           SET CMDPRS
                                ;           CHECK FOR CORRECT PATTERN
                                ;         IF READ (FROM VAX)-
                                ;           LOAD BUFFER
                                ;           WAIT FOR CMDPRS INTERRUPT
                                ;           READ VIEW FOR ADDRESS
                                ;           LOAD ADDRESS FOR DMA
                                ;           INITIATE DMA
                                ;           SET CMDPRS
                                ;         SET VNTPRS
                                ;         CHECK FOR VNTACK
                                ;
                                ;       FOR DIRECTION, YES = DMA VAX TO LSI
                                ;--
                                ;;**********************************************************************
031506                          CONVERSATION:
                                        STATST
031506                          TEST22::
031506  012737  000026  002114          MOV     #22,L$TEST              ;TEST NUMBER FOR ERROR MESSAGES
031514  004737  013034                  CALL    $MSG                    ;CHECK FOR PNT FLAG
031520                                  SETVEC  VECTOR,#TRAP4,#PRI07    ; SET UP FOR INTERRUPT
031520  012746  000340                  MOV     #PRI07,-(SP)
031524  012746  012644                  MOV     #TRAP4,-(SP)
031530  013746  002444                  MOV     VECTOR,-(SP)
031534  012746  000003                  MOV     #3,-(SP)
031540  104437                          TRAP    C$SVEC
031542  062706  000010                  ADD     #10,SP
031546  005037  002450                  CLR     TRPFLG                  ; CLEAR INTERREPT FLAG
031552  052777  000020  150370          BIS     #QVREN,@QCTL            ; READ ENABLE
031560  012777  000000  150400          MOV     #0,@QVAD                ; ZERO ADDRESS REGISTER
```

TEST 22: CONVERSATION MODE

```
2793 031566  017737  150376  002506          MOV     @QVDA,DIR               ; GET DIRECTION
2794 031574  017737  150370  002510          MOV     @QVDA,PATTERN           ; GET PATTERN CODE
2795 031602  017737  150362  002512          MOV     @QVDA,WORD.COUNT        ; GET WORD COUNT
2796 031610  052777  000001  150324          BIS     #CMDACK,@QCMD           ; TELL MASTER DONE READING VIEW
2797 031616  052777  000100  150316          BIS     #PRSIE,@QCMD            ; ENABLE INTERRUPT
2798                                          ;
2799                                          ; CHECK FOR AVAILABLE MEMORY SIZE AGAINST WORD COUNT
2800                                          ;
2801 031624  012737  000000  002520          MOV     #NO,MAPPING             ; DEFAULT TO NO MAPPING
2802 031632  005737  002512                  TST     WORD.COUNT              ; TEST FOR ZERO
2803 031636  001435                          BEQ     20$
2804 031640  013701  002504                  MOV     MEMSIZ,R1               ; GET AVAILABLE MEM SIZE IN R1
2805 031644  013702  002512                  MOV     WORD.COUNT,R2           ; GET WORD COUNT IN R2
2806 031650  005402                          NEG     R2                      ; CONVERT WORD COUNT FROM 2'S COMP
2807 031652  020102                          CMP     R1,R2                   ; COMPARE AVAILABLE SIZE WITH WORD COUNT
2808 031654  103040                          BCC     30$                     ; IF OK, BRANCH
2809                                          ;
2810                                          ; NOT ENOUGH MEMORY AVAILABLE IN UNMAPPED MEMORY, TRY HI MEMORY WITH MAPPING
2811                                          ;
2812 031656  012737  000001  002520          MOV     #YES,MAPPING            ; SET FLAG TO MAPPING
2813 031664  013700  002512                  MOV     WORD.COUNT,R0           ; GET WORD COUNT IN R0
2814 031670  005400                          NEG     R0                      ; CONVERT WORD COUNT FROM 2'S COMP
2815 031672  012701  000005                  MOV     #5,R1                   ; LOOP COUNTER
2816                                          ;
2817                                          ; CONVERT WORD.COUNT TO PAR VALUE AND CHECK
2818                                          ;
2819 031676  000241                  10$:    CLC                             ; CLEAR CARRY FLAY
2820 031700  006000                          ROR     R0                      ; ROTATE RIGHT
2821 031702  077103                          SOB     R1,10$                  ; AGAIN IF NOT DONE
2822 031704  005200                          INC     R0                      ; INCREMENT TO NEXT PAR VALUE
2823 031706  013737  002120  002454          MOV     L$HIMEM,VAL             ; GET TOTAL MEMORY IN VAL
2824 031714  162737  001600  002454          SUB     #1600,VAL               ; GET TOTAL AVAILABLE HI MEM IN PAR FORMAT
2825 031722  003403                          BLE     20$                     ; BRANCH IF NO HI MEMORY
2826 031724  023700  002454                  CMP     VAL,R0                  ; SEE IF BUFFER LARGE ENOUGH
2827 031730  103012                          BCC     30$                     ; BRANCH IF ENOUGH MEMORY
2828
2829                                          ;
2830                                          ; ERROR CONDITION, NOT ENOUGH MEMORY AVAILABLE
2831                                          ;
2832 031732                          20$:
2833 031732                                  ERRHRD  67.,,ERR5               ; TELL OPERATOR ERROR
     031732  104456                          TRAP    C$ERHRD
     031734  000103                          .WORD   67
     031736  000000                          .WORD   0
     031740  007076                          .WORD   ERR5
2834 031742  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
2835 031746  012701  013630                  MOV     #ABORT,R1               ; ABORT CODE TO R1
2836 031752  000137  033302                  JMP     E                       ; EXIT TEST
2837                                          ;
2838                                          ; END ERROR CONDITION
2839                                          ;
2840                                          ; NOW SEE IF READ OR WRITE DMA
2841                                          ;
2842 031756                          30$:
2843 031756  013701  002510                  MOV     PATTERN,R1              ; ASSUME NO WRITE (READ)
2844 031762  012737  000002  002456          MOV     #DMAWT,EXP              ; SET UP DIRECTION BIT NO WRITE (READ)
2845 031770  022737  000001  002506          CMP     #YES,DIR                ; DMA WRITE FROM VAX
```

TEST 22: CONVERSATION MODE

```
2846 031776  001004                        BNE     40$                     ; IF NO WRITE (READ), BRANCH
2847 032000  012701  000001                MOV     #1,R1                   ; POINT R1 TO PATTERN TO CLEAR BUFFER
2848 032004  005037  002456                CLR     EXP                     ; SET WORD TO WRITE
2849                                    ;
2850                                    ; SET UP FOR BUFFER
2851                                    ;
2852 032010                             40$:
2853 032010  013702  002512                MOV     WORD.COUNT,R2           ; GET WORD COUNT TO R2
2854 032014  005402                        NEG     R2                      ; CONVERT WORD COUNT FROM 2'S COMP
2855 032016  006301                        ASL     R1                      ; SET UP TO GET PATTERN
2856 032020  006301                        ASL     R1
2857 032022  062701  033414                ADD     #DATPRN,R1              ; POINT TO PATTERN
2858 032026  022737  000001  002520        CMP     #YES,MAPPING            ; USE MAPPING BUFFER ROUTINE?
2859 032034  001414                        BEQ     80$                     ; BRANCH IF YES
2860                                    ;
2861                                    ; SET UP BUFFER WITH NO MAPPING
2862                                    ;
2863 032036                             50$:
2864 032036  013703  002502                MOV     FREMEM,R3               ; GET STARTING ADDRESS OF BUFFER IN R3
2865 032042  012704  000002            60$: MOV     #2,R4                   ; # OF WORDS IN PATTERN
2866 032046  012123                    70$: MOV     (R1)+,(R3)+             ; MOVE PATTERN WORD TO BUFFER
2867 032050  005302                        DEC     R2                      ; DECREMENT WORD COUNT
2868 032052  001433                        BEQ     120$                    ; BRANCH IF DONE
2869 032054  005304                        DEC     R4                      ; DECREMENT PATTERN WORD COUNT
2870 032056  001373                        BNE     70$                     ; IF NOT LAST PATTERN WORD, LOOP
2871 032060  162701  000004                SUB     #4,R1                   ; POINT R1 BACK TO START OF PATTERN
2872 032064  000766                        BR      60$                     ; START ALL OVER AGAIN
2873                                    ;
2874                                    ; NO MAP BUFFER TAKEN CARE OF, SET AND WAIT FOR INTERRUPT
2875                                    ;
2876                                    ;
2877                                    ; SET UP BUFFER IF MAPPING IS USED
2878                                    ;
2879 032066                             80$:
2880 032066  012737  001600  002522            MOV     #1600,APR               ; STORE UP INITIAL APR VALUE
2881 032074  012737  000001  177572            MOV     #8ITO,MMR0              ; ENABLE MAPPING
2882 032102  004737  033366                    JSR     PC,SETAPR               ; GO SET UP FOR APR
2883 032106  012704  000002            90$:    MOV     #2,R4                   ; # OF WORDS IN PATTERN
2884 032112  012123                    100$:   MOV     (R1)+,(R3)+             ; MOVE PATTERN WORD TO BUFFER
2885 032114  005305                            DEC     R5                      ; DECREMENT APR 8K LOOP COUNTER
2886 032116  001002                            BNE     110$                    ; BRANCH IF NEW APR IS NOT NEEDED
2887 032120  004737  033366                    JSR     PC,SETAPR               ; GO SET UP FOR NEXT APR
2888 032124  005302                    110$:   DEC     R2                      ; DECREMENT WORD COUNT
2889 032126  001405                            BEQ     120$                    ; BRANCH IF DONE
2890 032130  005304                            DEC     R4                      ; DECREMENT PATTERN WORD COUNT
2891 032132  001367                            BNE     100$                    ; IF NOT LAST PATTERN WORD, LOOP
2892 032134  162701  000004                    SUB     #4,R1                   ; POINT R1 BACK TO START OF PATTERN
2893 032140  000762                            BR      90$                     ; START ALL OVER AGAIN
2894                                    ;
2895                                    ; INTERRUPT ONLY NORMAL WAY OUT OF LOOP
2896                                    ;
2897 032142                             120$:
2898 032142  013701  002532                    MOV     DEFAULT,R1              ; NUMBER OF SECONDS TO WAIT
2899 032146  012702  026000            130$:   MOV     #TIMOUT,R2              ; TIMEOUT VALUE TO R2
2900 032152                            140$:   BREAK                           ; ALLOW CONTROL C
     032152  104422                            TRAP    C$BRK
2901 032154  005737  002450                    TST     TRPFLG                  ; DID INTERRUPT OCCUR
```

TEST 22: CONVERSATION MODE

```
2902 032160  001021                          BNE     150$                    ; BRANCH IF INTERRUPT OCCURED
2903 032162  005302                          DEC     R2                      ; DECREMENT TIMEOUT
2904 032164  001372                          BNE     140$                    ; IF NOT DONE, BRANCH
2905 032166  005301                          DEC     R1                      ; DECREMENT SECOND COUNTER
2906 032170  001366                          BNE     130$                    ; IF NOT DONE, BRANCH
2907                                         ;
2908                                         ; ERROR CONDITION, TIMEOUT WAITING FOR INTERRUPT
2909                                         ;
2910 032172                                  ERRHRD  68.,ERR6
     032172  104456                          TRAP    C$ERHRD
     032174  000104                          .WORD   68
     032176  000000                          .WORD   0
     032200  007320                          .WORD   ERR6
2911 032202  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
2912 032206  042777  000100  147726         BIC     #PRSIE,@QCMD            ; CLEAR INTERRUPT
2913 032214  012701  013630                  MOV     #ABORT,R1               ; ABORT CODE TO R1
2914 032220  000137  033302                  JMP     E                       ; JUMP TO TEST EXIT
2915                                         ;
2916                                         ; END WAIT FOR INTERRUPT LOOP, INTERRUPT RECEIVED
2917                                         ;
2918 032224                                  150$:
2919 032224  042777  000100  147710         BIC     #PRSIE,@QCMD            ; CLEAR INTERRUPT
2920                                         ;
2921                                         ; SET UP FOR DMA TRANSFER
2922                                         ;
2923 032232  052777  000020  147710         BIS     #QVREN,@QCTL            ; READ ENABLE
2924 032240  012777  000000  147720         MOV     #0,@QVAD                ; CLEAR VIEW REGISTER
2925 032246  017737  147716  002514         MOV     @QVDA,LOW16             ; READ LOW 16 BITS OF UNIBUS ADDRESS
2926 032254  013777  002514  147672         MOV     LOW16,@QUBA             ; LOAD LOW 16 BITS OF UNIBUS ADDRESS
2927 032262  017737  147 02  002516         MOV     @QVDA,HI2               ; READ HI 2 BITS OF UNIBUS ADDRESS
2928 032270  032737  177757  002516         BIT     #^CBIT4!BIT5,HI2        ; SEE IF ONLY BITS 4 AND 5 ARE SET
2929 032276  001412                          BEQ     160$                    ; BRANCH IF OK
2930                                         ;
2931                                         ; ERROR CONDITION, MORE THAN BITS 4 OR 5 SET FOR EXTENDED ADDRESS ON UNIBUS
2932                                         ;
2933 032300                                  ERRHRD  69.,ERR10               ; TELL OPERATOR ERROR
     032300  104456                          TRAP    C$ERHRD
     032302  000105                          .WORD   69
     032304  000000                          .WORD   0
     032306  007740                          .WORD   ERR10
2934 032310  004737  013116                  CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
2935 032314  012701  013630                  MOV     #ABORT,R1               ; ABORT CODE TO R1
2936 032320  000137  033302                  JMP     E                       ; END TEST
2937                                         ;
2938                                         ; END ERROR CONDITION
2939                                         ;
2940 032324                                  160$:
2941 032324  053737  002516  002456         BIS     HI2,EXP                 ; SET UP EXTENDED BITS IN EXP
2942 032332  022737  000001  002520         CMP     #YES,MAPPING            ; ARE WE MAPPING?
2943 032340  001407                          BEQ     170$                    ; BRANCH IF YES
2944                                         ;
2945                                         ; SET UP QBA IF NO MAPPING
2946                                         ;
2947 032342  013777  002502  147606         MOV     FREMEM,@QBA             ; Q-BUS ADD REG WITH BUFFER START ADD
2948 032350  042777  037400  147574         BIC     #37400,@QDMA            ; MAKE SURE Q-BUS EXTENDED BITS ARE ZERO
2949 032356  000406                          BR      180$
2950                                         ;
```

TEST 22: CONVERSATION MODE

```
2951                                        ; SET UP QBA WITH MAPPING
2952                                        ;
2953 032360  012777  160000  147570  170$:   MOV     #160000,@QBA        ; START BUFFER AT 28K
2954 032366  042777  037400  147556          BIC     #37400,@QDMA        ; MAKE SURE Q BUS EXTENDED BITS ARE ZERO
2955 032374  013777  002512  147556  180$:   MOV     WORD.COUNT,@QWC     ; GET WORD COUNT IN QWC
2956 032402  052737  000100  002456          BIS     #RDYIE,EXP          ; SET UP TO ALLOW DMA RDY INTERRUPT
2957 032410  013777  002456  147534          MOV     EXP,@QDMA           ; SET UP DMA REGISTER
2958 032416                                  CLRVEC  VECTOR
     032416  013700  002444                  MOV     VECTOR,R0
     032422  104436                          TRAP    C$CVEC
2959 032424                                  SETVEC  VECTOR,#CONT1,#PRI07 ; SET UP NEW INTERRUPT VECTOR
     032424  012746  000340                  MOV     #PRI07,-(SP)
     032430  012746  032550                  MOV     #CONT1,-(SP)
     032434  013746  002444                  MOV     VECTOR,-(SP)
     032440  012746  000003                  MOV     #3,-(SP)
     032444  104437                          TRAP    C$SVEC
     032446  062706  000010                  ADD     #10,SP
2960 032452  052777  000100  147466          BIS     #ERRIE,@QINT        ; ENABLE ERROR INTERRUPT
2961 032460  052777  000100  147464          BIS     #RDYIE,@QDMA        ; ENABLE RDY INTERRUPT
2962 032466  052777  000001  147456          BIS     #GO,@QDMA           ; INITIATE DMA TRANSFER
2963                                        ;
2964                                        ; WAIT FOR INTERRUPT
2965                                        ;
2966 032474  013701  002532                  MOV     DEFAULT,R1          ; NUMBER OF SECONDS OF TIMEOUT
2967 032500  012702  026000          190$:   MOV     #TIMOUT,R2          ; TIME OUT DELAY TO R2
2968 032504                          200$:   BREAK                       ; ALLOW CONTROL C
     032504  104422                          TRAP    C$BRK
2969 032506  005302                          DEC     R2                  ; DECREMENT TIMEOUT
2970 032510  001375                          BNE     200$                ; IF NOT DONE LOOP
2971 032512  005301                          DEC     R1                  ; DECREMENT SECOND COUNTER
2972 032514  001371                          BNE     190$                ; IF NOT DONE, LOOP
2973                                        ;
2974                                        ; ERROR CONDITION, TIMEOUT OCCURED WAITING FOR INTERRUPT
2975                                        ;
2976 032516  042777  000100  147426          BIC     #RDYIE,@QDMA        ; CLEAR INTERRUPT BIT
2977 032524                                  ERRHRD  70.,,ERR7           ; TELL OPERATOR TIMEOUT
     032524  104456                          TRAP    C$ERHRD
     032526  000106                          .WORD   70
     032530  000000                          .WORD   0
     032532  007424                          .WORD   ERR7
2978 032534  004737  013116                  CALL    ENDERR              ; GO PRINT OUT ENDING TERMINATOR
2979 032540  012701  013630                  MOV     #ABORT,R1           ; ABORT CODE TO R1
2980 032544  000137  033302                  JMP     E                   ; BRANCH TO END OF TEST
2981                                        ;
2982                                        ; END ERROR CONDITION
2983                                        ;
2984                                        ; DMA INTERRUPT SHOULD GO HERE
2985                                        ;
2986 032550                                  BGNSRV  CONT1
     032550                          CONT1::
2987 032550  042777  000100  147374          BIC     #RDYIE,@QDMA        ; CLEAR INTERRUPT BIT
2988 032556  012716  032564                  MOV     #CONT2,(SP)         ; CORRECT STACK
2989 032562                                  ENDSRV
     032562                          L10047:
     032562  000002                          RTI
2990 032564                          CONT2:
2991 032564  032777  100000  147354          BIT     #ERR,@QINT          ; ERROR INTERRUPT?
```

TEST 22: CONVERSATION MODE

```
2992 032572  001414                        BEQ     210$                    ; BRANCH IF NO ERROR INTERRUPT
2993                                ;
2994                                ; ERROR CONDITION, ERROR INTERRUPT OCCURED
2995                                ;
2996 032574                                ERRHRD  71.,,ERR11              ; TELL OPERATOR ERROR INTERRUPT OCCURED
     032574  104456                        TRAP    C$ERHRD
     032576  000107                        .WORD   71
     032600  000000                        .WORD   0
     032602  010030                        .WORD   ERR11
2997 032604  004737  013116                CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
2998 032610  005077  147332                CLR     @QINT                   ; CLEAR INTERRUPT REGISTER
2999 032614  012701  013630                MOV     #ABORT,R1               ; ABORT CODE TO R1
3000 032620  000137  033302                JMP     E                       ; BRANCH TO END OF TEST
3001                                ;
3002                                ; END ERROR CONDITION
3003                                ;
3004 032624                        210$:
3005 032624  052777  000001  147310        BIS     #CMDACK,@QCMD           ; TELL MASTER DAM DONE
3006 032632  022737  000000  002506        CMP     #NO,DIR                 ; DOES LSI NEED TO CHECK DATA
3007 032640  001002                        BNE     215$                    ; BRANCH IF DMA WAS VAX TO LSI
3008 032642  000137  033276                JMP     330$                    ; IF NOT, END TEST
3009                                ;
3010                                ; DATA WAS FROM VAX TO LSI, CHECK DATA
3011                                ;
3012                                ; SET UP TO POINT TO DATA FIELD
3013                                ;
3014 032646  013702  002512        215$:   MOV     WORD.COUNT,R2           ; R2 GETS WORD COUNT
3015 032652  005402                        NEG     R2                      ; CONVERT WORD COUNT FROM 2'S COMP
3016 032654  013701  002510                MOV     PATTERN,R1              ; R1 GETS PATTERN CODE
3017 032660  006301                        ASL     R1                      ; POINT R1 TO PATTERN
3018 032662  006301                        ASL     R1
3019 032664  062701  033414                ADD     #DATPRN,R1
3020 032670  005037  002474                CLR     COUNTER                 ; CLEAR ADDRESS COUNTER
3021 032674  022737  000001  002520        CMP     #YES,MAPPING            ; WAS MAPPING USED
3022 032702  001462                        BEQ     260$                    ; BRANCH IF MAPPING WAS USED
3023                                ;
3024                                ; FIRST CHECK DATA IF NO MAPPING WAS USED
3025                                ;
3026 032704  013703  002502                MOV     FREMEM,R3               ; R3 TO START OF BUFFER
3027 032710  005037  002462                CLR     ERROR1                  ; CLEAR ERROR COUNTER
3028 032714  012704  000002        220$:   MOV     #2,R4                   ; # OF WORDS IN PATTERN
3029 032720  005237  002474        230$:   INC     COUNTER                 ; INCREMENT COUNTER
3030 032724  012337  002454                MOV     (R3)+,VAL               ; GET WORD FROM BUFFER
3031 032730  012137  002456                MOV     (R1)+,EXP               ; GET EXPECTED PATTERN IN EXP
3032 032734  023737  002454  002456        CMP     VAL,EXP                 ; COMPARE VALUE WITH EXPECTED
3033 032742  001433                        BEQ     250$                    ; BRANCH IF DATA OK
3034                                ;
3035                                ; ERROR CONDITION, NOT WHAT EXPECTED IN BUFFER
3036                                ;
3037 032744  005737  002462                TST     ERROR1                  ; ANY OTHER ERRORS OCCURED
3038 032750  001004                        BNE     240$                    ; SKIP HEADER ERROR IF ALREADY PRINTED
3039 032752                                ERRHRD  72.,,ERR8                       ; PRINT ERROR HARD MESSAGE
     032752  104456                        TRAP    C$ERHRD
     032754  000110                        .WORD   72
     032756  000000                        .WORD   0
     032760  007530                        .WORD   ERR8
3040 032762  005237  002462        240$:   INC     ERROR1                  ; INCREMENT ERROR COUNTER
```

```
3041 032766  022737  000012  002462          CMP     #10.,ERROR1             ; SEE IF TOO MANY MESSAGES PRINTED
3042 032774  103416                          BCS     2508                    ; IF TOO MANY, BRANCH
3043 032776                                  PRINTX  #FOR10,COUNTER,VAL,EXP  ; PRINT DETAIL LINE
     032776  013746  002456                  MOV     EXP,-(SP)
     033002  013746  002454                  MOV     VAL,-(SP)
     033006  013746  002474                  MOV     COUNTER,-(SP)
     033012  012746  004230                  MOV     #FOR10,-(SP)
     033016  012746  000004                  MOV     #4,-(SP)
     033022  010600                          MOV     SP,R0
     033024  104415                          TRAP    C$PNTX
     033026  062706  000012                  ADD     #12,SP
3044                                         ;
3045                                         ; END ERROR CONDITION
3046                                         ;
3047 033032  005302                  2508:   DEC     R2                      ; DECREMENT WORD COUNT
3048 033034  001501                          BEQ     3208                    ; BRANCH OUT IF DONE
3049 033036  005304                          DEC     R4                      ; DECREMENT PATTERN WORD COUNT
3050 033040  001327                          BNE     2308                    ; BRANCH IF NOT DONE WITH PATTERN
3051 033042  162701  000004                  SUB     #4,R1                   ; POINT R1 BACK TO START OF PATTERN
3052 033046  000722                          BR      2208                    ; BRANCH IF DONE WITH PATTERN
3053                                         ;
3054                                         ; END NO MAPPING BUFFER CHECK
3055                                         ;
3056                                         ;CHECK DATA IF MAPPING WAS USED
3057                                         ;
3058 033050                          2608:
3059 033050  012737  001600  002522          MOV     #1600,APR               ; STORE UP INITIAL APR VALUE
3060 033056  012?   000001  177572           MOV     #BIT0,MMR0              ; ENABLE MAPPING
3061 033064  004737  033366                  JSR     PC,SETAPR               ; GO SET UP FOR APR
3062 033070  005037  002462                  CLR     ERROR1                  ; CLEAR ERROR COUNT FLAG
3063 033074  012704  000002          2708:   MOV     #2,R4                   ; # OF WORDS IN PATTERN
3064 033100  005237  002474          2808:   INC     COUNTER                 ; INCREMENT COUNTER
3065 033104  012337  002454                  MOV     (R3)+,VAL               ; GET WORD FROM BUFFER
3066 033110  012137  002456                  MOV     (R1)+,EXP               ; GET EXPECTED PATTERN IN EXP
3067 033114  023737  002454  002456          CMP     VAL,EXP                 ; COMPARE VALUE WITH EXPECTED
3068 033122  001433                          BEQ     3008                    ; BRANCH IF DATA OK
3069                                         ;
3070                                         ; ERROR CONDITION, NOT WHAT EXPECTED IN BUFFER
3071                                         ;
3072 033124  005737  002462                  TST     ERROR1                  ; ANY OTHER ERRORS OCCURED
3073 033130  001004                          BNE     2908                    ; SKIP HEADER ERROR IF ALREADY PRINTED
3074 033132                                  ERRHRD  73.,,ERR8                       ; PRINT ERROR HARD MESSAGE
     033132  104456                          TRAP    C$ERHRD
     033134  000111                          .WORD   73
     033136  000000                          .WORD   0
     033140  007530                          .WORD   ERR8
3075 033142  005237  002462          2908:   INC     ERROR1                  ; INCREMENT ERROR COUNTER
3076 033146  022737  000012  002462          CMP     #10.,ERROR1             ; SEE IF TOO MANY MESSAGES PRINTED
3077 033154  103416                          BCS     3008                    ; IF TOO MANY, BRANCH
3078 033156                                  PRINTX  #FOR10,COUNTER,VAL,EXP  ; PRINT DETAIL LINE
     033156  013746  002456                  MOV     EXP,-(SP)
     033162  013746  002454                  MOV     VAL,-(SP)
     033166  013746  002474                  MOV     COUNTER,-(SP)
     033172  012746  004230                  MOV     #FOR10,-(SP)
     033176  012746  000004                  MOV     #4,-(SP)
     033202  010600                          MOV     SP,R0
     033204  104415                          TRAP    C$PNTX
```

```
      033206  062706  000012                ADD     #12,SP
3079                                        ;
3080                                        ; END ERROR CONDITION
3081                                        ;
3082 033212  005305                 300$:   DEC     R5                      ; DECREMENT APR 8K LOOP COUNTER
3083 033214  001002                         BNE     310$                    ; BRANCH IF NEW APR IS NOT NEEDED
3084 033216  004737  033366                 JSR     PC,SETAPR               ; GO SET UP FOR NEXT APR
3085 033222  005302                 310$:   DEC     R2                      ; DECREMENT WORD COUNT
3086 033224  001405                         BEQ     320$                    ; BRANCH IF DONE
3087 033226  005304                         DEC     R4                      ; DECREMENT PATTERN WORD COUNT
3088 033230  001323                         BNE     280$                    ; IF NOT LAST PATTERN WORD, LOOP
3089 033232  162701  000004                 SUB     #4,R1                   ; POINT R1 BACK TO START OF PATTERN
3090 033236  000716                         BR      270$                    ; START ALL OVER AGAIN
3091
3092                                        ;
3093                                        ; BUFFER CHECKED, PRINT TOTAL ERROR COUNT IF NECESSARY
3094                                        ;
3095 033240                         320$:
3096 033240  005737  002462                 TST     ERROR1                  ; ANY ERRORS
3097 033244  001414                         BEQ     330$                    ; IF NO ERRORS, BRANCH
3098 033246                                 PRINTB  #FOR11,ERROR1           ; TELL TOTAL ERROR COUNT
      033246  013746  002462                MOV     ERROR1,-(SP)
      033252  012746  004253                MOV     #FOR11,-(SP)
      033256  012746  000002                MOV     #2,-(SP)
      033262  010600                        MOV     SP,R0
      033264  104414                        TRAP    C$PNTB
      033266  062706  000006                ADD     #6,SP
3099 033272  004737  013116                 CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
3100                                        ;
3101                                        ; END OF TEST
3102                                        ;
3103 033276  012701  000000         330$:   MOV     #0,R1                   ; TEST ENDED NORMALLY TEST CODE
3104 033302                         E:      CLRVEC  VECTOR                  ; CLEAR VECTOR
      033302  013700  002444                MOV     VECTOR,R0
      033306  104436                        TRAP    C$CVEC
3105 033310                                 SETVEC  VECTOR,#ERRINT,#PRI07   ; SET UP INTERRUPT VECTOR
      033310  012746  000340                MOV     #PRI07,-(SP)
      033314  012746  012652                MOV     #ERRINT,-(SP)
      033320  013746  002444                MOV     VECTOR,-(SP)
      033324  012746  000003                MOV     #3,-(SP)
      033330  104437                        TRAP    C$SVEC
      033332  062706  000010                ADD     #10,SP
3106 033336  052777  000100  146602         BIS     #ERRIE,@QINT            ; ENABLE ERROR INTERRUPT
3107 033344  022737  000000  002520         CMP     #NO,MAPPING             ; WAS MAPPING USED
3108 033352  001404                         BEQ     340$                    ; BRANCH IF NO MAPPING USED
3109                                        ;
3110                                        ; MAPPING WAS USED, RESTORE MAPPING REGISTERS AND TURN OFF MAPPING
3111                                        ;
3112 033354  004737  012754                 JSR     PC,MMINIT               ; RESTORE MM TO NORMAL
3113 033360  005037  177572                 CLR     MMR0                    ; DISABLE MEMORY MANAGEMENT
3114 033364                         340$:
3115 033364  000207                         RTS     PC
3116
3117                                        ;
3118                                        ; SUBROUTINE TO SETUP APR3 WITH NEW VALUE, AND R5 WITH NEW 4KW LOOP
3119                                        ; VALUE ON EXIT, R5 CONTAINS 10000 (4KW), AND APR3 HAS BEEN LOADED
3120                                        ; WITH POINT TO NEXT 4KW BLOCK, AND R3 CONTAINS STARTING ADDRESS OF
```

```
3121                                    ; MAPPED BUFFER.
3122                                    ;
3123 033366                             SETAPR:
3124 033366  012705  010000                    MOV     #10000,R5       ; R5 IS 8K LOOP COUNTER
3125 033372  013737  002522  172346            MOV     APR,APR3        ; LOAD APR 3 WITH INITIAL VALUE
3126 033400  012703  060000                    MOV     #60000,R3       ; GET STARTING ADDRESS OF BUFFER IN R3
3127 033404  062737  000200  002522            ADD     #200,APR        ; SET UP FOR NEXT APR
3128 033412  000207                            RTS     PC
3129
3130 033414                             DATPRN:
3131 033414  177777                            .WORD   177777          ; CODE 0
3132 033416  177777                            .WORD   177777
3133
3134 033420  000000                            .WORD   0               ; CODE 1
3135 033422  000000                            .WORD   0
3136
3137 033424  122645                            .WORD   122645          ; CODE 2
3138 033426  122645                            .WORD   122645
3139
3140 033430  055132                            .WORD   055132          ; CODE 3
3141 033432  055132                            .WORD   055132
3142
3143 033434  000000                            .WORD   0               ; CODE 4
3144 033436  177777                            .WORD   177777
```

TEST 23: CHECK QHALT (MANUAL)

```
                                        .SBTTL  TEST 23: CHECK QHALT (MANUAL)
                                        ;;**************************************************************************
                                        ;**
                                        ;TEST DESCRIPTION
                                        ; TELLS OPERATOR TO HALT PDP 11
                                        ; CHECKS FOR QHALT BIT
                                        ; PDP-11 ENTERS ODT
                                        ;
                                        ;TEST STEPS-
                                        ; 0       OPERATOR MESSAGE
                                        ; U     WAIT FOR INTERRUPT
                                        ; U     CHECK QHALT BIT
                                        ;--
                                        ;;**************************************************************************
                                        STATST
                                        TEST23::
033440  012737  000027  002114          MOV     #23,L$TEST              ;TEST NUMBER FOR ERROR MESSAGES
033446  004737  013034                  CALL    BMSG                    ;CHECK FOR PNT FLAG
033452                                  CLRVEC  VECTOR                  ; GET RID OF INTERRUPT VECTOR
033452  013700  002444                  MOV     VECTOR,R0
033456  104436                          TRAP    C$CVEC
033460  005077  146462                  CLR     @QINT                   ; CLEAR INTERRUPT REGISTER
033464                                  PRINTF  @#HALT1                 ; PRINT MESSAGE
033464  012746  033651                  MOV     @#HALT1,-(SP)
033470  012746  000001                  MOV     #1,-(SP)
033474  010600                          MOV     SP,R0
033476  104417                          TRAP    C$PNTF
033500  062706  000004                  ADD     #4,SP
033504                                  PRINTF  @#HALT2,#20$            ; PRINT MESSAGE
033504  012746  033540                  MOV     #20$,-(SP)
033510  012746  033730                  MOV     @#HALT2,-(SP)
033514  012746  000002                  MOV     #2,-(SP)
033520  010600                          MOV     SP,R0
033522  104417                          TRAP    C$PNTF
033524  062706  000006                  ADD     #6,SP
033530  004737  013116                  CALL    ENDERR                  ; PRINT MESSAGE TERMINATOR
033534                          10$:    BREAK                           ; ALLOW CONTROL C
033534  104422                          TRAP    C$BRK
033536  000776                          BR      10$                     ; BRANCH BACK
033540                          20$:    PRINTF  @#LTMSG                 ; PRINT HALT CONTINUE MESSAGE
033540  012746  033570                  MOV     @#LTMSG,-(SP)
033544  012746  000001                  MOV     #1,-(SP)
033550  010600                          MOV     SP,R0
033552  104417                          TRAP    C$PNTF
033554  062706  000004                  ADD     #4,SP
033560  004737  013116                  CALL    ENDERR                  ; PRINT MESSAGE TERMINATOR
033564  000137  013740                  JMP     START
033570     045     116  061  MLTMSG:    .ASCIZ  /%N1%ACONTINUING FROM HALT, WAITING FOR NEXT TEST/
033651     045     116  061  MHALT1:    .ASCIZ  /%N1%APRESS THE HALT KEY ON THE LSI FRONT PANEL/
033730     045     116  061  MHALT2:    .ASCIZ  /%N1%ATO REENTER LSI TEST FROM ODT, TYPE %O6%AG/
                                        .EVEN
```

```
3176                                    .SBTTL  TEST 24: CHECK Q POWER FAIL (MANUAL)
3177                                    ;;**********************************************************************
3178                                    ;+
3179                                    ;TEST DESCRIPTION-
3180                                    ; TELLS OPERATOR TO POWER DOWN FEP
3181                                    ; CHECKS FOR QPWRFL BIT
3182                                    ; PDP-11 ENTERS BOOT PROM
3183                                    ;
3184                                    ;TEST STEPS-
3185                                    ; Q       OPERATOR MESSAGE
3186                                    ; U     WAIT FOR INTERRUPT
3187                                    ; U     CHECK QPWRFL BIT
3188                                    ;-
3189                                    ;;**********************************************************************
3190 034010                                    STATST
     034010                             TEST24::
     034010  012737  000030  002114             MOV     #24,L$TEST              ;TEST NUMBER FOR ERROR MESSAGES
     034016  004737  013034                     CALL    BMSG                    ;CHECK FOR PNT FLAG
3191 034022                                     CLRVEC  VECTOR                  ; GET RID OF INTERRUPT VECTOR
     034022  013700  002444                     MOV     VECTOR,R0
     034026  104436                             TRAP    C$CVEC
3192 034030  005077  146112                     CLR     @QINT                   ; CLEAR INTERRUPT REGISTER
3193 034034                                     PRINTF  #MFAIL                  ; PRINT MESSAGE
     034034  012746  034064                     MOV     #MFAIL,-(SP)
     034040  012746  000001                     MOV     #1,-(SP)
     034044  010600                             MOV     SP,R0
     034046  104417                             TRAP    C$PNTF
     034050  062706  000004                     ADD     #4,SP
3194 034054  004737  013116                     CALL    ENDERR                  ; PRINT MESSAGE TERMINATOR
3195 034060                             10$:    BREAK                           ; ALLOW CONTROL C
     034060  104422                             TRAP    C$BRK
3196 034062  000776                             BR      10$                     ; BRANCH BACK
3197 034064     045     116     061    MFAIL:  .ASCII  /%N1%APOWER DOWN THE LSI FEP/
3198 03411?     045     116     061            .ASCIZ  /%N1%AREBOOT XXDP+ OR MANUAL BOOT TEST TO CONTINUE/
3199                                            .EVEN
```

```
                                .SBTTL  TEST 25: CHECK QBOOT (MANUAL)
                                ;;**************************************************************************
                                ;**
                                ;TEST DESCRIPTION-
                                ; SETS QBOOT BIT
                                ; CHECKS FOR PDP-11 RESPONSE
                                ;
                                ;TEST STEPS-
                                ; Q       OPERATOR MESSAGE
                                ; U     WAIT FOR INTERRUPT
                                ; U     CHECK QHALT BIT
                                ;--
                                ;;**************************************************************************
                                        STATST
                                TEST25::
034202  012737  000031  002114          MOV     #25,L$TEST              ;TEST NUMBER FOR ERROR MESSAGES
034210  004737  013034                  CALL    BMSG                    ;CHECK FOR PNT FLAG
034214  012701  000024                  MOV     #20.,R1                 ; NUMBER OF SECONDS TO TIME OUT
034220  012702  026000          10$:    MOV     #TIMOUT,R2              ; TIMOUT VALUE TO R2
034224          15$:    BREAK
034224  104422                  TRAP    C$BRK
034226  077202                  SOB     R2,15$                  ; DECREMENT TIMEOUT VALUE, BRANCH IF BNE
034230  077105                  SOB     R1,10$                  ; DECREMENT SECOND TIMEOUT, BRANCH IF BNE
                                ;
                                ; ERROR CONDITION, SHOULD HAVE BOOTED BY NOW
                                ;
034232                          ERRHRD  74.,,ERR15
034232  104456                  TRAP    C$ERHRD
034234  000112                  .WORD   74
034236  000000                  .WORD   0
034240  010466                  .WORD   ERR15
034242  004737  013116          CALL    ENDERR                  ; GO PRINT OUT ENDING TERMINATOR
034246  012701  013630          MOV     #ABORT,R1               ; ABORT CODE TO R1
034252  000207                  RETURN                          ; TO MAINLINE
                                ;
034254                          ENDMOD
```

```
                                        .ENABL  AMA
                                .SBTTL  HARDWARE PARAMETER CODING SECTION
                                        BGNMOD
                                ;++
                                ; 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
034254  000010                        .WORD L10050-L$HARD/2
034256                          L$HARD::
                                        GPRMA   G1,0,0,0,177776,YES     ;BASE ADDRESS
034256  000031                        .WORD   T$CODE
034260  034276                        .WORD   G1
034262  000000                        .WORD   T$LOLIM
034264  177776                        .WORD   T$HILIM
                                        GPRMA   G2,2,0,0,1000,YES       ;VECTOR
034266  001031                        .WORD   T$CODE
034270  034331                        .WORD   G2
034272  000000                        .WORD   T$LOLIM
034274  001000                        .WORD   T$HILIM
                                        ENDHRD
                                        .EVEN
034276                          L10050:
034276  102     122     111   G1:     .ASCIZ  /BRIDGE MODULE BASE ADDRESS/
034331  102     122     111   G2:     .ASCIZ  /BRIDGE MODULE VECTOR      /
                                        .EVEN
```

SOFTWARE PARAMETER CODING SECTION

```
                                .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.
                                ;--

                                ;SOFTWARE PARAMETER SECTION NOT NEEDED
                                        .EVEN


034364                          $PATCH::
034364                                  .BLKW   100

034564                                  LASTAD
                                        .EVEN
034564  034600                          .WORD T$FREE
034566  000004                          .WORD T$SIZE
034570                          L$LAST::
                                ;HARDCODED P-TABLE
034570                                  BGNSETUP 1
034570                                  BGNPTAB
034570  000000                          .WORD   0
034572  000002                          .WORD   L10053-./2-1
034574                          L10051:
034574  160500                          .WORD   QCMDAD                  ;HARDWARE UNIT 0 DEFAULT BASE ADDRESS
034576  000500                          .WORD   VEC                     ;HARDWARE UNIT 0 DEFAULT VECTOR
034600                                  ENDPTAB
034600                          L10053:
                                        ENDSETUP
        000001                  .END
```

SYMBOL TABLE

```
ABO     005534 G    COL1    026620 G    C$INIT- 000011      EQZ     025776      FOR13   004364 G
ABORT   013630      COL2    026634      C$INLP- 000020      ERR   - 100000 G    FOR14   004435 G
ACKIE - 000100 G    CONFIG  003217 G    C$MANI- 000050      ERRIE - 000100 G    FOR14.  004477 G
ADD     002452 G    CONT1   032550 G    C$MEM - 000031      ERRINT  012652 G    FOR15   004536 G
ADDRES  002142 G    CONT2   032564      C$MSG - 000023      ERROR1  002462 G    FOR16   004612 G
ADR   - 000020 G    CONT3   020552 G    C$OPEN- 000034      ERROR2  002464 G    FOR17   004663 G
APR     002522 G    CONT4   020574      C$PNTB- 000014      ERR0    006270 G    FOR18   004734 G
APR0  - 172340 G    CONVER  031506      C$PNTF- 000017      ERR1    006316 G    FOR19   004770 G
APR1  - 172342 G    CO01    022400 G    C$PNTS- 000016      ERR10   007740 G    FOR2    003427 G
APR2  - 172344 G    CO02    022414      C$PNTX- 000015      ERR11   010030 G    FOR20   005104 G
APR3  - 172346 G    COP1    023142 G    C$QIO - 000377      ERR12   010146 G    FOR21   005134 G
APR4  - 172350 G    COP2    023156      C$RDBU- 000007      ERR13   010252 G    FOR22   005221 G
APR5  - 172352 G    COUNTE  002474 G    C$REFG- 000047      ERR14   010336 G    FOR23   005314 G
APR6  - 172354 G    COX1    024144 G    C$RESE- 000033      ERR15   010466 G    FOR24   005343 G
APR7  - 172356 G    COX2    024160      C$REVI- 000003      ERR16   010552 G    FOR25   005417 G
ASSEMB- 000010      COY1    027440 G    C$RFLA- 000021      ERR2    006506 G    FOR26   005464 G
BAD     014140      COY2    027454      C$RPT - 000025      ERR3    006652 G    FOR3    003457 G
BADMSG  014170      CO1     021340 G    C$SEFG- 000046      ERR4    007012 G    FOR4    003547 G
BASEAD  002442 G    CO2     021354      C$SPRI- 000041      ERR5    007076 G    FOR5    003574 G
BITS$   012130 G    CTLB    011264      C$SVEC- 000037      ERR6    007320 G    FOR6    003622 G
BIT$    012110 G    CTLBIT  002751 G    C$TPRI- 000013      ERR7    007424 G    FOR7    003662 G
BIT0  - 000001 G    CXP1    024706 G    C19.1   031062 G    ERR8    007530 G    FOR8    003732 G
BIT00 - 000001 G    CXP2    024722      C19.2   031076      ERR9    007634 G    FOR9    003754 G
BIT01 - 000002 G    CXX1    025710 G    DATPRN  033414      EVL   - 000004 G    FOR9.1  004033 G
BIT02 - 000004 G    CXX2    025724      DEFAUL  002532 G    EW      023452      FOR9.2  004112 G
BIT03 - 000010 G    C$AU  - 000052      DFPTBL  002130 G    EWW     030026      FOR9.3  004205 G
BIT04 - 000020 G    C$AUTO- 000061      DIAGMC- 000000      EXP     002456 G    FREMEM  002502 G
BIT05 - 000040 G    C$BRK - 000022      DIR     002506 G    EXPECT  002222 G    FUNC0 - 000004 G
BIT06 - 000100 G    C$BSEG- 000004      DLYST   017106      EXQBA   002236 G    FUNC1 - 000010 G
BIT07 - 000200 G    C$BSUB- 000002      DLY1    002526      EXQCMD  002222 G    FUNC2 - 000020 G
BIT08 - 000400 G    C$CEFG- 000045      DLY2    002530      EXQCTL  002230 G    F$AU  - 000015
BIT09 - 001000 G    C$CLCK- 000062      DMAB    011310      EXQDMA  002232 G    F$AUTO- 000020
BIT1  - 000002 G    C$CLEA- 000012      DMABIT  003015 G    EXQINT  002226 G    F$BGN - 000040
BIT10 - 002000 G    C$CLOS- 000035      DMAWT - 000002 G    EXQMT0  002242 G    F$CLEA- 000007
BIT11 - 004000 G    C$CLP1- 000006      DPX3    025262      EXQMT1  002244 G    F$DU  - 000016
BIT12 - 010000 G    C$CVEC- 000036      DPX4    026042      EXQUBA  002234 G    F$END - 000041
BIT13 - 020000 G    C$DCLN- 000044      DP1     021752      EXQVAD  002246 G    F$HARD- 000004
BIT14 - 040000 G    C$DODU- 000051      DP19    031502      EXQVDA  002250 G    F$HW  - 000013
BIT15 - 100000 G    C$DRPT- 000024      DP2     022532      EXQVNT  002224 G    F$INIT- 000006
BIT2  - 000004 G    C$DU  - 000053      DP3     023516      EXQWC   002240 G    F$JMP - 000050
BIT3  - 000010 G    C$EDIT- 000003      DP4     024276      EXW     025216      F$MOD - 000000
BIT4  - 000020 G    C$ERDF- 000055      DP5     026752      EXZ     026706      F$MSG - 000011
BIT5  - 000040 G    C$ERHR- 000056      DP6     030112      EZ      024232      F$PROT- 000021
BIT6  - 000100 G    C$ERRO- 000060      DUMP    010656 G    E$END - 002100      F$PWR - 000017
BIT7  - 000200 G    C$ERSF- 000054      E       033302      E$LOAD- 000035      F$RPT - 000012
BIT8  - 000400 G    C$ERSO- 000057      ECONT   020130      E10$    010722      F$SEG - 000003
BIT9  - 001000 G    C$ESCA- 000010      EDUMP   011166      E19     031436      F$SOFT- 000005
BMSG    013034 G    C$ESEG- 000005      EF.CON- 000036 G    E5$     010750      F$SRV - 000010
BOE   - 000400 G    C$ESUB- 000003      EF.NEW- 000035 G    E6$     011006      F$SUB - 000002
BRDGFL  002434 G    C$ETST- 000001      EF.PWR- 000034 G    FERR    013156 G    F$SW  - 000014
BRIDGE  002432 G    C$EXIT- 000032      EF.RES- 000037 G    FLAG    011710      F$TEST- 000001
BRLEVE  002446 G    C$GETB- 000026      EF.STA- 000040 G    FORERR  005566 G    GO    - 000001 G
BUILD$  012152      C$GETW- 000027      EN      021706      FOR0    003306 G    G$CNTO- 000200
CMDACK- 000001 G    C$GMAN- 000043      ENDERR  013116 G    FOR1    003312 G    G$DELM- 000372
CMDB    011170      C$GPHR- 000042      ENDI    013546      FOR10   004230 G    G$DISP- 000003
CMDBIT  002604 G    C$GPLO- 000030      ENXM    020664      FOR11   004253 G    G$EXCP- 000400
CMDPRS- 004000 G    C$GPRI- 000040      EQ      022530      FOR12   004310 G    G$HILI- 000002
```

SYMBOL TABLE

```
G$LOLI= 000001          KISDRO= 172300 G        L$UNIT  002012 G        MQPFL = 000040 G        QWC     002160 G
G$NO  = 000000          LOE   = 040000 G        L10000  002136           MRDY  = 001000 G        QXAD16= 000400 G
G$OFFS= 000400          LOGUNI  002436 G        L10001  002142           MSG1    005765 G        QXAD17= 001000 G
G$OFSI= 000376          LOOPS   002524 G        L10002  006314           MSG2    006012 G        QXAD18= 002000 G
G$PRMA= 000001          LOT   = 000010 G        L10003  006504           MSG3    006061 G        QXAD19= 004000 G
G$PRMD= 000002          LOW16   002514 G        L10004  006650           MSG4    006130 G        QXAD20= 010000 G
G$PRML= 000000          L$ACP   002110 G        L10005  007010           MSG6    006202 G        QXAD21= 020000 G
G$RADA= 000140          L$APT   002036 G        L10006  007074           MT1B    011334          RAM     002466 G
G$RADB= 000000          L$AU    013730 G        L10007  007316           MT1BIT  003134 G        RDY   = 000200 G
G$RADD= 000040          L$AUT   002070 G        L10010  007422           MVADR = 000002 G        RDYIE = 000100 G
G$RADL= 000120          L$AUTO  013634 G        L10011  007526           NAMES   002336 G        RP0     011564 G
G$RADO= 000020          L$CCP   002106 G        L10012  007632           NEXT    013342          RP1     011570 G
G$XFER= 000004          L$CLEA  013640 G        L10013  007736           NO    = 000000 G        RP2     011660 G
G$YES = 000010          L$CO    002032 G        L10014  010026           NO$CHA  012640          RP4     011705 G
G1      034276          L$DEPO  002011 G        L10015  010144           NUM$TS  002252 G        SELDMA= 000024 G
G2      034331          L$DESC  002540 G        L10016  010250           ONEFIL= 000001          SELQCM= 000010 G
HELP  = 000000          L$DESP  002076 G        L10017  010334           O$APTS= 000000          SELQEV= 000004 G
HELPFI= 000000          L$DEVP  002060 G        L10020  010464           O$AU  = 000000          SELRDO= 000034 G
HELP1   005654 G        L$DISP  002124 G        L10021  010550           O$BGNR= 000001          SELUBA= 000020 G
HELP2   005723 G        L$DLY   002116 G        L10022  010654           O$BGNS= 000000          SELUVA= 000014 G
HIUBM = 170370 G        L$DTP   002040 G        L10023  012650           O$DU  = 000000          SELUVD= 000030 G
HI2     002516 G        L$DTYP  002034 G        L10024  012752           O$ERRT= 000000          SETAPR  033366
HLTMSG  033570          L$DU    013726 G        L10025  013200           O$GNSW= 000000          SETUP   013334
HOE   = 100000 G        L$DUT   002072 G        L10027  013632           O$POIN= 000001          SFPTBL  002140 G
HP1     002476 G        L$DVTY  002534 G        L10030  013636           O$SETU= 000001          SQBA    002206 G
HP2     002500 G        L$EF    002052 G        L10031  013716           PATTER  002510 G        SQCMD   002172 G
IBE   = 010000 G        L$ENVI  002044 G        L10032  013726           PLOC    002440 G        SQCTL   002200 G
IDU   = 000040 G        L$ETP   002102 G        L10033  013736           PNT   = 001000 G        SQDMA   002202 G
IER   = 020000 G        L$EXP1  002046 G        L10034  014216           PNTMSG  013074 G        SQINT   002176 G
INIT0   013210          L$EXP4  002064 G        L10035  020572           PRI   = 002000 G        SQMT0   002212 G
INIT1   013240          L$EXP5  002066 G        L10036  021352           PRINTI  011356          SQMT1   002214 G
INIT2   013250          L$HARD  034256 G        L10037  022412           PRI00 = 000000 G        SQUBA   002204 G
INIT3   013332          L$HIME  002120 G        L10040  023154           PRI01 = 000040 G        SQVAD   002216 G
INTB    011240          L$HPCP  002016 G        L10041  024156           PRI02 = 000100 G        SQVDA   002220 G
INTBIT  002672 G        L$HPTP  002022 G        L10042  024720           PRI03 = 000140 G        SQVNT   002174 G
INTFLG  002472 G        L$HW    002130 G        L10043  025722           PRI04 = 000200 G        SQWC    002210 G
ISR   = 000100 G        L$ICP   002104 G        L10044  026632           PRI05 = 000240 G        START   013740
IXE   = 004000 G        L$INIT  013210 G        L10045  027452           PRI06 = 000300 G        STATU$  012642
I$AU  = 000041          L$LADP  002026 G        L10046  031074           PRI07 = 000340 G        STORE$  012636
I$AUTO= 000041          L$LAST  034570 G        L10047  032562           PRSIE = 000100 G        SVCGBL= 000000
I$CLN = 000041          L$LOAD  002100 G        L10050  034276           P1      011410          SVCINS= 000000
I$DU  = 000041          L$LUN   002074 G        L10051  034574           P2      011476          SVCSUB= 000000
I$HRD = 000041          L$MREV  002050 G        L10053  034600           QBA     002156 G        SVCTAG= 000000
I$INIT= 000041          L$NAME  002000 G        MAPPIN  002520 G         QBUS    003271 G        SVCTST= 000000
I$MOD = 000040          L$PRIO  002042 G        MAXUNI= 000010 G         QCMD    002142 G        S$LSYM= 010000
I$MSG = 000041          L$PROT  013202 G        MEMSIZ  002504 G         QCMDAD= 160500 G        TESTS   002254 G
I$PROT= 000040          L$PRT   002112 G        MES1$   012402 G         QCTL    002150 G        TEST1   014220 G
I$PTAB= 000041          L$REPP  002062 G        MES2$   012431 G         QDMA    002152 G        TEST10  017030 G
I$PWR = 000041          L$REV   002010 G        MFAIL   034064           QINT    002146 G        TEST11  020132 G
I$RPT = 000041          L$RPT   013170 G        MMALT1  033651           QMT0    002162 G        TEST12  020734 G
I$SEG = 000041          L$SPC   002056 G        MMALT2  033730           QMT1    002164 G        TEST13  021756 G
I$SETU= 000041          L$SPCP  002020 G        MILLI = 000013 G         QNEX  = 020000 G        TEST14  022536 G
I$SRV = 000041          L$SPTP  002024 G        MIODIS= 000200 G         QUBA    002154 G        TEST15  023522 G
I$SUB = 000041          L$STA   002030 G        MMINIT  012754 G         QVAD    002166 G        TEST16  024302 G
I$TST = 000041          L$SW    002140 G        MMR0  = 177572 G         QVDA    002170 G        TEST17  025266 G
J$JMP = 000167          L$TEST  002114 G        MMR3  = 172516 G         QVNT    002144 G        TEST18  026046 G
KISARO= 172340 G        L$TIML  002014 G        MQHALT= 000100 G         QVREN = 000020 G        TEST19  026756 G
```

SEQ 0154

SYMBOL TABLE

```
TEST2   014240 G        TRAP4   012644 G        T$SAVL= 177777          T$$RPT= 010025          WDTRST= 000001 G
TEST20  030116 G        TRPFLG  002450 G        T$SEGL= 177777          T$$SRV= 010047          WDTO  = 000004 G
TEST21  030422 G        TST19   030440          T$SIZE= 000004          T$$SW = 010001          WDT1  = 000010 G
TEST22  031506 G        T$ARGC= 000001          T$SUBN= 000000          T$$TES= 010034          WORD.C  002512 G
TEST23  033440 G        T$CODE= 001031          T$TAGL= 177777          T1      013740 G        WSPACE= 020040 G
TEST24  034010 G        T$ERRN= 000112          T$TAGN= 010054          UAM   = 000200 G        X$      011124
TEST25  034202 G        T$EXCP= 000000          T$TEMP= 000004          UBUS    003277 G        X$ALWA= 000000
TEST3   014474 G        T$FLAG= 000040          T$TEST= 000001          UNEX  = 040000 G        X$FALS= 000040
TEST4   014730 G        T$FREE= 034600          T$TSTM= 177777          UPWRFL= 010000 G        X$OFFS= 000400
TEST5   015274 G        T$GMAN= 000000          T$TSTS= 000001          UXAD16= 000020 G        X$TRUE= 000020
TEST6   015436 G        T$HILI= 001000          T$$AU = 010033          UXAD17= 000040 G        YES   = 000001 G
TEST7   016004 G        T$LAST= 000001          T$$AUT= 010030          VAL     002454 G        $HLP    011712 G
TEST8   016146 G        T$LOLI= 000000          T$$CLE= 010031          VALUE   002470 G        $HLPFO  012102 G
TEST9   016476 G        T$LSYM= 010000          T$$DAT= 010053          VALUES  002172 G        $LEN  = 000012
TE$   = 000003          T$LTNO= 000001          T$$DU = 010032          VEC   = 000500 G        $L1   = 000005
TIME.5= 000000 G        T$NEST= 000000          T$$HAR= 010050          VECTOR  002444 G        $MESLN  012104
TIME1 = 000004 G        T$NSO = 000000          T$$HW = 010000          VNTACK= 002000 G        $NUM  = 000031 G
TIME2 = 000010 G        T$NS1 = 000004          T$$INI= 010027          VNTB    011214          $PATCH  034364 G
TIME4 = 000014 G        T$PCNT= 000000          T$$MSG= 010022          VNTBIT  002637 G        $STORE  012106
TIMOUT= 026000 G        T$PTAB= 010052          T$$PC = 000001          VNTPRS= 000001 G        $TEMP = 000000
TMRENB= 000002 G        T$PTHV= 000001          T$$PRO= 010026          WDTBUF  030412          $TNUM = 000032
TNUM    002460 G        T$PTNU= 000001          T$$PTA= 010052

. ABS.  034600      000
        000000      001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  29352 WORDS  ( 115 PAGES)
DYNAMIC MEMORY:  20060 WORDS  ( 77 PAGES)
ELAPSED TIME:  00:08:41
ZFPBA0.BIC,CZFPBA0/-SP=SVC/ML,ZFPBA01,ZFPBA02,ZFPBA03,ZFPBA04,ZFPBA05,ZFPBA06
.
```