FEPCM CHECK UTILITY
CZFPCA0

AH-T863A-MC
FICHE 1 OF 1

APR 1984
digital
Made In USA

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IDENTIFICATION

PRODUCT CODE: AC-T862A MC

PRODUCT NAME: CZFPCAO CHECK UTILITY

PRODUCT DATE: NOVEMBER 25, 1981

MAINTAINER: CSS GNG DIAGNOSTIC ENGINEERING

AUTHOR: M. PAUL HOLSINGER

MODIFIED:
MAY 5, 1982
P-TABLE SETUP CODE ADDED

A.0 DALE PROCTOR 22-DEC-1983
CHANGED THE NAME TO CZFPC-AO AND RELEASED TO SDC. ALSO UPDATED ALL THE DOCUMENTATION, AND REMOVED THE HELP FILE QUESTIONS FROM THE INITIALIZATION SECTION.

TABLE OF CONTENTS

1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

THIS UTILITY WAS DESIGNED TO TEST ALL UNIBUS AND Q-BUS DEVICES WHICH ARE MAPPED INTO A PDP-11 OR LSI-11 SYSTEM I/O PAGE. THE UTILITY WILL ADDRESS ALL WORD LOCATIONS IN THE PAGE, AND TEST EACH LOCATION FOR A BUS TIME-OUT, WHICH TRAPS THE INSTRUCTION TO THE VECTOR ADDRESS AT LOCATION 4.

THE UTILITY WILL PRINT A MESSAGE IDENTIFYING THE SYSTEM BUS TYPE FOLLOWED BY THE AVAILABLE MEMORY IN WORDS. A SUMMARY IS PRINTED FOR EACH DEVICE PRESENT ON THE BUS. EACH DEVICE LOCATION OR REGION IS LISTED FROM THE START WORD ADDRESS THROUGH THE LAST WORD ADDRESS FOLLOWED BY THE REGION SIZE, IN WORDS.

NOTE THAT TO MAINTAIN PROCESSOR INDEPENDENCE THE UTILITY WILL LIST ONLY THE REGIONS WHICH ARE MAPPED INTO THE THE I/O PAGE, WHICH MAY CONSIST OF ONE OR MORE DEVICE CONTROLLERS MAPPED INTO CONSECUTIVE MEMORY LOCATIONS. IT IS LEFT TO THE USER TO DETERMINE FROM THE SUMMARY GENERATED WHICH DEVICES ARE PRESENT ON THE BUS.

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+ AND PAPERTAPE. 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

ANY PDP-11 OR LSI-11 SYSTEM WITH A CONSOLE DEVICE AND AT LEAST 16K WORDS MEMORY ARE REQUIRED.

1.3 RELATED DOCUMENTS AND STANDARDS

REFER TO THE PERIPHERALS HANDBOOK FOR SPECIFIC DEVICE ASSIGNMENTS.

1.4 DIAGNOSTIC HIERARCY PREREQUISITES

NO ADDITIONAL PREREQUISITES ARE NECESSARY FOR THIS UTILITY.

1.5 ASSUMPTIONS

IT IS ASSUMED THAT THE CPU AND MEMORY ARE FUNCTIONING PROPERLY.

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 C N BE RECOGNIZED BY THE FIRST THREE CHARACTERS. SO
YOU MAY, FOR XAMPLE, TYPE "STA" INSTEAD OF "START".

* THESE CO MANDS ARE NOT IMPLEMENTED IN THIS UTILITY.

2.2 SWITCHES

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

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

* THESE SWITCHES HAVE NO MEANINGFUL USE WITH THIS UTILITY.

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).

THIS UTILITY REQUIRES THE MINIMUM OF ONE UNIT, AND HAS NO ADDITIONAL HARDWARE TABLE REQUIREMENTS.

2.5 SOFTWARE QUESTIONS

NO SOFTWARE TABLES OR QUESTIONS ARE REQUIRED.

2.6 EXTENDED P-TABLE DIALOGUE

THIS UTILITY HAS NO PTABLE DIALOGUE.

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 THE "# UNITS" QUESTION WITH "1"

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).

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.

THERE ARE NO ERROR MESSAGES GENERATED BY THIS UTILITY.

3.2 SPECIFIC ERROR MESSAGES

ANY ERROR MESSAGES GENERATED ARE PRODUCED BY THE SUPERVISOR, AND INDICATE A SYSTEM CPU OR MEMORY PROBLEM.

4.0 PERFORMANCE AND PROGRESS REPORTS

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

NO ADDITIONAL STATISTICS ARE PRODUCED.

5.0 DEVICE INFORMATION TABLES

THE PTABLE ENTRY IS SPECIFIED ONLY TO MEET THE MINIMUM REQUIREMENTS OF THE SUPERVISOR.

6.0 TEST SUMMARIES

REFER TO THE PROGRAM ABSTRACT (SECTION 1.1) FOR TEST DETAILS.

```
                                .TITLE PROGRAM HEADER AND TABLES
                                .SBTTL  PROGRAM HEADER

                                        .ENABL  ABS,AMA
002000          002000                  .       =       2000

002000                                  BGNMOD  SECT2
002000                          SECT2::

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

                                        POINTER BGNSETUP

002000                                  HEADER  CZFPC,A,0,0,1
002000                          L$NAME::                ;DIAGNOSTIC NAME
002000  103                             .ASCII /C/
002001  132                             .ASCII /Z/
002002  106                             .ASCII /F/
002003  120                             .ASCII /P/
002004  103                             .ASCII /C/
002005  000                             .BYTE   0
002006  000                             .BYTE   0
002007  000                             .BYTE   0
002010                          L$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$HPCP::                ;POINTER TO H.W. QUES.
002016  004052                          .WORD   L$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$LADP::                ;DIAG. END ADDRESS
002026  004100                          .WORD   L$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$PRIO::                ;DIAGNOSTIC RUN PRIORITY
002042  000000                          .WORD   0
002044                          L$ENVI::                ;FLAGS DESCRIBE HOW IT WAS SETUP
```

```
PROGRAM HEADER

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$DEVP::                ; POINTER TO DEVICE TYPE LIST
002060  002230                  .WORD   L$DVTYP
002062                  L$REPP::                ;PTR. TO REPORT CODE
002062  000000                  .WORD   0
002064                  L$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$DESP::                ;POINTER TO DIAG. DESCRIPTION
002076  002250                  .WORD   L$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  002664                  .WORD   L$INIT
002106                  L$CCP::                 ;PTR. TO CLEAN-UP CODE
002106  003434                  .WORD   L$CLEAN
002110                  L$ACP::                 ;PTR. TO AUTO CODE
002110  003432                  .WORD   L$AUTO
002112                  L$PRT::                 ;PTR. TO PROTECT TABLE
002112  002656                  .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
53
```

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  003456                          .WORD   T1
```

```
                                .SBTTL  DEFAULT HARDWARE P-TABLE

                                ;++
                                ; THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
                                ; THE TEST-DEVICE PARAMETERS.  THE STRUCTURE OF THIS TABLE
                                ; IS IDENTICAL TO THE STRUCTURE OF THE HARDWARE P-TABLES,
                                ; AND IS USED AS A "TEMPLATE" FOR BUILDING THE P-TABLES.
                                ; -

002126                                  BGNHW   DFPTBL
002126  000001                         .WORD   L10000-L$HW/2
002130                          L$HW::
002130                          DFPTBL::

002130  000000                         .WORD   0

002132                                  ENDHW
002132                          L10000:
```

```
                        .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.
                        ;--

002132                          BGNSW   SFPTBL
002132  000001                  .WORD   L10001-L$SW/2
002134                  L$SW::
002134                  SFPTBL::

002134  000000                  .WORD

002136                          ENDSW
002136                  L10001:

002136                          ENDMOD
                        .SBTTL
```

```
                        .TITLE GLOBAL AREAS
                        .SBTTL  GLOBAL EQUATES SECTION
002136                          BGNMOD  SECT3
002136                  SECT3::

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

177776          PSWADR  ==      177776          ;PROCESSOR STATUS WORD
177766          CPUADR  ==      177766          ;CPU ERROR REGISTER

160000          IOPADR  ==      160000          ;I/O PAGE START ADDRESS

000020          BUSTMO  ==      000020          ;BUS TIME-OUT MASK
000002          OVRFLO  ==      000002          ;OVERFLOW STATUS

002136                          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
```

GLOBAL EQUATES SECTION

```
000034                  EF.PWR==        28.                     ; A POWER FAIL/POWER UP OCCURRED
                        ;
                        ;
                        ; PRIORITY LEVEL DEFINITIONS
                        ;
000340                  PRI07== 340
000300                  PRI06== 300
000240                  PRI05== 240
000200                  PRI04== 200
000140                  PRI03== 140
000100                  PRI02== 100
000040                  PRI01== 40
000000                  PRI00== 0
                        ;
                        ;OPERATOR FLAG BITS
                        ;
000004                  EVL==       4
000010                  LOT==      10
000020                  ADR==      20
000040                  IDU==      40
000100                  ISR==     100
000200                  UAM==     200
000400                  BOE==     400
001000                  PNT==    1000
002000                  PRI==    2000
004000                  IXE==    4000
010000                  IBE==   10000
020000                  IER==   20000
040000                  LOE==   40000
100000                  HOE==  100000
```

GLOBAL DATA SECTION

```
                                .SBTTL  GLOBAL DATA SECTION

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

002136  000000          PLOC::          .WORD   0               ;PTR TO CURRENT HARDWARE P-TABLE
002140  000000          UNIT::          .WORD   0               ;CURRENT LOGICAL UNIT NUMBER
002142  000000          MPTR::          .WORD   0               ;PTR TO FIRST WORD OF FREE MEMORY
002144  000000          MSIZ::          .WORD   0               ;SIZE OF SYSTEM MEMORY

002146  000000          BASADR::        .WORD   0               ;DEVICE BASE ADDRESS
002150  000000          LSTADR::        .WORD   0               ;DEVICE LAST ADDRESS
002152  000000          COUNTR::        .WORD   0               ;DEVICE LOCATION COUNTER
002154  000000          TRPFLG::        .WORD   0               ;ADDRESS TRAP FLAG
002156  000000          TABFLG::        .WORD   0               ;TAB ACTIVE FLAG
002160  000000          HLPFLG::        .WORD   0               ;HELP FILE FLAG

002162  000000          REG0::          .WORD   0               ;R0 SAVE AREA
002164  000000          REG1::          .WORD   0               ;R1 SAVE AREA
002166  000000          REG2::          .WORD   0               ;R2 SAVE AREA
002170  000000          REG3::          .WORD   0               ;R3 SAVE AREA
002172  000000          REG4::          .WORD   0               ;R4 SAVE AREA
002174  000000          REG5::          .WORD   0               ;R5 SAVE AREA
002176  000000          REG6::          .WORD   0               ;SP SAVE AREA
002200  000000          REG7::          .WORD   0               ;PC SAVE AREA

002202  000000          HELP1::         .WORD   0               ;FLAG FOR SUPERVISOR HELP INFO
002204  000000          HELP2::         .WORD   0               ;FLAG FOR DIAGNOSTIC HELP INFO
```

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.
                                        ;--

 002206  104  122  123  HPFIL1::        .ASCIZ  /DRS.HLP/               ;SUPERVISOR HELP FILE
 002211  056  110  114
 002214  120  000
                                        .EVEN
 002216  132  060  067  HPFIL2::        .ASCIZ  /Z0793.HLP/             ;DIAGNOSTIC HELP FILE
 002221  071  063  056
 002224  110  114  120
 002227  000
                                        .EVEN

                                        ;
                                        ; NAMES OF DEVICES SUPPORTED BY PROGRAM
                                        ;
                                        DEVTYP  <UNIBUS OR Q-BUS>
 002230                                 L$DVTYP::
 002230  125  116  111                  .ASCIZ  /UNIBUS OR Q-BUS/
 002233  102  125  123
 002236  040  117  122
 002241  040  121  055
 002244  102  125  123
 002247  000
                                        .EVEN

                                        ;
                                        ; TEST DESCRIPTION
                                        ;
                                        DESCRIPT        <BUS ADDRESS TEST UTILITY>
 002250                                 L$DESC::
 002250  102  125  123                  .ASCIZ  /BUS ADDRESS TEST UTILITY/
 002253  040  101  104
 002256  104  122  105
 002261  123  123  040
 002264  124  105  123
 002267  124  040  125
 002272  124  111  114
 002275  111  124  131
 002300  000
                                        .EVEN
                                        .EVEN

                                        ;
                                        ; FORMAT STATEMENTS USED IN PRINT CALLS
                                        ;
```

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.
                                ;--

002302                                  BGNMSG

002302                                  EXIT    MSG
002302  000167                          .WORD   J$JMP
002304  000000                          .WORD   L10002-2-.

002306                                  ENDMSG
002306                          L10002:
002306  104423                          TRAP    C$MSG
```

INTERRUPT SERVICE ROUTINE

```
                                .SBTTL  INTERRUPT SERVICE ROUTINE
                                STARS
                                ;;*****************************************************************
                                ;;
                                ;;      TRAP4 WILL TRAP ANY BUS TIME-OUTS ON THE UNIBUS AND
                                ;;      INCREMENT TRPFLG, THE GLOBAL TRAP FLAG.
                                ;;
                                ;;      INPUT:          NONE
                                ;;
                                ;;      OUTPUT:         TRPFLG := TRPFLG + 1;
                                ;;
                                STARS
                                ;;*****************************************************************

                                        BGNSRV  TRAP4
                                TRAP4::
002310  010037  002162                  MOV     R0,REG0                 ;SAVE R0

002314  005237  002154          200$:   INC     TRPFLG                  ;SET TRAP FLAG

002320  013700  002162                  MOV     REG0,R0                 ;RESTORE R0
002324                                  ENDSRV                          ;AND RETURN
                                L10003:
002324  000002                          RTI
```

HELP FILE DUMP ROUTINE

```
                                .SBTTL  HELP FILE DUMP ROUTINE
002326                          STARS
                                ;;*****************************************************************
                                ;;
                                ;;      SUBROUTINE TO DUMP DOS HELP FILE TO CONSOLE
                                ;;
                                ;;      INPUT:          R1  =   POINTER TO "FILNAM.EXT"
                                ;;                      R5  =   RETURN ADDRESS
                                ;;
                                ;;      OUTPUT:         PRINTS 72 CHARACTER BUFFER TO CONSOLE
                                ;;
                                ;;      REGISTER USAGE: R1  =   POINTER TO LINE TEXT BUFFER
                                ;;                      R2  =   TAB POSITION COUNTER
                                ;;                      R4  =   CHARACTER FROM FILE
                                ;;                      R5  =   LINK REGISTER
                                ;;
                                ;;      CALLING SEQ:    MOV     @FILNAM,R1
                                ;;                      JSR     R5,DMP
                                ;;
                                ;;      FUNCTION:       DMP WILL OPEN, READ AND CLOSE THE SELETED FILE
                                ;;                      USING THE DIAG SUPERVISOR MACROS.  CHARACTERS
                                ;;                      ARE READ ONE AT A TIME AND TRANSFERRED TO THE
                                ;;                      LINE BUFFER, WHICH IS DUMPED TO THE CONSOLE
                                ;;                      WHEN FULL.
002326                          STARS
                                ;;*****************************************************************

000040          BLK     =       40                      ;BLANK CHAR
000015          CR      =       15                      ;CARRAGE RETURN CHAR
000012          LF      =       12                      ;LINE FEED CHAR
000011          TAB     =       11                      ;TAB CHAR
```

HELP FILE DUMP ROUTINE

```
                                ;       OPEN FILE AND PRINT NULL LINE
                                ;
002326  010137  002164  DMP::   MOV     R1,REG1                 ;SAVE POINTER TO FILE NAME
002332  010537  002174          MOV     R5,REG5                 ;SAVE RETURN ADDRESS
002336  005037  002156          CLR     TABFLG                  ;CLEAR TAB ACTIVE FLAG

002342                  100$:   OPEN    R1                      ;OPEN FILE
002342  010100                  MOV     R1,R0
002344  104434                  TRAP    C$OPEN
002346  012701  002556          MOV     #LINBUF,R1              ;AND LOAD POINTER TO BUFFER
002352  112721  000015          MOVB    #CR,(R1)+               ;MOVE CARRAGE RETURN
002356  112721  000012          MOVB    #LF,(R1)+               ;AND LINE FEED TO BUFFER
002362  112704  000000          MOVB    #0,R4                   ;FOLLOWED BY NULL
002366  004537  002462          JSR     R5,600$                 ;PRINT BUFFER, RESET R1

                                ;       GET NEXT CHARACTER FROM SUPERVISOR, AND TEST FOR END OF FILE

002372                  200$:   GETBYTE R4                      ;GET NEXT CHAR IN R4
002372  104426                  TRAP    C$GETB
002374  110004                  MOVB    R0,R4
002376                          BNCOMPLETE 400$                 ;EOF IF INCOMPLETE
002376  103013                  BCC     400$
002400  001412                  BEQ     400$                    ;OR IF CHARACTER = ZERO

                                ;       TEST AND PROCESS TAB CHARACTER

002402  122704  000011  300$:   CMPB    #TAB,R4                 ;COMPARE WITH TAB
002406  001004                  BNE     350$                    ;NO:  CONTINUE
002410  112704  000040          MOVB    #BLK,R4                 ;YES:  LOAD R4 WITH A BLANK
002414  005237  002156          INC     TABFLG                  ;AND SET TAB ACTIVE

002420  004537  002462  350$:   JSR     R5,600$                 ;PRINT SPACES FOR TAB
002424  000762                  BR      200$                    ;AND RETRIEVE NEXT CHARACTER

                                ;       LAST CHAR OR END OF FILE

002426  004537  002462  400$:   JSR     R5,600$                 ;EMPTY BUFFER
002432  112721  000015          MOVB    #CR,(R1)+               ;OUTPUT CARRAGE RETURN
002436  112721  000012          MOVB    #LF,(R1)+               ;AND LINE FEED
002442  112704  000000          MOVB    #0,R4                   ;FOLLOWED BY NULL
002446  004537  002462          JSR     R5,600$                 ;PRINT

                                ;       CLOSE FILE AND RETURN TO MAIN

002452                  500$:   CLOSE                           ;CLOSE FILE
002452  104435                  TRAP    C$CLOS
002454  013705  002174          MOV     REG5,R5                 ;RESTORE RETURN ADDRESS
002460  000205                  RTS     R5                      ;AND RETURN
```

```
    229 002462                          STARS
                                        ;;*****************************************************************
    230                                 ;;
    231                                 ;;      SUBROUTINE TO TRANSFER CHARACTERS TO PRINT BUFFER AND DUMP
    232                                 ;;      BUFFER WHEN FULL.
    233 002462                          STARS
                                        ;;*****************************************************************
    234
    235                                 ;       MOVE CHAR TO BUFFER, TEST FOR NULL CHAR OR END OF BUFFER
    236
    237 002462  110421                  600$:   MOVB    R4,(R1)+                ;MOVE CHAR TO BUFFER
    238 002464  001403                          BEQ     700$                    ;PRINT BUFFER IF NULL
    239 002466  022701  002646                  CMP     #EOL,R1                 ;TEST FOR END OF BUFFER
    240 002472  001012                          BNE     800$                    ;NO:  CONTINUE
    241
    242                                 ;       PRINT BUFFER AND RESET POINTER
    243
    244 002474                          700$:   PRINTB  #LINE                   ;PRINT LINE AT CONSOLE
        002474  012746  002554                  MOV     #LINE,-(SP)
        002500  012746  000001                  MOV     #1,-(SP)
        002504  010600                          MOV     SP,R0
        002506  104414                          TRAP    C$PNTB
        002510  062706  000004                  ADD     #4,SP
    245 002514  012701  002556                  MOV     #LINBUF,R1              ;AND RESET POINTER
    246
    247                                 ;       TEST FOR CONTROL CHARS, TAB ACTIVE OR RETURN
    248
    249 002520  120427  000040          800$:   CMPB    R4,#BLK                 ;COMPARE CHAR WITH BLANK
    250 002524  100406                          BMI     850$                    ;BRANCH IF CONTROL CHAR
    251
    252 002526  005302                          DEC     R2                      ;DEC TAB COUNTER
    253 002530  001404                          BEQ     850$                    ;BRANCH TO RESET
    254 002532  005737  002156                  TST     TABFLG                  ;NOW TEST TAB FLAG
    255 002536  001351                          BNE     600$                    ;ACTIVE:  MOVE ANOTHER BLANK
    256 002540  000205                          RTS     R5                      ;NO:  JUST RETURN
    257
    258                                 ;       RESET TAB COUNTER, TAB ACTIVE FLAG AND RETURN
    259
    260 002542  012702  000010          850$:   MOV     #8.,R2                  ;RESET TAB
    261 002546  005037  002156                  CLR     TABFLG                  ;CLEAR TAB ACTIVE FLAG
    262 002552  000205                          RTS     R5                      ;AND RETURN
    263
```

HELP FILE DUMP ROUTINE

```
    265 002554                          STARS
                                        ;;*****************************************************************
    266                                 ;;
    267                                 ;;      BUFFER STORAGE AREA
    268 002554                          STARS
                                        ;;*****************************************************************
    269
    270 002554     045     101          LINE:   .ASCII  /%A/                    ;ALPHA NUMERIC BUFFER FLAG
    271 002556                          LINBUF: .BLKB   70                      ;SEVENTY CHARACTER BUFFER
    272 002646  000000                  EOL:    .WORD   0                       ;END OF LINE
    273
    274 002650                                  ENDMOD
    275
    276                                 .SBTTL
```

```
 1
12                                      .TITLE MISCELLANEOUS SECTIONS
13                                      .SBTTL  REPORT CODING SECTION
41
42 002650                                       BGNMOD  SECT4
   002650                               SECT4::
43
44                                      ;++
45                                      ; THE REPORT CODING SECTION CONTAINS THE
46                                      ; "PRINTS" CALLS THAT GENERATE STATISTICAL REPORTS.
47                                      ;--
48
49 002650                                       BGNRPT
   002650                               L$RPT::
50
51 002650                                       EXIT    RPT
   002650  000167                              .WORD   J$JMP
   002652  000000                              .WORD   L10004-2-.
52
53                                              .EVEN
54
55 002654                                       ENDRPT
   002654                               L10004:
   002654  104425                              TRAP    C$RPT
```

M2

PROTECTION TABLE

```
                                .SBTTL  PROTECTION TABLE

                                ;++
                                ; THIS TABLE IS USED BY THE RUNTIME SERVICES
                                ; TO PROTECT THE LOAD MEDIA.
                                ;--

002656                                  BGNPROT
002656                          L$PROT::

002656  177777                         -1              ;OFFSET INTO P-TABLE FOR CSR ADDRESS
002660  177777                         -1              ;OFFSET INTO P-TABLE FOR MASSBUS ADDRESS
002662  177777                         -1              ;OFFSET INTO P-TABLE FOR DRIVE NUMBER

002664                                  ENDPROT
```

INITIALIZE SECTION

```
                                        .SBTTL  INITIALIZE SECTION
002664                                  STARS
                                        ;;*****************************************************************
                                        ;;
                                        ;;      INITIALIZATION SECTION:
                                        ;;
                                        ;;        (0)   MANDATORY CALL "GPHARD" EACH PASS
                                        ;;
                                        ;;        (1)   EVENT FLAGS CHECKED TO BYPASS FIRST TIME INIT
                                        ;;        (2)   MANUAL INPUT REQUEST FOR HELP FILE
                                        ;;        (3)   COMPUTATION OF AVAILABLE MEMORY
                                        ;;        (4)   PRINT TITLE AND COLUMN HEADINGS
                                        ;;        (5)   SET TRAP VECTOR
002664                                  STARS
                                        ;;*****************************************************************

002664                                          BGNINIT
002664                                  L$INIT::
                                        ;       MANDATORY CALL TO RETRIEVE PTABLE ADDRESS
002664                                          GPHARD  UNIT,PLOC               ;RETRIEVE PTABLE ADDRESS
002664  013700  002140                         MOV     UNIT,R0
002670  104442                                 TRAP    C$GPHRD
002672  010037  002136                         MOV     R0,PLOC
                                        ;       TEST EVENT FLAGS
002676                                  100$:   READEF  #EF.CONTINUE            ;TEST FOR CONTINUE FLAG
002676  012700  000036                         MOV     #EF.CONTINUE,R0
002702  104447                                 TRAP    C$REFG
002704                                          BCOMPLETE 800$                  ;YES:  JUST SET VECTOR
002704  103477                                 BCS     800$
002706                                          READEF  #EF.NEW                 ;TEST FOR NEW PASS
002706  012700  000035                         MOV     #EF.NEW,R0
002712  104447                                 TRAP    C$REFG
002714                                          BNCOMPLETE 400$                 ;YES:  NO HELP
002714  103000                                 BCC     400$

                                        ;       PROCESS SUPERVISOR HELP FILE DUMP
                                        ;
                                        ;200$:  TST     HELP1                   ;TEST IF HELP FILE QUESTION ASKED
                                        ;       BNE     300$                    ;YES:  CONTINUE
                                        ;
                                        ;       GMANIL  HPMSG1,HLPFLG,1,YES     ;ASK OPERATOR
                                        ;       TST     HLPFLG                  ;TEST HELP REQUESTED
                                        ;       BEQ     300$                    ;NO:  CONTINUE
                                        ;
                                        ;       CALL DMP TO DISPLAY HELP FILE "DRS.HLP"
                                        ;
                                        ;250$:  MOV     #HPFIL1,R1              ;LOAD POINTER TO FILE NAME
                                        ;       JSR     R5,DMP                  ;AND DISPLAY FILE
                                        ;
                                        ;       PROCESS DIAGNOSTIC HELP FILE DUMP
                                        ;
                                        ;300$:  INC     HELP1                   ;SET FLAG FOR FIRST QUESTION
                                        ;
```

INITIAL IZE SECTION

```
118                             ;       TST     HELP2                   ;TEST IF QUESTION ASKED
119                             ;       BNE     4008                    ;YES:  CONTINUE
120                             ;
121                             ;       GMANIL  HPMSG2,HLPFLG,1,YES     ;GET OPERATOR RESPONSE
122                             ;       TST     HLPFLG                  ;TEST RESPONSE
123                             ;       BEQ     4008                    ;NO HELP:  CONTINUE
124                             ;
125                             ;3508:  MOV     @HPFIL2,R1              ;LOAD POINTER TO FILE NAME
126                             ;       JSR     R5,DMP                  ;AND DISPLAY FILE
127
```

INITIALIZE SECTION

```
                                        ;       DETERMINE AND PRINT AVAILABLE MEMORY IN WORDS
                                        ;
                                        ;               HIGH PAGE ADDRESS IS IN L$HIMEM, IN PAGE ADDRESS
                                        ;               FORM (64-BYTE PAGES).  DISPLAYED VALUE IS IN
                                        ;               2048-BYTE PAGES, SO THE PAGE ADDRESS IS DIVIDED
                                        ;               BY 32, AND BUMPED TO SHOW ABSOLUTE MEMORY SIZE.
                                        
002716  005237  002204          400$:   INC     HELP2                   ;SET FLAG FOR SECOND QUESTION
                                        
002722  013701  002120                  MOV     L$HIMEM,R1              ;MOV HIGH PAGE ADDRESS TO R1
002726  000241                          CLC                             ;AND CLEAR CARRY BIT FOR FIRST SHIFT
002730  006001                          ROR     R1                      ;SHIFT RIGHT AND CLEAR SIGN
002732  006201                          ASR     R1                      ;ARITH SHIFT RIGHT
002734  006201                          ASR     R1                      ;HIGH PAGE
002736  006201                          ASR     R1                      ;TO INDICATE
002740  006201                          ASR     R1                      ;SIZE IN K WORDS
002742  005201                          INC     R1                      ;INCREMENT TO ABSOLUTE SIZE
002744  010137  002144                  MOV     R1,MSIZ                 ;AND SAVE FOR MESSAGE
```

```
                                ;       READ BUS TO DETERMINE WHAT TYPE
                                ;
002750                          600$:   READBUS                         ;READ BUS TYPE
002750  104407                          TRAP    C$RDBU
002752                                  BNCOMPLETE 620$                 ;BRANCH IF UNIBUS
002752  103012                          BCC     620$
                                ;
002754                                  PRINTB  #BUS1                   ;PRINT Q-BUS TTL
002754  012746  003136                  MOV     #BUS1,-(SP)
002760  012746  000001                  MOV     #1,-(SP)
002764  010600                          MOV     SP,R0
002766  104414                          TRAP    C$PNTB
002770  062706  000004                  ADD     #4,SP
002774  000137  003020                  JMP     650$                    ;AND CONTINUE
                                ;
003000                          620$:   PRINTB  #BUS2                   ;PRINT UNIBUS TTL
003000  012746  003153                  MOV     #BUS2,-(SP)
003004  012746  000001                  MOV     #1,-(SP)
003010  010600                          MOV     SP,R0
003012  104414                          TRAP    C$PNTB
003014  062706  000004                  ADD     #4,SP
                                ;
                                ;       PRINT TITLE AND HEADINGS
                                ;
003020                          650$:   PRINTB  #TTL1                   ;PRINT HEADER
003020  012746  003170                  MOV     #TTL1,-(SP)
003024  012746  000001                  MOV     #1,-(SP)
003030  010600                          MOV     SP,R0
003032  104414                          TRAP    C$PNTB
003034  062706  000004                  ADD     #4,SP
                                ;
003040                                  PRINTB  #TTL2,MSIZ              ;AND SYSTEM MEMORY SIZE
003040  013746  002144                  MOV     MSIZ,-(SP)
003044  012746  003223                  MOV     #TTL2,-(SP)
003050  012746  000002                  MOV     #2,-(SP)
003054  010600                          MOV     SP,R0
003056  104414                          TRAP    C$PNTB
003060  062706  000006                  ADD     #6,SP
                                ;
003064                                  PRINTB  #HDR1                   ;AND COLUMN HEADINGS
003064  012746  003271                  MOV     #HDR1,-(SP)
003070  012746  000001                  MOV     #1,-(SP)
003074  010600                          MOV     SP,R0
003076  104414                          TRAP    C$PNTB
003100  062706  000004                  ADD     #4,SP
                                ;
                                ;       SET TRAP VECTOR
                                ;
003104                          800$:   SETVEC  #4,#TRAP4,#PRIO7        ;SET-UP NEW SERVICE ROUTINE
003104  012746  000340                  MOV     #PRIO7,-(SP)
003110  012746  002310                  MOV     #TRAP4,-(SP)
003114  012746  000004                  MOV     #4,-(SP)
003120  012746  000003                  MOV     #3,-(SP)
003124  104437                          TRAP    C$SVEC
003126  062706  000010                  ADD     #10,SP
                                ;
003132                          1000$:  EXIT    INIT
```

E 7

SEQ 0030

INITIALIZE SECTION

```
        003132  104432                          TRAP    C$EXIT
        003134  000274                          .WORD   L10006 .
    171
```

TITLE AND HEADER FORMATS

```
                                                .SBTTL  TITLE AND HEADER FORMATS
003136      045     116     064  BUS1:   .ASCIZ  /%N4%S2%A  Q-/
003141      045     123     062
003144      045     101     040
003147      040     121     055
003152      000
003153      045     116     064  BUS2:   .ASCIZ  /%N4%S2%A UNI/
003156      045     123     062
003161      045     101     040
003164      125     116     111
003167      000

003170      045     101     102  TTL1:   .ASCIZ  /%ABUS ADDRESS TEST UTILITY/
003173      125     123     040
003176      101     104     104
003201      122     105     123
003204      123     040     124
003207      105     123     124
003212      040     125     124
003215      111     114     111
003220      124     131     000
003223      045     116     062  TTL2:   .ASCIZ  /%N2%AAVAILABLE MEMORY:    %D4%AK WORDS/
003226      045     101     101
003231      126     101     111
003234      114     101     102
003237      114     105     040
003242      115     105     115
003245      117     122     131
003250      072     040     040
003253      040     045     104
003256      064     045     101
003261      113     040     127
003264      117     122     104
003267      123     000
```

TITLE AND HEADER FORMATS

```
181 003271      045     116     062  HDR1:    .ASCIZ  /#N2#ADEVICE ADDRESS#S4#ASIZE IN WORDS#N1/
    003274      045     101     104
    003277      105     126     111
    003302      103     105     040
    003305      101     104     104
    003310      122     105     123
    003313      123     045     123
    003316      064     045     101
    003321      123     111     132
    003324      105     040     111
    003327      116     040     127
    003332      117     122     104
    003335      123     045     116
    003340      061     000
182
183 003342      120     122     111  HPMSG1: .ASCIZ  /PRINT SUPERVISOR HELP INFO/
    003345      116     124     040
    003350      123     125     120
    003353      105     122     126
    003356      111     123     117
    003361      122     040     110
    003364      105     114     120
    003367      040     111     116
    003372      106     117     000
184 003375      120     122     111  HPMSG2: .ASCIZ  /PRINT DIAGNOSTIC HELP INFO/
    003400      116     124     040
    003403      104     111     101
    003406      107     116     117
    003411      123     124     111
    003414      103     040     110
    003417      105     114     120
    003422      040     111     116
    003425      106     117     000
185
186                                          .EVEN
187
188 003430                                   ENDINIT
    003430                           L10006:
    003430  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.
                                ;--

003432                                  BGNAUTO
003432                          L$AUTO::

003432                                  ENDAUTO
003432                          L10007:
003432  104461                          TRAP    C$AUTO
```

```
                                .SBTTL  CLEANUP CODING SECTION

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

003434                                  BGNCLN
003434                          L$CLEAN::

003434                                  EXIT    CLN
003434  104432                          TRAP    C$EXIT
003436  000002                          .WORD   L10010-.

                                        .EVEN

003440                                  ENDCLN
003440                          L10010:
003440  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.
                                ;--

003442                                  BGNDU
003442                          L$DU::

003442                                  EXIT    DU
003442  000167                          .WORD   J$JMP
003444  000000                          .WORD   L10011-2-.

                                        .EVEN

003446                                  ENDDU
003446                          L10011:
003446  104453                          TRAP    C$DU
```

ADD UNIT SECTION

```
                                .SBTTL  ADD UNIT SECTION

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

003450                                  BGNAU
003450                          L$AU::

003450                                  EXIT    AU
003450  000167                          .WORD   J$JMP
003452  000000                          .WORD   L10012-2-.

                                        .EVEN

003454                                  ENDAU
003454                          L10012:
003454  104452                          TRAP    C$AU

003456                                  ENDMOD

                                .SBTTL
```

```
 1                                      .TITLE HARDWARE TESTS
12
13                                      .SBTTL  BUS CHECK PROCESSING
14
40                                              .ENABL  AMA
41
42 003456                               STARS
                                        ;;**********************************************************************
43                                      ;;
44                                      ;;      THIS TEST WILL REFERENCE ALL LOCATIONS OF THE I/O PAGE
45                                      ;;      AND CHECK FOR A DEVICE TIME-OUT IN EACH CASE.  ANY SINGLE
46                                      ;;      LOCATION OR RANGE OF LOCATIONS WHICH ARE NOT TRAPPED ARE
47                                      ;;      LISTED ALONG WITH THE SIZE OF THE REGION.
48                                      ;;
49 003456                               STARS
                                        ;;**********************************************************************
50
51 003456                                       BGNMOD  SECT5
   003456                               SECT5::
52
53 003456                                       BGNTST
   003456                               T1::
54
55                                      ;       TEST INITIALIZATION:    ADDRESS POINTER IS SET TO I/O PAGE
56
57 003456  012701  160000                       MOV     #IOPADR,R1              ;LOAD I/O PAGE BASE ADDRESS
58
59                                      ;       DEVICE INITIALIZATION:  DEVICE BASE ADDRESS IS RESET TO
60                                      ;                               THE CURRENT ADDRESS POINTER, AND
61                                      ;                               THE DEVICE REGION LENGTH IS CLEARED.
62
63 003462  005037  002152               100$:   CLR     COUNTR                  ;INITIALIZE LOCATION COUNTER
64
65 003466  010102                       150$:   MOV     R1,R2                   ;SAVE BASE ADDRESS POINTER
66
67                                      ;       ADDRESS PROCESS LOOP:   DEVICE ADDRESS IS ACCESSED, TEST FOR
68                                      ;                               LAST LOCATION AND BUS TIME-OUT.
69
70 003470  022701  000000               200$:   CMP     #0,R1                   ;TEST IF PTR PAST LAST ADDRESS
71 003474  001464                               BEQ     500$                    ;YES:  PROCESS LAST REGION
72
73 003476  005037  002154                       CLR     TRPFLG                  ;RESET TRAP FLAG BEFORE TEST
74 003502  005711                               TST     (R1)                    ;TEST NEXT LOCATION INDIRECT
75
76 003504  062701  000002               250$:   ADD     #2,R1                   ;AND INCREMENT POINTER
77 003510  005737  002154                       TST     TRPFLG                  ;TEST FOR BUS TIME-OUT
78 003514  001003                               BNE     300$                    ;YES:  PROCESS NEW TRAP
79
80 003516  005237  002152                       INC     COUNTR                  ;INCREMENT LOCATION COUNTER
81 003522  000762                               BR      200$                    ;AND CONTINUE
82
83 003524  005737  002152               300$:   TST     COUNTR                  ;TEST FOR TRAP ON PREVIOUS LOCATION
84 003530  001756                               BEQ     150$                    ;YES:  RESET BASE ADDRESS POINTER
85
```

```
 87                                     ;       DEVICE ADDRESS REGION PROCESSING:  ADDRESS AND WORD COUNT COMPUTED.
 88                                     ;
 89                                     ;               MSG1:   SINGLE ADDRESS REGION
 90                                     ;               MSG2:   MULTIPLE ADDRESS REGION
 91
 92 003532  010237  002146      400$:   MOV     R2,BASADR               ;SAVE BASE ADDRESS
 93 003536  013704  002152              MOV     COUNTR,R4               ;LOAD COUNTER
 94 003542  005304                      DEC     R4                      ;AND MAKE RELATIVE TO ZERO
 95 003544  001015                      BNE     450$                    ;TEST COUNTER
 96
 97                                     ;       SINGLE ADDRESS REGION DISPLAYED.
 98
 99 003546                      420$:   PRINTB  #DVMSG1,BASADR,COUNTR   ;PRINT SINGLE ADDRESS MESSAGE
    003546  013746  002152              MOV     COUNTR,-(SP)
    003552  013746  002146              MOV     BASADR,-(SP)
    003556  012746  004000              MOV     #DVMSG1,-(SP)
    003562  012746  000003              MOV     #3,-(SP)
    003566  010600                      MOV     SP,R0
    003570  104414                      TRAP    C$PNTB
    003572  062706  000010              ADD     #10,SP
100
101 003576  000731                      BR      100$                    ;AND EXIT
102
103                                     ;       MULTIPLE ADDRESS REGION DISPLAYED.
104
105 003600  006304              450$:   ASL     R4                      ;MULTIPLY COUNTER BY TWO
106 003602  060204                      ADD     R2,R4                   ;ADD BASE ADDRESS AND
107 003604  010437  002150              MOV     R4,LSTADR               ;SAVE LAST ADDRESSES FOR MESSAGE
108
109 003610                              PRINTB  #DVMSG2,BASADR,LSTADR,COUNTR    ;PRINT MESSAGE
    003610  013746  002152              MOV     COUNTR,-(SP)
    003614  013746  002150              MOV     LSTADR,-(SP)
    003620  013746  002146              MOV     BASADR,-(SP)
    003624  012746  004016              MOV     #DVMSG2,-(SP)
    003630  012746  000004              MOV     #4,-(SP)
    003634  010600                      MOV     SP,R0
    003636  104414                      TRAP    C$PNTB
    003640  062706  000012              ADD     #12,SP
110
111 003644  000706                      BR      100$                    ;AND EXIT
```

BUS CHECK PROCESSING

```
                                        ;       PROCESS LAST LOCATION OR REGION:  COMPUTE REGION ADDRESS
                                        ;                                         AND LOCATION COUNT.
                                        ;
                                        ;               MSG1:   SINGLE ADDRESS REGION
                                        ;               MSG2:   MULTIPLE ADDRESS REGION

003646  005737  002152          500$:   TST     COUNTR                  ;TEST FOR VALID ADDRESS
003652  001445                          BEQ     1000$                   ;NO:  EXIT

003654  010237  002146                  MOV     R2,BASADR               ;SAVE BASE ADDRESS
003660  013704  002152                  MOV     COUNTR,R4               ;LOAD COUNTER
003664  005304                          DEC     R4                      ;AND MAKE RELATIVE TO ZERO
003666  001015                          BNE     550$                    ;TEST COUNTER

                                        ;       SINGLE ADDRESS REGION DISPLAY.

003670                          520$:   PRINTB  #DVMSG1,BASADR,COUNTR   ;PRINT SINGLE ADDRESS MESSAGE
003670  013746  002152                  MOV     COUNTR,-(SP)
003674  013746  002146                  MOV     BASADR,-(SP)
003700  012746  004000                  MOV     #DVMSG1,-(SP)
003704  012746  000003                  MOV     #3,-(SP)
003710  010600                          MOV     SP,R0
003712  104414                          TRAP    C$PNTB
003714  062706  000010                  ADD     #10,SP

003720  000422                          BR      1000$                   ;AND EXIT

                                        ;       MULTIPLE ADDRESS REGION DISPLAY.

003722  006304                  550$:   ASL     R4                      ;MULTIPLY COUNTER BY TWO
003724  060204                          ADD     R2,R4                   ;ADD BASE ADDRESS AND
003726  010437  002150                  MOV     R4,LSTADR               ;SAVE LAST ADDRESSES FOR MESSAGE

003732                                  PRINTB  #DVMSG2,BASADR,LSTADR,COUNTR    ;PRINT MESSAGE
003732  013746  002152                  MOV     COUNTR,-(SP)
003736  013746  002150                  MOV     LSTADR,-(SP)
003742  013746  002146                  MOV     BASADR,-(SP)
003746  012746  004016                  MOV     #DVMSG2,-(SP)
003752  012746  000004                  MOV     #4,-(SP)
003756  010600                          MOV     SP,R0
003760  104414                          TRAP    C$PNTB
003762  062706  000012                  ADD     #12,SP
```

BUS CHECK PROCESSING

```
                                ;       PROCESS TEST EXIT:      RESTORE OLD SERVICE ROUTINE.
                                
003766                          10008:  CLRVEC  #4                      ;RESTORE OLD ISR
003766  012700  000004                  MOV     #4,R0
003772  104436                          TRAP    C$CVEC
                                
003774                                  EXIT    TST                     ;AND EXIT FROM TEST
003774  104432                          TRAP    C$EXIT
003776  000050                          .WORD   L10013 .
                                
                                        .EVEN
```

BUS CHECK PROCESSING

```
151                                     ;       TEST MESSAGE FORMATS
152
153 004000      045     116     061     DVMSG1: .ASCIZ  /%N1%06%S21%D4/
    004003      045     117     066
    004006      045     123     062
    004011      061     045     104
    004014      064     000
154 004016      045     116     061     DVMSG2: .ASCIZ  /%N1%06%A -> %06%S11%D4/
    004021      045     117     066
    004024      045     101     040
    004027      055     076     040
    004032      045     117     066
    004035      045     123     061
    004040      061     045     104
    004043      064     000
155                                             .EVEN
156
157 004046                                      ENDTST
    004046                              L10013:
    004046  104401                              TRAP    C$ETST
158
159 004050                                      ENDMOD
160
161                                     .SBTTL
```

```
                                .TITLE PARAMETER CODING
                                .SBTTL  HARDWARE PARAMETER CODING SECTION
004050                                  BGNMOD  SECT6
004050                          SECT6::
                                ;++
                                ; 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.
                                ;--
004050                                  BGNHRD
004050  000000                          .WORD L10014-L$HARD/2
004052                          L$HARD::
004052                                  ENDHRD
                                        .EVEN
004052                          L10014:
                                        .EVEN
```

```
                                .SBTTL  SOFTWARE PARAMETER CODING SECTION

                                ;++
                                ; THE SOFTWARE PARAMETER CODING SECTION CONTAINS MACROS
                                ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
                                ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
                                ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
                                ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
                                ; WITH THE OPERATOR.
                                ;--

004052                                  BGNSFT
004052  000000                          .WORD L10015-L$SOFT/2
004054                          L$SOFT::

                                        .EVEN

004054                                  ENDSFT
                                        .EVEN
004054                          L10015:

004054                          $PATCH::
004054                                  .BLKW   10

004074                                  LASTAD
                                        .EVEN
004074  004106                          .WORD T$FREE
004076  000003                          .WORD T$SIZE
004100                          L$LAST::

004100                          ENDMOD
```

P TABLE SETUP SECTION

```
                                .SBTTL  P TABLE SETUP SECTION

004100                          BGNSETUP        1               ;ONE P TABLE

004100                          BGNPTAB                         ;P TABLE START
004100  000000                  .WORD   0
004102  000001                  .WORD   L10020-./2 1
004104                  L10016:

004104  000000                  .WORD   0                       ;DUMMY TABLE VALUE

004106                          ENDPTAB                         ;P TABLE END
004106                  L10020:

004106                          ENDSETUP                        ;END OF SETUP

        000001          .END
```

SEQ 0045

SYMBOL TABLE

```
ADR    = 000020 G      C$ERSO= 000057      F$MOD  = 000000      I$RPT  = 000041      L$RPT   002650 G
ASSEMB= 000010         C$ESCA= 000010      F$MSG  = 000011      I$SEG  = 000041      L$SOFT  004054 G
BASADR  002146 G       C$ESEG= 000005      F$PROT= 000021       I$SETU= 000041       L$SPC   002056 G
BIT0   = 000001 G      C$ESUB= 000003      F$PWR  = 000017      I$SFT  = 000041      L$SPCP  002020 G
BIT00  = 000001 G      C$ETST= 000001      F$RPT  = 000012      I$SRV  = 000041      L$SPTP  002024 G
BIT01  = 000002 G      C$EXIT= 000032      F$SEG  = 000003      I$SUB  = 000041      L$STA   002030 G
BIT02  = 000004 G      C$GETB= 000026      F$SOFT= 000005       I$TST  = 000041      L$SW    002134 G
BIT03  = 000010 G      C$GETW= 000027      F$SRV  = 000010      J$JMP  = 000167      L$TEST  002114 G
BIT04  = 000020 G      C$GMAN= 000043      F$SUB  = 000002      LF     = 000012      L$TIML  002014 G
BIT05  = 000040 G      C$GPHR= 000042      F$SW   = 000014      LINBUF  002556       L$UNIT  002012 G
BIT06  = 000100 G      C$GPLO= 000030      F$TEST= 000001       LINE    002554       L10000  002132
BIT07  = 000200 G      C$GPRI= 000040      G$CNTO= 000200       LOE    = 040000 G    L10001  002136
BIT08  = 000400 G      C$INIT= 000011      G$DELM= 000372       LOT    = 000010 G    L10002  002306
BIT09  = 001000 G      C$INLP= 000020      G$DISP= 000003       LSTADR  002150 G     L10003  002324
BIT1   = 000002 G      C$MANI= 000050      G$EXCP= 000400       L$ACP   002110 G     L10004  002654
BIT10  = 002000 G      C$MEM  = 000031     G$HILI= 000002       L$APT   002036 G     L10006  003430
BIT11  = 004000 G      C$MSG  = 000023     G$LOLI= 000001       L$AU    003450 G     L10007  003432
BIT12  = 010000 G      C$OPEN= 000034      G$NO   = 000000      L$AUT   002070 G     L10010  003440
BIT13  = 020000 G      C$PNTB= 000014      G$OFFS= 000400       L$AUTO  003432 G     L10011  003446
BIT14  = 040000 G      C$PNTF= 000017      G$OFSI= 000376       L$CCP   002106 G     L10012  003454
BIT15  = 100000 G      C$PNTS= 000016      G$PRMA= 000001       L$CLEA  003434 G     L10013  004046
BIT2   = 000004 G      C$PNTX= 000015      G$PRMD= 000002       L$CO    002032 G     L10014  004052
BIT3   = 000010 G      C$QIO  = 000377     G$PRML= 000000       L$DEPO  002011 G     L10015  004054
BIT4   = 000020 G      C$RDBU= 000007      G$RADA= 000140       L$DESC  002250 G     L10016  004104
BIT5   = 000040 G      C$REFG= 000047      G$RADB= 000000       L$DESP  002076 G     L10020  004106
BIT6   = 000100 G      C$RESE= 000033      G$RADD= 000040       L$DEVP  002060 G     MPTR    002142 G
BIT7   = 000200 G      C$REVI= 000003      G$RADL= 000120       L$DISP  002124 G     MSIZ    002144 G
BIT8   = 000400 G      C$RFLA= 000021      G$RADO= 000020       L$DLY   002116 G     ONEFIL= 000001
BIT9   = 001000 G      C$RPT  = 000025     G$XFER= 000004       L$DTP   002040 G     OVRFLO= 000002 G
BLK    = 000040        C$SEFG= 000046      G$YES  = 000010      L$DTYP  002034 G     O$APTS= 000000
BOE    = 000400 G      C$SPRI= 000041      HDR1    003271       L$DU    003442 G     O$AU  = 000000
BUSTMO= 000020 G       C$SVEC= 000037      HELP   = 000000      L$DUT   002072 G     O$BGNR= 000000
BUS1    003136         C$TPRI= 000013      HELP1   002202 G     L$DVTY  002230 G     O$BGNS= 000000
BUS2    003153         DFPTBL  002130 G    HELP2   002204 G     L$EF    002052 G     O$DU  = 000000
COUNTR  002152 G       DIAGMC= 000000      HLPFLG  002160 G     L$ENVI  002044 G     O$ERRT= 000000
CPUADR= 177766 G       DMP     002326 G    HOE    = 100000 G    L$ETP   002102 G     O$GNSW= 000000
CR     = 000015        DVMSG1  004000      HPFIL1  002206 G     L$EXP1  002046 G     O$POIN= 000001
C$AU   = 000052        DVMSG2  004016      HPFIL2  002216 G     L$EXP4  002064 G     O$SETU= 000001
C$AUTO= 000061         EF.CON= 000036 G    HPMSG1  003342       L$EXP5  002066 G     PLOC    002136 G
C$BRK  = 000022        EF.NEW= 000035 G    HPMSG2  003375       L$HARD  004052 G     PNT    = 001000 G
C$BSEG= 000004         EF.PWR= 000034 G    IBE    = 010000 G    L$HIME  002120 G     PRI    = 002000 G
C$BSUB= 000002         EF.RES= 000037 G    IDU    = 000040 G    L$HPCP  002016 G     PRI00  = 000000 G
C$CEFG= 000045         EF.STA= 000040 G    IER    = 020000 G    L$HPTP  002022 G     PRI01  = 000040 G
C$CLCK= 000062         EOL     002646      IOPADR= 160000 G     L$HW    002130 G     PRI02  = 000100 G
C$CLEA= 000012         EVL    = 000004 G   ISR    = 000100 G    L$ICP   002104 G     PRI03  = 000140 G
C$CLOS= 000035         E$END  = 002100     IXE    = 004000 G    L$INIT  002664 G     PRI04  = 000200 G
C$CLP1= 000006         E$LOAD= 000035      I$AU   = 000041      L$LADP  002026 G     PRI05  = 000240 G
C$CVEC= 000036         F$AU   = 000015     I$AUTO= 000041       L$LAST  004100 G     PRI06  = 000300 G
C$DCLN= 000044         F$AUTO= 000020      I$CLN  = 000041      L$LOAD  002100 G     PRI07  = 000340 G
C$DODU= 000051         F$BGN  = 000040     I$DU   = 000041      L$LUN   002074 G     PSWADR= 177776 G
C$DRPT= 000024         F$CLEA= 000007      I$HRD  = 000041      L$MREV  002050 G     REG0    002162 G
C$DU   = 000053        F$DU   = 000016     I$INIT= 000041       L$NAME  002000 G     REG1    002164 G
C$EDIT= 000003         F$END  = 000041     I$MOD  = 000041      L$PRIO  002042 G     REG2    002166 G
C$ERDF= 000055         F$HARD= 000004      I$MSG  = 000041      L$PROT  002656 G     REG3    002170 G
C$ERHR= 000056         F$HW   = 000013     I$PROT= 000040       L$PRT   002112 G     REG4    002172 G
C$ERRO= 000060         F$INIT= 000006      I$PTAB= 000041       L$REPP  002062 G     REG5    002174 G
C$ERSF= 000054         F$JMP  = 000050     I$PWR  = 000041      L$REV   002010 G     REG6    002176 G
```

```
PARAMETER CODING        MACRO M1200  22-DEC 83 15:23  PAGE 46-2                                                    SEQ 0046

SYMBOL TABLE

REG7    002200 G        TABFLG  002156 G        T$NSO = 000000          T$TSTM= 177777          T$$RPT= 010004
SECT2   002000 G        TRAP4   002310 G        T$NS1 = 000005          T$TSTS= 000001          T$$SOF= 010015
SECT3   002136 G        TRPFLG  002154 G        T$PCNT= 000000          T$$AU = 010012          T$$SRV= 010003
SECT4   002650 G        TTL1    003170          T$PTAB= 010017          T$$AUT= 010007          T$$SW = 010001
SECT5   003456 G        TTL2    003223          T$PTHV= 000001          T$$CLE= 010010          T$$TES= 010013
SECT6   004050 G        T$ARGC= 000004          T$PTNU= 000001          T$$DAT= 010020          T1      003456 G
SFPTBL  002134 G        T$ERRN= 000000          T$SAVL= 177777          T$$DU = 010011          UAM   = 000200 G
SVCGBL= 000000          T$FLAG= 000040          T$SEGL= 177777          T$$HAR= 010014          UNIT    002140 G
SVCINS= 000000          T$FREE= 004106          T$SIZE= 000003          T$$HW = 010000          X$ALWA= 000000
SVCSUB= 000000          T$GMAN= 000000          T$SUBN= 000000          T$$INI= 010006          X$FALS= 000040
SVCTAG= 000000          T$LAST= 000001          T$TAGL= 177777          T$$MSG= 010002          X$OFFS= 000400
SVCTST= 000000          T$LSYM= 010000          T$TAGN= 010021          T$$PC = 000001          X$TRUE= 000020
S$LSYM= 010000          T$LTNO= 000001          T$TEMP= 000000          T$$PRO= 010005          $PATCH  004054 G
TAB   = 000011          T$NEST= 177777          T$TEST= 000001          T$$PTA= 010017

. ABS.  004106      000
        000000      001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  28352 WORDS  ( 111 PAGES)
DYNAMIC MEMORY:  20060 WORDS  ( 77 PAGES)
ELAPSED TIME:  00:02:02
ZFPCA0.BIC,CZFPCA0/-SP=SVC/ML,ZFPCA01,ZFPCA02,ZFPCA03,ZFPCA04,ZFPCA05,ZFPCA06
.
```